



3 1293 01031 7984

LIBRARY
Michigan State
University

This is to certify that the

dissertation entitled

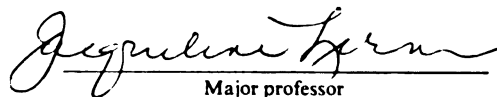
**Psychosocial Stress, Personality, and
Contextual Factors: Links to Pregnancy
and Birth Outcome**

presented by

AnnJanette Ramiro Alejano

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Psychology


Major professor

Date 8-26-94

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.

DATE DUE	DATE DUE	DATE DUE
48		
JUL 14 1999		

MSU is An Affirmative Action/Equal Opportunity Institution

ct/ci/ol/date due.pn3-p.1

**PSYCHOSOCIAL STRESS, PERSONALITY, AND CONTEXTUAL FACTORS:
LINKS TO PREGNANCY AND BIRTH OUTCOME**

By

AnnJanette Ramiro Alejano

A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

Department of Psychology

1994

S

P

P

L

W

M

CC

du

con

Co

mo

the

prop

ABSTRACT

PSYCHOSOCIAL STRESS, PERSONALITY, AND CONTEXTUAL FACTORS: LINKS TO PREGNANCY AND BIRTH OUTCOME

By

AnnJanette Ramiro Alejano

The present study examined the influence of stress, individual characteristics and contextual characteristics on birth outcome in first time mothers. The proposed models were patterned after the Institute for Social Research biopsychosocial model of stress (Kahn, 1981). Within this model, environmental factors, such as social, psychological and behavioral dimensions are given consideration in their influence on health. The results provide evidence for the influence of personality and temperamental characteristics on pregnancy outcome.

Participants in the study were 80 predominantly Caucasian middle-class career women experiencing their first pregnancies. The majority of participants were married, with college degrees. Data in the current study included information collected during the third trimester of pregnancy and medical information recorded during labor and delivery.

For this sample of first time mothers, individual characteristics appear to contribute to the number of complications occurring during labor and delivery. Contextual characteristics, on the other hand, did not play a factor in the proposed model. The proposed links between stress and birth outcome were not supported, and this may be due in part to the homogeneity of the sample. Although the original proposed model did not yield significant results, further analyses focused on

temperamental and personality characteristics in how they influence birth outcome.

Results indicated that differences in labor and delivery complications are apparent for Type A and B career women during their first pregnancies.

Temperamental behavioral style appears to have a greater influence on number of labor complications for Type A women, and does not affect labor progress for Type B women. When comparing the influence of psychological indicators between personality types, the results revealed that the greater anticipatory excitement and anxiety felt, the greater the number of complications Type A women experienced in the labor and delivery room. In contrast, for Type B women, the greater the anticipatory excitement and anxiety felt, the fewer the number of labor complications experienced. It is speculative that there may be a connection between raised emotional state and physiology which in turn influences the progress of labor and delivery for first time pregnant women.

Dedicated to my parents

Eugenio V. Alejano, Jr., M.D.

and

Paz Ramiro Alejano, R.N.

**For teaching me to use my head
and for reminding me that
"Education is something no one can ever take away from you"**

pa
un
dr
le
u
r
l

ACKNOWLEDGEMENTS

Although social support did not prove to be a key factor in the present study, the support and encouragement I received from friends and family during the course of the project was invaluable. They all served as true buffers to my constant barrage of stressors, and encouraged me through times when I felt managing the project was overwhelming. I could not have accomplished all I have in the past year, and especially in the past few months without these special people.

I feel extremely fortunate to have been able to work and learn from such a supportive and encouraging mentor, Dr. Jacqueline Lerner. I also thank Dr. Hiram Fitzgerald for the opportunities he has provided me along the way. I extend thanks to Dr. Fernanda Ferreira and Dr. Lawrence VanEgeren for their assistance on my dissertation committee. Additional thanks goes to Dr. Alexander VonEye for his statistical assistance.

Special thanks are warranted for my research family. It goes without saying that I thank Sandra Frassetto, my co-founder of the Transition to Parenthood project. It is incredible how far we have come from an idea and a conversation. The hundred headaches were worth it; thank you for pulling me through all the worries, negotiations, and times of panic. Very special thanks go to Mona Ibrahim for her thoroughness and capacity to pick up the thousands of details of the project--I feel I leave the data in very capable hands. I clearly could not have completed this dissertation without her. A hundred thousand more thanks to many independent study undergraduates who assisted in the painstaking and monotonous chore of data entry. In particular, I thank Laurie Falk, Candy Dreves and Matt Taylor for being so eager and

helpful at times I needed it most. As Matt would say, "PBORG rules!!"

Additional thanks go to Maria Townsend and Audrey White for their (very current) first-hand knowledge of pregnancy and the baby therapy they provided me during my most anxious times. I can't begin to say enough about the encouragement and emotional support Audrey especially provided throughout the project. And although he doesn't feel like he helped me very much, great big thanks go to Dave Whitney for providing me laughs, statistical direction, and emergency medical assistance during the last year. Collectively, the three of you have always been right there for me, all along and I appreciate it so much. Much love goes out to my family, the Alejanos, for seeing me through this transition in my life, and for the constant love and assistance they provided.

Finally, I wish to thank my special source of love and support, Tom Steele, for helping me through the physical and emotional tolls of the pregnancy project. You have listened to it all, and your patience and understanding and encouragement have been immeasurable. Without you, I wouldn't have made it in one piece.

TABLE OF CONTENTS

List of Tables	viii
List of Figures.....	ix
Problem Statement.....	1
Introduction	6
Systems Models.....	6
Defining Stress.....	11
The Institute for Social Research Model of Stress.....	23
Historical views of stress and pregnancy.....	27
Labor and delivery outcomes.....	29
Stress and pregnancy outcome research.....	34
Moderators in the Stress-Illness Model.....	52
Contextual Moderators.....	53
Individual characteristics and personal resources	63
Hypotheses.....	83
Method	89
Sample	89
Procedure.....	90
Measures.....	92
Results.....	105
Discussion	138
Appendix: Measures	161
List of References	204

LIST OF TABLES

Table

1	Review of prospective studies using primiparous subjects in assessment of stress and birth outcome	40
2	Constructs and measures	86
3	Reliability estimates for scales	106
4	Means, standard deviations and variable correlations	110
5	Individual indicators used in regression analyses for hypotheses 3 and 4	116
6	Regression analyses for hypotheses 3 and 4	118
7	Mean differences between Type A and Type B women	122
8	Regression analyses for Type B sample	124
9	Regression analyses for Type A sample.....	125
10	Principal components factor analysis for predictors	131
11	Latent constructs and individual indicators tested in structural equation model for hypothesis 2.....	135

LIST OF FIGURES

Figure

1	Institute for Social Research Model of Stress	24
2	ISR Model adapted for present study	26
3	Model of psychosocial stress, personality and contextual factors and links to pregnancy outcome	82
4	Regression model predicting labor complications	120
5	Regression models predicting labor complications for Type A and Type B groups	126
6	ISR-based model tested by LISREL	134
7	Reduced LISREL model	137

PROBLEM STATEMENT

Pregnancy is a time of transition involving "a matrix of social and psychological factors on one hand, and a series of structural, endocrinological and metabolic changes on the other." (Istvan, 1986). It is a time of uncertainty and adjustment on the part of the parents, in anticipation of a successful delivery and healthy newborn. The birth of a child is a stressful life event, one where control is desired but not easily achieved. Unfortunately, for many expectant couples, pregnancy and labor do not progress as expected.

The fact that as many as 5 - 15% of all deliveries in the Western World are classified as preterm (Brown, 1984) has led physicians, prenatal health care providers, and child developmentalists to a shared concern regarding the factors that may play a role in the onset of preterm labor. Preterm labor is defined as labor occurring between the beginning of the 21st week and the end of the 37th week of gestation (World Health Organization, 1977). A major concern for researchers and practitioners in this area has been the increased jeopardy for optimal development that preterm delivery poses for the infant. Physical, cognitive, social and developmental problems increase in likelihood with prematurity. Infants who survive a premature birth are more likely than others to be susceptible to neurodevelopmental problems, learning disorders and behavior problems, and their families also face increased financial and emotional burdens (Brown, 1985).

A variety of factors are linked to the risk of having a baby too small or too

soon.

inade

factor

poten

home

sumo

propo

66.9%

with 6

chang

wome

respon

positio

be diff

expose

extent

related

approx

appear

propor

soon. These factors include maternal age, poverty, race, low education, drug use and inadequate prenatal care. Brown (1985) has noted that "of the less documented risk factors, physical and psychological stress are particularly intriguing and of great potential importance (p 114)". Little is known about the impact that daily work and home stressors have on pregnancy outcome.

With the ever-increasing number of women in today's workforce, issues surrounding work and pregnancy come to the forefront. Within the past decade, the proportion of women entering the workforce has been steadily increasing. The rate of 66.9% of women aged 25 to 64 is expected to increase to 80.8% by the year 2000, with 66 million women projected to be in the labor force at that time. With the change in proportion come changes in women's occupations. Over time, more women have taken top-level, managerial or professional positions. Greater responsibility, longer work hours and greater stress accompany these male-dominated positions. Decisions regarding having a child in the midst of a developing career can be difficult.

As more and more women continue to add to the labor force, women are exposed to factors in the workplace that require adaptation and adjustment. To the extent that these work factors are indeed stressful, it has been predicted that "stress-related illnesses, coronary heart disease, and even death will increase and perhaps approximate the rates of men (Detre, Feinleib, Matthews, & Kerr, 1987). It would appear as though "women are undergoing a natural experiment of enormous proportions" (Matthews and Rodin, 1989, p 1389). What implications do these

potent

pregna

psycho

individ

during

relation

persona

poor in

S

multiple

include

develop

Kahn's

for asses

componen

term adap

personal p

by the fo

Th

such as the

~~program~~

potential health changes due to employment have on women who work during pregnancy?

The current study will attempt to bridge the areas of developmental psychology, psychophysiology and obstetrics by examining relationships between individual resources and environmental factors, and how they affect complications during pregnancy, labor progress and newborn outcome. Under investigation is the relationship between behavioral challenge (stress) from the environment, individual personality characteristics and how they influence potential birth complications and poor infant viability.

Several models will be proposed as frameworks with which to organize the multiple events that occur during the transition to first time parenthood. These include systems theory, a biopsychosocial model, and the theoretical viewpoint of developmental contextualism. The present research utilizes these themes within Kahn's (1981) Institute for Social Research stress model which provides a framework for assessing stress effects on health outcome. The ISR model includes six components: 1) the objective environment, 2) the psychological environment 3) short term adaptation response 4) sustained mental and physical health change, 5) enduring personal properties and 6) interpersonal relations. Each component will be assessed by the following measures.

The objective environment will include contexts held constant across subjects, such as the condition of pregnancy and the employment situation. Psychological environment includes perceptions of stress, as indicated by depression, anxiety and

se!

als

sh-

sty!

the

len;

bird

head

activ

of si

be as

achie

pregn

stress

for sc

serve

outco

workin

transi

data co

self-reports of daily and extreme life stressors. Work satisfaction and role strain will also provide measures of perceived stress as triggered by work environment. The short term adaptation response will be assessed by a measure of individuals' coping style in the face of problem situations. Sustained mental and physical change provide the outcome portion of the model. Resulting labor progress, such as labor stage length and complications and infant outcome indicators, such as Apgar scores, birthweight and prematurity will be assessed within this component of the model.

Enduring personal properties include individual styles of behavior and mental health. Personal style includes temperament indices of general activity level, sleep activity level, flexibility-rigidity, quality of mood, approach-withdrawal, rhythmicity of sleep, eating and daily habits, and task orientation. Type A personality will also be assessed, which is characteristic of individuals who are time-conscious, achievement-striving and competitive. Personal expectations of control during pregnancy will also be measured. Interpersonal relations that affect the influence of stress on health will be assessed by self-report of marital satisfaction and desired need for social support during pregnancy. The latter two components of the model may serve as mediators or buffers to the primary influence of stress on pregnancy outcome.

The current study proposes a short-term longitudinal study of 80 pregnant working women, assessing psychological and physical changes that occur during the transition to first time motherhood. The proposed analyses will utilize questionnaire data collected during the third trimester of pregnancy, medical data collected during

labor and delivery, and questionnaire data collected 8 weeks postpartum.

interde

present

relation

system.

system.

comprns

unit, es,

makes p

:1993, p

(biologi-

overlapp

understo

T

systems.

compose

molecule

describe

INTRODUCTION

The pregnancy event can be represented in terms of a network of interdependent and interrelated events. Several theoretical models will be used in the present study as a means of organizing a research plan aimed at looking at the relationship of interrelated variables during pregnancy. A review of three models, systems theory, the biopsychosocial model and developmental contextualism follows.

Systems Model

The events that occur during the course of pregnancy can be seen as a system. A system is defined as "an organized arrangement of elements which comprise a network of interdependent and coordinated parts, and which functions as a unit, especially for the purpose of concerted action. The regularized interdependence makes possible the functioning or performance of the unit as a whole" (Fitzgerald, 1993, p 4). The human system, comprised of differing levels of functioning (biological, psychological, interpersonal, cultural, or ecological) can be viewed as overlapping and interpenetrating systems. For example, individuals can be understood as biopsychological systems or psychosocial systems.

