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**"Social Psychological Differences
Between an Advanced and a Traditional
Manufacturing Plant"**

Richard Simourd

M.A. Thesis

Department of Psychology

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**"SOCIAL PSYCHOLOGICAL DIFFERENCES
BETWEEN AN ADVANCED AND A
TRADITIONAL MANUFACTURING PLANT"**

Submitted by **Richard W. J. Simourd, B.A.**

in partial fulfilment of the requirements for

the degree of Master of Arts

Chair

Thesis Supervisor

CARLETON UNIVERSITY
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Abstract

Increasingly global competition is being blamed for plant closures and job loss in North America. Many researchers (Gerwin, 1991; Handy, 1994; Dennison, 1990; Peters, 1982) have described attributes and approaches they suggest are mandatory for organizations wishing to survive this "revolution". In the manufacturing sector, the organizations thought likely to survive have been labelled "advanced" (Gerwin & Kolodny, 1992). Using criteria differentiating advanced and traditional manufacturing organizations, social and psychological factors were measured using a comprehensive set of questionnaire subscales at one advanced and one traditional plant. Discriminant function analysis allowed accurate classification of organizational membership in over 86% of the cases. Participative climate, satisfaction with co-workers and supervisors, and perception of organizational support were all shown to play a significant role in differentiating the advanced from the traditional organization. The implications of these results are discussed.

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Introduction

For the past twenty years or more North American manufacturing has been steadily decreasing under a virtually constant assault from cheaper and higher quality foreign competition. The effect has been increased unemployment in the manufacturing sector. To take only one example, Digital Equipment Corporation (DEC) in 1985 was the second largest computer manufacturer in the world. Between 1985 and 1995 its sales rose 300% from four to sixteen billion dollars. In 1985 DEC had 30 plants worldwide, with approximately 25 of those in North America; by 1995 DEC had added one non-North American plant, but only 2 of 25 North American manufacturing facilities had survived, one each in Canada and the U.S.. Employment fell during this period from 150,000 to 60,000, much of it in North America. While the total impact of remaining competitive has been great across the entire organization, it has quite obviously been most severe on the North American members.

Much has been written on how this sector can regain its competitive edge. Numerous terms have been used to characterize the necessary, supposed, or impending transformation. These range from the well known "excellent" companies of Peters and Waterman (1982) to the "post modern" companies of Handy (1994). The bulk of the management literature, however, fails to go beyond narrow or anecdotal

accounts to address directly what companies such as Digital have done to maintain their competitive position. We are interested in the psychological factors that may distinguish the North American manufacturer who has 'turned the corner' and changed sufficiently to join the ranks of the "advanced manufacturers" (Gerwin, 1991; Gerwin & Kolodny, 1992) who, according to the popular management literature, are more likely to survive in the face of global competition. What criteria can we use to distinguish those positioned to prosper from those "traditional manufacturers" who the management gurus (Peters & Waterman, 1982; Hammer & Champy, 1993; Senge, 1990; Covey, 1990) suggest will inevitably be overwhelmed?

In response to the changes facing manufacturers in Canada's industrial heartland, the Manufacturers' Research Council of Ontario (MRCO) and the Ministry of Industry Science and Technology commissioned a study by Jones, Berwald, Catano, and Hackett (1993) to examine individual and organizational human/social factors associated with differences in productivity. The Jones et al. study will provide the foundation for this thesis. The MRCO report highlighted groups of cultural factors associated with differences in productivity between shifts in an older traditionally structured and functioning 'heavy' manufacturer. We wish now to take this one step further, to

see if human factors can also help us predict which plants are likely to close and which will prosper. That is, we wish to determine if these same social and psychological dimensions which explained differences in productivity between competing shifts within the same company can also be used to distinguish the social and psychological dimensions which may distinguish an "advanced" manufacturing plant from a plant involved in traditional manufacturing.

Advanced Manufacturing

The business literature and the organizational psychology literature have begun to treat so-called "advanced manufacturing (AM)" as a special category of organization responding to different demands compared to the traditional manufacturing organization (e.g. Ayres, 1984; Gerwin, 1991; Gerwin & Kolodny, 1992; Upton, 1995). Gerwin (1991) describes advanced manufacturing organizations as "flexible systems of production," organizations that are able "to respond to low cost standardized items from abroad ... [by offering] wide varieties of technologically superior products aimed at specific market niches (p. 1)." The AM organization is therefore skill intensive and relies on radically new technology which represents a significant departure from existing manufacturing technology. While much of the literature on advanced manufacturing has focussed on the influence of radically new technologies, the advanced

manufacturing plant requires flexibility at the level of job tasks and human resources. As Gerwin (1991) notes, "At the machine level, for example, machine flexibility refers to the types of operations performed without difficulty in switching from one process to another (p. 12)." In much of traditional manufacturing rigid job classifications, adhered to by unions and management alike, impede flexibility directly. In fact, the research seems to show that technological change may be secondary in relation to flexibility. Upton (1995) has argued that, "Little direct correlation exists between the degree of computer integration and the degree of operational flexibility ... Operational flexibility is determined primarily by a plant's operators and the extent to which managers cultivate, measure and communicate with them (p. 75)." We may wish to go even farther than Upton and suggest as do Gerwin and Kolodny (1992) that in AM flexibility will be achieved more readily and effectively when the measurement and communication roles are assumed by those closest to the actual process operation.

A flexible organization may require a different organizational structure from the traditional hierarchical structure of the manufacturing industries. Cross-functional teams may become the main organizing vehicle allowing more effective identification of problems and more effective

solutions. For example, marketing, manufacturing and distribution sectors within any plant may have different needs. Marketing may respond to customer pressure for a variety of products which would be shipped on customer demand. Manufacturing, on the other hand, is likely to see efficiency as resulting from control over the number of products, while Distribution may feel it needs regularly scheduled deliveries to geographic areas to be efficient. A cross-functional team involving marketing, manufacturing and distribution representatives may, in principle, be an effective vehicle for resolving such conflicts of interest.

Gerwin & Kolodny (1992) argue that some form of socio-technical work arrangement is mandated in the advanced manufacture by virtue of the "delaying, demassing, and flattening out (p. 129)." Those people whose sole contribution was one of control are now deemed to be 'non-value added', therefore unnecessary, and in fact unaffordable. "In this environment, hierarchical control behaviour and thinking have become dated. The combined result has been the widespread collapse of vertical boundaries in the middle levels of the organization (p. 141)." Traditional vertical roles and traditional forms of control are assumed by teams, pushed farther down the organization closer or to those actually doing the job so they can exercise needed controls themselves. Davis (1982)

lists attributes of these types of work arrangements emphasizing human values, and most researchers (e.g. Trist, 1981; Walton, 1980) agree that these systems attempt to optimize organizational performance by elevating the importance of social/human considerations to the same level of importance as has been traditionally accorded to technical factors. We should note, however, that little is known to date about the operation of human processes in AM contexts (see e.g. Clegg & Corbett, 1987).

Organizational flexibility implies organizational change or organizational learning. The flexible organization may be understood as a "learning organization" (e.g. Garvin, 1993; Leavitt & March, 1988; Stata, 1989) in which behavioral/attitudinal/cultural change is the process of "encoding references from history into routines that guide behaviour (Leavitt & March, 1988)," or as Stata (1989) puts it, "Organizational learning occurs through stored insights, knowledge and mental models ...[and] builds on past knowledge and experience - that is on memory."

In the psychological literature, the process of organizational change and learning has ordinarily been understood by reference to the concept of organizational culture. Gerwin (1991) states that the relationship between the dimensions of organizational flexibility is influenced

by the "context," or in our terms, by the culture of the organization.

Organizational Culture

The notion of culture has become the central idea in organizational psychology. Understanding culture is thought by many theorists and researchers to be the key to improving organizational efficiency (Ouchi, 1981; Davis, 1984; Beer, Eisenstat, & Spector, 1990; Francis & Woodcock, 1990; Dennison, 1990). As the following quotation indicates managers and researchers have become convinced that the potential for organizational flexibility is determined by the existing culture:

"Immense changes in the economic environment and a radical increase in competitive pressures have put a premium on strategy and a company's capacity to implement it. Having the ability not only to formulate appropriate strategic responses, but also to get them moving quickly, now represents a competitive advantage. To tap this advantage, corporations have to be able to act fast. Perhaps the single most promising catalyst - and in many unlucky cases, the single greatest barrier - has come to be recognized as corporate culture (Davis, 1984, p. 2)."

As I have already noted, North American manufacturers

have been concerned for at least a decade that they were losing their ability to compete and ultimately to survive and have responded in a number of ways. At a macro political/economic level, we note the formation of trade zones such as NAFTA and the EEC and negotiations under the umbrella of the General Agreement on Tariffs and Trade (GATT). At the level of the individual business, an organization which wishes to become more productive may seek to reduce costs by measures such as contracting out, reducing the size of the work force or shifting operations to a lower wage economy. More interestingly, for our purposes, it may seek to organize or reorganize to produce "breakthrough" changes. We shall be concerned here to gain an understanding of the individual and group/organization variables which may differentiate the AM from the traditional organization.

