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Job design of patternmakers in apparel manufacturing

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The University of North Carolina at Greensboro, 1990

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JOB DESIGN OF PATTERNMAKERS

IN APPAREL MANUFACTURING

by

Nancy J. Staples

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

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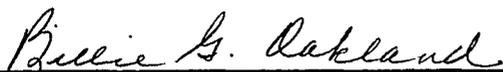
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APPROVAL PAGE

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The job structure of apparel patternmakers in North Carolina

manufacturing units producing women's and children's apparel in 1989 was

examined. Self-administered questionnaires were completed by

patternmakers and managers during visits to the companies by the

researcher. The response rate of 83% represented 50 companies employing

79 female and 40 male patternmakers.

The independent variables were: Fashion Change Frequency, a

scaled measure of the need to create new patterns due to fashion changes

in the product, and Organizational Strategy, a classification of the

company as Defender, Analyzer, Prospector, or Reactor. The dependent

job structure variables were: Task Differentiation and the core job

dimensions of the Job Diagnostic Survey: Skill Variety, Task Identity,

Task Significance, Autonomy, and Feedback.

Regression analysis revealed multicollinearity, which made it

impossible to assess the joint contribution of the independent

variables. This necessitated interpreting the contribution of

individual variables by the use of means, standard deviations, and

Pearson product moment correlations. The relationship between Fashion

Change Frequency and Task Differentiation was significant at the $p < .01$

level. Relationships significant at the $p < .05$ level were between

Strategy and Task Differentiation and between Strategy and both Job

Feedback and Agent Feedback.

High Fashion Change Frequency and Analyzer strategy require

patternmakers with strong patternmaking skills. Low Fashion Change

Frequency and Defender strategy require patternmakers with diverse

pre-production manufacturing skills and minimal patternmaking skills.

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

In order to compete in an increasingly competitive global market, apparel manufacturing has become a highly complex, rapidly changing industry. Apparel manufacturers in the United States are finding it necessary to adapt to new technologies and manufacturing processes. Traditionally, apparel manufacturers have been able to start their businesses with a relatively small financial investment, especially in areas where low-cost labor was available. As a result, there are a significant number of small apparel businesses. In the past it has been possible for apparel manufacturers, and especially small apparel manufacturers, to cater to a small, perhaps even local, segment of the market. But as competition has become more widespread, with decisions made on the other side of the world affecting even the small local company, it is no longer possible to function productively in isolation from the rest of the industry. It is uncertain whether there will continue to be such a vast range of company sizes in the apparel industry as companies attempt to become more efficient in order to compete. In particular, one could question whether the multitude of small apparel manufacturers will be able to survive. There seems to be a consensus that people are the key to the success of domestic apparel manufacturing. "One reason for excellence in corporations is productivity through human resources" (Daft, 1983, p. 506).

Despite technological advancements and the increased use of computers, there are key workers whose labor-intensive jobs will continue to be critical to productivity. There is a need for analyses of the existing jobs, since little research has been pursued to analyze the components of apparel manufacturing. It is only with valid base line data that better judgments can be made about the future structure of this rapidly changing industry. Logically, the study of such pivotal workers should take place where the impact of their manufacturing unit is of economic importance.

In 1988, North Carolina ranked third in the United States, after California and New York, in the number of employees in apparel and related finished products (Standard Industrial Codes beginning with 23). In the first quarter of 1988 there was an average of 84,500 North Carolina apparel and other finished products manufacturing employees in 846 manufacturing units that earned $243,866,585 (United States Department of Labor, Bureau of Labor Statistics, 1988). These firms represent vast diversity in product type, product price, and organizational size. Apparel manufacturing is important economically to North Carolina and to the United States, thereby making North Carolina an ideal site to study key jobs in apparel manufacturing. The job of the apparel patternmaker is one of these key positions.

Purpose

The purpose of this research is to develop a profile of the apparel patternmaker and to examine the structure of the patternmaker's job in

the context of the apparel manufacturing environment of 1989. This study focuses on a sample of North Carolina manufacturers of women's and children's apparel. These findings will contribute to the literature about patternmakers.

Justification

What is so special about the apparel patternmaker that would make this job worthy of an entire study? On page one of the August 3, 1987 Wall Street Journal, Seth H. Lubove states:

> Even in an age of impersonal silicon chips and robotic arms, which have come to symbolize modern manufacturing, certain people with particular skills spell the success--or failure--of their employers....As technology advances, the number or such vitally important workers dwindles. And the significance of such people often is overlooked.

One such pivotal worker is the patternmaker in an apparel firm. "It is the anonymous patternmaker...who translates designers' concepts into reality and fiscal reason" (Lubove, p. 14).

The influence that the patternmaking function exerts on the operation of an apparel firm suggests that, unless the job of patternmaker is performed well, the financial standing of the firm can easily be put in jeopardy. A review of the literature reveals limited research in which the activities of the apparel patternmaker had been the primary focus. Although the job of patternmaker is not as visible as, for example, the designer, nevertheless the impact of the patternmaker's work is of utmost importance. Because so little has been written about apparel patternmakers, and because their jobs are so important, research data gathered about this population of workers could

be a significant contribution to the current body of knowledge.

A need for better understanding of the nature of jobs in the apparel industry has been indicated by the cover focus and special features of the June, 1984 issue of <u>Bobbin</u> magazine, the management magazine for the sewn products industry (Varn, 1984).

> To survive in a high-tech world, the sewn products industry must 'throw away' those job descriptions which no longer reflect our industry, and build on those that do as we develop new, and ever-changing, descriptions for the workplace of the future (p.4).

> There are few sources of job description data for the sewn products industry, and even fewer current ones. As we move forward with certain change, it will be more important than ever to have, and use, up-to-date job description documentation....To adequately write the job descriptions of the future, we need to address documentation data sufficient for our current needs (p. 20).

It has been implied that the future success of domestic apparel manufacturing may rest on the skill and efficiency of the patternmaker. There is a need for data concerning the allocation of these pivotal human resources.

Objectives

The objectives of this study are:

1. To develop a demographic profile of the patternmakers.

2. To obtain data about the structure of the job of the apparel patternmaker.

3. To determine the ways in which the patternmaking tasks are divided in different companies.

4. To determine the fashion change frequency, the organizational strategy, the size, and the computer

technology use for patternmaking of the companies studied.

5. To identify the relationships among external environmental change, organizational strategy, and the structure of the patternmakers' jobs.

Statement of Hypotheses

The primary source of external environmental change for an apparel manufacturer is fashion change, which is measured by the independent variable Fashion Change Frequency. Organizational strategy, an independent variable, measures the manufacturer's adaptation to the external environment. The dependent variables are the core job dimension scores of the Job Diagnostic Survey and a task inventory measure of the patternmaker's job. These are, respectively, the scores for Skill Variety, Task Identity, Task Significance, Autonomy, and Feedback (Hackman & Oldham, 1974) and the Task Differentiation score (a measure derived from a task inventory based on the example of Morsh & Archer, 1967, and Archer & Fruchter, 1963).

The following general hypotheses will be tested:

Hypothesis 1A: Skill Variety will vary positively with Fashion Change Frequency.

Hypothesis 1B: Task Identity will vary positively with Fashion Change Frequency.

Hypothesis 1C: Task Significance will vary positively with Fashion Change Frequency.

Hypothesis 1D: Autonomy will vary negatively with Fashion Change Frequency.

Hypothesis 1E: Agent Feedback will vary positively with Fashion Change Frequency.

Hypothesis 1F: Job Feedback will vary positively with Fashion Change Frequency.

Hypothesis 1G: Task Differentiation will vary positively with Fashion Change Frequency.

Hypothesis 2A: Skill Variety will vary with Organizational Strategy.

Hypothesis 2B: Task Identity will vary with Organizational Strategy.

Hypothesis 2C: Task Significance will vary with Organizational Strategy.

Hypothesis 2D: Autonomy will vary with Organizational Strategy.

Hypothesis 2E: Agent Feedback will vary with Organizational Strategy.

Hypothesis 2F: Job Feedback will vary with Organizational Strategy.

Hypothesis 2G: Task Differentiation will vary with Organizational Strategy.

CHAPTER 2

REVIEW OF THE LITERATURE

Recent changes in the apparel industry, including global competition and technological advance, are forcing the American apparel industry to examine its method of operation. Although apparel products have not lacked for attention in the home economics, clothing and textiles, and social sciences literature, the primary focus of most of the research pursued has been in the aesthetic aspects of apparel (social-psychology, marketing, fit). The apparel industry has seldom been the focus of the literature in business, management, organizational behavior, or job design, despite the variety and widespread application of these specializations. Even simple job descriptions are not readily available for apparel workers. As an industry which is relatively easy to enter, many companies have operated in a "seat-of-the-pants" manner, resulting in inconsistent and often inefficient management. As a pivotal job, the patternmaking function within apparel manufacturing needs to be understood and its tasks effectively organized. The nature of existing jobs could provide the foundation for creating realistic job descriptions and developing a range of expertise levels for improved job placement.

A first step for being prepared to make intelligent strategic choices as they relate to the job of the apparel patternmaker is to determine what existing jobs encompass and how they are organized. To accomplish this, it is necessary to know what information is available about patternmakers, what factors indicate external environmental change, how organizational strategy is determined, how job design is determined, and how task inventories are developed.

Patternmakers

Patternmaking was the topic of three recent studies. Only one of the three studies solicited responses directly from the patternmakers. All of the studies were primarily concerned with actual and/or projected computer use in the apparel industry. Fraser (1985) focused on attitudes toward the use of computers, Sheldon (1988) emphasized current and projected use of computers, and Belleau and Didier (1989) assessed needs for instruction in the use of computers.

Fraser (1985) surveyed 125 designers, 125 patternmakers, and 125 production managers employed in apparel manufacturing where some form of computerized production was currently in use. An attitude index sought responses toward the use of Computer Aided Design (CAD). A response rate of 33% was realized. The results indicated that patternmakers and production managers have favorable attitudes toward the incorporation of CAD into the design process. Almost half of the designers, however, did not respond favorably to the prospect of using CAD in their jobs. It was suggested that non-cooperation among potential users would be a

production hazard. This study, which included a demographic profile of the workers, is the only study found in the literature with descriptive statistics about apparel patternmakers.

Sheldon (1988) focused on the impact of computer technology on the training of apparel designers. A survey mailed to 150 designers yielded responses from 95, a 63% response rate. Although the researcher sought responses from designers, the data gathered included information about the status of computerization in the patternmaking function. Patternmaking was computerized in 37% of the companies, which represented a 170% increase since a 1980 American Apparel Manufacturers Association Technical Advisory Committee study. Sheldon projected that in five years 65% of the companies surveyed would use computers for patternmaking. As a result of chi-square analysis of the projected-use responses, Sheldon suggested that there will be a computer technology gap between small and large apparel manufacturers, with small companies lagging behind. Sheldon emphasized the need for hands-on experience in patternmaking for college students.

Belleau and Didier (1989) used telephone survey techniques to interview all 38 apparel manufacturers in Louisiana. Their goal was to assist small to mid-sized apparel manufacturers with the transfer of personal computer technology dealing with many aspects of production, including patternmaking. Only 34% of the companies surveyed made patterns in Louisiana, and of those only 2% used computer technology. The suggestion was made that small to mid-sized companies would be primary targets for assistance in the transfer of personal computer

technology. Belleau and Didier projected that, with assistance, the Louisiana apparel manufacturers could compete more successfully with overseas contractors, increase productivity and profits, and provide more jobs for the state.

These studies imply that the patternmaker's job, as a part of the design function in an apparel organization, and as a part of the apparel industry in general, is changing. Yet the current structure of the apparel patternmaker's job and how that job is affected by the current environment of its employer are not clear. Therefore, to understand the patternmaker's job better, the first step is to understand the environment in which the job occurs.

External Environmental Change

The environment may be defined as those elements existing outside the boundary of an organization which have the potential to affect all or part of the organization. It is through the amount of uncertainty (change) they create for organizational decision makers that environmental elements affect the organization. "The pervasive nature of change affecting so many aspects of the business scene has suggested the observation that the only permanent element in the environment of business is change." (Glos & Baker, 1972)

Complexity and change are two features of the models commonly used in the business literature to describe the impact of the external environment on organizations. In this context, complexity refers to the number of external elements in the environment which are relevant to the

operation of an organization. Emery and Trist (1965) proposed four degrees of increasing complexity in organizational environments: placid-randomized, placid-clustered, disturbed-reactive, and turbulent field. Based on the work of Emery and Trist, Duncan (1972) created a matrix model to represent the external environment graphically. This model has been adapted by many others including Daft (1983, 1986) and Chung (1987). In Daft's model environmental change is measured by a stable/unstable continuum, while environmental complexity is measured by a simple/complex continuum. Chung indicates the degree of stability by static/dynamic and degree of complexity by low/high. The apparel industry falls in the unstable/dynamic-change and simple/low-complexity quadrant.

Apparel manufacturers operate in an external change environment which is at the opposite extreme of that which could be considered "protected". Constant innovation is the norm. With the possible exception of extremely stable products, the output of the apparel industry is subject to the whims of the marketplace whose leaders demand unending newness. The customer demands for "new" products have necessitated that apparel manufacturers pay attention to the market if they are going to succeed.

Marketing research routinely seeks to determine consumers' perceptions of products. This determination is often made through the use of scales to rate perceived benefits of a product (Williams, 1982). One product benefit of importance to apparel is fashion, that consideration which dictates frequency of styling changes, the

foundation for innovation. Sheldon (1988) related fashion change to the use of computerized equipment by suggesting that lower use by companies producing only women's clothing may be explained by their typically more frequent fashion-driven design changes. This implies that, at least for the use of the computer as a tool on the job, fashion change frequency makes a difference in the design of a patternmaker's job.

Organizational management is the moderator between the constantly-changing external environment and the patternmaker. To understand the context within which the apparel firm's management team structures the jobs within the organization, the organization's strategy should be examined.

Organizational Strategy

Between the influences outside of an organization and the workers inside the organization is management, which determines how to respond to the environmental factors and, thereby, how to manage the organization. It is this response to environmental variables by management which constitutes its strategy. For this reason, organizational strategy must be considered in the study of an individual job.

When an organization is able to develop structural arrangements consistent with the requirements of its environment, size, and technology, it will be more effective (Daft, 1983). Because top management is located at the interface between the environment and the

organization, its role is to interpret environmental characteristics, then respond with basic choices about:

> the appropriate size and growth of the organization, the technology that should be used, the products to be produced, the best organization structure to meet these needs, and the deployment and utilization of human resources (p. 472).

Miles and colleagues (Miles & Snow, 1978; Miles, Snow, Meyer, & Coleman, 1978) have proposed a theoretical framework for the strategy definition required by an organization's need for adaptation. It includes an adaptive process, called the adaptive cycle, and four empirically determined means of moving through the adaptive process, called the strategic typology.

In the adaptive cycle, top managers deal with three broad problems of organizational adaptation: the entrepreneurial problem, the engineering problem, and the administrative problem. Solving the entrepreneurial problem is the definition of an organizational domain, a specific good or service to be produced for a target market or market segment. Solving the engineering problem involves the creation of a system to operationalize the solution to the entrepreneurial problem. Solving the administrative problem means the rationalization and stabilization of the activities which successfully solved the problems faced in the entrepreneurial and engineering phases, including the formulation and implementation of those processes which will enable the organization to continue to evolve (innovation).

The strategic typology includes three types of organizational strategy and one "failure." At the extremes are the Defender and the Prospector. The Defender (Appendix A) deliberately acts and maintains

an environment for which a stable form of organization is appropriate, with maximum profit and minimum risk. The Prospector (Appendix B) is like the Defender in its consistency of solutions to the three problems, but its solutions seek to find and exploit new product and market opportunities, with maximum risk and minimum profit. The Analyzer (Appendix C) falls between the Defender and the Prospector, attempting to minimize risk while maximizing profit. The failure is the Reactor, whose pattern of adjustment to its environment is inconsistent and unstable. Unless an organization exists in a "protected" environment, such as a monopoly or a highly-regulated industry, it cannot be a Reactor indefinitely and must move toward one of the three consistent, stable strategies.

An apparel manufacturer, in solving the entrepreneurial problem, must decide the product to be manufactured and the market to be served. The customer demand in the marketplace which is most often associated with apparel goods is fashion. This becomes a product benefit which has the potential for significantly affecting the solution to the engineering and administrative problems, which ultimately determines the strategy of an apparel manufacturer.