The basic assumption of systems theories is that systems exist within larger systems. For example, social systems are composed of individuals, individuals are composed of tissues, and tissues are composed of cells and cells are composed of molecules and so forth. Nothing exists in isolation. Systems theory has been used to describe components of a system relative to adaptive functioning. Carlson and

Ca

2) s

excl

cross

system

The

chang

mother

percep

of the

biosp

biomed

health a

environ

health.

Instead,

emphasiz

T.

Cassell (19) note that these components include 1) characteristics of the individual, 2) social and ecological structure of the particular environment, 3) continuous active exchange processes connecting the individual and environments, and the individual's cross-environment transitions, and 4) the negotiation of adaptive fit.

For the purposes of the current research proposal, the pregnancy event is a system comprised of biological, social and psychological systems operating in concert. The relationship between mother and father are two independent systems undergoing change during the transition to parenthood. Meanwhile, the biological system of the mother undergoes radical change throughout the gestational period, and psychological perceptions shift in anticipation of the labor and becoming a first time mother. One of the key models in health psychology based on systems theory is the biopsychosocial model.

The Biopsychosocial Model

The biopsychosocial model of health developed as an extension to the biomedical model. The biomedical model only considered the biochemical factors of health and illness, whereas the biopsychosocial model includes the influence of environmental factors, such as social, psychological and behavioral dimensions on health. The model extends beyond the reliance on treatment for health problems. Instead, prevention, health enhancement and individual responsibility for health are emphasized.

The biopsychosocial model considers the role that lifestyles play in current

dise

the

asse

char

to he

psyc

nerve

These

of ion

possi?

person

contr

affect

hormo

perce

more c

multip

specific

acknow

not mea

diseases. It has been documented that behavioral factors are implicated in seven of the ten leading causes of death in the United States (Raub, 1989). One way of assessing the influences of environment on the body has been to measure a biological change in the body as a response to an external event. One biopsychosocial approach to health provided by Frankenhaeuser (1989) focuses on endocrine responses to the psychosocial environment. His work has targeted the coordinating functions of the nervous and endocrine systems in the adaptation of humans to their environment. These endocrine changes are hypothesized to develop as indicators as early warnings of long-term risks, such as heart disease.

For example, Frankenhaeuser's effort-affect model (1989) addresses the possible mechanism for favorable health effects of work conditions that allow for personal control. This mechanism can be the catecholamine/ cortisol balance of controllable situations. The theory discusses how effort and positive or negative affect induced by different work demands may be determinants of physiological/ hormonal responses. In turn, these responses influence health outcomes. How people perceive control over their environment mediates the quality of affect experienced. A more detailed set of examples will be covered in later sections.

The biopsychosocial systems model is an appropriate tool to identify the multiple systems at work during pregnancy. Although the present study does not specifically address nervous and endocrine systems in the model, it is important to acknowledge the physiological pathways between stress and health. This study will not measure biological markers, but theoretical notions of the hormonal and

end

The

way

tran.

and t

are at

is to c

of dev

highlig

approa

organis

itself. I

the con

exchang

in dyna

organis

(Lerner,

a descrip

endocrinological connections between psychology and biological change are possible. These issues will be addressed in a later section reviewing animal research. Another way to define and organize the system of multiple events occurring during the transition to parenthood is by way of the developmental contextualism model.

Developmental Contextualism

Throughout the history of developmental psychology, a synthesis of method and theory has evolved to attempt to explain the nature of human beings and how they are affected by environmental factors. The current task in developmental psychology is to determine exactly how genetic endowment interacts with experience in the course of development. In the case of this study, the course of pregnancy will be highlighted.

The developmental contextual perspective (Lerner, 1986) provides a means of approaching the relative contributions of nature and nurture. Within this perspective, organismic characteristics (genes, cells, tissues, organs) as well as the whole organism itself, function in a bidirectional, reciprocal or "dynamic interactional" relation with the contexts within which the organism is embedded. What results is a multilevel exchange of "information" variables. Because changes in the organism always occur in dynamic connection with changes in the context (and vice versa), changes in organism-context relations represent the basic change processes in development (Lerner, 1986). The developmental contextual view of human development provides a description of the dynamic interaction among biological, psychological and social

fa

on

pro

"ge

cur

thei

com

deve

conts

the in

influe

focus

course

and in

change

implic

influen

accusto

anticipa

can be s

factors influencing development. Individual outcomes are probabilities, i.e., dependent on the reciprocal interaction of both internal and external influences. The model proposes an ever-changing relationship among factors, providing a description of the "goodness of fit" between the individual and his/her environment. In the case of the current study, poor fit results in stress. Individuals are seen as active producers of their own development by virtue of a dynamic interaction of development with social contexts (Lerner, Lerner & Tubman, 1988).

The transition to first time motherhood is an inherent part of adult development for many adults. This proposal will examine this transition in the context of the workplace and its associated stressors. The emphasis will be placed on the individual who has personal resources (personality and temperament) which are influenced by the environment (social and work relationships). The proposal will focus on these components and how they interact and influence each other during the course of pregnancy, or stated alternatively, how constitution and environment coact and interact to influence birth outcomes.

For example, as a woman's body changes, adaptation is continuous, with changes in appetite, clothing and feelings about the growing fetus inside her and implications for change for the marriage. The physical and psychological adjustments influence how one feels about becoming a first time parent. Women who are accustomed to identifying themselves by marriage and career find themselves in anticipation of adding a new role of parent to their self-definition. Contextual factors can be supportive and buffering or they can heighten the stress felt during the

1

n

c

to

be

by

an

dear

psy

For

prim

biol

psych

psych

descri

stimu

brief

transition.

In summary, the systems, biopsychosocial and developmental contextual models furnish broad theoretical frameworks within which to assess individual and contextual influences on pregnancy outcome. The following section will be devoted to defining the complex issues associated with stress research. A model of stress will be offered as a more specific means of investigating pregnancy outcome as influenced by stress. The subsequent sections will address the variables of interest in more detail and how they fit in the proposed stress model.

Defining Stress

We are in the midst of an epidemic of stress that is causing illness and even death, but few agree about how to define stress. Approaches from diverse psychological and medical viewpoints lend to the confusion in how stress is defined. For example, in the biological sciences, investigators have tended to use stressors primarily as experimental tools, with most of the major discoveries of potential biological substrates for stress effects. Alternatively, investigators in the psychological and social sciences have targeted strong associations between certain psychosocial events and physical and mental illness. Generally, physicians tend to describe stress as a response, while psychologists have a tendency to define stress as a stimulus.

Stress may be defined as a cause, effect or interaction between the two. A brief examination of how definitions of stress have evolved over the past few decades

is in

stres

phys

indiv

could

the pe

Adapt

has no

optima

again.

stimuli

stress,

By the

respons

emphas

a stressor

physiolo

S

physiolo

included

is in order before delving into specific models of health and stress.

Walter Cannon (1935) laid the groundwork for explaining possible effects of stress on the body. In his work on blood hormones, Cannon studied the effects of physical or emotional "stress", by which he meant stimuli that disrupted an individual's normal internal environment. Stress which exceeded a critical threshold could strain people beyond their adaptive limits. Selye (1956, 1975) further extended the parameters within which to study stress by identifying a three-stage General Adaptation Syndrome. These stages include 1) an alarm reaction, in which adaptation has not yet been acquired, 2) a second stage of resistance, in which adaptation is optimal and 3) a final stage of exhaustion, in which the acquired adaptation is lost again. Selye postulated that this response was nonspecific, so that any noxious stimulus would produce the same stages of response (Selye, 1975).

Selye's subsequent research saw an evolution of change in the definition of stress, and his initial work in the 1930's used "stress" as a synonym for "stimulus". By the 1950's, Selye proposed that stress should refer instead to the nonspecific response of an individual to such stimuli, which he called "stressors". Increased emphasis was then placed on the importance of the individual. Thus, a stimulus was a stressor only if it produced a stress response, which consisted of specific, objective physiological changes.

Selye's research in neurobiology and medicine targeted endocrine and physiological responses to stressful situations. His key contribution to the field included a hypothesis that either physical or emotional stressors might produce stress

re

of

m

sin

stre

wo

His

the

disun

comm

index

to stre

compa

points

is or ha

small

reactions, and this provided strong foundations for psychosomatic research. In spite of these achievements, stress researchers have yet to agree on issues of definition and methodology. Mason (1975a) concluded that scientific opinion has changed little since the 1950's: "There are still some (researchers) who accept Selye's views on stress, some who use modifications of them, some who regard them yet as unproven working hypotheses, and some who simply reject or ignore them" (p 25). Historically, stress has been defined as a stimulus, response and interaction between the two. A brief description follows.

Stress as a Stimulus

As noted earlier, the term 'stressor' was introduced by Selye (1978) to distinguish between the cause (stressor) and the effect (stress). Stressors are commonly measured by a variety of life events scales which yield overall life events indexes. These measures are often quick and simple to administer. Another approach to stressors included defining certain contexts as inherently stressful. Outcomes are compared to a control group or by using subjects as their own controls at different points in time.

Yet it is noteworthy that incompatibility between wishes, desires and what one is or has might be a source of stress. Defining stressors in terms of solely external stimuli may miss an important part of the picture.

1

1

P

w

22

m

ou

dis

con

the e

dis

Stress as a Physiological Response

Physiologic stress is measured by a variety of techniques including cardiovascular (heart rate, blood pressure, vagal tone), immunologic (antibody response, lymphocytic activity, interferon production) and neuroendocrine (galvanic skin response, corticosteroid secretion). These measures help to clarify possible pathways connecting external stress with the development of disease states.

Unfortunately, circular reasoning results from determining the connection between physiologic measures and subjective distress. Which should be validated against which?

Psychologic stress is also measured by a variety of self-report or interviewer ratings of anxiety, depression and distress. These types of measures may capture more closely what people think when considering the definition of "being stressed out". Yet with these measures, subjects who cope well may not report high levels of distress, even when external stress is great, and vice versa.

Stress as an Interaction Between the Environment and the Organism

This view of stress is similar to the notions behind the model of developmental contextualism. In considering the interaction between how the individual perceives the environment and what resources he/ she brings to the situation, people seem to be distributed on a continuum of ability to withstand stressful circumstances.

Evidence indicates that rare individuals with certain characteristics do well

e

e

w

p

T

by

cr

di

ac

exp

The

dep

the

pass

with

must

(1977)

They

even under objective conditions of extreme stress, that some individuals do poorly even with little stress and for most individuals, increasing stress is generally related to worse health outcomes. The concept of hardiness (Kobasa, 1979, 1982), includes personalities with high degree of commitment, control and challenge in their lives. They view change as normal and as an opportunity rather than a threat.

Genetic vulnerability and earlier experiences with the environment play a role by affecting physiologic reactivity to stimuli (threshold and recovery effects) and creating individual differences in vulnerability to biochemical effects of stress in different target organs or systems (Kobasa, 1982). Social support and coping seem to act as buffers, by decreasing exposure to stress, increasing ability to cope when exposed, or both. These factors, in turn, are influenced by past life experiences. These notions parallel those within the theory of developmental contextualism which depicts individuals as producers of their own development. None of the subjects in the present study have had previous experience with childbirth, but they may have past experience with children and friends' pregnancies which may help them cope with their transition to parenthood.

Defining Types of Stressors

Given these conceptualizations of stress and its historical definitions, attention must be given to defining variation across types of stressors. Lazarus and Cohen (1977) identified three categories of stressors, each varying in intensity of effects. They are cataclysmic, personal, and background stressors.

con

im

flow

tox

nat

sun

line

gov

mis

can

inte

extr

beco

they

more

availa

scale

types

Cataclysmic stressors refer to events that happen to several people or whole communities at the same time. They are usually unpredictable, have a powerful impact, and require great coping efforts. These include natural disasters such as flooding, fire and earthquakes, wars, massive layoffs, and manmade disasters such as toxic waste dumps and nuclear power plants.

In many ways, reactions to manmade disasters are similar to reactions to natural disasters. Natural catastrophes are usually time-limited. In contrast, survivors of manmade disasters cope with the stress of not knowing what serious illnesses may result and not being able to find ways of overcoming it because of government indecision. Manmade disaster survivors typically have reported cases of miscarriage, stillbirth, birth defects, respiratory problems, urinary problems and cancer. Other psychophysiological problems have included family strain, depression, irritability, dizziness, nausea, weakness, fatigue, insomnia, and numbness in the extremities (Holden, 1980).

Personal stressors are those that affect individuals, such as failing exams, becoming employed, or getting divorced. These may or may not be predictable, but they also have powerful impact and require great coping efforts. Often these are more difficult to cope with than cataclysmic stressors because of the lack of support available when they occur. Scales such as the Holmes and Rahe (1967) life events scale are frequently used to measure personal stressors.

Finally, background stressors include daily work and family stresses. These types of stressors are the daily hassles of life, which are small but persistent problems

that

pro

to

run

ind

ever

stre

neg

into

stron

posit

Saras

Seize

they h

termin

they e

Frank

1981).

that irritate and distress individuals (Lazarus & Folkman, 1984). They include problems like a noisy workplace, too many responsibilities, or poor lighting. Failure to seek support or help in solving these stressors may cause more damage in the long run than cataclysmic or personal stressors.