Those manufacturers who have chosen to stay and compete in the Canadian manufacturing sector have undertaken a wide variety of approaches over the past ten or fifteen years in order to improve overall productivity and competitiveness. These include Participative Management, T-Groups, Management by Objectives (MBO), Quality Circles, Total Quality Management (TQM), and Business Process Re-engineering (BPR) to name only the more popular ones. Most of the management consulting "gurus" championing these concepts have made

incredible promises of the "quantum leaps" available if only organizations would adopt and implement their approach.

On the surface, these approaches seem to differ greatly: T-Groups focus on management sensitivity (Argyris, 1964); MBO focusses on goal setting (Raia, 1974); Quality Circles attempt to involve all (lower) levels in suggesting improvements (Robson, 1982); TQM focusses on quality and the customer (Deming, 1993); and, Re-engineering focusses on processes and technology (Hammer & Champy, 1985). There is, however, one common thread which runs through virtually all of these programs: the assumption that the attitudes, values and/or behaviours of the members of the organization always need to be addressed and in fact usually need to change if the program is to succeed. Unfortunately for most of the organizations that have tried any (or sometimes, all) of these approaches, little or no comprehensive understanding of the determinants, mediators or outcomes of these attitudes, values and behaviours is contained in the programs.

In my view, understanding the connection between values, attitudes and behaviour is equivalent to understanding the culture of the organization. In business circles, the culture of the organization has become central to understanding how to increase productivity (see e.g. Ouchi, 1981; Williams, Dobson, & Walters, 1989). The Plant

Manager of one of Digital Equipment Corporation's two remaining North American manufacturing plants attributed their survival and ultimate assumption of a world-wide mandate to the organizational culture which distinguished their group from others DEC plants in North America which ultimately were disbanded (Reid, 1995, personal communication). Much of this management thinking has been based on assumptions about "national" culture, with a particular focus on Japan (Erez & Early, 1993; Ouchi, 1981).

Definition of Organizational Culture

The notion of organizational culture as group norms can be found in the social psychology of the 1930's (e.g. Lewin et al, 1939). Much of this stemmed from the so-called Hawthorne studies of the 1920's (Roethlisberger & Dickson, 1939). Social psychologists in the 1940's distinguished work from non-work and used the notion of a "cultural island" to indicate that the training period marked a difference from the normal environment. Social psychologists also became aware that training programs had only limited utility. Supervisors given various kinds of training in say "leadership" would revert to type when they got back to the workplace. Gradually the notion of culture was used to explain why training did not produce the expected gains. The culture to which the individual returned was a more powerful determinant of behaviour than the limited intervention

(Fleishman, 1973). The culture sets limits to the ability of the individual to change.

Unfortunately for the researcher (and the practitioner), there are almost as many different definitions of culture in the literature context as there are books and articles on the subject (see e.g. Chagnon, 1993; Dennison, 1990). Some accounts focus mainly or solely on the views of the management of given organizations. Deal and Kennedy (1982) define organizational culture by means of the dominant values expressed in "mission" or "vision" statements. Examples might include Ford Motor Company's "Quality is Job 1" or Zeller's "The Lowest Price is the Law!". Lorsch (1986) argues that culture is determined by the beliefs shared by top management regarding how they manage themselves, their staff and their business. The so-called "cultural adaptationist" school (e.g. Katz & Kahn, 1978) sees culture as patterns of behaviour which meet a variety of organization specific needs and which is made visible by the sub-systems and links between levels which the organization puts in place. Cultural ideationists (e.g. Ouchi, 1981; Schein, 1990), on the other hand, view organizational culture in terms of ideas, shared, tacit beliefs and assumptions, which by their very nature are not directly observable. Ouchi (1981, p. 165) believes "tradition and climate make up a company's culture (and

that) ... culture implies a company's values..." He defined organizational culture as "a set of symbols, ceremonies, and myths that communicate the underlying values and beliefs of that organization to its employees." (Ouchi, 1981). It serves as a control mechanism, is implicit versus explicit, and contains information on objectives and acceptable procedures to move towards those objectives. Similarly, Schein (1983, 1990) clearly differentiates the surface climate of the organization (sometimes called the observable "artifacts") from the deeper assumptions and values which the members of a group come to share through a process of responding to internal and external environmental demands.

I intend to rely on an ideationist account on the ground that (i) only accounts of this type provide a link between behaviours and attitudes and values which are assumed by most theorists to underlie the changing organization and (ii) ideationist accounts allow us to understand that the degree to which the culture is shared between different sub-groups is a key variable.

Schein (1980, 1987), one of the most widely cited ideational theorists, formulated a general theory of culture which tries to integrate both surface manifestations and "deep structure". In Schein's view any culture can be understood to exist at three levels. The first or surface level of organizational culture consists of the readily

observable behaviour patterns as well as technology and other visible artifacts. Adaptationists tend to focus solely on this level, but Schein cautions that cultural artifacts are easy to misinterpret without a good understanding of deeper levels. Examples might include corporate mission and vision statements, policies and procedures manuals, dress code (IBM's blue suits) or company logos. The second level is that of communication and justification. Members of the group seek to make sense of and to justify and communicate what they do as a group. The third level contains implicit values and beliefs which may never be explicitly communicated. This deepest level of culture will be essentially cognitive. Members of the culture share, literally, a common language which shapes their thoughts about and their responses to problems, conflicts, and setbacks in common ways. Schein's views of culture may be summarised as follows:

"(a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think, and feel in relation to these problems (Schein, 1990)."

In short, the culture provides the individual members of any organization with shared ways of understanding the world and of responding to particular situations. These shared ways of understanding may be deeply embedded in the organization and so obvious to the insider as to be almost obscure to the outsider. In fact, Williams et al., explaining how Schein's 'tacit assumptions' come about, suggest that "When solutions lead repeatedly to success they become taken for granted and are likely to drop from awareness." (Williams et al., 1989. pg.17) Thus, even insiders may ultimately have difficulty identifying their own assumptions.

The practical importance of culture in an organization is held to be in its relation to organizational efficiency (e.g. Dennison, 1990; Jones et al., 1993), flexibility (Gerwin, 1991), and predictability (Davis, 1984). The degree of discongruence between levels of the culture, between explicit and taken-for-granted values may be associated with ineffective behaviour (e.g. Chatman, 1989; Galbraith, 1977; Lawler, 1990; Nadler & Tushman, 1988; Reichers, 1986; Vancouver & Schmitt, 1991).

Purpose of the Present Research

In the research reported here, I attempted to explicate and differentiate certain dimensions of the organizational culture of two manufacturing plants, one involved in AM and one involved in traditional manufacturing. Gerwin (1991;

Gerwin & Kolodny, 1992) gave criteria by means of which we may distinguish AM from traditional manufacturing. The criteria include (1) increased flexibility (a) through the use of multiple advanced technologies and (b) the movement of decision making and control down in the organization closer to the actual point of production; (2) tighter vertical and horizontal integration evidenced by (a) fewer boundaries, (b) fewer levels in the hierarchy, (c) socio-technical organization designs necessitating and promoting teamwork, and (d) increased individual and work-group influence; and, (3) a rapid rate of innovation characterized by frequent adoption of new technologies and processes. We sought out an organization which fit this profile of an advanced manufacturer in order to compare it in cultural terms to a traditional manufacturer.

The traditional plant, designated TM, has been in the same type of heavy engineering business using fundamentally the same technical and human systems since the early 1950's. The facility had been recently purchased by a major European multi-national from a consortium, a holding company which had invested little or nothing in the plant leading ultimately to forced downsizing. Prior to that, it was successfully operated by a U.S. multi-national for close to thirty years. The plant was unionized and, at the time of the study, eight months remained on the collective

agreement. Relations between management and the union were usually described by both parties as "neutral," neither hostile nor supportive (Jones et al., 1993). The plant was clearly not an example of AM. Innovation had been slow to occur or virtually non-existent over a considerable period of time. Work-rules (the collective agreement noted over 50 tightly differentiated job categories) discouraged flexibility and there had been little investment in advanced technologies. At the time of the study, a CAD system had only just been introduced and was not well understood by the design team. Finally, the organizational structure of the plant had changed little since the 1950's and was still hierarchical with many levels (approximately 7) between the front-line worker and the plant manager, and had upwards of 50 rigid job classifications. This TM plant met none of the criteria for advanced manufacturing.

The TM plant will be compared to a facility, designated AM and operated by a second manufacturer, which may be considered "advanced" according to the Gerwin and Kolodny (1992) criteria. In existence for approximately five years, this company was formed by the developer of a new technology. The company headquarters are in the U.S. where most initial investment originated and where the major markets are located. Manufacturing of the highly technical and constantly developing core sensor components is carried

out in the Eastern Ontario region where the founder/developer and his team of researchers operate. This facility has gone through a gradual but accelerating growth curve as more products and orders come on line. The facility uses state of the art clean room/high technology manufacturing processes. Management is interested in increasing the use of teams and in maintaining low management levels. In short, the organization is flexible and innovative through the use, development and manufacture of advanced technologies and has a relatively flat organizational structure, with only 3 levels from the shop floor to the plant manager. Table 1 compares the two organizations on the criteria of Gerwin and Kolodny.

