THE ROLE OF TECHNOLOGY AS A DETERMINANT OF INDUSTRIAL WORK GROUP BEHAVIOR

by

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ABSTRACT

This is a study investigating employee behavior within the work group as structured by the technology utilized in the work process. While it is true that factors other than the form of technology influence work group behavior, a sincere attempt is made to reveal the frequency and type of behavior that may be attributed to a particular educational form. It is assumed that a plant has specific types of technology, that is, the technology is set; therefore, the question is what behavior will result from a specific technology, given a certain mix of variables?

The object of this study based on Sayles' Behavior of Industrial Work Groups, Walker and Guest's The Man on the Assembly Line, and Blauner's Alienation and Freedom is threefold:

1. To investigate the direct influence of technological characteristics on organizationally relevant behavior. The technological characteristics deemed meaningful are the form of transfer technology binding the group, the form of conversion technology involved in product manufacture, and the number of cycles per hour passing through the group. The technologically dependent factors expressed in organizationally relevant behavior are the degree of grievance and pressure activity, the number of unplanned spontaneous outbursts, the participation of the group in union activities, the amount of voluntary turnover, and the degree of absenteeism.

2. To investigate the influence of technological characteristics on the behavioral consequences of the technology. The behavioral consequences of the technology are the intervening variables that are associated with a particular technological form and may influence the ultimate behavior pattern. They are: attention requirements of the job, frequency of break

in the job routine, mobility of workers in the group, work standards involving judgment, the degree of conversation, group status, and group cohesiveness.

3. To investigate the influence of the behavioral consequences of the technology on organizationally relevant behavior.

The method of investigation is through the direct observation of the aforementioned variables as recorded on a predetermined scale. The direct observations are then supplemented by descriptive information obtained from an interview schedule with first level supervisors and other levels of management. The results of these methods of investigation are presented in the body of the thesis.

The general conclusions reached are as follows:

1. No direct trend relationship is found between the degree of technological characteristics and the degree of organizationally relevant behavior. On the whole, a curvilinear relationship between the technological form and organizationally relevant behavior as described by Blauner in Alienation and Freedom is discernable; however, there are many exceptions.

2. The degree of the behavioral consequences of the technology such as attention requirements of the job, frequency of break in the job routine, mobility of workers in the group, work standards involving judgment, and the degree of verbal communication are found to be related to the form of technology. However, no relationship was found between the degree of status or cohesion and technological form.

3. The behavioral consequences of the technology such as attention requirements of the job, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment play an im-

portant role in explaining work group behavior. In-group communication, and group cohesiveness have little influence on organizationally relevant behavior.

"The technology of modern industry and commerce is the most single important determinant of who does what kind of work, when, and in what manner."

Robert Dubin
The World of Work
Englewood Cliffs, N.J.
Prentice Hall Inc., p.169

TABLE OF CONTENTS

LIST OF TABLES

LIST OF EXHIBITS

ACKNOWLEDGEMENT

In our economic era it has been said that the utilization of human resources is of prime importance in industry and that an organization without its people is analogous to an animal void of its lifeblood. Therefore, it is to the people in all positions of the organizational hierarchy that I am indebted. I offer my sincerest appreciation for their co-operation and assistance.

Outside of the organizational framework, my gratitude is extended to the members of professional associations and unions who enhanced my study. Also, I cannot speak highly enough of the members of my family and my wife who were prime motivating factors.

CHAPTER I

DESCRIPTION OF THE PROBLEM

The purpose of this study is to explore factors which contribute to industrial work group behavior, especially those which explain differences in behavior as manifested by various work groups. In a specific context, I wish to investigate the relationship of employee behavior to the work group as structured by the technology utilized; that is, what is the role of technology in determining behavior in different work groups?

For the purpose of this study, I will refer to the technology of the plant as the manner in which work tasks are divided and distributed. This encompasses the interrelation or flow of these tasks into one another and the way in which men are brought together to perform them. This paper, therefore, will be concerned only with the part technology plays in shaping behavior, and environmental factors such as customs, social sentiments, number of orders, business cycles, etc., will only be analyzed to the extent they interact with technology. It will be assumed that the plant has specific types of technology, that is, the technology is set; therefore the question is what behavior will result from a specific technology, given a certain mix of variables?

The groups utilized in this study are taken from a survey of industry in the Vancouver area. The basic criterion for establishing a group is that the work positions are linked by technology or propinquity as defined by some natural subdivision. (A "natural subdivision" may be an area as defined by technological process or spatial relationship to the rest of the plant.) This does not necessarily mean that members of a group can see one another or talk with one another but that the group is linked by the technology and spatially separated from other areas of the plant.

The other method utilized by researchers[1] in this field is to define a group as all those people reporting to the same immediate supervisor and working on the same shift; in other words, an administrative unit. However, in the extreme form where work groups are thirty or more, some natural boundary is then sought. Very few industries in this locale have technologically defined groups of larger than twelve in number while in many smaller plants a supervisor may be responsible for more than one work area. The criterion of natural boundaries for studying group interactions seems the most adequate for this locale.

The merits of this definition may not seem too evident for such technologically and spatially separated groups such as machinists and furnace crews but certainly are important in establishing work groups in large operations such as sawmills and telephone repair shops. In these areas, the job product passes through many different processes involving many employees before it is completed. Here, the form of technology utilized and plant size or propinquity of employees best describes which employees interact in each group both for technologically required and permitted co-operation.

For example, in one mill a barker to head sawyer group and edgeman to sorter group was discernable while in a large mill a head sawyer to trim sawyer group was distinguishable under this definition. In fact, the employees in these areas were described by management as having different degrees of organizationally relevant behavior (turnover, absenteeism, grievance and pressure activity, spontaneous outbursts, and pressure activities).

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[1] Merrihue, W.V. & Katzell, R.A., E.R.I. - Yardstick of Employee Relations, Harvard Business Review, Vol.33 No.6, 1955, pp.91-99.

Unfortunately, the definition of natural subdivisions as established by technology and propinquity does not hold for all work groups. It fails to recognize such functions as crane operators, maintenance crews, and inspection teams as work groups. While these employees may not work side by side, they do interact with one another both on a formal and informal basis. In this context, the group whose behavior is determined by the work process may vary depending on the task it performs. For instance, maintenance crews work with similar tools and may perform similar tasks. I will be concerned with groups as defined by a natural subdivision and by the task performed in order to ensure that a diversified sample is utilized.

This study will attempt to review the effect of technology on work group behavior through identifiable variables. The independent variables that are associated with a specific technology will be investigated and their relevance to exhibited group behavior elucidated. The format for analyzing technologically associated factors was adapted from that of Dr. M. Meissner.[2]

The first set of factors relates directly to the form of technology in which the group is involved, namely transfer technology, conversion technology, and operation cycles. Transfer technology relates to the actual process that binds the group starting with no transfer and progressing through hand transfer (hand, hand trucks), automotive transfer (motor trucks etc.), dead line and steered line (rollers, cranes, remote controlled conveyors), and live line (overhead conveyors and transfer machines with

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2 Meissner, M., "Behavioral Adaptations to Industrial Technology," A Doctoral Thesis in the process of being published, University of Oregon, 1963.

continuous movement). Conversion technology relates to the actual function the worker performs in the overall process, for example, tightening a bolt versus finishing material to high tolerances on a lathe. This form of technology is also rated by five factors: no conversion, hand tools, machine tools, steered automatics, and self-regulating automatics. Operative cycles are rated from zero to infinity for each group and also on a scale of no regular cycles, regular cycles with the same frequency for the group, regular cycles with a different frequency in the group, and continuous. The measurement is made in terms of cycles per hour passing through the work group involving both frequency and length of cycles as meaningful variables.

One can note the scalar progression that may be attained by using this rating method. Work groups may be arranged in accordance to the degree of technological involvement. A group working in forms of technology involving hand transfer and no conversion methods may be distinguished in a systematic manner from a group working in a live line, self regulating, continuous process technology.

The second set of factors investigated are those intervening factors that arise out of the form of technology (independent variables) and thus affect the ultimate behavior pattern. These behavioral consequences of the technology are, attention requirements needed to carry out the job processes required of the group as a whole, mobility for technically required and permitted co-operation, degree of judgment needed to perform the required functions, frequency of breaks in the job routine, and conversation within and outside the group as allowed by the technology. Such constraints as noise level and visual barriers, and the size of the group are

also investigated. These factors are rated in a similar manner to those describing the technology and their exact form will be elucidated later.

Measurements of individual and group status are deemed important for an intragroup and intergroup comparison of technically associated behavior. For this purpose four elements of status are studied; the position of group members on the promotional ladder, seniority, exclusiveness of task, and the length of learning time to perform a function.

Cohesiveness or the attractiveness of a group for its members is also an important behavioral consequence of the technology as it may be related to the opportunity for interaction as determined by visual restrictions, noise level, mobility within the work group, and attention requirements of the job. Group size may also be a factor in this area as large groups with many interaction restrictions may be less cohesive than smaller groups which have similar restrictions but have a greater degree of attraction through greater total group involvement.

The final set of factors investigated are the dependent variables associated with a particular form of technology. These dependent factors are expressed in organizationally relevant behavior and may be measured by the degree of grievance and pressure activity, the number of unplanned spontaneous outbursts, the participation of the group in union activities, the amount of voluntary turnover, and the frequency and length of absenteeism. Group behavior as measured by these factors may be investigated in relation to the technological characteristics of transfer technology, conversion technology, and cycles, encountered by a work group. Organizationally relevant group behavior may also be related to the behavioral consequences of the technology as indicated by the effects of mobility,

attention requirements, and other studied behavioral consequences of the technology.

Exhibit I elucidates the relationship between the plant technology and the resulting behavior of the group. The economic and cultural environment (e.g., business conditions, customs, social sentiments, etc.) do play a role, even though seemingly minor at times, in forming the basic type of technology the plant will utilize. The technology (transfer and conversion technology) dictates the formal group structure. Interplay between the formal group structure as determined by the technology and the economic and cultural environment affects the formation of the informal group and its associated behavior. Employee perception of power or problems and the resultant pressure extended by the work group on the firm is manifested in the degree of productivity release and employment stability as measured by voluntary absenteeism and turnover. This in turn affects the economic and cultural environment of the area and the organization and also has a direct effect on in-plant formal group structure.

An explanation and description of the chosen factors will be presented in the ensuing chapters. Exhibit II depicts the studied relationship between technological characteristics, behavioral consequences of the technology, and organizationally relevant behavior. The study will be organized into three main sets of predictions:

I The direct influence of technological characteristics on organizationally relevant behavior.

II The direct influence of technological characteristics on the behavioral consequences of the technology.

EXHIBIT I

THE PERCEIVED RELATIONSHIP BETWEEN PLANT TECHNOLOGY AND THE RESULTING BEHAVIOR OF A GROUP

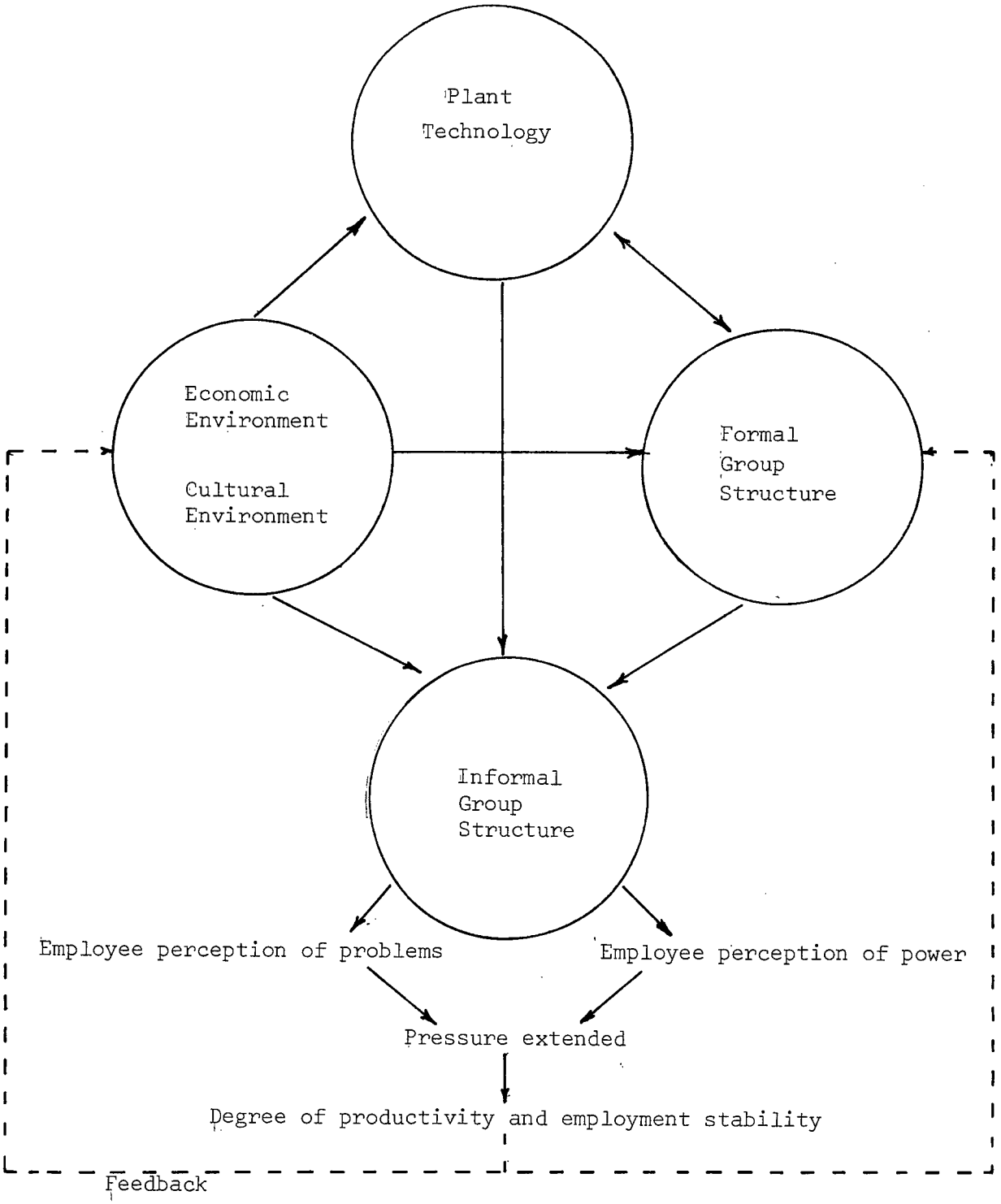

EXHIBIT II

ORGANIZATION OF THE INVESTIGATED VARIABLES

A. Technological Characteristics

1. Transfer technology (five degrees)
2. Conversion technology (four types)
3. Cycles per hour (five degrees)

I →

B. Organizationally Relevant Behavior

1. Grievance and pressure activity
2. Spontaneous outbursts
3. Participation in union activities
4. Management evaluation of the group
5. Turnover
6. Absenteeism

II

III

C. Behavioral Consequences of the Technology

1. Attention requirements
2. Frequency of break in the job routine
3. Worker mobility
4. Judgment required
5. Frequency of interaction
6. Group status
7. Group size
8. Group cohesiveness

III Influences of behavioral consequences of technology on organizationally relevant behavior.

Chapter II will delve into pertinent hypotheses and studies that involve the direct influence of technological characteristics on organizationally relevant behavior (Area I in Exhibit II). Chapter III will discuss the methodology of the study, while Chapter IV will depict the results of testing the hypotheses formulated in Area I in Exhibit II. Chapter V will discuss how the technological characteristics relate to the intervening behavioral consequences of the technology (Area II in Exhibit II). Chapter VI will be concerned with hypotheses on the influences of behavioral consequences of technology on organizationally relevant behavior (Area III in Exhibit II) followed by Chapter VII where the results of this area will be discussed. Chapter VIII will describe and interpret the conclusions of the study.

A sociological study of this nature may be of scientific interest but at first glance may seem to be of little practical importance. It is extremely interesting for science's sake to study why groups associated with one form of technology may exhibit a certain type of behavior as compared with groups working in another form of technology. It is my contention, however, that this type of study also has very real practical implications. If the relationship between technological form and specific types of group behavior can be established, the production of effective processes and performance in the organization as a whole may be attained. The variables depicted in this study may be utilized by management as a forewarning to the reaction of workers placed in a specific area and adjustments may be taken to create better work patterns. In this manner

it is hoped that, given certain technologically associated variables, worker reaction to union or management programs may be forecasted.

Most of the literature in this area is descriptive rather than experimental. The mathematics of graph theory and applications have been developed to a considerable degree, but mostly in pure mathematical state rather than related to the actual setting in which the behavior occurs.[3] When this research is coupled with the fact that much of the information associated with the resultant group behavior is of a confidential nature to the companies involved, only limited use may be made of the mathematical approach to organizational group dynamics. It must therefore be emphasized that this study is purely exploratory, as in addition to the above, the sample is not a random one; rather it is only representative of one locale, and the testing techniques applied by the author are only at the most very cursory in comparison with more sophisticated measurement techniques applicable to this situation. However, even if no conclusive statistical evidence can be offered to validate the hypotheses presented, the wealth of evidence contained herein should be sufficient to direct attention to the factors considered and at the very least, to promote further research in this area.

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[3] Flament, C., Applications of Graph Theory to Group Structure, Englewood Cliffs, Prentice Hall, 1963.

CHAPTER II

HYPOTHESES CONCERNING THE DIRECT INFLUENCE OF TECHNOLOGY ON ORGANIZATIONALLY RELEVANT BEHAVIOR

Through investigating the hypothesis, "that a group's behavior in the plant is a product of its inherent ability to function in a certain way," Leonard R. Sayles[4] examined the causal factors relating to intergroup and intragroup behavior as indicated in Exhibit III.

From these apparently technologically associated factors, he observed work group behavior, which he classified into five categories:

1. Over-all level of grievance and pressure activity
2. Number of unplanned spontaneous outbursts
3. Degree of internal unity (cohesiveness)
4. Participation in union activities
5. Management evaluation of groups as satisfactory employees.

By observing more than three hundred groups in different industrial settings and specifically exploring the intergroup and intragroup factors as affecting these five categories of work groups' behavior, he identified four basic group behavior types; apathetic, erratic, strategic, and conservative. Each of these group types was affected to different degrees by the intergroup and intragroup technologically associated factors which gave four distinguishable behavior patterns as shown in Exhibit IV.

It is with the technological factors that are associated with a specific technology and their effect on group behavior that this study will be basically concerned, and not with attempting to identify the number

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[4] Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, p. 42.

EXHIBIT III

SAYLES' FACTORS OF INTER-GROUP COMPARISON	SAYLES' FACTORS OF INTRA-GROUP COMPARISON
1. Position on promotional ladder, (status of the group)	1. Differentiation of the task (as affecting grievance reinforcement and social structure)
2. Size of work group	2. Frequency of interaction (as affecting group structure)
3. Relative internal homogeneity	3. Problem of gaining agreement on output standards in the interdependent group
4. Essentialness of their function	4. Impact of internal social life or participation in outside activities
5. Work standards involving judgment	5. Impact of work flow on group leadership
6. Repetitiveness of the task	6. Internal unity in interdependent versus individual work operations
7. Compactness of the work area (men to machine ratio)	
8. Sex differences	
9. Hours of work	

EXHIBIT IV

SAYLES' GROUP TYPE AND CHARACTERISTIC BEHAVIOR

1. APATHETIC

Characteristic of Low Skilled or Long Assembly Line Jobs.

Behavior:

a) relatively few grievances or pressure tactics

b) lack of clearly identified or accepted leadership

c) internal disunity and frictions

d) evidence of suppressed discontent

2. ERRATIC

Characteristic of Jobs with Identical Tasks, Homogeneous Crews or Short Assembly Lines

Behavior:

a) easily inflamed

b) poorly controlled pressure tactics

c) quick conversions to good relations with management

d) often highly centralized leadership

e) active in organizational phase of union

EXHIBIT IV (Cont'd.)

3. STRATEGIC

Characteristic of Individual Worker Controlled Jobs.

Behavior:

a) continuous pressure

b) well planned and consistent grievance activity

c) high degree of internal unity

d) relatively good production records over the long run, not all groups though.

4. CONSERVATIVE

Characteristic of Top Rungs of Promotional and Status Ladders of the Plant--Usually Individual Operations.

Behavior:

a) restrained pressure for highly specific objectives

b) moderate internal unity and self assurance

c) activity - inactivity cycles in terms of union activities and plant grievance procedures

of behaviorally distinguishable groups that exist through the technological progression. However, if Sayle's behavioral groups are distinguishable through an independent approach such as this, it is my hope that the results will be more useful than if a direct approach toward proving the existence of four technologically determined behavioral groups were taken.

Walker and Guest[5] investigated the following technologically influenced factors as affecting employee turnover and absenteeism:

1. The degree of repetitiveness
2. The degree of mechanical pacing
3. Skill as measured by length of learning time
4. Frequency of break in job routine
5. Frequency of social interaction
6. Size of interacting group

They found a statistically significant association between absenteeism and mass production characteristics as well as turnover and mass production characteristics. (Where mass production characteristics are associated with a high degree of mechanical pacing, repetitiveness, and low social interaction.) From these results one might hypothesize that employee dissatisfaction as measured by absenteeism and turnover is great in technologies possessing a high degree of mass production characteristics (continuous cycles, high degree of mechanical pacing, and repetitiveness.) It may follow that mass production technologies restrict employee interaction and their unity as a group may be less than in lower technological forms.

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[5] Walker, C.R., and Guest, R.H., The Man on the Assembly Line, Cambridge, Mass., Harvard University Press, 1952.

Faunce[6] examined the independent variables that arise from the technology, such as, the amount of attention required by the job, the distance between work stations, and the extent of control of the work pace, as those having important effects upon the frequency and nature of social interaction. He was able to derive that as a result of changes in production techniques in the "automated" plant (involving continuous processes and integration of production work processes) the combination of the above variables changed considerably so that social interaction was inhibited to a greater extent.