Appraisal of Stress

Given the variation in types of stressors that occur in our daily lives, the way individual appraise these stressors varies greatly. Regardless of the type of stressful event, many of these events themselves are not inherently stressful. Whether they are stressful depends on the appraisals of the individual. Appraisal of events as being negative or positive, predictability of events and ambiguity of events are all factored into the perception of stress. In general, negative events have been found to show a stronger relationship to both psychological distress and physical symptoms than do positive ones (e.g., Myers, Lindenthal, & Perrin, 1972; McFarlane et al, 1980; Sarason, Johnson & Siegel, 1978; Stokols, Ohlig & Resnick, 1978; Vinokur & Selzer, 1975).

In addition, perceptions of stress are also affected by the control people feel they have over stressful situations. When people feel they can predict, modify or terminate an aversive event or feel they have access to someone who can influence it, they experience it as less stressful, even if they actually do nothing about it (e.g. Frankenhaeuser, 1975; Glass & Singer, 1972; Suls & Mullen, 1981; Thompson, 1981). Finally, when a potential stressor is ambiguous, a person has no opportunity

to

dis

rep

Ma

clea

in a

of s

Se:

life

that

add:

This

persp

the be

social

relativ

compa

animal

to take action. The ability to take confrontative action is usually associated with less distress and better coping (Gal & Lazarus, 1975). For example, role ambiguity is reported as one of the major factors contributing to work-related stress (Cooper & Marshall, 1976). This role ambiguity can result from having no task guidelines, no clear standards of performance or lack of standards. The specific processes involved in appraisal will be discussed in more detail in the following section on early models of stress and health.

The current study will assess reactions to personal and background stressors. Self-report measures of depression, anxiety, daily work and home stress and extreme life stressors will be utilized to tap into stressors perceived by pregnant women. Now that the types of stress under focus have been reviewed, the following section addresses the connections between perceived stress and its effects on health outcome. This section will cover how stress affects health, including an evolutionary perspective, processes of psychological appraisal and responses to stress.

Stress and Physical Health

Frankenhauser (1989) offers an evolutionary perspective of stress influences on the body. This perspective combines genetic evolution and the accelerating pace of social-work evolution. In other words, although human physiology has remained relatively constant over time, technological advances have changed dramatically in comparison. Early man's largest concern was protection from larger dominant animals. Today's demands are noted to be more psychological than physical, but both

demands trigger the same bodily stress responses. Frankenhaeuser (1989) notes that modern stresses result from a mismatch between old biology and a new sociotechnical world. Early models of stress largely neglected the importance of psychological factors. This was in part due to the fact that early stress work was conducted on animals, where emphasis was placed on identification of endocrinological indicators of stress.

Lazarus (1968; Lazarus & Folkman, 1984) has been the chief proponent of psychological approaches to stress. In his view, the experience of stress involves an individual's assessment of his/her changing environment, then engaging in a series of processes of primary and secondary appraisal. Primary appraisal determines the meaning of the event, as beneficial, neutral, or negative in their consequences. Negative or potentially negative events are further appraised for their possible harm, threat or challenge. Once primary appraisals of potentially stressful events have occurred, secondary appraisal is initiated. The individual assesses his/her coping abilities and resources and whether they will be sufficient to meet the harm, threat and challenge of the event. Ultimately, the subjective experience of stress results from a balance between primary and secondary appraisal (Lazarus & Folkman, 1986).

These appraisals then yield physiological, cognitive, and emotional consequences. The primary physiological consequence of stress is arousal. The stress response involves a series of coordinated nervous system and endocrinological reactions. Sympathetic nervous system activity increases blood pressure, heart rate, pulse rate, skin conductivity, and respiration (Taylor, 1986). This activity is also

augmented by endocrine responses initiated by the adrenal glands. High levels of catecholamines (epinephrine or norepinephrine) and heightened levels of corticosteroids, especially cortisol, have been documented across a wide range of stressful events (Rose, 1980). These reactions may show some degree of specificity as a function of the particular stressor and the individual's appraisal of it.

Cognitive responses include outcomes of the appraisal process such as specific beliefs about the harm or threat of an event and about its causes or controllability. Cognitive responses include involuntary stress responses such as distractibility and inability to concentrate; performance disruptions on cognitive tasks (Zajonc, 1965; Cohen, 1980); and intrusive, repetitive or morbid thoughts (Horowitz, 1975).

Emotional reactions to stressful events range widely, including fear, anxiety, excitement, embarrassment, anger, and depression. Behavioral responses are variable, depending upon the nature or the stressful event. Actions may include confrontative action against the stressor ("fight") and withdrawal from the threatening event ("flight").

Given the physiological, cognitive and emotional consequences that may result from stress, how are these indicators of stress measured? Researchers have used a wide array of indicators. These include self-reports of perceived stress, life change and emotional distress; behavioral measures, such as performance on subsequent tasks; and physiological measures of arousal, such as skin conductivity, heart rate, and blood pressures. Biochemical indicators are also possible to investigate, such as blood levels and urinary levels of cortisol and catecholamines (Baum, Grunber, &

Singer, 1982).

The present study will attempt to measure types of stressors experienced with the use of self-report questionnaires. Aspects of the workplace and the daily stresses associated with occupational environment will furnish a context in which to assess pregnancy outcome. The next section briefly summarizes the special characteristics of occupational stress.

The Special Case of Daily Stressors: Occupational Stress

Studies of occupational stress have been increasing in the past several decades. These studies help to identify some of the most common stressors of everyday life, and work stress may be one of society's preventable stressors opening up possibilities for intervention. Generally, the characteristics of occupational environment and job content are critical with regard both to job satisfaction and to health (Frankenhaeuser, 1976, 1981; Frankenhaeuser & Gardell, 1976; Frankenhaeuser & Johannsson, 1976; Gardell, 1980; Johannsson et al, 1978; Levy, 1972, 1981).

The key job factors that trigger stress include quantitative work overload, qualitative work underload, lack of control and lack of social support. Workers who feel required to work too long and too hard at multiple tasks feel more stressed and sustain more health risks than do workers not suffering from overload (Caplan & Jones, 1975; Breslow & Buell, 1960). Perceived work pressure can produce work overload, as in the case of university faculty members who feel they have to work longer and harder than their colleagues (French, Tupper & Mueller, 1965; Brooks &

Mueller, 1966). In general, workers in high-stress jobs have a higher prevalence and incidence of wide range of diseases, and the greater the stress the greater the disease.

Lack of control over work has been related to a number of stress indicators, including heightened catecholamine secretion, job dissatisfaction, and absenteeism. Two studies by Frankenhauser (1976, 1981) found that workers with less control over work also showed high rates of headaches, high blood pressure, and gastrointestinal disorders including ulcers (see also House et al, 1979). Occupational stress does not always result in illness or illness precursors. Stress may also show up in ways that may be costly to a work organization. Higher rates of absenteeism, job turnover, tardiness, job dissatisfaction, sabotage, and lower levels of performance on the job may be evident (Cooper & Marshall, 1976).

Thus, work stress appears to be associated with two types of adverse consequences: first, there may be a direct association between certain objective conditions at work (physiological and psychological stressors) and ill health. Second, certain stress conditions may create fatigue or passivity in individuals and thus make it more difficult for them to involve themselves actively to change working conditions.

Taking environmental influences on individuals into consideration, a proposed model of the relationship between stress and illness is in order. The stress-illness relationship is very complex, since it is influenced by a number of preexisting and intervening factors (Taylor, 1986). The standard model of stress is the direct route model which explains that stress can produce physiological and psychological changes

conducive to the development of illness. Precursors of illness such as fatigue and achiness then develop, which, untreated, can lead to illness. This oversimplified model is subject to considerable variability as people react differently to the same stressors and the same symptoms. Variation in individuals' preexisting psychological or physical conditions may make them more vulnerable to stress, or stress may also affect illness by altering a person's health behavior patterns.

A Proposed Model of Research: The ISR Model of Stress

Now that definitions of stress, types of stressors and health outcomes have been reviewed, a general theoretical model for stress is now in order. Kahn's (1970, 1981) ISR Model is a useful organizing device to assess the components of stressful situations. This model does not view stress as a well-defined concept or phenomenon, but as a generic label for a set of phenomena and processes involving six classes of linked variables. The model components are depicted in Figure 1.

Objective organizational environments or situations give rise to psychological perceptions of those environments, including perceptions of stress--feelings that environmental demands are excessive relative to the person's abilities or that environmental opportunities are inadequate to justify the person's needs (French, 1974).

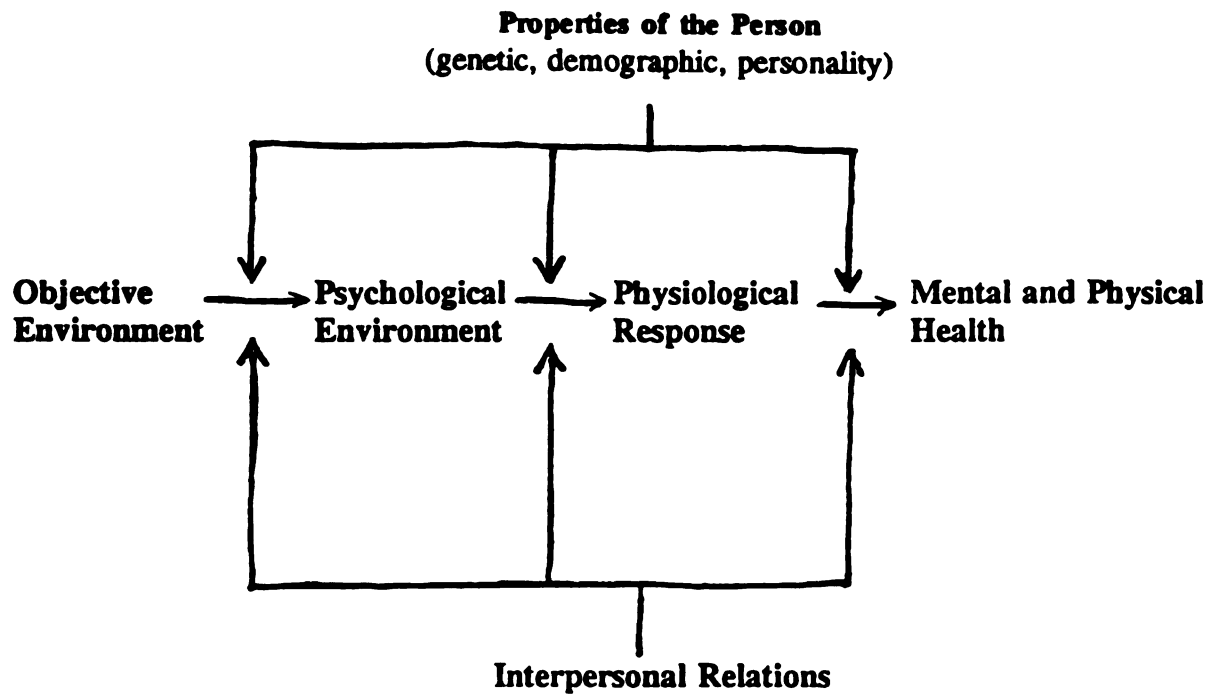


Figure 1.
Institute for Social Research Model of Stress

These perceptions give rise to short-term affective, physiological, or behavioral responses, including responses that may alter the objective environment or the person's perceptions of it. Responses are typically called coping and adaptation. Finally, depending on their nature, intensity and duration, these responses may lead to more sustained changes in mental and physical health.

Each of the relationships or effects among each of the four components can be conceived of as a process occurring and recurring over time, with the nature of the relationship or effect being conditional on an individual's enduring characteristics and interpersonal situation or environment (Kahn, 1981). Pearlin and Johnson (1977) offer the example of highly competent people who appear to be less likely to perceive given objective conditions as stressful. In addition, people with trustful or supportive interpersonal relations are less likely to experience adverse health outcomes following exposure to stressors (Cassell, 1976; Cobb, 1976).

One scientific strategy suggested by the model is to identify objective and subjective environmental factors that may adversely affect a range of health outcomes and then to work forward in the causal sequence to determine their effects. This is the goal of the present research, and Figure 2 depicts the model of the current study.

