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Productivity and Perceived Work Environment of Work Groups in Poland

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PRODUCTIVITY AND PERCEIVED WORK ENVIRONMENT
OF WORK GROUPS IN POLAND

by

Donald L. Gusfa

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
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Western Michigan University
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The primary purpose of this study was to determine the relation between levels of productivity and perceptions of autonomy among similar work groups. The analysis of data obtained did not support a tendency for perceptions of high autonomy among workers to be directly related to high levels of productivity. Data were obtained from workers at six carbide tool manufacturing plants in Poland who were administered the Work Environment Scale (WES) Form R (Moos, 1981) to measure perception of autonomy. The data were collected in February 1991. Analysis of the WES data used the Kendall tau test to investigate the relation between the independent variable productivity and the dependent variable autonomy. The researcher examined nine additional hypotheses, each involving productivity and involvement, peer cohesion, supervisor support, task orientation, work pressure, clarity, control, innovation, and physical comfort as measured by various WES subscales. Support for these hypotheses was found only between productivity and workers' perception of peer cohesion.
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Productivity and perceived work environment of work groups in Poland

Gusfa, Donald Leo, Ed.D.

Western Michigan University, 1993
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CHAPTER I

INTRODUCTION

Much has been written about labor productivity and perceived work group autonomy (Chew, 1988; Farh & Scott, 1983; Flint, 1981; Nevis, 1983; Steiner, 1972; Thurow, 1982). Although there exists research about perceived work group autonomy and labor productivity, their relationship remains vague. The primary purpose of this study was to determine whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy are directly related. Nine additional hypotheses were tested to measure the relation between productivity and the following aspects of work environment: (a) perceived work group involvement, (b) perceived work group peer cohesion, (c) perceived work group supervisor support, (d) perceived work group task orientation, (e) perceived work group work pressure, (f) perceived work group clarity, (g) perceived work group control, (h) perceived work group innovation, and (i) perceived work group physical comfort. The findings to be reported in this study are intended to guide future work environment measurement, experimentation, and organizational development in industry. Findings may be useful to industrial leaders as they continue their efforts to remain competitive through labor productivity improvements.

Increases in productivity are a continuous goal and concern of business organizations competing in either local or multinational
markets. Increasing numbers of organizations have instituted productivity measurement and improvement programs designed to supplement the continuing efforts of management to reduce costs and to increase productivity and thus competitiveness. Productivity, as defined by the White House Conference on Productivity in 1984 (Productivity Growth, 1984), is the ratio of goods and services produced in the economy, in an industry, or in an individual organization to the resources used to produce them. Kendrick (1977) defined productivity as the relationship between output of goods and services (O) and the inputs (I) of resources, human and nonhuman, used in the production process; the relationship is usually expressed in ratio form: O/I. When the ratio of output to total input rises, it indicates an increase in productive efficiency, or productivity. Furthermore, Kendrick indicated that output can be related to individual classes of inputs, such as labor hours used to manufacture the product and labor productivity as the savings achieved in the use of labor per unit of output. In this study, labor productivity is measured by labor hours per unit produced.

If the United States is to remain a world-class manufacturing nation, companies must be able to produce in small lots, adapting products to changing customer demands, which requires flexible work practices, workers willing to move from job to job, and "cross-trained" employees able to perform all tasks. The latter class of employees can fill in for absent co-workers and respond quickly to changes in models and production runs (Hoerr, 1989). Corporations in the United States became concerned when labor productivity declined during the 1970s and early 1980s. Labor productivity declined in the automotive, steel,
machine and tool, textile, and farming industries. Wage concessions were made by management to prevent labor unrest and threatened strikes. At that time, however, labor productivity improvement plans to minimize the incurred wage and benefit program increases were not initiated. Concerns about market competitiveness were especially evident in the automotive industry in the 1970s. Management arrived at the realization employees were willing to increase labor productivity only if they were more involved in the implementation processes and were able to share in increased profits, that is, application of work involvement theory through such methods as employee participation groups and participative management.

The Bureau of Labor Statistics (cited in Herman, 1975) reported for 1974 a decline in labor productivity per person. This decline in productivity was attributed to worker dissatisfaction due to the design and management of the work. American workers were dissatisfied with the quality of their working lives, which offered little challenge of autonomy (Kerr & Rosow, 1979).

An autonomous work group is one which follows the principles of sociotechnical design and open systems concepts, is organized around relatively complete production processes, and is provided with the minimal conditions for self-regulation (Katzell & Yankelovich, 1975). Rakich (1970/1971) described job autonomy as:

the degree to which an individual has the ability to influence or control the manner in which activities in the work setting are performed. It consists of four dimensions which are (1) task independence, (2) interpersonal influence, (3) individual or group participation, and (4) delegated decision making authority. All four dimensions affect the individual’s
autonomy by reason of reflecting his degree of influence or control over activities in the work setting. (p. 6)

The report, *Work in America* (Kerr & Rosow, 1979), speculated worker discontent would be considerably less if workers had an active voice in decisions at the workplace. Furthermore, they would work harder if their jobs were enriched or expanded to allow greater control over the order of their work and its content, or if altered in some way to provide more freedom from direct supervision.

**Productivity in Poland**

Concerns about labor productivity were not limited to the United States. In Poland, the Polish government in 1980, in an attempt to improve national productivity, decided upon a course of rapid industrialization financed by Western banks. Large credits from the West made possible a rapid and sizable growth in income, and consumption was premature in relation to popular expectations and the economy's real capacity (Pravda, 1983). Western banks were to have been paid by the generation of hard currency through increased exports of coal, copper, machinery, and machine tools. In 1988, Poland owed the West $40 billion and each year was paying $6 billion to meet scheduled payments (Merkel, 1989). When new capital equipment, lease agreements, computer software, etc., were put into place, workers throughout Poland were expected to increase their productivity (Sobczak, 1984). Calvo and Coricelli (cited in Kharas, 1991) indicated that firms were subjected to a serious credit crunch that generated reduced outputs and higher prices. As an example of the Polish government's increased productivity
demands, workers at the Gdanska Slocznia (formerly Lenin) Ship Yard were required to achieve productivity improvements (after new equipment was installed) by increasing the number of ocean-carrying freighters repaired and outfitted monthly (Sobczak, 1984). The gross production of light industry dropped 1.5% between 1970 and 1980, while investment outlays increased by 301% for the same period (Dziadkiewicz, 1987). Kharas (1991) indicated that the Polish Ministry of Industry, in 1990, estimated that 552 enterprises were faced with potential insolvency. These firms employed 674,000 workers. The ministry forecast that dismissals during 1991 would total 150,000, primarily in the machine tools, electronic, building, textile, and transport sectors.

The Polish government refused to take the nation's work force into its confidence or to permit open discussion of the productivity goals needed to support mounting national debt. Poland owed $2.5 billion in 1973; 8 years later the debt exceeded $23 billion, and in 1990 the debt exceeded $30 billion. The government denounced economic inefficiency but excluded any innovative reforms to resolve the debt crisis. Decision making and party superiority were to be preserved at all costs, even in a country torn by economic and social strain (Dobbs, Karol, & Trevisan, 1981).

The government's autocratic methods suppressed the desire to increase labor productivity initiatives and were accompanied by worker discontent. Two-thirds of the directors in office had less than 10 years of experience. They were highly educated, but many maintained an authoritarian style and were insensitive to the human factor in
production. This was not true of all new directors; nonetheless, on the whole, as borne out by surveys conducted in 1960-1980, one of every three workers looked upon industrial relations as a source of conflict (Pravda, 1983). Management was largely concerned with controlling the physical production process and avoiding theft, resulting in a hierarchical pyramid.

A perceived lack of concern by the Polish government for its human resources stimulated Polish workers into a "renewal" movement, which became known as "Solidarity." Solidarity led to the emergence of the first independent trade union supported by the Polish nation (Walesa, 1989).

There have been few, if any, genuine cases in which job enrichment had been successfully applied to a large, heterogeneous work force (Fein, 1975). However, this was not the case in Poland. Hyclak (1987) indicated in the period from 1956-1957 to 1980-1981, worker self-management was recognized as an important element in changing the economic system from being centrally controlled to being decentralized with decision-making authority in the firms. Also, worker participation without managerial authority was seen as a way to increase the productivity of enterprises without changing the basic enterprise system. In 1984 the concepts of Solidarity stimulated ideas of a market-oriented economy and worker participation in management. These concepts met with widespread and persistent support. The report on the state of the republic (Bielasiak, 1981) stated:

Whenever a note of candor has sounded in the words of our leaders, whenever society has been trusted, whenever our difficulties, our mistakes, and ways to rectify them have
been discussed openly, the social climate and people's attitudes have changed radically, and new energies and initiatives have been released. (p. 148)

Importance of the Study

The findings of this study should provide more information about the relationship of organizational effectiveness within a sociotechnical work design. Sociotechnical work design, as detailed in Chapter II, could increase labor productivity and offset the increasing cost of labor and improve the quality of work life.

