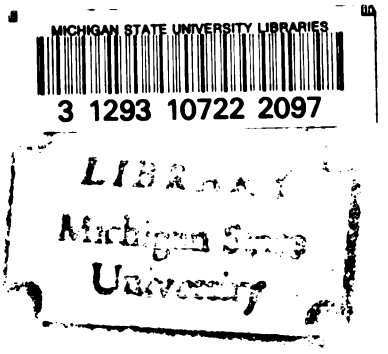

This is to certify that the

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A MULTIDISCIPLINARY ANALYSIS OF

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Jack Noel Rose

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John Gullahorn
Major professor

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ABSTRACT

A MULTIDISCIPLINARY ANALYSIS OF
DISRUPTIVE FACTORS IN SHIFTWORK

By

Jack Noel Rose

The theoretical aim of this research was to study the effects of shiftwork from the perspective that the sociocultural impetus toward time optimization has been a disruptive factor in various work situations.

The basis for this investigation initially involved the construction of a multidisciplinary theoretical framework for exploration of the social and behavioral significance of time in an actual setting. A desire for time optimization and the widespread use of shiftwork scheduling was seen to have emerged from new cultural values relating to work. Such values have become increasingly more important as societies have undergone a transition from primitive to industrial-technological.

Within the setting of five rural New York State health care institutions, the effects upon nurses of disrupted biological, psychological, and sociological life factors, stimulated by shiftwork scheduling, were analyzed. The initial study group consisted of 162 nurses at the five institutions, and included all nurses who were willing to volunteer their participation. For the purposes of hypothesis testing, the responses of 12 supervisory nurses and 7 male nurses, were eliminated from the data to enhance homogeneity

of the sample. Thus, a total of 144 responses were used in the final data analysis. Data obtained by structured interviews based upon a questionnaire, included information about each subject's demographic characteristics, as well as two measures of holistic well-being. The measures of well-being were specifically of psychological strain (Gillis, 1977), and of social isolation (Dean, 1961). It was hypothesized that both measures would show greater amounts of disruption as one analytically proceeded from day shift scores, to afternoon shift, night shift, and rotating shift measures.

From analysis of data obtained, it was found that:

(1) Psychological strain was significantly related to persons on different shifts.

(2) Social isolation was not significantly related to persons on different shifts.

The evidence indicates that the multidisciplinary approach to studying the disruptive factors in shiftwork has potential merit, yet further research using improved models is needed.

ACKNOWLEDGEMENTS

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Finally, I wish to state my sincere appreciation to my wife, Barbara, for her inspiration and understanding.

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CHAPTER I. THE PROBLEM

Statement of the problem

In this study, the investigator explored the usefulness of a holistic analysis model for explaining the disruptive effects of shiftwork scheduling, viewed as a major event operating within human society. Holistic analysis is used herein as the equivalent of a systems analysis frame of reference which considers the interaction of each person's biological, psychological, and social selves as a total system. Shiftwork scheduling has become increasingly pervasive in a multitude of work situations within our current culture, as an impetus toward time optimization has permeated the social organization of work. Time saving has become a cultural value which has been held in high regard by many in the industrial-technological world, and in particular, by administrators of complex organizations.

The specific purpose of this study was to explore the usefulness of the holistic model for explaining the disruptive effects of shiftwork upon nurses at five health care facilities in rural New York State.

Certain assumptions are necessary in any scientific endeavor. The present study is based upon the following set of assumptions, evidence for which is later presented in the theoretical framework and literature reviews. The sociocultural phenomenon of time optimization has brought about the major activity of shiftwork in a variety of work

situations. Although a minority of workers may actually prefer shiftwork, it has certain intrinsic drawbacks for which a better theoretical understanding is desirable.

A holistic or systems model is useful for explaining the interrelated disruptive effects of shiftwork along biological, psychological, and social dimensions. The relationships among these three areas of effects are complex and subtle (King, 1972:129). Various indicators of holistic disruptions have appeared in the literature in recent years. No single indicator has combined all dimensions satisfactorily, therefore two indices were selected for use in the present study. Indices of psychological strain (Gillis, 1977) and of social isolation (Dean, 1961) fulfill criteria of selection which demand coverage of biological, psychological, and sociological effects. The psychological strain index deals with the individual level of analysis, while the social isolation index applies to a societal, or "meta-individual" determinant (White, 1967:136). The Gillis (1977) scale is represented by questionnaire items 23 through 37 as appear in Appendix 1. The Dean (1961) scale is represented by questionnaire items 38 through 46 in the same Appendix.

Importance of the study

There are at least five ways in which this study is expected to contribute to social science research:

(1) This study is expected to provide a multidisciplinary

perspective on the use of time, and to discuss the sociocultural process of the structuring of time.

(2) The process of shiftwork is on the rise, socioculturally and will continue to have a direct sociocultural impact upon the world. Further theoretical understanding of the use of this "new frontier" of time as described by Melbin (1979), is needed. There is a particular need for examination of the evidence relating to work and values, to determine why this particular pattern of structuring time has become so popular.

(3) After a preliminary analysis of nursing as an occupation and profession, this study will examine how the process of shiftwork affects women in general, and nurses in particular, as such information is currently limited.

(4) The present study will provide an improved theoretical analysis (compared with previous studies described in the literature) of the implications of the current development of the major social phenomenon of shiftwork in the area of stress research within the social sciences.

(5) This study will contribute to the development of a model for administrative management of the major social organizational activity of shiftwork, which may become the dominant format for work in the future world culture. Direct implications for the optimal scheduling

of shiftwork in complex organizations will be discussed.

Theoretical framework

In order to appreciate the reasons that shiftwork has become such a popular way to structure working time socioculturally, an examination of the meaning of time as a multidisciplinary issue would seem useful.

Impressive efforts have been made by some modern sociologists to establish general conceptions that can help unify all of the social sciences (Gross, 1964a:201). The most noteworthy pioneer in this direction has been Talcott Parsons, who, along with collaborators from the disciplines of psychology and anthropology, aimed at establishing a general theory in the social sciences (Gross, 1964a:201). As has been true of attempts to construct a "grand theory", criticisms of Parson's theory have been leveled mainly at confusing terminology and purported loss of contact with the empirical world.

Time as an interdisciplinary issue

The analytical use of time within various disciplines differs, as does the meaning of time for each of a variety of disciplines. It is felt that the meaning of time can best be approached by a systematic examination of the different uses of time in selected disciplines. Since all phases of human culture are related and interdependent, to gain a real understanding of a phenomenon such as time, it

is necessary to pursue its meaning from several viewpoints (Hunt, 1972:26). To alleviate the difficulty of making disciplinary distinctions, a multidisciplinary perspective on time is formulated, following the systematic examination of the use and meaning of time in selected disciplines. This discussion will then lead to the statement of a theoretical framework for exploration of the social and behavioral significance of time, as applied to a research problem in an actual setting.

Philosophy of time

Philosophers have sought to know whether time is real or illusory, and have devoted much attention to questions about the nature of time.

> Time can be viewed either as metaphysically ultimate (process philosophy) or as illusory (philosophy of the manifold). For centuries it has been viewed as a significant dimension in the philosophy of history and in the theology of redemption (Encyclopedia Britannica, Micropedia, (9), 1974:1013).

Yaker (1971) has noted that the Hebrews perceive of time as a linear succession of instants whereas the Greeks view time as a geometric projection of a spatial and cyclic movement. It is from world views such as these that Western culture has inherited a variety of patterns of time use. Time has not only been considered by philosophers, but is the key concept in some philosophical systems (Doob, 1971:92).

The meaning of time for philosophy is to debate the nature of time itself, which accomplishes awareness of

issues concerning basic premises of human existence and the true meaning of life. Orme (1969) has noted that there appears to be a general tendency for philosophers to limit the variety of time phenomena considered, and also a tendency to examine time as conceived by the physical scientist for his convenience (Orme, 1969:147).

I could, perhaps not unprofitably, follow the philosophical investigations of time in greater detail, outlining the historical evolution of the various debates over the major issues as decisively as I would be able (Heidegger, 1962; Gelvan, 1970; Husserl, 1973; Toben, 1975; Sklar, 1976: 241). Instead, I will show how the meaning of time is such that time has taken on an intrinsic sociocultural "value", and is therefore subject to optimization by shiftwork scheduling.

Anthropological perspectives on time

From an anthropological perspective, the cultural use of time has undergone a transitional sequence:

> Time-keeping passed into time-saving and time-accounting and time rationing. As this took place, Eternity ceased gradually to serve as the measure and focus of human actions (Mumford, 1963:14).

Time optimization, meaning effort directed towards obtaining the maximum value from time available in terms of work output, has been a major outgrowth of these changes in the cultural use of time. And this has led to the creation of shiftwork as a major cultural phenomenon.

There is a good deal of evidence for aspects of time awareness having developed from simple zoological forms (Zeuner, 1949:247; Maxwell, 1971:37). Using conditioning techniques developed by behaviorists, researchers have demonstrated that various species can remember, as indicated by responses to rewards and punishments (Skinner, 1938; McConnell, 1962; Peretti and Zrout, 1975; Logan and Beck, 1977; Schwartz, 1978). Since dogs and chimpanzees appear to anticipate future rewards and punishments, an anthropological argument has been made that early ancestral hominids had this anticipatory time awareness ability, as well (Maxwell, 1971:33).

It has been stated by those involved in linguistics, that speech is a tool which facilitates human thought processes (Brown and Lennenberg, 1954; Brown, Black, and Horowitz, 1955). Whorf's (1956) hypothesis, derived from his hobby of studying North American Indian languages, suggested that different linguistic structures present different ways of viewing the world and of perceiving time, particularly in relation to different modes of grammatical tense construction (Anderson, 1980:384). Whorf also assumed that the grammatical categories of a language were indicators of cognitive categories of thought. Others have argued similarly, that language is an integral part of cognitive functioning (Lenneberg, 1969; Bourne, Dominowski, and Loftus, 1979). Since the Hopi language has two grammatical categories that are strange to English speaking people (e.g., one category

for temporary events and another for long-term events), Whorf concluded that the Hopi organize their world along a dimension of time which English speaking people tend to overlook (Krech, Crutchfield, and Ballachey, 1962:296: Bourne, Dominowski, and Loftus, 1979:124).

The cross-cultural studies of time perspective found in the work of Kluckhohn (1956) and Kluckhohn and Strodtbeck (1961), are deserving of analysis. The Kluckhohn's assume that there are fundamental questions for which all persons cross-culturally must find answers, in order to give direction to their lives. In the study by Kluckhohn and Strodtbeck (1961), questions which pertain to dominant value orientations were used to construct value profiles of five neighboring Southwest communities inhabited by ex-Texan, Mormon, Spanish-American, Navaho, and Zuni groups. The researchers attempted to ascertain each individual subject's dominant time perspective, either past, present, or future-oriented. A societal time orientation was then made up using the consensus of individual value orientations.

Differences among community members in this study, were often greater than the differences between the communities themselves. On the question of consensual time perspectives, the Mormons appeared to be past-oriented, the Spanish-Americans present-oriented, and the ex-Texans future-oriented.

Geertz examined both variation (1959) and uniformity (1973) with regard to Balinese social structure. In his

pursuit of the latter, he examined the cultural apparatus in terms of which Balinese people think about individual persons. Employing a classification scheme derived from Schutz (1962), Geertz distinguished between the following overlapping classes: (1) Consociates are individuals who actually meet somewhere in the course of daily life; (2) Contemporaries are persons who share a community of time but not of space and do not normally meet; (3) Predecessors are not yet born and (4) Successors have died so neither can by definition be interactants. In Bali there are six kinds of labels of individuality in person-definition. An important point derived from Geertz's excursion into this subject is that among the Balinese, time is relegated to a much less significant place than in more complex cultures. In fact, the Balinese may be said to have an achronic approach to life, or an achronic value orientation (Bateson, 1963:35). Thus, the Balinese, culturally downplay the death process, the effects of remembering the dead on one's present life, and the potential effects of today's actions on tomorrow's as yet unborn children.

Any cultural development which would alter Balinese experiences of time, person-perceptions, or notions of propriety would transform their lives entirely (Geertz, 1973:409). For example, shiftwork would have such an effect even though the Balinese do not adhere to Western conceptions of time. If the Balinese were compelled to adopt schedules of shiftwork, it would disrupt their qualitative,

static appreciation of time. It will be later argued that shiftwork has an even more pervasive disruptive influence for cultures which are rooted in clock-dominated systems of time structuring.

In his study of time and social structure among residents of the Ashanti Confederacy, Fortes (1970) used a Western conceptualization of time. Norms for the times of domestic residential transitions (e.g., change of residences after marriage; how children are viewed socially at different ages of social maturation) were calculated and interpreted as a means of better understanding the Ashanti social structure.

Systems of time reckoning and ordering, such as calendars, seem to be directly related to societal needs to coordinate large groups of people (Sorokin and Merton, 1937; Sorokin, 1964; Maxwell, 1971:51). Smaller, more homogeneous groups require less precision. Levi-Strauss (1967) has emphasized that whole cultures can be characterized by a preference for change or periodicity (Maxwell, 1971:52).

Maxwell (1971:51) states that Malinowski (1927) was among those to point out the relationship between precision of time scales and societal complexity. Although Malinowski advocated measurement in numerous ways in anthropology, he himself was never very systematic about this prescription (Kaberry, 1957:80).

E. E. Evans-Pritchard (1939, 1940) made a distinction between ecological time and structural time in his studies

of the Nuer, which was basically a statement of the difference between time based upon natural phenomena (e.g., rainy or dry seasons), and time based only upon social relationships as an artifact of a given culture (Maxwell, 1971:53).

In numerous socially static societies, the seasons and human generations repeat approximately uniformly, and often residents of these societies have very little time sense (as the Balinese), and lack the keen sense of history and of past and future that members of Western culture share (Schlegel, 1961:185).

In summary, time is used in at least two ways in anthropology. One use that has been discussed is to examine cultural differences in time perspectives. Another use has been for analysis of the accomplishments of mankind according to epochal events. The use of time in anthropology places man's cultural development and achievements in an understandable perspective. In addition, it shows the trend toward optimization of time and speaks to potential effects of this trend.

Sociological perspectives on time

It has been stated by Davis (1972:vii), that on the whole sociologists have been negligent of the topic of time. When sociologists have considered time, it has often been treated as a simple chronological variable with which to order other social data, or to correlate them (Davis, 1972: viii). How people subjectively experience time, how much

experience is patterned with a variety of situational and career influences, how organizations structure and regulate the uses of time, and how cultures interpret its passage, are among those matters which have been given little emphasis by sociologists (Davis, 1972:viii).

The question arises, as to how time has been used in sociology (in addition to simple chronological use), and what the significance of such use has been? Every society, it appears has some system of reckoning time (Doob, 1971:49, 75fn.). The calendar, in particular, is a social creation which generates and gives meaning to a myriad of social purposes (Davis, 1972:18fn.). One use of time in sociology has been to conceive of time as an alternate plane of existence (Melbin, 1978, 1979). This is accompanied by increased specialization within the society along the dimension of time (e.g., shiftworkers are specialized to work on a given shift) (Davis and Moore, 1945:249). One could debate the merits and justifications for the use of time as proposed by Melbin (1978, 1979).

> Man subsumes the continuing quality of experience by saying that he lives in time (the dimension of his becoming) even as he lives in space (the dimension of his movements) (Encyclopedia Britannica, (18), 1974: 421).

Melbin was thinking along such lines when he developed his perspective of time as an alternate plane of existence to space. His major premise is that time can be a "container for living" in much the same way as space is typically

occupied. Melbin thereby divides the concept of space-time into separate components. (Melbin, 1978:5).

Another use of time in sociology has been to analyze the effects of clock time on human groups. A key variable that has been considered in this regard is that of role relationships. The effects of time on such relationships are considered across several analytical levels: actor, personal relations (including family), organization, community, and society.

Jensen and Ellwood (1964) have commented on an attempt by Sorokin to translate certain natural science concepts (e.g., cause, space, time) so they may be meaningfully applied to sociocultural phenomena. Attempts have been made to find a shortcut to methodological maturity in social science by using the methods of natural science to study sociocultural phenomena (Jensen and Ellwood, 1964:v). The rationale for attempting to do so is based upon the erroneous assumption that a fundamental similarity between physical, biological, and sociocultural phenomena exists. By way of definition, an empirical sociocultural system consists of (1) a system of meanings, (2) embodied in material objects or vehicles, and (3) employed by human agents. Physiologically one can study what agents in a sociocultural system do as they interact. But, study of the reasons for their behavior, the "why" of their behavior, is not examined through natural science inquiry. Therefore, in order to understand the component of "meaning", an essential aspect of

sociocultural reality (and exclusive of physical space, physical time, and causality of natural science), it is necessary to transform natural science concepts and methodology. Sorokin (1964:34-35) gives an overall comparison of the principles and methods of the natural sciences with those of the sociocultural sciences, which he feels is homologically parallel, though profoundly different.

Sorokin's work represents a "total response" to a problem by a sociologist exhibiting a complex unity of thought, feeling, fact, and value (Dawe, 1973:43). His analysis of sociocultural time begins by his specification of a variety of "physicomathematical time systems," each with different structures, aims, and functions (Sorokin, 1964: 159). All of these are cited as examples of what sociocultural time is not, although sociocultural time is seen as homologous to each of them. His examples include classical mechanics, quantum theory, and relativity theory, each of which represent use of different systems of time.

Sorokin's analysis continues by his specification of several "biological times," cited for the same analytical purpose as were the "physicomathematical time systems". Introducing biological times with a review of the time system of evolution (seen as epochal, not continuous), Sorokin proceeds to distinguish physiological time from physical time (e.g., persons of equal age may be physiologically quite different) (Sorokin, 1964:113).

In his treatment of "psychological time," Sorokin draws connections to biological time. He refers to mental measurement, the subjectivity of individual time perception as "flow of consciousness" that is not related to physical time, and the connection of time with memory. Each of these topics has been the subject of intensive investigation by psychologists.

Sorokin then states, "whatever conception of time is offered, it is conditioned by the total character of the culture and society in which its author lives and works ... all elaborate conceptions of time in any field of thought are socioculturally conditioned and are sociocultural time in a broad sense" (Sorokin, 1964:168). By this definition, there is ultimately only one kind of time - sociocultural time. Without belaboring Sorokin's analysis further, it can be summarized as follows. The natural sciences use an objective means of conceiving and measuring time, which, though useful, ignores the social nature of time. The social sciences, or sociocultural sciences as Sorokin prefers to call them, necessarily use subjective analytic comparison as the basis for understanding phenomena.

A variety of societies use social events as the points of initial time reference (Sorokin, 1964:174). And among primitives, time reckoning per se is almost absent, yet, despite its discontinuity and brevity, it is characterized by specification of social events (Sorokin, 1964:175).

Thus, the idea of time and its divisions is to a great degree a social convention (Sorokin, 1964:184). Purely quantitative time cannot replace sociocultural time and is itself inadequate for a study of sociocultural phenomena, as it breaks a Gestalt, and the meaning of the period is lost (Sorokin, 1964:197-201; Perls, 1972, 1974).

For the present study, along with the mathematical calculations of differences across shifts (related to natural science time), an attempt has been made to specify the subjective aspects of sociocultural time for nurses on shiftwork. Shiftwork derived from sociocultural time, as it represents specification of social events pertaining to work, that are to occur at particular times.

Sorokin's analysis culminates with reference to the medieval divisions of sociocultural time into the following planes:

(1) Aeternitus (ideational time which is truely eternal)

(2) Aevum (co-participant in the ideational world of pure meanings and in the changing world of sensory perception) which is semi-eternal, e.g., a scientific law remains until superceeded

(3) Tempus (serviceable convention to which most refer when using the word time - clock time) (Sorokin, 1964: 215-217)

In a discussion of social time, Gioscia (1971) describes his sociological paradigm which consists of three parameters of time. One dimension is called the meta-chronic-anachronic, which refers to being ahead or behind

the times of social process. The second parameter is called the epichronic-catachronic, meaning elation or depression at the times. And the third dimension is the hyperchronic-hypochronic, or degree of sensitization or rate tolerance to the times, as when one person is patient while another is bored by the same social event. These three dimensions are considered to form a synchrony in which all dimensions are dialectically interrelated. Using this paradigm, Gioscia explores the origins of various social interactions (e.g., social revolution results from a metachronic age agroup impeding against an anachronistic society) (Gioscia, 1971:73).

In summary, time has been used in several ways in sociology. Aside from the chronological use of time, time has been used to describe sociocultural phenomena (Sorokin, 1964); for restructuring conceptualizations about planes of existence (Melbin, 1978, 1979); and as the basis for a synchronous paradigm for exploring the origins of social interactions (Gioscia, 1971).

Psychological perspectives on time

In psychology, the effects of clock time on the individual are of greatest importance. Key considerations include perception of time, feelings about time, motivational properties and uses of time (Knapp and Garbutt, 1958), personality traits that endure over time (Hall and Lindzey, 1957; Jourard, 1974; Monte, 1980), disruptions of time

relating to mental illness (El-Meligi, 1971; Salinger, 1971), and the effects of time deprivation.

Time perception varies inversely with the amount of interest an event or activity stimulates. Dull activities seem to take forever, whereas, interesting ones seem to be over all too soon.