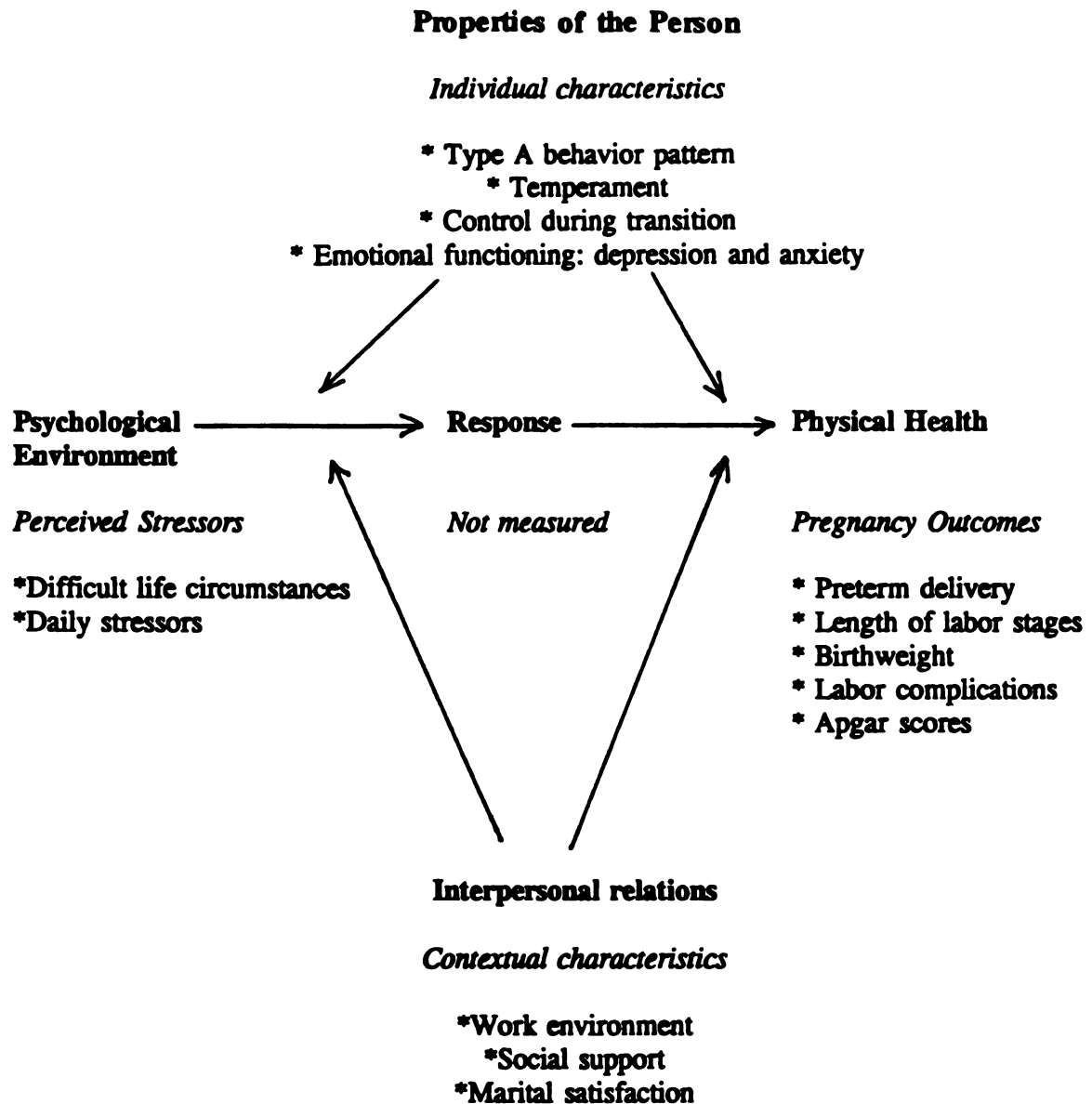


Figure 2.

Institute for Social Research Model adapted for the present study

ISR Model descriptors are in bold type

Current study descriptors are italicized

In summary, the contribution of psychological factors to physical dysfunction and disease has been briefly reviewed. It has long been believed that health problems often follow periods of emotional distress or upset (Selye, 1982). As discussed in previous sections, psychological stress has been examined as an etiological or exacerbating factor in a variety of physical illnesses such as mononucleosis (Kasl, Evans & Niederman, 1979), coronary heart disease (Jenkins, 1976; Theorell, 1981), cancer (Sklar & Anisman, 1981), and a variety of other disorders (for a review, see Istvan, 1986 and Bunney et al, 1982). The ensuing section will review literature on the influences of stress on pregnancy.

Historical Views of Stress and Pregnancy

Historically, several folk beliefs regarding emotional factors associated with dysfunctional pregnancy are described as early as in the Old and New Testaments, throughout the Middle Ages and into the present century (Ellis, 1906/ 1936). Ballantyne (1904) discussed several aspects of psychological effects on pregnancy and childbirth. The first is the doctrine of maternal "impressions", that is "the belief that exposure during pregnancy to a particular emotionally stressing object or event would result in some anomalous feature appearing in the neonate that specifically mimics this stressor (e.g. a mother frightened by a dog during pregnancy giving birth to a child with canine features" (Williamson, 1890, cited in Ellis, 1906; 1936)). A variation of this belief maintains that emotional distress could have nonspecific adverse effects on the fetus or the progress of childbirth.

Current research on stress and pregnancy has focused on effects of stressors on the progress of labor and infant outcome. The outcome variables included in the present study will investigate indicators of poor labor progress and newborn outcome. Indicators of poor labor progress include the length of labor stages and birthing complications while indicators of poor infant outcome include Apgar scores, low birthweight, and poor infant health complications that occur postnatally.

Generally, obstetric complications assessed during pregnancy include a range of risk indicators including gestational age (<37 weeks), birthweight <2.5kg, blood group incompatibility, blood pressure during pregnancy (<140/90 mmHg), lack of membrane rupture prior to delivery, spontaneous delivery, duration of first and second stages of labor, knotted umbilical cord, placenta previa or abruptio, and low Apgar scores (Prechtl, 1990). These risk indicators alert medical practitioners to potential medical intervention after the labor and delivery. These factors are often the outcome variables of focus in most pregnancy research. For example, stressful events that occur during the course of pregnancy, such as a car accident, may send the mother into the delivery at a premature date. Consequences of naturally stressful events can then be investigated by assessing labor progress and infant outcome. Often, labor difficulties lead to eventual infant health complications. Postnatal infant complications that are given special attention include respiratory distress, ventilatory assistance, infection, noninfectious illness, metabolic abnormality, convulsions, exchange transfusions, temperature disturbances, and surgery (Prechtl, 1990).

A review of the key outcome variables in the present study follows, with

special consideration given to the complexities of assessing premature delivery.

Labor and Delivery Outcomes

Length of Labor Stages

The biological process of birth is divided into three overlapping stages. The first stage of labor lasts from the first regular intense contractions of the uterus until the cervix is fully dilated. The length of this stage varies from woman to woman and from pregnancy to pregnancy, ranging from one hour to several days. This longest stage of labor lasts on average, 12 to 14 hours (Niswander, 1981). The second stage of labor begins once the cervix is fully dilated, and the newborn's head pushes through the cervix into the vagina. Roughly, this stage lasts 50 minutes for a first delivery and 20 minutes for later births (Niswander, 1981). Finally, the third stage of labor involves contraction of the uterus, where the placenta separates from the uterine wall, pulling other fetal membranes with it. This stage roughly lasts 5 to 10 minutes.

A study by Lederman et al (1979) assessed the relationship between psychological factors in the third trimester of pregnancy and progress in the first two stages of labor. Several psychological variables including anxiety, fear, self-esteem and loss of control correlated significantly with length of labor during stage 2. Their results gave support to the hypotheses that maternal conflict and anxiety affect plasma catecholamine and cortisol production, which in turn affect uterine activity and progress in labor. A study by Burns (1976), found cortisol levels to correlate with

the length of labor. It may be reasoned that if psychological conflict and anxiety in pregnancy have an effect on progress in labor, they may also have consequences for the well-being of the newborn (Lederman et al, 1979).

Apgar scores

The Apgar scoring system (Apgar, 1953) involves rating the newborn at 1 and 5 minutes after birth. Five different items are scored on a scale from 0 to 2. Two points are given if the infant is in the best possible condition for a particular sign, no points are assigned if the sign is not present, and 1 point is given for all conditions between 0 and 2. Individual scores are totaled to give a measure of the infant's overall physical condition. The highest total score an infant can obtain is 10. An infant with a score of less than 4 is considered to be in poor condition and to require immediate medical attention.

Research utilizing the Apgar scoring system has attempted to relate Apgar scores to maternal health variables, infant birth condition, later anomalies and/ or morbidity, and later neurological conditions (For a review, see Osofsky, 1987). Although its predictive value is questionable, the clearest finding regarding the Apgar test involves its relationship to infant mortality. Early studies documented strong correlations between low Apgar ratings and infant mortality, particularly during the neonatal period (e.g. Drage, Kennedy & Schwart, 1964; Richards et al, 1968; Seunian & Broman, 1975).

Birthweight

Generally, babies who are born before 37 weeks of gestation can weigh less than 5 1/2 pounds (2,500 grams), and this low birthweight helps to classify these low birth weight infants as premature. A wealth of research indicates that premature babies are at risk for many problems. Birth weight is the best available predictor of infant survival and healthy development. Many newborns who weigh less than 3 1/3 pounds (1,500 grams) experience difficulties that are not overcome, an effect that becomes stronger as birth weight decreases. Frequent illness, inattention, overactivity, and school learning problems are some of the problems that may extend into childhood (McCormick, Gortmaker, & Sobol, 1990; Vohr & Garcia-Coll, 1988). Roughly 1 in 14 infants is born underweight (< 6 pounds) in the United States (Kopp & Kaler, 1988)

A number of studies of the effects of risk factors on heart rate, especially those of medical condition, birth weight and prematurity have been reported (see VonBargen, 1983, for a review). For example, two studies report that even for full-term infants, birth weight may influence cardiac responding. LeVita et al (1980) and Stamps (1980) suggest that within the normal weight range, lower-weight infants may be less likely to orient to people and objects than higher-birth-weight infants.

Prematurity

The problems associated with prematurity have long been recognized by clinicians and studied by epidemiologists. However, these observations have not led

researchers any closer to the causes of preterm birth and no effective treatment has been found. Methodological problems in epidemiological studies of preterm birth may have misled investigators and contributed to the problems in defining preterm birth (Bryce, 1991). The main methodological problem that has hampered research in preterm birth has been its definition which is extremely broad and varies between countries (Bryce, 1991).

Preterm birth is defined by the World Health Organization as a birth before 37 completed weeks gestation (or less than 259 days) since the first day of the last menstrual period. This includes both live births and stillbirths. The WHO definition of a live birth is internationally accepted as "the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which after separation, breathes or shows pulsation of the umbilical cord or definite movement of the voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached" (World Health Organization, 1977, c.f. Bryce, 1991, p 439).

Problems Defining Preterm Birth

Differences between countries in the definition of a stillbirth have contributed to discrepancies in reported incidence of preterm birth. For example, in 1981 in France, the incidence of preterm birth was 5%, in the U.S. in 1982 it was 8% for white infants and 17% for black infants, in Hong Kong in 1981 to 1983, it was 2%, and in Western Australia in 1986, it was 8% (Papiernik et al, 1985; Paneth, 1986;

Drew et al, 1988; Moore, 1988).

Inadequate reporting may be the cause of the variation of rates seen all over the world. In some countries, abortions and births mainly occur outside of hospitals and birth attendants may be illiterate and recording systems nonexistent. Reported differences in the incidence of preterm birth between countries need to be considered in light of this factor (Bryce, 1991).

In countries where gestational age data have been kept and are reliable, preterm birth rates have been fairly constant. Another problem with the definition of preterm birth is its breadth in definition. The fact that the definition of preterm birth encompasses infants with a wide range of clinical conditions and prognoses from the previsible to the perfectly healthy has also led to problems in studying the condition. Most studies include cohorts of preterm infants that have large numbers of mildly preterm infants, while extremely preterm infants have been poorly represented.

Bryce notes that the "retrospective data collection, especially regarding perinatal mortalities, has been an obstetrical obsession" (Bryce, 1991, p 440). Such studies have yielded a long list of factors associated with preterm birth, including previous preterm births, medical illnesses, social disadvantage, and poor lifestyles (Institute of Medicine, 1985). The methodology used to establish these associates has varied from cross-sectional observations (Federick & Anderson, 1976) to multivariate techniques designed to minimize confounding (Berkowitz, 1985; Kaminsky, Goujard & Rumeau-Rouquette, 1973; Ross, Hobel, Bragonier, Bear & Bemis, 1986) to a longitudinal cohort study of women with previous preterm births which established

their risk of recurrence (Bakketeig & Hoffman, 1981).

Preterm birth remains an outcome of multiple causes. Because 37 complete weeks gestation was arbitrarily chosen as its upper limit, the preterm category includes many normal infants who merely have found themselves in the lower tail of a normal distribution.

While there is still no consensus on the definitions and criteria of preterm deliveries, the fact remains that, however defined, it is associated with risk and jeopardizes the viability of the infant. Efforts must be aimed at reducing preterm deliveries by delineating the factors that contribute to them. The next section will review the literature pertinent to the link between stress and pregnancy outcome with preterm delivery as one of those outcomes.

Stress and Pregnancy Outcome Research

Over the past two decades, the marriage of the two literatures on stress and poor pregnancy outcome have yielded several inconsistent and contradictory studies. Comparisons between existing studies are difficult due to the variation in the constructs and definitions provided by each study. The studies also vary in the timepoints of measurement during the course of pregnancy, and they also vary in the demographic characteristics of the samples, such as parity, age, education, socioeconomic status and marital status.

A number of studies have shown that women delivering preterm infants have increased rates of stress as compared to matched controls delivering full term infants

(Berkowitz & Kasl, 1983; Blau, Slaff & Easton, 1963; Gunter, 1963; Newton & Hunt, 1984; Newton, Webster, Binu, Maskrey & Phillips, 1979; Omer, Elizur, Barnea, Friedlander & Palti, 1986; Schwartz, 1977).