Blauner,[7] in his work on alienation, investigates four technologically different industries; printing, textiles, automobile manufacture, and chemical production. The printing industry is representative of craft work where an employee may do individual job work with little or no transfer and a combination of hand and machine conversion. The textile industry is a machine industry with standardized products rather than a craft industry like printing. Again, there may be little or no transfer of product between employees; however, the conversion technology is characterized by semiautomatic spinning frames and automatic looms. Automobile manufacture is typical of assembly line or mass technologies with greater division of labor, steered line and live line transfer, and hand and machine conversion. Chemical production is characteristic of process industries where live line transfer of the product does take place as the

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6 Faunce, W.A., "Automation in the Automobile Industry: Some Consequences for In-Plant Social Structure," American Sociological Review, 23, 1958, pp. 401-407.

7 Baluner, Robert, Alienation and Freedom, Chicago, University of Chicago Press, 1964.

chemicals and oils flow through pipes from one stage of processing to another, but usually without being handled by the employees. In this respect, steered and self-regulating automatics are the main types of conversion in the continuous process industries.

In analyzing the meaning of work to the employee in each of these technologies, Blauner states, "There is little meaninglessness in craft production because each craftsman makes a contribution to a unique product. In continuous-process production there is little alienation of this type because each operator contributes a unique function in the processing of a standardized product. Meaninglessness is most intensified on the automobile assembly line because both the product and the function of the individual worker is so highly standardized."[8]

On the basis of these findings, the primary hypothesis relating technological characteristics with organizationally relevant behavior (Area I in Exhibit II) is that grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, voluntary turnover, and absenteeism will be low in forms of technology involving no transfer, hand transfer, and automotive transfer as the technology linking the group; no conversion, hand tools, and employee operated machine tools as the source of conversion; and no regular cycles or employee controlled cycles in the work process. The degree of the described organizationally relevant behavior will increase in technologies involving dead line and steered line, and live line transfer methods; steered and self regulating conversion processes; and regular cycles. However, in the extreme techno-

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[8] Ibid., p. 173.

logical form of live line transfer, steered and self-regulating conversion, and continuous cycles which is characteristic of process industries, the degree of the aforementioned organizationally relevant behavioral factors will diminish from the previous level.

One would also expect that management's evaluation of the work group as satisfactory employees will be the inverse of the above relationships and therefore, management's satisfaction will be greater for groups at the extremes of the technological scale and less for groups in the middle range.

In summary, the variables investigated in this area will be of two types; those relating to the technological characteristics and those describing organizationally relevant behavior. The technological characteristics will be analyzed on the basis of the degree of transfer technology linking the members of the group. (No transfer, hand transfer, automotive transfer, dead and steered line transfer, and live line transfer), conversion technology relating to the work carried out on the product (no conversion, hand tools, machine tools, steered automatics, and self-regulating automatics), and cycles per hour (nonregular, regular, or continuous). Organizationally relevant behavior is described by grievance and pressure activity, spontaneous outbursts, participation in union activity, management evaluation of the group, voluntary turnover and absenteeism.

The hypotheses based on the cited studies express the belief that there is a curvilinear relationship between organizationally relevant behavior and the requirements of the technology as one progresses up the technological scale from no transfer, no conversion, and no regular cycles to live line, self-regulating automatics, and continuous process technologies. In accordance with Blauner's findings, the degree of organizationally

relevant behavior as indicated by grievance and pressure activity, spontaneous outbursts, participation in union activities, voluntary turnover, and absenteeism will be low in technologies where a greater amount of employee control and involvement in the work process exists, and high in technologies where the technology controls the rate and amount of employee involvement in the work process. The inverse of this relationship will be true for management evaluation of the group. Therefore, one will expect a similar degree of organizationally relevant behavior at both ends of the technological scale with the greatest variation occurring in dead and steered line or live line transfer technologies with steered or self-regulating automatic conversion and regular cycles.

CHAPTER III

METHODOLOGY

The primary source for data to test my hypotheses formulated from the sample of industry in the Vancouver area is primarily from my own observations of the technology of the various operations and of the interactions of the work groups. Historical information and descriptions of the work groups over long periods of time are provided by management including both top level and first line supervisors and foremen. A smaller amount of data is provided by union officials and unfortunately only a minimum of information is presented from face to face discussion with employees.

The sample includes fifty work groups from fifteen plants where I was given access and sufficient information to use in the study. One third of the sample is comprised of firms associated with the wood products industry, comprising three sawmills (one employing only eleven men), one sash and door company, and one custom furniture company. Other industries sampled are two local newspapers, two metal fabricating plants, one foundry, two automotive repair shops, one food processing company, one drug company, and one telephone repair company.

As I previously stated, this sample is not truly of my own design, but rather is limited through the choice of many companies not to impart any information to a study of this nature. Information relating to technology is readily obtained from just about all companies but obtaining information on employee behavior is another story. All too often a firm had to be omitted because the organization involved would not give any indication of grievance and pressure activity, absenteeism, and turnover in the area researched. My sample may, therefore, be biased in favor of the more advanced and flexible organizations in the area of personnel administration

that are located in the Vancouver area.

In each plant I attempted to follow the same technique, although there were some variations depending on the availability of personnel. My research was initiated with an interview with the personnel manager and/or the production manager in which we discussed the over-all operations of the plant. This was followed by a tour of the operations where the location of work areas, the basic technology employed, and the number of people involved were observed. I was then able to observe each area by working within my previous definition of a work group, that is, the task performed and a natural subdivision in the work process. The time spent observing each group varied according to the size of the group and the technology involved but in all cases sufficient time was spent to observe not only the technology but also employee interaction for a period of at least one hour.

These observations were attempted with a minimum of disruption to work group process and in the majority of cases were carried out without the group's knowledge by my utilization of inconspicuous vantage points such as walkways and other overhead locations. Even in the few cases where I was in plain sight of the group, my presence did not seem to interfere with the group interaction and communication at hand.

Interviews were then held with employees where permitted by management and by technology. This period was followed by discussions with first line supervisors or foremen where my findings were reviewed and elaboration on individual employees, the history of the department, and employee behavior was obtained. A wind-up discussion was then held with the personnel manager and/or the production manager in which my findings hopefully were reinforced.

The interview schedule was designed to give qualitative information on inter and intra group factors and was directed to the production manager and/or the personnel manager. Its objective was to obtain data for support or refutation of data subsequently obtained through my own observations and gives information on the past history of the plant and any changes that had occurred, group relationships with management and internal group relations. The complete text of the interview schedule appears in Appendix A.

I must admit that I did not rigidly adhere to this schedule but attempted to initiate discussion and establish a medium conducive to the free exchange of ideas and examples in each of these areas. I found I gathered much more meaningful information when I used the interview schedule as a guideline and allowed the management people to talk within this area. In cases where the person interviewed would not respond on his own initiative, I was forced to ask each of the questions in turn and subsequently only obtained an essential minimum of information. When free discussion did occur, I found I only had to ask a few questions to cover the areas of interest.

One of the main stumbling blocks in attempting an industrial survey of this nature lies in the differing interpretations that companies have as to what constitutes a grievance. A grievance is an effort on the part of employees to communicate on a vertical scale with the organization. They can stem from violations of the working agreement, the state of working conditions, technological change, and even an accumulation of frustrations. Some companies do not call a grievance such unless it goes to arbitration, while other companies call any complaint a grievance. In order to establish a criterion for judging grievances in this study, I will define a grievance

as a complaint that has been presented to the supervisor or the shop steward and has a justifiable cause, not just a complaint for the sake of complaining. This, I admit, is very difficult to distinguish at times; however, judgment was left to the foreman and other management personnel consulted to establish the frequency of grievances, once given this definition. I am not only interested in the frequency of grievance activity for a particular group, but also the condition from which the grievance arises.

The observation schedule I designed appears in Appendix B. The areas analyzed include the technology form, the job function, the work group function as determined by the technology, a measurement of group status and the associated factors or dependent variables arising from the technology.

The definition of the technology was established on the basis of three criteria: transfer technology, conversion technology, and operation cycles. The transfer technology relating to the technological process that binds the group was broken into a five-point scale starting with no transfer and progressing through hand transfer (hand, hand trucks, etc.), automotive transfer (motor trucks, etc.), dead line and steered line (rollers, cranes, remote controlled conveyors, etc.), and live line (overhead conveyors and transfer machines with continuous movement). Conversion technology relating to the actual conversion of material was also judged on a five-point scale: no conversion, hand tools (wrenches, hammers, etc.), machine tools (lathes, shapers, etc.), steered automatics (extrusion press, etc.), and self-regulating automatics (automatic trimmer, continuous press where adjustments are made automatically by the machine, etc.). Cycles were judged on a similar scale for the group, progressing from no regular cycles to regular cycles, same frequency within the group; regular cycles, different

frequency within the group; a continuous process; and finally, some cycles regular, some continuous within the group. Operative cycles were then rated from zero to infinity for the number of cycles passing through the group.

The rating of groups was performed by attempting to recognize the main trend or prevailing form within the over-all group. For example, the main form of transfer technology that links the group would be given the associated rating within the zero to four scale for that particular group. Similarly, a rating was established for conversion technology and cycles. In this manner, a distribution for the groups from four to fifty was obtained by first rating for transfer technology (hand transfer to live line), then rating for conversion technology (no conversion to self-regulating automatics), and finally rating for cycles (no regular cycles to regular, continuous). Thus, the group having the lowest form of technology (hand transfer, no conversion, no regular cycles) is placed in the number one position and the group existing in the highest form of technology (live line; self-regulatory automatics; regular, continuous cycles) is placed in the number fifty position with the rest placed accordingly in these limits. This distribution establishes the technological progression of the work groups investigated in the paper.

I then investigated the intervening factors associated with the job function as they are important in determining the resultant behavior of the work group. Here, four factors were studied; the attention requirements of the job function, the frequency of break in the job routine, the mobility of workers in the group as allowed by the technology, and work standards involving judgment. All factors were again rated on a five-point scale.

The progression for judging the frequency of break in the job routine was established after observing the groups and a discussion with first level supervisors. The number of breaks listed are in excess of those covered by the working agreement of all the plants (i.e., two coffee breaks and one lunch period). The scale established for mobility of workers within the group is based on the assumption that co-operation permitted by the plant rules allows more in-group freedom than technically required co-operation alone.

In order to study the interaction within the group, a scale of conversation frequency within the group and outside the group was formulated. The bases for these scales were the results of an unpublished study I did in 1965 on "Communication Patterns of Work Groups in Thirty-Five Technological Settings." I found that conversation frequency outside the group ranging from one to fifty plus per hour for the total group gives a good scalar dispersion. In this study I found that group size is positively related to the amount of conversation between group members where it is allowed by the technology, therefore, the frequency per man hour is the most meaningful method of measurement. Conversation frequency outside the group did not seem to be related to group size but rather the mobility of the group; therefore, I have chosen to utilize the conversation frequency of the total group.

The communication observed is the total communication (or conversation) in which each employee is involved. The only form of communication deemed meaningful to investigate was that of speech because if other methods (sign, signal, or object) were included, the results may tend towards equality, that is, group totals may become similar regardless of the form of technology and the only variant would be group size. Voice communication is

something that is available to any worker unless he is handicapped, while communication by mechanical means is not. A mechanical or visual signal may also be directed at more than one worker, placing the onus on the observer to distinguish to whom the signal was meaningful, whereas the direction of vocal contact is usually quite certain. This is particularly true in sawmills where lights are used as means of communication either to one individual or to the group as a whole and even though all eyes in the area are directed toward the lights, the message transmitted is not meaningful to all employees.

Visual restrictions and noise level inhibiting the frequency of in-group interaction were also investigated on a five-step scale. The scale for noise level is quite subjective. Under ideal conditions I can hear the tick of my wrist watch about eighteen inches from my ear; therefore, as the noise level increased my watch had to be moved closer to my ear and under the most extreme conditions had to be pressed right to my ear before the ticking could be heard. It was by judging the approximate distance of sound from my ear that I rated the noise level.

A diagram of work flow and work area size was also constructed to aid in studying group interaction.

The measurement of group status was obtained partly through discussion with the supervisor and partly through observation. The position on the promotional ladder is clearly defined in terms of grades established through the process of job evaluation and encompasses individual knowledge, skill, and responsibility in the job function. In most cases these grades were obtained from the companies' working agreements but in cases of nonunion shops, a verbal description had to suffice. The seniority scale

is based on company seniority as this is the only seniority in some plants and is the best criterion for an intergroup comparison as opposed to departmental seniority. In cases where the group was composed of a mixture of grades and seniority, an overall average was established for a group rating. The exclusiveness of the task as related to the rest of the plant was measured by observing whether the same job was performed by all the group, more than half the group, half the group, less than half the group or whether all members of the group performed different jobs. By utilizing this measurement scale, an inter-group comparison may be made for the studied groups. The sole criterion for measuring the length of learning time to perform the function to minimum acceptable standards was based on supervisory opinion in relation to the scale of no time required, less than one year, less than two years, less than three years and three years or more.

The last area of investigation is the dependent factors arising from the technology. This area is one of the most important but unfortunately, it is also one of the most subjective. The factors are grievance and pressure activity, number of unplanned spontaneous outbursts, cohesiveness as described by management, participation in union activities, management evaluation of the group as satisfactory employees, turnover, and absenteeism. Measurement of them is based on the subjective opinion of members of management in the companies studied. Only in a few cases were actual personnel records made available or utilized to enhance the objectivity of the study.

The scales presented in this study are my attempt to establish a common base for an inter-industry comparison. Measurement of the technological variables was based on scales developed by Dr. Meissner in his

previously quoted study and by a pilot study undertaken by myself in a metal plant. In this preliminary work the degrees were tested on a number of groups and proved to be beneficial instruments for comparing these groups. In the course of the study, only the exclusiveness of task scale was changed to account for the difference in group size. A difficulty in measuring the length of learning time to perform the function was encountered in the printing industry where a lengthy apprenticeship of seven years must be served before one becomes a journeyman. Here management's opinion was that the length of learning time to perform the job to minimum acceptable standards certainly fell within the established scale rather than the time required for apprenticeship.

I have already defined a grievance as any complaint that has been presented to the supervisor or the shop steward and that has a "justifiable" cause and cohesiveness as the attractiveness of a group for its members. Definitions also enhance the comparative value of an inter-industry group comparison as each factor is judged on a similar base. In this study turnover refers to voluntary turnover and absenteeism refers to both short term and long term absences from the job due to sickness and other reasons.

Discussion at the level of first line supervisors was not limited to just these factors for it was in this area that a wealth of information about individuals comprising the work group and even supervisory attitude to the work group was elucidated. Nowhere did I detect the feeling that a supervisor was concerned about how he was faring in comparison to other groups I had studied or with upper management's description of his group.

After concluding my observations and discussions with the foremen in the various work areas throughout the plant, I then returned to the personnel manager and/or the production manager for a concluding discussion. It was in these discussions that I gathered reinforcement or refutation of my material. I am happy to state that in every case agreement on work group behavior exhibited in that particular plant was the outcome of these discussions. Within the time and resources at my disposal, the validity of this study must rest solely on the above bases.

CHAPTER IV

RESULTS OF TESTING HYPOTHESES CONCERNING THE DIRECT INFLUENCE OF TECHNOLOGY ON ORGANIZATIONALLY RELEVANT BEHAVIOR

The primary hypothesis relating technological characteristics with organizationally relevant behavior (area I in Exhibit II) is that the degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, voluntary turnover, and absenteeism will be low in forms of technology involving no transfer, hand transfer, and automotive transfer as the technology linking the group; no conversion, hand tools and employee operated machine tools as the source of conversion; and no regular cycles or employee controlled cycles in the work process. The degree of described organizationally relevant behavior will increase in technologies involving dead line and steered line, and live line transfer methods; steered and self-regulating conversion processes; and regular cycles. However, in the extreme technological form of live line transfer, steered and self-regulating conversion, and continuous cycles which is characteristic of process industries, the degree of the aforementioned organizationally relevant behavioral factors will diminish from the previous level.

It is also expected that management's evaluation of the work group as satisfactory employees will be the inverse of the above relationships and, therefore, management's satisfaction will be greater for groups at the extremes of the technological scale and less for groups in the middle range.

The study data were arranged into frequency intervals in accordance with the size of the studied groups. A table of group size as appearing in Table I was then constructed. It is possible that the

element of size plays a role in group interaction since the larger the group the more potential interaction pathways that exist. The opportunity for interaction as measured by the size of the group is a definite factor in determining resultant work group behavior as was indicated in the supportive studies. Therefore, group size becomes meaningful in interpreting the relationships between the independent and dependent technologically related factors.

The mean group size for the fifty groups as determined from the grouped data in Table I was found to be 6.03 with the median 4.68 and the mode at 4.5 members. Thus the average of all the groups was close to six members with groups of five members having the highest recurrence, closely followed by groups composed of four members. Only two of the studied groups had more than fourteen members and they were composed of twenty and twenty-one members. This analysis of group size will become more meaningful as one investigates the resultant comparisons of technology with the studied forms of behavior.

Table II depicts the technological progression of the groups that were studied. This progression was obtained by first rating the transfer technology or the technology linking the group. The groups were then arranged within their transfer technology in sequence of gradings according to their conversion technology score. Finally, within the conversion technology grouping, the groups were scaled on their cyclical rating. The progression was then an over-all scaling on the basis of transfer technology, a scaling within each of the transfer technology groupings on the basis of conversion technology, and finally, within this framework, a scaling on the basis of cycles. For example, the newspaper

TABLE I

A TABLE OF GROUP SIZE FOR THE STUDY SAMPLE

Group Size	Number of Groups
Total	50
2 to 3	11
4 to 5	22
6 to 7	5
8 to 9	4
10 to 11	4
12 to 13	2
14 and over*	2

* The arithmetic mean of this interval is 20.50

TABLE II

THE TECHNOLOGICAL PROGRESSION OF THE INVESTIGATED WORK GROUPS AS DETERMINED BY THE STUDY METHOD

TRANSFER TECHNOLOGY	CONVERSION TECHNOLOGY	NO REGULAR CYCLES	REGULAR CYCLES, SAME FREQUENCY FOR GROUP	REGULAR CYCLES, DIFFERENT FREQUENCY IN GROUP	CONTINUOUS PROCESS	SOME CYCLES REGULAR, SOME CONTINUOUS
No Transfer	No Conversion					
	Hand Tools	Newspaper paste-up (1)				
		Lead pot workers (2)				
		Lead burning department (3)				
		Metalwork assembly shop (4)				
		Auto mechanics group (5)				
		Metal plant maintenance crew (6)				
		Sawmill maintenance crew (7)				
		Teletype repair shop (8)				
		Sheetmetal fabrication (9)				
		Newspaper advertising (10)				
				Door finishing department (11)		
	Machine Tools	Sawmill machine shop (12)				
				Solder spooling department (13)		
				Metal polishing group (14)		
	Steered Auto-matics	Foundry machine shop (15)				

TABLE II (Cont'd.)

TRANSFER TECHNOLOGY	CONVERSION TECHNOLOGY	NO REGULAR CYCLES	REGULAR CYCLES, SAME FREQUENCY FOR GROUP	REGULAR CYCLES, DIFFERENT FREQUENCY IN GROUP	CONTINUOUS PROCESS	SOME CYCLES REGULAR, SOME CONTINUOUS
Hand Transfer	No Conversion		Sawmill log pond (16) Sawmill log pond (17) Sawmill log pond (18)			
	Hand Tools	Foundry small moulds group (19) Foundry mould core group (20) Custom furniture group (21)				
	Machine Tools	Sheetmetal cutting department (22) Casting chippers and grinders (23)		Newspaper photography processing (24)	Die shop (25)	Door fabricating department (26)
	Steered Automatics			Newspaper editorial typesetting (27)		
Automotive Transfer	No Conversion	Metal goods shipping department (28) Foundry shipping department (29) Cable shipping department (30)				
	Hand Tools		Automotive paint shop (31)			

TABLE II (Cont'd.)