Time can have strong motivational properties. Anxiety generated by the passing of time can lead to constructive activity (Doob, 1971:411). However, when people establish artificial goals for themselves within arbitrary time frames, they risk personal disappointment and concomitant psychological distress if their goals are not reached by the time they have specified. Some psychotherapies attempt to curtail such a practice in order to help people avoid such self-initiated disappointments (Perls, 1974).

Personality theory explores enduring traits or behavior patterns that are related to time (Doob, 1971:408). By definition, traits are behavior patterns that persist over time. Mann, Siegler, and Osmond (1971) have suggested that time is derived from one's personality temperament and type, and is therefore a wholly private perception rather than a learned social perception. Using Jungian typology, they constructed a theory of different individual temporal orientations. In addition, they provide case studies using characters from novels, films, and history, to illustrate persons of each particular type (Mann, Siegler, and Osmond, 1971:148).

Perspectives on time in Biology and Chemistry

Time has been used in biology and chemistry to examine regularities of numerous physical processes within organisms. Physical processes are often seen as having timing mechanisms - called biochemical or biological clocks - yet, the locations of such clocks remain a mystery. The classical doctrine of "imprinting" has shown that biological oscillation couples itself to external temporality to produce biological clock time (Pittendrigh, 1971). Thus, the production of these clocks is an identifiable phenomenon, but the function of such clocks is speculative.

Use of clock time based on the earth's rotation affords the ability to quantify a host of physical bodily processes in relation to one standard of measurement (Taffel, 1965:25). When a person, for example, begins to work a different shift schedule, the change in time may be correlated with changes in biochemical bodily processes in order to observe possible changes of such processes. A casual relationship is believed to exist in the instance of a strong correlation.

> Biological clocks are modifiable within limits by changes in the environment: organisms respond to external cues which have temporal significance although just how the process works may remain a problem for research (Doob, 1971:70).

Perspectives on time in Physics

Physics uses time in two respects, referred to here as classical time and relativity. Man's first need for high precision time measurement was in sea navigation. Pendulum

clocks had been developed at the time this need arose, but they do not work at sea. Harrison was offered 20,000 pounds by the British government to solve the problem of constructing an effective clock for sea travel. He constructed the first clock having a balance wheel, based on the use of an escapement that converted pendular swings to even movement. At present, using precision atomic clocks (which use an atom as the pendulum), physicists can measure the speed at which the earth's rotation is slowing down. An inherent danger of this practice of measurement, is that of the tendency to sacrifice ideational time which is truely eternal, for the short-sighted but eminently practical techniques of time measurement for coordination of human actions.

Fortunately physicists have found aspects of the world which do not share the onward motion of classical time (Schlegel, 1961:193). These aspects are cyclic processes that are out of the stream of non-cyclic changes in the universe (Schlegel, 1961:193).

Physics also uses time as a basis for theoretical formulations about the nature of the universe, such as relativity theory. Relativity is the theory which shows that time is affected by motion, developed by Albert Einstein. Physicists now accept that time arises from events, rather than that time exists before events (Schlegel, 1961:183); Ridley, 1976:54). Assumptions in Einstein's theory necessitate an eventual return to the philosophical debates about the nature of time. For example, relativity theory addresses

the question as to whether two thoughts can occur simultaneously. Some philosophers maintain this can happen, but relativity theory states that this cannot occur.

Since the classic interpretation of Einstein's special theory of relativity by Hermann Minkowski, it has been clear that theoretical physics has to do not with the two entities of space and time taken separately, but with a unitary entity called space-time (Encyclopedia Britannica, (128), 1974:421).

Interdisciplinary considerations on past, present, and future

Time, as measured by physicists' mechanical devices is always past, and time, as the philosophers use the concept is always either past or future (Von Mises, 1966:100). From these viewpoints, the present is nothing but an ideal boundary line separating the past from the future. However, as Von Mises (1966:100) notes:

> But from the praxeological aspect there is between the past and the future a real extended present. Action is as such in the real present because it utilizes the instant and thus embodies its reality.

Davies (1977:221), a physicist, suggests that the origin of the division of time into past, present, and future, is in the mind (psychological), rather than in the physical world. When anthropologists establish time orientations of societies or groups, they are assessing the prevalence of an essentially psychologic quality. Ordinarily, we may not be aware of time until some purpose is thereby served (Doob, 1971:48).

> The impression of a moving, flowing, passing time, a time of uni-directional activity, is so fundamental to all experience (at least in Western civilization) that it pervades our entire society. The reluctance to discard the passage of time as an illusion is tremendous (Davies, 1977:220).

Cause and effect are essentially human concepts for human situations, and are the cornerstone of social scientific research (Davies, 1977:219). In fact, the known universe is the product of human conventions (Douglas, 1975:xiv). For example, in physics, cause and effect describe time-oriented interactions in terms of the decay of organization, itself a purely human notion (Davies, 1977:219). Thus, physics leads us to return to the philosophical question posed by time, as to the meaning of life or existence:

> It is probably better to regard the universe as a total phenomenon - the world is space-time, matter and interactions, extending from past to future, from place to place, from event to event in a vast network of complexity and existence (Davies, 1977:219).

As Novel laureate chemist Dr. Ilya Prigogine (1979), has philosophically stated: "We must change from the static view of being to a dynamic concept of becoming" (Prigogine, 1979:23).

Theoretical rationale guiding the research

An important factor for the present research derives from the foregoing theoretical framework. In order to make the best use of chronological time in an industrial-technological culture, a sociocultural pattern has emerged. That

is, administrators of various occupational work groups have instituted shiftwork schedules. This is the source of the first premise of the set of theoretical propositions guiding the present research. The other propositions were logically derived from a review of the literature on the sociology of work and health related effects, nursing as an occupation and/or profession, and studies of shiftwork, which follows.

(1) The sociocultural trend toward time optimization stimulates shiftwork scheduling of workers.

(2) Shiftwork stimulates biological disruptions.

(3) Shiftwork stimulates psychological disruptions.

(4) Shiftwork stimulates sociological disruptions.

(5) Biological disruptions stimulate psychological disruptions and vice versa.

(6) Psychological disruptions stimulate sociological disruptions and vice versa.

(7) Biological disruptions stimulate sociological disruptions and vice versa.

(8) Biological disruptions contribute to psychological strain and social isolation.

(9) Psychological disruptions contribute to psychological strain and social isolation.

(10) Sociological disruptions contribute to psychological strain and social isolation.

(11) Shiftwork induced disruptions contribute to psychological strain and social isolation, in direct relation to the amount of deviation from normal daytime scheduled work demanded by the shiftwork schedule.

Summary

The problem for research was explained as formulation of a theoretical time framework for explaining the social and behavioral significance of time, in a human behavioral setting. It was proposed that a sociocultural trend toward time optimization in the working world, has stimulated increased use of shiftwork schedules in recent years. This is particularly applicable to the industrial-technological societies in the world today. These shiftwork schedules are believed to be responsible for stimulating a complexity of disruptions in the lifestyle of the worker. They are also believed to aggravate preexisting problems. From this theoretical basis was derived the specific problem for research, of exploring the significance of selected disruptive factors of shiftwork among a group of nurse subjects.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

In this chapter, a multidisciplinary body of available literature is considered to assist with formulation of the theoretical basis for this study. The specific areas of exploration were largely determined by the preceeding theoretical analysis of the multidisciplinary nature of time. This discussion led to the idea that time optimization, a socioculturally determined trend, is related to work. First, a conceptual framework for stress research relevant to work, is provided. Next, various aspects of the social organization of work and related cultural values are reviewed in light of their relevance to the specific problem for research - the stressful effects of shiftwork on nurses. The discussion of work is followed by examination of nursing as an occupation and/or profession. Then, a review of studies by other researchers on various factors relating to shiftwork is presented. Each topic is assessed in terms of what is generally known, and for potential contributions to the problem for study. The chapter concludes with a restatement of each of the premises of the theoretical rationale guiding the research, strengthened by their connection to relevant points revealed in the literature review.

In reviewing the literature described, some specific questions relevant to the problem for study, were addressed:

(1) How has stress research been treated theoretically? A framework for stress research is discussed in response to this question.

(2) How does the social organization of work and the cultural values which frame it affect the worker? This includes consideration of the related factors of leisure and time; motivation and incentives; and alienation and depersonalization.

(3) What is the holistic perspective afforded by social science on health and illness as a major social phenomenon, and how is it applicable to shiftwork?

(4) Has nursing become a profession? Discussion of this question should serve to enhance the sociological context of the present study.

(5) How are workers affected by the stress of shiftwork in multidisciplinary terms? From this discussion derives the present problem for research.

The technique used to search the related literature may be of interest. Initially, a broad computer search of four data bases was made for the period January, 1966 through July, 1976. The data bases searched were as follows: Medlars, Psychological Abstracts, ERIC, and Biosis (State University of New York at Albany, University of Libraries Reference Services Department, 1975). The search was repeated on the same data bases for the period July, 1976 through September, 1979. The title used for each of the searches was as follows: Biological, Biorhythmic,

Psychological, and Sociological effects of Shiftwork. Several thousand abstracts were retrieved by the searches. Subsequently, several hundred articles were retrieved and reviewed. Using the demands of the theoretical framework to establish criteria of acceptability, those contributions considered relevant to the present study were incorporated herein. In addition, several university libraries were searched for holdings under relevant subject headings.

Framework for stress research

McGrath (1970) has developed a conceptual framework for the conducting of stress research. Many of the ideas presented in this section are therefore credited to his systematic efforts. There are intimate relationships between physical and social conditions as antecedents of stress, as well as among biological, psychological, and social interactional responses to stress (McGrath, 1970:5). Given a certain structural framework, it can then be used to generate a paradigm of the dynamics of operation of shiftwork. The guiding principle is holism - for the framework as well as the paradigm - they should take into account as many related phenomena as possible. The present study will, then, explore selected segments of this multidisciplinary theory.

Stress has been defined in many ways (Selye, 1956; Appley and Trumbull, 1967; McGrath, 1970). For the present study, the concept is used as a general rubric having

heuristic value as a basis for connecting seemingly diverse interdisciplinary areas. (McGrath, 1970:11). From this conceptual formulation, the present study further refines the focal concept of stress by specification of behavioral phenomena (e.g., indexes of psychological strain and social isolation) for investigative use in a given stressful situation. Admittedly, such techniques for measuring stress and its effects are as yet less advanced than measurement of other human attributes such as intelligence, attitudes, or perceptual skills (McGrath, 1970:3).

Response-based definitions of stress

Cannon (1932) experimentally studied the relationship between emotions and physiological change. He described the "fight-flight reaction" to stress. In this physiological state the body was predisposed, due to excitement of the sympathetic nervous system, to either stand and fight danger or to run away from it. The emotions involved, stimulated by adrenalin secretion, were either fear or rage.

Selye (1956) elaborated on the research of Cannon (1932), in his formulation of the dominant response-based definition in use today (Mirkin, 1979). His general adaptation syndrome to stressors of any sort, consisted of a constant physiological pattern of responses that defined the occurrence of stress. Selye also believes that in addition to stress having the negative effects associated with the general adaptation syndrome, there also exists a positive type of stress. If a person is experiencing negative stress,

Selye suggests ways to convert such stress to a positive experience (Cherry, 1978). It would, of course, be naive to view all stress as endowed with such a potential for conversion. Similarly, there are according to Ellerbrock (1978:95), two reactions to stress. If it makes a person miserable, his/her body will have all kinds of deleterious reactions. If the stress is enjoyable, it will result in optimal personal functioning.

There are, however, some weaknesses to response-based approaches. First, there are numerous "stress inducing" conditions which subjectively vary from person to person as truly stressful. For example, consider the truism that some persons find regular exercise stressful, yet others do not. Thus, exercise might be excluded as a generally stressful situation, as might practically any other condition one specifies for analysis. Second, the same syndrome may arise from entirely different states of affairs, in a qualitative sense. Compare physical exertion with purely psychological fright. Both stimulate increased blood pressure and heart beat, etc. Third, all symptoms in the general adaptation syndrome do not always appear together; that is, there are exceptions (Lazarus, 1966).

Perhaps the most generally acceptable operational definition of psychological stress would be one propounded by Parsons (1966), which describes stress as a very broad term covering a considerable variety of conditions underlying avoidance and escape responding (Haythorn, 1970:160). For

Parsons, stress is what we escape or avoid (Weitz, 1970: 125). This definition, though a disturbingly broad one, has much to recommend it to the behavioral scientist (Haythorn, 1970:160).

Situation-based definitions of stress

Stress may involve the presence of certain classes of situations, or situations involving certain classes of stimulus properties. This type of definition has some advantages over the response-based definitions, but has some limitations as well.

Some questions immediately raised by situation-based definitions are as follows. First, what kinds of situations, and what properties of them make for stress? Second, how shall the researcher handle individual differences in response to the same, presumably stressful situation? Third, how can the situational properties be measured to yield quantitatively, the degree of stress present in different situations? Without such measurement, the tendency will be to develop separate stress theories for each distinct situation.

Stress as an organism-environment transaction

Stress is not just an intraindividual emotional state, as the preceeding discussion might seem to imply. It is a particular kind of reaction to environmental events. The occurrence of environmental change is a starting place for building a transactional definition of stress, yet some

stress reactions arise from continued interaction with an "objectively" unchanging environment. The earlier questions of measurement and specification of boundaries for classes of potentially stressful situations, however, remain.

The engineering analogy: a transactional definition

It is useful to draw an analogy between the social scientist's use of the term stress with the civil engineer's use of it. In engineering, stress is the application of an external force which produces "strain," to be reckoned in terms of the substance to which it is applied. The stress-strain effect is a relationship between an entity and its environment. Environmental stress can cause structural damage when there is no visible or apparent change in the application of external force because stress can be continual or cumulative over time. The social scientific use of stress differs from the engineering use. First, the social scientist has problems in measuring the stressing forces with which he/she deals, restricting the results of research to the stimulus situation. And second, the social scientist has to reckon with the added complexity that the effect of the force can be altered by the subject's perceptions of it.

All four definitions of stress critiqued so far, point up the diversity of meanings of stress, and reinforce the need for an organizing framework for its conceptualization. The definitions also direct attention to necessary considerations for any organizing framework attempting to present a

comprehensive conceptualization of the stress area. It is not the purpose of the present study to attempt to provide a comprehensive conceptualization of the stress area. This has been done by McGrath (1970). The preceeding discussion is useful in order to explain the conceptual formulation used in the present research. Each of the definitions presented may be related to the present study, as may the limitations of each.

A frame of reference for stress research

A frame of reference for stress research has been formulated by Kahn (1970), and will be briefly stated here.

(1) Focal organism or "actor" for stress research can be at any level - individuals, groups, or organizations.

The organism at whatever level is embedded and functions within a broader physical-social system.

(2) The stress problem involves four stages:

The first of these takes place in the environment - the physical-social system in which the focal organism is embedded. This class of events can be called demand (or load, input, "stressor," press, environmental force, etc.) Second, there is the reception (recognition, cognitive appraisal, perception, acceptance) of that "objective" demand by the focal organism. This class of events can be labeled strain (or subjective demand, or personal definition of stress). Third, there is the focal organism's responses to the subjective demand at physiological, psychological, behavioral, and social-interactive levels (including cultural). Fourth, there are the consequences of response,

both for the focal organism and for the larger system or environment in which it is embedded. It has been noted by McGrath (1970:16), that in principle, stress research efforts should be concerned with these events and linkages, but specific studies may well wish to limit concern to certain portions of this total span.

Time factors and stress

Discussion and analysis of the concept of time forms the broad range basis for the theoretical framework of this study. It has been seen that time has a multidisciplinary meaning and varied uses in social science inquiry. A sociocultural trend towards optimization of time has led to shiftwork. And, shiftwork brings with it a variety of disruptions of a stressful nature which may then be theoretically considered in relation to time sequence. The sequence of events in the stress problem, that is, objective demand - strain (subjective demand) - response - consequences, takes place through time. Furthermore, "feedback loops" are needed to reflect the "flow of events", and these four stages are most appropriately considered as a cyclic process through time (McGrath, 1970:17). Temporal factors are involved in both methodological and substantive issues with regard to stress research. They relate to stressor conditions, the experience of stress, coping behavior and consequences. In addition, there are temporal considerations at both macrolevels (for example, questions of

longitudinal studies versus studies at a single point in time) and microlevels (questions about the interval between signal and stress, about duration of demands, etc.) (McGrath, 1970:23).

The physical and sociocultural aspects of environment

Behavioral scientists have often not bothered with physical environment properties in stress research due to their assumptions about the nature of psychological stress. In other contexts, physical environment properties may be important determinants of behavior, as in use of space (Hall, 1963), or in isolation studies (Haythorn, 1970; Altman and Lett, 1970). If, for example, psychological stress inevitably has an intraorganismic and psychological component (e.g., anticipation of inability to cope), then physical conditions of the environment will affect psychological stress only after their translation into sociopsychological terms. If so, it is better to study these more proximal sociopsychological variables as they affect psychological stress, than to work with the more distal physical variables from which they originate. Some argue that the behavioral sciences should concern themselves with sociopsychological variables and not become involved with physical variables (McGrath and Altman, 1966).

Stress and the coping process

The coping process refers to a variety of behavior patterns by which an organism can actively prevent, alleviate,

or respond to stress-inducing circumstances (McGrath, 1970: 33). A thorough treatment of coping processes is provided by Lazarus (1966). It should be noted that choice of coping as a focal concept for stress research is based on the value premise that stress is bad and should be reduced (McGrath, 1970:56). Selye has noted the inherent weakness of such a premise in his exploration of positive as well as negative stress.

Summary of stress research framework

The occurrence of stress and its effects can be measured at physiological, psychological, behavioral (task and interpersonal performances), and at the organizational level. Within each of these levels, various operational types of measures can be applied: subjective reports, aided or unaided observation, trace measures, archival records. Alter-measures within level and type do not always agree; nor is there always convergence of measures across types and/or levels. Such lack of convergence of measures can be viewed as methodological weakness (alternate measures of the same property - stress - yield different results), or as substantive information (alternate measures represent alternate and more or less substitutable responses to stress).

In one sense the utility of stress concepts is promoted by their lack of specificity, since the use of an ambiguous rubric promotes interdisciplinary links between biology, psychophysiology, psychology, and sociology (Mechanic, 1970: 104). Mechanic (1970) does not believe it is either possible

or fruitful to come to agreement on the referents of the rubrics of stress and adaptation. He notes that "these concepts take on different meanings depending on the problem being investigated, the methods being used, the theoretical orientations of the investigator, and personal tastes" (Mechanic, 1970:105). Attempting to force stress research problems into a common mold implies the possibility of a viable integrated theory of behavior; a possibility that is fruitless to pursue at present because of lack of knowledge (Mechanic, 1970:105). Perhaps this is an extreme view to take as there is much to be gained in attempting to contribute to the formulation of such an integrated theory. For example, research, such as that by Dohrenwend (1973) on life events as stressors, has conceptualized stressfulness in quantifiable life change units.

Contribution of conceptual framework for stress research to the present study

Several stress-inducing conditions are hypothesized to be involved in shiftwork in a real life setting:

(1) actual or anticipated physical disruption

(2) actual or anticipated psychological disruption

(3) actual or anticipated disruption of social relationships

(4) a constraining environment which leads to deprivation (McGrath, 1970:63-64)

Deprivation is a compound form of stress which includes deprivation of physical needs (usually sleep), psychological needs (e.g., varied stimulation, time awareness) and/or

interpersonal needs.

The question of interest for the present study is as follows. Assuming shiftwork is a stressful situation for nurses (evidence will be presented indicating that this is a fair assumption), what are the various disruptive effects in multidisciplinary terms? Mechanic (1970:113) notes that one probably achieves a more useful perspective on stress if considered from both a personal and societal perspective simultaneously. Within the conceptual framework specified, it seems reasonable and convenient to define psychological strain and social isolation as particular reactions to stress.

From a theoretical organizational perspective, Gross (1964:853) has suggested that empirical studies should include both situational and psychological data. And Moss (1973) encouraged sociologists to consider biological processes in their work, yet noted the inherent difficulty of finding researchers capable of conceptualizing and measuring both social and biological properties (Moss, 1973:vii,3). Admittedly such a task is difficult, but not impossible. Psychological stress has been used conceptually, in the present study, to refer to the conditions that produce psychological strain (Indik, et. al., 1964:27; Gillis, 1977:428 fn.).

Work and values

Cross-cultural studies of work may contribute to our understanding of work and cultural values in the United

States (Osipow, 1973). Writers such as Benedict (1946) and Roe (1956) have been among those to have extensively discussed work in various cultures. The work of Mead (1937, 1939), who studied South Pacific islanders revealed (as might be expected in primitive cultures), that work was begun at a very early age and was assigned according to the individual's abilities. The work of such children was socially considered as important, in contrast to the work of American children which is usually considered as unimportant (Osipow, 1973:253). The artificiality of work for American children may well generate culturally unwholesome attitudes towards work in later life (Osipow, 1973:253).