Foreign competition is an important consideration in economic planning in the United States. Manufacturing operations have been moved to countries such as Mexico, Korea, and China due to the availability of cheap labor. Given that labor is less expensive in foreign countries, American industry must compete by improving labor productivity. The findings of this study, by describing the relation between perceived work group autonomy and labor productivity at selected factories in Poland, may provide useful information in a search for practices which can improve labor productivity. Rakich (1970/1971) described perceived job autonomy as the amount of job autonomy afforded an individual in his or her work setting, as viewed by that individual, in contrast to objective job autonomy which is determined from objective criteria such as position in the organization hierarchy.

The data used in this study were collected in Poland. The reason for collecting data in Poland is the Solidarity movement's emphasis upon labor productivity improvements to decrease national debt through the actions of work groups. The value of this study is important given the
legalization of Solidarity in 1989 and the opening of new markets within the Eastern European countries in 1990.

This study is exploratory; findings may prove to be useful for future investigations into the relation between labor productivity and worker perceptions of: (a) work group autonomy, (b) work group involvement, (c) work group peer cohesion, (d) work group supervisor support, (e) work group task orientation, (f) work group work pressure, (g) work group clarity, (h) work group control, (i) work group innovation, and (j) work group physical comfort.

The remainder of this dissertation is divided into the following chapters: Presented in Chapter II is a review of the literature, as well as a description of the measuring instrument and a presentation of the reported research using the measurement instrument (Work Environment Scale, Moos, 1981). Described in Chapter III are the data sources and data analysis procedures. Presented in Chapter IV are the analysis and conclusions of the research findings. Chapter V contains the summary and recommendations for further research.
CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to determine whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy and other work environments are directly related. This chapter is divided into six sections: (1) theories of leadership, (2) autonomous work groups, (3) productivity, (4) Work Environment Scale, (5) reported research, (6) discussion, and (7) summary. Solidarity and sociotechnical work design were discussed in Chapter I.

In the first section, leadership theories are reviewed because these provide a background for the understanding of work environments, including autonomous work groups.

Theories of Leadership

Classical Theory

Classical organization theory, as espoused by Taylor (1911), Weber (1947), and Fayol (1929), directs organizational efficiency by specifying work task to worker role, developing employee rules and procedures, and establishing sufficient levels of authority to maintain them. Taylor (1911) thought workers will put forth extra effort on the job to maximize their economic gain. He arrived at this conclusion by observing a steel worker, who after putting in a 12-hour day of lifting pigs of iron, ran 12 miles up a mountainside to work on his cabin. If this
excess energy can be used to produce more on the job, suggested Taylor, higher profits from lower fixed costs can be used to pay the worker significantly more for his increased efforts. Such was the beginning of "scientific management" (Opsahl & Dunnette, 1966).

Scientific management subdivides functions into tasks and assigns them to individuals with the appropriate skills, duties, and rules. Responsibilities are clearly defined, the chain of command is top down, each manager directs a small number of employees toward a specified objective, and managerial authority is commensurate with responsibility. Management plans, at least one day in advance, the work of every worker to the most minute detail (Taylor, 1911).

**Behavioral Theory**

The behavioral school of thought in the United States is often traced to the Hawthorne studies conducted at the Western Electric Company in 1924 (Roethlisberger & Dickson, 1947). Mayo's (cited in Homans, 1950) work directed attention to the existence of small, informal, face-to-face groups within larger work groups (the classical theorists ignored the informal organization). Mayo did not consider the worker as strictly an economic being. He thought the strongest human characteristic is man's desire to be associated continually with his fellows. Members of the informal groups observed at Western Electric share in a variety of activities and beliefs common to the group. Membership in the group becomes their source of satisfaction, strength, and security and provides a buffer against the demands of the larger world of department and factory. Employee motivation and performance are
influenced by factors such as type of management control perceived by the worker, respect by management for the individual, and the interaction within the group, rather than by the classical belief of monetary incentives, discipline, and job security. Social factors also account for increased productivity at Hawthorne. Supervision is relaxed. Operatives set their own work pace and develop their own norms, practices, and values.

Advocates of behavioral theory theorize a worker's increased job involvement is reflected in a steady production improvement. The worker is no longer considered less than a man driven for money and at the mercy of his environment. Experiments by Calvin, Hoffman, and Harden (1957) compared democratic and authoritarian leadership styles. They found there is no consistent trend in favor of either style; however, the less intelligent subjects perform better under authoritarian leadership, while the more intelligent subjects perform slightly better under democratic leadership.

Maslow's (1954) "Human Need Hierarchy" accentuates (the difference between the behavioral and classical) these perceptions of management theory. The behaviorists view workers as individuals with wants and desires, whereas the classical school views workers as being part of the production process. Maslow's theory of human nature was not developed to understand people at work. Rather it is concerned with motivation in life. The most appropriate organizational setting and managerial approach is one conducive to the individual's satisfying his own needs or wants while meeting organization objectives (McGregor, 1960). When management provides a work setting which satisfies the
wants of an individual, he or she will be an effective member of the organization.

The focus of the behaviorists is on improved communication, where management and the workers have insight into the minds of each other, and where the sociotechnical design of jobs influences employees' participation in decision making and increases their job satisfaction and productivity. Cognitive models indicate productivity, and satisfaction increases can be attributed to specific inputs from subordinates on issues in which they are interested and knowledgeable (K. I. Miller & Monge, 1986). Cognitive models also suggest that if employees participate with management in decision making, they will be better prepared to implement agreed-upon work procedures. Groups need approval, support, and a maintained sense of personal worth (Likert, 1961). Likert linked effective groups to active participation in a limited area of decisions, although decisions do not have to be unanimous.

Likert (1961) and D. Katz and Kahn (1966) launched a program of research studies, the aim of which was to discover the conditions resulting in a high level of group functioning and a high level of individual satisfaction of the group members. The study at Prudential Insurance Company of America led to the identification of 12 high-producing and 12 low-producing groups of clerical workers who are equal in ability and background. This study found evidence supervisory style affected group motivation; and that as a consequence of this interaction, the most effective style from the standpoint of production is one which is more concerned with the employees' need for attention and respect than with
productivity. Successful supervisors combine employee-centered and production-centered orientations (Kahn, 1960).

**Human Relations Theory**

The human relations theories differ from behavioral theories in that the former purportedly are characterized by better controls and better measurement and probed more deeply into the underlying psychology of individuals (Gellerman, 1963). Bennis (1976) described an organization as "a social system where people have norms, values, shared beliefs, and paradigms of what's right and what's wrong and what's legitimate and what isn't of how practice is conducted" (p. 15). Designing work organizations does not mean having to conform to classical bureaucratic principles. The technical aspects could be pushed aside in favor of humanistic results (Trist, 1981). The best match would be somewhere between social and technical systems. In order to be correlated, the distinctive characteristics of the social and technical systems must be mutually respected (Emery, 1970). The work group, rather than the individual job holder, becomes central. Taylor (1911) designed man out of the system.

In contrast to Taylor's view, sociotechnical systems theorists propose that effective performance, defined usually in terms of output, absenteeism, morale, etc., is a function of aligning the social and technological systems in a way which will allow a coupling of their dissimilarities. Human relations theory emphasizes interpersonal relations, job satisfaction, and the importance of informal groups as being the catalysts initiating the study of job attitudes and their relation to human
behavior in organizations. This interest in job satisfaction developed from the desire of scientists to learn more about job satisfaction and its presumed relation to job performance.

Emery (1970) presented a work paradigm based on six principles, or assumptions, which are paraphrased below:

1. The work system is a set of activities that make up a functioning whole, rather than single jobs into which the work system can be desegregated.

2. The work group is central rather than the individual job holder.

3. Internal regulation of the system by the group rather than the external regulation of individuals by supervisors.

4. Develop multiple skills in the individual, thereby increasing the response repertoire of the group.

5. Prescribed work roles are no longer valued; rather, discretionary roles are valued.

6. The individual is complementary to the machine rather than an extension.

Autonomous Work Groups

Autonomous work groups largely emerge from the application of sociotechnical systems perspective (Cummings, 1978; Emery & Trist, 1969; Susman, 1976). The process of group decision making can lead to better utilization and integration of knowledge than individual or consultive decision making. The group may set goals which are higher than those which would have been assigned by management. As noted in the study *Work in America* (Kerr & Rosow, 1979), what workers want
most is more autonomy in their job environment. Katzell and Yankelovich (1975) may have been summarizing this phenomenon when they stated:

A major development of the socio-technical approach is experimentation with autonomous work groups. Based on principles of socio-technical design and open systems concepts, work groups are organized around relatively complete production processes and are provided with the minimal conditions for self regulation. These self regulating properties include (a) clear measure of input and output for effective feedback of results; (b) requisite task variety; (c) joint commitment to the whole task; (d) total task responsibility. Since these groups are capable of managing the internal activities of their units, managers are freed from direct control duties and are required to manage the boundary conditions that relate the work groups to other sections of the organization and to their environments. (p. 69)

In support of Katzell and Yankelovich (1975), the study Work in America (Kerr & Rosow, 1979) reported on a changing work force:

1. The work force changed from one having an average educational attainment of less than junior high to one with more than a high school education.