TRANSFER TECHNOLOGY	CONVERSION TECHNOLOGY	NO REGULAR CYCLES	REGULAR CYCLES, SAME FREQUENCY FOR GROUP	REGULAR CYCLES, DIFFERENT FREQUENCY IN GROUP	CONTINUOUS PROCESS	SOME CYCLES REGULAR SOME CONTINUOUS
Dead Line and Steered Line	No Conversion			Sawmill green chain (32)	Sawmill green chain (33)	
	Hand Tools	Foundry furnace and molding crew (34)	Plywood door gluing (35)			
			Pharmaceutical packaging (36)			
				Telephone dial repair (37)		
			Metal anodizing group (38)			
			Sawmill barker and head sawyer group (39)			
	Steered Automatics			Sawmill edgeman to sorter group (40)		
				Sawmill head sawyer to trim sawyer (41)		
				Sawmill gang sawyer to trim sawyer (42)		
					Metal extrusion press (43)	
Live Line	Hand Tools				Sheet metal painting (44)	
	Self Regulating Automatics				Newspaper press room (45)	
					Food processing (46)	
					Wire extrusion and cable coiling group (47)	
					Newspaper mail room (48)	
					Sawmill automatic trim shop (49)	
					Newspaper press bldg. (50)	

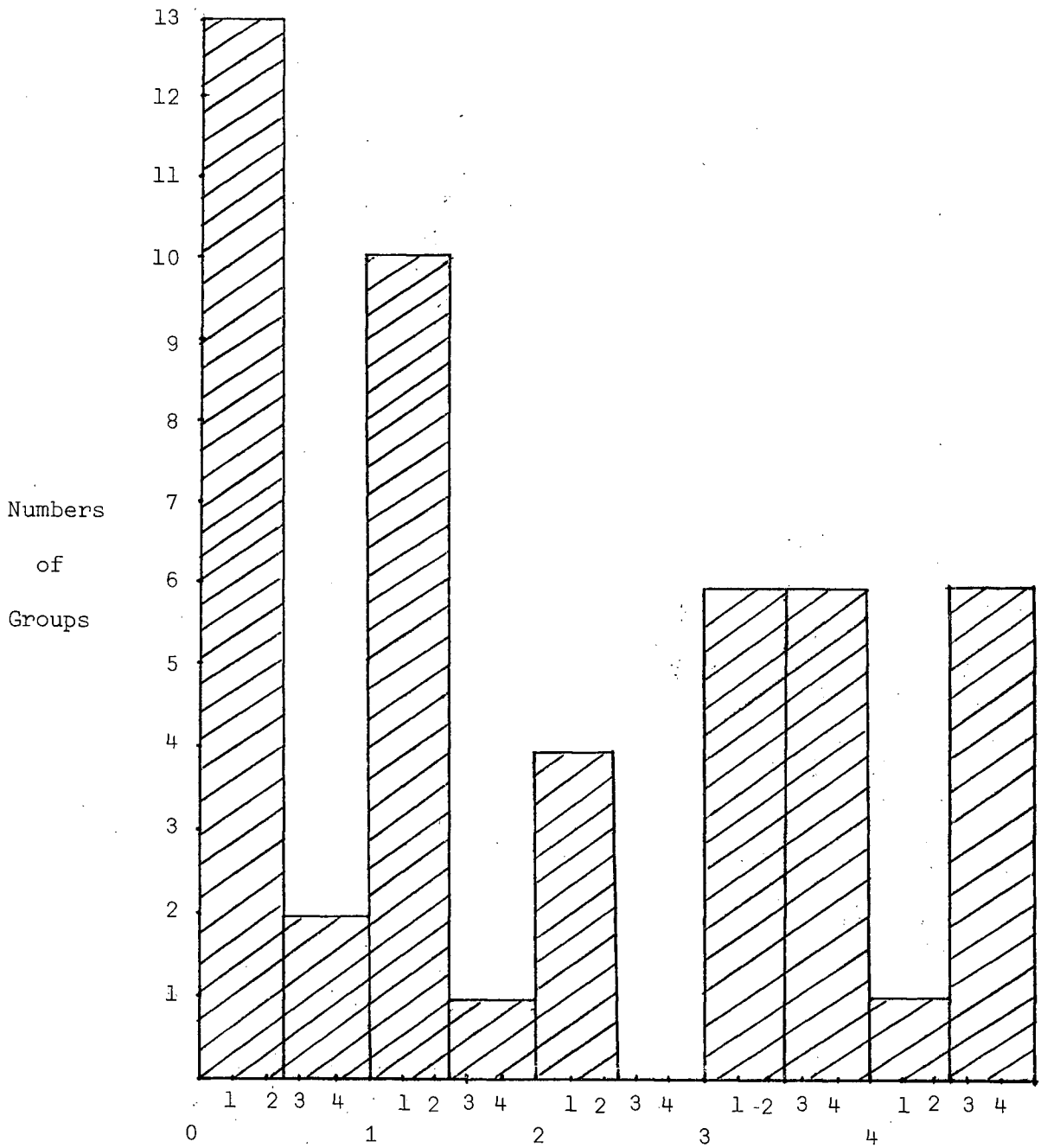
paste-up group listed at the beginning of the progression has no transfer technology, utilizes hand tools in the conversion process, and has no regular cycles; whereas the newspaper press at the end of the progression has a live line transfer technology, utilizes a self-regulating automatic controlled through a master console in the conversion process, and is an example of a continuous process.

In order to gain further insight into the establishment of this progression, Exhibit V was designed. After cursory observation of Table II, it is obvious that the groups studied are not equally disbursed along the technological scale. The scale of technological progression utilized in Exhibit V was constructed in the same manner as the one described in the previous exhibit with the groupings established by ratings on transfer technology, conversion technology, and cyclical frequency in that order. A bar graph was then constructed for the number of groups occurring within an area of technological progression. The area chosen for the base of each bar splits each of the transfer technology ratings in half as this gives the most meaningful representation of group disbursement.

If one could choose a cross-section of industry to give the best sample for a study of industrial work groups, a graph of equal frequencies for each area of transfer technology would be expected. Unfortunately, this is not the case here. Fifteen of my groups fall in the category of no transfer technology, twelve are linked by hand transfer, four are joined through automotive transfer, twelve are tied by dead line and steered line transfer mechanisms, and seven are bound by self-regulating automatics as the main form of product transfer.

EXHIBIT V

A FREQUENCY DISTRIBUTION OF THE TECHNOLOGICAL PROGRESSION OF THE GROUPS STUDIED



Of the fifteen groups working in technologies where no transfer technology linked the group, eleven utilized hand tools and machine tools in their product conversion, while only three utilized machine tools in a technology requiring no regular cycles or regular cycles with a different frequency within the group, and one used steered automatics in its material conversion. In Table II, only three of these first fifteen groups are actually involved in the use of hand tools alone; the other twelve are involved in technologies employing hand tools, machine tools, and steered automatics to varying degrees in their conversion processes. The criterion for judgment here was the main type of conversion process utilized in producing the product. The sawmill machine shop (group 12), the solder spooling department (group 13), and metal polishing crew (group 14) used machine tools as their main source of conversion even though some hand tools were involved and the metal polishing crew had one steered automatic machine in their finishing process. The foundry machine shop had mainly steered automatics although some hand tools and self-regulating automatics were evident.

At this point one might question why the sawmill maintenance crew (group 7) is higher than the metal plant maintenance crew (group 6) in the no transfer, hand tools, no regular cycles, technological scale. This type of conclusion is due to one's concept of a maintenance crew or for that matter, any type of crew as existing apart from a particular industry and technology. All too frequently, when one mentions a "widget crew" or a "frimfram group" people immediately think of these groups as being the same throughout all industries. This is only logical for our idea of this crew is formed according to our past experience and

knowledge. Therefore when we say "maintenance crew," we think of maintenance as being universal and similar throughout all industry rather than think of a specific type of maintenance associated with a specific type of industry or even technology. In this case the sawmill maintenance crew worked with a greater amount of machine equipment due to the large scale maintenance projects demanded by the type of technology employed in the forest industry. The metal plant maintenance crew worked on projects that were more of an individual nature and required only hand tools and light machine tools such as drills, grinders, etc. It must be noted that the maintenance crew at the sawmill was employed by an enterprise that kept a very tidy, updated plant with modern equipment; therefore, the features distinguishing these two crews are particular to the investigated plants and not indicative of all sawmill or metal plant maintenance crews.

Moving up the scale represented in Table II to the twelve groups joined by hand transfer technologies, one may differentiate between eleven groups which have either no conversion or incorporate hand tools, a degree of hand and machine tools, and machine tools; and only one group, the editorial typesetting group which employed many machine tools and some self-regulating punch tape monitors, working in regular cycles but at a different frequency within the group. In this grouping, the three sawmill ponds (groups 16, 17 and 18) were approximately equal in that no conversion was undertaken but differentiation was made on the number of cycles per hour that passed through the group. One of the more interesting factors here is that the sawmill size was no indication of this type of group's productivity. The smallest mill had the greatest per capita productivity while the largest mill experienced many bottlenecks and breakdowns during my

visit and was evidently prone to such tieups. The same man (who worked at both places as a saw sharpener) showed me around both mills and said of the smaller operation, "This mill is a family run operation. Its productivity in board feet per man per minute is greater than any other mill in Vancouver. There is just no comparison between working here, where it's a pleasure to work and...where sometimes it's pure hell." The intermediate mill pond was very small and fed a very efficiently run mill but its cycles were somewhat slower than the first group.

The third technological step in Table II is indicative of the four companies having a means of automotive transfer binding the work group into a productive whole. Only four groups were found in this area; three shipping departments and one automotive paint shop. All the shipping departments had no conversion but were graded according to the type of automotive equipment and the quantity of orders handled. The metal goods shipping department used only small hyster vehicles while the foundry and cable shipping departments used large and small motor lifts. The automotive paint shop (group 31) was an example of hand and machine tool conversion technology where the car was transferred from work station to work station starting with wet sanding through to painting and drying in a bake oven.

The next area on the technological progression is representative of industries with dead line (rollers, hand pushed rail carts) and steered line (cranes, remote controlled conveyors) transfer technology. Twelve groups were found to be in this range; six with no conversion or hand tools with some machine tools; and six with steered automatics as a source of conversion. The two green chains (groups 32 and 33) at the beginning of this area were separated mainly on the basis of size as it affected the

cyclical pattern of work. The smaller mill only had two men on the green chain with each setting his own rate of speed whereas the larger mill had eight men working in a continuous motion with the technology setting the speed. In this mill the lumber was marked by a pair of sorters and each man on the chain was responsible for stacking a particular marking. The aluminum anodizing group (group 38) marks the utilization of steered automatics in the conversion process. The metal plates were moved by an overhead crane and dipped in a series of three vats. The group members move with the plates, control their timing, and stack them at the end of the vats. The internal sawmill groups (groups 39, 40, 41 and 42) were separable on the basis of size of plant and productivity.

The live line transfer technology processes had only seven groups with the sheet metal painting group (group 44) utilizing hand and machine tools in the conversion process with the remainder utilizing self-regulating automatics. A group disbursement in this latter area was obtained on the basis of progressively increasing output.

Now that the technological progression of industrial work groups in this study has been elucidated and an idea of group disbursement within this progression obtained, I will turn my attention to comparing the degree of technology with resultant work group behavior. I hope that further insight will be gained by supplementing this information with descriptions of group interaction.

Tables III, IV, V, VI, VII and VIII depict the degree of resultant behavior associated with a particular technology. For simplicity and clarity, tables are constructed with the degree of behavior for a given technology recorded. The technological description is based on the major

TABLE III

THE DEGREE OF GRIEVANCE AND PRESSURE ACTIVITY ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	1	0	1	0	0	0	1	0	7
Hand Tools	1	0	10	1	0	3	0	0	1	1	0	3	1	0	0	4	0	17
Machine Tools	0	1	2	0	0	4	0	0	0	0	0	0	0	0	0	0	1	6
Steered Automatics	0	0	1	0	0	1	0	0	0	2	1	3	0	0	0	2	1	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1	5
Total	1	1	13	1	0	11	0	0	4	4	1	7	1	1	5	7	3	40

TABLE IV

THE DEGREE OF UNPLANNED SPONTANEOUS OUTBURSTS ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	1	0	1	0	0	0	1	0	7
Hand Tools	1	0	10	1	0	3	0	0	1	1	0	3	1	0	0	4	0	17
Machine Tools	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	7
Steered Automatics	0	0	1	0	0	1	0	0	0	1	2	3	0	0	0	1	2	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1	5
Total	1	0	14	1	0	11	0	0	4	3	2	7	1	1	5	6	3	41

TABLE V

THE DEGREE OF PARTICIPATION OF UNION GROUPS IN UNION ACTIVITIES AS ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	1	0	0	0	0	0	1	0	6
Hand Tools	1	0	9	1	1	1	0	0	0	1	0	2	1	0	0	4	1	12
Machine Tools	0	1	2	0	1	3	0	0	0	0	0	0	0	0	0	0	2	5
Steered Automatics	0	0	1	0	0	1	0	0	0	2	2	1	0	0	0	2	2	3
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3	3
Total	1	1	12	1	2	8	0	0	3	4	2	3	1	3	3	7	8	29

TABLE VI

THE DEGREE OF TURNOVER ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	0	2	0	0	0	0	0	2	6
Hand Tools	2	1	8	0	1	3	0	0	1	1	2	1	1	0	0	4	4	13
Machine Tools	0	1	2	0	0	4	0	0	0	0	0	0	0	0	0	0	1	6
Steered Automatics	0	0	1	0	0	1	0	0	0	1	4	1	0	0	0	1	4	3
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3	3	0
Total	2	2	11	0	1	11	0	0	4	2	8	2	4	3	0	8	14	28

TABLE VII

THE DEGREE OF ABSENTEEISM ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	1	1	0	0	0	0	1	1	6
Hand Tools	0	1	10	0	1	3	0	0	1	0	3	1	1	0	0	1	5	15
Machine Tools	0	1	2	0	1	3	0	0	0	0	0	0	0	0	0	0	2	5
Steered Automatics	0	0	1	0	0	1	0	0	0	1	2	3	0	0	0	1	2	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1	5	0
Total	0	2	13	0	2	10	0	0	4	2	6	4	2	5	0	4	15	31

TABLE VIII

THE DEGREE OF MANAGEMENT'S EVALUATION OF THE GROUP AS SATISFACTORY EMPLOYEES ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	1	2	0	3	0	0	1	1	0	0	0	0	5	3	0
Hand Tools	9	2	0	3	1	0	1	0	0	2	2	0	0	0	1	15	5	1
Machine Tools	2	1	0	3	1	0	0	0	0	0	0	0	0	0	0	5	2	0
Steered Automatics	1	0	0	1	0	0	0	0	0	3	3	0	0	0	0	5	3	0
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0
Total	12	3	0	8	4	0	4	0	0	6	6	0	0	6	1	30	19	1

categories of transfer technology and conversion technology. As the type of cycles (nonregular, regular, and continuous) encountered by a group is used for obtaining a dispersion within these main categories, cycles will only be discussed to the extent they influence behavior of a group that differs from other groups in the same technological category. The resultant organizationally relevant behavior is presented in six separate tables; grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and management's evaluation of the group as satisfactory employees. The basis for measurement of this behavior was discussed in the description of the methodology of the study with reference to Appendix B. It is thought that the three degrees of high, medium, and low degrees of organizationally relevant behavior will indicate the general differences of behavior exhibited by any one group in a particular technology.

In this chapter a comparison for each organizationally relevant behavior type for a given technology will be presented and comparisons with the hypotheses presented in Chapter II will be made. However, a complete understanding of work group behavior within the technological representation cannot be obtained unless individual groups are investigated and explanations based on supporting studies for both typical and deviant groups within each technological category are investigated. To avoid repetition in discussion of groups within a technological category, all six types of organizationally relevant behavior will be discussed for each technological category; i.e., grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and management's evaluation of the groups as satisfactory

employees, will be discussed for groups in no transfer, hand tools technologies, then no transfer, machine tools technologies, and on through the technological progression. A clear and succinct summary comparing the study results of organizationally relevant behavior for a given technology with the hypotheses presented in Chapter II will be made. To explain the results in these tables, I must return to my theoretical grounding for this study, as the expected results are based on theory.

The results of the studies of Sayles, Walker and Guest, Faunce, and Blauner, led me to expect certain results. These are that grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism will be low in forms of technology involving no transfer, hand transfer, and automotive transfer as the technology linking the group; no conversion, hand tools, and employee operated machine tools as the source of conversion; and no regular cycles or employee controlled cycles in the work process. The degree of the above organizationally relevant behavior will increase in technologies involving dead line and steered line, and live line transfer methods; steered and self-regulating conversion and continuous cycles which is characteristic of process industries, the degree of the aforementioned organizationally relevant behavioral factors will diminish from the previous level. It is also hypothesized that management's evaluation of the work group as satisfactory employees will be the inverse of the above relationships and therefore, greater for groups at the extremes of the technological scale and less for groups in the middle range.

In the results of the present study, organizationally relevant behavior classified as high or medium degree does tend to rise slightly

for groups working in dead line and steered line, and live line technologies, but tapers off for the groups in the higher extremes of live line technologies. As these organizationally relevant behavioral factors are based on Sayles' study, it should be noted, as indicated in Exhibit IV, that all four types of group behavior: apathetic, erratic, strategic, and conservative may be found in technologies where work group members have some control over the work process. For example, apathetic behavior is characteristic of both low skilled jobs and long assembly lines; erratic behavior is evident both in areas of short assembly lines and of homogeneous crews performing identical tasks; strategic behavior is characteristic of only individual worker controlled jobs; and conservative behavior is characteristic of jobs that are usually individual operations with some implications toward status which will be discussed in the section concerning the behavioral consequences of the technology. Therefore, some mixture of these behavioral group types may be found in technologies of no transfer, hand transfer, and automotive transfer, as well as technologies of dead and steered line, and live line transfer. As Sayles' technological definitions have this nebulous quality, the original descriptions of transfer technology, conversion technology, and cycles will be continued to be used in the descriptive phase of this study.

The organizationally relevant behavior manifested in turnover and absenteeism as investigated by Walker and Guest was the basis for my hypothesis that turnover and absenteeism will be low in forms of technology involving no transfer, hand transfer, and automotive transfer technology as linking the group; no conversion, hand tools and employee operated machine tools as the source of conversion; and no regular cycles or employee

controlled cycles in the work process; and will increase in technologies involving dead line and steered line, and live line transfer methods; steered and self-regulating conversion processes; and regular cycles. Turnover and absenteeism will then diminish in technologies of live line transfer; steered, and self-regulating conversion; and continuous cycles. Tables III to VIII indicate that this hypothesis holds true except in the extreme case where turnover and absenteeism in live line transfer technologies regardless of the source of conversion or number of cycles is in the medium to high category.

It was hypothesized that management's evaluation of the group as satisfactory employees would also have a curvilinear relationship but be greater for groups at either end of the technological scale and smaller in the center. Table VIII shows that no curvilinear relationship exists for groups in this study. Management's evaluation of the group as satisfactory employees is greater in no transfer, hand transfer, and automotive transfer technologies than dead line and steered line, and live line transfer technologies. Again the source of conversion within these transfer technologies does not seem to affect this trend.

To attempt to comprehend the meaning of these results and why some individual group deviations occur, groups within each technological category must be investigated. As was mentioned, rather than look at each type of organizationally relevant behavior and the deviant groups within each table, I will progress along the technological scale analyzing groups typical of hypothesized behavior and deviant groups as most of these groups are common to all types of investigated behavior. In this manner I hope that a minimum of repetition will be encountered.

In no transfer, hand tool conversion technologies, eight of eleven are consistent with the hypothesized behavior. These are the newspaper paste-up group (1), the lead burning department (3), the metalwork assembly shop (4), the metal plant maintenance crew (6), the teletype repair shop (8), the sheetmetal fabrication department (9), the newspaper advertising group (10), and the door finishing department (11). I shall attempt to describe two of these groups so that one may see the similarities of technology and organizationally relevant behavior between them.

The newspaper paste-up group (1) operates in a no transfer, no conversion, and no regular cycles technology. This is a very low skilled job entailing the organization of articles on a newspaper page. The job is very tedious and involves the simplest manipulations to fill a page. Certain articles are set aside as "fillers" for any unused space. The jobs are all individual with each man working one particular section of the paper, for example, the weekend section, sports section, wand ads, and so on. Internal disunity was very prevalent in this group, pressure tactics, grievances, and spontaneous outbursts were at a minimum, in fact, an informal group seemed almost nonexistent.

The lead burning department (3) also operates in a no transfer, hand tool, and no regular cycle technology. This job involves a tremendous degree of skill and requires a long learning time with special training before the function can be performed. The group does quite a number of their jobs in the field and thus has a degree of autonomy from the rest of the plant. Even though this group mainly exhibits a low degree of grievance and pressure activity, spontaneous outbursts, participation in union activities, turnover, and absenteeism, management claims the group

will exert pressure in activity-inactivity cycles as meets their needs, and because of their position relative to the rest of the plant, they usually find that their needs are met both by management and the union.

The main deviant from the groups in the no transfer, hand tool conversion, category is the lead pot workers. Their exhibited behavior of grievance and pressure activity, spontaneous outbursts, participation in union activities, turnover, is high. Absenteeism and management's evaluation of the group as satisfactory employees is only moderate. They are an example of a group performing almost identical tasks where each man ladles molten lead out of a pot into a series of ingot molds. When he reaches the end of the series of molds, he then tips them over onto the rack and stacks the ingots in a pile on the floor. Little judgment is required by the employee and the job is physically taxing due to the extreme heat from the lead pots and the weight of the metal. (One ladle filled one ingot weighing approximately fifty pounds.) The only break the men have from this process is the skimming of the oxidized layer of molten metal from each of the ingots before the metal solidifies.

These men are the main source of grievance activity in the plant but the frequency and intensity of their grievances holds no relation to the issues they represent. The group had marched "en masse" to the foreman to complain about such things as the lack of water pressure in their drinking fountain and other conditions that could be rectified through a simple discussion.

The auto mechanics group (7) exhibits a greater degree of turnover than the typical groups in the no transfer, hand tool conversion technology where their turnover is of a medium degree compared with the low degree of typical groups. They are a nonunion group, thus their

participation in union activities is nil.

Their work is characterized by individual jobs which are identical in that they are all working on car engines. Working conditions in the garage are excellent but because each employee has his own set of tools, there is constant bickering among employees and grievances presented to management about the disappearance of tools. The group is not what one would call cohesive, but rather has two members that have been with the firm for ten or twelve years and three that have been there less than a year and it has been a problem holding on to the three mechanics. This may be because of no leadership within the group. The two older mechanics have formed a clique and keep everything to themselves, giving the younger ones no direction whatsoever. As the manager of the operation stated, "If only these kids could be given some direction and guidance on the shop floor, this place might not serve as a training ground for other service stations."

The sawmill maintenance crew (7) and the metal plant maintenance crew (6) both work in no transfer, hand tool conversion, and no regular cycles technology; however, their behavior differs in that the metal plant maintenance crew is typical of groups in this type of technology while the sawmill maintenance crew has a high degree of turnover and are only evaluated as a moderately satisfactory group by management. Both maintenance crews are characterized by individual, noninterdependent operations which allows their members to work as scattered subgroups. Basically, the members do not all work together but work in the locations occupied by other work groups. However, through working in pairs and by constantly shifting locations they seem to keep a group identity. Perhaps this is

due to their power as represented by the skills they possess as compared to the rest of the plant. The production manager of the metal plant stated, "Our maintenance people are a real social unit. They have a satisfying job and derive a lot of pride from it as they can see the end result of their work. They are not pressed to meet production indices and have a large degree of control over what they do. They eat lunch together and discuss common problems and above all they keep the dirty end of the stick equally divided."

The mill manager had similar comments to make about his crew but here the similarity ended. The mill crew is a smaller crew with only five members as compared to the metal crew of twelve and because of the demands of the technology, is required to work as a crew more often than the maintenance people in the metal plant. The deciding difference is noted by Sayles, "For most of the men in conservative groups there is the probability that if the company does not provide satisfactory employment opportunities, there are an adequate number of jobs available requiring their specialization in the local labor market."[9] The sawmill crew was seriously affected by seasonal factors. The crew worked and exhibited behavior typical of other no transfer, hand tool conversion, and no regular cycles technologies in the fall and winter but as soon as outside construction industries started in the spring, the level of grievance and pressure activities would rise, spontaneous outbursts would occur sometimes, and crew members would begin leaving the mill for outside jobs. This group's behavior pattern is definitely affected by the company's inability to

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9 Sayles, op. cit. p.35.

provide adequate rewards to keep their maintenance people.