Most current research has focused more on the effects of anxiety or life change stress on reproductive dysfunction, and less so on physiological underpinnings of stress as a contributing factor. This is partly attributable to the ethical and practical restraints on experimental research on humans, as well as the interplay of medical, behavioral and sociodemographic factors that contribute to obstetric risk. Therefore, much of the research on stress influences on pregnancy outcome have been conducted with animals.

Animal research on induced stress and pregnancy outcome

Studies on a variety of laboratory animals (pregnant sheep, monkeys, rodents) provide evidence that maternal exposure to stressors (heat, light, noise, shock, crowding, handling) has adverse effects on reproductive outcomes in mammals. Generally, these results implicate stress-related increases in catecholamine secretion as an underlying mechanism for these effects (Caldwell, 1963). In rats, for example, exposure to stressors during gestation has been associated with lower birth or fetal weights and smaller litter sizes or higher rates of fetal resorption, and as little as 10 minutes of restraint during gestation have produced higher rates of growth-retarded and malformed fetuses (Michel & Fritz-Nigli, 1978). For a more intensive review, see Istvan, 1986). Yet overall findings from the animal data suggest that although

stress seems to generally produce unfavorable reproductive outcomes in rodents, there is little evidence from this research that exposure to stressors will result in specific unfavorable reproductive outcomes (Istvan, 1986). It is evident that the applicability of rodent data to humans is accepted with reservations. Some of these reservations are eliminated by using primate subjects, whose physiology more closely resembled human physiology.

Research with primates has found that maternal exposure to stressors can impair placental development, increase the rates of spontaneous abortion, and produce lower birth weights (Myers, 1972, Small, 1982). Myers (1972) argues that epinephrine and norepinephrine released as part of the stress response produced by exposure to aversive events tend to reduce uterine blood flow, resulting in fetal hypoxia. The corresponding hormonal effects on human pregnancy will be covered below in more detail.

Human Research

Generally, laboratory experiments with humans have demonstrated that exposure to stressors is associated with increases in adrenal catecholamine secretion and reports of increased anxiety (Dimsdale & Moss, 1980a). Exposure to environmental stressors is also associated with levels of increased plasma (Dimsdale & Mass, 1980b, Levi, 1972) and urinary catecholamines (Frankenhaeuser & Johansson, 1976). Unfortunately, a direct investigation of stress-related physiological change in humans during pregnancy is at best shaky or untenable, because procedures

for simultaneously assessing maternal and fetal blood gases and endocrine levels are invasive and can threaten the viability of the fetus.

Self-report Questionnaire Studies: Outcome Issues

Studies examining maternal psychosocial factors with obstetric outcome fall roughly into two categories, those where the outcome measured is a categorization of birth as normal or abnormal, and those where a quantitative index of neonatal physical status is utilized, such as gestational age, Apgar score, or birth weight. However, such analyses make it difficult to determine whether psychosocial factors have effects on specific obstetric difficulties, such as preterm delivery, high blood pressure, premature rupture of the membranes and lengthy and difficult deliveries.

Most studies on stress and birth outcome have examined the relation of self-reports of stress or anxiety to global normal-abnormal categorizations of birth. Most psychological measures in these types of studies are administered after childbirth, and one must have reservations with the findings obtained with such variation in research designs.

Comparisons across studies are difficult to make because of different characteristics of the sample populations, the numbers of participants in each study, the use of different measures across studies, and the variation in ways of measuring constructs. Many studies include multiparas women--women who have already delivered one infant. This poses problems for comparisons across studies because multiparas women have already had the experience of childbirth and come prepared

with certain expectations for the process of labor and delivery. Different points of time of questionnaire administration also contribute to the confusion in making solid conclusions as to the effects of psychosocial factors on preterm delivery. Most studies do not include subjects in all phases of childbearing. An additional problem in comparisons is the retrospective nature of many of the studies.

The retrospective design is inconclusive for several reasons. Preterm women might have paid more attention to events that would otherwise have been ignored. In addition, these mothers were probably anxious about the health of their infants or grieving over their deaths--conditions which might have negatively influenced their perceptions of life events (Omer & Everly, 1988). Finally, subjects may try to justify poor pregnancy outcome by searching for possible events that may have happened during the course of pregnancy to help explain the poor outcome.

Table 1 includes a brief review of studies pertinent to the design proposed in the current research. The list includes only studies of primiparous (first-pregnancy) subjects who participated in prospective studies including the third trimester of pregnancy as part of the design.

A shortcoming of research that attempts to link the relation of psychosocial variables to health outcomes has been the failure to consider the role of medical and demographic factors in elevating risk of illness or modifying an individual's status on relevant psychosocial dimensions (Kasl, 1983); Krantz & Glass, 1984). These authors suggest that emotional distress during pregnancy is likely to be linked to pre-existing medical and demographic risk. The following section reviews representative papers

that have attempted to address the relationship between psychosocial factors and poor pregnancy outcome.

Table 1.

Review of prospective studies using primiparous subjects in assessment of stress and birth outcome

Study	Predictors	Outcome measures	Results
Scott & Thompson, 1956	Neuroticism assessed by Maudsley Medical Questionnaire and global stability rating during the third trimester	Variety of labor and delivery complications	"Stable women low in neuroticism had the the fewest complications. However, "unstable women" high in neuroticism had fewer difficulties than the two better adjusted groups
McDonald & Parham, 1964	MAS and other measures administered during third trimester	Variety of labor and delivery complications	There was no difference in anxiety between the normal and abnormal groups, and no relation between MAS and length of labor
McDonald, 1965	MAS and MMPI completed during the third trimester	Women with any one of three pregnancy or delivery abnormalities versus women with normal pregnancy and delivery	Women with abnormalities scored higher on the MAS than normals; there were few differences for the MMPI scales

D J
M C K
M P
B K S
S S C

Edwards & Jones, 1970	Trait scale from STAI during third trimester, State scale every week until delivery; staff rating of adjustment	Classifications as normal or abnormal based on pregnancy, delivery, and neonatal records	Trait and weekly assessment of State anxiety were unrelated to abnormalities, but the abnormal group was rated as more maladjusted
Nuckolls, Cassel, & Kaplan, 1972	Social assets questionnaire completed during second trimester; SRE completed during third trimester	Classification as complications or no complications based on pregnancy, delivery, and neonatal factors	SRE scores and social assets were non related to complications. However, a combination of high life change and low social assets was associated with a higher complications rate
McDonald & Parham, 1964	MAS and other measures administered during third trimester	Birthweight	MAS scores were positively related to birth weight
Burstein, Kinch & Stern, 1974	MAS and pregnancy anxiety scale completed at unspecified point during pregnancy	Birth weight	Both anxiety scales were unrelated to birth weight
Standley, Soule & Copans, 1979	Investigator-devised prenatal anxiety measures administered by interview during third trimester	Apgar scores and birth weight	Prenatal anxiety was unrelated to either Apgar scores or birthweight

Newton & Hunt, 1984	LEI completed during third trimester	Preterm (< 37 weeks gestation) and low-birth weight infants (< 2,500 g) compared with full- term and normal birthweight groups	Experience of a major life event was associated with both prematurity and low birth weight
---------------------	--------------------------------------	--	--

Maternal Stress and Obstetric Difficulties

Several investigations have assessed the relationship between maternal stress and obstetric difficulties. These stresses may be physical or mental. Several authors have noted increased preterm labor, preterm delivery, intrauterine growth retardation, low maternal weight gain, low birth weight, placental infarction, toxemia, bleeding and abruption in women working in physically stressful jobs (Armstrong, Nolin & McDonald, 1989; Axelsson, Rylander & Molin, 1989; Fox, Harris & Brekken, 1977; Mamelle, Laumon & Lazar, 1984; Naeye & Peters, 1982; Saurel-Cubizolles et al, 1985; Tafari, Naeye & Gobezie, 1980; Teitelman, Welch, Hellenbrand, & Bracken, 1990). Often stressors come in the form of significant life events that occur during pregnancy. This section will cover the representative retrospective and prospective studies that have addressed the connection between life events stress and obstetric difficulties.

Retrospective studies.

Retrospective studies assess life events of women who had preterm and term labors after the delivery. For example, Gunter (1963) compared life events that had occurred all through the mothers' past lives. Only major stressful events (e.g. bereavement, abandonment, serious illness) were included, and more of these events were found in the lives of the mothers who delivered prematurely. Schwartz (1977) found similar results, comparing life events during pregnancy, including the 2 1/2 years preceding the delivery.

during

even

(197

period

World

even

scales

197

since

and

Ch

fin

in

S

su

of

co

Berkowitz and Kasl (1983) found that the reported number of life events during pregnancy were higher for women who deliver prematurely, but only if the life events occurred during the first two trimesters of pregnancy. Similarly, Newton et al (1979) divided their sample into two subsamples of very early deliveries (gestation period less than 35 weeks) and early deliveries (gestation between 35 and 37 weeks). Women who had very early deliveries were confirmed to have experienced more life events, as defined by the Holmes and Rahe (1967) Schedule of Recent Experiences scale.

Prospective Studies

Alternatively, prospective studies conducted by Omer and colleagues (1986, 1988) were conducted by administering questionnaires during the pregnancy, and similar relationships were found between life events that occurred during pregnancy and preterm contractions and preterm delivery. Studies by Newton & Hunt (1988) and Ching and Newton (1982) yielded similar results.

As an illustration, Norbeck and Tilden (1983) asked pregnant women in the first trimester or early in the second trimester, to complete a variety of assessment instruments, including the Sarason Life Experience Survey (Sarason, Johnson & Siegel, 1978), the State/Trait Anxiety Inventory (Spielberger, 1976) two social support measures, and depression and self esteem scales. Demographic data and obstetric histories were also obtained. After childbirth, three separate categories of complications were scored for pregnancy, labor and delivery and general neonatal

status. Their results indicated that life change prior to pregnancy was related to pregnancy complications, whereas a composite "emotional disequilibrium" score composed of depression, anxiety and self-esteem measures was related to infant condition complications. In addition, the combination of few life change experiences and low amounts of tangible support obtained from others was related to higher rates of labor and delivery complications. Yet the majority of the 117 participants in this study were multigravidas. Whether or not these results would hold for first-time mothers remains to be seen.

A similar study by Smilkstein, Helsper-Lucas, Ashworth, Montano, and Pagel (1984) focused on risk factors (maternal smoking and drinking, previous pregnancy complications), and Schedule of Recent Experience (SRE) (Holmes & Rahe, 1967) reports for both pregnancy and the year preceding pregnancy. These authors reported that SRE scores for pregnancy were related to three of four complications measures, though it should be noted that a critical p of .15 was used.

To illustrate the impact of daily stressors as compared to the impact of risk factors, researchers have also focuses on work stress and its efect on pregnant employees. Mamelie, Laumon and Lazar (1984) reported that women working more than 40 hours per week showed a 9% preterm delivery rate, compared with 3.6% among women working fewer than 40 hours per week. In order to assess pregnancy outcome as a result of daily life stressors, studies focusing on women under high daily stress provides a picture of the extreme end of the daily stress continuum. One occupation that fits this profile is that of physicians in residency training.

A Special Population of Pregnant Physicians during Residency

The proportion of U.S. medical school students who are women increased dramatically from 8 percent to 32 percent, between 1965 and 1985 (Crowley, 1986). Twenty-six percent of the training slots in residence programs are filled by women. Residency is a time of high stress for any individual. All residents report that long work hours, lack of time with family, and inadequate support from peers and/or faculty are major problems (Schwartz et al, 1987).

A pregnant resident has additional stresses: the physical demands of the pregnancy, and later the emotional strain of filling many roles (mother, wife, and physician). They also face the potential stress that they, in turn, place on other residents (Shapiro, 1982). Residency entails long periods of walking, running, and standing, frequent periods of sleep deprivation, and extremely long work weeks and is thus one of the most physically and emotionally demanding types of work.

Physicians with demanding work schedules have been reported to have an increased risk of preterm delivery (Miller, Katz & Cefalo, 1989), intrauterine growth retardation (Grunebaum, Minkoff & Blake, 1987), placental abruption (Schwartz, 1985) and pregnancy-induced hypertension (Phelan, 1988). Specifically, women who held positions of "house officer" (who work between 80 and 120 hours per week in the hospital) were found to be at increased risk of experiencing adverse pregnancy outcome. They were more likely to deliver a low birth weight, growth retarded infant during residency than before or after residency (Grunebaum, Minkoff & Blake, 1987; see also Alegre et al, 1984 and Naeye & Peters, 1982).

Miller et al (1989) found that 60 women physicians were 2.3 times more likely to deliver preterm infants than a group of control women who had at least 16 years of education. Grunebaum et al (1987) also reported that the delivery of low-birthweight infants was 3 to 4 times more common among physicians. Yet neither study used a large scientifically selected sample of physicians; many were recruited from university group practices.

In addition, Schwartz' evaluative study of 37 physicians found an increased incidence of threatened premature labor and a much higher incidence of abruptio placentae and associated serious bleeding when compared with the general population (Schwartz, 1985), but she did not find an increased rate of intrauterine growth retardation.

Phelan (1988) further specifies differences between preterm labor and preterm delivery in a sample of pregnant physicians. In her study, ten percent of pregnancies among 1197 (primiparous and multiparous) physicians were complicated by preterm labor and 6% by preterm delivery. The risks in the general population are estimated at 5-10% and 8%, respectively (Lamont, Dunlop & Crowley, 1983). The only complication that may be increased in residency is pregnancy-induced hypertension (Phelan, 1988). She notes that this may reflect the greater age of the woman at the time of pregnancy.