2. A work force comprised mostly of rural immigrants and peasant origin to largely native born.

3. A work force influence minded.

4. A work force informed, knowledgeable, and creative.

Taylor’s (1911) primacy of the machine has been replaced by the human relations concept of concern for the worker. A skilled work force using general purpose machinery is capable of higher productivity and flexibility than an unskilled work force using highly specialized machines (Friedman, 1983). The use of autonomous work groups involves a shift in focus to group from individual work procedures. The research
conducted by advocates of human relation theories focuses on job designs and work organizations where human resource can manifest itself. D. Katz and Kahn (1966) cautioned against "the glorification of the primary group as a source of work satisfaction" (p. 54) and suggested the importance of group autonomy. This form of work organization has direct consequences for the worker's self-development for general satisfaction in the workplace and for productivity (Gulowsen, 1979). Gulowsen also listed seven criteria for autonomy. They are paraphrased as:

**Goal formation:** Group formulates its goals, both qualitative and quantitative.

**Performance control:** Group controls its performance with regard to where to work, when to work, and in which activities to engage.

**Production method:** Group decides on the best production method: modular, assembly line, etc.

**Distribution of tasks:** Group members assign tasks.

**Group membership:** Membership decided by the group.

**Internal and external leadership:** Group decides on the necessity of adding members.

**Operations performance:** Group decides on the sequencing of operations.

Gulowsen's (1979) criteria are used in this study to formulate a working definition of autonomous work groups.

The Katzell and Yankelovich (1975) definition is used in this study to describe autonomous work groups operationally. This definition fits five of the seven criteria for autonomous work groups as described by

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Gulowsen (1979). The two items that do not fit are: (1) group membership and (2) internal and external leadership. Katzell and Yankelovich's definition of autonomous work groups incorporates the facets of discretion, control, participation, and decision-making authority.

Autonomous work groups are work structures where members regulate their behavior around relatively whole tasks. The work design has at least two features which distinguish it from more traditional task structures: (1) The focus of design is interdependent task groupings rather than individual tasks, and (2) task control is located within the group rather than external to it. Also, autonomous work groups are task structures where independent workers self-regulate their behavior around relatively whole tasks (Cummings & Griggs, 1977). Work groups also have indicated they perceive personal responsibility for their work (Turner & Lawrence, 1965). Autonomous work groups have been found to perceive they have a major say in scheduling their work, selecting the equipment to be used, and in deciding upon procedures to be followed (Hackman & Lawler, 1971).

A study of 60 employees and 4 supervisors describes their jobs relevant to five job characteristics, which include autonomy (Oldham, 1976). The study found a relationship between the measure of internal motivation and employees' rated work quality, work quantity, and work effort. The correlation between measures of autonomy and growth needs is .58 ($p < .01$). The relationships between the presence of autonomous work groups to employee work motivation, job satisfaction, and group performance were studied over a 3-year period in a British company producing confectionery (Wall, Kemp, Jackson, & Clegg,
In the study, an autonomous work group is described as being a group which has collective control over the pace of work, distribution of tasks, organization of breaks, and collective participation in recruitment and training of new members. Seven hundred and twenty production employees work in groups of 8 to 12 people. They concluded that throughout the early part of the test, production fell short of targets, individual and group efficiencies were low, and machine utilization was poor. However, with increased reliability of the technology, increased skill levels, and increased personnel levels, production steadily increased. Toward the end of the second year, the autonomous work groups achieved output targets, and they remained at that level for the remainder of the study. Implementation of this work design increased intrinsic job satisfaction, but it did not affect work performance demonstrably. At an organizational level, productivity benefits were realized because autonomous work groups reduced indirect labor costs.

Data for 56 blue-collar workers measure the correlation between worker attitudes and behavior and the function of autonomous work groups (Cummings & Griggs, 1977). The findings indicate three distinct conditions are present if a work group is to be classified as an autonomous work group: boundary control, task control, and control of the whole task. The correlation between task control and team performance is .34 ($p < .05$).

A study of 101 samples from 88 studies in published literature of either measures of autonomy or measures of participative decision making concludes employees who perceive comparatively high levels of autonomy at work are more satisfied, committed, involved, and
motivated; are absent less; and have fewer intentions of quitting (Spector, 1986). The correlations range in magnitude from .20 to .48 ($p < .05$).

**Productivity**

Productivity is the ratio of goods and services produced in the economy, in an industry, or in an individual organization to the resources used to produce them (Productivity Growth, 1984). This definition is similar to definitions given by a number of other authors. Kendrick (1977) defined it as the relationship of output to any or all of the associated inputs, nonhuman as well as human. Katzell and Yankelovich (1975) indicated productivity reflects how well people, machinery, or both perform together.

**Work Environment Scale**

Described in this section is the instrument used to measure the perceptions of work groups in Poland of their work environments. In this section, the development of the Work Environment Scale (WES) Form R (Moos, 1981) is described, and a description of each of the work environments is provided.

The Work Environment Scale (Form R) is designed to measure the subjects' perceptions of their work environments. Additionally, the instrument has been used with many types of groups to measure three group dimensions of work environments. Insel and Moos (1974) described the work environments as (1) relationship dimensions, (2) personal growth dimensions, and (3) systems maintenance-systems change.
dimensions. The Work Environment Scale (Form R) (Insel & Moos, 1974) has 10 subscales. The instrument asks people how they perceive their current work situations. Moos developed the scale using the needs-press concept. The needs-press concept assumes individual behavior is a result of internal thought processes (needs) interacting with external stimuli (presses) (Murray, 1938). Murray described a need:

A need is clearly an emergence from the immediate past or as Schopenhauer would have it "a push from the rear," rather than a pull from the future. The environment may, of course, be effective in arousing this push, and to consciousness the field that lies before its vision or the imagery which seems to anticipate such a field commonly appears in the guise of a pull, positive incentive or attraction. To put it metaphorically, a need may have no inkling of what it needs. It may be a blind impulse, but an impulse which does not as a rule completely subside until a situation of a certain kind has been arrived at. (p. 68)

Murray (1938) described a press:

For example a press may be nourishing, or coercing, or injuring, or chilling, or befriending, or restraining, or amusing or belittling to the organism. It can be said that a press is a temporal gestalt of stimuli which usually appears in the guise of a threat of form or promise of benefit to the organism. It seems that organisms quite naturally classify the objects of their world in this way: This is sweet, this comforts, this lacks support. (p. 40)

The subscales of the Work Environment Scale (Form R) described by Moos (1981) are:

1. **Involvement**: the extent to which employees are concerned about and committed to their jobs.

2. **Peer Cohesion**: the extent to which employees are friendly and supportive of one another.

3. **Supervisor Support**: the extent to which management is supportive of employees and encourages employees to be supportive of one another.

4. **Autonomy**: the extent to which employees are encouraged to be self-sufficient and to make their own
decisions.

5. **Task Orientation**: the degree of emphasis on good planning, efficiency, and getting the job done.

6. **Work Pressure**: the degree to which the press of work and time urgency dominate the job milieu.

7. **Clarity**: the extent to which employees know what to expect in their daily routine and how explicitly rules and policies are communicated.

8. **Control**: the extent to which management uses rules and pressures to keep employees under control.

9. **Innovation**: the degree of emphasis on variety, change, and new approaches.

10. **Physical Comfort**: the extent to which the physical surroundings contribute to a pleasant work environment.

The WES, according to the needs-press theory as interpreted by Insel and Moos (1974), provides an understanding of an individual's perceptions and behavior in groups. The average internal consistency for the WES subscales (N = 1,045) is .78 with a range of .73 to .86. The average item subscale correlation is .48 with a range of .36 to .53. Moos (1981) indicated normative data were collected for 1,442 employees in representative work groups and 1,607 employees in a variety of health care work groups. The preliminary norms used in Form R were obtained from measures of 624 individuals in 44 different work groups. Insel and Moos (1974) used the following work groups in the norming sample: (a) recreational and maintenance workers in city parks; (b) professional and paraprofessional workers in volunteer outpatient clinics; (c) janitors, maintenance workers, security workers, and fire station attendants employed at a university; (d) city employees in public works, financial services, and city clerk's office; (e) skilled maintenance and
public works employees in community development and administrative services; (f) faculty members in a nursing school; (g) employees of a small electronics firm; (h) administrative staff and nurses employed in a veteran's hospital; (i) maintenance and production workers in a large factory; (j) various employees of a trucking firm; and (k) various employees of a soft drink bottling plant.

The Work Environment Scale was used in this study because three or four of the types of groups that were used to norm this in the United States are considered to be similar, or at least not dissimilar, to groups of production workers in factory settings anywhere in the world, including either the United States or Poland.

Reported Research

Summaries of studies in which the WES was used are included in this section.

Five hundred and eighty-nine enlisted men and women at the Naval School of Health and Science, San Diego, California, were sampled (Booth, Norton, Webster, & Berry, 1976). The results indicate the Social Climate scales may constitute useful item pools when applied to new environments, and the original scales may be applicable in new settings. A sampling of 14 law enforcement officers found the WES can be helpful in the study of work environments of criminal justice agencies (Waters, 1978). A sampling of 50 depressed and 50 nondepressed white women found independent women whose work environments are incongruent with their needs, but who are free to leave their environments, are depressed, similar to dependent women who perceive their
work environments as low in structure (Wetzel, 1978). A study of the work and family environments of a group of public school teachers found a relationship between teacher perceptions of work structure and work environment (Shannon, 1982/1983). Involvement at .61, Staff Support at .43, Autonomy at .62, and Task Orientation at .68 supports the relationship at the alpha level of .05. A study about whether or not a group of middle-aged men (35-50 years) perceive their work and family environments differently than younger men (20-34 years) found at the alpha level of .05 no difference between the two groups in the scores measuring their perceptions of involvement, peer cohesion, staff support, autonomy, task orientation, work pressure, clarity, control, innovation, and physical comfort in their work (O'Brien, 1979/1980).