Just as fashion change affects the design of apparel, trends in organizational theory affect the way that jobs are designed. To understand the structure of a job in 1989, it is necessary to know the development of job design practice throughout this century.

Job Design

"Modern" job design theory has its roots in the work of Frederick W. Taylor (1911), whose Scientific Management strategy dominated job design thinking through the middle of the 20th century. His work promoted the "scientific" study of jobs so that they could be simplified and standardized. As an outgrowth of the Industrial Revolution and the resulting emphasis on division of labor into tasks simple enough to be performed with little training, and great efficiency, Taylor's method assumed that the worker would be motivated by financial rewards alone. This assumption did not prove true. Boredom and dissatisfaction resulted in irresponsibility of workers and decreased productivity. The union movement received impetus from the negative aspects of Scientific Management.

In the early 1950's, job design theorists began to look at the worker's human needs on the job, as well as the employer's need for productivity. Maslow's work on motivation (1943, 1954), derived a hierarchy of needs from physical needs to self-actualization needs, provided the base for job enrichment and job enlargement. Maslow stated that until certain needs are met there will be no motivation to pursue higher needs. Job enrichment can be thought of as a process in which the worker is given more responsibility for job planning and execution and for policy setting. Job enlargement changes the job by adding to the number and variety of operations performed (Lawler, 1969).

Herzberg (1966) and Herzberg, Mausner, and Snyderman (1959) theorized that internal factors and external factors serve different

functions in job enlargement/enrichment. Herzberg believed that motivation includes a level of satisfaction with the work and a level of dissatisfaction, two separate continua. He did not believe that satisfaction and dissatisfaction are opposite extremes on a single continuum. He called motivators those elements of the work that are intrinsic, including feelings of self-worth, challenge, importance. Dissatisfiers, or "hygiene factors", are extrinsic, such as pay, benefits, vacations. Herzberg believed that it is the balance between these two elements that affects the employee's level of motivation to work.

Early research in the application of job enrichment/enlargement unfortunately did not follow scientific methodology, and this led to some disillusionment with the theory. There was also an underlying assumption that all workers were dissatisfied with the Scientific Management type of job. Turner and Lawrence (1965) investigated the role of various job characteristics including responsibility, optional interaction, knowledge and skill required, autonomy, variety, and required interaction. Job satisfaction and attendance were greatest in small towns, where local culture moderated workers' reactions to the job characteristics. "Anomie", or normlessness, was the workers' norm in large cities, where scores were lower. The requisite task attribute index used by Turner and Lawrence was later modified by Hackman and Lawler (1971) to include four core task dimensions: variety, autonomy, task identity, and feedback.

Hulin (1966) and Blood and Hulin (1967) investigated individual
differences in responses to job characteristics. Community
characteristics, work norms, were found to be related to workers'
responses to job enlargement. "Job satisfaction is a product of the
discrepancies between expectations and experience" (1966, p. 190). Many
recent studies have focused on the notion of individual differences in
worker preferences for job characteristics, finding that the differences
usually do influence worker reactions to their jobs (Pierce and Dunham,
1976).

The best known and most complete theory for explaining worker
responses to job characteristics is that of Hackman and Oldham (1974,
1975, 1976), based on the earlier work by Hackman and Lawler (1971).
Hackman and Oldham approached the problem of individual differences by
the addition of a "growth needs strength" factor to the response of
workers to five core job dimensions: skill variety, task identity, task
significance, autonomy, and feedback. They reasoned that individuals
with a high need for personal growth and development would respond more
favorably to jobs with high ratings on core job dimensions. The scoring
of their instrument, the Job Diagnostic Survey (JDS), results in a
measure for each individual dimension which is an average of the
responses to three questions. The questions are rated on a scale of one
through seven. Hackman and Oldham's model also includes provision for
determining a motivating potential score (see Appendix D).

The work of Hackman and Oldham has not gone unquestioned. Dunham
(1976) and Dunham, Aldag, and Brief (1977) conducted studies using the

JDS and concluded that variety and autonomy might be better expressed by a combined characteristic called "job complexity", and that perhaps the underlying theory of the JDS needed revision. It was suggested that, because the dimensionality of perceived task design was not stable across samples, the dimensionality should be examined for each sample studied. At about the same time, in response to the questions about the validity of the JDS, Sims, Szilagyi, and Keller (1976) developed the Job Characteristics Inventory (JCI), employing six job dimensions. Brief and Aldag (1978) summarized the JCI by stating:

> An alternative approach would be to employ a job (or task) inventory, a form of structured job analysis questionnaire which consists of a listing of tasks, usually those relevant to the jobs within a particular occupational area....The relative advantages of the job inventories are that the procedures for their development are well known, that the inventories have been shown to yield high reliability (test-retest) responses, and that the inventories are independent of any particular taxonomic approach to the characterization of jobs. This independence allows the researcher to explore the role of objective job characteristics without relying upon any preconceived notion of what dimensions of the job are relevant to employee perceptions, affective states, or behaviors. At this stage in the development of task design theory, it would appear that such independence from preconceptions may be necessary if exploration of less traditional avenues of inquiry is to be facilitated (p. 669).

Roberts and Glick (1981) state that Hackman and Oldham's work should be considered exploratory, not confirmatory. "The incumbent responses to the JDS reflect incumbents' task perceptions and only indirectly measure task characteristics" (p. 210). They argue that the model does not include characteristics which focus on low growth needs strength and that the model fails to maintain the distinction between within-person and person-situation relations.

Campion (1982), Campion and Thayer (1985), Campion (1988), and Campion and Thayer (1989) proposed an interdisciplinary measure for job design which is the most recently contributed model in job design theory. His inclusion of mechanistic, human factors, and biological approaches in addition to motivational, focused more on worker responses than on job characteristics.

Fried and Ferris (1986) performed a quantitative analysis of job characteristics related to 7,000 people in approximately 900 job positions. They demonstrated the validity of task identity and job feedback, but suggested that skill variety, task significance, and autonomy should be combined into one dimension.

In 1987 Idaszak and Drasgow revised the JDS to remove the reverse scoring of some items. Kulik, Langner, and Oldham (1988) found that the revised items did not substantially improve the usefulness of the JDS for predictive purposes. They suggested that use of the revised JDS could not be compared with results of previous research using the original JDS. Idazak, Bottom, and Drasgow (1988) recommended that, for scales like the JDS, with so few items per factor, larger than usual sample sizes are needed.

In spite of the controversies surrounding the validity of the core job dimensions of the JDS, there has been consensus that although the dimensionality of perceived task design varies greatly across samples, it is multidimensional in nature. Based on a review of the literature, the JDS appears to be the most widely used perceptual measure of task

design. In 1976 Dunham stated that the reliability estimates of the
measures of JDS core job dimesions were typically above .70 (p. 93).

The development of job design measures has provoked controversy.
The suggestion of the usefulness of task inventories made by Brief and
Aldag (1978) leads to a need for an understanding of the develpment and
application of task inventories as a supplement to such measures as the
JDS.

Task Inventories

Over the years many efforts have been made to obtain job-related
information, but much of it has been unsystematic, more subjective than
objective, and in a form not conducive to systematic analyses.

> The study of the human work (which occupies a major part of man's
> lifetime) probably has not generally benefited from the systematic,
> scientific approaches that have been characteristic of other
> domains of inquiry, such as the study of physical phenomena,
> biological phenomena, or of the behavior of man himself (as through
> psychological and sociological research) (McCormick, p. 654).

Recently there have been significant improvements in systematic
approaches for the data collection process and for the analysis of job
descriptive data.

The Dictionary of Occupational Titles (1977) is a part of the
operations of the United States Training and Employment Service
(UST&ES). It provides for the classification and coding of both
applicants and jobs available by the use of an occupational
classification system. At the lowest level are the actual definitions
of included occupations (see Appendix E for the DOT definition of a
patternmaker).

The greatest contribution to systematic research in job analysis has been the identification and use of some type of job-related units. These units make possible more systematic analysis and application. The information is acquired through structured questionnaires or taxonomies. Two of these methods are the Position Analysis Questionnaire (PAQ) and job inventories.

The PAQ (McCormick, Jeanneret, & Mecham, 1969) is divided into six major sections: information input, mental processes, work output, relationships with other persons, job context, and other job characteristics. It is intended that the PAQ be an analysis of rater responses to these generic job elements which could be found in all jobs. The analysis links the data to a specific job. The PAQ was used by Lounsbury and Gibson (1987) in studying marker makers in the apparel industry.

The use of job (task) inventories was developed by the Personnel Division of the Air Force Human Resources Laboratory (Christal, 1969; Morsh, 1964, 1969; Morsh & Archer, 1967). These structured job-analysis questionnaires usually list the tasks which are relevant to a specific job within some occupational area. The list includes all of the activities which could possibly be performed by an incumbent in the job in question. Each item is a simple statement of an activity which may be checked or rated. The inventory is usually completed by the worker in the job, but may also be completed by a supervisor.

The procedures for developing task inventories were detailed by Morsh and Archer (1967) and Archer and Fruchter (1963). Depending on

the extent of the analyst's knowledge of the job being studied, source materials may be consulted for background and may lead to the development of a preliminary inventory. Another approach employs a sample of incumbents or technical experts who list tasks included in the jobs. The lists are then combined, edited, and organized into a consistent form.

The preliminary inventory is reviewed by technical experts, who may include incumbents that will not be included in the statistical sample. A revision is made, incorporating the suggestions of the reviewers. The resulting inventory may be the final form or may be further tested. Space is usually provided for incumbents to write in tasks which are not listed on the final inventory. Although it is anticipated that the development and review process would produce an inventory so complete that other tasks would not need to be listed, new tasks added can easily update the inventory for future use. A demographic section usually follows the task listings. The task inventory does not require any training on the part of the respondent, but it is suggested that the researcher be available to respond to any questions that might need to be answered.

To summarize the measures selected for use in this research, the model for determining organizational strategy was developed by Miles and Snow (1978). The Job Diagnostic Survey of Hackman and Oldham (1974) provides the core job dimensions of skill variety, task identity, task significance, autonomy, and feedback which characterize the job being studied. The use of a task inventory is supported by Morsh and Archer

(1967) and Archer and Fruchter (1963). The need for research with a specific focus on apparel patternmakers is indicated by the dearth of information available about apparel patternmakers and their jobs.

CHAPTER 3

THEORETICAL FRAMEWORK

Kerlinger (1973) states that one of two types of exploratory field studies is that which seeks to discover or uncover relations among variables in real social structures. This study began with the assumption that there was little empirical knowledge about the design of the patternmaker's job. Students are trained in the art of patternmaking and draping, then are sent out to jobs which employ these skills in the manufacture of apparel. It is known that the design of jobs involving patternmaking vary considerably, but little is known about the exact nature or cause of this variation, or on what, if anything, the variability impacts.

The theoretical framework begins with an understanding of organizations. In organization theory, sociologists attempt to understand relationships so that recommendations can be proposed for appropriate strategies and structures affecting the worker's situation. Organizations are open systems, that is they do not exist in a vacuum, they are affected by outside influences. The environment is one important influence on organizations.

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the only permanent element in the environment of business is change."
(Glos & Baker, 1972)

Two features of the models commonly used in the business literature
to decribe the external environment are complexity and change (Emery &
Trist, 1965; Duncan, 1972; Daft, 1983, 1986; and Chung, 1987). The
apparel industry is characterized by low complexity and high change.
The complexity level is industry-wide, but the specific level of change
differs from company to company. This proposed research will examine
the nature of change in the apparel manufacturing environment of each
separate company by the frequency of styling changes dictated by
fashion. It is the frequency of these fashion changes which affect the
necessity for the organization to manufacture new styles within its
chosen product type.

The management of an organization links the changing environment
with the individual in a particular job. As such, it is the
responsibility of management to direct the process of adapting to
environmental change and uncertainty. For this reason, the method of
adaptation by management seemed to be a logical addition to the
potential influences on the design of the patternmaker's job.

As developers of an organizational strategy model, Miles, Snow,
Meyer, and Coleman (1978) state that "organizations are limited in their
choices of adaptive behavior to those which top management believes will

allow the effective direction and control of human resources." It is necessary for management to identify the impersonal forces in the environment which impact the organization, then make a conscious choice to adopt a particular strategy by which the organization will adapt to those forces. The key element in choosing a strategy is interpretation of the external environment. Because resource commitment, including the allocation of human resources, depends on strategy, management must design jobs in such a way as to maximize the achievement of its strategic goals. This suggests a logical connection between the design of a worker's job and the adaptive strategy of the company by which he/she is employed.

Although job design theory focuses on explaining worker responses to job characteristics, it is first necessary to profile the specific job of interest. "Any such listing of possible sources of variance would be incomplete without consideration of the nature of the jobs in question" (McCormick, 1976). Two widely used means by which jobs are described are: the Job Diagnostic Survey (Hackman & Oldham, 1974, 1975, 1976) and task inventory analyses (Christal, 1969; Morsh, 1964; Morsh, 1969; McCormick, 1976; Brief & Aldag, 1978).

Hackman and Oldham state that any job can be described in terms of five core job dimensions: skill variety, task identity, task significance, autonomy, and feedback. The Job Diagnostic Survey (JDS) employs a questionnaire of scaled responses which, when scored, indicates the level of each dimension found in the job being studied and derives a corresponding motivating potential score (MPS). A task

inventory is a form of structured job-analysis questionnaire which lists tasks relevant to a given job and provides for some response to those tasks. Usually the workers are asked to indicate whether they do or do not perform each task, and, for those performed, to rate the task as to its frequency of performance and/or importance. The responses may then be used to demonstrate, through the resulting task differentiation score (TDS), how an organization divides the labor of the particular job.

The JDS and the task inventory provide indicators of job structure to explain the nature and variation of patternmakers' jobs. The job dimension scores of the Job Diagnostic Survey (JDS) and the task differentiation score (TDS) of the task inventory were the dependent variables for job structure. The fashion change frequency of the product manufactured and the organizational strategy of the company of employment were the primary independent variables. Two potentially moderating independent variables were also measured--the size of the company of employment and the frequency with which available computer technology was used for patternmaking. Figure 1 illustrates the theoretical framework. This research assumes that external forces affect the design of a job, and employs the JDS as a dependent, rather than an independent, variable.

EXTERNAL ENVIRONMENT
(fashion change frequency)

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ORGANIZATIONAL STRATEGY
(company size) . .   (firm type)   . . (computer use)

.

.

.

(JDS)   JOB DESIGN   (TDS)
(patternmaker)
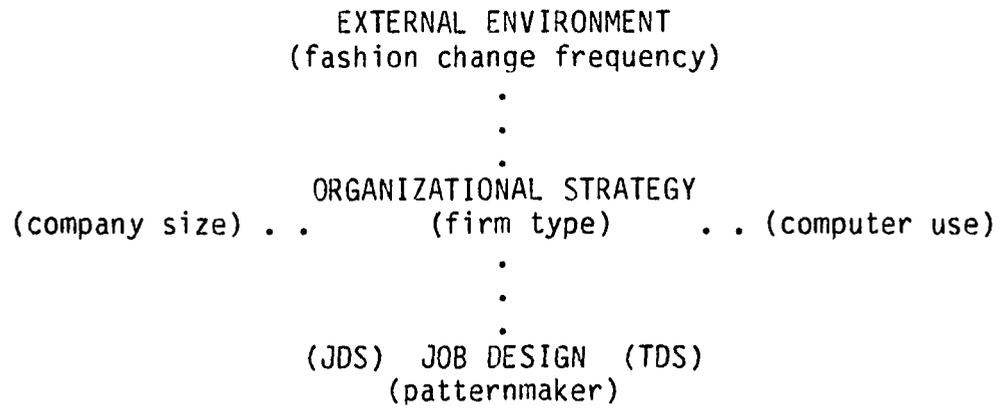
Figure 1

Theoretical Framework Model for Job Design of Patternmakers in Apparel
Manufacturing

CHAPTER 4

METHODOLOGY

The methodology will be discussed in six sections. These are: a) the problem statement, b) the variable definitions and measurements, c) the instrument, d) the sample, e) the data collection, and e) the data analysis.

Problem Statement

A study was developed so that information related to a demographic profile of a sample of apparel patternmakers and the structure of their jobs could be collected. The researcher determined the ways that the patternmaking tasks are divided by different companies. The Fashion Change Frequency, Organizational Strategy, Organizational Size, and the Computer Use of the companies were determined. The relationships between patternmaking job structure variables, the frequency of fashion changes of its product, and its organizational strategy were identified.