Sociological studies of work and values have shown a changing trend in the value system of Americans. For most of this century, and in particular during the period following World War II up to about 1970, the value system of most Americans centered around a number of powerful, culturally derived middle-class symbols that relied upon their ability to provide at least some of the essentials of psychological well-being (Yankelovich, 1978:47). These values were typified by Whyte's (1956) discussion of organizational control in America, entitled The Organization Man. The "organization man" is a vague term which refers to anyone in the generation of bureaucrats during the 1950's. Organization men talk of the "treadmill," the "rat race," and of the inability to control one's direction. Whyte points out that organization life does not always go along with the

precepts of the Protestant Ethic. Advancement by personal connections is a notable exception to this ethic. Whyte proposes the existence of a Social Ethic; a body of thought beyond the Protestant Ethic that has been taking care of the redefinition of the organization man's place on earth. This Social Ethic rationalizes the organization's demands for reality and gives those who subscribe to it a sense of dedication in doing so. It is an ideology that morally legitimizes pressures of society against the individual. Although no organization member would be likely to admit outright that he believes in the Social Ethic, many would subscribe wholeheartedly to the following separate component ideas that, when synthesized, form it: (1) A belief in the group as the source of creativity; (2) A belief in "belongingness" as the ultimate need of the individual; and (3) A belief in the application of science to achieve the belongingness.

Whyte's main thesis is that emphasis of the Social Ethic is wrong. We need to know how to cooperate with the organization while simultaneously knowing how to resist certain of its aspects. In a sense, he was recommending that one overtly value the organization highly, while covertly maintaining a more self-restrained sentiment about the value of the organization and one's work.

A change to a new set of values has involved either time away from the organization, or suggested change in the nature of jobs in the organization to accommodate the new

values. The following work-related ideas are included among these new values: (1) the increasing importance of leisure (time is seen as a measure of one's values), (2) the symbolic significance of the paid job (as opposed to unpaid housework), and (3) the insistence that jobs become less depersonalized or alienating (Yankelovich, 1978:77). People also want the chance for personal growth through jobs, in recent years (Renwick, Lawler, et. al., 1978).

For some people, the acquisition of material symbols is no longer valued as a primary goal in life (Abbott, 1977:29). These people have accepted non-material values because of a general uncertainty about what values should replace those being discarded. Yet for many, there remain a variety of motivational reasons for work (Caplow, 1954). Etzioni (1977) has suggested that millions of Americans may be embracing a new ethos, as they increasingly pursue what used to be called nonproductive activities as legitimate patterns of living (e.g., study, public life).

Leisure time: a contradiction

Predictions that a future of leisure time would emerge, have not been fulfilled (DeGrazia, 1971:444). One may debate whether these predictions will ever be realized. Thus far, people seem caught in an endless circle of wanting things that cost money that costs work that costs time (DeGrazia, 1971:447). This is typical of those subscribing to the dominant values of the "rat race" of organizational life

(Whyte, 1956:2). Presently, after giving the first and best part of one's day to work, one is left with freedom which formerly meant engaging in pastimes but today involves other work, chores, moonlighting, or sometimes play (DeGrazia, 1971:453-454). An underlying value in this situation is that a person who is not working at his/her job should: (1) do something, and, (2) preferably do something productive. No other nation is as precise in its time sense or so time-conscious as the United States (DeGrazia, 1971: 458). Time is, therefore, valued for the fact that work can be accomplished within its structure.

Thus, whatever free time we have is really unfree, but is indirectly linked to worktime to which we ultimately return (DeGrazia, 1971:474). The phrase, "leisure time," is contradictory, since leisure has no adjectival relation to time (DeGrazia, 1971:476). Leisure is a state of freedom from everyday necessity, and one would engage in truely leisure activities for their own sake - an ideal that is seldom approached by most. No specific leisure time activity is inherently more satisfying than any other. It is the ability to identify oneself as a participant in any specific activity that makes one's use of time satisfying and valued ("Time: A Measure of Our Values," 1979:201).

Motivation to work

Levenstein (1973) argues that in an age of affluence in industrial societies, the traditional intrinsic rewards

of creative attachment to work are lost, creating the need for new incentives. What motivational incentives exist for work in today's society?

In attempting to answer the question of why people work, one might consult the writings of Maslow (1978) who specified a hierarchy of human needs. Maslow classified needs based on the priority with which they tend to be satisfied. Generally, once the most basic need is fulfilled, a person will be motivated to realize a higher need (although there are exceptions to this pattern). The needs specified are as follows: survival (physiological); security (safety); social (love and belonging); esteem (ego, self-identity); and self-actualization (infinite pursuit of being and becoming one). Several assumptions underly Maslow's model. The most significant of these are as follows: the organism is holistic; an act usually has more than one motivation; classification of motivation is based on goals rather than drives; motivation theory is human-centered; motivations are only one class of behavior determinants since behavior is also biologically, culturally, and situationally determined. Since there are exceptions to the sequence or process implied in need fulfillment, the hierarchy is best viewed as an organizing concept rather than as an explanatory model (O'Shaushenessy, 1976:91).

There have been numerous offshoots of Maslow's theory, two of which will be described here. Argyris (1960) and Strauss (1963) have written about complex organizations using

concepts and ideas derived from Maslow's theory. Argyris wanted to provide knowledge concerning the difficulties the individual faces and the opportunities he has for self-actualization in industrial organizations, for application to any genotypically similar complex organization. He sees most human problems in organizations as arising because relatively healthy people are asked to participate in formal work situations which coerce them to use few of their more than "skin-surface" abilities. Argyris contends that the existence of the organization is symptomatic of sick organizations that should be changed to facilitate individual growth.

Strauss (1963) states what basically amounts to Maslow's model as the "personality versus organization" hypothesis. Strauss advocates that management should not provide high wages and liberal employee benefits, but rather should promote job enlargement, general supervision, strong cohesive work groups, and decentralization - all "power-equalization" techniques. He criticizes the personality versus organization hypothesis for overemphasizing the individual's desire for freedom and underemphasizing his/her desire for security. In direct opposition to Argyris (1960), Strauss (1963) sees a need for conforming, unimaginative types of "organization men." Although workers may be apathetic and dependent in Argyris' terminology, Strauss feels that they are not necessarily actively dissatisfied, as they seek meaning in life from home and community activities rather

than from their jobs. Thus, Strauss concludes that there is a broad range of people that do not seek self-actualization on the job, and that this is okay because it would be too difficult to redesign some jobs to permit self-actualization to occur.

Others, such as Herzberg (1966), and Vroom (1964), have attempted to assess the determinants and effects of work satisfaction.

Herzberg (1966) has compared work satisfiers with dissatisfiers and developed a two-factor theory of motivation. His theory was developed from a series of interviews with engineers and accountants about their work. Strong determiners of job satisfaction that emerged in Herzberg's results were achievement, recognition, work itself, responsibility, and advancement (Herzberg, 1966:72). The major dissatisfiers were company policy and administration, supervision, salary, interpersonal relations and working conditions (Herzberg, 1966:74). Satisfiers or "motivators" seem to describe man's relationship to what he does, while the dissatisfiers or "maintenance" factors describe his relationship to the context or environment (Herzberg, 1966:74). Thus, good feelings were associated with job content factors, while bad feelings were associated with job context factors. Shiftwork is a job context factor that would therefore be a potential source of negative feelings for the worker.

Kornhauser (1978) has noted that jobs in which workers are better satisfied are conducive to better mental health;

jobs in which larger numbers are dissatisfied are correspondingly conducive to poorer average mental health (Kornhauser, 1978:85). The criteria for participation in organizations have been specified by March and Simon (1958, Ch.4). Their analysis also shows the major dissatisfying factors affecting a worker's decision to change jobs.

Financial compensation is certainly an important factor in worker motivation (Opsahl and Dunnette, 1966). Money operates as a generalized conditioned reinforcer (Skinner, 1953), a conditioned incentive (Dollard and Miller, 1950), an anxiety reducer (Brown, 1961), and as an instrument for gaining desired outcomes (Vroom, 1964), according to various theoretical viewpoints.

Lawler (1969) has argued that when jobs are structured in a way that makes intrinsic rewards appear to result from good performance then the jobs themselves can be very effective motivators.

Theories of motivation in general

Psychological research into the nature of motivation has largely emphasized animal behavior and sought a physiological explanation (Warr and Wall, 1975:168). Focusing on observable behavior in such efforts, motivation has been seen as its hypothesized cause, with little attention paid to such concepts as experience and feelings (Warr and Wall, 1975:168). A more satisfactory view, especially for human applications, would have to consider these aspects. Thus,

models of wanting have been constructed to complement the presently limited behavioral motivation theories (Warr and Wall, 1975:168-177).

Expectancy theory

A group of models, called expectancy or instrumentality theory have attempted to specify a person's feelings about different events or actions in terms of the perceived likelihood that they will have desirable consequences (Warr and Wall, 1975:169). They try to predict the course of action an individual will take when given the chance to choose his behavior. The theory originally derived from the work of psychologists Tolman (1932) and Lewin (1935), and includes the work of Vroom (1964). Vroom (1964) believes that people work for both economic and motivational reasons. He predicts that given the chance a person will choose to work when the valence of outcomes which he expects to attain from working, are more positive than the valence of outcomes he expects to obtain from not working (Vroom, 1964:29).

Expectancy theory has been valuable for recognizing that people operate in complex ways in motivational decision-making, yet the theory has some drawbacks, noted by Warr and Wall (1975). First, the measurement of subtly differentiated judgements is difficult, if not impossible as it requires precise measurement of valences. And second, expectancy theory places too strong an emphasis on an assumed future time orientation in people, and ignores the probability that

people are at times more present-oriented in their wants as Freud (1949) noted.

Exchange theory

A set of models that does consider more immediate sources of wanting has been called equity or social comparison theory (Warr and Wall, 1975:171; Janis and Wheeler, 1978), as well as exchange theory. These include models by Festinger (1954) and Homans (1961).

Festinger argued that people seek to resolve uncertainty about their opinions and abilities by social comparison activities. People want their ratio of inputs to rewards to be similar to that of others. If another person is receiving greater rewards relative to inputs, a person who is comparing himself with that person will be expected to have increased wants. This coincides with Homans' (1961) conception of the rule of "distributive justice" which states that a man's rewards in exchange with others should be proportional to his inputs.

One of the major analytic tools of modern sociology is the social role concept (Neff, 1977:40). Gullahorn and Gullahorn (1971) explored the information processing involved in resolution of role conflict, using an application of Homans' (1961) theory of social behavior and Simon's (1957) work on decision-making, to their computer similation of human behavior.

Aspiration level theory

A third theoretical approach is concerned with wants, generated to the extent a person has come to expect them to be fulfilled. In Lewin's (1935, 1947) laboratory research on so-called aspiration levels, a recurrent theme was that task success tended to raise a person's aspiration levels. Like Vroom, Lewin used the concept of valence to indicate the strength of an individual's preference for some outcome to which he/she aspired.

Other theories of motivation

McClelland (1961) categorized three human motivational needs: (1) the need for affiliation, (2) the need for power, and (3) the need for achievement. Warr and Wall (1975) have commented on McClelland's work, noting that some people are particularly prone to set themselves targets which necessitate personal effort and skill for their attainment, and to evaluate their own performance against high internal standards of excellence (Warr and Wall, 1975: 160-161). This tendency may be both satisfying and stressful to the individual.

Likert's (1961) theory of motivation is quite general. He feels that motivational forces come from the workers direct perceptions, from attitudes, and from the values and goals of the individual's work group (Likert, 1961:99). His ideas are cognizant of the social forces affecting the worker's life. As Likert notes, "To minimize these conflicts

and tensions, the individual seeks to influence the values and goals of each of the different work groups to which he belongs and which are important to him so as to minimize the inconsistencies and conflicts in values and goals" (Likert, 1961:165). Such conflicts are believed to be aggravated by shiftwork, particularly as the schedules detract from the worker's ability to selectively participate in groups outside of the work organization that are important.

Measurement of satisfaction with work

Aside from the specification of satisfier and dissatisfier factors in work situations by Herzberg (1968), there has been little attempt to assess the relationship between personality variables and job satisfaction in theoretical terms. Most of the empirical work represents an effort to establish a relationship between measures of adjustment or neuroticism and job satisfaction (Vroom, 1964:161). Numerous methods of measuring adjustment have been used, including personality inventories.

Research such as that of Mayo (1945) and the group dynamics research of Lewin (1935, 1947) has stimulated organizations to re-evaluate and change their personnel administration policies. Such re-evaluation has focused upon the protection and enhancement of the individual employee's self-esteem. The importance of at least moderate self-esteem for adequate individual mental health has

been recognized by many authors such as Adler (1939, 1954, 1958), Fromm (1947), Horney (1937), Reik (1964), Rogers (1961), and Watts (1968). In the work situation, the organizations's members are the primary contributors to the enhancement or defeat of a given individual's self-esteem. Reduction of freedom to make time allocation choices of work and leisure activities as when shiftwork is imposed, would also tend to reduce self-esteem. Shiftwork would theoretically place a burden on such choice-making, resulting in undesirable mental health consequences, with regard but not limited to individual self-esteem.

Time-and-motion and shiftwork compared

From the classic work of Taylor (1911), and his movement towards the rationalization of production by scientific management, the routinization of all types of industrial roles was increased (Schneider, 1957:155); March and Simon, 1958:12-13). In light of this we may compare and contrast one of the earliest applications of administrative technological concern with the use of time called time-and-motion study, with the later application of shiftwork. Proponents of the rationalization of production reasoned that since the efficiency of the machine depends on the economy of its movements, the movements of the worker should be similarly arranged to optimize productivity. This view led to intensive studies of the most efficient methods of employing the worker's time and motions (Schneider, 1957: 155). Implicit in such pursuits was a disregard for worker

satisfaction, since the prescription of the most efficient guides for industrial work usually involved psychologically boring patterns of repetitive cyclical movements which resembled the operations of a machine. The benefits to the industry at cost to the worker were obvious. Unions attempted to intervene and even to furnish the engineers to conduct the time-and-motion studies, with the expectation that this would guard workers against radical changes in production methods and concomitant distress (Schneider, 1957:311). Ironically, the procedural changes recommended after time-and-motion studies have been completed, are often inefficient. As DeGrazia (1971:464) notes, a person's own style of movements may take longer, but due to personal idiosyncracies will tire the person less in the long run.

A comparison may be drawn between the use of time in time-and-motion endeavors, and the use of time in the regulation of shift schedules. The most notable feature of both is that they evidence disregard for the mental state of the employee, and can lead to all sorts of negative outcomes for individual workers beginning with general dissatisfaction. Ironically, cost reduction may increase a system's total cost if measures of total system performances are not considered (Churchman, 1968). The time-and-motion recommendations treat the individual as if (s)he were a machine that produces a certain output, rather than as someone who thinks about work outcomes. The shiftwork schedule treats the individual as (s)he were a machine, ever ready to be turned on or off

at the whim of management. This is particularly likely in the case of the rotating shiftworker, whose "on-off switch" is ever accessible and manipulated by an overseeing controller.

If one were to contrast time-and-motion endeavors with shiftwork, it would be necessary to concede that of the two, the former is the least desirable from the standpoint of the worker. Shiftwork has some redeeming aspects to commend it, whereas time-and-motion restrictions do not seem to have any redeeming aspects at all. Among the positive aspects of shiftwork are the various reasons people have given for their preference for certain shift schedules. Nursing seems to have escaped time-and-motion efforts, but has not evaded shiftwork scheduling.

Stress as psychological strain

There have been many thousands of studies related in some way to stress. Many have shown that work contributes to stress in people's lives. One indicator of stress is psychological strain. The historical development of the psychological strain index used in the present research was traced. Examination of the relative merits of various questionnaire items, for inclusion or exclusion in the present study, was facilitated by the historical search as to the origins of this index. Each study mentioned in this section was selected because it was directly referenced by the study that succeeded it chronologically. The

sequence was found to originate with the work of Stouffer, et. al., (1950), and terminate with the study of Gillis (1977). Thus, the index used to measure what is referred to herein as "psychological strain" has undergone sequential development and refinement over a thirty year period.

The United States Army's Neuropsychiatric Screening Adjunct (Stouffer, et. al., 1950) provided the initial basis for development of the index of psychological strain used in the present study. It was modified and used in a Health Opinion Survey by MacMillan (1957), of psychoneurotic and related types of disorders conducted in a rural Canadian community. A modification of the Health Opinion Survey by Gurin, et. al., (1960) was used for a nationwide interview survey in the United States, and contained a four factor index of twenty total symptoms "expressing emotional stress and disturbance" (Gurin, et. al., 1960: 177). Another large study took a similar tack. As noted by Langner (1962), the classic study of mental disorder in midtown, Manhattan, New York City, used his screening instrument of twenty-two psychiatric symptoms indicating impairment.

A study of 8,234 employees of a single form, carried out by Indik, et. al., (1964), used a single factor self-report check list to assess "psychological strain." This instrument, used by Indik, et. al., (1964), was a shortened form of the Gurin, et. al., (1960) index, and was similar to the Langner (1962) instrument used in the midtown

Manhattan study. The Indik, et. al., (1964) instrument of psychological strain showed all interitem correlations to be positive, with 90 percent of them significant at the .10 level, and split-half index reliability was estimated to be +.85 (Indik, et. al., 1964:29). A slightly modified version of the Indik, et. al., (1964) instrument was used in a study of psychological strain in high rise housing conducted by Gillis (1977). The modifications of omitting one item, and unifying the coding scales for the remaining items, were made by Gillis (1977), to expedite field use of the scale. The methodological integrity of the instrument remained consistent with the reliability figures reported by Indik, et. al., (1964). That is, all interitem correlations were positive with over 95 percent significant beyond the .05 level, and a single factor accounted for 69 percent of the variance (Gillis, 1977:429).

Consideration was given to various recommendations mentioned by McGrath (1970) concerning stress research in general. It was decided that the index of psychological strain (Gillis, 1977) would be a useful indicator of holistic effects, mainly in the areas of physiological and psychological disturbance. In order to enhance the multidisciplinary view of shiftwork, an index that would pertain to social factors was additionally desired. The following section describes the results of the literature review on this point, which led to adoption of an index of social isolation (Dean, 1961).

Alienation and low job satisfaction

Alienation is the separation of man from his work, and man from his workmates (Scott, 1970:76). A rift is said to develop between man's productive ability and the power to control his own economic status. In some of his early writings, Marx advanced a theory of the impact of alienation on human relations in industry (Broom and Selznick, 1963: 648). For Weber (1946) and Durkheim (1951), the price that mankind has been forced to pay for technological and social progress has been an increasing alienation of human beings from each other, from established systems of ethical and social values, and from their work (Neff, 1977:45).

For example, a morbid exemplar of extreme alienation among nurses who work night shifts, is revealed by a story about such nurses placing bets as to when terminally ill patients would die ("Life and Death Bets," 1980:115). This activity may be seen as an extreme form of alienation from normative ethical and social values. Benoliel (1976:13-14) has noted that nurses who work in Intensive Care Units face stress comparable to the "dehumanizing and meaningless experience" of the Vietnam War. If this observation is correct, it serves to explain, but not justify the betting activity described above.

Fromm (1955) has observed that not only does a bureaucratic situation cause people to become alienated from the apparatus for which they work, but that there is also a serious tendency toward man's alienation from himself

(Fromm, 1955:120-143). And Argyris (1957) has noted how easily formal organizations foster frustration, conflict, and psychological failure in initially psychologically healthy individuals.

Workers are "alienated" in the sense that they feel that they have no control over the work process, that their work is meaningless, that they are not really part of the work community, and that work is not a significant feature of their personalities or lives (Argyle, 1974:3). Some sociologists have approached job satisfaction in terms of this concept, as has been mentioned. Marx first cited division of labor and exploitation of workers by employers during the Industrial Revolution, as its cause. And some sociologists have expanded the concept of alienation to include four kinds (Argyle, 1974:225-226):

(1) Powerlessness - lack of control over management policy, the conditions of employment or the immediate work process

(2) Meaninglessness - inability to see the purpose of the work done or how it fits into the whole production process

(3) Self-estrangement - failure to regard the work as a central life interest or means of self-expression, experiencing a depersonalized detachment while at work

(4) Isolation - not belonging to working groups or guided by their norms of work behavior

Since rotating shiftwork in hospitals entails changing from one work group to another, it was expected in the

present study, that nurses on rotating shiftwork schedules would evidence the social isolation aspect of alientation to a greater extent than other factors. It was also felt that night and afternoon shiftworkers would feel less guided by behavioral norms than would day shiftworkers. Within the hospital, occupational groups tend to be discrete from one another, not only in terms of function but in their patterns of association, in their values, and in their perceptions of the institution and each other (Croog and VerSteeg, 1972:295). For this reason, it was felt that nurses might be particularly likely to feel various amounts of social isolation while at work. It was hypothesized that greater amounts would be found among nurses who worked on night shift when overall activities are at a low, and among rotating shift nurses who lack consistency in the ability to relate to their co-workers. Rotating shift workers cannot be certain when their social conversations with friends will continue, as they are often not certain as to their hours of work. For these reasons, an index of social isolation (Dean, 1961), encompassing both social and psychological aspects with regard to alienation, was selected for comparative use (Robinson and Shaver, 1973:275-276). This particular index, from among those used by Dean (1961) to study the phenomenon of alienation, had a higher reliability when tested, than did the other components of powerlessness and normlessness (Robinson and Shaver, 1973:275).