In no transfer, machine tool conversion technologies two of the three investigated groups, the sawmill machine shop (12) and the metal polishing group (14) have the hypothesized low grievance and pressure activity, number of spontaneous outbursts, participation in union activities, turnover, absenteeism, and a high evaluation as satisfactory employees. These groups are individual operations where each operates his own machine and controls his own work pace with the exception of the metal polishing group where extruded metal strips are polished and the task is repetitive.

On the other hand, the solder spooling group even though working in a no transfer, machine tool conversion technology with regular cycles but a different frequency in the group, has a medium degree of grievance and pressure activity, participation in union activities, turnover, absenteeism, and a medium evaluation as satisfactory employees. The typical job consists of each man performing the same operation, one spooling five pound spools, the other one pound spools. The solder is coiled in a large barrel, the operator places the spool on the machine, attaches the free end of this coil to the spool and with his left hand pushes the lever operating the machine while guiding the solder on the spool with his right hand. When he judges that he has enough solder on the spool he shuts the machine off and then weighs the spool. He removes any excess solder or adds if the weight is deficient and finally, clips the spool free from the main solder bulk. The job, therefore, requires some judgment, but is extremely tedious.

The only group in the no transfer, steered automatic conversion with no regular cycles technology, the foundry machine shop (15), exhibited

the hypothesized behavior of low grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and a high evaluation by management. This group is involved in lathe and machining operations similar to those of the sawmill machine shop (12) but the machinery utilized is of the steered automatics conversion type giving the operator a greater amount of mobility from the equipment.

In summary, groups in no transfer technologies were indicative of the hypothesized low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. They were also representative of a high evaluation as satisfactory employees. Deviant group behavior was attributed to such factors as: frequency of break in the job routine, lack of informal group leadership, lack of recognition by the company of skilled workers' mobility and lack of provision of adequate rewards to keep these people, and the lack of judgment and degree of repetition required by some jobs.

Progressing to the hand transfer technologies where hypothesized organizationally relevant behavior is comparable to that of technologies where no transfer is evident, some deviations are also encountered.

The sawmill log ponds (16, 17 and 18) are representative of hand transfer, no conversion technologies with regular cycles throughout the group. The groups exhibited a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover and absenteeism. However, two of the log pond groups (17 and 18) were viewed as having a moderate rating as satisfactory employees. These groups are involved in transferring logs and one man operating a cutoff

saw. The job itself is extremely popular in summer but extremely unpopular in winter. No cohesion exists within the group other than a unified feeling of discontent in the winter months. These jobs require only a minimum of skill and employees are thought of as "slackers" by the management of the two companies. The third log pond (16) is from a family run mill and composed of only two men who could speak relatively little English.

Of groups in hand transfer, hand tool conversion technologies, only the custom furniture group (21) and the sheetmetal cutting department (22) have the hypothesized low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and a high evaluation as satisfactory employees by management. These groups control their own work pace and require skill to perform their functions. The custom furniture building shop is one of the few west of the Rocky Mountains and each man was proud of his skill as a furniture craftsman. All work including the fitting of springs and upholstering was done on a frame which was assembled by a cabinet maker outside this shop to meet specifications required by customers. The sheet metal shop is the highest paid group in a large foundry as each job performed requires a lengthy training period. The hand transfer technology involves one man on layout, one man on the cutting shears, one man operating the bending machines and two men involved in assembly.

The foundry small molds group (19) which also works in a hand transfer, hand tool conversion technology exhibited the hypothesized behavior in all factors of organizationally relevant behavior but participation in union activities where a medium degree was evident. This group has one man passing sand to two men, each involved in making small molds, and

another two men who are each involved in making large molds. The cores for these molds are obtained from the mold core group which is situated in the next department. As the next paragraph indicates, the mold core group is the hot bed of this plant and the high degree of individual contact between these groups may account for the medium degree of participation in union activities shown by the small molds group.

The mold core group (20) also is involved in a hand transfer, hand tool conversion technology and exhibits a high degree of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities. Turnover, absenteeism, and management evaluation of the group as satisfactory employees are only medium. Even though the group is linked by hand transfer technology, the nature of the work entails a high degree of skill for it is in this area that cores are made for all the molds in the foundry. The group is composed of five men: two that pack the sand in the core molds, one who dries the sand, one who sprays the molded cores with graphite and one who operates the bake oven. A great degree of personal judgment enters into the work of these men, they have a high degree of personal mobility and work from 7:00 A.M. to 3:30 P.M. (as does the rest of the foundry) in comparison to 8:00 A.M. to 3:30 P.M. for the metal work and machine sections of the foundry. The group is the heart of union activity within the plant and exerts continuous pressure on management and fellow foundry workers. Grievances over time and motion studies are their prime target as they feel one cannot force a job as exacting as theirs. The group has a high degree of internal unity and is quite permanent in that there are very few jobs available within the plant that are at a higher rung on the promotional ladder and these

jobs require special training by the individual performing them.

The hand transfer, machine tool conversion category is represented in this study by four groups; the casting chippers and grinders (23), the newspaper photography processing (24), the die shop (25), and the door fabricating department (26). The groups have the hypothesized low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and a high evaluation as satisfactory employees by management. However, two exceptions are evident. These are the medium degree of absenteeism and the medium evaluation by management for the casting chippers and grinders (23), and the medium degree of participation in union activities for the door fabricating department (26). The chippers' and grinders' job is to grind the excess metal and sand off the sand castings. The castings are first placed in a sand blasting furnace for preliminary cleaning and then passed on to the grinders for final cleaning. The grinders compose the main bulk of the crew and are all involved in similar tasks. The area is extremely dusty and dirty with a covering of dust over everything. This group is the lowest status group in the plant and also one of the lowest paid. On this basis one might expect a larger degree of turnover than does exist but as the employees have no other skill, they stay. However, the group is not very cohesive. They are a source of constant bickering among themselves and with management and the union but they "don't want to rock the boat too hard and lose their jobs."

The door fabricating department (26) exerts some grievance and pressure activity and is quite active in union activities. Their technology is characteristic of a short assembly line with the first man in the group

operating three different machines at different times to prepare door moldings. These are then passed through the molding machine to the "sticker" where they are glued and then to the sasher who assembles the doors and passes them through the sanding machine. Judgment is important in setting tolerances and adjusting the machine. The fact that this group exerts a small degree of pressure on management may be related to its high degree of internal unity and that all members have been there for more than eight years.

The only group representing hand transfer, steered automatic conversion technologies is the newspaper editorial typesetting group (27). The girls in this group type a punch tape. This tape is verified and then coded by machines on discs and then processed and the resultant article waxed and dried before being passed to the paste-up group. The majority of equipment utilized in the conversion process is the steered automatic type of coding, processing, and waxing machines. The behavior characteristic of this group is similar to the hypothesized low grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and a high evaluation as satisfactory employees by management.

Thus, groups in hand transfer technologies were also in general indicative of the hypothesized low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover and absenteeism. They were also representative of a high evaluation as satisfactory employees. Deviant group behavior may be attributed to such factors as: seasonal factors, ethnic background, frequency of contact with trouble areas in the plant, no jobs available at higher rungs

of the promotional ladder without extensive special training, lack of skill to perform better jobs, and high internal unity and length of service possessed by a group.

In the automotive transfer, no conversion groups, the metal goods shipping department (28), the foundry shipping department (29), and the cable shipping department (30), the hypothesized behavior was a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover and absenteeism. The hypothesized degree of management's evaluation of the group as satisfactory employees was high. The same hypotheses were formulated for the automotive transfer, hand tool conversion group, the automotive paint shop (31). The type of technology utilized by these groups was previously noted as small hyster vehicles by the metal goods shipping department, and small and large motor lifts by the foundry and cable shipping departments. In the automotive paint shop the group experienced the same frequency of cycles as the car was passed from function to function.

The exhibited behavior of these groups in the automotive transfer, no conversion and the automotive transfer, hand tool conversion technologies was identical with the hypothesized in all measured categories of organizationally relevant behavior.

Progressing into the dead and steered line and live line areas where studies of Sayles, Walker and Guest, Faunce, and Blauner indicate one should expect a higher degree of resultant organizationally relevant behavior which tapers off slightly in extreme technological conditions (live line, self-regulating automatics, and continuous process technologies), deviant groups are still found.

In the dead line and steered line transfer, no conversion technologies two sawmill green chain groups are encountered, one exhibiting the hypothesized higher degree of organizationally relevant behavior, the other exhibiting the lower degree of behavior identical with groups in no transfer, hand transfer, and automotive transfer technologies. The sawmill green chain (33) representative of the hypothesized high degree of organizationally relevant behavior is a constant thorn in management's side as they may flare up for no apparent reason. Management related this to the employees' dislike of the work which is physically demanding, too warm in summer months, and too cold in winter months. In fact, most of the positions are held by new Canadians learning the language, students on summer vacation, or men starting with the mills and hoping to work up to better positions. Their grievances are usually treated very lightly by management with the result that one will die as another arises to take its place. This group has a high degree of grievance and pressure activity, unplanned spontaneous outbursts, participation in union activities, and absenteeism. It has only a medium degree of turnover and a medium evaluation as a satisfactory group.

In contrast the other green chain (32) which is smaller than the previous exhibits a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities. Turnover and absenteeism are present to a medium degree and management's evaluation of the group as satisfactory employees is high. This green chain group works in a family owned and operated sawmill. All employees but one who is a part-time employee are East Indian and are related to one another. Very little English is spoken or understood by the majority of

the employees in the mill, as some were just new arrivals from India. The mill is nonunion which accounts for the low degree of participation in union activities. Turnover and absenteeism are moderate as there are a few East Indian operated mills in this area whose owners bargain for each other's employees. This mill had just lost its gang sawyer to another mill and the gang saw was being operated by the owner who seemed to be well versed in all phases of mill work.

In the dead and steered line transfer, hand tool conversion technology, four groups are present; the foundry furnace and molding crew (34), the plywood door gluing group (35), the pharmaceutical packaging group (36) and the telephone dial repair shop (37). The only group exhibiting the hypothesized behavior is the foundry furnace and molding crew which has high grievance and pressure activities, number of unplanned spontaneous outbursts and participation in union activities with a medium degree of turnover, absenteeism and a medium evaluation as satisfactory employees by management.

The plywood door gluing group (35) constructing solid doors has low grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. It also has a high evaluation as satisfactory employees by management. The group consists of two men who operate the glue machine which applies glue to the plywood panels and also operate a press. They have a fair degree of control over the amount of doors glued but most complete thirty to thirty-five doors per day. These are placed in the press and allowed to dry overnight. The smell from the glue is almost unbearable to one that is not accustomed to it, but it didn't seem to bother the men at all.

Both of these men have been with the firm for twelve years and work quite well together. This type of work is not too desirable to the other men in the plant, although one stated, "There's not too much pressure involved. I wouldn't mind the work but it would take some time to get used to that glue smell." Even though the men in this have a comparable degree of seniority to the rest of the plant, the job certainly holds no rank of high status within the plant.

The pharmaceutical packaging group (36) exhibits a lesser degree of grievance and pressure activity, spontaneous outbursts, and participation in union activities than expected for a dead line transfer technology but these men are being groomed as future salesmen; therefore, the short run monotony of the job of wrapping drugs is overcome by future aspirations.

The telephone dial repair shop (37) is comparable with the pharmaceutical group. These men also exhibit a low degree of grievance and pressure activity, spontaneous outbursts, and participation in union activities, as they are being trained for jobs in the field. In both cases, absenteeism and turnover meet the expected, for if an employee notes newer employees reaching the field before he does, he reacts through absenteeism and finally leaves the job.

Progressing to the dead and steered line transfer, and steered automatic conversion technologies, the six representative groups are: the metal anodizing group (38), the sawmill barker and head sawyer group (39), the sawmill edgeman to sorter group (40), the sawmill head sawyer to trim sawyer group (41), the sawmill gang sawyer to trim sawyer group (42), and the metal extrusion press (43). Only three of these groups exhibit the higher degree of hypothesized organizationally relevant behavior, while

two reach a higher degree only in some factors, and one exhibits the same degree as hypothesized for the no transfer, hand transfer, and automotive transfer technologies.

The metal anodizing group (38) and the metal extrusion press (43) have the hypothesized higher degree of organizationally relevant behavior. These groups work in a steered line, steered automatics technology. The work pace is high and tempers continually flare as bottlenecks occur. The foreman of the extrusion press crew takes great care in determining which men will work together so that personality conflicts will be avoided. He is particularly aware of ethnic background and will not allow an Englishman in his crew to work with a German in his crew, as they don't seem to realize that World War II has ended. He believes that the low boiling point of his crew is related to the high degree of repetitiveness associated with this technology.

The sawmill barker and head sawyer group (39) has low grievance and pressure activity, low spontaneous outbursts, low participation in union activities, low turnover, and low absenteeism coupled with a high evaluation as satisfactory employees. This group operates in a steered line transfer technology starting with the barker, the peeled logs pass on to the lever man who flips them onto a line where they're picked up by the head rig operated by the head sawyer. After the sawyer is through cutting, the helper pulls the lumber onto the conveyor. This group is the highest status group in the mill as the barker must have special training to operate the water pressure and timing of the log in the barker, while the head sawyer is the most valued job in the plant and also the highest skilled and highest paid.

The above group is the exact opposite of the sawmill group of head sawyer to trim sawyer in a larger mill (41). This group is similar to the previous group but has two basic differences; it is larger due to the design of the mill and the head sawyer rides the head rig as he cuts the logs. There is continual bickering among the group through the use of hand signals but some of the members are also known to frequent a local pub during noon hour and after work.

The factors attributing to the differences in the groups' behavior may be found in mill age, size, and management policy. The second group works in an older mill that has a long record of layoffs and constant shifting of employees. They have an extremely difficult time keeping head sawyers because of the external demand for head sawyers. The union is in a constant battle with management over replacements for head sawyers. The union states seniority is a prime factor but management emphasizes ability to do the job. They take employees who have excellent potential and train them to be head sawyers and when a vacancy arises move these people into the position. Unfortunately, this creates hardships between the head sawyer and the rest of the plant; therefore, when an opening arises elsewhere, the head sawyer may leave. In the first group, the mill is extremely modern, the head sawyer well paid and the group works as a unit. This head sawyer has been on the job for more than ten years and management will go to just about any limit to keep him there. As the mill foreman said, "This man is the key in our operation. He is the highest paid and we'll go to any lengths to keep him. Our problem in the forestry industry today is training. We have no program to prepare our people to move to other jobs. All too often people leave as they can see no future

here and we have no one trained to take their place. Our lack of training costs all of the companies in the industry thousands of dollars each year. As the situation stands right now, it's better for us to meet our key personnel's demands rather than face losing them."

This policy is also reflected in the edgeman to sorter group (40). They too have a low degree of activity in the grievance field, as well as, a low degree of absenteeism and a medium degree of turnover. I believe that the mill foreman's statements of this management's attitudes and policies toward its employees accounts for this low degree of anti-company behavior in this technology.

The sawmill gang sawyer to trim sawyer (42) also has a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, and absenteeism associated with a medium degree of turnover and a high evaluation by management. This is the East Indian family run sawmill whose close family relationship both on and off the job and the inability of many of these people to speak English may account for the realization of limited job opportunities outside this mill and the low degree of organizationally relevant behavior for this group in the steered line, steered automatic technology.

In summary, the higher degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism hypothesized for the dead line and steered line transfer technologies was found for most groups studied in this category. The hypothesized lower evaluation of these groups as satisfactory employees was also found with the noted exceptions. The larger number of deviations from the hypothesized were attributed to such factors as: management

policy, the repetitiveness of the job, the mobility of employees from their work places, the status of the group as measured by technical competence, and the availability of higher skilled jobs to members of the work groups. Ethnic background and family ties were again found to be important in affecting the behavior of work groups.

Only the sheet metal painting group is found in the live line transfer, hand tool conversion technological category in this study. This group has the hypothesized high degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Management's evaluation of this group as satisfactory employees is medium. A description of their work will be given in the chapter discussing the behavioral consequences of the technology.

The hypothesized degree of organizationally relevant behavior for groups in live line transfer, self regulating automatic conversion, and continuous cycles is lower than hypothesized for the previous groups in dead line and steered line transfer, and live line transfer, hand tool conversion technologies. The groups in this technological category as shown in Table II are: the newspaper press room (45), the food processing group (46), the wire extrusion and cable coiling group (47), the newspaper mail room (48), the sawmill automatic trim shop (49), and the newspaper press building (50). These groups exhibit mainly a low degree of grievance and pressure activity, and number of unplanned spontaneous outbursts. Their participation in union activities remains low for the newspaper press room, the newspaper mail room, and the sawmill automatic trim shop, but rises to a medium degree for the food processing group, the wire extrusion and cable coiling group, and the newspaper press building. Turnover and absenteeism rises

to a medium degree for the most part and high in a few instances while management's evaluation of the group as satisfactory employees is only medium for all groups.

The groups in this study in the live line, self-regulating automatic conversion and continuous process technology differ from Blauner's continuous process groups in the gas and oil industry in that these groups still have a large degree of employee immobility as contrasted to the freedom of the individual in the gas and oil industry. In fact, in closely analyzing the gas and oil industry technology where live line, self-regulating automatics and continuous flow is present, it is evident that none of the technologies represented in this study are automated to the degree that the individual has freedom of movement. The control factor is present in the groups represented in this study in that the employee has control over the process which may account for the low degree of grievance and pressure activity and the number of unplanned spontaneous outbursts. However, the degree of automation in the self-regulating conversion, continuous processes utilized in British Columbia still has many traditional ties in that unions require that jobs that existed in the past remain as in the newspaper press building (50) or that management has only automated one part of a large process as in the sawmill automatic trim shop (49).

The group approaching closest to the technology of the continuous processes in gas and oil is the newspaper press room (45), where the degree of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities is lower than comparable groups in the live line transfer, self-regulating automatic conversion,

and continuous process area. This group was representative of a new concept in the newspaper field due to the degree of mobility allowed the men by their working agreement. They interchanged jobs within their area so that all would become proficient in each job function. All these men must have a high degree of skill to set up the press but during the operation their job changes to one of watching. This was a new plant and all the employees seemed quite happy with the work. One employee expressed his feelings, "This is the place to work rather than the old job shop where you learn only one function. Here I'm learning everything. It makes quite a difference when you understand the total operation and know who to go to if anything goes wrong." However, a fairly high degree of turnover and absenteeism was evident due to the company's poor financial condition. The company had millions tied up in capital expenditure but was realizing very little from revenues. Many employees were worried about the company folding and had decided to find new jobs before this happened. Unfortunately, their fears were justified when the company closed operations.

The higher than anticipated degree of turnover and absenteeism may be due to the skill and technical competence that employees in these groups have. In this economic period in British Columbia, skilled workers are in high demand in all types of industry. This also coupled with a high degree of capital investment and expansion undertaken in the forest, mining, power, telecommunications, and other industries, results in many opportunities for skilled employees. This may result in a fairly high degree of absenteeism followed by turnover for employees not satisfied in their present employment. I believe that the behavioral consequences of the technology which will be investigated in the following chapters will help explain the high degree of turnover and absenteeism encountered in the live

line transfer, self-regulating automatic conversion, and continuous process technologies.

In summarizing the hypotheses relating the technological characteristics to organizationally relevant behavior predicted a curvilinear relationship. It was felt that organizationally relevant behavior as measured by grievance and pressure activity, number of unplanned spontaneous outbursts, participation, turnover and absenteeism would be low in no transfer, hand transfer, and automotive transfer technologies, rising in dead line and steered line transfer, and live line transfer, hand machine, or steered automatic conversion, and diminishing in live line transfer, self-regulating automatic conversion, continuous cycles. It was hypothesized that management's evaluation of the group would have the opposite curve, that is, high in no transfer, hand transfer, and automotive transfer technologies, rising through dead line and steered line, and live line transfer technologies, to live line transfer, self-regulating automatic conversion, continuous cycles technologies where it would diminish.

In this chapter it was established that these hypotheses hold (with some noted exceptions) except for the case of the live line transfer, self-regulating automatic conversion, continuous cycles technology where turnover and absenteeism were present to a higher degree than anticipated. It is hoped that these deviations and the others encountered may be explained by investigating the behavioral consequences of the technology such as attention requirements of the job, frequency of break in the job routine, worker mobility, judgment required, frequency of interaction, group status, group cohesiveness, and group size as affecting cohesiveness.

Other variations outside of the technology employed as noted in my descriptions are the companies' policy as reflected in recognition of

the work group through pay and fringe benefits, in other words, the group's perception of how it is being treated by the company. The prime example here is the different approach to the mill workers taken by two different companies. The companies' approach to unions is another factor external to the technology as some companies in my study such as, the auto mechanics, one sawmill, and automotive paint shop are nonunion. In these cases the company employee relations were very good as external pressure was on the company to meet and maintain employee requests. Ethnic background, and family operations also played an important role in determining work group behavior, especially in the cases of the East Indian mill and the metal extrusion press.

Within the group, the areas of informal leadership or the group's perception of supervision were not investigated as they are not associated with one specific technology, but these are factors that may affect group behavior as indicated by Walker.[10]

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[10] Walker, C.R., et al., The Foreman on the Assembly Line, Cambridge, Mass., Harvard University Press, 1956. pp. 135-141.

CHAPTER V

A DISCUSSION OF THE INFLUENCE OF THE TECHNOLOGY ON THE BEHAVIORAL CONSEQUENCES OF THE TECHNOLOGY

The relationship of the technological variables to the intervening behavioral consequences of the technology may be of interest at this stage of organizing a total picture of the influence of technology on organizationally relevant behavior. The effect of technological form on the behavioral consequences of the technology may not elucidate any general relationships but may be of value in explaining intervening behavior for a specific transfer or conversion form.