Variable Definitions and Measurements

The element of external environmental change was perceived as having potential importance to the job of the apparel patternmaker. The independent variable chosen to represent this change in the apparel industry was Fashion Change Frequency. An additional independent

variable, Organizational Strategy, represented the link between the external environment and the patternmakers as individual workers in an organization.

The literature relevant to the development of methodologies for describing and designing jobs indicated that jobs may be described by ratings on core job dimensions and by task inventories. The resulting dependent variables were: a) core job dimension scores and b) a task differentiation score.

Independent Variables

Organization Size was defined by the number of employees in the organization or by the total sales volume of the company. For the purpose of this study, Organization Size was determined by the total sales volume (Appendix H). It was anticipated that some companies might have management, design, patternmaking, and cutting, but would contract all or some of their production, thereby making the number of employees unrepresentative of company size. This assumption proved to be correct, necessitating the use of gross annual sales as an indicator of size.

Fashion Change Frequency was defined as the relative frequency with which it is necessary to create new patterns, as opposed to carry-overs or minor adaptations of existing patterns, for each line of garments produced by an apparel manufacturer. It was measured by the responses to an equal-appearing interval scale (Appendix H). Explanatory statements assisted in the rating process.

Organizational Strategy is the method by which the management of an organization adapts to the impersonal forces in the environment which impact the organization. Implied in this definition is the fact that organizational strategy is a conscious choice. It was determined by responses to questions concerning the adaptive cycle of the company (Appendix H). This identified the organization as a Defender, Prospector, Analyzer, or Reactor.

Computer Use is the use of the computer as a tool to accomplish a task. It was determined by a list of patternmaking tasks which might be computerized (Appendix F, Section 7). Patternmakers were asked to indicate the frequency with which each task is performed on his/her job with the aid of a computer. The responses to a six-point scale from "never" to "daily" were totalled to determine the computer use score. A statement was included to insure that the response was an indication of whether the computer use was a part of that patternmaker's job and not a function of some other employee's job.

Dependent Variables

The dependent job structure variables were core job dimension scores of the JDS and the task differentiation score (TDS). The core job dimension scores were determined using the short form of the Job Diagnostic Survey (Appendix F, Sections 1 through 5). This instrument elicited ratings from one to seven on fifty-three questions pertaining to the incumbent's job. The scoring key provided by Hackman and Oldham (Appendix G) was employed to determine the extent to which the job

included Skill Variety, Task Identity, Task Significance, Automony, and Feedback. The score for each individual dimension was an average of the responses to three questions in the instrument. The job dimensions are defined as follows (Hackman & Oldham, 1974, p.5):

Skill Variety is the degree to which a job requires a variety of different activities in carrying out the work, which involves the use of a number of different skills and talents of the employee.

Task Identity is the degree to which a job requires completion of a "whole" and identifiable piece of work--that is, doing a job from beginning to end with a visible outcome.

Task Significance is the degree to which a job has a substantial impact on the lives or work of other people--whether in the immediate organization or in the external environment.

Autonomy is the degree to which a job provides substantial freedom, independence, and discretion of the employee in scheduling the work and in determining the procedures to be used in carrying it out.

Feedback is the degree to which carrying out the activities required by a job results in the individual obtaining direct and clear information about the effectiveness of his or her performance.

The division of labor (Task Differentiation) is the way in which a company divides the total number of tasks required to complete the job being studied. It was determined by an analysis of patternmakers'

responses to a task inventory (Appendix F, Section 6), which listed all of the tasks for which an apparel patternmaker could possibly be responsible on the job. Patternmakers were asked to indicate the frequency with which each task is encountered on his/her job. The responses to a six-point scale from "never" to "daily" were totalled to determine a task differentiation score. The task inventory was developed by compiling a list of patternmaking tasks which were then critiqued by patternmakers and patternmaking supervisors. The final task inventory reflects the suggestions of these experts.

Instruments

The instrument for patternmakers was a self-administered questionnaire developed by the researcher (Appendix F). It included the short form of the Job Diagnostic Survey, a task inventory, and a demographic questionnaire. The task inventory was pre-tested by ten patternmakers at three apparel manufacturing firms. A list of tasks which could potentially be a performed on a patternmaker's job was developed by the researcher, edited by the pre-test patternmakers, then organized into a consistent form to provide the final task inventory. The instrument for management was a self-administered questionnaire addressing organizational strategy, organizational size, and product fashion change frequency (Appendix H).

Sample

Patternmakers employed by manufacturing firms that have plants in North Carolina were visited. The Directory of Manufacturing Firms in North Carolina, a publication of the North Carolina Department of Commerce, lists manufacturers by their Standard Industrial Code (SIC) classification. The SIC codes of apparel and other finished products begin with the number 23. For the purposes of this study, the following women's and children's wear SIC code manufacturers were considered:

```
Womens, misses, and juniors
     2331  Blouses, waists, and shirts
     2335  Dresses
     2337  Suits, skirts, and coats
     2339  Outerwear not elsewhere classified
Girls, childrens, and infants
     2361  Dresses, blouses, waists, shirts
     2363  Coats and suits
     2369  Outerwear not elsewhere classified
```

For the most current year available, 1987-1988, there were 213 manufacturing firms with plants in North Carolina in the above SIC codes listed in the Directory of Manufacturing Firms in North Carolina. A random sample of 64 firms (30%) was selected. The manufacturers were contacted by telephone to determine the location and supervisor of the patternmaking department. When this sample resulted in a total of 15 eligible companies, the population of 213 listings was telephoned. It was determined that there were 208 separately-operated companies and 60 were eligible for participation (see Appendix I for a complete breakdown of companies by eligibility type). Three companies refused to participate, two companies (located in Missouri and Ohio) were eliminated due to travel funds limitations. The resulting participants

(55 companies) represented 91.7% of the eligible population of companies. Five of these companies were eliminated because of incomplete questionnaires, leaving a final sample of 50 companies (83%).

Data Collection

Telephone calls were made to determine whether the company employed its own patternmakers and, if so, whether the patternmakers were employed at the company address listed in the directory. If the department was in another location, the address and telephone number were requested. A letter of introduction was sent to explain the study (Appendix J). The patternmaking department was telephoned, the study further explained, and an appointment made for the administration of the questionnaire. A follow-up letter was sent to confirm the appointment (Appendix K). The companies included had their patternmaking departments located as follows:

NC	38	NY	6
SC	3	VA	2
PA	1	TN	1
NC & NY	3	NJ & NY	1

Data Analyses

The data were computer-analyzed using the Statistical Package for the Social Sciences (SPSSX). Descriptive statistics were compiled from the demographic data. Pearson product moment correlations among the variables were examined to identify possible sources of multicollinearity, which could result in unreliable regression coefficient estimates. The relative effect of the independent variables

on the dependent variables was examined using the standardized beta weights of a separate multiple regression model for each dependent variable.

CHAPTER 5

RESULTS AND DISCUSSION

Introduction

The patternmakers and managers who responded to the questionnaires represented 83% of the eligible population of SIC 233 and SIC 236 North Carolina apparel manufacturing firms in 1989. Of the 60 firms eligible, 50 were usable. Ten were deleted for the following reasons: limited travel funds for data collection (2), refusal to participate (3), and failure to complete the management questionnaire (5). A summary of the responses by geographic location is included in Figures 2 and 3.

Most of the eligible manufacturing firms had their patternmakers in North Carolina (35 companies). Five responding companies had patternmakers employed in New York City. Three firms maintained patternmaking departments both in New York City and in North Carolina. One of those firms also had a patternmaker in upstate New York. Three other companies located patternmakers in South Carolina, two in Virginia, one in Pennsylvania, and one in both New York City and southern New Jersey.

There were several advantages to on-site data collection: full completion of the questionnaires, assurance of anonymity, and the opportunity for observation and conversation in addition to the formal questions. The rate of non-return was much greater among those

Figure 2
Summary of Responses by Geographic Location--North Carolina, South
Carolina, and Virginia
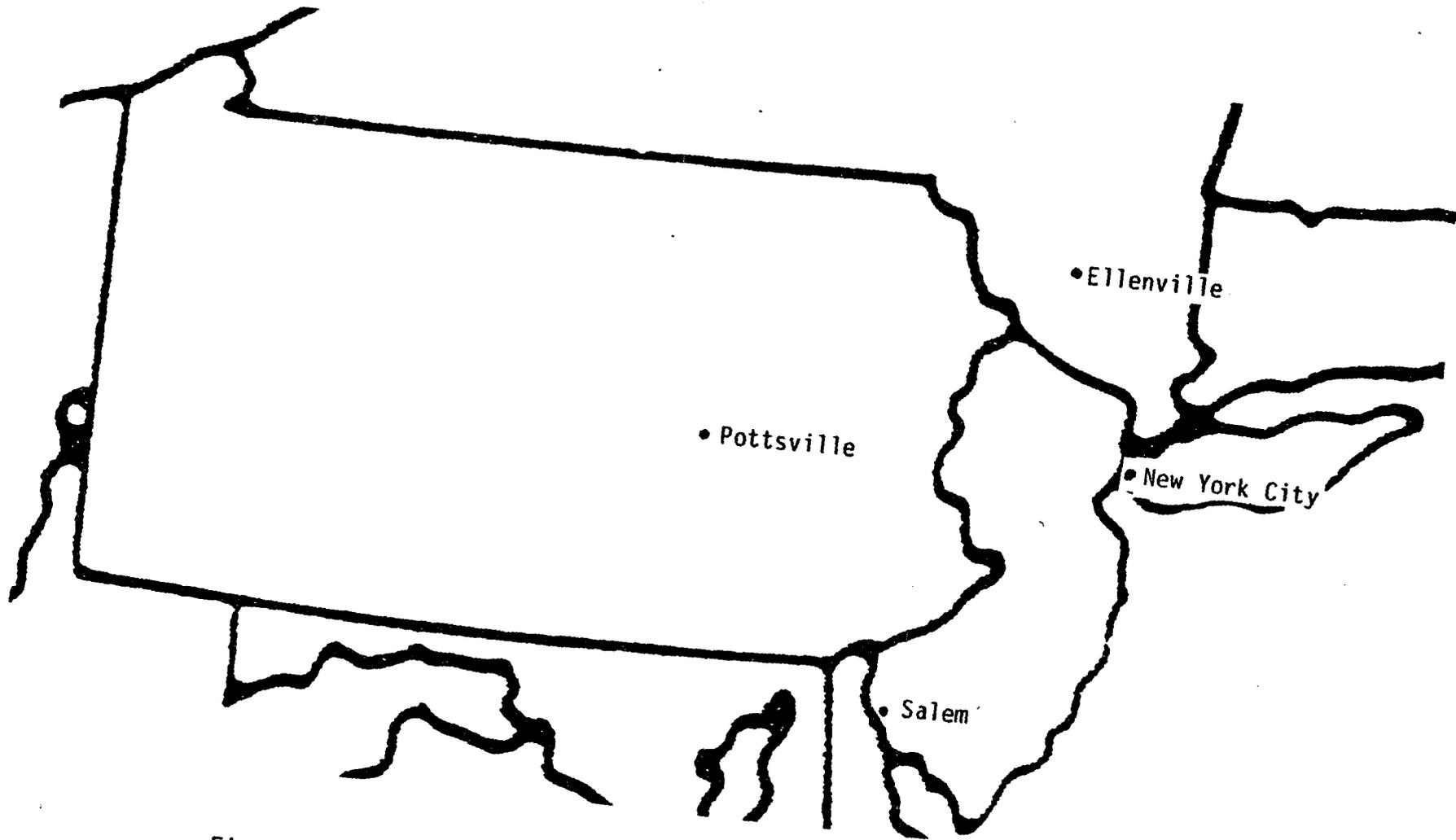
Figure 3
Summary of Responses by Geographic Location--New York, New Jersey, and Pennsylvania

companies where the managers were unavailable at the time of the visit.

Profile of Apparel Manufacturers

The companies participating in this study were small, with 50% reporting gross annual sales of $25 million or less. The largest company reported gross annual sales of $650 million ($M$ = $55.97, SD = $117.4). By the self-report measure, there were sixteen Defenders, seven Analyzers, twenty-four Prospectors, and three Reactors (see Appendices A, B, and C for profiles of strategy types). Although every level of Fashion Change Frequency was reported, 50% of the company managers indicated that their product's Fashion Change Frequency was seven or higher on a scale of ten (M = 6.34, SD = 2.40). Among Defenders, the mean Fashion Change Frequency was 5.88 (SD = 2.65), for Analyzers 8.71 (1.25), for Prospectors 5.88 (2.07), and for Reactors 7.00 (2.65).

Profile of Patternmakers

There were 119 patternmakers employed by the responding companies (see Appendix L for tables describing patternmakers). Of 29 separate job titles of employees responsible for patternmaking, 70.0% identified themselves as either patternmaker (42.0%), head patternmaker (10.0%), production patternmaker (10.0%), assistant designer (4.2%), or cutting supervisor (4.2%).

Two thirds of the patternmakers were female. Patternmakers ranged
in age from 22 to 71. The mean age for females was 38.8, for males
46.5. The mean number of years as a patternmaker was 8.8 for females
and 19.7 for males. The overall mean salary was $30,156, with a mean of
$25,587 for females and $40,323 for males. For the entire population,
salaries increased with increasing years on the job as a patternmaker
(see Table L-4).

Sixteen of the patternmakers (13.4%) had not graduated from high
school. Of those, six (5.0%) had some technical school and/or college
in addition. Thirty (25.0%) had graduated from high school only, 46
(38.0%) had some technical school training and/or some college in
addition. Twenty-five (21.0%) were college graduates and two (1.6%) had
graduate degrees. The highest mean salary of $56,800 was for a
combination of some high school, some technical school, and/or some
college (n=5). This could be due to the fact that four out of five were
male patternmakers with between twelve and twenty-nine years of service,
including the highest paid of all patternmakers. In general, the
highest mean salaries were for patternmakers who had attended a
combination of technical school and college.

Forty percent (n=32) of the females and 50% (n=20) of the males
were sole support of their households. However, the mean salaries in all
cases of those not providing sole support were higher than those who
were providing sole support.

Profile of Computer Use

The use of the computer was measured by scaled responses indicating frequency of use for particular patternmaking and related functions (see Appendix F, Section 7). These responses were then summed to provide an indicator of computer use. Although the potential score was 35, the highest response score was 30 with a M = 4.3 and a SD = 8.5, which indicated low computer use and wide variation among companies. The use of the computer by any patternmakers for any of the seven functions listed was reported by only 13 companies (26.0%). This figure does not take into account the frequency of use, however. The most frequently reported of the functions, making pattern changes and grading patterns, were listed as a part of the job of 20 patternmakers at 13 companies. The number of companies with patternmakers using the computer daily for any patternmaking function was only 10 (20.0%), representing 11 patternmakers (9.2%). The frequency-of-computer-use data are shown in Table 1. These numbers are considerably lower than those reported by Sheldon (1988).