Table 1
Traditional vs Advanced Plant Comparison

<u>Criterion</u>	<u>AM</u>	<u>TM</u>
FLEXIBILITY:		
Use of, or reliance on, multiple advanced or radically new production technologies	Y	N
Decision making/control closer to point of production	Y	N
INTEGRATION:		
Fewer functional silos/vertical organizational boundaries/less rigid job classification	Y	N
Fewer levels in the organization	Y	N
Socio-technical work arrangement	Y	N
Increased individual and work group influence	Y	N
INNOVATION:		
Rapid rate of innovation/technologically superior products and processes	Y	N

The two plants were assessed by means of a number of standardized scales designed to measure the following variables: organizational culture and climate, task organization, the individual's perception of resources available in the organization, the individual's personal resources, the work stress factors operating in the situation, relationships with supervisors and the perceptions about supervisory practices and style, job satisfaction, and commitment to the organization.

Organizational Climate relates to such matters as openness to new ideas, clarity of objectives and communication, and recognition for appropriate activities. Work Organization (sometimes called job design) refers to the way in which tasks are organized so that the job itself will provide effective feedback, provide motivation, etc. The questionnaire items are derived from Campion (1988). Campion argues that it is useful to distinguish a number of aspects of job design and, in particular, to distinguish motivational aspects from physical/mechanical aspects.

The Role Stress variables from the Occupational Environment Scale (OES) measure different aspects of role stress in the workplace. The present research is based on the account of stress given by Lazarus (e.g. Lazarus, 1982; Lazarus, 1984; Lazarus & Folkman, 1984; see also James &

James, 1989) in which stress is taken to be an emotional response to the environment arising from a cognitive appraisal of the meaning and significance of events for one's own well-being. For example, individuals at work are frequently confronted with situations in which they may be required to play a role which conflicts with their personal values or to play a number of roles which potentially conflict with each other. In addition, the single or multiple roles which confront the individual may not be clearly articulated in terms of the activities or of the performance levels which management, for example, might expect. The first situation is referred to as Role Conflict and the second as Role Ambiguity. Negative attitudes toward work have been consistently shown to be related to role stress (see e.g. Jackson & Schuler, 1985). Role Overload (or role load) refers to the number or the intensity of the demands that may be placed on an employee in his or her role as the holder of a position within an organization. Role Insufficiency refers to the lack of fit between an individual's abilities and training and the requirements of the job. Responsibility for Others refers to the responsibility that the person has, or feels, for the performance and welfare of other people in the organization. Sources of stress directly related to the Physical

Environment involve noise, overcrowding, air pollution, extremes in light temperature, and hours of work including shift work. We have also included under the rubric of stress a specific measure of Interrole Conflict, the conflict which employees may encounter between the demands of home and work. Plausibly, second shift workers may be more likely to experience conflict for this reason.

Attitude measures were divided between measures of Job Satisfaction with various aspects of the work and Commitment to the Organization. Commitment in turn is differentiated into Affective and Continuance Commitment (for a review of the extensive literature on organizational commitment see Mathieu & Zajac, 1990). Affective commitment refers to an emotional identification with the organization characterized by "(a) a strong belief and acceptance of the organizations goals and values; (b) a willingness to exert considerable effort on behalf of the organization; and (c) a strong desire to maintain membership in the organization (Mowday et al, 1979)." Continuance commitment, which has been shown to be effectively independent of affective commitment (Meyer & Allen, 1984) implies a commitment by the individual based solely on the costs of leaving.

A number of variables may in theory mediate the effects of climate and stress on outcomes. These include the degree

of Involvement in work which the individual experiences, the extent to which he or she associates or feels a Sense of Community with colleagues, the ways in which the Supervisor is seen to behave, and the degree of Perceived Support which the individual experiences from the organization. We shall examine three aspects of supervisory behaviour, Initiating Structure (e.g. asks for uniform procedures), Consideration for subordinates, and Emphasizing Production. In short, group members will be asked about the extent to which the supervisor, as group leader, assists the group in formulating goals, in reaching those goals, and fosters a sense of trust and mutual support. The measurement of perceived organizational support is based on the assumption that "The perception of being valued would encourage the incorporation of organizational membership into the employee's self-identity and thereby increase prosocial acts carried out on behalf of the organization (Eisenberger et al., 1990)." Traditionally, measurement of commitment has focused on the attitude of the employee toward the organization. This tradition is reflected here in the measurement of affective and continuance commitment. The Eisenberger et al. approach focuses on how individuals perceive the attitude of the organization toward them.

Hypotheses

A number of differences between the plants appear to follow from the notion of advanced manufacturing.

1. Because work process are flexible in AM, the work in itself should be more motivating, as evidenced by higher scores on the MJDQ for the AM group compared to the TM group.

2. Because work processes are more highly skilled in AM, the job tasks should be perceived as more challenging by the members of the AM plant. This will be visible in lower ratings in job insufficiency.

3. Focusing decision making at the lowest appropriate levels should lead to higher levels of job satisfaction among AM workers with respect to the work itself.

4. In turn, higher levels of participation in decision making should lead to a higher degree of trust between workers and managers reflecting in increased organizational commitment (affective) and a heightened perception of the organization as supportive among AM workers (POS).

5. A rapid rate of change may lead to higher levels of work stress, in particular role ambiguity, among AM workers.

Method

Introduction to the Sites

At plant T, once plant management agreed to support the study, an effort was made to explain to the union executive the purpose of the study in order to elicit their support. While the exchange was productive, union leadership would not endorse the study. However, there was no disagreement with the goals, nor was there any public opposition. At plant A, once the manufacturing manager received the endorsement of his production manager, a go-ahead was given. This endorsement involved two separate areas, purpose of the study, and the major one, time lost from work as people complete the study on company time. The manufacturing manager also "ran it by the founder", but this, in the opinion of the researchers, appeared to be more of a 'surprise avoidance' /political strategy since they resided in the same facility.

At both sites, employee information sessions were held to explain the purpose of the study. After an introduction by a plant official, a researcher briefly described the purpose and methods of the study. The researchers were identified and contact numbers were provided. It was clearly noted that participation was to be voluntary and that all

responses from employees would be anonymous and confidential. The independence of the researchers from plant management was emphasized. The sessions were limited to small groups of approximately 30 to facilitate questions and convey the importance of the individual to the research. Respondents were informed that participation would take place during their regular shift.

Participants

At plant T 223 shop-floor participated in the study. This figure comprised more than 90% of the available workforce on the second shift, and about 50% of the workforce on first shift. It is difficult to be precise about the discrepancy in the participation rate. Observation suggested that those first shift workers who would rotate to the second shift tended not to participate. Participants were carefully instructed in any case, to make their responses based upon conditions in their present shift. No demographic data, other than shift membership, was gathered at plant T because of fears, expressed by union officials, that such information may have lead to the identification of individual respondents.

At plant A 141 of the 200 people in the facility completed the survey. The 70% participation rate was comparable to plant T. At plant A there is no union, and

management felt that sufficient trust existed such that we could ask for demographic data without fear that employees would believe management was trying to identify individual respondents. Demographics, which were optional, covered age, education, sex, tenure, function/group, job changes, continuing education, mother tongue, and work experience and unemployment history prior to joining this firm. As at plant T, all plant A participants were instructed to base their responses upon conditions in their present group rather than the facility in general.

The Questionnaire Package

The package was designed to measure the following variables: organizational climate and the work environment; satisfaction with work including job tasks, recognition and rewards, supervision and colleagues; motivational aspects of the work performed; perception of supervisory behaviours; role stress including overload, insufficiency, conflict, ambiguity and responsibility; perceptions of organizational support; and various types of commitment to the organization.

It is worth noting at this point that we are measuring attitudes, stressors, etc. which differentiate AM from TM, and specifically not dealing with any causal link to behaviours; we leave that to other researchers (Fishbein &

Ajzen, 1975; Ajzen & Fishbein, 1977; Festinger, 1975; Lewin, 1952) rather than the popular "gurus".

Organizational Climate. Climate was operationalized for present purposes as the degree of openness to new ideas from employees, decision making practices, clarity of objectives and communication, and recognition for appropriate activities. The Peers subscale of the Work Environment Scale (WES; Moos, 1974) together with the Sense of Community Scale of Chavis, Hogge, McMullen, and Wandersman (1986) were administered together with the Autonomy, Pressure and Innovation subscales of the WES. As well, 12 items were taken from the Scale of Organizations (SOO; Taylor & Bowers, 1972).

Work Attitudes. A number of aspects of work attitudes were assessed along traditional lines. Involvement was measured using the appropriate subscale of the WES (Moos, 1974). Job Satisfaction was measured by means of the Job Descriptive Index (JDI; Smith, Kendall & Hulin, 1969) which includes sub-scales referring to satisfaction with the work itself, pay, promotion, colleagues, supervision and the job in general. Affective and continuance commitment were measured by means of the scales provided by Meyer and Allen (1984). Affective commitment refers to an emotional identification

with the organization. Continuance commitment, which has been shown to be independent of affective commitment (Meyer & Allen, 1984), implies a commitment by the individual based solely on the costs of leaving the organization. POS was also determined from the 16 item scale of Eisenberger et al. (1986).