The behavioral consequences of the technology which were discussed in Chapters I, II and III are: A. Technical behavior (attention requirements of the job function; frequency of break in the job routine, i.e. rest periods, lunch, coffee breaks and washroom trips; mobility of workers in the group; and work standards involving judgment); B. Frequency of verbal interaction; C. Group status; D. Group cohesiveness and group size as affecting cohesiveness.

Other variables such as aspects of personality, management organizational decisions, supervisory style, ethnic background, and the like may also influence these intervening behavioral variables but an effort will be made to discuss the influence of the technology on the intervening variables.

A. Technical Behavior

The studies of Sayles, Walker and Guest, and Faunce as outlined in Chapter II indicate that attention requirements of the job function, the frequency of breaks in the job routine, the mobility of workers in the group, and work standards involving judgment are important behavioral

consequences of the technology. The description of the results of testing hypotheses concerning the direct influence of technology on organizationally relevant behavior in the previous chapter indicates the importance of these factors.

Blauner has described the degree of subdivision and integration of work. He found that printers in the craft industries have control over the process of work which extends into the social relations of production but this control is lost in the mass production automobile industries where, "The automobile worker is an alienated worker because his work has become almost completely compartmentalized from other areas of his life, so that there is little meaning left in it beyond the instrumental purpose."[11] In the chemical process industries Blauner feels that the social function in production again becomes meaningful to an employee. The degree of control exercised by groups in this study may be found in the effect that the technology has on the aforementioned variables of technical behavior.

Tables IX, X, XI and XII depict the degree of the following behavioral consequences of the technology: attention requirements of the job function, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment related to each technological category.

The attention requirements of the job function range in the medium and low categories of the table for the no transfer, hand transfer, and motor transfer technologies, progressing to a high degree in the dead line and steered line transfer, steered automatic conversion, and in live line

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11. Blauner, Alienation and Freedom, Chicago, University of Chicago Press, 1964, pp. 121, 122.

TABLE IX

THE EFFECTS OF TECHNOLOGY ON THE ATTENTION REQUIREMENTS OF THE JOB FUNCTION

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	0	0	2	0	0	0	0	0	8
Hand Tools	0	9	2	0	2	2	0	0	1	0	1	3	0	0	1	0	12	9
Machine Tools	0	2	1	0	3	1	0	0	0	0	0	0	0	0	0	0	5	2
Steered Automatics	0	1	0	0	1	0	0	0	0	6	0	0	0	0	0	6	2	0
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	5	0	1
Total	0	12	3	0	6	6	0	0	4	6	1	5	5	0	1	11	19	20

TABLE X

THE EFFECTS OF TECHNOLOGY ON THE FREQUENCY OF BREAK IN THE JOB ROUTINE

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	3	0	0	0	0	2	0	0	0	3	0	5
Hand Tools	10	1	0	3	1	0	1	0	0	2	2	0	0	0	1	16	4	1
Machine Tools	1	2	0	4	0	0	0	0	0	0	0	0	0	0	0	5	2	0
Steered Automatics	1	0	0	1	0	0	0	0	0	0	1	5	0	0	0	2	1	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	2	0	4
Total	12	3	0	8	1	3	4	0	0	2	3	8	2	0	5	28	7	15

TABLE XI

THE EFFECTS OF TECHNOLOGY ON THE MOBILITY OF WORKERS IN THE GROUP

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	3	0	0	3	0	0	0	0	2	0	0	0	6	0	2
Hand Tools	11	0	0	4	0	0	1	0	0	3	1	0	1	0	0	20	1	0
Machine Tools	3	0	0	3	1	0	0	0	0	0	0	0	0	0	0	6	1	0
Steered Automatics	1	0	0	1	0	0	0	0	0	1	0	5	0	0	0	3	0	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	2	0	4
Total	15	0	0	11	1	0	4	0	0	4	1	7	3	0	4	37	2	11

TABLE XII

THE EFFECTS OF TECHNOLOGY ON WORK STANDARDS INVOLVING JUDGMENT

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	3	0	0	3	0	0	0	0	2	0	0	0	6	0	2
Hand Tools	11	0	0	4	0	0	1	0	0	4	0	0	1	0	0	21	0	0
Machine Tools	2	0	1	3	1	0	0	0	0	0	0	0	0	0	0	5	1	1
Steered Automatics	0	0	1	0	1	0	0	0	0	0	0	6	0	0	0	0	1	7
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
Total	13	0	2	10	2	0	4	0	0	4	0	8	1	0	6	32	2	16

transfer, self-regulating automatic conversion, continuous cycles technology.

In the fifteen hand transfer technology groups, only three exhibit a low degree of attention requirements. These are the newspaper paste-up group (1) and the lead pot workers (2) in the hand tool conversion technology and the solder spooling group (13) in the machine tool conversion category who have only surface attention requirements as compared with a medium degree of attention requirements of other groups in the no transfer technological category. In the hand transfer technology, six of twelve groups have low attention requirements. These are: the sawmill log ponds (16, 17 and 18) in the no conversion area, the foundry small molds group (19) and the foundry mold core group (20) in hand tool conversion, and the casting chippers and grinders (23) in machine tool conversion. All other groups in the hand transfer technology have a medium degree of attention requirements. All groups in the automotive transfer technology have a low degree of attention requirements.

In the dead line and steered line transfer technologies, six groups have a high degree of attention requirements, one has a medium degree, and five have a low degree. All six groups with the high degree of attention requirements are in the steered automatic conversion technology which includes the metal anodizing group (38) to the metal extrusion press (43). The group with the medium degree of attention requirements is the telephone dial repair shop (37) while the other three groups in the hand tool conversion category, the foundry furnace and molding crew (34), the plywood door gluing group (35), and the pharmaceutical packaging group (36), have a low degree of attention requirements. The two sawmill green

chains in the no conversion category have a low degree of attention requirements. In other words, a progression is evident in the dead line and steered line technologies as the first five groups have a low degree of attention requirements, the sixth group has a medium degree and the last six groups have a high degree.

In live line transfer, hand tool conversion, the sheet metal painting group (44) has a low degree of attention requirements while the live line transfer, self-regulating automatic conversion groups with the exception of the food processing group (46) have a high degree of attention requirements associated with the technology.

Most of the descriptive material on these groups was elucidated in the previous chapters or will be described in Chapter VII; however, it is interesting to compare some of the groups with a similar degree of attention requirements. The newspaper paste-up group (1) has the very monotonous job of placing articles on a page which requires a low degree of attention requirements. Even the casting chippers and grinders (23) which work with machine tools in the process of removing pit holes and excess metal from the casting have relatively low attention requirements. The metal painting group (44) which works in a live line transfer technology has the repetitive task of painting metal sheets with spray guns and brushes which requires very low attention requirements.

Of groups with a medium degree of attention requirements, the lead burning department (3), the sheetmetal cutting department (22), and the telephone dial repair shop (37) are but a few. Even though these groups are representative of no transfer, hand transfer, and dead line and steered line transfer a similar degree of attention requirements is

associated with their function.

It is also of significance that no groups in steered automatic conversion technologies have a low degree of attention requirements and that all groups in dead and steered line transfer, steered automatic conversion have a high degree of attention requirements. The food processing group (46) which deviates from other groups in the live line transfer, self-regulating automatic conversion has a low degree of attention requirements in that the majority of the group pays only surface attention to the job. Therefore, the source of conversion is important in determining the attention requirements of the job function as the steered automatics and self-regulating automatics generally require a high degree of attention while other forms of conversion require a lower degree.

The frequency of break in the job routine (rest periods, lunch, coffee breaks, washroom trips, and visits with other workers) is high in the no transfer, hand transfer, and automotive transfer technologies, becoming lower in dead line and steered line and live line transfer technologies with only two groups in the six in live line transfer, self-regulating automatic conversion having a high degree of frequency of break in the job routine.

Only three groups in the no transfer, hand transfer, and automotive transfer technologies have a low frequency of break in the job routine. These are the three sawmill log pond groups (16, 17 and 18) where mobility is restricted within the log pond area and only noon hour,coffee breaks, and emergencies give the men any break from the job routine. Also, only four groups within these transfer technologies have a medium degree of break in the job routine. These are the lead pot workers (2), the solder

spooling department (13), the metal polishing group (14) and the foundry mold core group (20). The lead pot workers and solder spooling department have regular lunch and coffee breaks but only have a few side trips to the washroom or drinking fountain. The men on the lead pots take salt tablets and are cautioned against drinking too much water. Although no production quota exists on these jobs there is an informal record existing among the men for the most number of ingots poured in a day and in the solder spooling department, a record for the pounds of solder spooled and packaged in a day. This informal competition among the group members helps to create interest in the job and may account for the lower degree of break in the job routine for these groups. The metal polishing group and the foundry mold core group have a high degree of control over their work pace, are quite closely knit, and autonomous from the rest of the plant. Informal discussions are carried on by the groups while the work process is progressing with the result that members keep the break from the job routine relatively low for these types of technology.

In the dead line and steered line transfer technology, the plywood door gluing group (38) and the foundry furnace and molding crew (34) have a high degree of frequency of break in the job routine. The plywood door gluing group works in basically a dead line transfer technology with the members controlling their own work pace. The spreading of glue is an extremely trying job as the glue is not only sticky but has a very penetrating odor and the fumes hurt one's eyes. It is not usual to see members of this group frequently visit the washroom or go outside for a breath of air. The foundry furnace and molding crew is one of the larger groups in this study and works in an area that is prone to extremely high temperatures. The work itself also lends to many breaks as after the molds are positioned,

there is a period before the furnace is tapped and after the furnace is tapped there is a period for cooling of the product. The length of this period is dependent on the size of the casting.

The pharmaceutical packaging group (36), the telephone dial repair group (37) and the metal extrusion press crew (43) have a medium degree of frequency of break in the job routine which is higher than other groups in dead line and steered line transfer technologies. The degree of break in the job routine for the first two groups may be related to the degree of repetitiveness of the job in a dead line transfer technology. As was previously stated, these areas are training grounds for more challenging jobs. The people employed know that they will only be in these locations for a brief period; however, the job is far below most of their capabilities with the result that a higher degree of break than for other groups in this technology is evident. The metal extrusion press crew functions in a manner similar to the foundry furnace and molding crew as they work extremely hard while billets are being extruded into strips for one order but once the order is completed, the equipment must be adjusted for the next order.

In the live line transfer technology groups only the two newspaper press groups (45 and 50) have a high degree of break in the job routine. These groups are quite busy during the setting up of the press, but once it is in motion the watching function allows a high frequency of break in the job routine. The other groups in live line transfer are involved in processes which are not completely operated from one or two consoles and therefore these people must watch a particular function throughout the process.

The results of the degree of mobility of workers in the group are similar to those of frequency of break in the job routine. All groups in no transfer, hand transfer, and automotive transfer technologies with the exception of the door fabricating department (26) have a high degree of mobility within the group. However, five of twelve groups have a higher degree of mobility than others in the dead line and steered line transfer technology and four of seven groups have a lower degree of mobility than others in the live line transfer technology.

In the hand transfer, machine conversion technology, the door fabricating group has a medium degree of mobility as mobility is mainly for technically required co-operation. The machines utilized in door fabricating require close attention and mobility of employees is mainly in the transfer of the product from one work place to the next.

In dead line and steered line transfer technologies, the hand tool conversion groups (the foundry furnace and moulding crew, the plywood door gluing group, the pharmaceutical packaging group, and the telephone dial repair shop) and the metal anodizing group (38) in steered automatic conversion have a higher degree of mobility within the group than other groups in this transfer technology. All the hand tool groups in this transfer technology are mobile or have mobility for both technically required and permitted co-operation. In this respect hand tool conversion may allow the employee to leave his work place whenever he sees fit, where the methods of machine tool conversion and steered automatic conversion may tie an employee to the work process for at least a longer period of time. The members of the metal anodizing group have no set work places but move from vat to vat with the metal sheets and are mobile to work in any location in this process.

Again, it is only the newspaper press groups in the live line transfer, self-regulating automatic conversion, continuous cycles technology that have a high degree of mobility. The other groups must stay at their work stations as was previously indicated.

The exhibited degree of work standards involving judgment is evident in Table XII. The degree of work standards involving judgment is high in no transfer, hand transfer, automotive transfer, dead line and steered line transfer, and live line transfer where no conversion, hand tool conversion, and machine tool conversion is utilized. Where steered automatics and self-regulating automatics are the source of conversion, the degree of work standards involving judgment is lower than previous sources of conversion. However, three exceptions are evident: the metal polishing group (14) and the sawmill green chains (32 and 33). The metal polishing group has one machine that is a steered automatic but the majority are machine tools. These machines are set for a specific type of metal strip and the operator feeds the metal into the machine. The only judgment required in this no transfer, machine tools conversion group is whether the strip is completely polished and if not, some hand finishing may have to be done. The sawmill green chains which are a dead line and steered line transfer, no conversion technology offer the employee little judgment as all he is required to do is to read the grading mark and stack accordingly.

B. Frequency of Verbal Interaction

The frequency of verbal interaction may also vary with technological form. Tables XIII, XIV, XV and XVI depict the frequency of internal and external conversation of the groups and the associated limiting factors of visual constraints and noise level.

TABLE XIII

THE EFFECTS OF TECHNOLOGY ON THE CONVERSATION PER MAN WITHIN THE GROUP

Types of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	2	0	1	3	0	0	1	1	0	0	0	0	6	1	1
Hand Tools	5	3	3	3	0	1	0	0	1	3	0	1	1	0	0	12	3	6
Machine Tools	3	0	0	2	0	2	0	0	0	0	0	0	0	0	0	5	0	2
Steered Automatics	1	0	0	1	0	0	0	0	0	1	0	5	0	0	0	3	0	5
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	2	4
Total	9	3	3	8	0	4	3	0	1	5	1	6	1	2	4	26	6	18

TABLE XIV

THE EFFECTS OF TECHNOLOGY ON CONVERSATION OUTSIDE THE GROUP

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	1	2	3	0	0	0	0	2	0	0	0	3	1	4
Hand Tools	2	5	4	1	0	3	0	0	1	0	1	3	0	0	1	3	6	12
Machine Tools	1	0	2	0	1	3	0	0	0	0	0	0	0	0	0	1	1	5
Steered Automatics	1	0	0	0	1	0	0	0	0	0	0	6	0	0	0	1	1	6
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1	5
Total	4	5	6	1	3	8	3	0	1	0	1	11	0	1	6	8	10	32

TABLE XV

THE DEGREE OF VISUAL RESTRICTIONS ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	0	0	2	0	0	0	0	0	8
Hand Tools	2	0	9	0	0	4	0	1	0	0	0	4	0	0	1	2	1	18
Machine Tools	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	7
Steered Automatics	0	0	1	1	0	0	0	0	0	2	2	2	0	0	0	3	2	3
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1	2	3
Total	2	0	13	1	0	11	0	1	3	2	2	8	1	2	4	6	5	39

TABLE XVI

THE DEGREE OF NOISE LEVEL ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	1	1	0	0	0	0	1	1	6
Hand Tools	3	5	3	2	0	2	0	1	0	1	2	1	0	1	0	6	9	6
Machine Tools	1	1	1	2	0	2	0	0	0	0	0	0	0	0	0	3	1	3
Steered Automatics	0	1	0	0	1	0	0	0	0	4	1	0	0	0	0	5	3	0
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	0
Total	4	7	4	4	1	7	0	1	3	7	4	1	6	1	0	21	14	15

In the no transfer technology where a medium or high degree of conversation and a relatively low degree of restrictions are evident for the majority of groups, three groups in hand tool conversion have a low degree of conversation within the group while four in hand tool conversion and two in machine tool conversion have a low degree of conversation outside the group.

The sawmill maintenance crew (7) has a low degree of conversation frequency within the group which may be attributed to the high degree of noise and visual restrictions between group members. This group does communicate to a high degree with other group members as they perform their tasks. Even when together the sawmill maintenance crew did not have as high a degree of communication as the metal plant maintenance crew as the equipment in the sawmill is larger and farther apart in area than in the metal plant. The sheetmetal fabrication group (9) and the newspaper advertising group (10) also have a low degree of verbal conversation within the group but this is associated with a low degree of verbal conversation outside the group. The sheetmetal fabrication group is hampered by a high noise level but the newspaper advertising group has no such restrictions. The members of the latter group work in silence without disturbing the next man. In many cases the next man may be a bench or two away which would necessitate a loud conversation which would not be tolerated by the rest of this group. This rule of this group appeared to be, "work in silence."

Other groups in no transfer, hand tool conversion having a low degree of conversation outside the group are the lead pot workers (2) and the lead burning department (3). In no transfer, machine tool conversion,

the solder spooling department (13) and the metal polishing group (14) have a low degree of conversation outside the group. These groups, as most of the other groups having a low degree of external conversation, are either extremely cohesive groups such as the lead burners or metal polishing groups or are spatially isolated from the rest of the plant as all four of these groups are with the lead burners the only ones having a high frequency of break in the job routine.

In the hand transfer technology, four of twelve groups have a low degree of conversation frequency. The sawmill log pond (16) of the East Indian mill did very little internal or external communicating as the members were further apart than in the other log ponds. In hand tool conversion groups, the foundry small molds group (19) did little internal or external communicating as they were isolated from the rest of the plant except the mold core group and had a high noise level with some visual restriction as inhibitors of conversation. In machine tool conversion the casting chippers and grinders (23) and the door fabricating department (26) have a low degree of both internal and external verbal communication. The former group has a very high noise level as a limiting factor while the latter has both noise and visual barriers as limiting factors. Other groups exhibiting a low degree of external communication are also departmentalized or have limiting restrictions such as low frequency of break.

The only group in the automotive transfer technology having a low internal and external degree of verbal communication is the automotive paint shop (31) which has medium visual restrictions, a medium noise level, and whose members are quite far apart in work location.

Six of twelve groups in dead line and steered line exhibit a low degree of verbal communication. In the no conversion category, the one sawmill green chain (31) has a high degree of verbal communication within the group and one (32) has a medium degree. Noise is somewhat of an inhibitor but group members are mobile and required to work together to some extent. In fact communication is quite effective in breaking the monotony of this job. In hand tool conversion only the plywood door gluing group (35) has a low degree of conversation as the foundry furnace and molding crew (34), the pharmaceutical packaging group (35) and the telephone dial repair shop (36) have a high degree. These groups have little noise or visual restrictions and again conversation is one way of overcoming job monotony. The only group in steered automatic conversion that exhibits a high degree of conversation is the metal anodizing group (39) which has low visual restrictions between group members and the noise level only reaches a medium degree.

The groups in live line transfer, self-regulating automatics conversion, continuous process technology have a medium or low degree of conversation. Only the two newspaper press groups (45 and 50) have a medium degree of conversation. The other groups in this category are restricted by either noise level, visual barriers, or a combination of both. Mobility, attention requirements and frequency of break in the job routine are often limiting factors of conversation frequency for these groups.

In summary, there is a low degree of verbal communication in no transfer, hand transfer, and automotive transfer technologies. However, in dead line and steered line transfer technologies a mixture of high and

low degrees of verbal communication was found, and in live line transfer, self-regulating automatic conversion, continuous cycles technological groups, a low degree of communication was found rather than the anticipated high. These variations were attributed to the degree of visual restrictions and noise level, as well as attention requirements, frequency of break in the job routine, and mobility. The associated limiting factors of visual constraints and noise level are low in no transfer, hand transfer, and automotive transfer technologies, increasing in dead line and steered line transfer technologies with the exception of live line, self-regulating automatic conversion, continuous cycles where visual restrictions are mainly low and the noise level is high.

C. Group Status

Status at the individual group membership level has been investigated by Jay M. Jackson.[12] He feels that the more highly valued an individual is by a group, the greater will be his attraction to the group. From this study, one may expect that a group awarding high status to an individual will be attractive to him and therefore, a group involved in exclusive, high status jobs that other members in the work organization may aspire to attain will hold a position of status relative to other work groups in the organization. Inter-group status then arises out of the status of the functions or jobs a particular group performs relative to other groups in the plant.

In this study, work group status is measured by the group's position on the promotional ladder, seniority, exclusiveness of task, and

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[12] Jackson, J.M., "Reference Group Processes in a Formal Organization," Group Dynamics, 2nd Ed., Dorwin, Cartwright, Row, Peterson and Co., 1962, p. 120.

length of learning time to perform the job. The first two factors of position on the promotional ladder and seniority of investigated groups may only prove useful in comparing the behavioral consequences of the technology with organizationally relevant behavior as the cited studies of Sayles, Walker and Guest have indicated that groups in different technological settings may have different positions on the promotional ladder and different degrees of seniority. Sayles has also described, as in Exhibit IV, that groups in similar technologies may be composed of members performing tasks that are highly exclusive or members performing tasks that are similar. This diversity within the same technology is true of the length of learning time to perform the function. Sayles' apathetic groups and conservative groups may operate within similar technologies such as no transfer with hand tool conversion.

Status, as measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function is depicted in Tables XVII, XVIII, XIX, and XX. These tables indicate that there are groups with a high position on the promotional ladder and groups with medium and low positions, regardless of the technology. Similar results are apparent for seniority and length of learning time to perform the function. In other words, there is no definite relationship between technological form and the group's position on the promotional ladder, length of learning time to perform the function, or seniority. There is, however, a high degree of exclusiveness of task in live line transfer, self-regulating automatic conversion, and continuous cycles. This finding concurs with Blauner's description of the exclusive functions in the chemical industry that was noted in Chapter II.