Job Dimensions and Task Differentiation

JDS job dimensions (Appendix F, Sections 1 through 5) were scored using the Hackman and Oldham guide for scoring the short form of the JDS (Appendix H). The score for each individual dimension was an average of the responses to three questions in the instrument. The questions were rated on a scale of 1 through 7. The mean job dimension scores in

Table 1

Number of Apparel Manufacturing Firms and Number of Patternmakers by
Computer Use and Frequency of Computer Use

	Frequency of Computer Use							
	At Least Once Per Year				At Least Once Per Season			
	Units		Patternmakers		Units		Patternmakers	
Computer Use	n	(%)	n	(%)	n	(%)	n	(%)
To Make First Patterns	---	---	---	---	---	---	---	---
To Make Production Patterns	---	---	---	---	1	(2)	1	(.8)
To Make Pattern Changes	1	(2)	1	(.8)	1	(2)	1	(.8)
To Cut Out Patterns	---	---	---	---	1	(2)	1	(.8)
To Grade Patterns	---	---	---	---	---	---	---	---
To Make Markers	---	---	---	---	1	(2)	2	(1.7)
To Fill Out Spec Sheets	---	---	---	---	---	---	---	---

Table 1

Number of Apparel Manufacturing Firms and Number of Patternmakers by Computer Use and Frequency of Computer Use

	Frequency of Computer Use							
	At Least Once Per Month				At Least Once Per Week			
	Units		Patternmakers		Units		Patternmakers	
Computer Use	n	(%)	n	(%)	n	(%)	n	(%)
To Make First Patterns	1	(2)	2	(1.7)	1	(2)	3	(2.5)
To Make Production Patterns	1	(2)	1	(.8)	1	(2)	4	(3.4)
To Make Pattern Changes	---	---	---	---	3	(6)	6	(5.0)
To Cut Out Patterns	3	(6)	4	(3.4)	3	(6)	4	(3.4)
To Grade Patterns	2	(4)	4	(3.4)	1	(2)	5	(4.2)
To Make Markers	1	(2)	2	(1.7)	1	(2)	2	(1.7)
To Fill Out Spec Sheets	1	(2)	2	(1.7)	2	(4)	3	(2.5)

Table 1

Number of Apparel Manufacturing Firms and Number of Patternmakers by
Computer Use and Frequency of Computer Use

| | Frequency of Computer Use | | | | | | |
| | Daily | | | | Total | | |
Computer Use	Units n	(%)	Patternmakers n	(%)	Units n	(%)	Patternmakers n	(%)
To Make First Patterns	9	(18)	13	(10.9)	11	(22)	18	(15.1)
To Make Production Patterns	9	(18)	13	(10.9)	12	(24)	19	(16.0)
To Make Pattern Changes	8	(16)	12	(10.1)	13	(26)	20	(16.8)
To Cut Out Patterns	5	(10)	6	(5.0)	12	(24)	15	(12.6)
To Grade Patterns	10	(20)	11	(9.2)	13	(26)	20	(16.8)
To Make Markers	8	(16)	9	(7.6)	11	(22)	15	(12.6)
To Fill Out Spec Sheets	1	(2)	1	(.8)	4	(8)	6	(5.0)

Table 2, indicate that, according to Hackman and Oldham's example (1974), the job of patternmaker is a relatively "good" job. When portrayed graphically as in Figure 4, the patternmaker's mean scores define a rather high profile with a peak at Task Significance (Agent Feedback is not included in the figure because there was no comparable data from Hackman and Oldham). Although all the scores are lower than those in the "good" Hackman and Oldham example, an engineering maintenance worker, they far exceed those of the "bad" example, the job of a "back room" worker in a bank. When compared to the mean scores of job dimensions by Equal Employment Opportunity Commission Categories from a study by VanMaanen and Katz (1974) cited by Hackman and Oldham, the patternmaker's profile most nearly approximates that of 368 administrators, defined as occupations in which employees set broad policies and exercise or direct overall responsiblility for execution of these policies. Other categories were 477 professionals, 380 technicians, 352 protective services personnel, 159 para-professionals, 582 office/clericals, 287 skilled craftsmen, and 427 maintenance/service workers. The means for patternmakers were higher in every dimension than the overall mean scores for the total of 3059 workers in all the above categories (see Appendix M for mean job dimension scores for all categories).

The instrument for task differentiation was prepared specifically for this study (Appendix F, Section 6), which necessitated a determination of those components which would become the Task Differentiation

Table 2

Means, Standard Deviations, and Ranges for Patternmakers' Job
Dimensions, Task Differentiation, Fashion Change Frequency, Gross Annual
Sales, and Computer Use

Variable	$\underline{M}$	$\underline{SD}$	Low	High
Dependent				
Skill Variety	5.733	.849	3.33	7.00
Task Identity	5.528	1.054	2.67	7.00
Task Significance	6.220	.913	3.33	7.00
Autonomy	5.532	.943	3.67	7.00
Job Feedback	5.480	.878	3.67	7.00
Agent Feedback	5.041	1.211	2.33	7.00
Task Differentiation	24.739	6.836	8.00	35.00
Independent				
Fashion Change Frequency	6.340	2.379	1.00	10.00
Gross Annual Sales	55.972	117.396	1.20	650.00
Computer Use	4.309	8.352	0.00	30.00
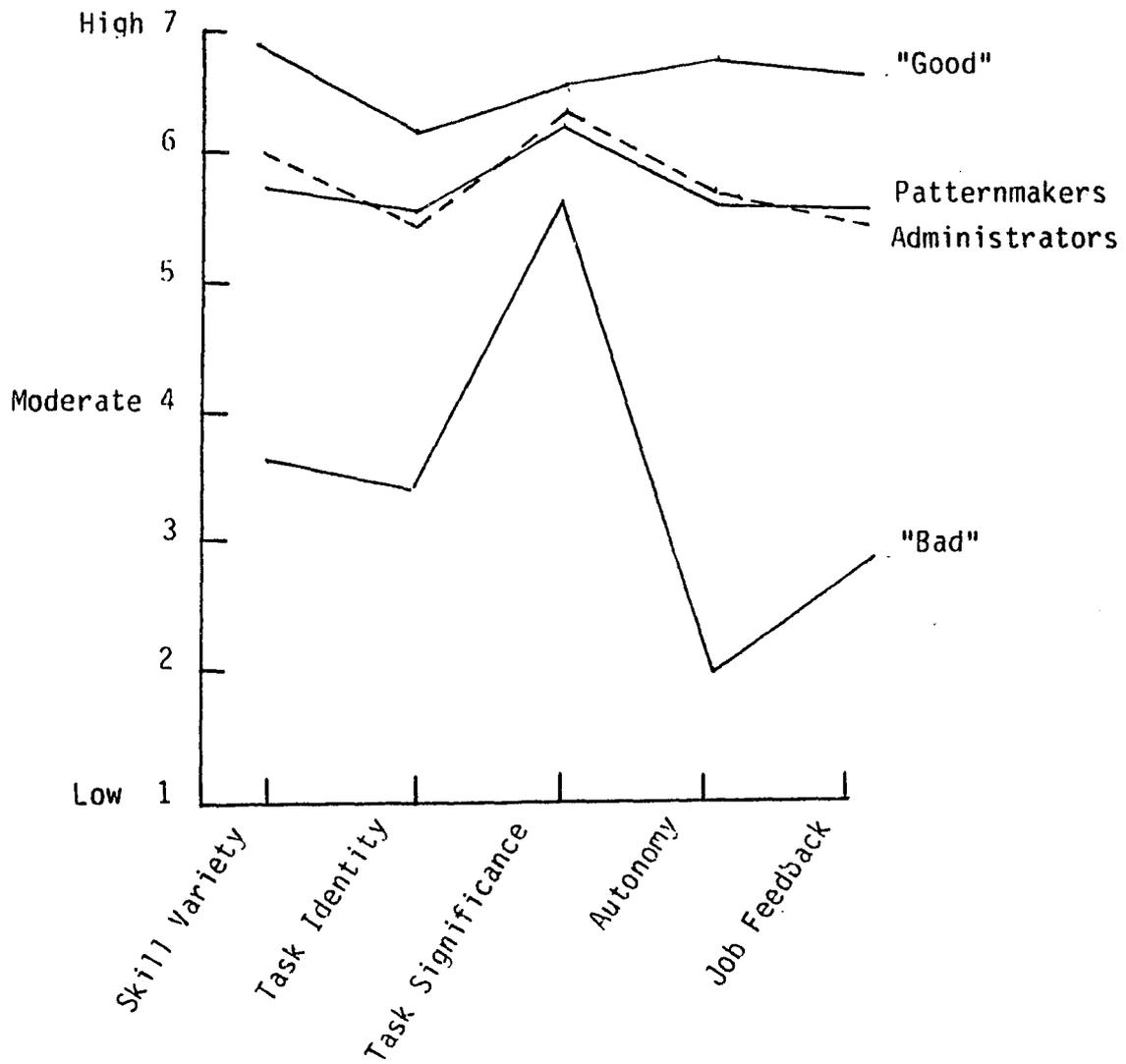
Figure 4

Mean Job Dimension Scores--Patternmakers Compared with EEOC
Administrators and Hackman and Oldham's "Good" and "Bad" Jobs

Score. Pearson product moment correlations indicated that the sum of the scores for first patternmaking and production patternmaking was representative of differentiation. The highest possible score was 48. Aggregated scores by company ranged from eight to 35 ($\underline{M}$ = 24.7, $\underline{SD}$ = 6.8).

Intercorrelations Between Variables

Dependent Variables

Bivariate correlations between the dependent variables are shown in Table 3. They indicate a strong positive relationship ($\underline{p}$ <.01) between:

Skill Variety and Task Significance	($\underline{r}$ = .4311)
Skill Variety and Job Feedback	($\underline{r}$ = .3285)
Task Identity and Task Differentiation	($\underline{r}$ = .3264)
Task Significance and Autonomy	($\underline{r}$ = .4148)
Task Significance and Job Feedback	($\underline{r}$ = .4492)
Task Significance and Task Differentiation	($\underline{r}$ = .3222)
Agent Feedback and Autonomy	($\underline{r}$ = .3421)
Agent Feedback and Job Feedback	($\underline{r}$ = .7690)
Autonomy and Job Feedback	($\underline{r}$ = .4767)

A significant relationship ($\underline{p}$ <.05) was indicated between:

Autonomy and Skill Variety	($\underline{r}$ = .2465)
Autonomy and Task Identity	($\underline{r}$ = .2455)

These data suggest that where there is a need for the use of more skills on the job, there is an accompanying perception of greater significance to the job, greater autonomy on the job, and more feedback from the job itself, to let the patternmaker know that the job is being done well. The greater the extent to which the patternmaker perceives that the job encompasses the completion of a "whole" product, the more autonomous the patternmaker feels and the more differentiated the job

Table 3

Pearson Product Moment Correlations of Dependent Variables

Dependent Variable	1	2	3	4	5	6	7
(1) Skill Variety	----	.1139	.4311**	.2465*	.3285**	.0830	.1381
(2) Task Identity		----	.0380	.2455*	.2054	.1674	.3264**
(3) Task Significance			----	.4148**	.4492**	.1550	.3222**
(4) Autonomy				----	.4767**	.3421**	.1393
(5) Job Feedback					----	.7690**	.0976
(6) Agent Feedback						----	.0168
(7) Task Differentiation							----

*p <.05. **p <.01. N = 50.

tasks are. When the patternmaker believes that his/her job performance can affect others significantly, the perception of autonomy and feedback from the job is greater and the tasks performed are more differentiated. A sense of being able to decide how to go about doing the work of being a patternmaker without instruction from others is usually accompanied by the use of many skills on the job, a sense of completing a "whole" product in the work, and feedback not only from supervisors, but also from the job itself providing clues to tell the patternmaker how well he/she is doing on the job. In addition, as the level of feedback from the job increases, so does that from superiors.

In their paper outlining the development of the JDS as a work design measurement tool, Hackman and Oldham (1974) reported on their study of 658 employees in 62 jobs representing business organizations (including industrial and service organizations in the east, southeast, and midwest, both rural and urban). The mean scores for the core job dimensions were considerably lower in all cases than those for patternmakers (see Appendix N), even lower that the EEOC mean scores reported by VanMaanen and Katz (1974). Hackman and Oldham found that the overall level of correlations among the job dimension variables was higher for aggregated jobs than for individual jobs. They state that this can be explained by the averaging of perceptions and reactions of all individuals on the same job prior to the computation of the correlations.

Hackman and Oldham suggest that it is to be expected that the job dimensions would be moderately intercorrelated. This is due to the fact

that often "good" jobs are good in a number of ways, and "bad" jobs are bad in general. They state that this inter-relatedness:

> does not detract from their usefulness as separate job dimensions--so long as the fact of their non-independence is recognized and accounted for in interpreting the scores of jobs on a given job dimension (1974, p. 26).

Because the scores on the job dimensions for this study were first aggregated by company, the scores, and therefore the correlations, are expected to be more reliable than if individuals had been treated as separate observations.

Unfortunately, with the exception of the above comments on intercorrelation in general, Hackman and Oldham did not attempt to explain the correlations they obtained. They state that the "pattern" of the correlations by individuals and aggregated by jobs was similar, yet never are specific about interpretation. In order to place the current study in proper perspective as it related to the known data provided by Hackman and Oldham, the researcher made comparisons.

The overall level of relationship among the job dimensions for patternmakers was the same or lower than that for the jobs in the Hackman and Oldham study. This could be attributed to the fact that there is less variability in one job across many companies of the same type than in 62 jobs across many companies of many types. The means and standard deviations for Hackman and Oldham's 62 jobs and for patternmakers illustrate this point. In all cases the standard deviations over 62 jobs was considerably larger than that for patternmakers, with differences ranging from .376 to .821 (see Appendix for Hackman and Oldham's means and variances). This fact suggests that

one could expect that there would be differences in the correlation matrices of the two studies.

The restriction in the range of the means in the patternmakers' scores results in generally lower correlations. Dimensions in which the correlations for patternmakers were lower were:

> Task Identity and Skill Variety
> Task Identity and Task Significance
> Task Identity and Autonomy
> Task Identity and Job Feedback
> Agent Feedback and Skill Variety
> Agent Feedback and Task Identity
> Autonomy and Variety

The correlations were approximately the same for:

> Job Feedback and Skill Variety
> Job Feedback and Task Significance

Dimensions in which the correlations for patternmakers were higher than those for the Hackman and Oldham study were:

> Task Significance and Variety
> Task Significance and Autonomy
> Agent Feedback and Task Significance
> Agent Feedback and Autonomy
> Agent Feedback and Job Feedback
> Autonomy and Job Feedback

In order to determine whether the differences between the correlations for patternmakers and those for Hackman and Oldham's 62 jobs were significant, the correlations were transformed using Fisher's transformation statistic (Guilford and Fruchter, 1978). Five differences were significant at $p < .05$ and three at $p < .01$. These data are presented in Table 4.

Table 4

Dependent Variable Pearson Product Moment Correlations, Fisher's z, and
Differences-- Patternmakers Compared to 62 Jobs

Variable Combination	Correlations					
	Patternmakers		62 Jobs		Difference	Z
	r	z	r	z		
Skill Variety and Task Identity	.110	.110	.200	.203	-.093	-1.41
Skill Variety and Task Significance	.430	.460	.230	.234	.226	3.44**
Skill Variety and Autonomy	.250	.255	.640	.758	-.503	-7.65**
Skill Variety and Job Feedback	.330	.343	.430	.460	-.117	-1.78*
Skill Variety and Agent Feedback	.080	.080	.120	.121	-.041	-0.623
Task Identity and Task Significance	.040	.040	.330	.343	-.303	-4.61**
Task Identity and Autonomy	.250	.255	.400	.424	-.169	-2.57*
Task Identity and Job Feedback	.210	.213	.370	.388	-.175	-2.66**
Task Identity and Agent Feedback	.170	.172	.320	.332	-.160	-2.432*
Task Significance and Autonomy	.410	.436	.060	.060	.376	5.72**

*p<.05. **p<.01.

Table 4

Dependent Variable Pearson Product Moment Correlations, Fisher's z, and
Differences-- Patternmakers Compared to 62 Jobs

| Variable Combination | Correlations | | | | | |
| | Patternmakers | | 62 Jobs | | Difference | Z |
	r	z	r	z		
Task Significance and Job Feedback	.450	.485	.360	.377	.108	1.64
Task Significance and Agent Feedback	.160	.161	-.010	-.010	.171	2.599*
Autonomy and Job Feedback	.480	.523	.460	.497	.026	.400
Autonomy and Agent Feedback	.340	.354	.250	.255	.099	1.505
Job Feedback and Agent Feedback	.770	1.020	.240	.245	.780	11.857**

**p<.01.

In general, the comparatively restricted range in the pattern-maker's scores suggests that one might anticipate lower correlations with significant differences between the correlations for patternmakers and Hackman and Oldham's 62 jobs. However, the most significant difference was in the relationship between Job Feedback and Agent Feedback, where variability does not explain the difference. The correlation for patternmakers was .770 while for 62 jobs it was .240. This extremely large difference could be attributed to the fact that feedback in general in the job of patternmaker is unlike most jobs.

The result of the patternmaker's efforts on the job creates a tangible product. When the patternmaker's work is done, that product, or the result of that product, is handled many times by many people. Therefore, the likelihood exists that there are many agents who could provide feedback about the patternmaker's job. On most jobs, however, and Hackman and Oldham's business jobs in particular, it is likely that only one or possibly two agents would have any contact with the worker's output. Because the patternmaker gets to see and handle not only the finished pattern but, in most cases, also the sample garment from which the pattern is made, there is ample opportunity for feedback from clues provided by the job itself. In addition, the successful manufacturing, marketing, and purchase of a garment for which one has made the pattern provides feedback about how well the patternmaker's job was done. This opportunity for a high level of feedback in general, and the fact that the feedback tends to be congruent from whatever source, suggests that

a correlation of .770 is not unreasonable and that its difference from that on 62 jobs is understandable.