Job Design. This multi-dimensional concept refers to the way in which tasks are organized so that the job itself will provide effective feedback and motivation. The Clarity, Comfort, and Task Organization subscales of the WES were used in this regard together with 18 items provided by Campion (1988). In addition, two items were specifically constructed in a 5-point Likert-type scale format (Just doing the work required by the job provides many chances for me to figure out how well I am doing;" "The job itself provides me with clues about whether or not I am performing well.") This items will be referred to as the "Feedback" sub-scale.

Work Stress. Role stress measures in the workplace were taken from the Occupational Environment Scale (OES; Osipow & Spokane, 1983) which assesses role overload, insufficiency, ambiguity, conflict, responsibility for others and aspects of the physical environment. A specific measure dealing with Interrole Conflict or the rival demands of home and work was

also included (Kopelman, Greenhaus & Connolly, 1983).

Supervisory Behaviour. The behaviour of supervisors was differentiated as Consideration, Initiating Structure and Production Emphasis using the 10 item sub-scales from Stogdill

(1963). The Supervisory Behaviour subscale of the WES was also administered.

Effort and Recognition. Four questionnaire items were specifically written for the study to assess the degree to which personal effort was seen to influence output and quality ["On this job my effort makes a difference in meeting production (quality) standards;" "The quantity (quality) of my work output is accurately measured by the company's performance standards"]. A second set of four items were concerned with the degree to which effective work is recognized in the workplace ["Producing (a) high quality (quantity) of work is recognized by the company (my co-workers)"].

Responses were made on a 5-point Likert-type scale anchored by "Strongly Disagree" and "Strongly Agree." We interpret these items as indicating the degree to which effective work is appropriately valued.

The psychometric properties of all of the previously

constructed scales are known to be excellent in terms of internal consistency, test-retest reliability and validity. The reader is referred to the appropriate references. The internal consistency of the items written for the study was obtained at plant T and was good (Cronbach's alpha = .70 to .75).

Results

All data analyses were carried out using SPSS for Windows. The results will be reported as follows: Reliabilities, Descriptive Statistics (Means and Standard Deviations for each plant), MANOVA analysis of the difference between the groups followed by univariate ANOVAs, and finally a Discriminant Function Analysis as a convenient summary of the MANOVA.

Reliabilities. Cronbach's alpha was calculated as a measure of internal consistency for each scale (Table 2). Where the level of internal consistency fell below .65, the scale was dropped from further analysis.

Table 2 - Reliability of Subscales (Cronbach's Alpha)

<u>SUBSCALES¹</u>	<u>ALPHA²</u>
Affective Commitment	0.82
Continuance Commitment	0.75
Inter-Role Conflict	0.89
MJDQ	0.85
Perceived Organizational Support	0.93
SOO Climate	0.89
JDI Job	0.9
JDI Pay	0.79
JDI People	0.89
JDI Promotion	0.84
JDI Supervision	0.88
JDI Work	0.78
OES Ambiguity	.67 ³
OES Conflict	0.71
OES Insufficiency	0.83
OES Load	0.79
OES Physical Environment	0.76
OES Responsibility for	0.71
Others	

¹ alpha greater than .65

² Cronbach's alpha

³ with 1 item deleted

Table 2 (cont'd)

<u>Subscales</u>	<u>Cronbach's alpha</u>
WES Autonomy	.46
WES Clarity	.48
WES Comfort	.30
WES Involvement	.59
WES New	.57
WES Organization	.19
WES Pressure	.78
WES Supervision	.54
WES Control	.54
WES Peers	.48

It is clear from Table 2 that the set of WES subscales tends to be unreliable, sometimes considerably so. The WES had proven questionable in the Jones et al. (1993) study and in fact were reported by those researchers to have "...not discriminated between the shifts, demonstrated only minimally acceptable internal consistency, and conceptually overlapped with other variables in the analysis." The WES sub-scales therefore will not be used in any subsequent analysis.

Eighteen sub-scales had reliability greater than .65 (one variable, OES Ambiguity, required 1 item to be deleted to reach this threshold) and were thus used in more detailed analyses.

Descriptive Statistics. Means and standard deviations for each group are shown in Table 3.

Table 3Descriptive Statistics for Reliable Subscales

	TM	AM	TM	AM
<u>RELIABLE SUBSCALES⁴</u>	<u>Mean</u>	<u>Mean</u>	<u>Std.Dev</u>	<u>Std.Dev</u>
Affective Commitment	31	33.7	9.6	9
Continuance Commitment	40	33.6	8.2	8.1
Inter-Role Conflict	22	24.9	6.4	7.5
MJDQ	51	55.8	9.8	10.5
Perceived Organizational Support	53	64.5	18.2	17.3
SOO Climate	26	32.3	6.9	7.5
JDI Job	23	25.4	8.4	8.3
JDI Pay	5.3	7.1	4.4	4.7
JDI People	20	27	9.2	8.1
JDI Promotion	3.3	5.6	4	4.9
JDI Supervision	19	25.3	9	8.6
JDI Work	17	19.6	7.6	6.3
OES Ambiguity	26	23.4	5	6.8
OES Conflict	26	23.1	7.2	6.8
OES Insufficiency	29	28.1	8.9	8.3
OES Load	22	25.6	6.1	7.8
OES Physical Environment	24	19.3	7.3	5.4
OES Responsibility for Others	22	21.8	6.3	6.1

⁴ alpha greater than .65

Multivariate Analysis of Variance. A MANOVA using the remaining variables indicated a significant multivariate difference between the groups, $F(18, 241) = 13.27, p < .0001$. Table 4 (next page) shows the significant univariate effects together with an estimate of effect size in each case.

Table 4Variables Differentiating Advanced from Traditional Mfg.

<u>VARIABLE</u>	<u>Structu re Coeffi cient</u>	<u>Wilks Lambda</u>	<u>F</u> ⁵	<u>Signif. Level</u>
SOO Climate	.42	.85	45.9	.0000
JDI People	.37	.88	34.3	.0000
JDI Supervision	.36	.88	34.0	.0000
Continuance Commitment	-.35	.89	31.3	.0000
OES Physical Environment	-.31	.91	24.7	.0000
Perceived Organizational Support	.30	.92	23.8	.0000
OES Load	.28	.93	20.6	.0000
JDI Promotion	.27	.93	18.0	.0000
MJDQ	.23	.95	14.0	.0002
Inter-Role Conflict	.22	.95	12.5	.0005
OES Ambiguity	-.21	.96	11.6	.0008
OES Conflict	-.21	.96	11.1	.0010
JDI Pay	.20	.96	9.7	.0020
JDI Work	.16	.97	6.8	.0096
JDI Job	.12	.98	3.9	.0480
Affective Commitment	.12	.99	307	.0559
OES Insufficiency	.05	.99	0.7	.4048
OES Responsibility for Others	.01	.99	0.03	.8546

⁵ Univariate F with 1 and 258 degrees of freedom

Clearly with a large number of degrees of freedom for each univariate test, a number of variables are likely to show significant differences between groups while the effect size is equally likely to be relatively small. Therefore, it is interesting that, contrary to prediction, Affective Commitment did not differ between the AM and the TM plants.

Discriminant Function Analysis (DFA).

A DFA was run with two aims. First, we wish to determine the linear combination of variables which best discriminated between the groups, i.e., to determine which variables in MANOVA were irrelevant to the discrimination of the AM from the TM plant. Second, the analysis classifies individuals according to group membership on the battery of tests. Table 5 shows that the discriminant function (structure matrix) available to us given two groups. The battery of tests was successful in classifying 86.5% of individuals correctly. As a check on the classification analysis, a second DFA was run based on 50% of the sample randomly selected by the SPSS algorithm. This second analysis correctly classified 86.2% of the cases in the split sample. Clearly, the discriminant function significantly enhances our ability to predict compared to chance.

Table 5**Results of the Classification Analysis: Predicting Membership in Advanced (AM) or Traditional (TM) Mfg.**

<u>Actual Group & Total N</u>	<u>Predicted Group</u>	
	<u>AM</u>	<u>TM</u>
Advanced Manufacturing (AM) n=95	84	11
	88.4 %	11.6 %
Traditional Manufacturing (TM) n=165	24	141
	14.5 %	85.5 %

Percentage of Cases Correctly Classified = 86.5 %

Variables Important to the Discriminant Function

<u>Variable</u>	<u>Loading</u>
SOO Climate subscale	.42
JDI People subscale	.37
JDI Supervision subscale	.36
Continuance Commitment subscale	.35
OES Physical Environment subscale	.31
Perceived Organizational Support subscale	.30

note: Climate & Perceived Organizational Support were the most important in differentiating group productivity in the Jones et al. (1993) study.

The squared canonical coefficient for the function in Table 5 indicates that the set of variables accounted for approximately 50% of the variance between the groups.