TABLE XVII

THE POSITION ON THE PROMOTIONAL LADDER ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	1	2	1	2	0	0	0	2	0	0	0	1	3	4
Hand Tools	3	5	3	2	2	0	0	1	0	1	1	2	0	0	1	6	9	6
Machine Tools	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	3	2	2
Steered Automatics	0	1	0	0	1	0	0	0	0	3	2	1	0	0	0	3	4	1
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	3	2
Total	4	7	4	4	5	3	2	3	2	4	3	5	1	3	3	14	21	15

TABLE XVIII

THE DEGREE OF SENIORITY ASSOCIATED WITH A GIVEN TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	2	1	2	0	1	0	0	2	0	0	0	2	2	4
Hand Tools	3	3	5	2	2	0	0	1	0	2	0	2	0	0	1	7	6	8
Machine Tools	0	3	0	1	2	1	0	0	0	0	0	0	0	0	0	1	5	1
Steered Automatics	1	0	0	0	0	1	0	0	0	0	5	1	0	0	0	1	5	2
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3	3
Total	4	6	5	3	6	3	2	1	1	2	5	5	0	3	4	11	21	18

TABLE XIX

THE DEGREE OF EXCLUSIVENESS OF TASK ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	3	0	0	0	0	2	0	0	0	3	0	5
Hand Tools	5	0	6	3	0	1	1	0	0	1	0	3	0	1	0	10	1	10
Machine Tools	1	0	2	2	0	2	0	0	0	0	0	0	0	0	0	3	0	4
Steered Automatics	0	0	1	0	0	1	0	0	0	5	1	0	0	0	0	5	1	2
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	0
Total	6	0	9	5	0	7	4	0	0	6	1	5	6	1	0	27	2	21

TABLE XX

THE LENGTH OF LEARNING TIME TO PERFORM A FUNCTION ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	0	0	3	0	0	2	0	0	0	0	0	8
Hand Tools	5	2	4	2	1	1	1	0	0	0	2	2	0	0	1	8	5	8
Machine Tools	2	0	1	1	2	1	0	0	0	0	0	0	0	0	0	3	2	2
Steered Automatics	1	0	0	0	0	1	0	0	0	4	1	1	0	0	0	5	1	2
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	3	1	2	3	1	2
Total	8	2	5	3	3	6	1	0	3	4	3	5	3	1	3	19	9	22

D. Group Cohesiveness

Leonard Sayles[13] in his survey of industrial work groups suggests that in larger assembly lines, on which employees are restricted in their interaction with employees on either side of them, the development of a "cohesive" work group is impaired. In this manner "cohesive" may be defined as the attractiveness of a group for its members.

The author also indicates that one may expect smaller groups to exhibit greater cohesiveness than larger ones, but no indication is made of what one should expect the range of the size of the smaller or larger groups to be. However, one would expect as group size increases that cliques (a group with mutual attraction on the part of all members) will form within the group.

Table XXI indicates that there is no predictable relationship between technological form and cohesiveness for this study as there are groups described as having a low degree of cohesiveness and others described as having a medium or high degree of cohesiveness in every type of transfer technology.

The idea that the smaller group is more cohesive than the larger group is not true in this study. Table XXII which relates group size to the described degree of cohesiveness indicates that groups with a high degree of cohesiveness are of similar size to groups with a low degree of cohesiveness.

The relationship of cohesiveness to organizationally relevant behavior will be discussed in Chapter VII. In that chapter descriptions of

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13 Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, p. 56.

TABLE XXI

THE DEGREE OF GROUP COHESIVENESS AS DESCRIBED BY MANAGEMENT ASSOCIATED WITH A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0	0	0	0	0	3	3	0	0	0	2	0	0	0	0	3	2	3
Hand Tools	5	1	5	3	0	1	1	0	0	0	1	3	1	0	0	10	2	9
Machine Tools	1	1	1	3	0	1	0	0	0	0	0	0	0	0	0	4	1	2
Steered Automatics	0	0	1	0	0	1	0	0	0	4	1	1	0	0	0	4	1	3
Self-Regulating Automatics	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	2	4
Total	6	2	7	6	0	7	4	0	0	4	4	4	1	2	4	21	8	21

TABLE XXII

THE RELATIONSHIP OF AVERAGE GROUP SIZE TO GROUP COHESIVENESS FOR A PARTICULAR TECHNOLOGY

Type of Conversion Technology	Type of Transfer Technology																	
	No Transfer			Hand Transfer			Automotive Transfer			Dead and Steered Line Transfer			Live Line Transfer			Totals		
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
No Conversion	0.0	0.0	0.0	0.0	0.0	3.7	4.3	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	4.3	5.0	3.7
Hand Tools	7.0	2.0	6.0	5.0	0.0	5.0	6.0	0.0	0.0	0.0	20.0	8.7	4.0	0.0	0.0	5.5	11.0	6.6
Machine Tools	2.0	2.0	4.0	6.7	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	1.0	7.0
Steered Automatics	0.0	0.0	11.0	0.0	0.0	5.0	0.0	0.0	0.0	6.3	9.0	7.0	0.0	0.0	0.0	6.3	9.0	7.7
Self-Regulating Automatics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	4.3	0.0	6.5	4.3
Total	4.5	2.0	7.0	5.9	0.0	5.9	5.2	0.0	0.0	6.3	11.3	7.9	4.0	6.5	4.3	5.1	6.7	5.8

groups with similar degrees of cohesiveness will be given.

E. Summary

The results of the influence of technology on the behavioral consequences of the technology indicate the following:

1. Attention requirements of the job function are low in no transfer, hand transfer, and automotive transfer technologies, increasing in dead and steered line transfer, and live line transfer.

2. The frequency of break in the job routine (rest periods, lunch, coffee breaks, washroom trips, and visits with other workers) and on the job physical mobility of workers in the group are high in the no transfer, hand transfer, and automotive transfer technologies, decreasing in the dead line and steered line and live line transfer technologies. It is felt that the deviation of the live line transfer, self-regulating automatic conversion, continuous cycles technology for these three factors (attention requirements of the job function, frequency of break in the job routine, and on the job physical mobility) from Blauner's findings may be attributed to the spatial separation of the watching functions required of the members of these groups rather than control from one or two central locations as evidenced by Blauner's groups.

3. Work standards involving employee judgment as measured by the amount of control the employee has over the conversion process is high in no transfer, hand transfer, automotive transfer, dead and steered line transfer, and live line transfer where no conversion, hand tool conversion and machine conversion is utilized. Where steered automatics and self-regulating automatics are the source of conversion, the degree of work standards involving judgment is lower than the previous sources of conversion.

4. There is a high degree of verbal communication in no transfer, hand transfer, and automotive transfer technologies. However, in dead line and steered line transfer technologies, both high and low degrees of verbal communication are evident, and in live line transfer, self-regulating conversion, continuous cycles technological groups, a low degree of communication is found. These variations are attributed to the degree of visual restrictions and noise level, as well as attention requirements, frequency of break in the job routine, and mobility. The associated limiting factors of visual constraints and noise level are low in no transfer, hand transfer and automotive transfer technologies, increasing in dead line and steered line transfer technologies with the exception of live line transfer, self-regulating automatic conversion, continuous cycles where visual restrictions are mainly low and the noise level is high.

5. There is no predictable linear or curvilinear relationship between the group's position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the job, and technological form except for exclusiveness of task in the live line transfer, self-regulating automatic conversion, continuous cycles technology where a high exclusiveness of task is evident.

6. High, medium, and low degrees of cohesion are present in almost all technological categories. Group size has no apparent effect on cohesiveness in any technological category in this study.

CHAPTER VI

HYPOTHESES CONCERNING THE EFFECTS OF THE BEHAVIORAL CONSEQUENCES OF THE TECHNOLOGY ON ORGANIZATIONALLY RELEVANT BEHAVIOR

Hypotheses concerning the effects of behavioral consequences of the technology on organizationally relevant behavior will be based on the previous descriptions of these areas that appeared in Chapters IV and V. The relationships investigated will be of area II with area III in Exhibit II. The previously described studies of Sayles, Walker and Guest, and Faunce as that appear in Chapter II again will form the theoretical base for the new set of hypotheses.

Faunce[14] examined the intervening variables that arise from the technology that influence work group behavior. He found that attention requirements of the job was one factor having an important effect upon the frequency and nature of social interaction. Specifically, he found that when attention requirements for a job function became more stringent, social interaction was inhibited to a greater extent with the behavioral consequence of employee unrest. A relevant hypothesis for this study is that groups having a high degree of attention requirements will have a high degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low or medium degree of attention requirements will have a low degree of organizationally relevant behavior.

The intervening behavioral consequences of the technology of frequency of break in the job routine (rest periods, lunch, coffee breaks, washroom trips, and visits with other workers), on the job physical mobility

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[14] Faunce, W.A., "Automation in the Automobile Industry: Some Consequences for In-Plant Social Structure," American Sociological Review, 23, 1958, pp. 401-407.

of workers in the group, and work standards involving judgment (the amount of control the employee has over the conversion process) were examined by Walker and Guest, and Sayles. Walker and Guest[15] examined the technologically influenced factors of frequency of break in the job routine, the frequency of social interaction, and the degree of mechanical pacing as they affected employee turnover and absenteeism. They found a statistically significant association between absenteeism and mass production characteristics and turnover and mass production characteristics (where mass production characteristics are associated with a high degree of mechanical pacing, repetitiveness, and low social interaction).

Sayles[16] examined the technologically influenced factors of work standards involving judgment and frequency of interaction as they influence the overall level of grievance and pressure activity, number of unplanned spontaneous outbursts, degree of internal unity (cohesiveness), participation in union activities, and management's evaluation of groups as satisfactory employees. He found that the lower the degree of judgment allowed by the technology and the lower the frequency of interaction allowed by the technology, the higher the overall level of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities. There is an exception in the extreme case where long assembly lines which inhibit total group interaction and a low degree of organizationally relevant behavior is exhibited.

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15 Walker, C.R., and Guest, R.H., The Man on the Assembly Line, Cambridge, Mass., Harvard University Press, 1952.

16 Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, pp. 64-66; 76-79.

On the basis of this material, it is hypothesized that groups having a high or medium degree of break in the job routine (rest periods, lunch, coffee breaks, washroom trips, and visits with other workers), on the job physical mobility of workers in the group, and work standards involving judgment (the amount of control the employee has over the conversion process), will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover and absenteeism. Groups with a low degree of break in the job routine, on the job physical mobility of workers in the group, and work standards involving judgment will have a medium or high degree of organizationally relevant behavior.

Although none of the cited studies investigate communication within the group and outside the group as a means of explaining organizationally relevant behavior, both Walker and Guest, and Sayles have examined the frequency of interaction. Walker and Guest[17] have noted that on longer assembly lines where workers are restricted in their interaction to workers on either side of them may also inhibit the development of any real informal group. Sayles[18] indicates that the informal group produces the needed adjustments and co-ordination between group members required by the work process but where the group is divided by a communications barrier, work centered discontents are prevalent.

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17 Walker, C.R., and Guest, R.H., The Man on the Assembly Line, Cambridge Mass., Harvard University Press, 1952, p. 79.

18 Sayles, L.R., Op. cit., p. 79.

For this study, it is hypothesized that groups having a high or medium degree of verbal communication will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low degree of verbal communication will have a high degree of organizationally relevant behavior.

Leonard Sayles has stated, "the status of the work done by a group is believed to be an important factor affecting its pattern of behavior. It affects the attitude of the members toward their group. Self-confidence, even self-righteousness, is a product of recognized value."[19] In the relation of behavior to status, one would expect the higher the status of the group, the lower will be the degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover and absenteeism. Status may be measured by the group position on the promotional ladder, job security as determined by seniority, exclusiveness of the task performed by the group and the length of learning time to perform the function required of the group. Pay differentials may also be an important factor contributing to status but were not measured because of the difficulty in obtaining wage scales from nonunion employers.

Communication has also been used for a means of studying the status of members within the group. Horsefall and Arnsberg[20] studied the initiating and receiving of communication as well as content and were able

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19 Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, p.55.

20 Horsefall, A.B. and Arnsberg, C.M., "Teamwork and Production in a Shoe Factory," Human Organization, 8, #1 Winter 1949, pp. 13-25.

to investigate the existence of informal group leaders, that is, the person of highest status in the group. They found that such an individual indulges in more conversation with each of the group members than any other person in the group. It is assumed that this person is able to give some form of social approval through verbal communication. If this assumption holds true for individuals, it is within the realm of possibility that it may hold true for groups. A member or members of a group of high status may give social approval in the form of verbal communication to an individual or members of a group of lower status. If this is the case, one may hypothesize that groups of high status as measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the job will be involved in a greater amount of communication with other groups within the limitations and noise level, than a group of low status.

In studies of the relationship between cohesiveness and performance, Cartwright and Zander[21] found that high producing employees felt that they were part of the group in contrast to low producers who felt only partial membership or none at all. In addition, groups with the highest degree of cohesiveness were composed of employees with the highest levels of morale and job satisfaction. Therefore, in this study it is expected that groups having a high degree of cohesiveness (the attractiveness of a group for its members) will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Conversely, groups with a low degree of cohesiveness will have a high degree of organizationally relevant behavior.

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[21] Cartwright, D., and Zander, A., Group Dynamics, Evanston, Illinois, Row, Peterson and Co., 1960, pp. 566, 567.

CHAPTER VII

RESULTS OF TESTING HYPOTHESES CONCERNING THE EFFECTS OF BEHAVIORAL CONSEQUENCES OF THE TECHNOLOGY ON ORGANIZATIONALLY RELEVANT BEHAVIOR

A. Technical Behavior

Tables XXIII, XXIV, XXV, and XXVI show the relationship between the behavioral consequences of the technology as indicated by attention requirements of the job, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment and organizationally relevant behavior as indicated by grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism.

It was hypothesized that groups having a high degree of attention requirements will have a high degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a medium or low degree of attention requirements will have a low degree of organizationally relevant behavior. The results of Table XXIII support this hypothesis as most of the groups are found to have a high degree of organizationally relevant behavior associated with a high degree of behavioral consequences of the technology, or a low degree of the former associated with a medium or low degree of the latter. It is true that some deviations do exist, but these are in the minority and will be described after all the hypotheses relating to attention requirements of the job function, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment have been discussed.

It was hypothesized that groups having a high or medium degree of break in the job routine (rest periods, lunch, coffee breaks, washroom trips,

TABLE XXIII

A TABLE COMPARING ATTENTION REQUIREMENTS OF THE JOB WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	2	0	5	7
Medium	2	0	1	3
Low	7	19	14	40
Total	11	19	20	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	1	0	5	6
Medium	2	0	1	3
Low	8	19	14	41
Total	11	19	20	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	2	0	5	7
Medium	4	1	3	8
Low	4	17	8	29
Total	10	18	16	44

Turnover

	High	Medium	Low	Total
High	4	2	2	8
Medium	6	1	7	14
Low	1	15	11	28
Total	11	19	20	50

Absenteeism

	High	Medium	Low	Total
High	2	0	2	4
Medium	6	1	8	15
Low	3	18	10	31
Total	11	19	20	50

TABLE XXIV

A TABLE COMPARING THE FREQUENCY OF BREAK IN THE JOB ROUTINE WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	1	3	3	7
Medium	0	1	2	3
Low	27	3	10	40
Total	28	7	15	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	1	2	3	6
Medium	0	1	2	3
Low	27	4	10	41
Total	28	7	15	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	1	3	3	7
Medium	3	1	4	8
Low	22	2	5	29
Total	26	6	12	44

Turnover

	High	Medium	Low	Total
High	3	2	3	8
Medium	2	4	8	14
Low	23	1	4	28
Total	28	7	15	50

Absenteeism

	High	Medium	Low	Total
High	0	0	4	4
Medium	5	4	6	15
Low	23	3	5	31
Total	28	7	15	50

TABLE XXV

A TABLE COMPARING THE MOBILITY OF WORKERS IN THE GROUP WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	5	0	2	7
Medium	1	0	2	3
Low	31	2	7	40
Total	37	2	11	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	5	0	1	6
Medium	0	0	3	3
Low	32	2	7	41
Total	37	2	11	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	4	0	3	7
Medium	4	1	3	8
Low	25	1	3	29
Total	33	2	9	44

Turnover

	High	Medium	Low	Total
High	8	0	0	8
Medium	4	1	9	14
Low	25	1	2	28
Total	37	2	11	50

Absenteeism

	High	Medium	Low	Total
High	3	0	1	4
Medium	7	1	7	15
Low	27	1	3	31
Total	37	2	11	50

TABLE XXVI

A TABLE COMPARING WORK STANDARDS INVOLVING JUDGMENT WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	4	0	3	7
Medium	1	0	2	3
Low	27	2	11	40
Total	32	2	16	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	4	0	2	6
Medium	0	0	3	3
Low	28	2	11	41
Total	32	2	16	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	4	0	3	7
Medium	2	1	5	8
Low	22	1	6	29
Total	28	2	14	44

Turnover

	High	Medium	Low	Total
High	5	0	3	8
Medium	4	0	10	14
Low	23	2	3	28
Total	32	2	16	50

Absenteeism

	High	Medium	Low	Total
High	2	0	2	4
Medium	5	0	10	15
Low	25	2	4	31
Total	32	2	16	50

and visits with other workers), on the job physical mobility of workers in the group, and work standards involving judgment (the amount of control the employee has over the conversion process), will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low degree of break in the job routine, on the job physical mobility of workers in the group, and work standards involving judgment will have a medium or high degree of organizationally relevant behavior. Tables XXIV, XXV, and XXVI offer support to this hypothesis as they show groups having a high degree of behavioral consequences of the technology have a low degree of organizationally relevant behavior. The results for groups having a low or medium degree of behavioral consequences of the technology are inconclusive. The organizationally relevant behavior indicated by turnover and absenteeism offers the best support to the hypothesis that groups with a medium or low degree of the above behavioral consequences of the technology will have a medium or high degree of organizationally relevant behavior. As has already been indicated, some groups have little grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities but may react to technologically imposed limitations on the job by a medium or high degree of absenteeism and turnover.

Although the overall trend of these behavioral consequences of the technology is important in examining organizationally relevant behavior, the deviations from the hypothesized become quite important in explaining why certain groups exhibit behavior that is different from the hypothesized.

In technologies where no transfer, hand transfer, and machine transfer are prevalent sources of binding the group, the groups with high

levels of unsatisfactory behavior or those deviating from the expected began with the lead pot workers (2) who exhibited high grievance and pressure activity, a high number of unplanned spontaneous outbursts, a high participation in union activities, high turnover, medium absenteeism, and a medium evaluation by management as satisfactory employees. This type of work is extremely monotonous in that the attention requirements of the job function and frequency of break in the job routine are low, while the work standards involving judgment are low and the mobility of workers in the group is restricted compared to other groups in this transfer technology. Thus, these technologically associated factors do play a role in determining their behavior for even though the employees have little break in their job routine, they are just mobile enough to interact with one another and reinforce their complaints or act on a perceived grievance. In other words, they have just enough restrictions to limit any concerted activity but enough freedom to allow spontaneous outburst.

Other groups having similar organizationally relevant behavior in the no transfer, hand transfer, and automotive transfer technologies are the solder spooling group (13) and the casting chippers and grinders (23). These groups have relatively low attention requirements, a low frequency of break in the job routine, low mobility compared with other groups in the low transfer technologies, and utilize hand and machine tools in their product conversion. This description compares directly with that of the lead pot workers as depicted above. The degree of these technologically associated factors associated with the mental or physical requirements of the job is enough to breed the degree of "unsatisfactory" behavior exhibited by these groups.

In the technologies of dead line, steered line, and live line the foundry furnace and molding crew (34) and the two green chains (32 and 33) exhibit similar behavior in their frequency and level of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. The foundry furnace and molding crew is one of the larger groups in the plant. It is linked by two overhead cranes which carry crucibles from the furnace that are tipped into the prepared molds. While the metal is being prepared in the furnace, the crew readies the molds, then assists in the tapping of the furnace and the pouring of the metal, and lastly the removal of the castings from the area. The employees while having nearly identical tasks, are required to interact with one another in a work process that is as monotonous and strenuous as that of the previous groups. It is no surprise that the behavioral consequences of the technology are of the same magnitude as the others in this category with attention requirements, frequency of break in the job routine, and mobility relatively low.

The sawmill green chains represent a short steered line process that requires high physical endurance and a calm temperament. There must be a degree of co-ordination between the employees if the lumber is to be separated correctly but interaction and communication is inhibited by the low frequency of break in the job routine, and low mobility of the workers in the group.

The foundry mold core group (20) exerts continuous pressure and has consistent grievance activity, as well as a high degree of unplanned spontaneous outbursts and participation in union activities. The behavioral consequences of the technology indicate restrictions on group freedom. Even

though the attention requirements of this particular group are low and the work standards involving judgment are high, the frequency of break in the job routine and the mobility of workers in the group are fairly low. Another group which is characteristic of this type of behavior is the door fabricating department (26) which was described as operating in a short assembly line. This group is limited by the even more stringent technologically associated factors of detailed attention requirements, low mobility and the use of machine tools. However, the frequency of break in the job routine is such that if coupled with the tenure of the people in this group, it could have a mellowing effect on the number of spontaneous outbursts, turnover, and absenteeism shown by this group.

The sheet metal painting group (44) which functions in a live line transfer technology and engages in work quite similar to that of the door fabricating department has high grievance and pressure activity, a high number of unplanned spontaneous outbursts, high participation in union activity, high turnover, high absenteeism, and a low evaluation as satisfactory employees by their management. In this case metal panels are hung on a continuously circulating overhead conveyor. As these panels pass by, they are spray painted, then pass into a bake oven, and finally emerge and are removed from the conveyor and stacked. The odor and spray of paint is prominent in this area. The foreman of this crew gave the following description of their activities, "This is the pressure crew in the plant. They are extremely active in the union and continually plan their own activities and other's throughout the day. I have to be extremely careful of what I say in their presence if I don't have concrete evidence or before I know it--bingo! It's a grievance--and a well-planned one at that! The two plant

hotheads are also in this group and sometimes, some fairly rough on-the-spot action is encountered." The technologically associated factors, again, hold the key to this behavior, for even though the frequency of break in the job routine is low, the low attention requirements of the job function, the high mobility for this type of technology, and the low judgment factors allow enough in-group freedom for both spontaneous outbursts and concerted behavior.