The second highest difference was Skill Variety and Autonomy, with a correlation coefficient of .250 for patternmakers and .640 for 62 jobs. The researcher observed, while visiting the participating patternmakers, that the people responsible for the patternmaking function were required to use a variety of skills. Where the product was fast-changing and the duties were divided among many workers, each individual job used the full range of complex patternmaking skills. Where the product was more stable, the patternmaker was likely to use minimal patternmaking skills but to have other responsibilities, in addition to patternmaking, which necessitated the use of further skills. Therefore, there was little variation in skill variety among patternmakers. Over 62 jobs the range of skill variety was greater, thus the difference in correlations is not surprising.

The next highest difference was between Task Significance and Autonomy, with a correlation coefficient of .410 for patternmakers and .060 for 62 jobs. The stronger relationship among patternmakers is the more logical in general, because one would assume that a worker who enjoys greater autonomy would perceive the job as more significant. Hackman and Oldham gave no explanation for the low correlation across 62 jobs, but the wording of the questions for significance could be perceived as suggesting that, unless the job affects the life or death of another person, it is not significant. The researcher found that many questions were addressed to this supposition.

The difference in the correlation coefficients between Task

Identity and Task Significance, with r = .040 for patternmakers and r =

.330 for 62 jobs was the fourth highest. Again, the restriction in the

range of variability among patternmakers is a factor. Whether the

patternmaker was responsible for creating a new pattern for a high

Fashion Change Frequency, complex, up-to-the-minute styled garment or

for making minor alterations to the pattern for a low Fashion Change

Frequency pull-on pant, it was the patternmaker's job to complete the

pattern. For this reason, patternmakers in general perceived their job

as completing a whole piece of work. Since the correctness of the

pattern in either case would affect all of the jobs beyond patternmaker

in the work flow of manufacturing, the perception of significance was

generally and consistently high.

Skill Variety and Task Significance, with r = .430 for

patternmakers and r = .230 for 62 jobs reflects the same potential

misconception as mentioned above. Any time a clarification of Task

Significance was requested, the researcher emphasized the extent to

which others are affected by how well the job is done. This

clarification may have influenced the patternmakers' responses in a way

that Hackman and Oldham's sample was not.

Task Identity and Job Feedback produced correlations of r = .210

for patternmakers and r = .370 for 62 jobs. The lack of variablility in

Task Identity among patternmakers has been discussed above. It was

observed that patternmakers generally have frequent occasions for

feedback from the job itself because they see the garment for which the

pattern was made, first in the sample, later in stock to be shipped, and often in retail stores. For this reason, the range of variability for Job Feedback is comparatively restricted for patternmakers.

Three differences in correlations were weaker, but significant (p <.05). A correlation of .250 for patternmakers and .400 for 62 jobs for the relationship between Task Identity and Autonomy follows the same logic as each of these dimensions in combination with others already discussed. The restriction in the range of scores for patternmakers again affects the correlation. Agent Feedback and Task Identity, with r = .170 for patternmakers and r = .332 for 62 jobs, and Skill Variety and Job Feedback, with .330 for patternmakers and .430 for 62 jobs, also reflect this tendency.

Independent Variables

Pearson product moment correlations for the independent variables, as shown in Table 5, indicated that there was a positive relationship (p <.01) between Fashion Change Frequency and Analyzer strategy and between Gross Annual Sales and Computer Use. It is not surprising that Fashion Change Frequency is most highly correlated with the Analyzer strategy because, in order to change fashion frequently, it is necessary to maintain a firm product base while seeking new product and market opportunities. The influential research group of the Analyzer in the apparel business is represented by the strength of the design function, which follows closely the changes of fashion in the marketplace. While

Table 5

Pearson Product Moment Correlations of Independent Variables

Variable	1	2	3	4	5	6	7
(1) Fashion Change	----	-.1355	.4068**	-.1897	.0708	-.3897**	-.2234
(2) Defender		----	-.2768*	-.659i**	-.1733	-.0654	.2033
(3) Analyzer			----	-.3876**	-.1019	-.0549	-.0383
(4) Prospector				----	-.2427*	.1517	-.1006
(5) Reactor					----	-.1104	-.1317
(6) Gross Annual Sales						----	.4709**
(7) Computer Use							----

*p <.05. **p <.01. N = 50.

the product line undergoes changes due to the dictates of fashion, the product type remains the same. From this foundation the company can then investigate ways to locate and exploit new product and market opportunities.

The relationship between Gross Annual Sales and Computer Use shows that, although companies of all sizes use the computer, the extent of use is greater in larger companies. The tendency toward greater use of the computer by larger companies makes sense because of a likelihood that there would be more money available to invest in the equipment and more flexibility to take the time to train employees.

A negative relationship (p <.01) was indicated between Gross Annual Sales and Fashion Change Frequency (r = .3897), Defender and Prospector strategies (r = -.6591), and Analyzer and Prospector strategies (r = -.3876). A negative relationship (p <.05) was indicated between Reactor and Prospector strategies (r = -.2427). As Gross Annual Sales increase, so does the size of the company. In a large company, it is difficult to make changes rapidly. Thus it is logical that there would be a tendency toward large companies reporting a low Fashion Change Frequency. The inclusion in any of the strategy types implies exclusion from the other three strategies. Therefore, a negative relationship between pairs of strategy types is to be expected.

Regression Analysis

Multiple regression analysis was used to test the collective relationship between the independent variables, Fashion Change Frequency

and Organizational Strategy, and each of the dependent variables: Skill Variety, Task Identity, Task Significance, Autonomy, and Feedback. This analysis resulted in two equations with F's significant at $p < .01$, and one at $p < .05$. These data are presented in Table 6.

An examination of the beta weights for the significant regression equations suggests a serious problem with multicollinearity. Table 7 presents these data juxtaposed with the respective Pearson product moment correlations. The least logical combination of betas and correlations is for Task Identity. In all three strategy types, the correlations are very small (.1202, .0558, .0505), while the betas are moderately or extremely large (.9281, .5575, .9327). Given the mathematical relationship between beta and correlation, the beta-weights appear to be biased. Although the equations for Agent Feedback and Task Differentiation are not as illogical as that for Task Identity, the evidence suggests that none of the equations can assess the joint contribution of the independent variables.

Upon closer examination of the mean values and standard deviations for the dependent variables of the significant regressions, the possibility of multicollinearity among the independent variables was more obvious. Especially in the case of Task Identity, although there was a statistically significant regression, there was neither a statistically significant nor a practical difference in the means (Defender M = 5.71, SD = 1.2; Analyzer M = 5.67, SD = .44; Prospector M = 5.58, SD = .79). Therefore, the multiple regression equations may be useful to determine the percentage of the variance in the dependent

Table 6

Regression Equation Beta Weights and Significance of F's for All
Dependent and Independent Variables

	Independent Variable				
Dependent Variable	Fashion Change Frequency	Defender	Analyzer	Prospector	p
Skill Variety	.0912	-.1652	-.0488	.0216	.7675
Task Identity	.2869	.9281	.5575	.9327	.0102**
Task Significance	.1736	-.3868	.4232	-.3945	.4454
Autonomy	.1518	.4660	.1269	.4997	.3954
Job Feedback	.2021	.6797	.2795	.5640	.1648
Agent Feedback	.1660	.6828	.0723	.5306	.0444*
Task Differentiation	.5821	.1162	.0498	.3846	.0006**

*$p <.05.$ **$p <.01.$ $N = 50.$

Table 7

Comparison of Regression Beta Weights and Pearson Product Moment
Correlations for Task Identity, Agent Feedback, and Task Differentiation

Dependent Variable	Independent Variable							
	Fashion Change Frequency		Defender		Analyzer		Prospector	
	β	r	β	r	β	r	β	r
Task Identity	.2869	.2110	.9281	.1202	.5575	.0558	.9327	.0505
Agent Feedback	.1660	.0022	.6828	.2907	.0723	-.2549	.5306	.0210
Task Differen- tiation	.5821	.5136	.1162	-.2299	.0498	.1054	.3846	.1783

variables explained collectively by the independent variables, but the relative contributions expressed by the beta weights of the regressions are useless. Because the proportion of each independent variable's contribution in the joint equation was not assessible, it was necessary to determine the single effects of the independent variables. Means, standard deviations, and Pearson Product Moment correlations were computed and compared. These data are presented in Table 8.

Agent Feedback is negatively related (p <.05) to both Analyzer (r = -.2549) and Reactor (r = -.2427) strategies, suggesting that Agent Feedback is comparatively poor in these company types. At the same level, Task Differentiation is negatively related to the Defender strategy. Because the main focus of a Defender firm is to seek a stable product and customer base, one would expect a lower Task Differentiation score. The patternmaker would be likely to have to perform other tasks in addition to patternmaking because the primarily minor product changes are not time consuming.

Task Identity (p <.01, r = -.4237) and Job Feedback (p <.05, r = -.2689) are related to Reactor strategy. If the patternmaker has a high score indicating either that the job includes the completion of a whole piece of work or that the job alone provides significant feedback about how well the job is being done, it is likely that the employer is a Reactor.

It is important to note that although the Reactor strategy is significantly related to some of the dependent variables, there were

Table 8

Means, Standard Deviations, and Pearson r's--Dependent Variables by
Independent Variables

Variable Strategy	n	M	SD	r	[a]Fashion Change Frequency	n	M	SD	r
Task Differentiation									
Defender	16	22.47	6.80	-.2299*	Low	11	17.97	4.86	.5136**
Analyzer	7	26.51	4.10	.1054	Medium	20	26.30	6.73	.5136**
Prospector	24	25.99	7.10	.1783	High	19	27.00	5.49	.5136**
[b]Reactor	3	22.67	4.04	-.0774					
Task Identity									
Defender	16	5.71	1.20	.1202	Low	11	4.89	1.12	.2110
Analyzer	7	5.67	.44	.0558	Medium	20	5.76	.96	.2110
Prospector	24	5.58	.79	.0505	High	19	5.64	1.01	.2110
Reactor	3	3.78	1.92	-.4237**					
Skill Variety									
Defender	16	5.56	.85	-.1781	Low	11	5.82	.89	.0896
Analyzer	7	5.83	.47	.0256	Medium	20	5.51	1.01	.0896
Prospector	24	5.88	.98	.1320	High	19	6.01	.56	.0896
Reactor	3	5.89	.19	.0348					
Task Significance									
Defender	16	6.18	.88	-.0332	Low	11	6.15	1.05	.1287
Analyzer	7	6.01	.62	-.0925	Medium	20	6.00	1.05	.1287
Prospector	24	6.21	1.04	-.0085	High	19	6.50	.59	.1287
Reactor	3	7.00	.00	.2182					

[a]The aggregated Fashion Change Frequency is divided as follows:

Low=1,2,3,4   Medium=5,6,7   High=8,9,10

[b]The Reactor strategy is included to illustrate better the effect of organizational strategy. It was excluded from the regression to save degrees of freedom.

*$p < .05$.   **$p < .01$.

Table 8

Means, Standard Deviations, and Pearson r's--Dependent Variables by
Independent Variables

Variable Strategy	n	M	SD	r	[a]Fashion Change Frequency	n	M	SD	r
Autonomy									
Defender	16	5.64	.92	.0810	Low	11	5.36	1.01	.0454
Analyzer	7	5.22	1.03	-.1341	Medium	20	5.59	.93	.0454
Prospector	24	5.64	.88	.1146	High	19	5.57	.95	.0454
[b]Reactor	3	4.78	1.35	-.2043					
Job Feedback									
Defender	16	5.74	.81	.2032	Low	11	5.24	1.02	.1167
Analyzer	7	5.38	.64	-.0450	Medium	20	5.50	.86	.1167
Prospector	24	5.45	.89	-.0306	High	19	5.59	.83	.1167
Reactor	3	4.56	1.26	-.2689*					
Agent Feedback									
Defender	16	5.55	1.01	.2907	Low	11	4.86	1.42	.0022
Analyzer	7	4.28	.70	-.2549*	Medium	20	5.18	1.12	.0022
Prospector	24	5.06	1.22	.0210	High	19	4.99	1.23	.0022
Reactor	3	3.89	1.90	-.2427*					

[a]The aggregated Fashion Change Frequency is divided as follows:

Low=1,2,3,4   Medium=5,6,7   High=8,9,10

[b]The Reactor strategy is included to illustrate better the effect of
organizational strategy. It was excluded from the regression to save
degrees of freedom.

*$p < .05$.

only three companies which perceived themselves as Reactors. One would expect few Reactors because the strategy type actually exhibits no planned strategy at all. It is characterized by a general lack of strategic direction, and, therefore, is an undersirable state of being. An organization cannot survive for any significant length of time as a Reactor, but must choose the direction of Defender, Analyzer, or Prospector or cease to exist.

The strongest correlation was a positive one between Fashion Change Frequency and Task Differentiation (p <.01, r = .5136). There was a small difference between the mean Task Differentiation score for medium (26.30) and high (27.00), but a large difference between those two and the low score (17.97). This indicated that one could expect the job of a patternmaker in a low Fashion Change Frequency company to be very different from that in companies with either medium or high Fashion Change Frequency. The researcher observed that in companies with low Fashion Change Frequency the person responsible for patternmaking was also responsible for a significant number of additional non-patternmaking tasks.

In one firm with a Fashion Change Frequency score of 2, the people responsible for patternmaking were called "garment development engineer." They were responsible for: patternmaking, grading, marker making (including a layout book with drawings of markers in miniature to assist the cutting room), spec sheet preparation, sample room supervision, engineering (deciding machine use, attachment use, cam use, thread use, machine speeds, sequence of operations), and quality control

(booklet of drawings for each step in the construction process as well as graded measurements for the finished product).

At the opposite extreme, in a company with a Fashion Change Frequency of 8, there were separate first patternmakers and production patternmakers, all of whose job tasks were patternmaking-related. The first patternmakers were responsible for making first patterns, supervising the construction of first samples, and organizing designer's sketches in notebooks. The production patternmakers were responsible for attending fittings of approved first samples, noting changes to be made, making production patterns, indicating grade rules on patterns, supervising construction of final adoption samples, attending adoption meetings, preparing spec sheets (only sections on garment description, pattern list, graded measurement chart, special instructions for mark and spread and for sewing, notions list), checking quality audit, organizing work-in-process, consulting with manufacturing, engineering, and quality control, and checking computer-generated graded nests of patterns.

The potentially moderating variables, Organization Size and Computer Use, did not contribute to a useful regression equation. There were, however, three significant correlations between these and other variables. Computer Use correlated positively (p <.05, r = .2465) with Agent Feedback indicating that, in companies making greater use of the computer for patternmaking functions, the patternmakers perceived themselves as receiving more feedback from colleagues and superiors. Organization Size correlated negatively with Fashion Change Frequency

and positively with Computer Use (p <.01, r = -.2234). This indicates that larger companies usually produce garments with lower Fashion Change Frequency. Because it is more difficult for large companies to "retool" for new garment styles, they are logically more likely to produce a more stable product line. Although the computer was used in a company as small as $4 million, there was a greater trend toward computer use in larger companies.

Testing of the Hypotheses

Because environmental change and organizational strategy had been identified in the literature as variables potentially associated with job structure, the relationships between Fashion Change Frequency and Organizational Strategy and the dependent job structure variables were examined.

The following hypotheses were tested:

Hypothesis 1A: Skill Variety will vary positively with Fashion Change Frequency.

There was no significant relationship between Skill Variety and Fashion Change Frequency. Hypothesis 1A was rejected.

Hypothesis 1B: Task Identity will vary positively with Fashion Change Frequency.

There was no significant relationship between Task Identity and Fashion Change Frequency. Hypothesis 1B was rejected.

Hypothesis 1C: Task Significance will vary positively with Fashion
                 Change Frequency.

There was no significant relationship between Task Significance and

Fashion Change Frequency. Hypothesis 1C was rejected.

Hypothesis 1D: Autonomy will vary negatively with Fahsion Change
                 Frequency.

There was no significant relationship between Autonomy and Fashion

Change Frequency. Hypothesis 1D was rejected.

Hypothesis 1E: Agent Feedback will vary positively with Fashion Change
                 Frequency.

There was no significant relationship between Agent Feedback and

Fashion Change Frequency. Hypothesis 1E was rejected.

Hypothesis 1F: Job Feedback will vary positively with Fashion Change
                 Frequency.