Discussion

The preceding review of literature found in some instances a direct relation between perceived levels of autonomy and levels of productivity. The literature indicates autonomous work groups emerge from the application of sociotechnical system perspective. Therefore, with the emergence of Solidarity, the Polish government no longer adheres to autocratic methods of decision making in the workplace. Decisions affecting production now rest in the hands of firms, and workers increase their participation in management (one of the concepts of Solidarity). This situation indicates there is some basis for the existence of productivity and perceived work environment differences among work groups in Poland. Therefore, the following 10 hypotheses were formulated:
Hypothesis 1: Perceptions of autonomy among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Rakich (1970/1971) found a relationship between job autonomy and employee performance ($r = .246$). Rakich indicated that his findings add further support to the basic premise of other studies which stipulate that people having higher levels of job autonomy are higher performers. Booth et al. (1976) sampled 589 enlisted men and women. Their research indicated the Social Climate scales may constitute useful item pools when applied to new environments and the original scales may be applicable to new settings. O'Brien (1979/1980) found the group of middle-aged men (mean age 38.8 years) and the group of younger men (mean age 28.7 years) do not differ at the .05 alpha level in their perceptions of autonomy in their work environment. Shannon (1982/1983) found the relation between teacher perception of work structure and the Work Environment subscale Autonomy supporting the existence of a relation at the alpha level of .05. Autonomy is found to be correlated with the self-report of personal productivity ($r = .21$, $p < .05$), and personal productivity is, in turn, correlated with reports of general affective tone ($r = .55$, $p < .001$) and job attractiveness ($r = .44$, $p < .001$) (Farh & Scott, 1983). Thus, subjects in the most autonomous condition report a higher level of autonomy; and those who report a higher level of autonomy, whatever the condition, tend to report a higher level of personal productivity.

Booth et al. (1976) did not directly address the issue of whether or not there are differences in perceptions of autonomy between groups. O'Brien (1979/1980) did not find differences when he disaggregated his
data by age and did not find differences in perceptions of autonomy. Shannon (1982/1983) did find a relation, using the Work Structure subscale Clarity and Innovation and the Work Environment subscale Autonomy at the .05 alpha level. Farh and Scott (1983) and Rakich (1970/1971) found a correlation between autonomy and productivity. Four of these five studies did examine the relation of autonomy to other variables. In three of the four studies, relations between autonomy and other variables were found. Based on the studies where a relation between perceptions of autonomy and productivity were found, it was determined to complete a comparative study in an industrial setting outside of the United States. Because one of the concepts of Solidarity is worker participation in management, and because Solidarity places an emphasis on labor productivity to reduce the country's national debt, it was determined to add to the empirical data on productivity and the relation to autonomy by testing work groups in Poland for differences.

As outlined in Chapter I, the remaining perceptions of the work environment, as measured by the Work Environment Scale, made up the nine other hypotheses.

Hypothesis 2: Perceptions of involvement among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Oldham (1976) hypothesized the more an individual is internally motivated, the greater the work effort, quality, and quantity, and the lower his absenteeism. Results show a positive relation between the measure of internal motivation and employee-rated work quality, work quantity, and work effort. O'Brien (1979/1980) found no relation in their perceptions of involvement in the work environment between a
group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years). Shannon (1982/1983) found the existence of a relation between teacher perception of work structure and the Work Environment subscale involvement. The Pearson product-moment correlation was .61. (A .05 alpha level was used in that study.) K. I. Miller and Monge (1986) indicated productivity and satisfaction increases can be attributed to specific inputs from subordinates on issues in which they are interested and knowledgeable.

**Hypothesis 3:** Perceptions of peer cohesion among work groups in Poland manufacturing carbide tooling are directly related to productivity.

O'Brien (1979/1980) found no relation in their perceptions of peer cohesion in their work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years). However, Homans (1950) thought the strongest human characteristic is man's desire to be associated continually with his fellows.

**Hypothesis 4:** Perceptions of supervisor support among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Kahn (1960) indicated the most successful superiors combine employee-centered and production-centered orientations. Mayo's (1945) work at Hawthorne indicates employee motivation and performance are influenced by factors such as type of management for the individual. Social factors also account for increased productivity at Hawthorne. Supervision is relaxed. Likert (1961) and D. Katz and Kahn (1966) produced evidence supervisory style affects group motivation; and as a
consequence of this interaction, the most effective style from the stand-
point of production is one which is more concerned with the employees' 
need for attention and respect than with productivity. O'Brien (1979/
1980) found no relation in their perceptions of supervisor support in their 
work environment between a group of middle-aged men (mean age 38.8 
years) and a group of younger men (mean age 28.7 years). Shannon 
(1982/1983) found the existence of a relation between teacher percep-
tion of work structure and the Work Environment subscale Staff Sup-
port. The Pearson product-moment correlation was .43. (A .05 alpha 
level was used in that study.)

**Hypothesis 5:** Perceptions of task orientation among work groups 
in Poland manufacturing carbide tooling are directly related to produc-
tivity.

Taylor (1911) espoused organizational efficiency by specifying 
work task to worker role. Taylor thought workers will put forth extra 
effort on the job to maximize gain. O'Brien (1979/1980) found no rela-
tion in their perceptions of task orientation in their work environment 
between a group of middle-aged men (mean age 38.8 years) and a group 
of younger men (mean age 28.7 years). Shannon (1982/1983) found 
the existence of a relation between teacher perception of work structure 
and the Work Environment subscale Task Orientation. The Pearson 
product-moment correlation was .68. (A .05 alpha level was used in 
that study.)

**Hypothesis 6:** Perceptions of work pressure among work groups 
in Poland manufacturing carbide tooling are directly related to productiv-
ity.
O'Brien (1979/1980) found no relation in their perceptions of work pressure in their work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years).

Hypothesis 7: Perceptions of clarity among work groups in Poland manufacturing carbide tooling are directly related to productivity.

O'Brien (1979/1980) found no relation in their perceptions of clarity in their work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years).

Hypothesis 8: Perceptions of control among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Cummings and Griggs (1977) found a positive correlation, .34 (p < .05) between task control and team performance. O'Brien (1979/1980) found no relation in their perceptions of control in the work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years).

Hypothesis 9: Perceptions of innovation among work groups in Poland manufacturing carbide tooling are directly related to productivity.

O'Brien (1979/1980) found no relation in their perceptions of innovation in their work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger men (mean age 28.7 years).

Hypothesis 10: Perceptions of physical comfort among work groups in Poland manufacturing carbide tooling are directly related to productivity.
O'Brien (1979/1980) found no relation in their perceptions of physical comfort in their work environment between a group of middle-aged men (mean age 38.8 years) and a group of younger (mean age 28.7 years).

Summary

Only a very small number of studies were found that investigated the relation between productivity and (a) involvement, (b) peer cohesion, (c) supervisor support, (d) autonomy, (e) task orientation, (f) work pressure, (g) clarity, (h) control, (i) innovation, and (j) physical comfort variables measured on the Work Environment Scale (Moos, 1981). Farh and Scott (1983) and Rakich (1970/1971) found a correlation between autonomy and productivity. Furthermore, Farh and Scott found a higher level of autonomy, whatever the condition, associated with corresponding higher levels of productivity. This study examined perceived autonomy and productivity in order to support or refute the propositions offered in the literature, particularly those of Farh and Scott. No study identical or similar was found which was conducted in Poland. Therefore, this study was conducted to test the hypothesis of Farh and Scott under conditions which occurred in Poland in 1991. One hypothesis to measure the relation between the independent variable productivity and the dependent variable autonomy was formulated; nine additional hypotheses, each involving productivity and one of the following dependent variables, involvement, peer cohesion, supervisor support, task orientation, work pressure, clarity, control, innovation, and physical support, were formulated for this study. Based on the findings of the studies that
have been reported, which are mixed, decisions were made for each
hypothesis on whether to treat it as either nondirectional or directional.
Much of what is theorized about autonomy and its influence upon other
variables remains untested theory. This study will contribute to the
number of tests of theoretical propositions about the importance of
autonomy.
CHAPTER III

DESIGN AND PROCEDURES

The purpose of this study was to determine whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy as well as other aspects of the work environment are related. This chapter contains the procedures for testing the research hypotheses. The hypothesis developed to study the relation between perceived work group autonomy and productivity between factories manufacturing carbide tooling in Poland is: **Hypothesis 1**: Perceptions of autonomy among work groups in Poland manufacturing carbide tooling are directly related to productivity. The following hypotheses were also tested:

**Hypothesis 2**: Perceptions of involvement among work groups in Poland manufacturing carbide tooling are directly related to productivity.

**Hypothesis 3**: Perceptions of peer cohesion among work groups in Poland manufacturing carbide tooling are directly related to productivity.

**Hypothesis 4**: Perceptions of supervisor support among work groups in Poland manufacturing carbide tooling are directly related to productivity.