In contrast, Klebanoff et al (1990) found no significant differences in the rates of miscarriage, ectopic gestation, and stillbirth, or in either fetal growth or duration of pregnancy between their sample of female residents and the wives of male

residents.

Unfortunately, a drawback of most of the current research on stress and pregnancy is in its lack of application to the general population, by taking various socioeconomic factors into consideration. For example, other women with equally physically demanding occupations are usually of lower socioeconomic status.

In summary, these studies offer conflicting evidence for a relation between self-reports of anxiety, life change stress, and global ratings of obstetric outcome. Eight of 23 studies reviewed by Istvan (1986) using global obstetric difficulty as an outcome measure found that life change stress or anxiety was related to poor obstetric outcome. Istvan (1986) concisely concludes:

"Psychosocial factors may be valuable in explaining reproductive failure only to the degree that their contribution to reproductive outcomes can be disentangled from that of other indicators of obstetric risk. If it can be proven that psychosocial factors contribute independently to obstetric and neonatal problems, either directly or by modifying health-risk behaviors, the notion of stress or anxiety-related reproductive dysfunction would be substantially more compelling (p 342)."

An ideal investigative research program would include psychosocial assessment that would initially occur prior to conception and would be repeated throughout the course of pregnancy. Taking note of time constraints associated with most research, it is difficult to predict which participants will eventually become pregnant.

Assessments of psychophysiological mechanisms at work, such as the measurement of

urinary catecholamine and/or corticosteroid levels may be useful marker of stress. As stated earlier, the present study does not assess hormonal changes, but it is important to acknowledge the physiological pathways that cannot be ignored in the model of stress. The following section will focus on the relationship of psychological variables with physiological stress responses and the role of the autonomic nervous system.

Psychophysiological Responses to Stress during Pregnancy: Hormonal Mechanisms and Biochemical Changes

It has been recognized that the nervous system and the endocrine system interact to help an individual adapt to the environment (Selye, 1950). Studies of catecholamines (Lederman et al, 1977, O'Shaughnessy et al, 1987; Zuspan, 1979) and corticosteroids (Lederman et al, 1978; Sasaki et al, 1987; Kirschbaum & Hellhammer, 1989) have attempted to capture inter-individual differences in response to both acute and chronically stressful situations.

External challenges are appraised by the brain from which signals are set to the hypothalamus, via the autonomic nervous system, and then to the adrenal medulla. Hypothalamic messages take two pathways, a neural pathway to target tissues by way of the autonomic nervous system, and a neuroendocrine pathway to target tissues by way of the pituitary, adrenal and other endocrine glands. The response is the secretion of stress hormones, chiefly epinephrine and norepinephrine. In certain situations, the brain also sends messages to the adrenal cortex which then secretes cortisol, another stress hormone that has a role in the immune response. Short term

risks in catecholamines and corticosteroids serve to facilitate adaptation to challenges and therefore can be viewed as beneficial. On the other hand, a sustained rise in circulating stress hormones has the potential to cause adverse health effects, possibly including obstetrical complications.

Hormonal Reactions to Stress

Catecholamine secretion in humans is increased in situations made stressful by a high degree of uncertainty or lack of situational control (Frankenhaeuser, 1975a; Frankenhaeuser, 1975b; Bassett et al, 1987) as well as in situations involving physical challenge (Dimsdale & Moss, 1980; Fibeger et al, 1984a). Several factors that have been associated with increased epinephrine levels are life change and stressful events (Katz, 1983; Katz et al, 1988; Omer & Everly, 1988; Theorell, 1972). The higher the ratio of norepinephrine (NE) to epinephrine (E), the greater the effects were as a result of stress. In other words, people who experience more stress have higher catecholamine levels than those experiencing less stress. For the pregnant woman, both of these catecholamines decrease uterine blood flow (Adamsons, Mueller-Heubach & Myers, 1971; Rosenfeld & West, 1977; Shnider et al, 1979). This in turn affects the growing fetus. Catecholamine levels can be measured via urine collection.

Another mechanism that has been proposed to link maternal stress during pregnancy with preterm labor and delivery is the action of norepinephrine and epinephrine on uterine smooth muscle motility. Short term moderate level effects of

epinephrine enable the uterus to relax and slow contractions (beta-adrenergic), while long term higher level effects of epinephrine are alpha-adrenergic, which speed up contractions (Anton, 1979; Omer & Everly, 1988). For example, a national study of female resident physicians who worked during their pregnancies in physically demanding, stressful situations, was twice as likely to have preterm labors (11.3% vs 6.0%) compared with the pregnancies of their male classmates' wives-- a result that could be stress-related (Hatch et al, 1991). Generally, catecholamines are favored as the most sensitive, reliable and practical indicator of a stress response by several experts in the field (Frankenhaeuser, 1975 and 1989, Kasl, 1983). Corticosteroids are an alternative choice of investigation.

Emory et al (1992) propose that psychological stress such as stressful life events or the perception of a stressful situation might lead to further increases among pregnant women in the release of catecholamines and corticosteroids. The gravid woman might easily be predisposed to react because of the natural rise in CRH and cortisol during the third trimester of pregnancy.

Given the results of several studies, there appears to be a consistent relationship between psychological state such as anxiety and mood and alterations in hormone and catecholamine levels. It can be assumed that if these hormones and catecholamines can be related to preterm labor, then psychological variables may be intimately involved in a series of events that eventually lead to premature birth. The role of stress becomes an important factor in this set of relationships since stress is implicated in both anxiety and mood disorders as well as changes in circulating

hormones and catecholamines.

In summary, Geiser (1989) notes that psychosocial, neuroendocrine and biochemical factors have an interactive influence on the immune system. One important factor from this body of research is that decreases in measures of immune status accompany a variety of stressful life events and that emotional distress, individual differences, and social support may mediate the impact of stress on the immune system.

With the information on stress events and potential influences on pregnancy outcome set in place, it is time to return to the original model of stress and consider the mediational components that influence the direct pathway between stress and health outcomes. These include the influence of individuals' enduring personal characteristics and the influence of interpersonal relations that help to buffer the direct influences stress may have on the body.

Assessment of the Environmental Context and the Individual: Moderators in the Stress-Pregnancy Outcome Model

The path from a stressor to a health consequence is complex. Moderators may influence any of the model components through the perceived environment, immediate emotional, physiological and behavioral reactions, and eventual consequences. Returning to the proposed ISR model, two moderators in the stress-illness model include properties of the context and properties of the individual.

Contextual Moderators

The context in which a person encounters a stressor can alter reactions and consequences markedly. Contextual factors can be supportive and buffering, or they can heighten the stress effect. In the proposed research, the contextual or environmental factors under focus will be the employment situation, social support and marital satisfaction. Under typical daily life circumstances, each factor can be influential on normal functioning. Assessing these external influences on a pregnant woman may yield different implications.

The Work Environment

Within the last few decades, society has experienced a steady increase in the number of women entering the workforce. One change has been a steady increase in their rate of participation. In 1960, 37.7% of the female civilian population was employed, and this number increased to 43.4% in 1970, and again up to 56.6% in 1988 (U.S. Department of Labor, 1989). Another major change has been observed in the range of jobs that women occupy, with the numbers of female executives and professionals ever increasing. In 1982, 6,054 women occupied executive/professional positions. By 1987, this number rose to 8,540 and up to 15,441 in 1993 (U.S. Dept. of Labor, 1993).

Recent studies suggest that professional women competing in a male-dominated environment are subject to chronic stress (Hall & Hall, 1980) and that professional women share common demands with their male counterparts. The job environment

provides conditions conducive to stress such as underutilization of skills, lack of recognition for accomplishment, lack of autonomy, presence of deadlines and excessive work hours (Haw, 1982). For professional women, particular stressors can be identified beyond job demands such as work overload, role conflicts, office politics and problematic relationships with coworkers (Johnson & Johnson, 1977; Lein, Durham, Pratt et al, 1975; Rapoport & Rapoport, 1978). In addition, prestigious positions sought by women are associated with the types of stressors experienced in the workplace. Generally, more prestigious occupations are accompanied by greater work stress, increased responsibility, and greater time restraints which in turn may influence health. In contrast, women in occupations low in prestige face low incomes which are accompanied by economic stressors. Hence, a U-shaped curve may characterize the relationship between stress and occupational prestige (Mueller & Parcel, 1981).

Employed women also face demands with which men do not have to cope, such as discrimination, stereotyping, marriage and work interference, social isolation, and a greater workload at home (Cooper & Davidson, 1982; Nelson & Quick, 1985; Puff & Moeckel, 1979).

Work and health.

There are many aspects of the employment situation that can affect health. Unfortunately, the psychophysiological stress response is nondiscriminatory in its effects on men and women. Both sexes appear equally vulnerable to work stress and

its consequences. Early studies examining work influences on pregnancy found that for women with long work weeks whose occupation was physically tiring, the proportion of preterm births was increased (Chamberlain & Garcia, 1983). Results from the U.S. Collaborative Perinatal Project (Naeye & Peters, 1982) found an association between low birthweight and work that involved the following factors: standing, low pre-pregnancy weight, hypertension and low pregnancy weight gain. For other occupations, psychological stress hazards are present in the work environment. Much research over the course of the last 30 years suggests that work may be a significant source of stress, and that stress may be tied to serious consequences in regard to mental and physical ill health (Cooper & Marchall, 1976; House, 1974; Jenkins, 1971a,b; Kahn et al, 1964; Kasl, 1978; Margolis et al, 1974). For example, Greenglass (1985) reported significant correlations among managerial women between job/family conflict and scores on scales assessing depression, irritation and job anxiety.

One approach to the assessment of employed women and work stress has included research on Type A personality and work styles. Since Type A is a personality construct, the review of this literature will be included in the section of the model describing individual characteristics and resources.

Balancing career and pregnancy.

The transition to parenthood is a context in and of itself, involving role redefinition, and balancing two or more roles. Throughout the pregnancy, women

increasingly visualize themselves as mothers and not just career women (Liefer, 1980). The years of a woman's career advancement are also those of childbearing. In addition, the threat of unemployment and the limitations on wages of their mates have encouraged women to enter marriage with the plan of having two incomes.

Many women want to combine family life with a career. A common concern of women is the timing of the pregnancy. Many are concerned that pregnancy will cause significant interruptions in their careers and that a demanding career will prevent optimal nurturing of their children. Women also worry that delaying childbearing may result in infertility or pregnancy complications (Roeske & Lake, 1977). They may fear that they will be part of the 10 - 15% of women who will have relative or absolute fertility, and that the longer they delay a pregnancy, the lower their conception rate will be (Schwartz, 1985). Taking time away from careers to nurture children is one of several reasons why many women may seem to be slower in developing their careers.

Hence, first pregnancies become a special time marked by dramatic changes in self-definition (Deutch, Ruble, Flemin, Brooks-Gunn & Stangor, 1988). A number of studies have suggested that the transition to parenthood may be perceived as a crisis by some women (e.g. Dyer, 1963; LeMasters, 1957). There is sufficient evidence that those who are able to visualize themselves as mothers during this transition are better able to adjust to the newborn (Liefer, 1980; Oakley, 1980; Shereshefsky & Yarrow, 1973).

Returning to the special case of pregnant physicians, many investigators feel

that managing a medical career and a family takes an unusually high toll on women physicians (Brodkin, Shrier & Buxton, 1982; Kaplan, 1982), as evidenced by their higher divorce rate and suicide rate compared with non-physician women. The peak incidence of divorce and suicide was found to coincide with the time of both early career development and childbearing (Brodkin, Shrier & Buxton, 1982).

In summary, when considering the effects of stress on health, it is important to assess the context in which it occurs, such as the work environment and incorporating the role of "mother" with "employee". The effects of employment on women's health vary, depending on the type of job and on the woman's family situation. The workplace can serve as a moderator or it can intensify the link between stress and health. Another component of environment that can serve as a moderator is support of family, friends, and significant others.

Social Support

A great deal of research exists documenting the physical and psychological health benefits of social support. Social support has been noted to "moderate" or "buffer" the impact of psychosocial stress on physical and mental health. Social support has been associated with lower cardiovascular reactivity (Kamarck, Manuck & Jennings, 1990), enhanced immune function (Jemmott & Magloire, 1988; Kiecolt-Glaser et al, 1984), better adjustment to and recovery from illness (Dunkel-Schetter, 1984; Mumford, Schlesinger & Glass, 1982; Trelawny-Ross & Russell, 1987; Wortman, 1984), and reduced mortality (Berkman & Syme, 1979; Blazer, 1982;

House, Robbins & Metzner, 1982; Ruberman, Weinblatt, Goldberg & Chaudhary, 1984).

Although researchers share a general sense of what social support is, specific conceptual definitions and operational definitions vary widely, making it difficult to compare the results of different studies. Some studies have found that support does buffer the impact of stress on health (e.g. Caplan, 1972; Nuckolls et al, 1972; Cobb & Kasl, 1977; Eaton, 1978; Gore, 1978; House & Wells, 1978). Others (e.g. Pinneau, 1975, 1976; Lin et al, 1979) point out that many of these studies have methodological limitations. Further, several studies have failed to find significant stress-buffering effects of support (e.g. Pinneau, 1975, 1976; Andrews et al, 1978; LaRocco & Jones, 1978a; Lin et al, 1979). A few studies (Hobfoll & London, 1986; Hobfoll & Walfisch, 1984) have suggested that no single resource of support will be beneficial for all events because resources need to be ecologically congruent with situations and individuals' needs.