There was no significant relationship between Job Feedback and

Fashion Change Frequency. Hypothesis 1F was rejected.

Hypothesis 1G: Task Differentiation will vary positively with Fashion
                 Change Frequency.

Task Differentiation varied positively with Fashion Change

Frequency. The relationship was significant at $p < .01$. Hypothesis 1G

was accepted.

Hypothesis 2A: Skill Variety will vary with Organizational Strategy.

There was no significant relationship between Skill Variety and Organizational Strategy. Hypothesis 2A was rejected.

Hypothesis 2B: Task Identity will vary with Organizational Strategy.

Task Identity varied with Organizational Strategy. The relationship with Reactor strategy is significant at p <.01. Hypothesis 2B is accepted.

Hypothesis 2C: Task Significance will vary with Organizational Strategy.

There was no significant relationship between Task Significance and Organizational Strategy. Hypothesis 2C was rejected.

Hypothesis 2D: Autonomy will vary with Organizational Strategy.

There was no significant relationship between Autonomy and Organizational Strategy. Hypothesis 2D was rejected.

Hypothesis 2E: Agent Feedback will vary with Organizational Strategy.

Agent Feedback varied with Organizational Strategy. The relationship with Analyzer and Reactor strategies is significant at p <.05. Hypothesis 2E was accepted.

Hypothesis 2F: Job Feedback will vary with Organizational Strategy.

Job Feedback varied with Organizational Strategy. The relationship with Reactor strategy is significant at p <.01. Hypothesis 2F was accepted.

Hypothesis 2G: Task Differentiation will vary with Organizational
                Strategy.

Task Differentiation varied with Organizational Strategy. The
relationship with Defender strategy is significant at $p < .05$.
Hypothesis 2G was accepted.

CHAPTER 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

In this study the job structure of apparel patternmakers in North Carolina manufacturing units producing women's and children's apparel in 1989 was examined. Self-administered questionnaires were completed by patternmakers and management during a visit to the company by the researcher. The response rate was 83%.

The independent variables were: fashion change frequency, a measure of the need to create new patterns as opposed to carrying over old ones, and organizational strategy, a classification of the organization's adaptation to the external environment. The dependent job structure variables were: the core job dimensions of the Job Diagnostic Survey of Hackman and Oldham (1974), specifically skill variety, task identity, task significance, autonomy, and feedback, and task differentiation.

The descriptive profile which emerged from the demographic data for the manufacturing units suggests an industry with primarily small companies (50% reporting $25 million or less in gross annual sales). Half of the firms employed a strategy which focused on identifying and exploiting new product and market opportunities. One-third focused their efforts on defending a stable niche in the marketplace. The

geographic location of the patternmaking departments included sites in North and South Carolina, Virginia, New York, New Jersey, and Pennsylvania. Computer use for any patternmaking function was relatively small (26%), and even smaller if frequency of use was considered (20% using the computer daily).

The profile of patternmakers indicated that the majority were female. The males were generally older, had been on the job longer, and were paid more. Most patternmakers were not the sole support of their families. The educational background of patternmakers ranged from some high school to graduate degrees, but the largest group were those who had some combination of high school with technical school and/or college.

The patternmakers' mean scores for the core job dimensions, when compared to equivalent data in the literature on 70 other jobs, suggest that the job of patternmaker is a "good" one, similar in skill variety, task identity, task significance, autonomy, and feedback to the job of an administrator. The differentiation of tasks in the patternmaker's job was directly related to the fashion change frequency dictated by the organization's product.

Although multicollinearity among the variables made it impossible to assess the joint contribution of the independent variables in a multiple regression equation, a detailed analysis of means, standard deviations, and Pearson product moment correlations indicated that a significant relationship ($p < .01$) existed between fashion change frequency and task differentiation, between strategy and task

differentiation (p <.05), and between strategy and two job dimensions--job feedback (p <.01) and agent feedback (p <.05).

Conclusions

This study was limited to the patternmakers of manufacturers in one state and two SIC manufacturing groups. Although the responding companies represent 83% of the eligible population within these parameters, it cannot be assumed that their responses are representative of the entire population of patternmakers. The following conclusions can be drawn from this research:

1. The structure of the apparel patternmaker's job varies across companies.

2. The variation in patternmakers' jobs is most strongly related to the necessity for creating new patterns which is dictated by the fashion change frequency of the product being manufactured.

3. Organizational strategy does influence the patternmaker's job structure.

4. The patternmaker's job tasks are most differentiated in companies with Analyzer strategy.

5. The job of patternmaker provides an unusually high level of opportunity for receiving feedback to indicate how well the job is being done.

6. Although the use of the computer for patternmaking functions is
   not widespread, there is a greater trend toward use in larger
   companies and in companies with lower fashion change frequency.

Recommendations

Based on the conclusions reached in this research, the following
recommendations are made.

Recommendations for Industry and Education

1. Companies need to consider their organizational strategy when
   designing jobs.

   If organizations would be more attuned to their strategies
   when designing jobs, the structure of the jobs could be
   improved. These jobs could then better serve the purposes of
   the organization.

   In the patternmaking function, companies whose strategy is
   to maintain a stable product, while constantly identifying and
   utilizing new product and market opportunities, require a wider
   range of skills on the job which are specific to patternmaking
   skills. It would behoove these companies to eliminate
   extraneous tasks from the patternmaker's duties and hire
   applicants with strong patternmaking skills. This practice
   should result in less training time and better employee
   performance.

In a company whose primary purpose is to defend the niche of a stable product, the patternmaker's job would be better organized to include a variety of pre-production tasks. In this way, one employee could serve many functions and eliminate the extra expense and inefficiency of employing several more specialized workers.

2. Educators should prepare students for the variety of expectations placed on patternmakers.

A broad range of true patternmaking skills, as opposed to general manufacturing skills, will be required in a company where the external environment and organizational strategy require frequent pattern changes. However, these companies are in the minority. Students must be prepared for the fact that a large proportion of apparel manufacturing firms need versatile employees who can perform a variety of tasks as needed in many areas of pre-production.

3. Patternmakers should be made aware of the many subtle sources from which they receive feedback.

The researcher observed that patternmakers often complained about a lack of praise and appreciation for their efforts. This could be pointed out to management and could be improved, but to many managers patternmaking is a mystery, as long as it works they don't care about the details of how it

works. Patternmakers need to recognize that they are more
fortunate than most workers in general in that they do have
many opportunities for feedback about their performance. The
job of patternmaker is so specialized that seldom will anyone
say, "Wow! That was a great pattern you made!" Only another
patternmaker might have enough knowledge to make such a
judgment. Patternmakers must expect to find their reward in
the successful manufacturing of the product for which they have
made the pattern.

Recommendations for Further Research

1. Researchers should continue research to profile the
   patternmaker's job among manufacturers of other SIC 2300
   apparel product types.

   The patternmakers of manufacturers in other parts of the
   country, especially those with plants in first- and second-
   ranking California and New York, need to be studied. It would
   be helpful if, in addition to fashion change frequency, a
   measure to classify the product itself were added. The
   researcher observed that women's dresses and fashion sportswear
   and children's "dress up" clothes seemed to require more
   patternmaking skills in production than other product types.

2. A more sensitive instrument than the JDS should be found or developed to determine strategy-based differences in a single job across many companies within one industry.

Although the JDS is an appropriate instrument for the evaluation of job design across many companies, it is imprecise in detecting differences in the same job across many companies. Because there was no evidence that the JDS had previously been used for an inter-organizational study of one job within a single industry, its use was attempted for this study. Since the JDS was created as a "generic" job design tool, its inadequacy for this purpose is not surprising. In the future, knowing where the weaknesses of the JDS are, yet using it as a base, researchers could improve its effectiveness for detecting single job inter-organizational differences by adjusting the questions to be more task specific, focused on the particular job being studied, as is the task inventory.

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APPENDIX A

CHARACTERISTICS OF THE DEFENDER

Characteristics of the Defender

Entrepreneurial problem	Engineering problem	Administrative problem
Problem: How to "seal off" a portion of the total market to create a stable set of products and customers	*Problem:* How to produce and distribute goods or services as efficiently as possible	*Problem:* How to maintain strict control of the organization in order to ensure efficiency
Solutions: 1. Narrow and stable domain 2. Aggressive maintenance of domain (e.g., competitive pricing and excellent customer service) 3. Tendency to ignore developments outside of domain 4. Cautious and incremental growth primarily through market penetration 5. Some product development, but closely related to current goods or services	*Solutions:* 1. Cost-efficient technology 2. Single core technology 3. Tendency toward vertical integration 4. Continuous improvements in technology to maintain efficiency	*Solutions:* 1. Financial and production experts most powerful members of the dominant coalition; limited environmental scanning 2. Tenure of dominant coalition is lengthy; promotions from within 3. Planning is intensive, cost-oriented, and completed before action is taken 4. Tendency toward functional structure with extensive division of labor and high degree of formalization 5. Centralized control and long-looped vertical information systems 6. Simple coordination mechanisms and conflicts resolved through hierarchical channels 7. Organizational performance measured against previous years; reward system favors production and finance
Costs and benefits: It is difficult for competitors to dislodge the organization from its small niche in the industry, but a major shift in the market could threaten survival	*Costs and benefits:* Technological efficiency is central to organizational performance, but heavy investment in this area requires technological problems to remain familiar and predictable for lengthy periods of time	*Costs and benefits:* Administrative system is ideally suited to maintain stability and efficiency but is not well suited to locating and responding to new product or market opportunities

Miles, R.E. & Snow, C.C. (1978). Organizational strategy, structure, and process. New York: McGraw-Hill, p. 48.

APPENDIX B

CHARACTERISTICS OF THE PROSPECTOR

Characteristics of the Prospector

Entrepreneurial problem	Engineering problem	Administrative problem
Problem: How to locate and exploit new product and market opportunities	*Problem:* How to avoid long-term commitments to a single technological process	*Problem:* How to facilitate and coordinate numerous and diverse operations
Solutions: 1. Broad and continuously developing domain 2. Monitors wide range of environmental conditions and events 3. Creates change in the industry 4. Growth through product and market development 5. Growth may occur in spurts	*Solutions:* 1. Flexible, prototypical technologies 2. Multiple technologies 3. Low degree of routinization and mechanization; technology embedded in people	*Solutions:* 1. Marketing and research and development experts most powerful members of the dominant coalition 2. Dominant coalition is large, diverse, and transitory; may include an inner circle 3. Tenure of dominant coalition not always lengthy; key managers may be hired from outside as well as promoted from within 4. Planning is broad rather than intensive, problem oriented, and cannot be finalized before action is taken 5. Tendency toward product structure with low division of labor and low degree of formalization 6. Decentralized control and short-looped horizontal information systems 7. Complex coordination mechanisms and conflict resolved through integrators 8. Organizational performance measured against important competitors; reward system favors marketing and research and development
Costs and benefits: Product and market innovation protects the organization from a changing environment, but the organization runs the risk of low profitability and overextension of its resources	*Costs and benefits:* Technological flexibility permits a rapid response to a changing domain, but the organization cannot develop maximum efficiency in its production and distribution system because of multiple technologies	*Costs and benefits:* Administrative system is ideally suited to maintain flexibility and effectiveness but may underutilize and misutilize resources

Miles, R.E. & Snow, C.C. (1978). Organizational strategy, structure, and process. New York: McGraw-Hill, p. 66.

APPENDIX C

CHARACTERISTICS OF THE ANALYZER

Characteristics of the Analyzer

Entrepreneurial problem	Engineering problem	Administrative problem
Problem: How to locate and exploit new product and market opportunities while simultaneously maintaining a firm base of traditional products and customers *Solutions:* 1. Hybrid domain that is both stable and changing 2. Surveillance mechanisms mostly limited to marketing; some research and development 3. Steady growth through market penetration and product-market development *Costs and benefits:* Low investment in research and development, combined with imitation of demonstrably successful products, minimizes risk, but domain must be optimally balanced at all times between stability and flexibility	*Problem:* How to be efficient in stable portions of the domain and flexible in changing portions *Solutions:* 1. Dual technological core (stable and flexible component) 2. Large and influential applied research group 3. Moderate degree of technical efficiency *Costs and benefits:* Dual technological core is able to serve a hybrid stable-changing domain, but the technology can never be completely effective or efficient	*Problem:* How to differentiate the organization's structure and processes to accommodate both stable and dynamic areas of operation *Solutions:* 1. Marketing and applied research most influential members of dominant coalition, followed closely by production 2. Intensive planning between marketing and production concerning stable portion of domain; comprehensive planning among marketing, applied research, and product managers concerning new products and markets 3. Matrix structure combining both functional divisions and product groups 4. Moderately centralized control system with vertical and horizontal feedback loops 5. Extremely complex and expensive coordination mechanisms; some conflict resolution through product managers, some through normal hierarchical channels 6. Performance appraisal based on both effectiveness and efficiency measures, most rewards to marketing and applied research *Costs and benefits:* Administrative system is ideally suited to balance stability and flexibility, but if this balance is lost, it may be difficult to restore equilibrium

Miles, R.E. & Snow, C.C. (1978). Organizational strategy, structure, and process. New York: McGraw-Hill, p. 79.

APPENDIX D

THE JOB DIAGNOSTIC SURVEY MODEL
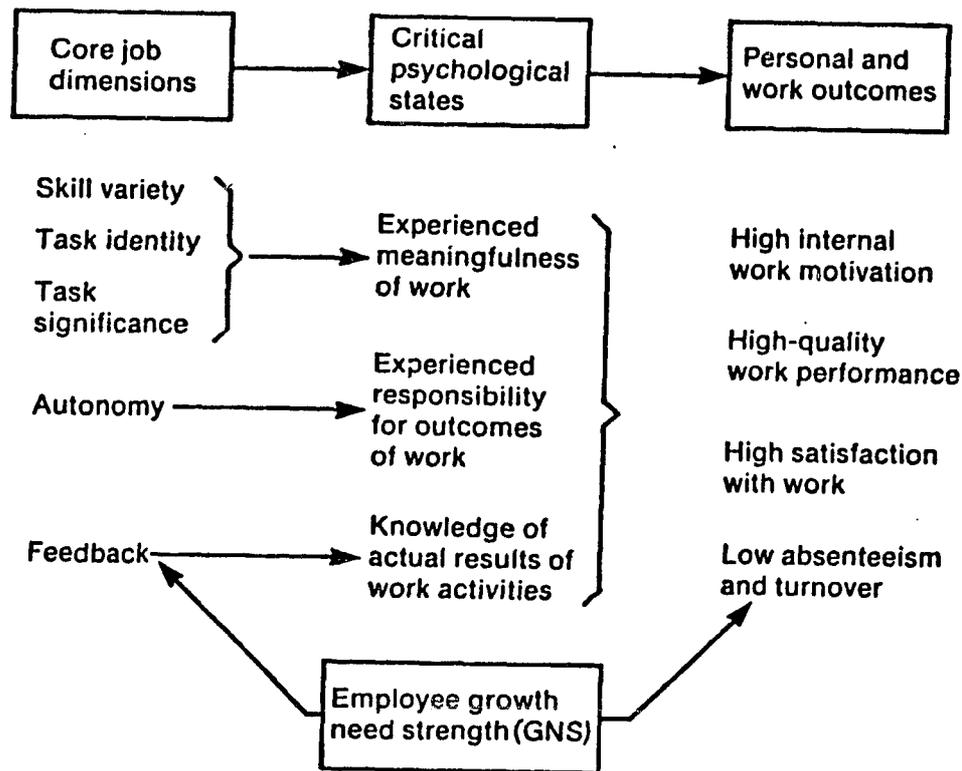
| Core job dimensions | → | Critical psychological states | → | Personal and work outcomes |

Skill variety
Task identity
Task significance } → Experienced meaningfulness of work

Autonomy → Experienced responsibility for outcomes of work

Feedback → Knowledge of actual results of work activities

High internal work motivation

High-quality work performance

High satisfaction with work

Low absenteeism and turnover

Employee growth need strength (GNS)

Hackman, J.R. & Oldham, G.R. (1974). The Job Diagnostic Survey: an instrument for the diagnosis of jobs and the evaluation of job redesign projects (Technical Report No. 4). Yale University: Department of Administrative Services, p. 3.

APPENDIX E

THE DICTIONARY OF OCCUPATIONAL TITLES DEFINITION

781.381-026 PATTERNMAKER (furn.; garment; tex. prod., n.e.c.)