Women and work

Working females will constitute 58 percent of workers by the turn of the century ("Working in the 21st Century," 1979:16). A study of psychological factors that inhibit women from engaging in the kinds of work achievement-directed behavior necessary to ensure promotion to managerial ranks, is found in O'Leary (1974). Hall and Gorden (1973) noted that among married women, irrespective of whether or not they were working, home pressures contributed most to role conflict. It does seem clear, throughout the literature, that women face obstacles in the pay they receive, promotions, and the accessibility of certain positions as a function of sex; and, such discriminations would be expected to have an influence on female career development not experienced by males (Gilmer, 1961:274-275; Osipow, 1973: 265; Lopata, 1974; Higginson and Quick, 1975:147-149; Whitehurst, 1977).

Nursing and the health care system

The traditional social interaction in the health care relationship has been between physician and patient (Cockerham, 1978:145). The modern health care system has expanded to include many additional occupational roles and interactants. Of major interest for the present study, is the role of nurse. Nursing represents the largest single group of health workers in the United States, with about 815,000 R.N.'s and 492,000 L.P.N.'s as of 1974 (Cockerham, 1978:147).

There remains a distinct prestige differential, to be discussed later, between the physician and subordinate roles such as that of nurse, which are classified as "paramedical" (Cockerham, 1978:146). Ultimately the physician exerts control over the other health care workers, with the possible exception of administrators (Melick, 1959). The hospital administrator may have certain power over the physician, yet remains as a secondary status level, as does the nurse. During recent years, perhaps no other occupation has been the object of as much study and analysis as nursing (Mauksch, 1972:206).

Early Development of Nursing

Historically, males have performed nursing tasks, yet the social role of the nurse is today identified with traditional female functions (Cockerham, 1978:148). There are indications that the earliest hospital nurses in ancient India around 1600 B.C. were men, because women held an inferior position in the society (Maclean, 1974:48-49). The original concept of nursing was influenced by practicing nuns who felt that such work was a way to attain spiritual salvation. They did not adhere to the authority of doctors and practiced nursing as they deemed appropriate. They would, if they desired, refuse either doctors' orders or treatment of categories of patients they did not like, such as unwed mothers or persons with venereal disease

(Cockerham, 1978:148). Secular nurses who, at that time worked in public hospitals were characterized as lower-class.

Florence Nightingale

Florence Nightingale, during the middle of the nineteenth century, changed the role of nursing in Western society in the direction of becoming an honored and respected occupation (Cockerham, 1978:149). Having successfully brought a contingent of nurses to aid the British wounded in the Crimean War, the British public endowed Nightingale with fame and popularity (Friedson, 1970:61; Cockerham, 1978:149). She was able to raise enough money to establish a nursing school which used her approach to training that emphasized a code of behavior idealizing nurses as "responsible, clean, self-sacrificing, courageous, cool-headed, hard-working, obedient to the physician, and possessing the tender qualities of the mother" (Cockerham, 1978:150). This image detracted, however, from establishing a view of nurses as capable leaders. Nursing was thus defined as a subordinate part of the technical division of labor surrounding medicine (Friedson, 1970:61).

Male Nurses

It may surprise some to learn that male nurses constitute about an eighth of all nurses in the National Health Service hospitals in England and Wales (Scott, 1970:138). In fact, as mentioned earlier, the tradition of male

nursing predates Florence Nightingale, going back to the Knights Templar and to the monasteries. In the United States, the majority of male nurses are found working in psychiatric hospitals. Male nurses in such hospitals were not used as subjects in the present study, because there are many more stress-producing features present in such environments than are present in the general hospitals and nursing homes.

Nursing Education

Unlike the generally similar programs of education found in various medical schools, nursing education has been characterized by a curious assortment of different types of educational experiences, any one of which can qualify a student as a nurse. It usually takes about one year to become a Licensed Practical Nurse (LPN), and from two to five years to obtain a Registered Nurse (RN) diploma. In programs lasting four or five years, a university baccalaureate degree is obtained, as well. Most nurses in the United States have been educated in hospital based diploma schools (Cockerham, 1978:151). A problem with nursing education that detracts from professionalism is the fact that practically anyone can gain admission to some sort of nursing program (Cockerham, 1978:153). This creates problems for both the aspiring nursing student as well as for the institution. For example, having taught a one year sequence in psychology to nursing students enrolled in an

LPN program, the effects of a consistently high dropout rate from the entire program in the neighborhood of 25%, have been evident. Warnecke (1973:153) cited a national attrition rate from collegiate nursing programs of 40%. The source of this situation seems to be largely related to relaxed standards for admission, which unfortunately admit some students with reading levels of about eighth grade. Very few of these individuals are able to compete, although remedial courses are offered in order to provide a chance for success.

Nursing Students

Studies of student nurses suggest that most desire to be needed and to be engaged in personal helping relationships (Cockerham, 1978:153). They may find, however, that some nursing faculty do not reinforce the image of the nurse as mother-surrogate, and tend to de-emphasize an intimate nurse-patient relationship (Cockerham, 1978:153).

Studies of the socialization of nurses by Davis (1972), Davis and Olesen (1963), and Psathas (1968), have all concluded that students experience a transition from a state of idealistic innocence to a kind of unemotional internalized recognizance of the routinized tasks ahead. This contributes to an eventual lack of commitment to the actual practice of nursing among many (Cockerham, 1978:157). The major stresses experienced by the novice during this transition come from difficulties in psychologically integrating

the identities of student nurse role with the concurrently emerging identity as an adult female (Davis and Olesen, 1963:94). This leads to disenchantment with career choice, and more realistic perceptions and outlooks (Psathas, 1968:52).

Nursing students generally seem unsure of themselves and passive, though there is some indication that as they enter the profession, those with grossly inadequate personality traits are excluded (Osipow, 1973:215). Surveys of nursing students reveal that most desire and expect marriage, and plan to give motherhood time priority over nursing work (Glaser, 1967:25-35).

There are divergent views as to when a professional self-image develops among medical students. Some feel it develops during schooling, while others such as Becker, et. al. (1963) feel it develops after graduation from medical school (Becker, et. al., 1963:419-420). Despite the lapse in logic when comparing medical doctor's education to the education of nurses, it is perhaps of some heuristic value in this instance. Having had experience in teaching licensed practical nursing students for over five years, I tend to agree with the view that a professional self-image develops during schooling. Perhaps this process is different for doctors and nurses. During the field experience of nurses, an integral part of their education, they begin to think and act as nurses, as evidenced by their classroom and lunchroom conversations.

Near the end of their educational program, however, the transitional effects of socialization into the role of nurse, have been assimilated.

Structural features of nursing

Relating to nursing as an occupation, Strauss (1967) has cited some of its structural features, which have emerged historically. The field of nursing is currently almost wholly occupied by women who seem to work in subordination to physicians (Loomis and Loomis, 1960:308). It is predominantly a salaried occupation whose workers are openly recruited. Nurses have great geographical mobility due to a relatively open market for skills that are spatially transferrable. The occupation is embedded within a hierarchy of authority. Some specialize in teaching or administration, yet traditionally also do conventional bedside nursing. There is a "curious melange of educational institutions and nursing degrees" with clinical specializations that parallel medicine itself (Strauss, 1967:62-63). Having gone through training rotations of surgical nursing, pediatric nursing, obstetrical nursing, etc., nurses have accumulated a nursing identity definable primarily in medical terms (Magraw, 1966:181).

Nursing: occupation or profession?

Is nursing a genuine profession, or an assisting occupation? (Strauss, 1967:102). Many nurses themselves do not know the answer to this question. Nursing has come to

be greatly concerned with finding a new, independent position in the division of labor in medicine (Friedson, 1970: 63). There has been a substantial amount of literature devoted to debating the familiar argument over whether nursing should be considered an occupation or a profession (Devereux and Weiner, 1962; Wilensky, 1964; Corwin, 1965; Davis, 1972:10). Sociologist William Goode, having established criteria for professions, excluded nurses from consideration as professionals, viewing nursing education as a lower-level of medical education (Goode, 1957:1960).

Using criteria established by Merton (1957), Fottler (1976) notes that nursing is a segregated occupation, as a large majority of workers are female, and there is an associated normative expectation that this is how it should be (Fottler, 1976:98). In contemporary publications, however, there is seen an increasing emphasis on association of nursing with the title "profession" (Rodin, 1978:32). Thus, the debate has no resolution, as yet. It seems nurses write and feel like professionals, as they strive to professionalize (e.g., Corwin, 1965:355), while sociologists tend to relegate the practice of nursing to an occupational status (e.g., Goode, 1960; Collins, 1977). Sociologists are averse to bestowing the encomium of profession upon nursing, since nurses lack the right to control their own work (Friedson, 1970:71; Davis, 1972:10).

Amitai Etzioni (1964) feels that nurses are "semi-professionals" who tend to adopt the full fledged profession

as their reference group and view themselves as full-fledged professionals who feel they should be given more discretion and be less controlled, particularly with regard to the young intern or the older supervisor (Etzioni, 1964:89). Friedson (1970:57) has also referred to nurses as "semi-professional."

Davis (1967) cites several paradoxes that characterize nursing. Two of these relate directly to the professional status of the nurse. Tacitly acknowledging that nursing indeed is a profession, Davis states (Davis, 1967:vii-viii):

> - It is a paradox that despite the considerable responsibility assumed by professional nurses for the treatment and care of patients, their organizational role in hospitals and elsewhere is so lacking in the autonomy and authority characteristically associated with professional status.
>
> - It is a paradox that, whereas other occupations in America accorded the prestigious title of profession have long since established the bachelor's degree as a minimum prerequisite for practice, professional nursing continues, despite historic and bitterly fought battles, to rely overwhelmingly on the services of persons who have not received a college education.

The first "paradox" is valid and may be related to an overreaching paradox as Davis notes, such as "modern woman's social role" (Davis, 1967:viii). The second "paradox" is invalid for at least two reasons. First, there is no minimum educational prerequisite for the status of professional athlete in America; all one needs to do is accept money for athletic performance to be

considered "professional." Second, to say that nurses are persons who have not received a college education discounts any college education under the artificial standard implied by Davis, of the bachelor's degree. Davis does, however, realize one could endlessly dwell on the conundrum of what "really is" or "really isn't" a profession (Davis, 1967:x).

An underlying assumption in the preceeding discussion has been that there indeed exists certain true professions. Taking the view that a "profession" should be considered as a folk concept, Becker (1962:32) regards professions:

> . . . simply as those occupations which have been fortunate enough in the politics of today's work world to gain and maintain possession of that honorific title . . . there is no such thing as the "true" profession . . . There are only those work groups which are commonly regarded as professions and those which are not.

Status of the role of nurse

The licensed R.N. ranks second in status to the physician in the United States health care system (Cockerham, 1978:147). The practice of nursing occurs within a system that is highly stratified by sex, with the nurses having internalized attitudes of subordination projected by both physicians and hospital administrators (Cockerham, 1978:157-158).

Goffman (1967) alludes to the status differential between nurses and physicians in his observational study of mental patients (Goffman, 1967:47-48). Examples given by Goffman included both verbal and nonverbal cues. Verbally,

doctors gave medical orders to nurses, but nurses did not give such orders to doctors (Goffman, 1967:53). And, doctors tended to call nurses by their first names, yet nurses responded with "polite" or "formal" address (Goffman, 1967: 64). Nonverbally violating the nurses' territorial rights, doctors had the right to walk into the nurses' station and lounge on the dispensing counter (Goffman, 1967:79). Perhaps even more significantly, doctors engaged in asymmetrical touch relations with nurses, with a tacitly acknowledged mutual understanding that it would be presumptuous to reciprocate a doctor's touch (Goffman, 1967:74).

Other aspects of the nurse role

Johnson and Martin (1965:31) contend that in the doctor-nurse-patient social system, there is a clear division of labor from which emerges the nurse in the primary role of expressive specialist or social-emotional expert, and the doctor as instrumental specialist or task leader. Johnson and Martin (1965) mention that nurses also perform an instrumental role function, and doctors an expressive role function, but that they do so secondarily. Skipper (1965) has argued that it is most useful to view the nurse's role as a combination of instrumental and expressive functions, withholding sociological emphasis on one or the other.

Habenstein and Christ (1963) characterized the role opinions of professionalizer, traditionalizer, and utilizer. The professionalizer is a self-descriptive role. The

traditionalizer is committed to a personal role, and the utilizer is in nursing, primarily as a contractual means of earning money. It has been said that the public health nurse's willingness to work with a client is contingent primarily upon liking him or her (Zuckerman, 1977:52). This would place the public health nurse in the role of utilizer. Perhaps the role options suggested by Habenstein and Christ (1963) have overlapping capabilities. In this case the public health nurse might have the qualities of the other roles to a limited extent.

Leonard Stein (1967) has described the interaction between physicians and nurses as "the doctor-nurse game." In this game, the nurse attempts to give the doctor recommendations without appearing to do so, and the doctor attempts to ask for recommendations, similarly, without appearing to do so. As a non-zero sum game, rewards and punishments may be shared by both players (Stein, 1967:700). A successful game creates a doctor-nurse alliance with social rewards, while an unsuccessful game has negative social consequences as penalties, such as being thought of as a "clod" (Stein, 1967:700).

Sociological perspective on nursing and shiftwork

A theoretical distinction derived by consideration of sociological contributions to medicine, has been made by Strauss (1957). He makes a distinction between sociology in medicine and sociology of medicine, that is of particular

relevance for this dissertation (Kendall and Reader, 1972: 3). Sociology in medicine means the application of sociological concepts, knowledge, and methods to clarify medical and social-psychological problems of interest to medical professionals. Herein sociological knowledge adds to medical knowledge to attempt to solve medical problems. Sociology of medicine, on the other hand, asks questions about medical workers, their institutions and organizations, and their relations with others in pursuit of essentially sociological inquiry. The present study is primarily concerned with questions about nurses and how they are affected by pervasive institutionalized shiftwork, within a multidisciplinary theoretical framework. Admittedly, this has necessitated examination of certain social-psychological aspects, but only insofar as they relate to the qualitative differences of shiftwork experiences. No attempt is made at detailed medical assessment, nor a study restricted to sociology in medicine.

Eckland (1972) notes the emergence of a new multidisciplinary field that takes as its central problem the coactions of social and biological variables, which is called "social biology" (Eckland, 1972:109). It is at this point one wonders whether the distinctions between academic disciplines are real or illusory. Analogous to the question as to the nature of time itself, the correct answer seems to favor the latter view of distinctions.

This may be difficult for most scientists to accept, particularly those with vested interests in maintaining academic disciplinary distinctions.

As a function of their role, nurses bear the full, immediate, and concentrated impact of stresses arising from patient care (Brown, 1967:196).

> Nurses are confronted with the reality of suffering, incurable disease, and death; they must carry out tasks generally regarded as distasteful and frightening; the work situation arouses in them strong and mixed feelings, which may include libidinal and erotic impulses, pity and compassion, guilt and anxiety, hatred and resentment of patients who arouse these feelings, and even envy of the care given the sick person.

In addition to these stresses, nurses often face long hours as do many factory workers. Under the bureaucratically reformed nursing service and English hospital system created by Florence Nightingale, nurses typically lived in a hospital dormitory and were expected to give their total attention to nursing (Glaser, 1967:5-6). The dedication today is theoretically the same. The long hours exist only when a nurse works two consecutive shifts, or changes shift schedules over a relatively short period of time, as is often the case with rotating shiftworking nurses. In this regard, nursing in hospitals could be said to resemble shiftwork in factories.

Shiftwork and leisure

There are severe temporal consequences for the shiftworker in terms of the available ways to use leisure (Berry, 1965). Vroom (1964) suggests that the dislike some people have for shiftwork depends on how much their leisure and family activities are disrupted, and on how much these activities are valued. In comparison to shiftworkers who must work specific hours, self-employed people may work extremely long hours, longer than most shiftworkers, and are highly satisfied with their work (Argyle, 1974:231). It seems, therefore, time worked per se is not the disruption causing factor. Rather, change of time, incompatible times for a given individual's constitutional makeup, and times that conflict with other valued activities, are the dissatisfying qualities that shiftwork imposes upon people.

Studies of the relationship of life changes in roles and routine activities, to psychological distress as measured by Langner (1962), such as would be caused by shiftwork, have raised unresolved questions of casual direction (Wildman and Johnson, 1977:179). One possibility is that a threshold exists, above which negative consequences begin to occur. In this case, causal direction is not a factor for consideration. Another approach suggests that both very large and very small amounts of life change have adverse affects on the individual. It is with this approach that the question of causal direction arises. From the available literature specifically relating to shiftwork, it

seems more plausible that the second approach is applicable. With regard to the lifestyle of the nurse, the rotating shift would seem to be the least monotonous, and the night shift the most monotonous. Yet, these two extremes are postulated to correlate more highly than day or afternoon shiftwork, with indicies of holistic disturbance. It has been seen that undesirability, as a characteristic of life events, relates closely to stressfulness (Mueller, Edwards, and Yarvis, 1977:307). Taking a logical step in reasoning, the more holistic disruptions of an undesirable nature a person experiences, whether in the direction of greater or lesser activity, the greater the likelihood there will be an increase in life change. Admittedly this point has yet to receive empirical verification, however, it does seem plausible in light of the present theoretical framework.

Shiftwork studies

References to shiftwork appeared in the records of European guilds as far back as the thirteenth century, as complaints by craftsmen that nightwork reduced their efficiency and the quality of their output (Hedges and Sekscenski, 1979:14). Guilds were able to prohibit nightwork for the most part, until the Industrial Revolution. As factories emerged, and as certain manufacturing processes developed in the late nineteenth and early twentieth centuries, shiftwork became widespread. Currently, in the United States, about ten million nonfarm wage and salary

workers who usually work full time, work other than daytime shifts. This means about one employee in six works on a shiftwork schedule. This ratio has remained stable in the United States labor force since 1973 (Hedges and Sekscenski, 1979:15). Worldwide, it is estimated that the number of shiftworkers has doubled in the last twenty years (Zabrusky, 1978:2).

Formerly, a six-day workweek and a workday from sun up to sun down had been basic societal patterns, enduring for most of recorded history (Mann, 1965:111). The social and economic forces within the Industrial Revolution that provided the initial impetus toward changes in hours of work, continue to demand examination and research as to the optimum allocation of time to work (Mann, 1965:112; Rutenfranz and Knauth, 1976:333). However, the allocation of time to work that is found to be optimum for the society, or for bureaucratic managerial ends, may not be optimum for the workers. On the contrary, it is likely to be less than optimum for the workers. There are certain relative costs and benefits applicable to different work hour patterns. Such schedules affect the well-being and effectiveness of society and its individual members. When these costs and benefits are more thoroughly understood, the study of shiftwork variation and effects will have provided insights at two levels of analysis. One level is that of the organization, and holds implications for managerial decision-making concerning hours of work. The individual worker's

quality of life can be significantly improved through the intelligent use of psychological and sociotechnical intervention to realize innovative solutions to shiftwork problems (Prien, et. al., 1979:98). A second level is that of society. The study of shiftwork will provide insights at this level with regard to societal functioning (Mann, 1965:112).

As has been noted, there are social, technological, and economic factors that contribute to the situation of management deciding to schedule work according to shifts in order to optimize time and facility usage (Rutenfranz and Knauth, 1976:333). Various social services operate around the clock, e.g., hospitals, restaurants, police, fire and rescue, airlines, railways, etc. Some technological manufacturing processes of long duration necessitate shiftwork, e.g., iron and steel production. And, from an economic standpoint, some types of expensive machinery, such as computer hardware, can be used profitably only if in constant operation.

People have had to adjust to work schedules in such services and industries, to the extent that their bodies and social commitments would allow. It has been noted by sleep and biological rhythm researchers that people have fairly distinct physiological clocks (Kowinski, 1975:46; Telekey, 1975:46). In addition, a range of peaks at different times around the clock, have been found for numerous bodily functions in humans. As a result, it has been

acknowledged that the ideal time of day for peak work efficiency varies from person to person (Kleitman, 1963). Most persons tend to work better during the day, yet some work best at night (Breithaupt, et. al., 1978:767). A questionnaire has been developed by Horne and Ostberg (1976), that can be used to make this distinction by self-assessment. Workers have typically been labeled as 'day' or 'night' people, according to their peak work efficiency times. Other sources in the literature have mentioned a similar dichotomy, identifying day people as "larks," and night people as "owls" (Kowinski, 1975:46; "Rx for Shift Workers," 1979:36). No researcher has found that shiftwork, which involves changing from one shift to another, is good for the worker, although some individual workers may think they thrive on it for the short term (Zalusky, 1978:5).

There are a number of viable reasons for some people to select night work in preference to day work. These reasons apply to physiological, psychological, and social areas of people's lives, and to the interactive effects of such areas. Physiologically, some "night" people logically prefer night work because it is compatible with their general biological rhythms (Kowinski, 1975). They have historically performed both physically and mentally better at night. Socially, night work has permitted an adult to be home more hours of the day for child care purposes, thereby eliminating the necessity and expense of a baby-sitter (Sheridan, 1973:34; Houston, 1973). And, in a study

of 270 men and women in the hospitality industry, many found nightwork socially "convenient" (Gilmer, 1961:273). Nightwork has been used for moonlighting by those desiring to supplement their income (Houston, 1973:39). Such work is often better paid and therefore preferred (Wojtczak-Jaroszowa, 1977:43). In addition, it has provided the opportunity for workers to engage in daytime activities more frequently, such as outdoor sports or shopping. In many cases, nightwork is not deliberately selected, but is the only work available in a no choice situation.