**Hypothesis 5**: Perceptions of task orientation among work groups in Poland manufacturing carbide tooling are directly related to productivity.
Hypothesis 6: Perceptions of work pressure among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Hypothesis 7: Perceptions of clarity among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Hypothesis 8: Perceptions of control among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Hypothesis 9: Perceptions of innovation among work groups in Poland manufacturing carbide tooling are directly related to productivity.

Hypothesis 10: Perceptions of physical comfort among work groups in Poland manufacturing carbide tooling are directly related to productivity.

This chapter is divided into six sections: (1) plant selection, (2) subjects, (3) instrumentation, (4) data collection, (5) data analysis, and (6) summary.

Plant Selection

The focus of this study was the relation between perceived autonomy of work groups in Poland and labor productivity at selected organizations manufacturing carbide tooling in Poland. Subscales of the Work Environment Scale (WES, Moos, 1981), Involvement, Peer Cohesion, Supervisor Support, Task Orientation, Work Pressure, Clarity, Control, Innovation, and Physical Comfort, also were to be examined.

Three steps were defined for this study before departure to Poland. Step 1, the mean score and standard deviation for all factories’ plant productivity were to be computed. Step 2, factories with standard
productivity scores one or more standard deviations above or below the mean were to be administered the survey. These factories were to be considered as having high or low productivity, respectively. A minimum of three factories in each category (high and low productivity) was considered necessary for purposes of this study. If the sample size were larger and if more than three factories in either group had been realized, then the factories with the most extreme scores in each group were to be chosen for the study. Step 3, if three or more factories did not fall within the high and low productivity range as defined in Step 2, then all of the factories were to be rank ordered from high productivity to low productivity and used in the study. An alpha of .10 was used to test the null hypotheses. This study is exploratory; therefore, a decision was made to use a high alpha level.

Upon arrival in Poland and before conducting the survey, the following occurred:

1. Contact was made with Poland’s Department of Commerce in Warsaw in February 1991. The Department of Commerce was requested in a face-to-face meeting to provide the names of the organizations manufacturing carbide tooling near the cities of Warszawa, Gdansk, and Kracow.

2. The Department of Commerce provided the researcher with the list of only six factories located near the cities of Warsaw, Gdansk, and Kracow. The Department of Commerce confirmed that these were the only factories of this type.

3. After the list of six factories was provided by the Department of Commerce, telephone contact with the plant manager at each of the...
six factories was made requesting permission to conduct the study.

4. The plant manager at each factory computed their labor productivity by dividing the total monthly labor hours required to produce the parts by the monthly production. Actual production totals were not divulged to the researcher because each plant manager stated that he wanted to keep such data confidential. To verify the productivity data, the researcher reviewed the data with a sales engineer employed by a Polish export company familiar with data of this type. He confirmed the reasonableness of the data.

5. All six factories were surveyed using the WES. Permission to conduct the survey was obtained from the local union representative in face-to-face meetings and plant management at each factory site by telephone before the survey was administered. The workers at the factories sampled in Poland were laborers in light industry manufacturing machine cutting tools, namely, carbide cutting inserts. To obtain information about the workers' perceptions of their work environment, strict assurances were provided the workers, including their local union representatives, that the information requested would not be disclosed for purposes other than for this study (see Appendix C). After such assurances were acknowledged, subject participation was voluntary. Individual perceptions were obtained from scores recorded on the WES. The scorer counted the number of yes answers for each subscale and entered the total on a worksheet. Raw scores were converted to an average score for all respondents surveyed at each factory location. Consequently, only WES data for workers employed on the day the survey was administered at the selected plants were used for
this study. Average scores for the subscales at each factory site were calculated for this study. All testing was administered in the morning during the designated work break.

Subjects

This study was conducted near the major industrial cities of Warszawa, Gdansk, and Krakow. The population for this study was factories comprised of work groups involved in the manufacturing of carbide tools. Poland—Statistical Data 1987 (Dziadkiewicz, 1987), published by the Central Statistical Office of Poland, indicates in 1986, 4,277,000 workers were employed in industry. Forty-five percent had a basic vocational education, 35% a secondary education, and 6% a third level (college) education (the data do not address the remaining 14% of the workers). The number of workers in light industry was 686,000, representing 16.1% of the industrial enterprises. The number of workers manufacturing carbide tooling is unknown. The average pay per worker was 27,499 zlotys per month, approximately $55 U.S. Rogers and Matthews (1991) reported that the wages in Eastern Europe are cheap, in Poland especially. The wage rate in Poland is 15% of equivalent British rates, and less than either that of Hungary or Czechoslovakia. In 1985 the number of organizations with 51-100 workers was 7,900; 101-500 workers, 11,900; 501-1,000 workers, 2,200; 1,001-5,000 workers, 1,800; and 5,001 and more workers, 200.

The subjects for this study were factory workers manufacturing primarily cutting tools, namely, carbide cutting inserts. The percentage of subjects asked to answer the survey was 100% of the workers at the
selected plants working at the time the survey was administered. The employees at each plant completed the survey in a designated area monitored by the researcher. The plant manager at each plant verified that 100% of the employees asked to take the survey did in fact participate. It is assumed that the high response rate was due to the plant managers' perception that the researcher could in some way affect potential sales to United States customers. Therefore, pressure to complete the survey could have been applied to the workers, but the researcher had no indication that this actually occurred.

Permission to conduct the study was obtained from both factory management and local union representatives. Each work group was introduced to the researcher and encouraged by the researcher to participate in the study. A verbal agreement was made between the researcher and the workers to (a) keep information obtained from individual participants confidential by not requiring their names or any other means of identification on the questionnaire and (b) to report only group data in the study. A request was made to the workers at each factory site, encouraging their participation in completing the WES. The participants at each factory site (the work group) had described to them the study and the instrument as a group. Identification codes were assigned to each plant. Each factory surveyed was identified by its assigned code. A logbook with the following information was maintained: assigned code number for each factory surveyed, total work force on the rolls at each factory, number of production days used in the calculation, total production and total labor hours for the 2 months used for the survey, and number of employees at the work site the day the questionnaire was
administered (if extenuating manufacturing circumstances had been found which necessitated using production output for months other than the 2 preceding the survey, one of two actions would have occurred: (1) the factory would have not been used in the survey; or (2) if the factory was used in the survey, the information would have been noted on the logbook including conclusions).

Instrumentation

The Work Environment Scale, Form R (Moos, 1981) was used in this study because factory workers had been used in the norming sample. The instrument is published by the Consulting Psychologists Press, Inc., Palo Alto, California, copyright 1981. The publisher granted permission to use the instrument and to translate the English version into Polish. Insel and Moos (1974), using the Kuder-Richardson Formula 20, determined the internal consistencies. The average internal consistency for the English version of the Work Environment Scale subscales (N = 1,045) is .78 with a range of .73 to .86. The average item subscale correlation is .48 with a range of .36 to .53. Test-retest reliability of individual scores on 10 subscales varies from a low of .69 for Clarity to a high of .83 for Involvement (Moos, 1981).

Polish workers, completing the translated WES, were asked to respond true or false to 90 single-sentence statements on the instrument. Moos (1981) indicated the instrument should take between 15 and 20 minutes to complete. Questions pertaining to the subscales are alternated in the survey to appear as every 10th question. Subscale scoring is facilitated by this arrangement of questions for each subscale.
Raw scores for this study were obtained by adding *yes* responses marked in appropriate spaces as contributing to the subscale score. High raw scores (on a subscale 0-9) were interpreted as indicating a higher perceived presence of the measured subscales. An average score was calculated for the work group, that is, the workers at each factory, for the subscales. Tables for converging raw scores for each subscale to average scores are provided by Moos (1981).

Because Polish versions of the WES were not available, permission was obtained from the publisher to translate the WES from English to Polish. Translation accuracy was ensured by the method of back-translation (Lefkowitz, 1988/1989); that is, the questionnaire was translated from English to Polish by a bilingual interpreter and member of the Union of Polish Translators in Warsaw, and retranslated back from Polish to English by another bilingual interpreter at the University of Warszawa. The researcher compared the back-translated version to the English version and found it to be similar. (The same process was employed by the researcher in a pilot of the WES conducted in Poland in 1984; no problems were incurred with that translation.)

**Data Collection**

When Solidarity was legalized and Poland began changing to a free market economy from a communist state-controlled economy, it is likely Polish industry found it no longer necessary to report industry production data in a manner calculated to justify the communist economic system. Hyclak (1990) indicated that worker councils within Poland have considerable voice in production, investment, and profit and wage decisions.
essential to a changing economic system (centrally controlled to decentralized decision making). It is also probable, therefore, such data reported now are not subject to the pressures exerted by the previous government. Therefore, one could expect some accuracy in (a) the productivity data provided by the plant management at each factory site surveyed and (b) the responses to the WES provided by the Polish workers at each factory site. However, there is no clear evidence for accuracy or inaccuracy of these data in the environment under study.

The following steps were taken before the questionnaire was administered:

1. The researcher obtained permission to conduct the survey from the plant manager and the plant union representative.

2. During the workday prior to 12:00 noon, workers in the plant were told by the researcher in Polish the purpose of the study.

3. The researcher assured the potential respondents the data collected would be used only for purposes of the study and individual responses would be aggregated and not revealed on an individual basis.

4. A consent form was given to each worker to indicate his understanding of, and agreement to, the conditions of participation in the survey.