Many researchers agree that there are at least three main types of social support: emotional (intimacy, attachment, caring and concern), instrumental (provision of aid or assistance), and informational (providing advice, guidance or information relevant to the situation) (House, 1981; House & Kahn, 1985; Kahn & Antonucci, 1980; Thoits, 1985). Of the three functions, researchers have considered emotional support to be the primary component (Cohen & Hoberman, 1983; House, 1981; Schaefer, Coyne & Lazarus, 1981). Emotional support is proposed to be most helpful because it provides one with reassurance that others are available for help.

People who feel loved and cared for enjoy a higher state of life satisfaction at all times, stressful or not. In contrast, informational and instrumental support may compose the part of support that buffers the effects of stress (Helgeson, 1993).

An individual's perception of support resources and actual accessing of support are two components within a complex process of ecological congruence. According to the model of ecological congruence suggested by Hobfoll (1986a, 1986b), resource effectiveness is related to a) the availability of resources, b) fit of resources to situational demands c) time since the event and stage in individual's development d) extant personal and cultural values, and e) perceptions regarding degree of threat and assessment of resource (social support) availability. How this process may operate in the context of pregnancy is covered in the next section.

Social support during pregnancy.

As a time of major social change, pregnancy is a period when the expectant mother must redefine relationships with and responsibilities to significant others in her life (Richardson, 1982). Supportive relationships may enhance feelings of well-being, personal control, and positive affect thereby helping women to perceive pregnancy-related changes as less stressful (Norbeck & Anderson, 1989; Tietjen & Bradley, 1985).

Informational support may provide guidance with respect to adequate prenatal care, proper nutritional and health-care practices, and preparation for labor and delivery (Aaronson, 1989; Burnes-Bolton, 1988; Zweig, LeFevre & Kruse, 1988). In

addition, assistance with daily tasks with physically taxing demands that may be harmful to expectant mothers is helpful, especially late in pregnancy (Mamelle, Laumon & Lazar, 1984; Mamelle & Munoz, 1987; McDonald, McDonald, Armstrong, et al, 1988)

Social support serves as an environmental mediator and influences a woman's experience and the outcome of pregnancy (Nuckolls et al, 1972). In the presence of high life stress prior to pregnancy and antepartally, psychosocial assets, including social support were associated with fewer childbirth complications. Nuckolls, Cassel & Kaplan (1972) suggested that social support serves as an environmental mediator that influences a woman's experience and the outcome of pregnancy.

Norbeck & Tilden (1983) found that women with high stress and low social support prior to pregnancy had the highest rate of gestation and infant complications. Women with low stress and low levels of support had higher rates of labor and delivery complications. In addition, women who received more prenatal support experienced better progress in labor and delivered babies who had higher birthweights and appeared healthier five minutes after birth, as indicated by Apgar ratings (Collins et al, 1993).

In line with Hobfoll's model of ecological congruence, Cohen (1979) asserted that "a woman's capacity to adapt to the demands and tasks of pregnancy is generally related to an overall balance between stresses and supports, both present and past" (p 17).

Problematic relationships have been associated with such unfavorable

pregnancy outcomes as spontaneous abortion (Berle & Javert, 1954); toxemia (Glick, Salerno & Royce, 1965; Nuckolls, Cassel & Kaplan, 1972); and premature delivery (Blau et al, 1963; Gunter, 1963; Newton, Webster, Binu et al, 1979; Wortis & Freedman, 1962). Hence, stress appears to be an important force in provoking illness and social support is a balancing force in mediating health. This is equally true of everyday problems that cause stress as with major life event stressors (Burks & Martin, 1985). One of these daily challenges may be related to spousal support and the marital relationship during pregnancy. The following section reviews this literature.

The marital relationship during the transition to parenthood: A more specific type of social support.

Marital status is often a fulcrum for research into social support and pregnancy outcome (Kessler & Essex, 1982; Norbeck & Tilden, 1983; Richardson, 1982, 1983; Tilden, 1983, 1984). Pregnancy is marked by an increasing need for a couple to modify established patterns in the marriage, as well as to prepare both psychologically and materially for the arrival of the newborn. This is done in a context of psychological and physical changes, particularly in the expectant mother (Bibring, 1959; Chalmers, 1982; Colman & Colman, 1971). Sharing in discussion and disclosure between spouses has been associated with improved health perceptions, and less rehospitalization one year following a heart attack (Helgeson, 1991). Generally, dissatisfaction with marriages during pregnancy carries over to dissatisfaction as

parents (Belsky, Spanier & Rovine, 1983; Cowan et al, 1985).

Research by Tilden (1984) indicates that pregnant women without partners are candidates for greater stress, less social support, and greater emotional stability, a significant finding given the evidence that stress, anxiety, and inadequate social support contribute to pregnancy complications. Yet marital satisfaction even for married couples does not remain consistent during pregnancy. On average, for married couples, marital satisfaction declines for first-time parents (Belsky, Spanier & Rovine, 1983; Feldman & Nash, 1984; Grossman, Eichler, and Winickoff, 1980; Shereshefsky & Yarrow, 1973)

In studying relationships shared by women and their husbands during pregnancy, Richardson (1983) found changes in instrumental assistance to be most critical. Assistance was often used by women as indicators of their husbands' love and concern for her or, when absent or begrudgingly given, of his lack of love for her. In addition, Mercer, Hackley & Bostrom (1983) found that women who received greater emotional and instrumental support from their mate during pregnancy and delivery tended to have a more positive perception of their birth experience, as compared to those who received little support.

Norbeck and Tilden (1983) found emotional support to be significantly related to emotional disequilibrium, while tangible support was not. The authors found significant interactions between negative life events (life stress) and both types of support. In addition, tangible social support predicted complications of gestation, labor, delivery and newborn status.

In summary, the marital relationship and larger social support network have been reviewed to assess their mediational effects on stress and health outcomes. Now that the contextual factors that exert a mediational influence on the stress-pregnancy outcome model are set in place, it is time to review the other set of mediational factors that are unique to individuals.

Individual Characteristics as Moderators

Properties of the individual can be thought of as personal characteristics, such as vulnerability or resistance to any specific stressor. These individual characteristics include personality factors, such as Type A and temperament, desire for control, coping style and psychological functioning (depression and anxiety as indices of mental health). Moderators such as temperament, personality and sociodemographic status are usually considered to be stable characteristics of the individual or environment, that change slowly over time. Coping strategies, depression and anxiety are the result of interactions between individuals and their environments and these may last only during a specific interaction. Each of these individual characteristic mediators and how they may play a role in the stress-illness pathway will be reviewed in the section to follow.

Type A Personality and Women

Increasing attention has been given to the stressors associated with higher level occupations that play a large part in the development of cardiovascular disease

(Friedman and Rosenman, 1974). A way of assessing this connection has been through conceptualizations of the Type A behavior pattern.

The Type A behavior pattern (TABP) is associated with lifestyle descriptors such as hard driving, hostile, competitive, ambitious, impatient, and motivated. This type of behavior, typical of upper managerial and professional positions, has been associated with proneness to coronary heart disease (Rosenman & Friedman, 1974). Type B persons, on the other hand, are labeled as coronary resistant, and possess few of the mentioned characteristics for Type As. Instead, these individuals tend to be unhurried and relaxed.

TABP is often associated with those individuals who exhibit a chronic sense of time urgency combined with a near-permanent state of irritability. This behavior pattern has also been described as the individual's way of controlling his/her surrounding world, "by being aggressive and competitive, by overcoming environmental resistance (being impatient and in control), by gaining privileged access to resources via high social status (being ambitious), and by hoarding resources as a hedge against future shortages" (Van Egeren, Abelson, & Sniderman, 1983 p 386).

Yet the means by which Type A behavior pattern increases the risk for premature coronary heart disease is uncertain. A hypothesis posed by Kelly and Houston (1985) suggests that Type A experiences increase neuroendocrine arousal that results in the increase of atherosclerosis and increases in the likelihood of a clinical event.

Research on Type A women has been fairly limited in scope, due to the

majority of studies of males in executive positions most susceptible to the Type A behavior pattern. For example, the Western Collaborative Group Study assessed the Type A coronary-prone behavior pattern which was found to relate to coronary heart disease (Mathews et al, 1977). In this study, 3,524 professional men aged 39 to 59 were assessed for Type A behaviors. No women were included in the study.

The initial theories involving Type A behavior originated in the late 1960's, a period when fewer women were part of the workforce. As these studies progressed into the 1970's, populations of women were gradually included, yet the occupations were most commonly nursing, teaching and library positions (Waldron, 1978; Haynes and Feinleib, 1980). Few studies have included women in male-oriented positions. Hence, the studies completed in the seventies found few differences between Type A and B women. These studies made it difficult to assess differences between male and female Type As as well. Women are only recently assuming similar competitive positions, and more female investigators and physicians are pursuing sex differences in Type A and B behavior patterns.

Relatively recent research investigated Type A/B differences in college women, and took into consideration family history (Lane, White, and Williams, 1984). Lane et al (1984) studied college aged women, and used the student version of the Jenkins Activity Survey to determine subject types (A or B). They concluded that Type A women were hyperresponsive compared to Type B subjects, but only if they also had a positive family history of hypertension. Another college sample collected by Lawler, Schmeid, Mitchell and Rixse (1984) assessed coronary-prone

behavior pattern and physiological responses to stress in women aged 18-27. They compared women in traditional (feminine) vs. non-traditional (masculine) majors. Their findings concluded no physiological differences between Types A and B women.

Several problems using college age samples arise when comparing Type A and B behaviors. Lawler et al (1983) suggest that women below the age of 25 are less likely to have children, and more likely to be working, even if they are not Type A. The older group may experience more time pressures, because of added responsibilities. This would explain why women 26-44 years of age in a study by Jenkins, Rosenman, and Friedman (1967) were equally susceptible to Type A as their male counterparts. They concluded that their sample of 25-50 year old women had similar behavioral and physical responses as their male counterparts. They noted that the key factor, education level, helped determine whether or not individuals were Type A or B. Unfortunately, the study neglected to specify the employment characteristics of their female sample.

Another study by Lawler, Rixse, and Allen (1983) supports the results of Jenkins et al (1967). This research team compared professional/ executive women (Type As) to another sample of housewives (Type As and Bs) in measures of heart rate, blood pressure, and skin conductance. These measures were taken during periods of rest, during math problem solving, and solving visual puzzles. The sample included women ages 25-55, and their results revealed higher heart rates and higher systolic blood pressures for the Type A women. They concluded that many employed

women are as Type A as men, not that Type B women are less likely to work.

Unfortunately, their samples were unbalanced for behavior types in each comparison group. Their Employed sample included only professionals or executives, all registering as Type A. Their housewife sample included both Type As and Bs. No comparison group of Employed Type Bs was incorporated into the design. In addition, their small sample (n=41), left room for speculation on these results. Perhaps failure to find Type B employed women was due to their restriction to executive females in their sample. As more women in the workforce continue to fill executive/ managerial positions, better comparisons can be made today.

A more recent study by Kelly and Houston (1985) assessed differences in characteristics of Type A and Type B women as related to work factors. Type A women typically have higher educational attainment that in turn influences the higher occupational positions they occupy. They seek and attain more demanding and taxing job experiences, and have more preference to work more hours per week. Type As also work more overtime. Given these preferences, it is no surprise that Type A employed women report more quantitative workload at their jobs. The single gender difference that Kelly and Houston (1985) uncovered was that women did not perceive their skills as being underutilized, a finding consistent with male Type A's.

Generally, across studies, Type A women are found to be no less Type A than men, especially when education, occupation, or socioeconomic status (SES) are controlled. As with men, Type A scores are positively correlated with education and occupational status in women. Over all, Type A women are found to be more

reactive physiologically than their Type B counterparts. In a study by Dearborn & Hastings (1987), Type A women had more stressful jobs, and reported more symptoms of physical and psychological strain in response to job stress and job dissatisfaction. Type A women may experience more symptoms of strain than do Type Bs, in part because they perceive having more work stress than do the Type Bs.

Type A career motivation.

For women who occupy prestigious occupations, Type A classifications are generally higher, career motivations are often stronger, and they have orientations toward achievement and career aspirations (Greenglass, 1990). Greenglass (1990) noted that the higher the Type A scores, the more the respondent wanted to attain higher positions of authority, the greater her perceived chances of an authority figure, and the higher her career aspirations were for career recognition.

As career women, Type A's have high expectations of themselves, and feel greater pressure to perform. In attempting to meet multiple role demands, A's experience greater time pressures and as a result, greater conflict. Despite a heavy workload for Type A working mothers, women did not consider themselves overworked. "In admitting they were overworked, they felt they could and should be able to be feminine, successful in careers, good mothers and have a happy marriage--without feeling overloaded" (Greenglass, 1990 p 313). Hence, Type A working women appear to have high standards for combining career and family.