In the no transfer, hand transfer, and automotive transfer technologies, eight groups having relatively low status as depicted in Chapter V have a low degree of grievance and pressure activity, a low number of unplanned spontaneous outbursts, low participation in union activities, low or medium turnover, and low absenteeism. They are the newspaper paste-up group (1), the auto mechanics group (5), the sawmill machine shop (12), the foundry machine shop (15), the sawmill log ponds (16, 17, and 18), and the newspaper editorial typesetting group (27). The newspaper paste-up group has only surface attention requirements with the frequency of break in the job routine, mobility, and judgment factors being very high. Even with this freedom, the group is not closely knit. The sawmill machine and foundry machine shops have detailed attention requirements, a high frequency of break in the job routine, and a high in-group mobility. The basic difference between the two is that a higher judgment factor is involved in the hand and machine conversion of the mill versus the steered automatics of the foundry. The log pond groups all have low attention requirements, a low frequency of break in the job routine, a high mobility of employees in the group, and high work standards involving judgment. The lack of break in the job routine is balanced by the undemanding type of work

carried out by these groups. The mechanics group has detailed attention requirements, a high frequency of break in the job routine, a high mobility within the group, and a high judgment factor in their work processes which are comparable to the factors encountered in the sawmill machine shop. This degree of freedom coupled with individual type of work is conducive to the low degree of organizationally relevant behavior shown by this group. The newspaper editorial typesetting group has a lesser degree of freedom than the rest of these groups as detailed attention requirements, less frequency of break, less mobility, and the use of machine tools in the conversion process characterize this group. As previously described, this group exhibits a low degree of organizationally relevant behavior due to their limited interaction and the high degree of noise encountered in their work area.

The lead burning department (3), the door finishing group (11), the metal polishing group (14), and the shipping departments (28, 29, and 30) are relatively high status groups as indicated in Chapter V, and have a low degree of organizationally relevant behavior.

Even though the requirements of the job are exacting for the die shop (25) and the lead burning department (3), these groups have a high degree of freedom of mobility and break in the job routine. The door finishing group (11) is slightly more restricted in mobility and frequency of break in the job routine, but as there are only two men in the group and both are within ten feet of each other, there is a maximum degree of interaction.

The shipping departments (28, 29, and 30) also have a maximum degree of freedom of mobility, and break in the job routine associated

with low attention requirements and a high degree of control over their jobs. These groups are not exactly high status as their length of learning time is low but management indicated they are key groups around negotiating time.

The metal polishing group (14) like the lead burners and the die shop have detailed attention requirements, a low frequency of break in the job routine, a higher mobility of workers in the group, and low judgment required in the job process. This group is composed of two brothers of Japanese background whose department is completely separate from the rest of the plant. Their basic function is the polishing of metal strips on machine tools and steered automatics which in itself is an extremely monotonous task. However, this group has an absolute minimum in turnover, absenteeism, spontaneous outbursts, and grievance and pressure activity. They are management's main focus during negotiations and serve as an excellent channel of communications to and from both the union and management. The explanation for this behavior may lie in their approach to the job and the pride they take in their work. They have raised this group to a high status level in the plant.

Progressing into the dead line, steered line, and live line transfer technologies, the newspaper press room (45), the food processing plant (46), the wire extrusion and cable coiling group (47), the newspaper mail room (48), the sawmill automatic trimshop (49), and the newspaper press building (50) exhibit medium or low grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, associated with medium or high turnover and absenteeism. The door gluing group is a significant exception here as it has low grievance and pressure

activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. In these groups, the attention requirements are high with the frequency of break in the job routine, the mobility of workers in the group, and work standards involving judgment very low. There are three exceptions to this degree of job rigidity; the door gluing group and the two press rooms. The door gluing group has restrictions comparable to those in the lower technologies, but has a relatively high restriction in mobility, whereas, the press groups are very mobile and tend to congregate in a group throughout the operation of the press but their frequency of break in the job routine is also high. The two press groups differ in that one is operated by a console control and fills a whole building while the other is quite small and operated from a small panel. Both are loosely constructed groups, where interaction is inhibited by spatial separation during set-up and by noise during the operation.

The role that the behavioral consequences of the technology play in determining organizationally relevant behavior is an extremely important one. The preceding descriptions indicate that groups having similar behavioral consequences of the technology also exhibit a similar degree of organizationally relevant behavior except the few noted groups that had slight variations.

B. Frequency of Verbal Interaction

It was hypothesized that groups having a high or medium degree of in-group verbal communication would have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low

degree of in-group verbal communication would have a high degree of organizationally relevant behavior.

Table XXVII indicates that the above hypothesis holds for groups having a high degree of in-group verbal communication as they do exhibit a low degree of organizationally relevant behavior. However, the tables in this exhibit also show that most of the groups having a low degree of verbal communication within the group also have a medium or low degree of organizationally relevant behavior rather than the hypothesized high degree.

Therefore, there appears to be a similar medium or low degree of organizationally relevant behavior, regardless of the degree of verbal communication within the group. These results indicate that the degree of verbal communication within the group has little influence on organizationally relevant behavior.

In order to understand this result, a description of the groups having a similar degree of organizationally relevant behavior, regardless of the degree of verbal communication within the group, will be presented.

Group status was discussed in the chapter comparing technological form with the behavioral consequences of the technology. The results of this comparison indicated that no predictable relationship exists between the technology and the degree of status of a group except for the high exclusiveness of task in live line transfer, self-regulating automatic conversion continuous cycles technology. As there are groups of both high and low status in each technological category, it is thought to be of interest to differentiate between these degrees of status to determine if there is any difference in the conversation patterns within the group and restrictive elements between group members.

TABLE XXVII

A TABLE COMPARING THE DEGREE OF VERBAL COMMUNICATION WITHIN THE GROUP WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	4	2	1	7
Medium	1	0	2	3
Low	21	4	15	40
Total	26	6	18	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	4	2	0	6
Medium	0	0	3	3
Low	22	4	15	41
Total	26	6	18	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	3	2	2	7
Medium	2	1	5	8
Low	19	3	7	29
Total	24	6	14	44

Turnover

	High	Medium	Low	Total
High	4	3	1	8
Medium	4	1	9	14
Low	18	2	8	28
Total	26	6	18	50

Absenteeism

	High	Medium	Low	Total
High	3	1	0	4
Medium	3	3	9	15
Low	20	2	9	31
Total	26	6	18	50

The groups shown as low status in Tables XVII, XVIII, XIX, and XX and having a low degree of organizationally relevant behavior in the no transfer, hand transfer, and automotive transfer have greater external communication than the rest of the groups in these technologies. These are the newspaper paste-up group (1), the mechanics (5), the machine shops (12 and 15), and the newspaper editorial typesetting group (27). The exceptions here are the mill ponds (16, 17, and 18) where the East Indian cultural group exhibited lower internal communication than the other two. However, all these groups were loosely joined and conversation appeared to take place between sub-groups of individuals within the group rather than the total group. For example, the two senior mechanics conversed quite frequently and consulted each other for information while the younger mechanics would converse among themselves and say little to the older ones unless they were faced with a problem they couldn't solve.

The groups of low status having medium or low grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, associated with a medium or high degree of turnover and absenteeism that work in dead line, steered line, and live line transfer technologies have little external and internal communication. These are the door gluing group (35), the newspaper press groups (45 and 50), the food processing plant (46), the wire extrusion and cable coiling group (47), the newspaper mail room (48), and the sawmill automatic trim shop (49). The restrictive factors of noise and sight become very important in these groups for this type of restriction may inhibit the formation of any real informal group as mentioned in the study by Walker and Guest.[22] In the cases of the

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22 Walker, C.R. and Guest, R., The Man on the Assembly Line, Cambridge, Harvard University Press, p. 79.

press rooms interaction did occur during the running of the press but the noise factor even restricted this conversation to a considerable degree.

Groups of high status as depicted in Tables XVII, XVIII, XIX, and XX that work in no transfer, hand transfer, and automotive transfer have the same opportunity for conversation as the aforementioned groups in these technologies due to the low degree of restricting factors. These are the lead burners (3), the door finishers (11), the metal polishers (14), the die makers (25) and the shippers (28, 29, and 30). All of these groups met and entered into discussions as total units. This discussion was mainly work centered rather than directed toward external or personal messages. The exception here is, of course, the shipping groups who must interact with truck drivers, salesmen, foremen, purchasing clerks, and many others, but this large degree of external communication did not seem to affect their internal unity to any noticeable extent. The degree of organizationally relevant behavior exhibited by these groups is similar to the low degree exhibited by the lower status groups in these technologies.

Groups that have a medium or high degree of grievance and pressure activity, number of spontaneous outbursts, participation in union activities, turnover, and absenteeism, and in general have a higher degree of spontaneous behavior rather than the concerted type are the lead pot workers (2), the solder spooling department (13), and the chippers and grinders (23) in no transfer, hand transfer and automotive transfer technologies, and the green chains (32 and 33), and the foundry furnace and mold core group (34) in the dead line and steered line transfer technologies. These groups have a higher degree of internal conversation than external but all communication is inhibited to an extent by noise. In other words, these groups did

communicate; however, this communication is limited so that the group cannot interact as a total group. Brief meetings between individuals and the passage of messages from person to person typifies the communication of these groups. This is an ideal medium for insufficient communications which in turn give birth to many tensions which accumulate until released through a short-lived flare-up and then the cycle begins again.

The only group exhibiting a similar degree of organizationally relevant behavior as the above groups but differing in the amount of verbal communication are the chippers and grinders (23). They communicate externally to a greater extent than above groups which may partially explain why they have a high or medium degree of organizationally relevant behavior for even though they converse and bicker among themselves, a fair amount of their communication is directed individually to supervisors, engineers and other employees.

The groups indicative of continuous pressure on management and the union through well planned group activity, the foundry mold core group (20), the door fabricating department (26), and the sheet metal painting group (44), differ from the previous groups in the frequency of their communications. The foundry mold core group and the sheet metal group have a high degree of in-group discussion with few restrictions. The groups are compact enough that conversations may involve the group as a whole rather than just a few members at one time. These groups have the opportunity to discuss issues at length during the normal work process and may follow up by taking well planned and concerted action directed toward the union or management.

Again, an exception is witnessed in the amount of communicating done by the door fabricating department where both external and internal

communication is low. As was observed in the discussions on the technology and the behavioral consequences of the technology, this group has all the characteristics of one prone to sudden flare-ups, but because of tenure in their positions, have seemingly mellowed and exert well planned pressure on management. The group is composed of only three members and communication that is initiated involves the whole group or is passed throughout the group.

Communicative interaction, therefore, is high in groups exhibiting a low degree of organizationally relevant behavior and is low for groups exhibiting a comparable low degree of organizationally relevant behavior rather than the hypothesized high. This deviation may be attributed to the restrictive noise and visual factors present in dead and steered line and particularly live line transfer technologies. In some groups, as noted, these restrictive factors allow only partial in-group communication which has the end result of employee frustration and a high degree of unorganized spontaneous outbursts.

C. Group Status

Status, as measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function, is compared with organizationally relevant behavior in Tables XXVIII, XXIX, XXX, and XXXI.

In relating behavior to status, it was hypothesized that one would expect the higher the status of the group, the lower the degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. As the tables indicate, this hypothesis is true for groups having a high degree of status as

TABLE XXVIII

A TABLE COMPARING GROUP POSITION ON THE PROMOTIONAL LADDER WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	0	4	3	7
Medium	1	0	2	3
Low	13	17	10	40
Total	14	21	15	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	0	3	3	6
Medium	1	1	1	3
Low	13	17	11	41
Total	14	21	15	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	1	4	2	7
Medium	1	4	3	8
Low	10	12	7	29
Total	12	20	12	44

Turnover

	High	Medium	Low	Total
High	0	4	4	8
Medium	3	4	7	14
Low	11	13	4	28
Total	14	21	15	50

Absenteeism

	High	Medium	Low	Total
High	0	0	4	4
Medium	2	7	6	15
Low	12	14	5	31
Total	14	21	15	50

TABLE XXIX

A TABLE COMPARING SENIORITY WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	1	2	4	7
Medium	0	2	1	3
Low	10	17	13	40
Total	11	21	18	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	1	1	4	6
Medium	0	2	1	3
Low	10	18	13	41
Total	11	21	18	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	1	3	3	7
Medium	1	5	2	8
Low	8	10	11	29
Total	10	18	16	44

Turnover

	High	Medium	Low	Total
High	0	2	6	8
Medium	1	8	5	14
Low	10	11	7	28
Total	11	21	18	50

Absenteeism

	High	Medium	Low	Total
High	0	0	4	4
Medium	1	9	5	15
Low	10	12	9	31
Total	11	21	18	50

TABLE XXX

A TABLE COMPARING EXCLUSIVENESS OF TASK WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	2	2	3	7
Medium	2	0	1	3
Low	23	0	17	40
Total	27	2	21	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	1	2	3	6
Medium	3	0	0	3
Low	23	0	18	41
Total	27	2	21	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	3	1	3	7
Medium	5	1	2	8
Low	15	0	13	29
Total	23	2	18	44

Turnover

	High	Medium	Low	Total
High	4	2	2	8
Medium	9	0	5	14
Low	14	0	14	28
Total	27	2	21	50

Absenteeism

	High	Medium	Low	Total
High	1	2	1	4
Medium	9	0	6	15
Low	17	0	14	31
Total	27	2	21	50

TABLE XXXI

A TABLE COMPARING LENGTH OF LEARNING TIME TO PERFORM FUNCTION WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	0	2	5	7
Medium	1	0	2	3
Low	18	7	15	40
Total	19	9	22	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	0	1	5	6
Medium	1	1	1	3
Low	18	7	16	41
Total	19	9	22	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	1	2	4	7
Medium	2	3	3	8
Low	13	4	12	29
Total	16	9	19	44

Turnover

	High	Medium	Low	Total
High	3	1	4	8
Medium	4	3	7	14
Low	12	5	11	28
Total	19	9	22	50

Absenteeism

	High	Medium	Low	Total
High	0	1	3	4
Medium	5	2	8	15
Low	14	6	11	32
Total	19	9	22	50

measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function, as they do exhibit a low degree of organizationally relevant behavior. However, groups having a medium or low degree of status also exhibit a low degree of organizationally relevant behavior.

Again, there is a low degree of organizationally relevant behavior no matter what the degree of the variables attributing to status. It appears that position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function have little influence on organizationally relevant behavior. Rather than generalize on these results, a group by group approach may provide an explanation for specific cases.

The groups in the no transfer, hand transfer, and automotive transfer technologies that exhibit a low degree of organizationally relevant behavior, namely, the newspaper paste-up group (1), the mechanics group (5), the machine shops (12 and 15), the mill ponds (16, 17, and 18), and the newspaper editorial typesetting group (27) are associated with a low position on the promotional ladder, low seniority, low exclusiveness of task, and a short length of learning time to perform the function. These jobs are very low prestige jobs having a fairly large proportion of new and unskilled people performing them, the majority learning at the bottom rung of the ladder before moving up. In this respect, most of them are faced with split roles, that is, they want to be accomodative to the union's wishes while at the same time creating a good impression with management. Their appearance to both management and the union is, then, of an apathetic nature.

Other groups in the no transfer, hand transfer, and automotive transfer technologies that exhibit a low degree of organizationally relevant behavior, the lead burners (3), the door finishing group (11), the metal polishing group (14), the die shop (25), and the shipping departments (28, 29, and 30), have high positions on the promotional ladder, medium-high seniority, high exclusiveness of task, and a long length of learning time to perform their function. The only exception here is the shipping departments which have a relatively short length of learning time. These groups have a high level of self confidence, and consequently carry a high degree of prestige relative to other groups in the plant. These groups are the main target of management activity as it is through these people that management attempts to communicate with the rest of the plant and to receive feedback on these messages as well as union activity. Only the metal polishing group (25) exhibited approximately equal communication with management and the union but the production manager felt, "these brothers weigh everything that both management and the union present and give us extremely good representation at all times. If we're out in left field, they certainly tell us, and then it's up to us to reconsider."

The lead pot workers (2), the solder spooling group (5), the chippers and grinders (23), the green chains (32 and 33) and the foundry furnace and mold core group (34) have a medium-low position on the promotional ladder, medium-low seniority in the plant, low exclusiveness of task, and low learning time to perform their functions. The fact that members of these groups nearly all have identical tasks and a low learning time to perform their jobs, coupled with a relatively high interaction gives an excellent environment for spontaneous activity in some form of

overt behavior. Members of many of these groups, particularly the green chains, appear to be marking time or waiting for an opportunity to move into another area in the plant. As one of the men on the green chain stated, "This job is for the birds. A guy leaves here after work and he's too tired to do anything. I go home to the wife and kids, eat supper, and then flake out. The only time we get to do anything as a family is on the weekend. Well, I'm getting some seniority here now and I'm going to apply for every posting that I can. I'm going to get out of here come hell or high water!"

On the other hand, the groups of the foundry mold core shop (20), the door fabricating department (26) and the sheet metal painting area (44) hold medium positions on the promotional ladder, medium seniority, relatively high exclusiveness in their tasks, but a short learning time to perform these tasks. The status of these groups appears to be higher than those exhibiting a higher degree of spontaneous outbursts, but these people are also frustrated to an extent in that with their present skills they can rise no higher in the plant. Therefore, their behavior is of the concerted type in which each member of the group is as well informed as the next. It is to these groups that groups having high spontaneous activity turn their attention in times of in-plant trouble. Informal reinforcement is communicated between these two types of groups during lunch break and after hours. However, group commitment is total in groups having well planned concerted activity but not in the groups exhibiting spontaneous activity due to restricted communications and interaction between group members.

These higher status groups are consciously or unconsciously the prime target of the union representatives. The foundry foreman indicated that the first area approached by the union is the mold core group with

the idea that their feelings will be indicative of the total plant.

In the dead line and steered line, and live line transfer technologies, the plywood door gluing group (35), the newspaper press rooms (45 and 50), the food processing plant (46), the wire extrusion and cable coiling group (47), the newspaper mail room (48), and the sawmill automatic trim shop (49) have a medium position on the promotional ladder, a medium-low seniority, a high exclusiveness of task, and a medium length of learning time to perform their function. However, even though they are more skilled than low status groups in no transfer, hand transfer, and automotive transfer technologies, their interaction is inhibited to the extent that it does not come near the threshold required for a total group effort. The communication required to initiate and reinforce any idea is lacking, thus, the group is frustrated in its attempts to gain self confidence and reach the level of individual conformity to group norms and goals necessary to the functioning of a group. The status that it does have is lost in the group's inability to organize as a total group.

In summary, groups of high status do exhibit a low degree of organizationally relevant behavior. However, medium and low status groups also tend towards a low degree of organizationally relevant behavior due to the limitations imposed on them by their technology and by the very structure of the job itself as low status groups in the no transfer, hand transfer, and automotive transfer technologies have jobs that require little interaction with the rest of the plant as well as within the group. High status jobs in these technologies have a high degree of in-group interaction. Some groups of low status were differentiated from others by the degree of spontaneous outbursts they exhibited while other groups

of medium status were noted to have a high degree of concerted grievance and pressure activity. Groups in live line transfer technology have a medium status but their interaction is inhibited to the extent their grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities becomes lower than groups in dead line and steered line technologies.

The hypothesis that higher status groups may communicate to a greater extent than the rest of the plant as a means of social approval does not seem to have any conclusive evidence. It has already been noted that management in most instances directs its communications to high status groups such as the lead burners (3) and the metal polishing group (14) while the union communicates through medium status groups having well planned concerted activities. The results of this study indicate that neither of these group types enter into on the job communications with external groups or individuals to any great extent. The only exception is the shipping departments, but most of their communication is to individuals outside the plant such as truck drivers and to purchasing and sales people within the plant. They do interact with individuals in other departments to a greater degree than any other group but most of this communication is shipping oriented rather than problem oriented.

In fact, low status groups in no transfer technologies exhibit greater communication with other areas in the plant than any of the other groups observed. It is quite possible that these people are approaching higher status areas for reinforcement and recognition of ideas as these are mainly people at the lower rung of the promotional ladder. In this respect, groups of higher status may wish to withhold certain information

or be the exclusive source of this information and wait until approached by lower status groups before imparting it, rather than going to these groups.

The sawmill groups (39, 40, 41 and 42) hold a relatively high position on the promotional ladder, medium seniority (five to nine years), high exclusiveness of task, and a long learning time to perform their function. Their status, as measured by these factors, should be high, yet the perceived status of each of the groups is not similar. I have already indicated that of the two mills involved, one is willing to look after the requirements of its employees while the other is willing to take its chances that the employees will stay regardless of the external labor market. In this case it is the perceived status of the group relative to the rest of the plant, and even more important, the rest of the forest industry, that is one of the prime factors governing the behavior of these groups.

D. Group Cohesiveness

Cohesiveness as defined in terms of the attractiveness of a group for its members implies two conditions: the properties of the group such as its goals, size, internal organization, and position in the organization or industry; and the needs of the individual member for security, membership, recognition, and other things which may be derived by the individual from group membership. Group cohesiveness, then, entails the nature of the group and the extent of involvement of individual members. As Hubert Bonner has stated, "the more attractive the group is to its members, the greater is the power to produce changes in its individual members, such as solutions of problems, increasingly effective discussion, productivity on task, etc."[23]

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[23] Bonner, H., Group Dynamics, New York, Ronald Press, 1959, p. 86.

In this aspect, one may expect that groups having a high degree of cohesiveness (the attractiveness of a group for its members) will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low degree of cohesiveness will have a high degree of organizationally relevant behavior. Table XXXII indicates that this hypothesis is true as groups having a high degree of cohesiveness have a low degree of organizationally relevant behavior. However, groups having a low degree of group cohesiveness also have a low degree of organizationally relevant behavior. In this case, the results also indicate that cohesiveness has little influence on organizationally relevant behavior.