Draws sets of master patterns for articles, such as garments, parachutes, and upholstery, following sketches, sample articles, and design specifications: Examines sketches or sample articles and design specifications to ascertain number, shape, and size of pattern parts and quantity of cloth required to make finished article, using knowledge of manufacturing processes and characteristics of fabrics. Draws outlines of parts on paper, using drafting instruments, such as calipers, squares, straight and curved rules, and pencils. Draws details on outlined parts to indicate position of pleats, pockets, buttonholes, and other items. Marks outlined garment parts with lines and notches that serve as guides in joining parts of garment. Cuts out master patterns, using scissors and knife, and marks size and style information on patterns. May draw and cut out sets of patterns of different sizes, following master patterns [PATTERN GRADER-CUTTER (garment)]. May fabricate template from plywood, trace around template with chalk to outline pattern on material, and cut out pattern parts, using power shears [DESIGNER AND TEMPLATE MAKER, COVERINGS (aircraft-aerospace mfg.)].

Dictionary of occupational titles. (1977). U.S. Training and Employment Service. (4th Ed.). Washington, D.C.: American Institutes for Research, p.

APPENDIX F

THE QUESTIONNAIRE FOR PATTERNMAKERS

THE UNIVERSITY OF NORTH CAROLINA
AT GREENSBORO

On the following pages you will find several different kinds of
questions about your job. Specific instructions are given at the start
of each section. Please read them carefully. It should take you no
more than twenty minutes to complete the entire questionnaire. Please
move through it quickly.

> The questions are designed to obtain <u>your</u>
> perceptions of your job and <u>your</u> reactions to it.

There are no "trick" questions. Your individual answers will be kept
completely confidential. Please answer each item as honestly and
frankly as possible.

> Thank you for your cooperation.

SECTION ONE

This part of the questionnaire asks you to
describe your job, as <u>objectively</u> as you can.

Please do NOT use this part of the questionnaire to show how much you
like or dislike your job. Questions about that will come later.
Instead, try to make your descriptions as accurate and as objective as
you possibly can.

A sample question is given below.

A. TO WHAT EXTENT DOES YOUR JOB REQUIRE YOU TO WORK WITH MECHANICAL
   EQUIPMENT?

```
        1--------2--------3--------4--------5-------(6)-------7
Very little; the                  Moderately        Very much; the
job requires almost                                 job requires almost
no contact with                                     constant work with
mechanical equip-                                   mechanical equip-
ment of any kind.                                   ment.
```

You are to <u>circle</u> the number which is the most accurate description of
your job. If, for example, your job requires you to work with
mechanical equipment a good deal of the time--but also requires some
paperwork--you might circle the number six, as was done in the example
above.

If you do not understand these instructions, please ask for assistance.
If you do understand them, turn the page and begin.

1. TO WHAT EXTENT DOES YOUR JOB REQUIRE YOU TO <u>WORK CLOSELY WITH OTHER</u> <u>PEOPLE</u> (either customers or people in related jobs in your own organization)?

```
1--------2--------3--------4--------5--------6--------7
```

| Very little; deal-ing with other people is not at all necessary in doing the job. | Moderately; some dealing with others is necessary. | Very much; deal-ing with other people is an absolutely essential and crucial part of doing the job. |

2. HOW MUCH <u>AUTONOMY</u> IS THERE IN YOUR JOB? THAT IS, TO WHAT EXTENT DOES YOUR <u>JOB</u> PERMIT YOU TO DECIDE <u>ON YOUR OWN</u> HOW TO GO ABOUT DOING THE WORK?

```
1--------2--------3--------4--------5--------6--------7
```

| Very little; the job gives me almost no personal "say" about how and when the work is done. | Moderate; many things are standardized and not under my control, but I can make some decisions about the work. | Very much; the job gives me almost complete responsi-bility for deciding how and when the work is done. |

3. TO WHAT EXTENT DOES YOUR JOB INVOLVE DOING A "WHOLE" AND IDENTIFIABLE PIECE OF WORK? THAT IS, IS THE JOB <u>A COMPLETE</u> PIECE OF WORK THAT HAS AN OBVIOUS BEGINNING AND END? OR IS IT ONLY A SMALL PART OF THE OVERALL PIECE OF WORK, WHICH IS FINISHED BY OTHER PEOPLE OR BY AUTOMATIC MACHINES?

```
1--------2--------3--------4--------5--------6--------7
```

| My job is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product. | My job is a moderate-sized "chunk" of the overall piece of work; my own contribution can be seen in the outcome. | My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product. |

4. HOW MUCH VARIETY IS THERE IN YOUR JOB? THAT IS, TO WHAT EXTENT DOES THE JOB REQUIRE YOU TO DO MANY DIFFERENT THINGS AT WORK, USING A VARIETY OF YOUR SKILLS AND TALENTS?

```
1--------2--------3--------4--------5--------6--------7
```

| Very little; the job requires me to do the same routine things over and over again. | Moderate variety. | Very much; the job requires me to do many different things, using a number of different skills and talents. |

5. IN GENERAL, HOW SIGNIFICANT OR IMPORTANT IS YOUR JOB? THAT IS, ARE THE RESULTS OF YOUR WORK LIKELY TO AFFECT THE LIVES OR WELL-BEING OF OTHER PEOPLE SIGNIFICANTLY?

```
1--------2--------3--------4--------5--------6--------7
```

| Not very significant; the outcomes of my work are not likely to have important affects on other people. | Moderately significant. | Highly significant; the outcomes of my work can affect other people in very important ways. |

6. TO WHAT EXTENT DO MANAGERS OR CO-WORKERS LET YOU KNOW HOW WELL YOU ARE DOING ON YOUR JOB?

```
1--------2--------3--------4--------5--------6--------7
```

| Very little; people almost never let me know how well I am doing. | Moderately; sometimes people may give me feedback; other times they may not. | Very much; managers or co-workers provide me with almost constant feedback about how well I am doing. |

7. TO WHAT EXTENT DOES DOING THE JOB ITSELF PROVIDE YOU WITH INFORMATION ABOUT YOUR WORK PERFORMANCE? THAT IS, DOES THE ACTUAL WORK ITSELF PROVIDE CLUES ABOUT HOW WELL YOU ARE DOING--ASIDE FROM ANY FEEDBACK CO-WORKERS OR SUPERVISORS MAY PROVIDE?

```
1--------2--------3--------4--------5--------6--------7
```

| Very little; the job itself is set up so I could work forever without finding out how well I am doing. | Moderately; sometimes doing the job provides feedback to me; sometimes it does not. | Very much; the job is set up so that I get almost constant feedback as I work about how well I am doing. |

Listed below are a number of statements which could be used to describe a
job. Please indicate whether each statement is an accurate or an
inaccurate description of your job.

Once again, try to be as objective as you can in deciding how accurately
each statement describes your job--regardless of whether you like or
dislike your job.

Write a number in the blank beside each statement, based on the following
scale:

HOW ACCURATE IS THE STATEMENT IN DESCRIBING YOUR JOB?

1	2	3	4	5	6	7
Very Inaccurate	Mostly Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Mostly Accurate	Very Accurate

_____ 1. The job requires me to use a number of complex or high-level
          skills.

_____ 2. The job requires a lot of cooperative work with other people.

_____ 3. The job is arranged so that I do not have the chance to do an
          entire piece of work from beginning to end.

_____ 4. Just doing the work required by the job provides many chances
          for me to figure out how well I am doing.

_____ 5. The job is quite simple and repetitive.

_____ 6. The job can be done adequately by a person working alone,
          without talking or checking with other people.

_____ 7. The supervisors and co-workers on this job almost never give me
          feedback about how well I am doing in my work.

_____ 8. This job is one where a lot of other people can be affectd by
          how well the work gets done.

_____ 9. The job denies me any chance to use my personal initiative or judgment in carrying out the work.

_____ 10. Supervisors often let me know how well they think I am performing on the job.

_____ 11. The job provides me the chance to finish completely the pieces of work I begin.

_____ 12. The job itself provides very few clues about whether or not I am performing well.

_____ 13. The job gives me considerable opportunity for independence and freedom in how I do the work.

_____ 14. The job itself is not very significant or important in the broader scheme of things.

SECTION THREE

Now please indicate how you personally feel about your job.

Each of the statements below is something that a person might say about his or her job. You are to indicate your own, personal feelings about your job by marking how much you agree or disagree with each of the statements.

Write a number in the blank for each statement, based on this scale:

HOW MUCH DO YOU AGREE WITH THE STATEMENT?

1	2	3	4	5	6	7
Disagree Strongly	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Agree Strongly

____ 1. My opinion of myself goes up when I do this job well.

____ 2. Generally speaking, I am very satisfied with this job.

____ 3. I feel a great sense of personal satisfaction when I do this job well.

____ 4. I frequently think of quitting this job.

____ 5. I feel bad and unhappy when I discover that I have performed poorly on this job.

____ 6. I am generally satisfied with the kind of work I do in this job.

____ 7. My own feelings generally are not affected much one way or the other by how well I do on this job.

SECTION FOUR

Now please indicate how <u>satisfied</u> you are with each aspect of your job as listed below. Once again, write the appropriate number in the blank beside each statement.

<u>HOW SATISFIED ARE YOU WITH THIS ASPECT OF YOUR JOB?</u>

1	2	3	4	5	6	7
Extremely Dissatisfied	Dissatisfied	Slightly Dissatisfied	Neutral	Slightly Satisfied	Satisfied	Extremely Satisfied

_____ 1. The amount of job security I have.

_____ 2. The amount of pay and fringe benefits I receive.

_____ 3. The amount of personal growth and development I get in doing my job.

_____ 4. The people I talk to and work with on my job.

_____ 5. The degree of respect and fair treatment I receive from my boss.

_____ 6. The feeling of worthwhile accomplishment I get from doing my job.

_____ 7. The chance to get to know other people while on the job.

_____ 8. The amount of support and guidance I receive from my supervisor.

_____ 9. The degree to which I am fairly paid for what I contribute to this organization.

_____10. The amount of independent thought and action I can exercise in my job.

_____11. How secure things look for me in the future in this organization.

_____12. The chance to help other people while at work.

_____13. The amount of challenge in my job.

_____14. The overall quality of the supervision I receive in my work.

SECTION FIVE

Listed below are a number of characteristics which could be present on any job. People differ about how much they would like to have each one present in their own jobs. We are interested in learning how much you personally would like to have each one present in your job.

Using the scale below, please indicate the degree to which you would like to have each characteristic present in your job.

NOTE: The numbers on this scale are different from those used in previous scales.

```
4---------5---------6---------7---------8---------9---------10
```

Would like having   Would like having   Would like having
this only a moderate   this very much   this extremely
amount (or less)   much

_____ 1. High respect and fair treatment from my supervisor.

_____ 2. Stimulating and challenging work.

_____ 3. Chances to exercise independent thought and action in my job.

_____ 4. Great job security.

_____ 5. Very friendly co-workers.

_____ 6. Opportunities to learn new things from my work.

_____ 7. High salary and good fringe benefits.

_____ 8. Opportunities to be creative and imaginative in my work.

_____ 9. Quick promotions.

_____10. Opportunities for personal growth and development in my job.

_____11. A sense of worthwhile accomplishment in my work.

SECTION SIX

Listed below are activities that might be involved in a patternmaker's job. Using the following scale, indicate the frequency with which each activity is encountered on your job.

For example, if you were a sample maker you might respond to these questions as indicated:

  5 Assemble patternmakers' samples
  2 Assemble photography samples

The number 5 means that samples to test patternmakers' patterns are made daily, while the number 2 means that samples to be used for photography are only made once every season.

HOW FREQUENTLY DO YOU PERFORM THIS TASK ON YOUR JOB?

0	1	2	3	4	5
Never	At least once per year	At least once per season	At least once per month	At least once per week	Daily

MAKE FIRST PATTERNS
___ by flat pattern techniques
___ by draping on form
___ from sketches
___ from photographs
___ from garments ("knock off")

MAKE PRODUCTION PATTERNS
___ revise first patterns
___ make new patterns
___ adjust patterns for specific fabrics

MAKE PATTERNS FOR SPECIAL USES
___ buttonhole placement
___ pocket placement
___ cutting guides or artwork placements for pre-tucking, embroidery, applique, etc.

SUPERVISE SAMPLE SEWING
___ for samples to be approved by designer
___ for photography garments

ORGANIZE SAMPLE ROOM
___ estimate yardage requirements
___ order fabrics and trims
___ locate fabrics and trims
___ send out for embroidery, pleating, etc.

HOW FREQUENTLY DO YOU PERFORM THIS TASK ON YOUR JOB?

0	1	2	3	4	5
Never	At least once per year	At least once per season	At least once per month	At least once per week	Daily

FIT GARMENTS
___ on form
___ on live model

GRADE PATTERNS
___ write grade rules
___ put grade rule numbers on patterns
___ grade patterns
___ check graded nests for accuracy

MAKE MARKERS
___ sample markers
___ production markers

PREPARE SPEC SHEEETS
___ describe garment
___ describe construction
___ list supplies
___ list pattern pieces
___ provide marking and spreading instructions
___ provide cutting instructions
___ provide finishing instructions
___ distribute prepared spec sheets
___ revise spec sheets when changes are made

ASSIST QUALITY CONTROL
___ provide graded measurement chart
___ measure duplicates and compare to measurement chart

COMMUNICATE DIRECTLY WITH
___ designer
___ assistant designer
___ engineering
___ quality control
___ grading
___ marking
___ purchasing
___ contractors
___ manufacturing (management)
___ manufacturing (cutting)
___ manufacturing (sewing)
___ sales

HOW FREQUENTLY DO YOU PERFORM THIS TASK ON YOUR JOB?

0	1	2	3	4	5
Never	At least once per year	At least once per season	At least once per month	At least once per week	Daily

MANAGE FILES
___ file sketches
___ file patterns
___ file spec sheets

MISCELLANEOUS
___ analyze problems (troubleshoot)
___ prioritize functions
___ shop the market to compare fit and construction techniques
___ attend adoption meetings
___ other

Using the same scale, please indicate the frequency with which you personally perform the task WITH THE AID OF A COMPUTER on YOUR job.

USE COMPUTER
___ to make first patterns
___ to make production patterns
___ to make pattern changes
___ to cut out patterns
___ to grade patterns
___ to make markers
___ to fill out spec sheets

In the space below, please name the computer equipment YOU PERSONALLY use on YOUR job (if applicable).

_____

SECTION SEVEN

The following information is needed for statistical purposes. All of your responses are strictly confidential. Individual responses will not be seen by anyone in your company. Your help is greatly appreciated.

Please mark (x) the correct response or fill in the blank, as appropriate, in each category.

State your job title:_____

___ Female
___ Male   ___ Age

                                            ___ Years in this job
___ Some high school
___ High school graduate or G.E.D.   ___ Years as a patternmaker
___ Technical training
___ Some college   ___ Are you the sole support
___ College graduate (Bachelor's)   of your family?
___ Graduate degree
                                            _____ Current annual salary

___ Trained on the job

    Company(s)_____

___ Trained at trade school

    School(s)_____

___ Trained in college design program

    School(s)_____

APPENDIX G

THE SCORING KEY FOR THE JOB DIAGNOSTIC SURVEY

SCORING KEY FOR THE SHORT FORM OF THE JOB DIAGNOSTIC SURVEY

The Short Form of the Job Diagnostic Survey (JDS) measures several characteristics of jobs, the reactions of the respondents to their jobs, and the growth need strength of the respondents. Some of the scales tapped by the JDS are not included in the Short Form; others are measured with fewer items. The scales measuring the objective job dimensions are, however, identical with those in the JDS.

Each variable measured by the JDS Short Form is listed below, along with (a) a one or two sentence description of the variable, and (b) a list of the questionnaire items which are averaged to yield a summary score for the variable.

For further information about the instrument and its uses, contact:

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*   *   *

I.   JOB DIMENSIONS: Objective characteristics of the job itself.

A. Skill Variety: The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the employee.

Average the following items:

     Section One   #4
     Section Two   #1
                  #5 (reversed scoring--i.e., subtract the number entered by the respondent from 8)

B. Task Identity: The degree to which the job requires the completion of a "whole" and identifiable piece of work--i.e., doing a job from beginning to end with a visible outcome.

Average the following items:

     Section One   #3
     Section Two   #11
                  #3 (reversed scoring)

C. Task Significance: The degree to which the job has a substantial impact on the lives or work of other people--whether in the immediate organization or in the external environment.