5. The researcher gave the potential respondents instructions, in Polish, for completing the survey.

6. The researcher administered the survey instrument to each worker who signed the consent form at the plant during working hours at the time and in the location designated by the plant manager and agreed to by the plant union representative. Only the researcher was
present at the time the questionnaire was administered.

7. The survey instrument was collected from the respondents on the morning of its administration and only by the researcher.

8. Confidentiality was maintained by the researcher's personally collecting the survey when it was completed by the respondent.

9. For each plant all of the surveys completed by the respondents were used for this study.

10. All survey instruments were coded to indicate from which plant the responses were received. No method was used to identify individual respondents.

Data Analysis

The essential task in the data analysis was to determine for the hypotheses whether or not the difference in the aspects of the work environment and productivity scores among the factories support the existence of a relationship at the alpha level of .10. The WES subscale scores were entered into a computer system using a terminal tabulation. Analysis was achieved through the use of a statistical application program, Statistical Package for the Social Sciences-Expanded (SPSS-X, SPSS, Inc., 1991). The hypotheses were analyzed using the Kendall tau test for ordered alternatives (Siegel & Castellan, 1988), a nonparametric measurement, that tests the hypothesis that the samples (or groups) are ordered in a specific a priori sequence. It is important to note that in order to ensure proper use of the test, the researcher must be able to specify the order of the groups or measures a priori. For purposes of this study, the a priori order used in the analysis is plant productivity.
ranked from lowest to highest for the months of January, February, and average January/February 1991. Kendall's tau and its probability level were attained using the computer program SPSS-X (SPSS, Inc., 1991). The scores are illustrated in tables designed for this study.

Summary

An overview of the methodology for the study has been presented in this chapter. Plant selection, subjects, instrumentation, data collection, and data analysis procedures have been discussed.
CHAPTER IV

ANALYSIS AND CONCLUSIONS

The purpose of this study was to determine whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy and other work environments are related. The Kendall tau test for ordered alternatives was used to investigate the relation between the independent variable productivity and the dependent variables, involvement, peer cohesion, supervisor support, task orientation, work pressure, clarity, control, innovation, and physical comfort, as measured by the Work Environment Scale (WES, Moos, 1981).

For each of the six plants used in this study, the independent variable, productivity, was provided by the respective plant manager. The productivity for each plant (see Table 1) for the months of January and February 1991, including the average productivity for the same 2 months, is the ratio of the total production man-hours worked at each plant for the month to the total month’s production.

Written daily production reports of the total number of carbide tools manufactured, including the total daily labor hours used to produce the carbide tools, were requested; but the information was not released to the researcher. Instead, the management at each of the factories provided the researcher with total labor hours worked and the productivity in each month for January and February. The researcher calculated
the average productivity for these two months for each plant. Table 1 shows the order of the plants with respect to productivity.

Table 1
Summary of Plant Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>January</th>
<th>February</th>
<th>Average (Jan. &amp; Feb.)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwp Vis</td>
<td>63%</td>
<td>67%</td>
<td>65%</td>
<td>1</td>
</tr>
<tr>
<td>Chifa</td>
<td>66%</td>
<td>68%</td>
<td>67%</td>
<td>2</td>
</tr>
<tr>
<td>Walimet</td>
<td>68%</td>
<td>73%</td>
<td>71%</td>
<td>3</td>
</tr>
<tr>
<td>Bialystok</td>
<td>68%</td>
<td>75%</td>
<td>72%</td>
<td>4</td>
</tr>
<tr>
<td>Poreba</td>
<td>80%</td>
<td>81%</td>
<td>81%</td>
<td>5</td>
</tr>
<tr>
<td>Wifama</td>
<td>84%</td>
<td>95%</td>
<td>90%</td>
<td>6</td>
</tr>
</tbody>
</table>

**Note.** The ranking is done using the average productivity levels, with 1 being the lowest productivity and 6 being the highest productivity.

A minimum of three plants in each category (high and low productivity) was not realized because the total manufacturing locations producing carbide tooling in Poland at the time of the survey, February 1991, was only six. This was confirmed by the Director of the Department of Commerce in Poland. Additionally, only two of the six plants (Fwp Vis and Wifama) were found with productivity scores one or more standard deviations above or below the mean for the month of January.

Since a minimum of three plants with productivity scores one or more standard deviations above and below the mean was not realized, the alternate plan to rank order each plant from high productivity to low
productivity was used for purposes of this study. The three average highest productivity plants are Bialystok, Poreba, and Wifama; the three average lowest productivity plants are Fwp Vis, Chifa, and Walimet. The analysis was based on the average productivity.

Furthermore, no investigations to explain the relation between productivity and the WES subscales with reported data are known to have been made in Poland.

The data for this study were gathered from questionnaires submitted to Polish workers in six different plants (see Appendices C and D). The questionnaires were submitted to workers in each plant on the day shift. Raw scores were obtained by adding yes responses as contributing to the subscale score. Tables for converting raw scores for each subscale to average scores are provided by Moos (1981). Participation in all cases was entirely voluntary. Even though the sample is small (six factories), the high rate of response, 100% of the day shift hourly workers at each plant, reflects an intense interest in the subject matter.

Analysis of the Data

Previous researchers have found differing results in the relationship between work group autonomy and productivity. This study examined whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy and other work environments are directly related. What follows is the description of the analysis for the hypotheses. The Kendall tau adjusted for ties was used to test the null hypothesis that there is no relationship between the independent variable, productivity, and dependent variables, involvement, peer cohesion,
supervisor support, task orientation, work pressure, clarity, control, innovation, and physical comfort. Kendall tau was evaluated using either a directional or nondirectional test and setting the nominal alpha at .10.

**Hypothesis 1: Productivity and Autonomy**

Support for the null hypothesis between productivity and the perception of autonomy was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .2760, .3333, and .3333, respectively. The subscale Autonomy measures the extent to which employees are encouraged to be self-sufficient and to make their own decisions. As shown in Table 2, there is no relationship between the two variables at the alpha level of .10 (one-tailed).

**Hypothesis 2: Productivity and Involvement**

Support for the null hypothesis between productivity and the perception of involvement was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .4140, .3333, and .3333, respectively. The subscale Involvement measures the extent to which employees are concerned about and committed to their jobs. As shown in Table 3, there is no relationship between the two variables at the alpha level of .10 (one-tailed).
Table 2
Descriptive Summary of Data: Relationship Between Perception of Autonomy as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Autonomy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>35.38</td>
<td>20.39</td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>43.86</td>
<td>15.86</td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>39.92</td>
<td>18.45</td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>43.53</td>
<td>18.44</td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>37.40</td>
<td>27.65</td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>46.17</td>
<td>14.74</td>
</tr>
</tbody>
</table>

Autonomy with: Kendall tau and p

<table>
<thead>
<tr>
<th></th>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.2760</td>
<td>.222</td>
</tr>
<tr>
<td>February productivity</td>
<td>.3333</td>
<td>.174</td>
</tr>
<tr>
<td>Average productivity (January and February)</td>
<td>.3333</td>
<td>.174</td>
</tr>
</tbody>
</table>

Hypothesis 3: Productivity and Peer Cohesion

Support for the null hypothesis between productivity and the perception of peer cohesion was existent at the .10 level. The attained values for Kendall tau for the months of January, February, and January/February average were .6901, .7333, and .7333, respectively. The subscale Peer Cohesion measures the extent to which employees
Table 3
Descriptive Summary of Data: Relationship Between Perception of Involvement as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Involvement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>29.88</td>
<td>14.22</td>
<td></td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>38.07</td>
<td>18.21</td>
<td></td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>32.92</td>
<td>18.97</td>
<td></td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>34.20</td>
<td>13.81</td>
<td></td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>31.80</td>
<td>12.72</td>
<td></td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>29.58</td>
<td>10.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Involvement with:</td>
<td>Kendall tau</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td></td>
<td>January productivity</td>
<td>.4140</td>
<td>.126</td>
<td></td>
</tr>
<tr>
<td></td>
<td>February productivity</td>
<td>.3333</td>
<td>.174</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average productivity (January and February)</td>
<td>.3333</td>
<td>.174</td>
<td></td>
</tr>
</tbody>
</table>

are friendly and supportive of one another. As shown in Table 4, there is a relationship between the two variables at the .10 alpha level (one-tailed).