Structure coefficients and Wilks Lambda reported in Table 4 can be used to determine which variables are most important to the discriminant function. According to Pedhazur (1982) and Tabachnick & Fidell (1989) a combination of a significant F and a high structure coefficient/loading ($>.30$ or 9% of the variance) is required for the variable to be considered "important"⁶. Six variables, Climate, Satisfaction with People, Satisfaction with Supervision, Continuance Commitment, Physical Environment, and the Perception of Organizational Support, met these criteria.

Discussion

Review of the Hypotheses

The data clearly show significant differences between AM and TM. Do the differences occur as hypothesized?

Hypothesis 1. It was predicted that AM members would find work processes more flexibly designed and motivating,

⁶ A very interesting dissenting opinion to this practice was published by Harvard's Robert Rosenthal (American Psychologist, June 1990, pg. 775-777). He suggests that "softer" areas of psychology such as organizational psychology might wish to look at effect sizes a little differently and effectively loosen an unnecessarily high standard. This generated several comments to the argument which appeared in AP, October 1991, pg. 1083-1087.

resulting in higher scores than TM members on the Multidimensional Job Design Questionnaire (MJDQ). While we obtained a significant univariate effect with respect to the MJDQ with AM members reporting higher scores, this variable did not appear as important in the DFA.

Hypothesis 2. Due to the increased skills and training required in AM, it was hypothesized that feelings that the job was not sufficiently challenging would be significantly decreased for AM versus TM members with this effect reflected in differences in Role Insufficiency. The results did not support this hypothesis. The univariate F with respect to Insufficiency was not significant. Had it been possible to obtain demographic data at both plants (age, education and tenure in particular), we may have observed some interesting interactions.

Hypothesis 3. This stated that "focussing decision making at the lowest appropriate levels should lead to higher levels of job satisfaction among AM workers with respect to the work itself." There was some support for this hypothesis in the sense that we observed a significant univariate difference between the groups on the JDI Work sub-scale in favour of the AM group. Nonetheless, the Work satisfaction scale did not emerge as an important variable in terms of the DFA.

However, strong support for the importance of decision making at the lowest appropriate level may, perhaps be found in terms of the Climate and Supervision variables which were clearly important elements of the discriminant function. Three of the 12 items of the SOO have to do with decision making and empowerment in various forms, i.e., (1) decisions are made at levels where adequate and accurate information is available; (2) people above your supervisor are receptive to ideas and suggestions from your work group; and (3) persons affected by decisions are asked for their ideas. Items on the JDI Supervision scale which refer to empowerment include "leaves me alone" and "asks my advice." Dennison (1990, pg.43) discusses indices of the SOO which include Decision-Making Practices (involvement) and Lower Level Influence and Control, and these same clusters are mentioned in Cook et al.'s (1981) compendium of work-related measures and their uses. In future research, it may prove useful to use a more specific empowerment measure. However, clear support is found in the data for Gerwin and Kolodny's contention of increased participation in AM.

Hypothesis 4. It was predicted that increased participation in decision making should lead AM workers to be more emotionally attached to the organization (Affective Commitment) and perceive it as more supportive. This

hypothesis was partially supported. No significant univariate difference between the groups was observed for the Affective Commitment scale. However, POS did show a significant univariate difference between the groups and this variable also appeared on the discriminant function. The difference in the meaning of Affective Commitment versus POS will be discussed in more detail below.

Hypothesis 5. It was hypothesized that a more rapid rate of change at AM plants would lead to higher levels of work stress, in particular role ambiguity. In practice, results in this regard were mixed. Role stress attributable to the physical environment was significantly lower in the AM group. On the other hand, stress due to role overload was significantly higher among AM members. Conflict between work and home life was also significantly higher in the AM group. Contrary to the hypothesis, role ambiguity was significantly higher in TM workers. This could possibly be explained by AM workers having better relationships with peers and supervisors, more support from the organization, and more input into decisions, all of which may serve to mitigate expected increases in ambiguity due to a more rapid rate of change.

Summary of Differences Between AM and TM Members

AM and TM groups were readily differentiable on the basis of variables having to do with general perceptions of their respective organizations. The discriminant function analysis showed that Climate, Continuance Commitment, POS and relative satisfaction with supervisors and colleagues best discriminated the two groups. In other words, AM workers had a more favourable view of their direct managers and colleagues as well as of their organization as open, innovative, more supportive of their own goals and values and more likely to reciprocate effort, while TM workers were more likely to report that they remained with the organization for want of any better alternative. While some of the detailed hypotheses of the study may not have been supported, the findings do support the general thrust of the ideas, based on the work of Gerwin and his colleagues (Gerwin, 1991; Gerwin & Kolodny, 1992), and outlined in the introduction. The AM environment in contrast to traditional practices may be seen as encouraging more participation in decision making, as providing more variety of tasks and interest in the work itself based on more open communication with supervisors.

One way of summarising the difference is to say that

the AM culture is the "stronger" of the two. There are a number of accounts of cultural strength in the literature. Hofstede (1976) argues that a weak culture would exhibit greater variability, or fewer shared values, attitudes and beliefs, while a stronger culture would have greater homogeneity of responses. However, variability, rather than indicating weakness, might in fact indicate the presence of subcultures, which share some of the views of the larger group, but differ on certain variables. These subcultures might be based on such organizational factors as level, role, function, or even on demographic variables including age, tenure, or gender. While Hofstede (1976) believes that strong cultures do not allow subcultures to develop, tolerance of, or belief in the value of, small group autonomy and pride, may be itself a central cultural value. A strong culture may even find it in its own interest from time to time to promote specific subcultures.

A more convincing account of cultural strength has been given by Williams, Dobson and Walters (1989) state, the term *strength* must be used with care,

"Is a strong culture one where the central beliefs and attitudes are strongly held? Or is a strong culture one which is homogeneous - that is the beliefs and attitudes are common to all groups in the organization?

Or is a strong culture one that is readily recognizable? Or alternatively one which promotes organizational effectiveness. These are not mutually exclusive definitions. A homogeneous culture can constrain the effectiveness of an organization as easily as it can promote it. Similarly the strongly held attitudes may be in direct conflict with the objectives of the organization, or held by only a few members (Williams et al., 1989, p.24)."

Williams et al. (1989) define strength as the extent of internalization by members of, or the extent of acceptance and agreement with, the beliefs, attitudes and values of other members of the group. In the present research, the POS scale allow the researcher to assess homogeneity of values across the organization in the sense that individuals report on the degree of congruence between their beliefs and values and those of the organization. In this sense, the AM plant clearly constitutes the stronger culture.

On the other hand, the variables which do not distinguish the groups may be of equal interest. We should bear in mind that the study compared two organizations with a great many similarities. They share the same national and provincial culture, the economy, government and regulations, hiring pool, etc. It would, therefore, be surprising if

there were not a number of similarities between the organizations. Nonetheless, a failure to find a significant difference with respect to some variables has a particular theoretical significance. It might have been expected based on increased participation, greater satisfaction with managers, etc. that workers at the AM plant would have developed higher levels of Affective Commitment. Certainly, AM workers were less likely to report that they continued with the employer because of lack of opportunity elsewhere or the costs of leaving (Continuance Commitment). One might speculate that emotional attachment to the company would continue to grow over time. In practice, however, the correlation (-0.005) between the length of time in employment at the plant and Affective Commitment indicated virtual independence of these variables. Possibly, the relatively low levels of Commitment had to do with local effects such as increased demands from the employer for greater output or the failure of the employer, as the researcher learned from casual asides, to make good on a profit sharing plan. Detailed interviewing of participants is anticipated to check hypotheses of this nature.

Similarly, the comparability of Role Insufficiency in the two plants is surprising. AM work, in general terms, is described as offering greater variety of skilled tasks than

would typically be the case in a TM plant. Indeed, successful AM operations are usually thought of as requiring such variety (Gerwin, 1991, p.12). Possibly, the fact that management wished to obtain increased output from its workforce had caused it, as a temporary expedient, to fall back on traditional hierarchical control methods such as relatively fixed job classifications. Again, an interview study should be conducted to determine the reasons for relatively high levels of Insufficiency in the AM plant.

Methodological Issues

There were a number of differences between the Jones et al. (1993) study which provided the data on the TM plant and the evaluation of the AM plant in the present research. While both used the same survey instrument, the Jones et al. study was based on two additional methods, structured interviews and critical incident workshops. As noted it is likely to be of value to adapt these methods to the AM plant to test specific hypotheses.

On the other hand, it was possible to collect certain kinds of data at the AM company which were unobtainable at the TM facility. The level of trust between management and workers at the TM plant were sufficiently low that, after discussions with the union and management, it was deemed

unwise to collect demographic data from all respondents as there was the feeling on the part of some workers that such information might identify individuals or groups. In principle, this methodological difference between the studies may indicate the degree to which TM workers with unpopular views feared retaliation and distrusted management.

At the AM plant management, response to demographic questions was optional. Most did respond, and the data yielded is potentially rich. The impact of variables such as age, sex, education, tenure, previous employment, continuing education, etc. can be correlated with our cultural data to bring out relationships important to the organization. Results of this kind are outside the confines of the present study. It will suffice to note one result. Further analysis of the AM data (see Appendix X) has shown that men and women, for example, displayed significantly different levels of satisfaction about promotion. Polarization along lines of gender may be extremely important for the company's human resources practices and the level of resistance to change of men and woman, as well as for a more theoretical understanding of sub-cultural responses.