Average the following items:

     Section One   #5
     Section Two   #8
                  #14 (reversed scoring)

D. Autonomy: The degree to which the job provides substantial freedom, independence, and discretion to the employee in scheduling his work and in determining the procedures to be used in carrying it out.

Average the following items:

    Section One   #2
    Section Two   #13
                   #9 (reversed scoring)

E. Feedback from the Job Itself: The degree to which carrying out the work activities required by the job results in the employee obtaining information about the effectiveness of his or her performance.

Average the following items:

    Section One   #7
    Section Two   #4
                   #12 (reversed scoring)

F. Feedback from Agents: The degree to which the employee receives information about his or her performance effectiveness from supervisors or from co-workers. (This construct is not a job characteristic per se, and is included only to provide information supplementqary to construct (E) above.)

Average the following items:

    Section One   #6
    Section Two   #10
                   #7 (reversed scoring)

G. Dealing with Others: The degree to which the job requires the employee to work closely with other people (whether other organization members or organizational "clients").

Average the following items:

    Section One   #1
    Section Two   #2
                   #6 (reversed scoring)

II. AFFECTIVE RESPONSES TO THE JOB: The priviate, affective reactions or feelings an employee gets from working on his job.

A. General Satisfaction: An overall measure of the degree to which the employee is satisfied and happy in his or her work.

Average the following items from Section Three: #2
                                                  #6
                                                  #4 (reversed scoring)

B. Internal Work Motivation: The degree to which the employee is self-motivated to perform effectively on the job.

Average the following items from Section Three: #1
#3
#5
#7 (reversed scoring)

C. Specific Satisfactions: These short scales tap several specific aspects of the employee's job satisfaction.

C1. "Pay" satisfaction. Average items #2 and #9 of Section Four.
C2. "Security" satisfaction. Average items #1 and #11 of Section Four.
C3. "Social" satisfaction. Average items #4, #7, and #12 of Section Four.
C4. "Supervisory" satisfaction. Average items #5, #8, and #14 of Section Four.
C5. "Growth" satisfaction. Average items #3, #6, #10, and #13 of Section Four.

III. INDIVIDUAL GROWTH NEED STRENGTH: This scale taps the degree to which an employee has strong vs. weak desire to obtain "growth" satisfactions from his or her work.

Average the six items from Section Five listed below. Before averaging, subtract 3 from each item score; this will result in a summary scale ranging from one to seven. The items are: #2, #3, #6, #8, #10, #11

IV. MOTIVATING POTENTIAL SCORE: A score reflecting the potential of a job for eliciting positive internal work motivation on the part of employees (especially those with high desire for growth need satisfaction) is given below.

$$\text{Motivating Potential Score (MPS)} = \left[\frac{\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}}{3}\right] \times \left[\text{Autonomy}\right] \times \left[\text{Feedback from the Job}\right]$$

Hackman, J.R. & Oldham, G.R. (1974). The Job Diagnostic Survey: an instrument for the diagnosis of jobs and the evaluation of job redesign projects (Technical Report #4). Yale University: Department of Administrative Sciences, Appendix D.

APPENDIX H

THE QUESTIONNAIRE FOR MANAGEMENT

1. Age of firm

1-5 years ___
6-10 years ___
11-30 years ___
31+ years ___

2. Number of employees ___

3. Ownership (Check one)

A. Controlled by one stockholder ___
B. Controlled by a few (2-20) ___
C. Widely held ownership 20+ ___

To what extent are the following strategies (behaviors) used by your firm? A score of 0 means no such strategy is used, a score of 1 indicates that the strategy is rarely used. A score of 5 indicates that it is a common strategy, etc.

		Low					High
	Relative impact of Board of Directors (or owners) on the operations of the firm	0	1	2	3	4	5
4.	Major and frequent product/service innovations	0	1	2	3	4	5
5.	Follow the lead of competitors	0	1	2	3	4	5
	Diversification into unrelated lines:						
6.	--by acquisition	0	1	2	3	4	5
7.	--establish own dept.'s or subsidiaries	0	1	2	3	4	5
8.	Geographic expansion	0	1	2	3	4	5
	Vertical integration:						
9.	--up (e.g., buy raw material sources)	0	1	2	3	4	5
10.	--down (e.g., buy retail outlets)	0	1	2	3	4	5
11.	Extensive Advertising	0	1	2	3	4	5
12.	Shotgun approach to new product introduction (To reduce risks)	0	1	2	3	4	5
13.	Selective approach to new product introduction	0	1	2	3	4	5
14.	Market segmentation--diff. lines for diff. mkts.	0	1	2	3	4	5

To what extent does your firm make use of the following:

15. **Controls** - Monitor the internal trends and incidents relative to organizational performance and include MIS, employee performance appraisal, quality controls, budgeting and cost accounting.

Little					Much
0	1	2	3	4	5

16. Centralization is the degree to which decisions are made only at high levels of management.

Low					High
0	1	2	3	4	5

17. Explicitness of strategies is the degree to which objectives and strategies (ways of achieving objectives) are clearly stated and understood.

Low					High
0	1	2	3	4	5

18. What is the functional background of your CEO?

Production
    Marketing   _____
    Finance   _____
    Other (state)_____

19. Which of the following organizational profiles best fits your firm? Check one
     TYPE I_____   TYPE II_____

TYPE I

Production emphasis--"nobody does it cheaper."

Marketing emphasis--"budget prices/good values."

Standardized products (only a few models and limited optional features).

No frills operating culture ("lean and mean" reputation).

Stay out front in riding experience curve downward (lower prices ----> added volume and market share ----> lower costs due to experience effects).

High productivity per employee.

Cost-cutting innovations.

Can set the floor on market price (in best position to use price-cutting as an offensive or defensive weapon).

Accept low profit margins in return for high volume.

TYPE II

Production emphasis--"nobody makes it better."

Marketing emphasis--"ours is better than theirs."

Many frills (models, options, features, services).

Create one or more points of difference.

Frequent innovation.

Premium pricing to cover added cost of differentiation.

Intensive advertising and sales efforts.

To what extent does your firm fit the following
description:

	Low					High
Production emphasis--"made especially for you."	Low 0	1	2	3	4	High 5
Marketing emphasis--"ours meets your needs better."	Low 0	1	2	3	4	High 5
Specialization (buyer segments, geographic areas, end-use applications).	Low 0	1	2	3	4	High 5

Competitive advantage depends on:

	Low					High
--Being the low-cost leader in the target segment or	Low 0	1	2	3	4	High 5
--Successful differentiation (doing something that is especially appealing to customer comprising the target segment).	Low 0	1	2	3	4	High 5

20. Which one of the following descriptions most closely fits your organization compared to other firms in the industry? (Please consider your division or company as a whole and note that none of the types listed below is inherently "good" or "bad.")

_____ Type 1   This type of organization attempts to locate and maintain a secure niche in a relatively stable product or service area. The organization tends to offer a more limited range of products or services than its competitors, and it tries to protect its domain by offering higher quality, superior services; lower prices, and so forth. Often this type of organization is not at the forefront of developments in the industry--it tends to ignore industry changes that have no direct influence on current areas of operation and concentrates instead on doing the best job possible in a limited area.

_____ Type 2   This type of organization typically operates within a broad product-market domain that undergoes periodic redefinition. The organization values being "first in" in new product and market areas even if not all of these efforts prove to be highly profitable. The organization responds rapidly to early signals concerning areas of opportunity, and these responses often lead to a new round of competitive actions. However, this type of organization may not maintain market strength in all of the areas it enters.

_____ Type 3   This type of organization attempts to maintain a stable, limited line of products or services, while at the same time moving out quickly to follow a carefully selected set of the more promising new developments in the industry. The organization is seldom "first in" with new products or services. However, by carefully monitoring the actions of major competitors in areas compatible with its stable product-market base, the organization can frequently be "second in" with a more cost-efficient product or service.

_____ Type 4   This type of organization does not appear to have a consistent product-market orientation. The organization is usually not as aggressive in maintaining established products and markets as some of its competitors, nor is it willing to take as many risks as other competitors. Rather, the organization responds in those areas where it is forced to by environmental pressures.

21. In the previous question, you selected a particular description of your organization. Which description (i.e., Type 1, 2, 3, or 4) best fits your organization for the period:

5 years ago   _____
5 years from now   _____

22. Which number is the most accurate indicator of the apparel product your organization manufactures?

Infrequent   Frequent
fashion   fashion
changes   changes

1   2   3   4   5   6   7   8   9   10

Primarily   Half carry-   Primarily
carry-overs   overs and half   new styles
                                   new styles
                                      or
                           primarily simple modifications
                                 to existing styles

23. What were the gross annual sales of your firm for 1988? _____

APPENDIX I

BREAKDOWN OF COMPANIES BY ELIGIBILITY TYPE

Table I-1

Breakdown of North Carolina SIC 233 and SIC 236 Manufacturers

Category	n
Included	56
Contractors	64
No longer in business	51
Inappropriate product or no patternmaking	23
Has patternmaking contracted	9
Refused to participate	3
Missouri, Ohio	2
Total	208

APPENDIX J

INTRODUCTORY LETTER

MONTH DAY, 1989

MR. or MS. FIRST LAST NAME
COMPANY NAME
STREET
CITY, STATE   ZIP CODE

Dear MR. or MS. LAST NAME:

As a teacher of patternmaking at the University of North Carolina at Greensboro,
I am interested in examining the structure of the patternmaker's job in the
context of the apparel manufacturing environment of 1989. My ultimate goal is
to develop a relevant curriculum so that our students will be well prepared for
jobs in the industry.

Last year the state of North Carolina ranked third in the nation in the number
of people employed in apparel and related finished products. This indicates
that apparel manufacturing is important to the economy of North Carolina, and to
the nation as a whole. It is therefore a logical place in which to focus a
study of workers in the apparel manufacturing business. Because your company
maintains a manufacturing facility in the state of North Carolina, I would like
to include your patternmakers in my research. This study is strictly academic
and will not identify your company in any way. If you are generous enough to
share your time, then a copy of the results and implications will be forwarded
to you at the conclusion of the study.

Your patternmakers will be asked to fill out a questionnaire which should
require no more than thirty minutes to complete. During the same time, you will
be asked to answer a few questions about your organization. In about a week, I
will be telephoning you to set up an appointment to administer the
questionnaires.

I realize that your time is at a premium, but the success of this important
study will depend on your company's responses. Please check your schedule and
determine when in the next few months I might be able to visit. Take into
account vacation schedules, because all patternmakers must respond in order for
your company to be included. I look forward to speaking with you in the near
future.

                                        Sincerely,

                                        Nancy J. Staples
                                        Lecturer and Graduate Researcher

APPENDIX K

CONFIRMATION LETTER

MONTH DAY, 1989

MR. or MS. FIRST LAST NAME
COMPANY NAME
STREET
CITY, STATE   ZIP CODE

Dear MR. or MS. LAST NAME:

Thank you for your company's willingness to participate in my study of patternmakers in apparel manufacturing. I believe that the patternmaker has an extremely important job. Hopefully my study will provide some needed recognition for the position.

This is to confirm our appointment for APPOINTMENT TIME. I look forward to meeting you then.

Sincerely,

Nancy J. Staples

APPENDIX L

TABLES DESCRIBING PATTERNMAKERS

Table L-1

Job Titles of Employees Responsible for Patternmaking

Title	No.	(%)
Patternmaker	50	(42.0)
Head patternmaker	12	(10.0)
Production patternmaker	12	(10.0)
Assistant designer	5	(4.2)
Cutting supervisor	5	(4.2)
Designer	5	(4.2)
Garment development engineer	3	(2.5)
Trainee	3	(2.5)
Assistant patternmaker	2	(1.7)
Draper	2	(1.7)
First patternmaker	2	(1.7)
Vice president, design and merchandising	1	(.8)
Vice president, product development	1	(.8)
Assistant cutting supervisor	1	(.8)
Assistant cutting room manager	1	(.8)
Design assistant	1	(.8)
Designer/patternmaker	1	(.8)
Designer/merchandiser	1	(.8)
Designer/sample hand	1	(.8)
Director of manufacturing	1	(.8)
Manager of patternmaking and marking	1	(.8)
Patternmaker/marker maker	1	(.8)
Patternmaker/grader	1	(.8)
Patternmaker for computer input	1	(.8)
President	1	(.8)
Product manager	1	(.8)
Production planner/patternmaker	1	(.8)
Project leader/sample maker	1	(.8)
Sample maker	1	(.8)
Total	119	

Table L-2

Profile of Patternmaker's Age, Salary, and Family Support

	M	SD	Range
Age			
Female	38.8	11.4	22-71
Male	46.5	9.6	31-65
Salary			
Female (n=79)	$25,008	$ 8,825	$10,400-48,430
Male (n=40)	$40,323	$17,141	$12,625-95,000
Total (n=119)	$30,156	$14,190	$10,400-95,000
Sole Support of Family			
Female			
Yes (n=32)	$24,587	$8,455	$11,500-42,000
No (n=47)	$25,294	$9,146	$10,400-48,430
Male			
Yes (n=20)	$38,521	$15,325	$12,625-65,000
No (n=20)	$42,124	$19,010	$23,000-95,000
Total			
Yes (n=52)	$29,946	$13,334	$11,500-65,000
No (n=67)	$30,318	$14,914	$10,400-95,000

Table L-3

Profile of Patternmaker's Education

Education	M	SD	Range
Some high school (n=10)	$23,098	$8,808	$17,160-28,000
Some high school and some technical school or some college (n=5)	$56,800	$27,184	$35,000-95,000
Some high school, and technical school, and some college (n=1)	$41,000	---	---
High school graduate (n=30)	$24,200	$9,665	$12,000-49,000
Technical school (n=21)	$31,040	$12,134	$13,000-65,000
Some college (n=14)	$32,262	$12,167	$15,000-48,000
Technical school and some college (n=11)	$35,918	$13,764	$21,600-62,000
College graduate (n=23)	$29,232	$16,342	$10,400-85,000
College graduate and some technical school (n=2)	$40,500	$9,192	$34,000-47,000
Graduate degree (n=2)	$29,000	$1,414	$28,000-30,000

Table L-4

Profile of Patternmaker's Years as a Patternmaker

	M	SD	Range
Years as a Patternmaker			
Entire population	12.47	9.8	1-40
Female (n=79)	8.82	8.0	1-40
Male (n=40)	19.68	9.1	2-35
Salary by Years as a Patternmaker			
1-9 (n=58)	$23,057	$7,112	$10,400-42,000
10-19 (n=30)	$34,972	$14,813	$12,625-85,000
20-30 (n=21)	$36,104	$17,675	$11,500-95,000
30+ (n=10)	$44,387	$14,449	$22,000-62,000

APPENDIX M

MEAN JOB DIMENSION SCORES FOR 3068 EEOC WORKERS

Table M-1

Mean Job Dimension Scores for 3068 EEOC Workers in Eight Categories

Category	Skill Variety	Task Identity	Task Significance	Autonomy	Job Feedback
Administrators (n=368)	5.98	5.42	6.26	5.60	5.39
Professionals (n=477)	5.84	5.30	6.22	5.50	5.25
Technicians (n=380)	5.33	5.18	5.94	5.20	5.22
Protective Services (n=352)	5.83	4.58	6.43	4.97	4.92
Para-professionals (n=159)	5.05	5.11	6.20	4.89	4.83
Office, Clerical (n=582)	4.47	4.89	5.90	4.75	5.13
Skilled craft (n=287)	5.06	5.15	5.78	4.85	5.14
Maintenance, Service (n=427)	4.23	5.12	5.87	4.59	4.92
Overall Sample (N=3059)	5.18	5.09	6.06	5.04	5.12

Hackman, J.R. & Oldham, G.R. (1974). The Job Diagnostic Survey: an instrument for the diagnosis of jobs and the evaluation of job redesign projects (Technical Report #4). Yale University: Department of Administrative Sciences, Appendix F.

APPENDIX N

MEAN JOB DIMENSION SCORES FOR 62 JOBS

Table N-1

JDS Core Job Dimension Means and Variances for 62 Jobs

Job Dimension	M	SD
Skill Variety	4.49	1.67
Task Identity	4.87	1.43
Task Significance	5.49	1.29
Autonomy	4.80	1.43
Job Feedback	4.98	1.41
Agent Feedback	3.98	1.65

Hackman, J.R. & Oldham, G.R. (1974). The Job Diagnostic Survey: an instrument for the diagnosis of jobs and the evaluation of job redesign projects (Technical Report #4). Yale University: Department of Administrative Sciences, p. 22.