**Hypothesis 4: Productivity and Supervisor Support**

Support for the null hypothesis between productivity and the perception of supervisor support was nonexistent. The attained values
Table 4
Descriptive Summary of Data: Relationship Between Perception of Peer Cohesion as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Peer cohesion</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>37.50</td>
<td>14.38</td>
<td></td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>38.36</td>
<td>15.44</td>
<td></td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>43.23</td>
<td>19.23</td>
<td></td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>43.33</td>
<td>19.03</td>
<td></td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>40.60</td>
<td>14.22</td>
<td></td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>46.92</td>
<td>11.90</td>
<td></td>
</tr>
</tbody>
</table>

Peer cohesion with:

<table>
<thead>
<tr>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.6901</td>
</tr>
<tr>
<td>February productivity</td>
<td>.7333</td>
</tr>
<tr>
<td>Average productivity (January and February)</td>
<td>.7333</td>
</tr>
</tbody>
</table>

*p < .10.

for Kendall tau for the months of January, February, and January/February average were -.138, -.200, and -.200, respectively. The subscale Supervisor Support measures the extent to which management is supportive of employees and encourages employees to be supportive of one another. As shown in Table 5, there is no relationship between the two variables at the alpha level of .10 (two-tailed).
Table 5
Descriptive Summary of Data: Relationship Between Perception of Supervisor Support as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Supervisor support</th>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>40.50</td>
<td>10.10</td>
<td></td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>36.29</td>
<td>9.09</td>
<td></td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>42.23</td>
<td>12.72</td>
<td></td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>41.67</td>
<td>12.88</td>
<td></td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>39.40</td>
<td>14.12</td>
<td></td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>39.08</td>
<td>11.12</td>
<td></td>
</tr>
</tbody>
</table>

Supervisor support with: January productivity -.138 .70
February productivity -.200 .56
Average productivity (January and February) -.200 .56

Note. Because the sign of each of the Kendall tau is opposite expectations, the reported probabilities are for a two-tailed test.

Hypothesis 5: Productivity and Task Orientation

Support for the null hypothesis between productivity and the perception of task orientation was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February

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average were -.276, -.200, -.200, respectively. The subscale Task Orientation measures the degree of emphasis on good planning, efficiency, and getting the job done. As shown in Table 6, there is no relationship between the two variables at the alpha level of .10 (two-tailed).

Table 6
Descriptive Summary of Data: Relationship Between Perception of Task Orientation as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Task orientation</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>-276</td>
<td>43.13</td>
<td>16.50</td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>-200</td>
<td>48.00</td>
<td>19.89</td>
</tr>
<tr>
<td>Walimmet</td>
<td>3</td>
<td>00</td>
<td>33.00</td>
<td>22.22</td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>00</td>
<td>57.60</td>
<td>16.13</td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>00</td>
<td>29.00</td>
<td>20.19</td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>00</td>
<td>38.00</td>
<td>14.60</td>
</tr>
</tbody>
</table>

Task orientation with:

- January productivity: Kendall tau: -.276, p = .222
- February productivity: Kendall tau: -.200, p = .287
- Average productivity (January and February): Kendall tau: -.200, p = .287

Note. Because the sign of each of the Kendall tau is opposite expectations, the reported probabilities are for a two-tailed test.
Hypothesis 6: Productivity and Work Pressure

Support for the null hypothesis between productivity and the perception of work pressure was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .0714, .1380, and .1380, respectively. The subscale Work Pressure measures the extent to which employees are concerned about the pressure of their job. As shown in Table 7, there is no relationship between the two variables at the alpha level of .10 (one tailed).

Hypothesis 7: Productivity and Clarity

Support for the null hypothesis between productivity and the perception of clarity was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .138, .200, and .200, respectively. The subscale Clarity measures the extent to which employees know what to expect in their daily routine and how explicitly rules and policies are communicated. As shown in Table 8, there is no relationship between the two variables at the alpha level of .10 (one-tailed).

Hypothesis 8: Productivity and Control

Support for the null hypothesis between productivity and the perception of control was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .138, .200, and .200, respectively. The subscale Control measures the extent to which management uses rules and pressure to keep
Table 7
Descriptive Summary of Data: Relationship Between Perception of Work Pressure as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Work pressure</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td></td>
<td>60.75</td>
<td>11.90</td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td></td>
<td>46.07</td>
<td>12.60</td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td></td>
<td>47.08</td>
<td>9.66</td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td></td>
<td>48.20</td>
<td>11.82</td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td></td>
<td>47.00</td>
<td>13.77</td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td></td>
<td>52.00</td>
<td>9.95</td>
</tr>
</tbody>
</table>

Work pressure with:

<table>
<thead>
<tr>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.0714</td>
</tr>
<tr>
<td>February productivity</td>
<td>.1380</td>
</tr>
<tr>
<td>Average productivity (January and February)</td>
<td>.1380</td>
</tr>
</tbody>
</table>

employees under control. As shown in Table 9, there is no relationship between the two variables at the alpha level of .10 (one-tailed).

Hypothesis 9: Productivity and Innovation

Support for the null hypothesis between productivity and the perception of innovation was nonexistent. The attained values for
Table 8
Descriptive Summary of Data: Relationship Between Perception of Clarity as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>23.00</td>
<td>9.01</td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>47.00</td>
<td>19.57</td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>29.92</td>
<td>20.99</td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>47.87</td>
<td>15.14</td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>42.00</td>
<td>23.97</td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>41.58</td>
<td>18.24</td>
</tr>
</tbody>
</table>

Clarity with: Kendall tau p

<table>
<thead>
<tr>
<th>Clarity with:</th>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.138</td>
<td>.351</td>
</tr>
<tr>
<td>February productivity</td>
<td>.200</td>
<td>.287</td>
</tr>
<tr>
<td>Average productivity (January and February)</td>
<td>.200</td>
<td>.287</td>
</tr>
</tbody>
</table>

Kendall tau for the months of January, February, and January/February average were -.414, -.3333, and -.3333, respectively. The subscale Innovation measures the degree of emphasis on variety, change, and new approaches. As shown in Table 10, there is no relationship between the two variables at the alpha level of .10 (two-tailed).
Table 9

Descriptive Summary of Data: Relationship Between Perception of Control as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Control</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>42.38</td>
<td>19.76</td>
<td></td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>52.36</td>
<td>11.63</td>
<td></td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>41.00</td>
<td>10.41</td>
<td></td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>61.73</td>
<td>8.90</td>
<td></td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>44.60</td>
<td>13.33</td>
<td></td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>49.58</td>
<td>16.20</td>
<td></td>
</tr>
</tbody>
</table>

Control with:

<table>
<thead>
<tr>
<th></th>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.138</td>
<td>.351</td>
</tr>
<tr>
<td>February productivity</td>
<td>.200</td>
<td>.287</td>
</tr>
<tr>
<td>Average productivity</td>
<td>.200</td>
<td>.287</td>
</tr>
</tbody>
</table>

Hypothesis 10: Productivity and Physical Comfort

Support for the null hypothesis between productivity and the perception of physical comfort was nonexistent. The attained values for Kendall tau for the months of January, February, and January/February average were .0714, .0000, and .0000, respectively. The subscale Physical Comfort measures the extent to which the physical...
Table 10
Descriptive Summary of Data: Relationship Between Perception of Innovation as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Fwp Vis</td>
<td>38.50</td>
<td>16.18</td>
</tr>
<tr>
<td>Chifa</td>
<td>40.21</td>
<td>12.54</td>
</tr>
<tr>
<td>Walimet</td>
<td>36.23</td>
<td>16.08</td>
</tr>
<tr>
<td>Bialystok</td>
<td>45.40</td>
<td>19.37</td>
</tr>
<tr>
<td>Poreba</td>
<td>17.60</td>
<td>9.37</td>
</tr>
<tr>
<td>Wifama</td>
<td>34.75</td>
<td>10.56</td>
</tr>
</tbody>
</table>

Innovation with: Kendall tau  

| January productivity | -.4140 | .252 |
| February productivity | -.3333 | .174 |
| Average productivity (January and February) | -.3333 | .174 |

Note. Because the sign of each of the Kendall tau is opposite expectations, the reported probabilities are for a two-tailed test.

surroundings contribute to a pleasant work environment. As shown in Table 11, there is no relationship between the two variables at the alpha level of .10 (one-tailed).

Data of means and standard deviations for all subscales as measured in each of the six factories is in Appendix A. The subscale

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Table 11

Descriptive Summary of Data: Relationship Between Perception of Physical Comfort as an Environmental Factor and Productivity

<table>
<thead>
<tr>
<th>Plant name</th>
<th>Productivity rank</th>
<th>Physical comfort</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fwp Vis</td>
<td>1</td>
<td>Physical comfort</td>
<td>26.63</td>
<td>8.19</td>
</tr>
<tr>
<td>Chifa</td>
<td>2</td>
<td>Physical comfort</td>
<td>45.43</td>
<td>19.37</td>
</tr>
<tr>
<td>Walimet</td>
<td>3</td>
<td>Physical comfort</td>
<td>36.85</td>
<td>17.83</td>
</tr>
<tr>
<td>Bialystok</td>
<td>4</td>
<td>Physical comfort</td>
<td>31.60</td>
<td>8.37</td>
</tr>
<tr>
<td>Poreba</td>
<td>5</td>
<td>Physical comfort</td>
<td>31.40</td>
<td>9.91</td>
</tr>
<tr>
<td>Wifama</td>
<td>6</td>
<td>Physical comfort</td>
<td>32.08</td>
<td>17.03</td>
</tr>
</tbody>
</table>

Physical comfort with:

<table>
<thead>
<tr>
<th>Physical comfort with:</th>
<th>Kendall tau</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>January productivity</td>
<td>.0714</td>
<td>.423</td>
</tr>
<tr>
<td>February productivity</td>
<td>.0000</td>
<td>.500</td>
</tr>
<tr>
<td>Average productivity (January and February)</td>
<td>.0000</td>
<td>.500</td>
</tr>
</tbody>
</table>

responses of perceptions of agreement and nonagreement for the subscales in total and by plant as a percentage are summarized in Appendix B.
Summary

The analysis of the data indicates Hypothesis 1 is not supported at the .10 alpha level. The only hypothesis supported at the .10 alpha level is Peer Cohesion.
CHAPTER V

DISCUSSION OF FINDINGS, SUMMARY OF STUDY, AND
RECOMMENDATIONS FOR FURTHER RESEARCH

This chapter is comprised of the following sections: review of study purpose, review of study design, discussion of the findings, and recommendations for further research.