Generalizability of Results. Are the differences reported likely to hold true if we were to use different sites as our sample? Let us first examine whether our companies are representative. The traditional manufacturer met none of the criteria defined by Gerwin and Kolodny (1992) for advanced manufacturing; it was not highly flexible and closely integrated, and innovation was slow with slow introduction of technologies. Jones et al. (1993) showed that the TM plant was typical of North American manufacturing in that it was experiencing an attempted revitalization to overcome its recognized deficit in productivity and competitiveness. The plant's ownership history was also quite typical having had three owners, including the present management, in the previous decade. The plant's experience of more or less continual downsizing is also commonplace in the traditional manufacturing sector.

The advanced plant met all the criteria for AM; it used and created the latest technologies, changed rapidly, had few levels and job types, used teams and made decisions at lower levels. It had also undergone considerable change. The company had developed from an essentially research organization into a research and manufacturing company, with significant and constant growth in volume, staff and product offerings. It had also undergone a change from private to

public ownership. This is consistent with what we would expect from a new, advanced organization, and we believe the AM plant to be representative of many advanced manufacturers.

Another issue affecting generalizability has to do with the type of research the survey reported here constitutes. Clearly, as Jones et al. pointed out, this is a cross-sectional view of the organizations at one point in time. The stability of these results over time can only be ascertained with longitudinal research. This is particularly difficult to achieve in organizational research.

Conclusions

Williams et al. (1989) suggest that differences between AM and TM may not occur by choice but rather are dictated by function. An advanced manufacturer's role in market leadership demands innovation, which demands use of multiple new technologies and the flexibility derived from flat organizations and socio-technical work designs. As Leavitt (1988) suggests the common behaviours of AM plants and their staff may lead to common attitudes and values:

"...one can change the attitude by changing behaviour first. Not only does behaviour line up with attitude, attitudes line up with behaviour! (Leavitt, 1988,

p.86)."

Argyris (1964) says that "Change is not going to be effective and permanent until the total organization accepts the new values (p. 74)." The CEO of Southwestern Bell said "Managing organizational change is a topic American business needs to examine and understand, because fundamental change will be the order of the day for the foreseeable future. And obviously, the company that can adapt its culture to change, quickly and successfully, will have a powerful competitive advantage (Beer et al., 1990, p.1)." In these terms, the AM plant has an obvious advantage compared to its TM counterparts. The AM plant is fundamentally based on change as a central cultural value. The typical TM plant faces the problem of introducing changing work practices etc. into an organization which is likely to be highly resistant to change as open communication and participation in decision making may not have previously been salient practices.

"Openness, trust, commitment, and risk-taking grow only where the climate is supportive (Argyris, 1964, p. 73)." Climate is not a physical attribute, it is an assessment made by group members, and is one heavily influenced by emotional perceptions of respect, involvement, and support. To the extent that POS differentiates the TM and AM plants,

it is reasonable to believe that the AM plant is more likely to take risks and to do so successfully. The tough part of change in organizations is the people (see e.g. Upton, 1995).

This study has highlighted which beliefs and attitudes may be important in differentiating members of Advanced Manufacturing from Traditional Manufacturing. The direction is clear, and the data also suggest considerable opportunities for significant gains in both advanced organizations and their more traditional counterparts.

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APPENDIX A

THE WORK ENVIRONMENT SCALE

INSTRUCTIONS

The following 90 statements are about the place in which you work. If you think the statement is **TRUE** or mostly **TRUE** circle the **T** next to the statement. If you think the statement is **FALSE** or mostly **FALSE** circle the **F** next to the statement. Please be sure to respond to every statement even if it is difficult for you to do so.

1. The work is really challenging.	T	F
2. People go out of their way to help a new employee feel comfortable.	T	F
3. Supervisors tend to talk down to employees.	T	F
4. Few employees have any important responsibilities.	T	F
5. People pay a lot of attention to getting work done.	T	F
6. There is constant pressure to keep working.	T	F
7. Things are sometimes pretty disorganized.	T	F
8. There is a strict emphasis on following policies and regulations.	T	F
9. Doing things in a different way is valued.	T	F

10. It sometimes gets too hot.	T	F
11. There's not much group spirit.	T	F
12. The atmosphere is somewhat impersonal.	T	F
13. Supervisors usually compliment an employee who does something well.	T	F
14. Employees have a great deal of freedom to do as they like.	T	F
15. There is a lot of time wasted because of inefficiencies.	T	F
16. There always seems to be an urgency about everything.	T	F
17. Activities are well planned.	T	F
18. People can wear wild looking clothing while on the job if they want.	T	F
19. New and different ideas are always being tried out.	T	F
20. The lighting is extremely good.	T	F
21. A lot of people just seem to be putting in time.	T	F
22. People take a personal interest in each other.	T	F
23. Supervisors tend to discourage criticisms from employees.	T	F

24. Employees are encouraged to make their own decisions.	T	F
25. Things are rarely "put off till tomorrow."	T	F
26. People cannot afford to relax.	T	F
27. Rules and regulations are somewhat vague and ambiguous.	T	F
28. People are expected to follow set rules in doing their work.	T	F
29. The place would be on of the first to try out new ideas.	T	F
30. Work space is awfully crowded.	T	F
31. People seem to take pride in the organization.	T	F
32. Employees rarely get to do things together after work.	T	F
33. Supervisors usually give full credit to ideas contributed by employees.	T	F
34. People can use their own initiative to do things.	T	F
35. It is a highly efficient, work oriented place.	T	F
36. Nobody works too hard.	T	F

37. The responsibilities of the supervisor are clearly defined.	T	F
38. Supervisors keep a rather close watch on employees.	T	F
39. Variety and change are not particularly important.	T	F
40. This place has a stylish and modern appearance.	T	F
41. People put a lot of effort into what they do.	T	F
42. People are generally frank about how they feel.	T	F
43. Supervisors often criticize employees over minor things.	T	F
44. Supervisors encourage employees to rely on themselves when a problem arises.	T	F
45. Getting a lot of work done is important to people.	T	F
46. There is no time pressure.	T	F
47. The details of assigned jobs are generally explained to people.	T	F
48. Rules and regulations are pretty well enforced.	T	F
49. The same methods have been used for quite a long time.	T	F

50. The place could stand some new interior decorating.	T	r
51. Few people ever volunteer.	T	F
52. Employees often eat lunch together.	T	F
53. Employees generally feel free to ask for a raise.	T	F
54. Employees generally do not try to be unique and different.	T	F
55. There's an emphasis on work before play.	T	F
56. It is very hard to keep up with your work load.	T	F
57. Employees are often confused about exactly what they are supposed to do.	T	F
58. Supervisors are always checking on employees and supervise them very closely.	T	F
59. New approaches to things are rarely tried.	T	F
60. The colours and decorations make the place warm and cheerful to work in.	T	F
61. It is quite a lively place.	T	F

62. Employees who differ greatly from the others in the organization don't get on well.	T	F
63. Supervisors expect far too much from employees.	T	F
64. Employees are encouraged to learn things even if they are not directly job related.	T	F
65. Employees work very hard.	T	F
66. You can take it easy and still get your work done.	T	F
67. Fringe benefits are fully explained to employees.	T	F
68. Supervisors do not often give in to employee pressure.	T	F
69. Things tend to stay just about the same.	T	F
70. It is rather drafty at times.	T	F
71. It is hard to get people to do any work.	T	F
72. Employees often talk to each about their personal problems.	T	F
73. Employees discuss their personal problems with supervisors.	T	F
74. Employees function fairly independently of supervisors.	T	F

75. People seem to be quite inefficient.	T	F
76. There are always deadlines to be met.	T	F
77. Rules and policies are constantly changing.	T	F
78. Employees are expected to conform rather strictly to rules and customs.	T	F
79. There is a fresh and novel atmosphere about the place.	T	F
80. The furniture is usually well arranged.	T	F
81. The work is usually very interesting.	T	F
82. Often people make trouble by talking behind others' backs.	T	F
83. Supervisors really stand up for their people.	T	F
84. Supervisors meet with employees regularly to discuss their future work goals.	T	F
85. There is a tendency for people to come to work late.	T	F
86. People often have to work overtime to get their work done.	T	F
87. Supervisors encourage people to be neat and orderly.	T	F

88. If an employee comes in late he or she can make it up by staying late.	T	F
89. Things always seem to be changing.	T	F
90. The rooms are well ventilated.	T	F

THE OCCUPATIONAL ENVIRONMENT SCALE

The 60 following statements are designed to measure the kinds of stress that people experience in their work. Read each statement and circle the answer which seems to fit you best for each statement according to the following scale.