There are many unresolved questions that have arisen from reviewing the available literature, concerning disruptions caused by shiftwork. Little research has been done using female subjects, in particular. This is a particularly noteworthy factor, in light of the evidence that a large number of women engage in shiftwork. In fact, the proportion of women on the late shiftwork schedules, equals or exceeds that of men in some industries (Hedges and Sekscenski, 1979:15).

Previous shiftwork research (male-oriented)

Previous shiftwork research has been monopolized by a disproportionately large number of male-oriented studies. Locations of such male shiftworkers studied have ranged from factories (Mott, et. al., 1965; Koller, et. al., 1978), to taxi companies (Sakai and Takahashi, 1975), to air

traffic control towers (Saldivar, et. al., 1977) to railroads (Cottrell, 1939; Akerstedt and Theorell, 1976; Akerstedt, 1977).

The existing shiftwork research has been either social-psychologically oriented or medically oriented (Agervold, 1976:185). Within the medically oriented research, some studies are prevailingly biological-psychologically oriented, while others are clinically medically oriented (Agervold, 1976:185). The present study attempts to present a multidisciplinary picture of shiftwork disruptions by consideration of both orientations. In addition to the social-psychological orientation, there is a biological-psychological orientation. And, encompassing each of these orientations, analysis of the cultural context of the research is provided.

The Mott, et. al., (1965) study

One of the most, if not the most comprehensive male-oriented studies of the social psychological effects of shiftwork was conducted by Mott, et. al., (1965). The research team used numerous indices to examine such factors as family role, friendship patterns, organizational participation, anxiety, self-esteem, conflict-pressure, and physical health. For controls, this study used age, education, number of children at home, and worker's desire to change shifts (Mott, et. al., 1965:141). Although this study tended to emphasize social psychological variables,

it did provide the beginning of a methodological framework for a multidisciplinary analysis of shiftwork disruptions.

In the Mott, et. al., (1965) study, shiftwork was seen to increase the experienced difficulty of the individual with his major life roles. Men working the afternoon shift were more likely to report difficulty with their role as father and in the performance of miscellaneous household functions. Men working the night shift were more likely to report difficulty with their role as husband, including the sexual relationship and the providing of adequate protection to their wives and families. Men working rotating shift patterns described all of the above difficulties, and also reported that the rotating shift pattern interfered with the formation of friendships and with their opportunities to see friends (Kahn and French, 1970:260).

Mott and his colleagues found reduced integration of the shiftworker in a number of social relationships. They reported less functional integration in marriage, in terms of the adequacy of coordination of activities, problem solving in family affairs, and sharing of responsibilities. The amount of strain and tension in marriage was reported to be greater among shiftworkers than day workers. Findings about the integration of the individual in the community showed a similar pattern. The shiftworker was less likely to be a member of community organizations, less likely to be an active participant in the organizations to which he

did belong, and also less likely to be a leader in such organizations (Kahn and French, 1970:260).

Male shiftworkers, especially those who reported difficulty with the shiftwork pattern, were commonly bothered by problems of the time-oriented bodily functions such as sleep, appetite, and elimination (Kahn and French, 1970:261). They were also more likely to report colds, headaches, infectious diseases, ulcers, and rheumatoid arthritis. Of all workers surveyed, the rotating shiftworkers were found to be the most bothered by disruption of time-oriented bodily functions (Mott, et. al., 1965:234-282).

The psychological effects of shiftwork appeared to be strongly mediated by the extent to which the shiftworker felt that the shiftwork pattern interfered with other life activities (Kahn and French, 1970:261). Where such felt interference was high, the shiftworker was also likely to experience low self-esteem and high anxiety.

All the findings on the reported effects of shiftwork upon males, were mediated by additional factors of personality, family relations, and background, although not always in obvious fashion. For example, neuroticism appeared to mediate inversely the relationship between shiftwork and experienced difficulty. People who score high on the neuroticism measure reported themselves to be less bothered by shiftwork than people who scored low (Kahn and French, 1970:261).

The attitudes and behaviors of the wives of shiftworkers were seen to be particularly important as mediating factors. For example, those shiftworkers whose wives made substantial adjustments in scheduling meals, sleep, quiet time, and social life, were much less affected themselves in the adverse ways previously described. It seems that the fact of shiftwork presented the wife with a great deal of additional power over the husband, the stereotyped male breadwinner. She was able, for example, to exclude him from a great deal of the family and marital relationships if she wanted to, without exposing herself to general social sanction or criticism. There is also the suggestion, that in some of the interview material, wives and husbands were able to use the fact of shiftwork in a collusive fashion to "hide" from each other in time, in a way that is analogous to people hiding from each other in space (Kahn and French, 1970:261). Melbin (1978, 1979) has viewed nightwork from a theoretical standpoint based upon this view of the use of time.

In critiquing the Mott, et. al., (1965) study, the following point deserves consideration. That is, the study did not provide an integrated picture of the effects of shiftwork, due to its lack of an explicit holistic theoretical framework, and also to its omission of female shiftworkers as subjects.

Previous shiftwork research on nurses

Few studies of shiftwork have been carried out on female shiftworkers (Folkard, Monk, and Lobban, 1978:786). As an example of the lack of consideration given to females in this regard, one study of the sociological disruptions of shiftwork by Banks (1956), surveyed the wives of male shiftworkers, and totally neglected to study female shiftworkers. This was a problem noted with the methodology of the Mott, et. al., (1965) study, as well.

A limited amount of previous shiftwork research on nurses, was found to give only partial coverage to the issues raised by the theoretical framework guiding the present research. Most studies of nurses used only females as subjects, as the nursing profession contains few males. Each study tended to focus on specific aspects of shiftwork, leaving a holistic understanding of the effects to be obtained mainly by laborious cognitive synthesis of the results of each. A multidisciplinary understanding of shiftwork has been recommended, to surpass monocausal conceptualizations, but prior to the present study has been unobtained (Agervold, 1976). As specific examples of single aspect studies of nurses on shiftwork, Felton (1973), Hildebrandt and Stratmann (1979), Folkard, et. al., (1978, 1979), and Costa, et. al. (1978), focused on physiological correlates of shiftwork. The study by Costa, et. al. (1978), used only male nurse subjects (n=18). A study by

Strilaeff (1976), emphasized turnover rate differences among female nurses across shifts.

In studies of the sleep patterns of nurses, the possibility was noted that general malaise and fatigued awakening found in shiftworkers could have been related to insufficient repayment of sleep deficits which accumulated in the daytime sleep of night shift workers (Bryden and Holdstock, 1973:37); Felton, 1975:19). In another purely physiological study of 39 female nurses who rotated shifts, it was found that their biological clocks were disrupted in ways similar to those of air travelers who experience the phenomenon known as "jet lag" (Felton, 1975:19). Another study revealed the combined effects of shiftwork with those of actual jet lag, but did not specify the effects of shiftwork alone. In this particular study, 444 United States Air Force active duty female flight nurses responded to a questionnaire survey pertaining to flying physiological and psychological changes associated with flying duty (Farrel and Allen, 1973). The findings included such effects as irregular menstrual cycles, disrupted sleep patterns, disrupted bowel habits, increased bruising tendencies and decreased weight (Farrel and Allen, 1973: 31-36). A problem in interpretation of these particular results is whether to attribute them to shiftwork, to jet lag, or to the interactive effects of both.

Other studies have corroborated the finding that nightwork alone can cause unhealthy weight loss in females

(Telekey, 1943:746). Both sleep loss and circadian sleep-wake disruptions were found to have psychosomatically contributed to increased negative psychological moods among nurses in another study by Taub and Berger (1974:164).

Two studies of nurses were located that have direct implications in their findings, for the present research. A study by Pilon and Zang (unpublished) looked at both physiological and psychological variables among 17 female nurse subjects, in order to provide the basis for a master's thesis. The other study was a three-year comparative study of nurses and food processers, directed by a psychologist (Tasto and Colligan, 1978; "Rx for Shift Workers," 1979; Slade, 1979).

The Pilon and Zang (unpublished) study

In a study written to fulfill some of the requirements for an M.S. degree in Psychiatric/Medical-Surgical nursing, at the University of Michigan in 1976, Pilon and Zang looked at some selected physiological and psychological effects of shift rotation among 17 volunteer female registered nurse subjects, aged 21 to 29 years, from a large midwestern university hospital. The effects that were studied involved: (1) performance of a mathematical task; (2) quantity and subjective quality of sleep received: (3) response to the Speilberger (1970) Self-Evaluation Questionnaire/State Trait Anxiety Inventory or STAI; and (4) urinary sodium and potassium excretion rhythms. Each subject

served as her own control, as data were collected for two three day periods. The study found that subjects work efficiency (as determined by a mathematical task), and sodium excretion rhythms were initially disturbed by shift rotation, but began a trend towards adaptation by the second night of shiftwork. Potassium excretion patterns partially inverted immediately after rotation to night shift. Sleep patterns were similarly disturbed. Stress levels were found to be highest when subjects worked days. A study by Segal (1965:385) revealed a corroborative finding for this effect, as night work minimized interward communication thus minimizing differences and overall stress levels. These levels increased when the subjects rotated to nights from days (Pilon and Zang, unpubl.:28). The researchers concluded that it would be desirable to study the stress variables in the future, using a larger sample. Based on the theoretical framework for stress research provided by McGrath (1970), it is questionable whether the technique of administration of a mathematical task to measure stress levels is of much value. In addition, two salient limitations are lack of male subjects and a very small sample size. Rather than analyze this study for scientific rigor, it is considered fruitful to simply note the implications of their research for the present study. First of all, it was demonstrated that research on shiftwork among nurses is a necessary and desirable area of scientific pursuit. Secondly, preliminary verification of

some of the results that appeared in previous studies of male shiftworkers, was achieved by this study of female nurses. And third, attention was paid to selected factors that are, in theory, holistically related to the effects of shiftwork, although this relationship was not explicated by the authors.

The Tasto and Colligan (1978) study of nurses and food processors

According to a large scale three-year project conducted by the Stanford Research Institute in Menlo Park, California, under the direction of clinical psychologist Donald Tasto, for the National Institute for Occupational Safety and Health in Cincinnati, Ohio, rotating shiftworkers were found to be prone to more severe health and safety disorders than their fixed shift colleagues (Tasto and Colligan, 1978). Looking first at health and safety records of 2,400 shiftworkers (half nurses and half food processors) it was determined that people who rotate shifts visited medical clinics more often, gave more serious reasons for taking sick days, and had more accidents than fixed shift workers. Second, based upon a 2,000 questionnaire response from 3,500 questionnaires mailed to shift employees in both groups, it was learned that rotators fared worst, with night workers coming in second, on an array of items including fatigue, nervousness, digestion problems, colds and chest pains, alcohol consumption, difficulty with sleep, and happiness of marriage ("Rx for Shift Workers," 1979:36).

Tasto related his findings to individual differences in adaptability to shiftwork - the phenomenon of day people vs. night people - and in changing from one shift to another too quickly. His study concluded that working unconventional hours presents a distinct health hazard for some workers, particularly those who work on rotating shifts (Slade, 1979:107).

Shiftwork, role conflict, and nursing

One type of role conflict that has been extensively studied concerns conflict between the expectations of a single role, i.e., nurse. The nurse is in a state of role conflict because the position itself carries conflicting demands. The nurse must balance individual physicians' orders against the independent demands of the patients while managing an aggregate of cases in an administratively acceptable manner (Friedson, 1970:126). In managing cases, nurses are expected to administer "tender loving care" around the clock, as an integral part of their role (Devereaux, 1950:63). Some nurses are shocked at the experience of role conflict and leave the field of nursing because of it (Kramer, 1974).

Another source of role conflict involves the life roles of the individual. Shiftwork is likely to affect the opportunity and ability of the individual to perform other major life roles; for example, those of husband and father or wife and mother, citizen, and friend (Kahn and

French, 1970:260). It will be recalled that the Mott, et. al. (1965) study of male factory-workers, showed that shiftwork increased the experienced difficulty of the individual with his major life roles. As hospitals resemble factories in many ways, there is every reason to expect that nurses are not exempt from this effect found among factory workers. In fact, nurses are likely to not only face this type of inter-role conflict, but the first type of intra-role conflict is likely to tend to compound their difficulties.

March and Simon (1958) made the following prediction which is relevant to shiftwork and role conflict. The greater the congruence of work time patterns with those of other roles, the greater the compatibility of the job and other roles (March and Simon, 1958:97). Based upon earlier studies of labor turnover, March and Simon have stated that the perceived desirability of movement to another job will be greater among night shiftworkers than among day shiftworkers (March and Simon, 1958:97).

Previous research relevant to the theoretical rationale

In this section, each of the statements in the theoretical rationale is considered in light of available evidence in the literature. Support for each of the assumptions is provided, and specifications of hypotheses to be tested by the present study are presented.

(1) The sociocultural trend toward time optimization stimulates shiftwork scheduling of workers.

A sociocultural trend toward time optimization on the part of administrators was seen to have had a historical development, according to a multidisciplinary analysis of the use of time. Administrators have found that a good way to make optimum use of labor and facilities, has been to schedule work around the clock. In this way, facilities and equipment are seldom, if ever, idle (Gilmer, 1961:422).

(2) Shiftwork stimulates biological disruptions.

There is much scientific evidence to support this contention. The human body harbors a number of "clocks" that regulate physiological functions (McConnell, 1978:23). Thus far, competing hypotheses have been proposed to explain or identify the site(s) of these clocks. One hypothesis maintains, for example, that these clocks are located in cells throughout the body (Richter, 1960, 1965). Some other locations suggested by the hypotheses of other researchers, have been in cells found in the joints, the endocrine glands, the brain (Richter, 1960:1526; 1965:4), and in the central nervous system (O'Dell, 1975:46; Shepherd, 1978:98).

Periodicity in different functions emerges at varying times during the first year of life of the human infant (Mills, 1966:133). The human then undergoes a process of gradual entrainment or adjustment and regulation to a twenty-four hour day (Mills, 1966:1964). The circadian rhythm of waking and sleeping is among the various periodic

functions found (Aschoff, 1965). Additional periodic functions that have been identified, include body temperature (Benedict, 1904), urine flow, urine sodium and potassium excretion (Pilon and Zang, unpubl.), grip strength, secretion of human growth hormone (Kahn, 1974), pulse, respiration, blood sugar, hemoglobin level, blood pressure, and amino acid level (Zabrusky, 1978:5). The term "circadian" refers to an approximate twenty-four hour rhythmic pattern of waking and sleeping (Dement, 1974:148). This pattern is believed to be regulated by the most primitive of our biological clocks (Richter, 1960:1526). The circadian cycle suffers a most serious disturbance, called "desynchrony," when a worker changes from one work shift to another (Bunning, 1973:23). A similar disruption of body clocks also occurs when humans cross a number of time zones, as in transcontinental airplane flight, or when they become subjects in psychological time isolation experiments (Conroy and Mills, 1970:121). Numerous attributes believed to be dependent upon circadian rhythms include brain wave patterns, psychomotor performance, instrument reading ability, mental performance efficiency, and other industrial performance activities (Mills, 1966:135; Colquhoun, et. al., 1968a, 1968b).

From the evidence available, it seems that people do not perform their best in work situations when there is disruption of their physiological rhythms due to shiftwork schedules (Blakelock, 1967; Rutenfranz, et. al., 1974:224,

1976; and Bryden and Holdstock, 1973:36). In addition, it takes up to a month or more for some persons to regain satisfactory sleep patterning following disruption (Taylor, 1967:93; Wyatt and Mariott, 1953:164). Even with satisfactory sleep patterning, the total amount of sleep time shiftworkers receive is less than the norm for non-shiftworkers. There are other factors, besides sleep patterning, that remain in a state of disruption. For some proportion of shiftworkers, completely satisfactory physiological adjustment is never obtained. A Swedish experiment concluded that approximately 28 percent of the work force cannot adapt to shiftwork (Zalusky, 1978:5). A minority of shiftworkers are, therefore, continually bothered if on fixed shift, or intermittently bothered if on rotating shift schedules, by physiological disruptions that defy reconciliation.

Although the majority of shiftworkers seem able to adjust to a fixed afternoon or night shift physiologically, they are still influenced by concomitant psychological and sociological disruptions. And, those workers who work on rotating shift schedules, are in constant flux in this regard.

(3) Shiftwork stimulates psychological disruptions.

The psyche of the individual is adversely affected by shiftwork. For example, people have a range of possible emotions and feelings about their work, as well as different motivational levels. These qualities directly contribute to

job satisfaction. And, job satisfaction has been identified as a major predictor of life satisfaction and longevity (Tanner, 1976). If people are generally satisfied with their work, they are seldom likely to feel bored, desire to change to a different work schedule, or have lack of motivation to "get going." It is hypothesized that since most people are "day" people, the majority of satisfied workers will be found on day, or first shift. Satisfaction will be considered as absence of psychological strain, based upon the index provided by Gillis (1977). Workers whose schedules deviate from the first shift it is further hypothesized, will experience less satisfaction on the average, in direct relationship to the amount of deviation.

(4) Shiftwork stimulates sociological disruptions.

Social relationships of the individual are affected by shiftwork (Zalusky, 1978:5). In considering social factors as causing human psychological strain or stress, the influence of the individual's role, in addition to biological and psychological factors, is of concern (Zola, 1972: 491). A person is ultimately responsible for the social situation in which they participate, and is affected by this aspect of individual responsibility (Zola, 1972; Girdano and Everly, 1979).

It is hypothesized that as a person becomes less of a "day" person, because of the restructuring of lifestyle caused by shiftwork, (s)he will experience greater sociological disruptions, because the person will be relocated

further from the mainstream of social activities and relationships of societal members.

One aspect of this is disruption of social integration patterns. For example, when a married couple work during incompatible hours, the ramifications are largely determined by social factors such as attitudes of reference groups. If the group's attitudes are negative, feelings of alientation from the reference group may emerge. Divergent findings have been reported with regard to social integration patterns of shiftworkers. One study found no clear-cut differences between shift and day workers in social integration or leisure activities (Blakelock, 1967: 2335A). In other studies, shiftwork was found to have had disruptive effects on social integration patterns. An extensive factory-oriented study by Mott, et. al., (1965), described earlier, contained several replications of this disruptive effect. Similar findings were reported by Tasto and Colligan (1978).

Another aspect is disruption of family and personal relationships (Schneider, 1957:455). The way this would occur would depend primarily on each individual actor's situation, yet some generalizations can be made. For the present research, it is hypothesized that more reported disruptions will arise the further one proceeds away from day shift, as most families and institutions in society are not set up to meet the demands of a person whose participation is limited to "off" or irregular hours (Rutenfranz,

et. al., 1977). In a study by Wyatt and Mariott (1953), a higher divorce rate among shiftworkers appeared. And in a study by Banks (1956), interviews with the wives of shiftworkers showed that they were displeased with the negative impact of rotating shift schedules upon leisure time and family activities. Workers on shiftwork also report that they feel their relationship with their children suffers (Zalusky, 1978:6). If a person is thus affected by his/her shift schedule, (s)he is hypothesized to be more likely to feel alone in the world, be missing out on social interactions with friends, and in general feel that the world is an unfriendly place in which it is difficult to find new friends. There are exceptions, as successful adaptation to alternative social lifestyle patterns may occur in some cases.

Divergent findings have been reported with regard to optimum scheduling of shiftwork to meet social demands. Colquhoun (1970) has stated that the optimum theoretical solution for reducing shiftwork associated social adjustment problems has been to use a "fixed" night shift for some workers (Colquhoun, 1970:560). Surprisingly, other studies have suggested frequent shift rotation as the solution to adjustment problems (Maurice, 1975:45; Zalusky, 1978:6). In practice, fixed night shiftwork has tended to maximize social disruptions so most future shiftwork is likely to be of the rapidly rotating type (Colquhoun, 1970: 560). Whether this is desirable, has yet to be determined.

The present study is expected to contribute evidence concerning this question. It is hypothesized that greater social adjustment problems will appear among rotating shiftworkers, than among other shiftworkers.

Fixed night shift has tended to be difficult for workers to adjust to socially, because society is structured in such a way as to progressively limit opportunities for conventional social activities, such as adult education, as the early morning hours approach (Pantzar, 1977). Several contextual factors might intervene in this instance. If, for example, a worker has a high percentage of friends on night shift, (s)he might view such hours as sociologically favorable. Or, some single persons might find social opportunities for meeting other singles to be enhanced by nightwork. If the community in which the shiftworker resides is small, or if the shiftworker has children to consider, nightwork may present several social problems that could be avoided by daywork. The following matrix has been constructed to hypothetically illustrate the manner in which sociological factors identified would tend to be affected among workers, on each of the four shiftwork schedules studied:

	DAY	AFTERNOON	NIGHT	ROTATING
Modal cultural expectations	Normal	Unusual, but an acceptable alternative	Unusual and weird with trend toward greater acceptance	Acceptable but tiring
Impact on group membership status	Not affected	Affected if meetings are missed	Alternative affiliations likely	Affected if meetings are missed
Community participation	Normal	Appears to be normal	Absent from mainstream	Erratic
Social opportunities	Normal	Normal	Alternative social patterns likely	Eclectic

(5) Biological disruptions stimulate psychological disruptions and vice versa.