Review of Study Purpose

This study was conducted to determine whether or not for work groups in Poland productivity levels and their perceptions of their own autonomy and other work environments are directly related. The study was prompted because of the following reasons:


2. At the time of this study (1991), no other study identical or similar had been conducted that measures workers' perceptions of their work environment after a change in government leadership and an apparent change in managerial style from autocratic to democratic as occurred in Poland.

3. The researcher has an interest in sociotechnical work design and its relation to improvements in worker productivity; for example,
Howard (1980) indicated that a mere 1% improvement in the productivity of federal employees would save $4.0 million annually.

Additionally, much of what is written about autonomy and its influence upon other variables remains untested theory; consequently, this study will contribute to the number of tests of theoretical propositions about the importance of autonomy and its relation to the other work environments.

Review of Study Design

Six plants manufacturing carbide tooling in Poland were used in this study. This study measured perceptions of Polish workers in their work environment, the dependent variable, using the productivity scores of each of the six plants, the independent variable. Data for the study was obtained from participants' completion of the WES during February 1991. Polish workers were required to respond yes or no to 90 single-sentence statements about their work environment in completing the WES questionnaire. The questionnaire has 10 subscales with 9 statements for each subscale. Raw scores (0-9), with higher scores indicating greater perceived presence of a subscale, were converted to standard scores for analysis (Moos, 1981). Standard scores for the WES were entered into the computer program Statistical Package for the Social Sciences-Expanded (SPSS-X, SPSS, Inc., 1991) to calculate the significance and correlation coefficients for the 10 subscales of the WES. Analysis of the WES data used the Kendall tau test for ordered alternatives to investigate the hypotheses.
The weakness in this analysis is the small number of plants available for sampling. However, the population available was limited; the research purposely was confined to Poland because it was thought that due to the historic change in political structure, from communist control to democratic orientation, and the apparent change in managerial style from autocratic to democratic, investigation into perceptions of autonomy and productivity would be particularly fruitful. In an effort to limit extraneous variables, the researcher chose to concentrate on the carbide tooling industry because its plants employed similar methods of production and measured productivity in a similar manner.

Discussion of the Findings

The researcher did not find support for the hypothesis that there is a relation between the perceptions of autonomy among work groups in Poland manufacturing carbide tooling and productivity using an alpha level of .10. The findings of this study did not support that of Farh and Scott (1983), who found that subjects in the most autonomous condition reported a higher level of autonomy, and those who reported a higher level of autonomy, whatever the condition, tended to report a higher level of personal productivity. The findings of this study were not anticipated by the researcher although the dramatic changes in the work environment, namely, throwing off the yoke of state-controlled production in Poland, including the Soviet-influenced lack of employee-oriented management, could have provided the necessary impetus for workers to become more self-sufficient and to make more of their own decisions.
On the other hand, due to the limited number of factories manufacturing carbide tooling in Poland available for sampling, the chance of finding a relation between perceptions of autonomy and productivity was in this study very small even if the hypothesis were true. It should be noted that some of the unique aspects of the groups of factories used in this study were that all six factories manufactured carbide tooling on similar machinery, the work force appeared to be of similar age, overall physical plant size appeared to be similar, and all workers at all six factories exhibited a positive attitude to taking the survey. The researcher had control over the following aspects of data collection: the time of day, instructions for completing the survey, only the researcher was present at the time of administration of the survey, collection of the survey instruments by the researcher, confidentiality of the survey, and identification of survey instruments according to plant. The researcher did not have control over the following aspects of data collection: sample size (only six available); daily production data, which had been requested but was not provided; and number of respondents at each plant.

Because the questionnaire was not distributed to the respondents prior to the test, the probability of their being coached by plant management or union representatives is unlikely. Therefore, it can be assumed that they answered the questionnaire honestly.

The researcher found support for the hypothesis that there is a direct relation between perceptions of peer cohesion among work groups in Poland manufacturing carbide tooling and productivity. One might suspect that in order to survive under the former autocratic, suppressive
work environment workers throughout Poland had to cooperate with, and to be highly supportive of, each other. It seems logical to assume that this attitude, once ingrained in the work ethic, would persist even after the break-up of the communist system. Polish workers now are working together for the right reason, that is, to increase productivity, not merely for the sake of their own personal survival. Furthermore, the high correlation coefficient indicates to the researcher that high levels of peer cohesion are a very important determinant of high productivity in a work environment. Another example is Chrysler's current method of manufacturing (Ford Motor Company's is similar). Daun (1992) reported that Chrysler's platform management concept for manufacturing vehicles uses the team approach, an important aspect of which is peer cohesion because the team members must work collaboratively to share information, resources, and responsibilities in order to sustain the platform concept. Chrysler sees this concept as the way by which it will remain competitive with other vehicle manufacturers worldwide in the era of smaller volume, niche-marketed production.

No relation was found between productivity and the perceptions of involvement, supervisor support, task orientation, work pressure, clarity, control, innovation, and physical comfort using an alpha level of .10; therefore, they will not be elaborated upon.

Recommendations for Further Research

The following recommendations are offered as a result of being involved in designing, conducting, and evaluating this study:
1. Future studies which measure productivity and work environments should consider using a larger sample size.

2. Because this study was conducted in 1991, relevant literature beyond that date was not reviewed. Therefore, future studies which measure productivity and work environment should consider literature subsequent to 1991.
Appendix A

Means and Standard Deviations
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**Note:** I = Involvement, PC = Peer Cohesion, SS = Supervisor Support, A = Autonomy, TO = Task Orientation, WP = Work Pressure, C = Clarity, CTL = Control, INN = Innovation, and COM = Physical Support.
Appendix B
Subscale Summary for All Plants
Subscale Summary for All Plants

**Involvement:** 41% agreed they are concerned about and committed to their jobs; 57% did not; 2% did not respond.

**Peer Cohesion:** 53% agreed they are friendly and supportive of one another; 46% did not; 1% did not respond.

**Supervisor Support:** 49% agreed management is supportive of employees and encourages employees to be supportive of one another; 50% did not; 1% did not respond.

**Autonomy:** 50% agreed employees are encouraged to make their own decisions; 48% did not; 2% did not respond.

**Task Orientation:** 55% agreed that there was an emphasis on good planning efficiency and getting the job done; 44% did not; 1% did not respond.

**Work Pressure:** 49% agreed on the degree to which the pressure of work and time urgency dominate the job milieu; 50% did not; 1% did not respond.

**Clarity:** 48% agreed employees know what to expect in their daily routine and how explicitly rules and policies are communicated; 50% did not; 2% did not respond.

**Control:** 53% agreed management uses rules and pressures to keep employees under control; 46% did not; 1% did not respond.

**Innovation:** 30% agreed there was an emphasis on variety, change, and new approaches; 69% did not; 1% did not respond.

**Physical Comfort:** 32% agreed to the extent to which the physical surroundings contributed to a pleasant work environment; 67% did not; 1% did not respond.
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Appendix C
Letter to Participants
To Perspective Study Participants,

I am working on my dissertation entitled "Productivity and Perceived Work Environments of Work Groups in Poland" at Western Michigan University. The dissertation requires collecting data from Polish workers to complete the University's requirements for obtaining my doctoral degree. Your participation in this study is important but you have the freedom not to participate, the right to withdraw, and the right to skip any item on the questionnaire should you choose. Additionally, there is no penalty should you decide to withdraw from this study.

Thank you,

[Signature]

Donald L. Cusfa
8209 McCandlish Road
Grand Blanc, Michigan
U.S.A.
Phone (313) 6362901

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Szanowni Państwo!


Wasz udział w tych badaniach jest ważny, ale jest to udział w pełni dobrowolny. Każdy z Państwa ma prawo wycofania się z badań, a także prawo nieudzielenia odpowiedzi na którekolwiek z pytań ankiety. Ponadto mają Państwo pełną gwarancję, że za wysłanie się z udziału w tej ankiecie nie grozi żadna kara.

Dziękuję
January 29, 1991

TO WHOM IT MAY CONCERN:

Mr. Donald Leo Gusfa, when in Poland, will be working on his doctoral dissertation entitled, "Productivity and Perceived Work Environments of Work Groups in Poland." The purpose of his trip is to collect data to complete the University's requirement for his doctoral degree. His planned research has been approved by his dissertation committee.

Any consideration rendered will be appreciated.

Sincerely,

[Signature]

Edgar A. Kelley
Professor and Chair, Dissertation Committee
Appendix E

Letter of Approval From Human Subjects
Institutional Review Board

79
Date: February 6, 1991
To: Donald L. Gusfa
From: Mary Anne Bunda, Chair
Re: HSIRB Project Number: 91-01-24

This letter will serve as confirmation that your research protocol, "Productivity and Perceived Work Environments of Work Groups in Poland" (as revised), has been approved under the exempt category of review by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

xc: Edgar Kelley, Educational Leadership

Approval Termination: February 6, 1992
BIBLIOGRAPHY


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