ROLE OVERLOAD

	1	2	3	4	5
	"Rarely or Never"	"Occasionally"	"Often"	"Usually"	"Most of the Time"
1. At work I am expected to do too many different tasks in too little time.	1	2	3	4	5
2. I feel that my responsibilities are increasing.	1	2	3	4	5
3. I am expected to perform tasks on my job for which I have never been trained.	1	2	3	4	5
4. I have to take work home with me.	1	2	3	4	5
5. I have the resources to get my job done.	1	2	3	4	5
6. I feel competent in what I do.	1	2	3	4	5
7. I work under tight time deadlines.	1	2	3	4	5
8. I wish that I had more help to deal with the demands placed upon me at work.	1	2	3	4	5
9. My job requires me to work in several equally important areas at once.	1	2	3	4	5
10. I am expected to do more work than is reasonable.	1	2	3	4	5

ROLE INSUFFICIENCY

	1 "Rarely or Never"	2 "Occasionally"	3 "Often"	4 "Usually"	5 "Most of the Time"
11. I feel that my career is progressing about as I had hoped.					1 2 3 4 5
12. I feel that my job fits my interests and skills.					1 2 3 4 5
13. I am bored with my job.					1 2 3 4 5
14. I feel that I have enough responsibility on my job.					1 2 3 4 5
15. I feel my talents are being used on the job.					1 2 3 4 5
16. I feel my job has a good future.					1 2 3 4 5
17. I am able to satisfy my needs for success and recognition in my job.					1 2 3 4 5
18. I feel I am overqualified for my job.					1 2 3 4 5
19. I learn new skills in my work.					1 2 3 4 5
20. I have to perform tasks that are beneath my ability.					1 2 3 4 5

ROLE AMBIGUITY

	1	2	3	4	5
	"Rarely or Never"	"Occasionally"	"Often"	"Usually"	"Most of the Time"
21. My supervisor provides me with useful feedback about my performance.				1 2 3 4 5	
22. It is clear to me what I have to do to get ahead.				1 2 3 4 5	
23. I am uncertain about what I am supposed to accomplish in my work.				1 2 3 4 5	
24. When faced with several tasks at once I know which should be done first.				1 2 3 4 5	
25. I know where to begin a new project when it is assigned to me.				1 2 3 4 5	
26. My supervisor asks for one thing but really wants another.				1 2 3 4 5	
27. I understand what is acceptable personal behaviour on my job (e.g. dress, interpersonal behaviour etc.)				1 2 3 4 5	
28. The priorities of my job are clear to me.				1 2 3 4 5	
29. I have a clear understanding of how my boss wants me to spend my time.				1 2 3 4 5	
30. I know the basis on which I am evaluated.				1 2 3 4 5	

ROLE CONFLICT

	1 "Rarely or Never"	2 "Occasionally"	3 "Often"	4 "Usually"	5 "Most of the Time"
31. I feel conflict between what my employer expects me to do and what I think is right and proper.				1 2 3 4 5	
32. I feel caught between factions at work.				1 2 3 4 5	
33. I have more than one person telling me what to do.				1 2 3 4 5	
34. I feel I have a stake in the success of my organization.				1 2 3 4 5	
35. I feel good about the work I do.				1 2 3 4 5	
36. My supervisors have conflicting ideas about what I should be doing.				1 2 3 4 5	
37. I am proud of what I do for a living.				1 2 3 4 5	
38. It is clear who really runs things where I work.				1 2 3 4 5	
39. I have divided loyalties on my job.				1 2 3 4 5	
40. The work I do has as much payoff for me as for my employer.				1 2 3 4 5	

ROLE RESPONSIBILITY

	1	2	3	4	5
	"Rarely or Never"	"Occasionally"	"Often"	"Usually"	"Most of the Time"
41. I feel I deal with more people during the day than I prefer.	1	2	3	4	5
42. I spend time concerned with the problems others bring to me.	1	2	3	4	5
43. I am responsible for the welfare of subordinates.	1	2	3	4	5
44. People on the job look to me for leadership.	1	2	3	4	5
45. I have on the job responsibility for the activities of others.	1	2	3	4	5
46. I worry about whether the people who work for/with me will get things done properly.	1	2	3	4	5
47. People who work for/with me are really hard to deal with.	1	2	3	4	5
48. If I make a mistake on the job the consequences for others can be pretty bad.	1	2	3	4	5
49. My job demands that I handle an angry public.	1	2	3	4	5
50. I like the people I work with.	1	2	3	4	5

PHYSICAL ENVIRONMENT

	1 "Rarely or Never"	2 "Occasionally"	3 "Often"	4 "Usually"	5 "Most of the Time"
51. On my job I am exposed to high levels of noise.					
52. On my job I am exposed to high levels of wetness.					
53. On my job I am exposed to high levels of dust.					
54. On my job I am exposed to high temperatures.					
55. On my job I am exposed to bright light.					
56. On my job I am exposed to low temperatures.					
57. I have an erratic work schedule.					
58. On my job I am exposed to personal isolation.					
59. On my job I am exposed to unpleasant odours.					
60. On my job I am exposed to poisonous substances.					

JOB DESCRIPTIVE INDEXINSTRUCTIONS

Think of your present work. What is it like most of the time?

In the blank beside each word given below write

Y for "Yes" if it describes your work,

N for "No" if it does NOT describe it, or

? if you cannot decide.

WORK ON PRESENT JOB

_____ Fascinating

_____ Routine

_____ Satisfying

_____ Boring

_____ Good

_____ Creative

_____ Respected

_____ Hot

_____ Pleasant

_____ Useful

_____ Tiresome

_____ Healthful

_____ Challenging

_____ On your feet

_____ Frustrating

_____ Simple

_____ Endless

_____ Gives sense of accomplishment

Go on to the next page ...

Think of the pay you get now. How well does each of the following words describe your present pay?

In the blank beside each word given below write
Y for "Yes" if it describes your present pay,
N for "No" if it does NOT describe it, or
? if you cannot decide.

PRESENT PAY

- _____ Income adequate for normal expenses
- _____ Satisfactory profit sharing
- _____ Barely live on income
- _____ Bad
- _____ Income provides luxuries
- _____ Insecure
- _____ Less than I deserve
- _____ Highly paid
- _____ Underpaid

Now please turn to the next page

Think of the opportunities for promotion that you have now.
How well does each of the following words describe these?

In the blank beside each word given below write

Y for "Yes" if it describes your opportunities for
promotion,

N for "No" if it does NOT describe them, or

? if you cannot decide.

OPPORTUNITIES FOR PROMOTION

_____ Good opportunities for promotion

_____ Opportunity somewhat limited

_____ Promotion on ability

_____ Dead-end job

_____ Good chance for promotion

_____ Unfair promotion policy

_____ Infrequent promotions

_____ Regular promotions

_____ Fairly good chance for promotion

Go on to the next page

Think of the kind of supervision that you get on your job. How well does each of the following words describe this supervision?

In the blank beside each word given below write
Y for "Yes" if it describes the supervision you get
N for "No" if it does NOT describe it, or
? if you cannot decide.

SUPERVISION ON PRESENT JOB

- _____ Asks my advice
- _____ Hard to please
- _____ Impolite
- _____ Praises good work
- _____ Tactful
- _____ Influential
- _____ Up-to-date
- _____ Doesn't supervise enough
- _____ Quick tempered
- _____ Tells me where I stand
- _____ Annoying
- _____ Stubborn
- _____ Knows job well
- _____ Bad
- _____ Intelligent
- _____ Leaves me on my own
- _____ Around when needed
- _____ Lazy

Please go on to the next page

Think of the majority of the people that you work with now.
How well does each of the following words describe these
people?

In the blank beside each word given below write

Y for "Yes" if it describes the people you work with,
N for "No" if it does NOT describe them, or
? if you cannot decide.

PEOPLE ON YOUR PRESENT JOB

- ___ Stimulating
- ___ Boring
- ___ Slow
- ___ Ambitious
- ___ Stupid
- ___ Responsible
- ___ Fast
- ___ Intelligent
- ___ Easy to make enemies
- ___ Talk too much
- ___ Smart
- ___ Lazy
- ___ Unpleasant
- ___ No privacy
- ___ Active
- ___ Narrow interests
- ___ Loyal
- ___ Hard to meet

Please turn to the next page

Think of your job in general. What is it like most of the time?

In the blank beside each word given below write

Y for "Yes" if it describes your job,
N for "No" if it does NOT describe it, or
? if you cannot decide.

JOB IN GENERAL

- _____ Pleasant
- _____ Bad
- _____ Ideal
- _____ Waste of time
- _____ Good
- _____ Undesirable
- _____ Worthwhile
- _____ Acceptable
- _____ Like to leave
- _____ Better than most
- _____ Disagreeable
- _____ Makes me content
- _____ Inadequate
- _____ Excellent
- _____ Rotten
- _____ Enjoyable
- _____ Poor

MULTIDIMENSIONAL JOB DESIGN QUESTIONNAIRE

INSTRUCTIONS

For each of the following statements please indicate the extent to which you agree or disagree by circling the appropriate number.