It is the high and medium status groups that provide satisfaction to their members through representing their members' values and needs in their resultant behavior. The low status groups on the other hand exhibit a large degree of individual member independence as indicated in the comparisons of communication frequency, group status, and the descriptive studies. The technology and its associated factors restricts interaction within the low status group within the live line transfer technologies as well as the others to the extent that group members' needs do not reach the threshold of being total group needs and, therefore, the "attractiveness" and "power" of these groups as perceived by their members is very low. On the other hand, medium and high status groups exhibit concerted group action as the group needs are representative of the total of the individual members' needs. Thus, the technological make-up that is conducive to a high degree of interaction and job status allows a higher degree of cohesiveness than technologies where interaction is impaired and the jobs hold a rela-

TABLE XXXII

A TABLE COMPARING GROUP COHESIVENESS WITH ORGANIZATIONALLY RELEVANT BEHAVIOR

Grievance and Pressure Activity

	High	Medium	Low	Total
High	4	3	0	7
Medium	0	2	1	3
Low	17	4	19	40
Total	21	9	20	50

Number of Unplanned Spontaneous Outbursts

	High	Medium	Low	Total
High	3	3	0	6
Medium	1	1	1	3
Low	17	5	19	41
Total	21	9	20	50

Participation in Union Activities for Union Groups

	High	Medium	Low	Total
High	3	4	0	7
Medium	3	2	3	8
Low	13	2	14	29
Total	19	8	17	44

Turnover

	High	Medium	Low	Total
High	3	3	2	8
Medium	4	4	6	14
Low	14	2	12	28
Total	21	9	20	50

Absenteeism

	High	Medium	Low	Total
High	2	1	1	4
Medium	3	7	4	14
Low	16	1	15	32
Total	21	9	20	50

tively low status in comparison to the rest of the plant and other comparable jobs in the industry.

Seashore[24] has found that under conditions of low cohesiveness, perception of a high degree of support from the company is coincident with low productivity standards, while low support is coincident with higher production. He indicates that the insecure employee experiences greater anxiety regarding the fulfillment of company demands and will adopt high productivity standards to minimize this anxiety. It may be that the exhibited low degree of organizationally relevant behavior found in this study, regardless of the degree of cohesiveness, is related to the low cohesive groups' attempts in some cases to reduce this anxiety state.

E. Summary

This chapter has attempted to relate the effects of behavioral consequences of the technology with the degree of organizationally relevant behavior exhibited by groups in the technological progression with the following results:

1. The hypothesis that groups having a high degree of attention requirements would have a high degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism was found to be true. The associated hypothesis that groups with a medium or low degree of attention requirements would have a low degree of organizationally relevant behavior is also true.

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[24] Seashore, S.E., Group Cohesiveness in the Industrial Work Group, Ann Arbour, The University of Michigan Press, 1954. pp. 97-102.

2. It was hypothesized that groups having a high or medium degree of break in the job routine (rest periods, lunch, coffee breaks, washroom trips, and visits with other workers), on the job physical mobility of workers in the group, and work standards involving judgment (the amount of control the employee has over the conversion process), will have a low degree of grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups with a low degree of break in the job routine, on the job physical mobility of workers in the group, and work standards involving judgment will have a medium or high degree of organizationally relevant behavior.

In this study it was found that this hypothesis is true, as groups having a high degree of these behavioral consequences of the technology have a low degree of organizationally relevant behavior. The results for groups with a low or medium degree of these behavioral consequences of the technology are inconclusive, but most groups having a similar degree of behavioral consequences of the technology also have a similar degree of organizationally relevant behavior.

3. Groups having a high degree of in-group verbal communication do exhibit a low degree of organizationally relevant behavior as was hypothesized. But the hypothesis that communication frequency and organizationally relevant behavior are related is not supported because most of the groups having a low degree of verbal communication within the group also have a medium or low degree of organizationally relevant behavior rather than the hypothesized high degree. This deviation may be attributed to the restrictive noise and visual factors present in dead line and steered line, and live line transfer technologies. In some

groups, as noted, these restrictive factors allow only partial in-group communication which has the end result of employee frustration and a high degree of unorganized spontaneous outbursts.

4. In relating organizationally relevant behavior to status as measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function, it was hypothesized that one would expect the higher the status of the group, the lower will be the number of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism.

While this hypothesis may hold true for this study, the hypothesis that the degree of status and organizationally relevant behavior are related is not supported because groups having a medium or low degree of status also exhibit a low degree of organizationally relevant behavior. It is thought that these latter results may be due to the limitations imposed on them by their technology and by the structure of the job itself as low status groups in the no transfer, hand transfer, and automotive transfer technologies have jobs that require little interaction within the plant as well as within the group while medium status groups in live line transfer technology have their interaction inhibited to the extent that their grievance and pressure activities, number of unplanned spontaneous outbursts, and participation in union activities becomes lower than groups in dead line and steered line technologies.

6. The hypothesis that higher status groups may communicate to a greater extent than the rest of the plant as a means of social approval does not have any conclusive evidence. In fact, it may be that groups of higher status may wish to withhold certain information or be the

exclusive source of this information and wait until approached by lower status groups before imparting it, rather than going to those groups.

6. Groups having a high degree of cohesiveness have the hypothesized low degree of organizationally relevant behavior. However, the hypothesis that the degree of cohesiveness and organizationally relevant behavior are related is not supported as groups having a low degree of cohesiveness also have a low degree of organizationally relevant behavior. Some of these groups with low cohesiveness may have a large degree of individual member independence as indicated in the comparisons of communication frequency, group status, and the descriptive studies. It may be that group member's needs do not reach the threshold of being group needs and, therefore, the "power" and "attractiveness" of those groups as perceived by their members is very low. On the other hand, some of the low cohesive groups may not perceive the company as being supportive and work to reduce their resultant anxiety state.

CHAPTER VIII

CONCLUSIONS

The purpose of my study was to investigate the relationship of employee behavior to the work group as structured by the form of technology utilized in the group. It was hoped that the variables depicted in this study may be used as a forewarning to the reaction of employees placed in a specific technology and that adjustments could be made to create better work patterns.

The first measurement attempted was the relationship of the degree of technology as graded by transfer methods, conversion methods, and cycles to the resultant behavior of the groups as indicated by grievance and pressure activity, number of unplanned spontaneous outbursts, participation in union activities, turnover, absenteeism, and management evaluation of the group as satisfactory employees. While no direct trend relationship was found, groups in the technologies of no transfer, hand transfer, and automotive transfer on the whole did exhibit a lower degree of behavior as measured by the above factors than groups in the dead line, steered line, and live line transfer technologies. Groups in live line transfer, self-regulating automatic conversion continuous cycle technology had a lower degree of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities than groups in dead line and steered line technologies with steered automatics as the source of conversion and regular cycles, different frequency in the group, and continuous cycles. There were notable exceptions, however, and descriptive analysis indicated that factors ranging from the described behavioral consequences of the technology to ethnic background of group members were the cause of these deviations.

The second measurement attempted was the relationship of the degree of technology as classified by transfer methods, conversion methods, and cycles to the behavioral consequences of the technology as classified by attention requirements of the job function, frequency of break in the job routine, mobility of workers in the group, frequency of verbal communication, group status, group size, and group cohesiveness.

The behavioral consequences of the technology such as attention requirements of the job function, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment were found to be related to the form of technology. Attention requirements were low or medium in no transfer, hand transfer, and automotive transfer technologies, regardless of conversion source or cycles. Attention requirements increase in dead line and steered line transfer, steered automatic conversion, regular cycles, different frequency in the group, and live line transfer, self-regulating automatic conversion, continuous process technologies. The frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment were high or medium in the no transfer, hand transfer, and automotive transfer technologies no matter what form of conversion was present, becoming lower in dead line and steered line transfer, steered automatic conversion, regular cycles, different frequency in the group and live line transfer, self-regulating automatic conversion, continuous cycles technologies. In the case where steered automatics and self-regulating automatics are the source of conversion it was found that the degree of work standards involving judgment is lower than for other sources of conversion.

The degree of verbal communication was found to be high in no transfer, hand transfer and automotive transfer technologies regardless of conversion source, decreasing in dead line and steered line, steered automatic conversion, regular cycles different frequency in the group, and live line transfer, self-regulating automatic conversion, continuous cycles technologies. Some variations were found, especially in dead line and steered line transfer, no conversion and hand tool conversion, no regular cycles or regular cycles, same frequency in the group, but these were attributed to visual restrictions and noise level as well as associated attention requirements of the job, frequency of break in the job routine, and worker mobility. The associated limiting factors of visual constraints and noise level were, in general, low in no transfer, hand transfer, and automotive transfer technologies. Noise level increased in dead line and steered line transfer, steered automatic conversion and live line transfer, self-regulating automatic conversion, continuous cycles technologies.

No relationship was found between the group's position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function, and technological form except in live line transfer, self-regulating automatic conversion, continuous cycles technology where a high exclusiveness of task was found.

No relationship between cohesiveness and technological form was found in this study, as well as, no relationship between the degree of cohesiveness and group size as groups with few members and groups with many members were found for both cohesive and non-cohesive groups.

The third measurement attempted was the relationship of the behavioral consequences of the technology with the degree of organizationally relevant behavior. The technologically associated factors such as attention requirements of the job function, frequency of break in the job routine, mobility of workers in the group, and work standards involving judgment play an extremely important role in explaining work group behavior. The more exacting these factors are the greater the degree of overt behavior on the group's behalf except in the cases of groups with live line transfer technology with steered automatics and self-regulating automatics as a source of conversion where these factors inhibited interaction to such a degree that the group's behavior was lower than groups in dead line and steered line technologies in the exhibited degree of grievance and pressure activity, number of unplanned spontaneous outbursts, and participation in union activities.

Groups that were found to have a high degree of in-group verbal communication exhibited a low degree of organizationally relevant behavior. However, groups that had a low degree of verbal communication within the group, also had a medium or low degree of organizationally relevant behavior. Therefore, in-group communication had little influence on organizationally relevant behavior.

This low degree of organizationally relevant behavior may be attributed to the restrictive degree of noise which was present in dead line, steered line, and live line transfer technologies. However, some groups had only partial in-group communication because of the restrictive factors with the end result of a high degree of employee frustration and unplanned spontaneous outbursts.

Group status was measured by position on the promotional ladder, seniority, exclusiveness of task, and length of learning time to perform the function. The results indicated that the higher the status of the group, the lower the degree of unplanned spontaneous outbursts, participation in union activities, turnover, and absenteeism. Groups having a medium or low degree of status also were found to have a low degree of organizationally relevant behavior. These results indicate that the degree of status has little effect on organizationally relevant behavior. The low degree of organizationally relevant behavior for low or medium status groups was related to the limitations of the technology as low status groups in the no transfer, hand transfer, and automotive transfer technologies exhibited little interaction while medium status groups had their interaction inhibited to the extent that their grievance and pressure activities, number of unplanned spontaneous outbursts, and participation in union activities became lower than groups in dead line and steered line technologies.

It was found that higher status groups do not communicate to a greater extent than lower status groups but may wish to withhold certain information or be the exclusive source of this information and wait until approached by the lower status groups before imparting it, rather than going to these groups.

Cohesiveness as defined in terms of the attractiveness of a group for its members was high for groups exhibiting a low degree of organizationally relevant behavior. Groups with a low degree of cohesiveness also had a low degree of organizationally relevant behavior which indicates the degree of cohesiveness has little influence on organizationally

relevant behavior. It may be that groups with low cohesiveness could not elevate individual needs above the threshold to becoming group needs and that the "power" and "attractiveness" of these groups as perceived by the individual members was very low. Other groups with a low degree of cohesiveness that perceive the company as non-supportive may be striving to reduce anxiety through higher productivity.

The predictability of group behavior for a given technology is very inconclusive as the behavior of groups in this study compared with Sayles' was different for what appears to be similar technologies. Sayles' study appears to be theoretically sound as once group behavior is known, this is an excellent method for classifying groups according to the behavior exhibited; however, this is greatly different from the problem at hand, which is the prediction of group behavior given a particular technology. Even Sayles has stated, "Our objective was to explain differences in behavior among work groups. We wished to discover whether certain aspects of employee day-to-day behavior could be related to the structure of the work group, as determined by the technology of the enterprise, independent of supervisory skills (or their absence), management and union pressures, and individual personality variables."[25] However, in analyzing my results as compared to Sayles', I find glaring discrepancies in types of work group behavior associated with similarly described technologies.

The first problem arises in trying to find consistent group behavior associated with similar technologies. As Exhibit IV indicates, technologies characteristic of low skilled jobs or long assembly line jobs

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[25] Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, p. 162.

develop apathetic work groups. A low skilled job in this case is one that involves a short length of learning time in order to accomplish a work task. One group representative of apathetic behavior in my study is the newspaper paste-up group which involves individual jobs in a non-transfer technology rather than member dependent functions. The mill pond groups are characteristic of a hand transfer technology and do hold true to the apathetic group type. The door gluing group, the newspaper press room, the food processing plant, the wire extrusion and cable coiling group, the newspaper mail room, the sawmill automatic trim shop, and the newspaper press building are associated with the higher forms of transfer technology but are definitely not long assembly line jobs or particularly low skilled jobs, yet these groups exhibited behavior close to apathetic.

Technologies with identical tasks, homogeneous crews, or short assembly lines are the ones identified by Sayles as typical of exhibiting erratic behavior. This description holds the best comparison in terms of behavior with my study as exemplified by the previous description of the lead pot workers, mechanics, and solder spooling group. The chippers and grinders who are involved in a hand transfer technology but basically all perform the same task exhibit behavior on the apathetic-erratic axis which is the expected as technologies characteristic of both types are found. Deviant groups are found though, such as, the pharmaceutical packaging group, the telephone dial repair shop, and the aforementioned door gluing group, newspaper mail room, the sawmill automatic trim shop and the newspaper press group which operate in short dead, steered, and live line technologies but are not representative of erratic behavior.

Strategic groups are characteristic of individual worker controlled jobs according to the summary of Sayles' groups in Exhibit IV. In this study groups one to thirty-one are characteristic of varying degrees of worker control but only the foundry mold core group and the door fabricating department are in the category that I described as indicative of this type of behavior.

Exhibit IV depicts conservative groups as individual operations at the top rungs of the promotional and status ladders of the plant. While it is true that individual jobs may attribute a degree of status to the work group, it is extremely difficult to predict the amount of status a certain technology will impart to the group, independent of the group occupying the position. The die shop is the only group in my study which could be predicted to be a conservative group as the description indicated. The maintenance crew in the mill was seen to differ considerably from the maintenance crew in the metal plant and, as well, the sawmill barker and head sawyer group in one mill differed from the sawmill barker and head sawyer group in another sawmill. In fact, my three shipping departments differ from Sayles' in that mine exhibit characteristics similar to those of a conservative group as their behavior was definitely that of a well formed group and not the apathy described by Sayles[26] as representative of shipping departments.

Another point of contention is presented by this description as Sayles continues, "Even more interesting from our point of view is a striking similarity in technological characteristics among groups that behave

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[26] Sayles, L.R., Behavior of Industrial Work Groups, New York, John Wiley and Sons, 1958, pp. 10-11.

similarly. In the several plants from which we were able to obtain descriptions, wire drawers consistently acted like a strategic group regardless of the company in which they were located, as did welders, grinders, pressers, etc., behave in a predictable fashion."[27] The three cited examples of the maintenance crews, barker and head sawyer groups, and shipping departments indicate these findings do not hold true in my research results. One of the reasons on which I have elaborated, is the different degrees of technology with which these groups are associated.

Group behavior appears to be affected by more than just the type of technology utilized and extends into the total structure of the job within a given plant. The type of supervision appears as an important variable as indicated in the study by Walker[28] as does the degree of informal leadership.

Other approaches to studying the influence of technology on organizationally relevant behavior have followed different procedures than this study.

In her study on industrial organization, Joan Woodward[29] utilizes the type of product as a method of defining technology. She establishes three main categories: integral products, dimensional products, and combined systems. The integral product category is subdivided on the basis of unit and small batch production and large batch and mass production; dimensional products are classed as the result of process production;

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27 Ibid., pp. 39-40.

28 Walker, C.R., et al., The Foreman on the Assembly Line, Cambridge, Mass., Harvard University Press, 1956, pp. 135-141.

29 Woodward, Joan, Industrial Organization, Theory and Practice, London, University of Oxford Press, 1965, pp. 135-141.

while combined systems include products of both large batch and process production. The technology is investigated along with organizational functions and the effect of change on the total organization.

Merrihue and Katzell[30] utilize indicators such as periods of absence, separations (all types), initial visits to the dispensary for occupational reasons, suggestions submitted through the suggestion system, actions incurring disciplinary suspension, grievances submitted through the formal grievance procedure, work stoppages, and participation in the insurance plan to measure their Employee Relations Index for groups in General Electric Plants. This index is utilized in a plant to plant, area to area comparison throughout the General Electric Organization.

These studies indicate that explanations of behavior on a group basis with the possibility of predicting organizationally relevant behavior, given a specific technology does have a place in industry. It may be possible to operationalize factors contributing to group behavior into input and output variables and construct models similar to those used in econometrics. In other words, given a set of variables relating to the technology, organizational culture, and the requirements of the job itself as input variables, specific degrees of organizationally relevant behavior will be the resultant output variables for a given group. It is hoped that exploratory studies such as this one will pave the way for more complex and time consuming studies such as the previous ones. In this fashion, the factors investigated herein will be meaningful on a total organization basis.

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30 Merrihue, W.V., and Katzell, R.A., "E.R.I. - Yardstick of Employee Relations," Harvard Business Review, Vol.33, No.6, 1955, pp. 91-99.

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APPENDIX A

INTERVIEW SCHEDULE

1. History of the Plant

   a) Which are the key areas in the plant?
   What skills are involved?
   Are these the most profitable operations?
   Which are the least profitable?

   b) What changes affecting your work groups have occurred in the past?
   Do you anticipate any future changes?

   c) Which areas have been your major problem areas in the plant?

2. Group Relationships with Management

   a) Which groups in the plant are the most self sufficient? Which are the least?

   b) Which groups in the plant are the most influential? Which are the least influential?

   c) Which group has the highest turnover and absenteeism? Which has the lowest?

   d) Which jobs are the most popular? Which are the least popular?

APPENDIX A (Cont'd.)

e) Which group exhibits the highest grievance level? Which has the lowest?

f) Which groups are pro-union? Which are anti-union? Which are inactive?

3. Internal Group Relations

a) Which groups are the most tightly knit?

b) Which groups are more informal in their work relations and interchange jobs with one another within the group?

APPENDIX B

TECHNOLOGICAL GROUP STUDY

Group:

Date:

I Technology Rating

1. Transfer Technology

0 - no transfer
1 - hand transfer
2 - automotive transfer
3 - dead line and steered line
4 - live line

2. Conversion Technology

0 - no conversion
1 - hand tools
2 - machine tools
3 - steered automatics
4 - self-regulating automatics

3. Cycles

0 - no regular cycles
1 - regular cycles, same frequency for group
2 - regular cycles, different frequency in group
3 - continuous process
4 - some cycles regular, some continuous

4. Cycles

0 to infinity

5. Notes

APPENDIX B (Cont'd.)

II Job Function

The Mechanics of the Work Task as Defined by the Technology

1. Attention requirements of the job function

0 - low
1 - surface
2 - detailed
3 - externally focused
4 - watching

2. Frequency of break in the job routine

0 - high frequency (six or greater)
1 - medium frequency (3 - 5 per day)
2 - low frequency (1 - 2 per day)
3 - break as covered in collective agreement (no replacement)
4 - no break except as in collective agreement (replacement needed)

3. Mobility of workers in group (may be to co-operate)

0 - all mobile
1 - mobility for permitted co-operation
2 - mobility for both technically required and permitted co-operation
3 - mobility for technically required co-operation
4 - no mobility

4. Work standards involving judgment (linked to conversion technology)

0 - hand tools (worker judgment only)
1 - hand and machine tools
2 - machine tools
3 - steered automatics
4 - self-regulating automatics

5. Notes

APPENDIX B (Cont'd.)

III Work Group Function as Determined by the Technology

1. Size of work group

2. Interaction of work group

A. Conversation frequency within group

0 - high frequency (21 and above/man/hour)
1 - above medium frequency (11-20/man/hour)
2 - medium frequency (6-10/man/hour)
3 - low frequency (1-5/man/hour)
4 - no conversation

B. Conversation frequency outside group

0 - high frequency (51 and above)
1 - above medium frequency (21-50/hour)
2 - medium frequency (11-20/hour)
3 - low frequency (1-10/hour)
4 - no conversation

C. Visual restrictions

0 - no restrictions
1 - some restriction
2 - can see half of group
3 - can see less than half of group
4 - can't see one another

D. Noise level

0 - quiet
1 - little noise
2 - moderate noise
3 - quite loud
4 - extremely noisy

3. Work Flow

4. Compactness of work area

5. Notes

APPENDIX B (Cont'd.)

IV Measurement of Group Status

1. Position on promotional ladder

0 - trainee
1 - grade C
2 - grade B
3 - grade A
4 - Head operator

2. Seniority

0 - no seniority (0 - 1 year)
1 - 1 - 4 years
2 - 5 - 9 years
3 - 10 - 14 years
4 - 15 years or more

3. Exclusiveness of task

0 - same job performed by all the group
1 - same job performed by more than half the group
2 - same job performed by half the group
3 - same job performed by less than half the group
4 - all different jobs

4. Length of learning time to perform function

0 - no time required
1 - less than one year
2 - less than two years
3 - less than three years
4 - three years or more

5. Notes

APPENDIX B (Cont'd.)

V Associated Factors Arising from the Technology (dependent variables)

1. Grievance and pressure activity

0 - none
1 - low (1 - 2 grievances per month)
2 - moderate (3 - 4 grievances per month)
3 - above moderate (4 - 5 grievances per month)
4 - high (above 5 grievances per month)

2. Number of unplanned spontaneous outbursts

0 - none
1 - 1 per month
2 - 2 per month
3 - 3 per month
4 - 4 per month or more

3. Cohesiveness as described by management

on the job -

off the job -

4. Participation in union activities

0 - nonunion
1 - card carrier
2 - active at times
3 - very active
4 - shop steward

5. Management evaluation of the group as satisfactory employees

0 - excellent
1 - good
2 - moderate
3 - poor
4 - unsatisfactory

6. Turnover

0 - none
1 - low
2 - medium
3 - high
4 - constant

APPENDIX B (Cont'd.)

7. Absenteeism

0 - none
1 - low
2 - medium
3 - high
4 - constant

8. Notes