Biological disruptions can stimulate psychological disruptions in several ways. When the chemical balance of the body is disrupted because of an improper diet, the result may be emergence of such psychological symptoms as depression and nervousness (Davis, 1970).

Disruptions of biological "clocks" contribute to periodic pain and psychological discord in a wide range of pathological conditions (Richter, 1960). A subtle form of circadian pathology results from desynchronization when the convenient association between low urine flow and the usual time of sleep is altered (Mills, 1966:159). The abnormal time routine is not only inconvenient and uncomfortable, but causes loss of sleep and disruption of dreams, both of

which are known to adversely affect sound psychological health. Increased rhythm dissociation as shiftworkers get older, may also lead to mental disturbance in a cumulative manner of effects (Cahn, et. al., 1968:610).

Circadian rhythm disruptions as occur in shiftwork, are likely to contribute to accidents. A greater number of accidents occur when biological efficiency is low, and inversely, the number of accidents decreases as biological efficiency increases (Noguiera, 1971:30). Error proneness is probably highest at night (Sollberger, 1965:286). In nursing, it is probable that medication errors, and errors in problem solving for example, happen when physical and psychological functions of nurses are at low resting levels (Felton, 1975:19). These low levels, which normally occur during sleep, are artificially induced during work hours among nurses who have not completed their biological adjustment to shift changes. Pilon and Zang (unpubl.) obtained experimental verification for increased problem solving errors among rotating shiftwork nurses.

Psychological disruptions can stimulate biological disruptions. Evidence for this conjecture is found in the theory of psychosomatics. Many human illnesses and disorders begin with stressful life situations which channel the stress through bodily processes (Cannon, 1939; Mangus, 1955:163-4; Selye, 1956; Girdano and Everly, 1979). If a person is psychologically disrupted and experiences depression, (s)he is likely to have such biological symptoms as

trouble with sleeping, loss of appetite, weight loss, headaches, stomach aches and intestinal difficulties, etc. (Lewinsohn, et. al., 1978:13). The aforementioned are some of the indicators of the psychological strain scale as used in the present study. The entire index consists of questions 23 through 37 which appear in Appendix 1. Negative emotions are associated with unnecessary disturbances of physiological mechanisms, proportional to the duration and intensity of the negative emotional state (Ellerbroeck, 1978:95; Blanchard and Epstein, 1978).

(6) Psychological disruptions stimulate sociological disruptions and vice versa.

If a person is mentally disrupted, it can have a negative effect on that person's social situation. For example, some psychologically depressed persons report reduced interest in sexual activity (Lewinsohn, et. al., 1978:13). Depression can also impede friendships and family harmony.

Research has been done on the presumed causes of loneliness and related mental states. The underlying cause, in much of the literature, has been labeled as alienation (Siassi, et. al., 1974:265). The social system has been held accountable for this psychological phenomenon (Robinson and Shaver, 1973:245). It was noted earlier, that workers will feel somewhat responsible for their life situation, yet they face an uncaring society, according to their perceptions. It is therefore hypothesized, that the further from the mainstream of daytime activities the

shiftworker lives, the greater will be the incidence of feelings of loneliness and isolation, and in general, of alienation from others and from work, as measured by the Dean (1961) index of social isolation. In order to measure alienation, Dean (1961) used scales comprising three separate components of powerlessness, normlessness, and social isolation. Dean found each subscale to be reliable after testing (Robinson and Shaver, 1973). For the present study, one subscale was selected from Dean's overall alienation scale, in order to facilitate administration in the field. The entire index consists of questions 38 through 46 which appear in Appendix 1. The most powerful predictive index was selected. It had a reliability coefficient of .84, and correlated with the total alienation scale with a coefficient of .75 (Robinson and Shaver, 1973: 275).

Sociological disruptions may stimulate psychological repurcussions. Shiftwork enhances the likelihood that social patterns of eating will be disrupted. When this occurs, people often do not receive adequate nutrition, and are consequently subject to suffer fatigue, depression, etc. (Davis, 1970). And when, for example, a person does not meet social commitments due to scheduling problems created by shiftwork, the reaction is often negative psychological assessment of such a person, by others and/or the person himself/herself. Liem and Liem (1978) have reviewed

research that links social structures and processes to psychological dysfunction.

(7) Biological disruptions stimulate sociological disruptions and vice versa.

A reliable positive correlation between feelings of fatigue (often found in shiftworkers with disturbed sleep patterns), and decreased working efficiency, has been found by numerous investigators (Cason, 1931:126; Bryden and Holdstock, 1973; Felton, 1975). A person who works on other than day shift will probably want to sleep at times other than those during which his/her family sleeps. This situation could create social incompatibility or disruption of relations. In their study of female nurses, Bryden and Holdstock (1973) indicated that a fruitful extension of their research would be to consider the effects of napping. If night duty nurses were "napping" during the day, rather than sleeping, it may indicate they attempted to reserve some day time for socially integrated behavior. It also may indicate that they had difficulty in sleeping, and therefore resorted to napping.

Most chronobiologists have maintained that the social routine of man has been the primary synchronizer of his biological clocks (Burns, 1975:168). In this way, sociological disruptions are likely to affect the synchronization of biological processes.

(8) Biological disruptions contribute to psychological strain and social isolation.

Because of the interrelationship between body and mind, it is proposed that part of the hypothetical construct known as psychological strain, is derived from biological disturbances of a physiological nature such as imbalances caused by sleep disturbances. Other indicators of psychological strain, of an essentially biological nature, include fatigue, headaches, and feeling nervous. Considering the relationship of biological disruptions to social isolation, a study by Rockwell, et. al., (1978) found the relationship relevant to the cause of suicide.

(9) Psychological disruptions contribute to psychological strain and social isolation.

It is axiomatically proposed that some elements of psychological strain are psychologically induced. Indicators of psychological strain which are of an essentially psychological nature, include emotions, feelings, and motivation. Psychological forms of occupational stress have been increasingly implicated in the etiology of psychosomatic illness and poor mental health (House, et. al., 1979).

It is also proposed that psychological disruptions will contribute to social isolation, as the shiftworker will find it difficult to maintain normal social relationships with non-shiftworking friends, acquaintances, and family members. And, the rotating shiftworker will have difficulty in maintaining any social relationships.

(10) Sociological disruptions contribute to psychological strain and social isolation.

Since (wo)man is a social animal, disruptions of social patterns are likely to contribute to psychological strain and to social isolation, in particular, when relationships become difficult if not impossible to maintain (Aronson, 1976). Even disruptions alone would tend to remove a person from the "normal" pace of life. Therefore, social isolation is proposed as an indicator of such an eventuality. Cockerham (1978) notes that sociologists generally prefer describing illness as a social, rather than as a biological event, because the condition of suffering denoted by illness is a subjective experience that usually results in a modification of the individual's behavior (Cockerham, 1978: 88). Thus, an illness can be regarded as a social entity definable in terms of social functioning, e.g., the "sick role" (Parsons, 1951; Mechanic and Volkart, 1961; King, 1972:139-142).

(11) Shiftwork induced disruptions contribute to psychological strain and social isolation, in direct relation to the amount of deviation from normal daytime scheduled work demanded by the shiftwork schedule.

This is a major aspect of the proposed relationships between shiftwork and psychological strain, and between shiftwork and social isolation, to be explored by the present research. Evidence that this pattern occurs in male factory-worker subjects is available (Mott, et. al., (1965). Whether this pattern is also present among female

nurses is the focus of the topic for investigation. Some studies have implicitly suggested that this pattern will be found (Pilon and Zang, unpubl.; Tasto and Colligan, 1978). Replacement of a scientific search that uses separate levels of analysis, with a holistic system of pursuit, is considered desirable (Geertz, 1973:44). Such an approach is necessitated by consideration of shiftwork (Zalusky, 1978:3).

It is well within the purview of the social scientific analysis of work, to consider the impact of a person's job on his/her behavior in nonjob situations as well as on the job itself. A dominant, basic hypothesis is this line of endeavor, is that various aspects of the job affect the worker's attitudes, behavior, mental health, and entire lifestyle (Mott, 1965:76). For the purposes of clarification, consider the following hypothetical situation. A husband works during the traditional day schedule. His wife, who has been home during the evenings, begins an afternoon or night shift as a nurse. Their network of social relations is disrupted because of the wife's work, and both experience stress. A vicious cycle of impact is likely to result, in which the couple's health, interpersonal relations, relations with friends and other family members, and general psychological well-being, are adversely affected by the differences in work schedules. Taking a holistic, systems analysis frame of reference, there are

interrelated physiological, psychological, and sociological factors to be accounted for.

Previous research on the influences of shiftwork was found to be lacking in information about female shift-workers, such as the nurse in this example. Studies of females that were identified were lacking in theoretical perspective. Some studies were physiological in orientation. Others were studies of the combined effects of shiftwork and jet lag, or of combinations of nurses as subjects with other types of workers. Lack of the comprehensive theoretical orientation holism provides, was considered an important limitation of the previous research. Most of the literature on shiftwork had focused upon a male, factory-oriented population of subjects. It was not certain whether the results of these studies would apply to a predominately female population of nurses.

In order to place the present study within the context of existing shiftwork research, the following description is offered. The present study attempts to pinpoint the severity and incidence of psychological strain and social isolation, among nurses who engage in shiftwork, while taking control factors into account. Such information appears to be missing from the current body of available literature on the subject. In keeping with the multidisciplinary nature of the present study, biological-psychological factors, as well as social-psychological factors were considered. Instruments were selected from a review of the previous

literature, on the basis of their applicability to the problem for study, established scientific merit, and expediency for use in the field. It may be mentioned that a clinical-medical orientation was not included for several reasons. A good deal of information has already appeared in the literature from this perspective. Such an orientation falls outside the traditional boundaries of multidisciplinary social science research. And, although clinical-medical information might have supplemented the findings of the present study, it would have been impractical and prohibitively expensive to conduct such research on the large number of subjects in the study.

Summary

Previous research relevant to the theoretical rationale was reviewed. A theoretical framework for stress research was described, and related to the present study. The social organization of work and the cultural values which frame it, were considered in relation to nursing and shiftwork. A social science perspective on health and illness as a major social phenomenon, was discussed in relation to the present research. Arguments as to whether nursing should more appropriately be called an occupation, or a profession, were presented. Shiftwork research results from studies in several disciplines, found by a review of the available literature, were considered in relation to the theoretical perspective adopted for the present research.

Having reviewed previous research on the subject of interest, specific problems for research were formulated. Based upon the literature review and theoretical framework, it is hypothesized that the data will demonstrate the following:

(1) Increasing amounts of psychological strain will appear in measurements across shifts in the following sequence: day, afternoon, night, and rotating.

(2) Increasing amounts of social isolation will appear in measurements across shifts in the following sequence: day, afternoon, night, and rotating.

CHAPTER III

METHODOLOGY AND PROCEDURES

Type and design of study

A field-study approach was used in the present research. The questionnaire used (Appendix 1), was constructed for use as a guide in structuring interviews with nurse subjects. The interview and questionnaire are powerful instruments for social science research, as they provide information about individuals' past experiences and behavior that is virtually unobtainable by other means (Cannell and Kahn, 1966:331).

The effects of psychological strain and social isolation were computed for each shift. It was originally intended that the differences between male nurse subjects and female nurse subjects would be examined for all variables under study. Upon realization that the sum of all male nurses in the five institutions surveyed realized a meager seven subjects, the males were excluded from the final data analysis. It might also be mentioned that although supervisory nurses were interviewed, they too were later discarded as subjects in order to improve the homogeneity of the sample.

It would have been ideal, perhaps, to have studied a sample of workers under a variety of shiftwork conditions, giving each a chance to subjectively assess the differences of working each shift schedule (Wyatt and Mariott,

1953:164). For example, each nurse would have worked day, afternoon, night, and rotating shift schedules for one-year periods. No study has been found that has attempted such a longitudinal technique. This type of study would have been difficult to conduct, because it would have required major disruption of an institutionalized routine. In addition, it would have been excessively costly and time consuming. Even if such a method had been attempted, the different effects of prolonged shift changes would somehow have to have been accounted for.

The present study used the methodological approach of directly entering selected institutions at random intervals, and finding out who was or was not experiencing psychological strain and social isolation, on the various shifts. Thus, the study was characterized by structured field interviews (Tooraen, 1972:404).

It was decided at the outset of the research that questionnaires were not to be distributed by mail, or by interhospital distribution systems. The decision by the investigator to assist the nurses in completing the questionnaires, was prompted by what seemed to be good reasons as specified below, considering the alternative survey research techniques:

(1) Increase "N". The investigator had used a direct mail survey technique combined with personal open-ended interviews, for data accumulation in a survey of 250 U.S. police departments. It was learned that:

(a) a disappointingly small number of responses were returned;

(b) individual perception as to the purpose and/or use of research data would inhibit responses (several questionnaires were returned lacking important information, yet containing statements which demonstrated this inhibition);

(c) more revealing information was obtained by face-to-face interviews.

(2) Increase likelihood of accuracy and responses. The investigator has taught Introductory Psychology and Social Psychology to L.P.N. students for over five years. From this unique academic experience, it was learned that roughly 20-25 percent of those graduates working as L.P.N.'s had barely passed many of their college courses. In fact, some had done so with surprisingly low eighth and ninth grade reading comprehension levels. It seemed reasonable to assume, therefore, that some significant number of respondents would have difficulty in comprehending the questionnaire if administered by mail. The interviewer expected to facilitate comprehension of questionnaire using the approach exemplified by Hetherington's (1972) study.

A sustained effort was made towards achievement of scientifically accurate results. The interviewer was particularly conscious of sources of experimenter bias, and tried to avoid such bias consistently. For example, care was

taken to dress for all interviews in a professional, yet nondescript fashion.

While the experimental method might have yielded more certain results with regard to shiftwork, had there been a way to control shifts, the field study interview technique afforded the advantage of studying and important phenomenon that cannot legitimately be controlled by a researcher. For a comprehensive discussion of the strengths and weaknesses of alternative survey techniques, see Nachimas and Nachimas (1981), chapter 8.

A question arose as to whether the effects of primacy in beginning shiftworkers would have a significant impact on the results of this study. Taylor (1973) felt that shiftwork continued for any lengthy period of time did not significantly affect health for those subjects who remain on shift. His research was limited to two factors; sickness absence and cohort mortality analysis figures (Taylor, 1973:18-19). Other researchers have seen the early days after the onset of shiftwork as the most troublesome for the worker, for reasons other than those mentioned by Taylor (1973). For example, the early days are markedly influenced by altered social and physiological rhythms of life (Foret and Benoit, 1974:343). And in another study, it was pointed out that shiftworkers have often faced the problem of working overtime, or of working two consecutive shifts, which has exacerbated the impact of disruptions (Cottrell, 1939:196-197). It is concluded that the

importance of primacy in studying beginning shiftworkers is not so great as Taylor (1973) implied, since shiftworkers are periodically subjected to irregular schedule interruptions which continue for years after the onset of their shiftwork routines.

In order to avoid the potential spurious results of primacy effects in shiftworking nurses beginning their employment, all subjects who had worked less than one month were excluded from the research sample. Three such cases were encountered.

If a nurse was interviewed while working overtime, it may have become a problem for analysis of the results, should this have occurred too frequently. On only two occasions did this occur. This factor was therefore considered an atypical occurrence that would not significantly influence the overall results. In addition, the random nature of enlisting subjects was expected to control for such exraneous factors.

In considering the design of the study in relation to the problem for research, the field-study strategy which was used did not pose any particular problems as applied to stress research, beyond those intrinsic to that strategy (McGrath, 1970:43-44). There does not currently exist a multidisciplinary stress area theory sufficiently broad as to encompass all aspects of the problem, or sufficiently operational so as to guide the development of manipulation and measurement operations and predict their relationships

so all results can be placed within a unified network of concepts and relations (McGrath, 1970:48-49.

The present theoretical development attempts to fix the topic of interest - nurses and shiftwork - within the currently available level of theoretical sophistication. It is expected to provide the nucleus for future development of a broad theory for multidisciplinary stress research, by concentrating on the subtopics within such a theory of psychological strain and social isolation.

Site of study

The study was conducted in a rural section of upper New York State, in the counties of Delaware and Otsego. Geographically, the area is mountainous. The two counties are socioeconomically similar, as both are relatively poor in terms of median annual household income. They are inhabited by residents who are predominantly engaged in agricultural and light industrial work activities. In addition, there are three colleges in the area, two of which have nursing programs.

The cooperation of five different private health care institutions was secured. A code number for data analysis purposes was assigned to each institution. The five institutions ranged from small to large (Spitzer, 1970). The size of the institution tended to directly correspond with the size of the town or city in which it was situated. The smallest institution had only 34 beds and was located in a

town with a population of 2,500. The largest institution had 205 beds and was located in a city with a population of 18,000. Three of the institutions were general hospitals, including the largest and the smallest, and two were nursing homes.

Certain expectations about differences due to the sizes of the institutions might be specified. The larger the institution, the greater the expectation of stress related disruptions. However, this relationship is only tentative as there may be administrative and/or structural-functional features of each site that would inhibit finding this proposed expectation to be true in the small number of institutions surveyed.

Expectations about differences due to the nature of the institution - hospital vs. nursing home - might also be specified. It would seem logical that hospitals might be more stressful places for nurses, than would nursing homes, since they accommodate such a diverse cross-section of the population and attend to such a wide array of medical needs. Yet, one could also argue that nursing homes are more stressful places for nurses, due to the tendency for physicians to be less frequently available, creating feelings of greater responsibility for nurses when they respond to crisis situations.

Subjects

The total number of subjects was 162. At a later point in this data analysis, 12 supervisory nurse subjects and seven male nurse subjects were discarded from the sample. Table 1 shows a breakdown of the distribution of subjects in each institution by sex. The desired goal of obtaining a large enough number of male subjects for meaningful comparative statistical purposes, was not realized. There was a much greater lack of male nurses in the five institutions surveyed than was originally anticipated. All male nurses employed by each of the field sites volunteered to serve as subjects, yet the total was too small at the end of data collection. In addition, there were fewer rotating shift subjects available than had been originally expected. Only eleven such subjects were found in the survey.

In assessment of the total number of nurses employed by each of the institutions visited, estimates were necessitated for two reasons. First, most of the institutions were reluctant to reveal the exact number of nurse employees, because of possible violation of employee's rights and fear of possible reprisal from union representation. Second, even if an institution's administrator was willing to risk such a violation of rights, the figures given were only temporarily accurate, due to the relatively frequent turnover. Turnover was found to be more frequent in the two hospitals which had a teaching orientation, and were also affiliated with local colleges.

Procedures for gathering data and instrumentation

The sampling procedure was as follows. After having obtained the official approval and sanction of each hospital administrator, meetings were arranged with supervisory staff nurses. Each of the twelve supervisory staff nurses encountered, agreed to serve as subjects, and facilitated the acquisition of additional subjects. The twelve supervisory staff nurses were eventually excluded from the data, so as to provide a more homogeneous sample. The supervisors approached each potential nurse subject with a request to participate in a doctoral dissertation study of nursing, on a strictly voluntary and anonymous basis if desired. Requests were made during random visits at random times, to each of the institutions noted, at a frequency of one institution per day. Most of the interviews were conducted in meeting rooms, conference rooms, or reading rooms. Some of the interviews had to be conducted at the posts of nurses who could not leave such locations while on duty, such as those working in an emergency ward or in an intensive care unit. Supervisory nurses were not only instrumental, but particularly receptive in assisting with the scheduling of interviews of consenting subjects.

Once preliminary contacts were made and the project objectives explained to the administrators, data collection proceeded smoothly with only a few interruptions for nurses

attending to emergencies. In such cases of interruption, all interviews were eventually completed during the same visit.

The chronological time of selection of subjects, was during the months of June, July, and August, 1978.

As may be seen in Table 1, the subjects from hospital number 1 which was the largest facility, dominated the original sample. The implications of this will be discussed in the analysis of the results.

The administration of the survey began by giving each respondent a copy of the questionnaire to read, while the interviewer asked for their responses to each of the questions. The subject's responses were coded by the interviewer on data sheets.

As for controls, the day shift acted as a control against the other patterns of shiftwork. This approach fulfilled the expectations developed in the theoretical framework, as the study is essentially an examination of variations from the norm of day shiftwork.

The focus of the present study was upon assessment of psychological strain and social isolation among nurse shiftworkers, who had been working for at least four weeks. This minimum amount of time was specified in order to control for any unusual effects accompanying the early days of job adjustment. It should be mentioned that there was some unavoidable error of measurement with the use of the psychological strain and social isolation indices, as there

TABLE 1

Summary of Sample

Hospital Code Number	Total No. of Nurses (Approx.)	Shift 1 F	1 M	2 F	2 M	3 F	3 M	Rotating F	Rotating M	All Shifts Totals F	All Shifts Totals M	Hospital Sample Totals
1	120	32	2	27	1	27	1	7	0	93	4	97
2	15	7	0	4	0	2	0	1	0	14	0	14
3	21	4	0	3	0	4	0	3	0	14	0	14
4	28	8	1	8	0	6	0	0	0	22	1	23
5	18	5	0	1	1	6	1	1	0	12	2	14
		56	3	43	2	45	2	11	0	155	7	162

is with any such measurement devices (Thurstone, 1928:532). The instruments used had been thought to fulfill desirable standards of evaluation, as had been documented by Robinson, et. al., (1974:1-15) and Gillis (1977). A discussion of the characteristics of the indices used shall follow.