	1	2	3	4	5
	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. The job allows freedom, independence or discretion in work scheduling, sequence methods, quality control or other decision making.	1	2	3	4	5
2. The work activities themselves provide direct and clear information as to the effectiveness (e.g. quality and quantity) of your job performance.	1	2	3	4	5
3. Other people in the organization, such as supervisors and co-workers, provide information as to the effectiveness (e.g. quality and quantity) of your job performance.	1	2	3	4	5
4. The job provides for positive social interaction such as team work or co-worker assistance.	1	2	3	4	5
5. The job duties, requirements and goals are clear and specific.	1	2	3	4	5
6. The job has a variety of duties, tasks and activities.	1	2	3	4	5
7. The job requires completion of a whole and identifiable piece of work. It gives you a chance to do an entire piece of work from beginning to end.	1	2	3	4	5
8. The job requires a high level of knowledge, skills and abilities.	1	2	3	4	5
9. The job is significant and important compared with other jobs in the company.	1	2	3	4	5

1 Strongly Disagree	2 Disagree	3 Neither	4 Agree	5 Strongly Agree	
10. The job allows opportunities for learning and growth in competence and proficiency.				1 2 3 4 5	
11. There are opportunities for advancement to higher level jobs.				1 2 3 4 5	
12. The job provides for feelings of achievement and task accomplishment.				1 2 3 4 5	
13. The job allows participation in work-related decision making.				1 2 3 4 5	
14. The job has access to relevant communication channels and information flows.				1 2 3 4 5	
15. The pay on this job is adequate compared with the job requirements and the pay in similar jobs.				1 2 3 4 5	
16. The job acknowledgment and recognition from others.				1 2 3 4 5	
17. People on this job have high job security.				1 2 3 4 5	
18. Just doing the work required by the job provides many chances for me to figure out how well I am doing.				1 2 3 4 5	

INTERROLE CONFLICTINSTRUCTIONS

Decide how you react to each of the following 8 statements. Circle the appropriate number to indicate your response according to the following scale.

1	2	3	4	5
Strongly	Disagree	Neither	Agree	Strongly
Disagree				Agree

1. My work schedule often conflicts with my family life.	1	2	3	4	5
2. After work I am too tired to do some of the things I would like to do.	1	2	3	4	5
3. On the job I have so much work to do that it takes away from my personal interests.	1	2	3	4	5
4. My family dislikes how much I am preoccupied with my work when I am at home.	1	2	3	4	5
5. Because my work is demanding there are times when I am irritable at home.	1	2	3	4	5
6. The demands of my job make it difficult to be relaxed all the time at home.	1	2	3	4	5
7. My work takes up time that I would like to spend with my family.	1	2	3	4	5
8. My job makes it difficult to be the kind of spouse or parent that I'd like to be.	1	2	3	4	5

SCALE OF ORGANIZATIONS

INSTRUCTIONS

Answer each of the following 12 questions by circling the number of the answer you want to give.

	1	2	3	4	5
	"To a very
little
extent"	"To a
little
extent"	"To
some
extent"	"To a
great
extent"	"To a very
great
extent"
1. To what extent is the organization generally quick to use improved work methods?	1	2	3	4	5
2. To what extent does this organization have goals and objectives that are both clear and reasonable?	1	2	3	4	5
3. To what extent are work activities sensibly organized in this organization?	1	2	3	4	5
4. In this organization, to what extent are decisions made at levels where the most adequate and accurate information is available?	1	2	3	4	5
5. How adequate is the information your work group gets about what is going on in other departments or units?	1	2	3	4	5
6. To what extent does this organization tell your work group what it needs to know to do the best possible job?	1	2	3	4	5
7. How receptive are people <u>above your supervisor</u> to ideas and suggestions coming from your work group.	1	2	3	4	5
8. To what extent does this organization have a real interest in the welfare and overall satisfaction of those who work here?	1	2	3	4	5
9. How much does this organization try to improve working conditions?	1	2	3	4	5

	1	2	3	4	5
	"To a very
little
extent"	"To a
little
extent"	"To
some
extent"	"To a
great
extent"	"To a very
great
extent"
10. To what extent are there things about working here (such as policies, practices, or conditions) that encourage you to work hard.	1	2	3	4	5
11. When decisions are being made, to what extent are the persons affected asked for their ideas?	1	2	3	4	5
12. People at all levels of an organization usually have know-how that could be of use to decision makers. To what extent is information widely shared in this organization so that those who make decisions have access to such knowledge?	1	2	3	4	5

SENSE OF COMMUNITYINSTRUCTIONS

The following statements are things people might say about their office or department where they work. Please circle TRUE (T) or FALSE (F) after each statement to show if it mostly true or false about your department.

1. I think my department is a good place for me to work T F
2. People in my department do not share the same values T F
3. My fellow workers and I want the same things from this job. T F
4. I can recognize most of the people in my office. T F
5. I feel at home in this office. T F
6. Very few of my fellow workers know me. T F
7. I care about what my fellow workers think of my actions. T F
8. I have no influence over what my department is like. T F
9. If there is a problem in my department the people who work here can get it solved. T F
10. It is very important for me to work in this department. T F
11. People in this department generally do not get along with each other. T F
12. I expect to work in this department for a long time. T F

PERCEIVED ORGANIZATIONAL SUPPORTINSTRUCTIONS

On the following pages you will see a number of statements about the organization for which you work, each of which you may agree or disagree with depending on your own personal evaluation. Please indicate the degree of agreement and disagreement with each statement by circling a number from 1 to 6 according to the following scale.

	1	2	3	4	5	6	7
	Strongly	Disagree	Mildly	Neither	Mildly	Agree	Strongly
	Disagree		Disagree		Agree		Agree
1. The organization values my contribution to its well-being.	1	2	3	4	5	6	7
2. If the organization could hire someone to replace me at a lower salary it would do so.	1	2	3	4	5	6	7
3. The organization fails to appreciate any extra effort from me.	1	2	3	4	5	6	7
4. The organization strongly considers my goals and values.	1	2	3	4	5	6	7
5. The organization would ignore any complaint from me.	1	2	3	4	5	6	7
6. The organization disregards my best interests when it makes decisions which effect me.	1	2	3	4	5	6	7
7. Help is available from my organization when I have a problem.	1	2	3	4	5	6	7
8. The organization really cares about my well-being.	1	2	3	4	5	6	7

1	2	3	4	5	6	7
Strongly	Disagree	Mildly	Neither	Mildly	Agree	Strongly
Disagree		Disagree		Agree		Agree

9.	Even if I did the best possible job, the organization would fail to notice.	1	2	3	4	5	6	7
10.	The organization is willing to help when I need a special favour.	1	2	3	4	5	6	7
11.	The organization cares about my genertal satisfaction at work.	1	2	3	4	5	6	7
12.	If given the opportunity the organization would take advantage of me.	1	2	3	4	5	6	7
13.	The organization shows very little concern for me.	1	2	3	4	5	6	7
14.	The organization cares about my opinions.	1	2	3	4	5	6	7
15.	The organization takes pride in my accomplishments at work.	1	2	3	4	5	6	7
16.	The organization tries to make my job as interesting as possible.	1	2	3	4	5	6	7

AFFECTIVE COMMITMENTINSTRUCTIONS

Below are a number of statements about the organization for which you work, each of which you may agree or disagree with depending on your own personal evaluation. Please indicate the degree of agreement and disagreement with each statement by circling a number from 1 to 6 according to the following scale.

	1	2	3	4	5	6	7
	Strongly	Disagree	Mildly	Neither	Mildly	Agree	Strongly
	Disagree		Disagree		Agree		Agree
1. I feel a strong sense of belonging to my organization.					1	2	3 4 5 6 7
2. I do not feel emotionally attached to this organization.					1	2	3 4 5 6 7
3. This organization has a great deal of personal meaning for me.					1	2	3 4 5 6 7
4. I do not feel like "part of the family" at this organization.					1	2	3 4 5 6 7
5. I would be very happy to spend the rest of my career with this organization.					1	2	3 4 5 6 7
6. I enjoy discussing my organization with people outside it.					1	2	3 4 5 6 7
7. I really feel as if this organization's problems are my own.					1	2	3 4 5 6 7
8. I think I could easily become as attached to another organization as I am to this one.					1	2	3 4 5 6 7

CONTINUANCE COMMITMENT

1	2	3	4	5	6	7
Strongly	Disagree	Mildly	Neither	Mildly	Agree	Strongly
Disagree		Disagree		Agree		Agree

9. Right now staying with my organization is a matter of necessity as much as desire. 1 2 3 4 5 6 7
10. One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice - another organization may not match the overall benefits I have. 1 2 3 4 5 6 7
11. I feel I have too few options to consider leaving this organization. 1 2 3 4 5 6 7
12. One of the few negative consequences of leaving this organization would be the scarcity of available alternatives. 1 2 3 4 5 6 7
13. It would be hard for me to leave my organization right now, even if I wanted to. 1 2 3 4 5 6 7
14. Too much in my life would be disrupted if I decided I wanted to leave my organization now. 1 2 3 4 5 6 7
15. It wouldn't be too costly for me to leave my organization in the future. 1 2 3 4 5 6 7
16. I'm not afraid of what would happen if I quit my job without having another lined up. 1 2 3 4 5 6 7

END

2 1 - 1 1 - 9 6

FIN