Psychometric characteristics of Gillis (1977) and Dean (1961) scales

The scale used by Gillis (1977) was used as part of the questionnaire for the present study. This scale is a shorter version of the index developed by Indik, et. al. (1964). And, as mentioned earlier, the index developed by Indik, et. al. is yet a shorter version of the index developed by Gurin, et. al. (1960). The Gillis (1977) instrument is comprised of items which are substantially similar to those in the more widely used, but longer scale constructed by Langner (1960). In the Gillis study, all interitem correlations were positive with over 95 percent significant beyond the .05 level. A factor analysis of these items revealed that a single factor accounted for 69 percent of the variance. The Gillis scale was used in the present study as it was presented in the Gillis (1977) study. Fifteen items were coded with five categories: never - 1, unsure - 2, occasionally - 3, frequently - 4, nearly always - 5, in a Likert-type scale. Possible scores ranged from 15 (low psychological strain) to 75 (high psychological strain). Actual scores in the Gillis study covered the full range, with a mean score of 24.97 and a standard deviation of 8.57.

In the present study, 91 percent of the interitem correlations for the psychological strain items were positive, with 41 percent significant beyond the .05 level (Table 2). Actual psychological strain scores in the present study ranged from 15 to 63 with a mean score of 27.4097, and a standard deviation of 6.4487.

The psychometric characteristics cited for the Dean scale in a previous study were 89 percent positive interitem correlations, with 52 percent significant beyond the .05 level.

In the present study 92 percent of the interitem correlations of the Dean scale items were positive, with 36 percent significant beyond the .05 level (Table 3). Actual score in the present study ranged from nine to 43 with a mean score of 27.000, and a standard deviation of 3.8431.

Both scales were used exactly as they had been constructed in the referenced studies from which they were derived. It was expected that the present study would therefore contribute information relating to the psychometric properties of both scales.

The Statistical Package for the Social Sciences (SPSS) computer program system was used to facilitate statistica calculations (Nie, et. al., 1975).

TABLE 2

Intercorrelation Matrix of the Index of Psychological Strain Items

*p < .05

Variable	23	24	25	26	27	28	29	30	31	32	33	34	35	36
24	.2811*													
25	.0095	.3356*												
26	.2201*	.3443*	.2213*											
27	.1978*	.2011*	.3351*	.1883										
28	-.0688	.0601	.1943*	.1758	-.0279									
29	.1430*	.1116*	.1341*	.1443	.1502	-.0017								
30	.0673	.1260*	.1818	.1175*	.1536	-.0267	.2693*							
31	.2404*	.3136*	.1622	.2246*	.1246*	.0443	.0159	.2996*						
32	.1915	.2900*	.2442	.2433*	.2046*	.0707	.3047*	.2146*	.2337*					
33	.0995	.1921	.2484	.2608*	.2276*	.1934	.1236*	.2287*	.0879	.2171*				
34	.1040	.2436*	.0390	.3395*	-.0128	.0314	.0407	-.0468	.0814	-.0061	.0722			
35	.0998	.0827	.0368	.0131	.0838	-.0473	.0557	-.0093	.0950	.0330	.0419	.0860		
36	-.0135	.1687	.1536	.1161*	.1197*	.2158*	.0514	.0429	.1373	.0547	.1980*	.0413	.1659	
37	.2260*	.3288*	.1933	.1636	.1633	.1101	.0644	.0730	.1310*	.1169*	.1758	.1352*	.0708	.1297*

TABLE 3

Intercorrelation Matrix of the Index of Social Isolation Items

Variable	38	39	40	41	42	43	44	45
39	.2411*							
40	.0846	.0160						
41	-.0463	.0029	.1347*					
42	.1348*	.1347*	.1230*	.1674				
43	.0340	.0370	.1918	.2104*	.4506*			
44	.1330*	.0629	.0756	.0715	.1504	.1669		
45	.1059	.0648	.0753	.1558	.3457*	.3805*	.2142*	
46	-.0922	.2485*	.0093	.2231*	-.0403	.0503	-.0312	.1716

*$p < .05$

Shiftwork was viewed as a kind of division of labor which led to anticipation of certain detrimental results (Blakelock, 1967). Boredom and alienation may be caused by "straightjacket scheduling" in any job (Kowinski, 1975). Presumably there would be some elements of alienation or anomia for nurses due to a variety of reasons, including the lack of adequate opportunities for socializing when "normal" patterns were disrupted by shiftwork. Based on previous literature, the manifestations of anomia were reflected in the social isolation index used in the present study (Dean, 1961).

The sources of data consisted of 144 questionnaire responses, and some additional observer notes. The questionnaire employed indices of psychological strain (Gillis, 1977) and social isolation (Dean, 1961), as well as various demographic characteristics. The questionnaires were administered verbally in interview fashion, and responses were coded by the researcher, in order to enhance consistency and understanding of the data sheets. The respondents were instructed using the following statement:

> The following questionnaire is part of a research project designed to assess a variety of conditions having an adverse effect on the nursing profession. The information obtained will provide data for a doctoral dissertation on this topic. Please try to answer all questions. All responses will be kept strictly confidential and anonymous.

The present study was geared toward a population of predominantly female nurse subjects. Guided by the theoretical proposition that a cultural trend toward time optimization has led to increased shiftwork scheduling, and that such scheduling causes holistic disruptions of well-being that contribute to psychological strain, the Gillis (1977) index was applied to this question. It was predicted that the lowest amounts of psychological strain would be found among day shift subjects, and that increasing amounts of psychological strain would appear in afternoon, night and rotating shift subjects in that order. The Gillis (1977) index basically covered a combination of biological and psychological factors. In keeping with the holistic theoretical orientation to the problem, sociological factors were also of interest. Three sets of sociological factors were used, derived from Gillis (1977): social isolation, confinement, and household composition. The social isolation factor was examined by Dean (1961). It was predicted that social isolation would appear in the same pattern among subjects across shifts, as would psychological strain, since this is the pattern of detrimental effects that seemed to emerge from previous studies of shiftwork.

A preliminary analysis of the data computer run was performed using analysis of variance techniques, to see if there were any significant relationships between the index of psychological strain across the various shifts, and

between the index of social isolation across the various shifts. The results of this preliminary analysis suggested that support for one of the two main hypotheses had been found statistically, and that further analysis of the data was warranted. Table 4 is provided so that the means from the preliminary analysis of the data may be inspected. T-tests were used to identify significant differences in psychological strain between specific shifts. For the sake of consistency in data analysis, t-tests were also run to examine differences in social isolation between specific shifts.

In order to test the significance of post hoc comparisons, a Scheffé test was run. And, multiple regression techniques were performed on the data to see how the other variables related to psychological strain.

TABLE 4

Preliminary Analysis of the Data: Mean Scores from AOV of Psychological Strain and Social Isolation

Shift	Mean Psychological Strain Score	Mean Social Isolation Score
First	25.2373	26.9492
Second	26.2889	26.9111
Third	29.7447	26.7660
Rotating	32.0909	28.7273

Strengths and limitations of the methodology

A study by Tessler and Mechanic (1978), revealed that despite variations between different studies of population characteristics, mode of data collection, and specific questions used to measure psychological distress, distress was seen to be a statistically significant correlate of perceived health status (Tessler and Mechanic, 1978:254). In short, people are able to express their own psychological stress via questionnaire responses, therefore the approach taken in the present study is viable. An underlying assumption of the present study is that the extent to which individuals can successfully cope with changes in their lives will be reflected in their responses of distress or strain. This assumption is presently being tested by McFarlane, et. al. (1980), and it appears that this assumption is valid on the basis of their preliminary report (McFarlane, et. al., 1980:124). Currently, there are numerous self-report schemes available for predicting psychiatric symptomatology (Ross and Mirowsky, 1979).

Another strength of the methodology was that first hand data was acquired, and no second hand data analyses using data obtained from other research studies, were used (Firth, 1970:32). The method of field interviews located at or near actual working areas, realized a more natural, directly job-related set of responses, than could have been realized by a laboratory research study. The interviews were all conducted by one researcher, which contributed to increased likelihood

of a common perception on the part of the subjects. This would not have been the case had several interviewers been used. The researcher attempted to remain alert to non-verbal body cues, so that bias of responses along this dimension was minimized. The study included biological, psychological, and sociological factors, which gave it a holistic theoretical orientation.

Some limitations of the methodology were as follows. Since the interviews did not take place in a laboratory setting, it was not a highly "controlled" study in the scientific sense of the word. There was involvement of individual subjects in data collection that may have resulted in distortion or omission of certain desired information (Cannell and Kahn, 1966:330-331). The administration of the questionnaires by personal interview was an attempt at reducing such distortion and omission, yet did itself constitute a methodological limitation. However, much social science research shares such limitations.

Some form of unobtrusive measure might have been used, but would probably have complicated things unnecessarily. For example, non-verbal indicators of psychological strain might have been obtained by rating the unobtrusively recorded, filtered speech of the nurses. Such a technique was used in a study of doctor-patient communication by Hall, Roter, and Rand (1981). However, it would have made the present study unnecessarily complicated and prohibitively expensive.

Both male and female subjects were interviewed for comparative purposes. This feature of studying both male and female shiftworkers, was found to have been lacking in most of the previous research surveyed. Although an attempt was made to acquire male subjects for the present study, the attempt was considered unsuccessful as only seven males were found. Since there were too few male subjects acquired for meaningful statistical analyses to be made, this element turned out to be a research limitation.

The study could only provide correlations, rather than direct identification of causal relationships. Only inferences as to causality were made. Another limitation concerned the time period for data collection. Although data collection took three months, the research design was not longitudinal. The method was time consuming, because there were distances of up to fifty miles between research sites, and because the study was directed at subjects working around the clock. The time and distance factors contributed to make the method selected somewhat expensive in terms of travel costs.

The present study was also limited with regard to the generalizability of the findings, as one hospital dominated the sample. Furthermore, the subjects were from a single, rural geographical area, and may not therefore be representative of the total population of nurses (Fottler, 1976:107). The demographic figures fortunately indicated that the

subjects were fairly heterogeneous with regard to their geographical backgrounds. Therefore, they were not expected to be atypical of nurses at comparable institutions in other parts of the U.S.

Any subjective report measure, such as the one used in the present study, is particularly vulnerable to reactivity effects (McGrath, 1970:71). The respondent knows (s)he is being "tested" and is therefore likely to attempt to alter his/her behavior to suit the social-psychological demands of the testing situation (Orne, 1962). The specific objectives of the research were deliberately kept vague, so as to attempt to minimize such effects. It is not, and probably cannot be known whether the steps taken were successful in this regard. We may simply acknowledge that personality characteristics act to increase or reduce the impact of subjectively appraised stress (Kessler and Cleary, 1980: 464).

A central methodological problem raised by the theoretical orientation of Hough, Fairbank, and Garcia (1976), applies to the theoretical orientation of the present study. Specifically, it is difficult to measure the degree of disruption of routine life patterns experienced by individuals (Hough, Fairbank, and Garcia, 1976:71). Such disruption was examined by statistical as well as the key concepts for this study, of psychological strain and social isolation.

As a final comment on the viability of the research methodology used in the present study, a statement by Ellerbroek (1978), will be discussed. He wrote about the puzzles of human illness and the connection between psychological states and physical diseases, and stated some basic definitions and postulates that relate to stress research and interdisciplinary social science in general (Ellerbroek, 1978:94). These underlying assumptions apply not only to the present study, but to any research effort:

> There is no such thing as a fact: any verbal statement is an opinion, no matter how labeled. For example, any statement can be called either an opinion or a fact. If you call it an opinion, you bear in mind the possibility of error. If you call it a fact, you are neurotically expressing a belief that the statement is gold-plated, never to be questioned, and, more important, you are turning off your thinking machine as to that item.
>
> Objective knowledge is a myth: all "knowledge" being based on biases in "perception" and "cognition," is subjective and emotionally determined (Ellerbroek, 1978:94).

Based on the theoretical rationale and framework developed in the present study, certain items of information emerged from a field-study, that are potentially useful for expansion of the theoretical basis and for applications in the sites studied. This is possible because of a sharing of subjective biases between two or more individuals.

Summary

Five health care institutions, which ranged in size from small to large, served as research sites for the

present study. The Gillis (1977) index of psychological strain, and the Dean (1961) index of social isolation, were incorporated into a questionnaire used to assess effects of shiftwork on male and female nurse subjects within a multi-disciplinary theoretical framework. The questionnaire also had items relating to confinement, household composition, socioeconomic and demographic factors. Subjects were interviewed at the research sites on a random, voluntary basis. The subjects worked either day, afternoon, night, or rotating shift schedules. Using appropriate statistical techniques and computer technology, the data was analyzed.

CHAPTER IV

RESULTS AND DISCUSSION

Background Variables

An analysis of the major background or demographic variables, as related to shift schedule and psychological strain is shown by Table 5. There were significant correlations ($p < .0001$) between shift schedule and psychological strain (as hypothesized), age and marital status, and income and education. It appears that the background variables were not significantly related to different shift schedules. The relationship that did occur as significant were not surprising. In addition, none of the background variables significantly related to psychological strain.

TABLE 5

Intercorrelation Matrix of Shift Schedule, Demographic Variables, and Psychological Strain

Variable	Shift Schedule	Age	Marital Status	Ethnicity	Religious Affiliation	Income	Education
Age	-.0164						
Marital Status	.0525	.4443*					
Ethnicity	-.0522	.0387	.0335				
Religious Affiliation	.0705	-.0825	-.0410	-.0832			
Income	-.0115	-.0626	.0739	-.0276	-.0931		
Education	-.0837	-.0737	-.0299	.0616	.0521	.3640*	
Psychological Strain	.3913*	-.1308	-.0458	-.0831	.1152	-.0211	-.0769

*$p < .0001$

Analysis of variance

The first finding that emerged from the analysis of variance, was that shiftwork was significantly related to psychological strain ($p < .00001$). This finding was hypothesized to occur, prior to research data collection, based upon the theoretical framework. Having noted this finding, t-tests were used to help understand the pattern of differences in means, of psychological strain across shifts (Table 6).

The second hypothesis which was formulated at the outset of the research, that social isolation would be related to shiftwork, did not receive empirical verification (Table 6). It should be mentioned, however, that a trend toward such verification did appear in the data. When the index of social isolation was later analyzed for variation across shifts, it was not seen to have realized statistically significant differences.

TABLE 6

Analysis of Variance of Psychological Strain by Shift Schedule

Shift	Mean Psychological Strain Score
First	24.9020
Second	26.3000
Third	30.2857
Rotating	32.0909

Source of Variation	df	MS	F
Between Shifts	3	319.479	8.966*
Within Shifts (Error)	140	35.631	

*P < .00001

TABLE 7

Analysis of Variance of Social Isolation by Shift Schedule

Shift	Mean Social Isolation Score
First	26.9804
Second	26.7250
Third	26.8333
Rotating	28.7273

Source of Variation	df	MS	F
Between Shifts	3	12.343	.833 (NS)
Within Shifts (Error)	140	14.821	

TABLE 8

Analysis of Variance of Desire to Change Shift by Shift Schedule

Shift	Mean Score of Desire to Change Shift
First	1.8431
Second	2.1500
Third	3.2857
Rotating	3.4545

Source of Variation	df	MS	F
Between Shifts	3	20.915	13.122*
Within Shifts (Error)	140	1.594	

*$p < .00001$

A fourth finding emerged from a hypothesis formulated during the collection of data, after a preliminary computer-assisted analysis of the data. This analysis of variance computer run, which is shown by Table 8, warrants some background explanation. Admittedly, there are numerous reasons to avoid "data snooping," however, in a study of this nature, there is a strong exploratory element present. Justification for the formulation of a hypothesis during the middle of the data collection process should, therefore, be permitted. It was from such a search of preliminary data, that the analysis of the desire to change shifts variable, was noted as a strong indicator of this feature of shiftwork. During the intermediate stages of data collection, while testing the efficacy of the SPSS program instructions, a discriminant analysis was performed. One result of this analysis was the identification of the variable of desire to change shifts as a strong predictor of shift schedule worked. The analysis in Table 8 shows that as subjects were interviewed across shifts, from day shift through rotating shift schedules, a progressive desire to change shifts was found. This desire was strongest among the rotating shiftworkers.

Post hoc comparisons

A Scheffé procedure was run at the .05 level of significance to test for shift group differences. The results obtained are noted in Table 9. From Table 9 it may be seen

that the pairs of significantly different groups for the psychological strain variable, are day-night shift, day-rotating shift, afternoon-night shift, and afternoon-rotating shift groups. This test substantiates the argument that there are differences between day and afternoon shift groups when compared with night and rotating shift groups, for the variable known as psychological strain.

TABLE 9

Scheffé Procedure to see Differences Across Shift Groups in Psychological Strain

		Group 01	Group 02	Group 03	Group 04
Mean	Group				
24.9019	01				
26.3000	02				
30.2857	03	*	*		
32.0909	04	*	*		

(*) Denotes pairs of groups significantly different at the .05 level.

T-tests

According to Kennedy (1977:174-175), the choice of comparisonwise t-tests for multiple comparisons, such as appear in Table 10 is justified, as the specific comparisons to be made were specified well in advance of the data collection and were the product of "strong interference"

as to specific directional operational predictions. As a priori comparisons, they were based upon careful consideration of the theoretical framework that guided the research, and the empirical and experiential foundations of the problem. The comparisonwise t-tests which appear in Tables 11 and 12 are perhaps more difficult to justify on these grounds, but are nevertheless considered valuable in light of the theoretical objectives of the research.

Relating to the first hypothesis, t-tests were run to help explain the differences in means of psychological strain across shifts (Table 10). No significant differences in psychological strain emerged, when day and afternoon shifts were compared. Similarly, no significant differences were found when night and rotating shifts were compared. These results were not considered at all surprising, as the combinations of shifts previously mentioned were predictably similar in the effects they had on the subjects, based upon the results of previous research efforts. When comparisons were made between afternoon and night shifts, and between afternoon and rotating shifts, significant differences in psychological strain emerged. The most significant differences in psychological strain occurred between day and night shifts, and between day and rotating shifts. The general trend of these differences was hypothesized prior to field data collection. Significantly greater psychological strain appeared among night and rotating shiftworkers, for these two highly significant comparisons.

TABLE 10

Differences Among Shifts in Psychological Strain (t-tests)

	Shift 1 (N=51)	Shift 2 (N=40)	Shift 3 (N=42)	Shift 4 (N=11)
Shift 1		-1.20	-4.63[a]	-4.76[a]
Shift 2			- .40	-2.57[b]
Shift 3				- .80

Note: all tests two-tailed

a = $p < .0001$
b = $p < .01$

TABLE 11

Differences Among Shifts in Desire to Change Shifts (t-tests)

	Shift 1 (N=51)	Shift 2 (N=40)	Shift 3 (N=42)	Shift 4 (N=11)
Shift 1		-1.25	-5.52[a]	-4.06[a]
Shift 2			-3.92[a]	-3.00[b]
Shift 3				-0.35

Note: all tests two-tailed

a = $p < .0001$
b = $p < .001$

TABLE 12

Marital Status Differences in Psychological Strain and Social Isolation (t-tests)

	Psychological Strain		Social Isolation	
	Mean	t	Mean	t
Marital Status				
Single (N=49)	28.8571	2.19*	26.8980	-0.67 (NS)
Married (N=78)	26.3462		27.3718	

Note: all tests two-tailed

*$p < .01$

A second hypothesis formulated at the outset of the research was that differences in social isolation scores across shifts would emerge, with the greatest amounts of social isolation present in persons working on rotating shifts. This hypothesis was not substantiated, as no statistically significant differences across shifts appeared for this index. Although it appeared to have been a useful tool in previous research studies, the social isolation index as used in the present study may not have been reliable or sensitive enough to detect any of the purported effects in the data.

If we were to consider psychological strain and social isolation by hospital, we would run into the problem of small N's for certain shifts. So, at this point in the

analysis of what has been done, it may be stated that the research gives a perspective on nursing in several institutions, some of which contributed statistically fewer subjects to the formulation of the perspective than did Hospital 1.

A third hypothesis mentioned earlier, was formulated during the middle stages of data collection. The variable of desire to change to another shift was singled out for tabular treatment because the results were of interest (Table 11). Studies of the body temperature patterns of workers, have shown that most people are "day" people (Benedict, 1904; Kowinski, 1975). Originally, it had been hypothesized, therefore, that nurses would be happiest and most satisfied with day shift, on the average. It was further hypothesized that this group would become increasingly dissatisfied with afternoon, night, and rotating shifts respectively, because theoretically these shifts would cause greater biological, psychological, and sociological disruptions of a holistic nature. The essence of this hypothesis was borne out by examination of the means. Significant differences occurred in all but two t-tests. Differences that were not significant arose between day and afternoon shift, and between night and rotating shift. A logical explanation for this result is that day and afternoon shiftworking nurse subjects had been oriented to predominantly daylight living experiences, while night and rotating shift subjects experienced the greatest proportion

of time living in the dark. Therefore, the difference among those nurse subjects whose shifts were most similar in this regard, were minimal. When either day or afternoon shift subjects were compared with either night or rotating shift subjects, significant differences in desire to change to another shift emerged. The subjects who were most desirous of change of shift were those who work the greatest proportion of hours in darkness. It has been noted that there is a small minority of nurses who prefer steady night shiftwork, or rotating shiftwork for various biological, economic, or social reasons.

Multiple regression analysis

From a stepwise hierarchical multiple regression analysis (Table 13) psychological strain was explained by all variables combined (Total RSQ = .73012). It is not certain whether this particular analysis was accurate. In terms of factors, shift schedule was the best predictor of psychological strain as was originally hypothesized (Total RSQ = .32021). In the stepwise regression procedure, the respective contribution of each variable to the total explained variance, determined the order of inclusion (Nie, et. al 1975:345).

An examination of some culture related demographic characteristics of the sample was made in order to consider the cultural context of this specific study. Table 14 shows some general characteristics of the subjects interviewed.

Excluding supervisory nurses, there were 133 nurse subjects interviewed who worked day, afternoon, and night shifts, in approximately equally sized groups. As was mentioned earlier, rotating shift nurse subjects were more difficult to obtain, thus a fourth group of subjects working this particular shift pattern numbered only 11. About half of the subjects were married, and about half were single, separated, divorced, and widowed subjects. Nearly all of the subjects were white and either Protestant or Catholic. They generally had lived in rural as opposed to urban areas for most of their lives.

TABLE 13

Stepwise Multiple Regression Analysis of Amounts of Variance (R Square) Predicted by Factors

Dependent Variable - Psychological Strain

			N
Multiple R Total	0.85447	Regression Variables	23
R Square Total	0.73012	Residual Variables	21

Variable	Multiple R	R Square
Shift Schedule	0.56587	0.32021
Social Isolation Index	0.66013	0.43577
Enjoy Leisure Time	0.72225	0.52164
Like To Be Alone	0.75225	0.56587
Marital Status	0.77130	0.59491
Hours Spent at Leisure Away From Home	0.78485	0.61598
Like to Change Shifts	0.79605	0.63370
Total Number Adults in Household	0.80417	0.64669
Feel Bored	0.81447	0.66337
Age in Years	0.82053	0.67326
Months Worked Current Job	0.82537	0.68123
LPN or RN	0.82930	0.68774
Hours Spent At Work Per Week	0.83165	0.69164
Years Worked Current Job	0.83423	0.69594
Present Gross Annual Salary	0.83860	0.70325
Religious Affiliations	0.84110	0.70746
Lived In City After Age 15	0.84390	0.71217
Lived In City Up To Age 15	0.84722	0.71778
Total Number Children In Household	0.85018	0.72281
Ethnicity	0.85258	0.72689
Highest Grade Completed	0.85388	0.72912
Head Of Household By IRS	0.85402	0.72935
Weekends Away From Home Per Year	0.85447	0.73012

TABLE 14

Selected Frequencies Related to the Cultural Context of the Research

Variable	N (Total = 144)	%
Shift Worked		
Day (First	51	35.4
Afternoon (Second)	40	27.8
Night (Third)	42	29.2
Rotating	11	7.6
Ethnicity		
White	138	95.8
Black	3	2.1
Hispanic	1	0.7
Oriental	2	1.4
Marital Status		
Single	49	34.0
Married	78	54.2
Separated	8	5.6
Divorced	6	4.2
Widowed	3	2.1
Religious Affiliation		
Protestant	86	59.7
Catholic	47	32.6
Jewish	2	1.4
Other	9	6.3
Lived In City Up To Age 15		
Yes	52	36.1
No	92	63.9
Lived In City After Age 15		
Yes	57	36.9
No	87	60.4

A social scientific study may be pursued on any of four levels according to Geertz (1973). He has noted that: "Once culture, psyche, society, and organism have been converted into separate scientific 'levels,' complete and autonomous in themselves, it is very hard to bring them back together again" (Geertz, 1973:41). In order to minimize this problem, the present study was directed at exploring the multidisciplinary nature of the phenomenon of shiftwork as a use of time. The multidisciplinary use of time was instrumental in formulation of the theoretical framework used to guide the research, and in comprehending the position of the study and meaning of the results within the context of time.

Implications for future research

At present, there does not appear to be a more general social and behavioral theory in terms of which shiftwork assumes greater significance. The work of Melbin (1978, 1979) is, perhaps, a step in the direction towards the construction of such a theory. It will be recalled that Melbin viewed night as a new frontier, analogous to the spatial frontier of the West in early American history. The value of this approach is, however, dubious. It seems more worthwhile to refine the body of theory concerned with stress research for the study of shiftwork, than to attempt to construct a new theory using shiftwork as the focal concept.

The implications of the results for the general theory from which the hypotheses were derived are that the effects of shiftwork are indeed complex. Although psychological strain was evident among nurses as related to shift schedule, it did not appear as pronounced as was theoretically expected. For this factor, and for the social isolation factor as well, there were apparently mediating processes in operation that had not been entirely accounted for by the theoretical framework. The theory did state that some people preferred shiftwork, although no predictions were made with reference to such persons. Although it would have been an important factor in understanding shiftwork, to have learned whether shiftwork was imposed or selected, this information was unfortunately not collected. Thus, this factor becomes a question for further research. The influence of those selecting shiftwork probably reduced amounts of psychological strain and social isolation across shifts. The theory did not, however, predict the homogeneity of nurses with regard to social isolation scores. It is not certain that the statistical results for the social isolation index were meaningful because of several possible sources of error mentioned earlier.

There are several implications for future research derived from the results of this study. Additional studies of shiftwork are needed between occupational groups that have not yet been examined, or have been only marginally

studied. It appears that while certain generalities with regard to the effects of shiftwork may be made across all work groups, there are certain peculiarities associated with each type of work, that intervene in the process of influence upon specific occupational groups. It is suggested that other groups that might benefit from such research include police, fire, and airline personnel. The present study adds to the existing body of knowledge about the field of nursing and its relationship to shiftwork, yet additional studies of this field are needed as well.

One particularly desirable approach would be to conduct a preliminary study of several of the important cognitive tasks associated with nursing, and see what the effects of shiftwork would be upon each in terms of task performance. This variable would be fairly easy to operationally define and measure.

With regard to scheduling, the question arises as to what type of shiftwork is least detrimental to health by causing the least amount of strain, while at the same time being the most productively efficient (Teleky, 1943:758-759). Current opinion maintains that long (over one month) duration, permanent shiftwork is preferable to rotating shift scheduling, as it gives the worker a better chance to adapt to interrupted circadian rhythms (Teleky, 1943:777; Reinberg and Ghata, 1964:125; Walker and de la Mare, 1971: 43). The present study tended to corroborate this opinion. Yet, coping with shiftwork induced changes is more than

simply a physiologically adaptive process. This was demonstrated in the theory developed in the present study. Coping is a process which takes place through time in a non-linear manner and its effects alter the meaning of the situation and therefore alter the levels and kinds of stresses involved at various stages of the process (McGrath, 1970:36). Mechanic's (1970:118) findings support this point, as he indicates also that this process is usually learned incidentally through experience rather than being formally taught. The issue, then, of the time it takes to do the work of coping as applied to shiftwork, is an important one for future research. We are also limited to our knowledge of the degree of versatility which individuals have in their modes of coping (McGrath, 1970:38).

In an industrial situation, where night workers retain some daytime habits such as meal times, complete adaptation to shift changes has been seen to be less likely to occur (Conroy and Mills, 1970:135-136; Walker and de la Mare, 1971: 37). The question of the scheduling of breaks for shiftworkers also arises. There is insufficient knowledge about the need for breaks during shiftwork (Wojtczak-Jaroszowa, 1977:46). Such questions are amenable to further study.

Another issue that might be explored in future studies is the longitudinal question of how psychological strain is patterned in subjects before entering shiftwork, as compared with subjects who have experienced various durations of

shiftwork (Akerstedt and Theorell, 1976: Akerstedt and Torsvall, 1978:849).

An additional area for research would be to look at accident records as related to shift schedules. Brown (1978) has suggested that shiftwork studies may have potential application to accident reduction among long distance drivers. And Folkard, et. al., (1978) suggested looking at the "activity pattern" of the hospital, that is, the interaction of rhythms of both nurses and patients with regard to accidents. Application of shiftwork studies in the future to accident reduction among human groups, would be a potentially invaluable topic for further research.

Since the existing body of theory and the results of the present study point toward identification of the rotating shift schedule as the most potentially disruptive, further research on persons whose schedules have been of this type is suggested. A comparison between an adequate sample of rotating shift workers and workers who do not rotate shifts, might prove valuable as providing additional evidence for ameliorative rescheduling in other occupations. Such scheduling would be likely to involve the reduction or elimination of rotating shifts whenever feasible. Two groups whose work involves matters of life and death would be most likely to benefit from such research - police and fire workers - since it is these groups who have traditionally worked on rotating schedules in large numbers.

The issue of shiftwork in different social settings could be explored in a comparative manner to see what features of each setting contribute to making shiftwork more or less acceptable (Wedderburn, 1978). Individual differences might also be given some consideration in future studies. One approach that has been suggested is that of the development of a questionnaire to distinguish between people who differ in the degree to which they can adjust to shiftwork (Folkard, Monk, and Lobban, 1979:89). Taking a chronobiological approach, other research has focused on circadian rhythm amplitudes of selected variables, such as body temperature or grip strength, to attempt to provide an individual index of a person's ability to sustain shiftwork (Reinberg, et. al., 1978:763). More research along the lines of a holistic theoretical approach which includes such chronobiological measures would seem desirable. With this goal in mind, additional work could be done in constructing more reliable and valid indexes as indicators of the holistic effects of shiftwork. It appears that as one proceeds towards larger analytical units, it becomes more difficult to construct scientifically useful instruments, due to the influence of larger numbers of intervening and extraneous variables.

Some suggestions for policy applications are as follows. Since some individuals are more incompatible with working a given shift schedule than other individuals, it is logical that administrators should attempt to allow workers to

select their shift if at all possible. The shortage of personnel in the field of nursing makes this suggestion particularly difficult to implement for health care administrators, however, in large cities it should be somewhat easier even for them to follow. As the numbers of shiftworkers in the field increase, greater selectivity of shift may be afforded nurses. Since the greatest amount of psychological strain was seen among the rotating shift nurse subjects, a legitimate argument could be made in favor of eliminating this option in scheduling. It is the most difficult to adjust to and should, if feasible for the operation of any given health care facility, be abolished.

Summary

Shiftwork was found to be significantly related to psychological strain in the subjects studied, as had been initially predicted at the outset of the research. Social isolation was not found to have been significantly related to shiftwork in the same sample of subjects, although it was originally predicted that this variable would be significantly related.

Of all the factors analyzed, shiftwork emerged as the best predictor of psychological strain in the subjects interviewed. It was hypothesized at the outset of the research that based upon the theoretical framework, this finding would emerge. The most significant differences in

psychological strain appeared between day and night shifts, and between day and rotating shifts.

CHAPTER V

SUMMARY AND CONCLUSIONS

The problem for research was explained as the multidisciplinary analysis of disruptive factors of shiftwork. In order to establish the context of the problem within existing theory and methodology, the meaning of time as a multidisciplinary issue was discussed. It was demonstrated that the cultural use of time has led to time optimization in the form of shiftwork. A framework for stress research was then provided, as holistic disruptions may be thought of as diverse stressors occurring simultaneously and interactively, on several analytical levels. The interaction between biological, psychological, and sociological factors in shiftwork was identified as theoretically relevant to the problem. Consideration was also given to the social organization of work and the ways in which cultural values affect the worker. Studies of shiftwork were extensively reviewed to see what groups of workers had been studied, what effects had been found, and whether any of the effects of shiftwork had been viewed from a holistic perspective in any of the available literature.

The previous research on shiftwork was seen to have been lacking in information about female shiftworkers. The literature was seen to have been dominated by monocausal studies of male, factory workers. It was not certain whether the results of monocausal, male factory-oriented studies

would apply to a predominantly female population of nurses. A decision was made to study this problem among this female-dominated field. Nursing was discussed in order to obtain some understanding as to whether this field of endeavor is more properly called an occupation or a profession. It became evident from the literature available dealing with this particular question, that the argument was essentially one of semantic distinction.

Having decided to study nurses, the specific problem for research was to attempt to pinpoint the severity and incidence of psychological strain and social isolation across shift schedules, among this predominantly female population. Instruments were selected from previous research literature, on the basis of their applicability to this problem, and previously obtained psychometric characteristics. An index of psychological strain was derived from a study by Gillis (1977), and an index of social isolation was obtained from a study by Dean (1961). Directly incorporating these instruments, a questionnaire appropriate to the problem and to be used in interviews, was constructed (Appendix 1). Variables pertaining to household composition and relevant demographic features were also included.

To summarize briefly, the problem for research was the multidisciplinary analysis of disruptive factors of shiftwork. A new theoretical approach was used, incorporating scales that assessed information across disciplines in social science, and including subjective information of a

physiological nature. The major implication of the study is that until more is learned about the long-term effects of shiftwork, rotating shiftwork should be eliminated whenever possible, and fixed shifts should be substituted. As an alternative to shiftwork, some companies have been experimenting with the innovation of flexible work hours which permit the employee to select not just the shift, but the hours of work desired (David, 1977; Owen, 1979). This plan may also prove to be desirable.

Previous theories and methodologies were generally found to be lacking in holism in their perspectives. The present theory upon which this study was based was viewed as an improvement over such past theories, because it provided a holistic perspective by incorporating a unique combination of factors crossing disciplinary lines. Future research on shiftwork is likely to benefit if consideration of the effects is maintained using a multidisciplinary orientation.

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APPENDIX 1

QUESTIONNAIRE USED IN THE STUDY

_____ Name _____Sex _____ Institution
_____ LPN or RN?
_____Address _____ Telephone #

The following questionnaire is part of a research project designed to assess a variety of conditions having an adverse effect on the nursing profession. The information obtained will provide data for a doctoral dissertation on this topic. Please try to answer all questions. All responses will be kept strictly confidential and anonymous.

1. On which shift schedule do you work? ___first ___second ___third ___rotating

2. What hours do you work? Please be specific:_____

3. How old are you? _____years

4. What is your date of birth? _____month ___day ___year

5. What is your marital status? ___single ___married ___common law ___separated ___divorced ___widowed

6. What is your ethnicity? ___white ___black ___hispanic ___oriental ___other

7. What is your religious affiliation? ___Protestant ___Catholic ___Jewish ___other

8. Did you live mainly in a city up to the age of 15, and not in the country? ___yes ___no

9. Did you live mainly in a city after the age of 15, and not in the country? ___yes ___no

10. What is the total number of children in your household? ____

11. What is the total number of adults in your household? ___

12. What is your present gross annual salary? ___$0-2,999 ___ $3,000-5,999 ___$6,000-8,999 ___$9,000-11,999 ___$12,000 and above

13. Are you the head of your household according to Internal Revenue Service regulations? ___yes ___no

14. Circle the number corresponding to the highest grade in school completed:
7 8 9 10 11 12 13 14 15 16 17 18 and above

15. How long have you been working at your current job?
___years ___months

16. How many hours away from home per week do you spend at work?
___0-2 ___21-40 ___41-60 ___over 60

17. How many hours away from home per week do you spend at leisure activities? ___0-10 ___11-20 ___21-30 ___over 30.

18. How many weekends do you spend away from home during the year? ___0 ___1 ___2 ___3 ___4 ___over 4

Please code your answers to the next sequence of questions according to the following:

1	2	3	4	5
NEVER	UNSURE	OCCASIONALLY	FREQUENTLY	NEARLY ALWAYS

19. Do you enjoy your leisure time?
1 2 3 4 5

20. Are you ever bothered by feeling bored?
1 2 3 4 5

21. How often do you like to be alone?
1 2 3 4 5

22. Are there times when you would like to change shifts at work?
1 2 3 4 5

23. Do you have any trouble getting to sleep or staying asleep?
1 2 3 4 5

24. Have you ever been bothered by nervousness, feeling fidgety and tense?
1 2 3 4 5

25. Are you ever troubled by headaches or pains in the head?
1 2 3 4 5

26. Do you have loss of appetite?
1 2 3 4 5

27. How often are you bothered by having an upset stomach?
1 2 3 4 5

1	2	3	4	5
NEVER	UNSURE	OCCASIONALLY	FREQUENTLY	NEARLY ALWAYS

28. Do you find it difficult to get up in the morning?
1 2 3 4 5

29. Has any ill health affected the amount of work you do?
1 2 3 4 5

30. Have you ever been bothered by shortness of breath when you were not exercising or working hard?
1 2 3 4 5

31. Have you ever been bothered by your heart beating hard?
1 2 3 4 5

32. Have you ever had spells of dizziness?
1 2 3 4 5

33. Are you ever bothered by nightmares?
1 2 3 4 5

34. Do you tend to lose weight when you have something important bothering you?
1 2 3 4 5

35. Do your hands ever tremble enough to bother you?
1 2 3 4 5

36. Are you troubled by your hands sweating so that you feel damp and clammy?
1 2 3 4 5

37. Have there ever been times when you couldn't take care of things because you just couldn't get going?
1 2 3 4 5

Please code your responses to the next group of statements according to the following scale:

1	2	3	4	5
STRONGLY AGREE	AGREE	UNCERTAIN	DISAGREE	STRONGLY DISAGREE

38. Sometimes I feel all alone in the world.
1 2 3 4 5

39. I don't get invited out by friends as often as I'd really like.
1 2 3 4 5

40. Most people today seldom feel lonely.
1 2 3 4 5

1	2	3	4	5
STRONGLY AGREE	AGREE	UNCERTAIN	DISAGREE	STRONGLY DISAGREE

41. Real friends are as easy as ever to find.
1 2 3 4 5

42. One can always find friends if s/he shows herself/himself friendly.
1 2 3 4 5

43. The world in which we live is basically a friendly place.
1 2 3 4 5

44. There are few dependable ties between people anymore.
1 2 3 4 5

45. People are just naturally friendly and helpful.
1 2 3 4 5

Note: Items 40, 41, 42, 43, 45 were reverse scored.

46. I don't get to visit friends as often as I'd really like.
1 2 3 4 5

47. Generally speaking, I feel I have understood the questions in this survey of nursing profession conditions.
1 2 3 4 5

48. I feel my answers to the questions in this survey have been accurate.
1 2 3 4 5

APPENDIX 2

DEFINITION OF TERMS

chronobiology

area of study dealing with biological rhythms.

circadian

"an approximate 24 hour rhythm" (Halberg and Katinas, 1973).

cycle

"the smallest part of a rhythm that repeats itself, irrespective of causal origin" (Mills, 1966).

desynchronization

"state of two or more rhythmic variables that have ceased to exhibit the same frequency and/or timing relationship" (Halberg and Katinas, 1973).

diurnal

"relating to biological variations or events occurring between sunrise and sunset or during the illuminated fraction of a near-daily schedule of alternating artificial light and darkness. Antonym: nocturnal" (Halberg and Katinas, 1973).

entrainment

"interaction between two or more orgasmic rhythms resulting in identical frequencies among interactants" (Halberg and Katinas, 1973).

holism

a systems analysis frame of reference which considers the interaction of each person's biological, psychological, and social selves as a total system.

infradian

longer than 24 hour rhythms.

period

"the time occupied by a single cycle" (Halberg and Katinas, 1973).

periodicity

"regularly repetitive changes occurring in animate or inanimate nature, irrespective of waveform or underlying mechanisms" (Halberg and Katinas, 1973).

psychological strain

a combination of physical, psychological, and social events that are interrelated and cause overall ill feelings and disruptions in the individual (Gillis, 1977).

rhythm

"a periodic component of biological time series with objectively quantified characteristics (i.e., a frequency, an amplitude)" (Halberg and Katinas, 1973).

shiftwork

work characterized by a predetermined time schedule which is divided into fixed and/or rotating segments of working hours (e.g., day (first shift), afternoon (second shift), night (third shift), and rotating (variable shifts)).

social isolation

psychological and social feelings of alientation from a job and sometimes from the world in general (Dean, 1961).

stressor

"an event or condition that may be purely physical, psychological, or social, that triggers a stress reaction" (Girdano and Everly, 1979:14).

time

"a facet of human consciousness felt both in psychic and physical experience, and an aspect of the observed environment metaphorically describable (in the language of material phenomena) as a one-way flow providing, together with space, the matrix of events. It can be measured either as an epoch (the moment of an instantaneous event as marked by a clock) or as the interval of duration of a continuous event, and by reference either to moving bodies or to electromagnetic phenomena (atomic time). Its flow has been found, in contemporary physics, to be relative to the observer's velocity and acceleration perspectives as environmental rhythms, temperature, drugs, and (perhaps) brain rhythms" (Encyclopedia Britannica, Micropedia, (9), 1974:1013).

time optimization

the impetus toward using time, workers, and facilities to their greatest potential efficiency.

ultradian

shorter than 20 hour rhythms.

Zeitgeber

aspect of the environment that sets the phase of a biological rhythm. Synonym: entraining agent (Halberg and Katinas, 1973: Monk, 1977:325; Aschoff, 1978:739).