Given these characteristics of the motivated Type A woman, how might these

women incorporate childbearing into their career goals? Although no literature exists examining Type A expectant mothers, several scenarios are possible. One can speculate that Type A career-oriented women may be more likely to postpone childbirth in order to pursue and fulfill career goals, or may be more likely to plan for a specific future time to have a child. Alternatively, Type A women may look at childbearing as an additional goal to master. Labor and delivery may be seen as achievement goals and therefore take precedence over a career.

Control and Coping

Control is an aspect of coping in the face of challenging situations. Separating control and coping style is difficult. Folkman (1984) discusses two forms of control: expectations for control in general and situational appraisals of the possibilities for control in specific situations. When applied to problem situations, a form of coping is to gain control over the situation. Generalized beliefs about control are likened to locus of control (e.g. Rotter, 1966) and are discussed in terms of primary appraisal of potential stressors. Alternatively, situational appraisals of control are part of secondary appraisal, when attention is focused not on evaluating the stressor but on gauging appropriate responses. The assessment of a challenging situation reflects specific expectations of control over specific events.

Control is an important determinant of these appraisals in the face of coping with difficult situations. Folkman (1984) suggests that greater effort is invested in situations that offer the promise of control. If the use of a control-based strategy is

seemingly successful, stress may be greatly reduced or eliminated. In contrast, failure of a control-based strategy may bring about not only the deleterious consequences of the stressor but also the effects of failure to reestablish control, such as frustration or learned helplessness (Seligman, 1975; Wortman & Brehm, 1975).

Control and pregnancy outcome.

Standard conceptualizations of control have included two constructs-- internal and external loci of control. An internal person is one who tends to take responsibility for her own actions and views herself as having control over her own future. External individuals tend to see control as residing elsewhere and attributes success or failure to outside forces (Rotter, 1966). Expectancy of control beliefs have been shown to predict health-related behaviors (see reviews by Strickland, 1978; Wallston & Wallston, 1978). The bulk of this research using generalized locus of control expectancies has supported the assumption that individuals who hold internal as opposed to external expectancies are more likely to engage in health-promoting behaviors (Strickland, 1978).

Womens' perceptions of control have been found to be related to compliance with prenatal health regimens during pregnancy that were related to actual pregnancy and birth outcomes (Tinsley et al, 1993). Other researchers have focused on control in the context of health locus of control. These studies measure a woman's belief that she is directly responsible for the health of her unborn child (internal) and two external dimensions assessing beliefs that health professionals and chance factors

determine the newborn's health (Labs & Wurtele, 1986).

A study by Oliver (1972) assessed expectancy for and recalled experience of control, coping and mastery during childbirth, as measured by self-report scales. He found that participation in Lamaze preparation classes was associated with expectancies for and recalled experiences of control, master and coping during labor and delivery. He concluded that personality, demographic, historical, background, situational and contextual variables have relative importance to expectations about experiences and to actual experiences during the events of labor and delivery.

When stress is a significant factor added to perceived control, difficulties during pregnancy may result. For example, a study by Floyd (1988) found that women experiencing high levels of stress were at greater risk of complication of pregnancy, if they were low in one measure of perceived control.

In summary, evidence suggests that perceptions of control and the use of available coping strategies may influence the progress of pregnancy, labor, and delivery. These personal characteristics serve as resources with which to handle stressors that may occur during pregnancy. Psychological states, such as depression and anxiety may also influence the perceptions of coping and control. Understanding how emotions fit into the picture of individual resources will be discussed briefly in the next section.

Psychological Functioning: Depression and Anxiety

Finally, the last individual characteristic component in the stress-health model

includes an index of emotional functioning that is unique to individuals. How people function emotionally has an impact on how they perceive events that occur during pregnancy. Clinical episodes of depression and anxiety also have connections to poor pregnancy outcome.

Investigators view pregnancy as a time of emotional upheaval, crisis, stress, or as some sort of illness inflicted on the woman (Bibring et al, 1959; Chapple & Furneaux, 1964; Grimm, 1961; Hanford, 1968; Lips, 1985; Nilsson & Almgren, 1970; Rothstein, 1972; Rubenstein, 1977). Spielberger and Jacobs (1979a,b) reviewed evidence noting that the biological and neuroendocrinal changes that occur during pregnancy may have profound psychological effects upon expectant mothers. Some of these changes may occur as the result of anxiety and depression.

Anxiety about the pregnancy, approaching birth and anticipated care of the child may occur throughout the transition to new motherhood. These are natural occurrences that happen for every expectant mother. For some women, the anxiety may be manifested in depressive behaviors, which together may influence her attitude towards the pregnancy. For example, a woman's perception of her marital relationship and support from her spouse have been found to relate to depressive symptomatology during pregnancy and after delivery (O'Hara, 1986; O'Hara et al, 1983).

Stress and its related anxiety or tensions have been shown in some way to translate into health compromises for childbearing women. Walker (1989) suggests the possibility that high levels of stress may lead to the abandonment of health-

promotive activities. Various studies provide evidence for a link between high anxiety during pregnancy and the onset of certain obstetric and neonatal complications (McDonald & Christakos, 1963; Brown et al, 1972; Gorsuch & Key, 1974; Crandon, 1979a,b; Standley et al, 1979; Barnett & Parker, 1986). For example, stressed and highly anxious women have higher incidence of pregnancy-induced hypertension, prolonged or precipitous labor, forceps delivery, fetal distress, and infants with congenital abnormalities and lower Apgar scores (Ascher, 1978; Crandon, 1979a, b). Lederman et al (1979, 1981) also associated psychological conflict and anxiety in pregnancy with prolonged labor and suggested the latter may have detrimental consequences for the fetus and the development of the infant.

However, other authors failed to confirm this relationship (Burstein et al, 1974; Newton & Hunt, 1984). For example, Edwards et al (1987) found different patterns of change in emotional functioning in the last trimester of pregnancy. Women with normal deliveries showed a reduction in state anxiety at the beginning of the third trimester and an increase near delivery, while women with complicated pregnancies showed an increase in state anxiety at the beginning of the third trimester and a reduction near delivery. It is not clear if a relationship between state anxiety and abnormal pregnancy depends on higher levels of anxiety in a particular period of pregnancy or on particular patterns of change in anxiety levels during pregnancy (Rizzardo et al, 1988).

Several investigators have charted change in emotional distress during the course of pregnancy (Edwards et al, 1987; Lubin et al., 1975; Rizzardo et al, 1988;

Rofe, Blittner & Lewin, 1993), and found patterns in psychological functioning from one trimester to the next. Rofe, Blittner & Lewin (1993) suggest that the major causes of women's emotional experiences during the first trimester are certain physiological changes that occur with pregnancy. As the pregnancy progresses, an approach-avoidance conflict with regard to delivery and its possible consequences evolves, and this constitutes one of the major elements in determining women's psychological condition during the last trimester. In other words, expectant mothers may spend more time considering complications and feeling greater emotional distress during the third trimester. Lubin et al (1975) have supporting evidence that during the course of pregnancy, anxiety decreases in the second trimester and rises again to its initial level in the third trimester, whereas depressive mood showed no variation over the trimesters.

Evidence suggests that the levels of emotional distress vary according to parity status. Women with primiparae status report less emotional distress during all trimesters as well as fewer headaches, less dizziness and pain during the second and third trimesters than did women with multiparae status (Rofe, Blittner & Lewin, 1993). A possible explanation may be that primiparous women have no previous experience to base their emotional distress and may attribute their feelings to other sources. They may feel distress is a natural part of the transition and they enter labor and delivery with a certain amount of naive fear and anticipation for any possible consequences.

On the more extreme end of psychological functioning, emotional disorder in

late pregnancy is more likely to be experienced by those women in whom there was evidence of pre-pregnancy psychological difficulties and symptoms. For some pregnant women, depression and anxiety may not be a specific result of being pregnant, but rather that pregnancy is just one additional stress which they have difficulty in coping with satisfactorily (Zajicek & Wolkind, 1978).

In summary, individual characteristics are comprised of multiple components: Type A behavioral tendencies, temperament, coping style, desired control and indicators of emotional state. Yet each component does not exist independently of the others. The next section will review literature pertinent to the links between individual characteristics.

Connections Between Individual Characteristics

Type A and temperamental style.

Type A pattern is the product of an interaction between an underlying behavioral or temperamental style and a set of socialization experiences (Steinberg, 1985). Steinberg (1985), in a study assessing adolescent characteristics, found that the achievement-striving component of Type A is associated with temperamental characteristics of high adaptability to new or challenging situations, negative mood, high approach towards other people, and low rhythmicity (predictability in time of sleep, hunger, eating and elimination functions). In addition, the Type A characteristic of impatience-anger was found to have as its temperamental antecedents low sensory threshold, low persistence, and low adaptability. Although these findings

apply to adolescent personality development, certain aspects of temperament appear to be related to the Type A behavior pattern. Together, these dimensions may comprise underlying behavioral style which in turn may influence how a woman experiences the transition throughout first-time pregnancy. Personality may influence how women access social support, coping style, and desire for control.

Type A women accessing social support.

Type A and B women differ in the extent to which they seek social support. In a study by Kelly & Houston (1985), Type A's reported both more stress and tension if they reported high general availability of social support, but not if they reported low general availability of social support. Suls (1982) has argued that under certain circumstances for certain people, social support may be a liability rather than a benefit.

Several explanations for the relationship between support and Type A behavior pattern are possible. Perhaps Type A employed women feel intruded upon or burdened when they perceive that others, particularly supervisors or husbands, are ready sources of support. Alternatively, social support may contribute to employed Type A women striving harder because they feel the support to do so or because they feel expected to do so (Greenglass, 1990).

Coping and Type A.

Researchers have begun to suspect that certain styles of coping with stress may

have pathophysiologic consequences, and that Type A's may rely on more maladaptive coping strategies than Type B's. Glass (1977) conceptualized the Type A behavior pattern as a characteristic style of coping with threats to one's sense of control. The coping strategy of Type A behavior seems maladaptive enough to increase susceptibility to coronary heart disease (Rosenman, Brand, Sholtz, & Friedman, 1976), and stress on a human biological system (Friedman, Byers, Diamant, & Rosenman, 1975).

It may be reasonable to expect that Type A's will show a greater tendency to rely on achievement related, solution-oriented, problem-focused coping. Hart (1988) notes that the relationship between ways of coping and Type A behavior is different among males than females. Type A and B individuals may cope with taxing situations differently. Type A's tend to engage in significantly more problem-focused coping than Type B's (Burke & Weir, 1980; Zeichner et al, 1983; Vingerhoets & Flor, 1984; Smith & Brehm, 1981; Heppner, Kampa & Brunning, 1984; Heppner, Reeder & Larson, 1983) which is consistent with theory relating Type A behavior and personal control to the stress and coping process. Type A behaviors may be interpreted as efforts directed at bolstering a perception of controllability (Folkman, 1984; Fleming, Baum & Singer, 1984). Hart (1988) found that female Type A's employed more cognitive restructuring coping than their female Type B counterparts. He suggests that female A's may be particularly sensitive to and concerned about losing control of their emotions. Folkman (1984) has also proposed that self-denigration coping strategies may serve to reinforce internal control beliefs by

creating an illusion of control.

Control and Type A.

An outcome is controllable by a person if and only if that individual's voluntary activity can change the probability that the outcome will occur (Lacey, 1979). When faced with an unpredictable situation, people may cope by trying to gain control or withdraw from the situation. People who feel in control believe that they will overcome current failures or tragedies, whereas people who feel helpless feel overwhelmed and without recourse when faced with life stressors (Abramson, Seligman & Teasdale, 1978)

A study by Lawler et al (1988) revealed that Type A scores and desire for control were positively correlated. Studies with adult women have suggested that need for control may be an important moderator of Type A effects. Type A women who have high desire for control were found to be more reactive to reaction time stressors. They concluded that desire for control may be a coronary-prone component of Type A behavior. Desire for control may be a critical factor linking Type A behavior to physiological reactivity in women. For example, high desire for control women exhibited larger heart rate or blood pressure responses either in anticipation of a task and throughout testing (Lawler et al, 1990).

Several studies have suggested that Type As may prefer competition over cooperation (Gotay, 1981; VanEgeren, 1979), and that they will choose to work alone rather than in the presence of others while under stress (Dembroski & MacDougall,

1978). One possible explanation for Type A's choice to remain in control is that they believe it will ensure the best possible outcome. Control reduces the level of aversiveness in a situation (Miller, 1979, 1980). These individuals may alternatively be more concerned with achieving a sense of personal satisfaction and/ or may have a desire for control in and of itself (Clark & Miller, 1990).

Clark & Miller (1990) conducted a study which revealed that Type A's choose to work alone, avoid cooperation and thereby retain control significantly more than Type Bs. These differences were not influenced by differential levels of anxiety, commitment to the task, desire for self-evaluation, or desire to make the task more enjoyable. The factor that appeared to distinguish between the two types was desire for responsibility. For Type As, there was a strong relationship between desire for responsibility and preference to work alone. In a similar study, Strube, Boland, Manfredo and Al-Falaij (1987) found that Type As were more likely than Type Bs to seek out diagnostic information about their abilities, under conditions of uncertainty.

With the connection between Type A behavior and control set in place, what implications does this pose for the pregnant Type A woman? For many, the time of pregnancy poses a situation of uncertainty in which control is not necessarily possible. Type A women appear accustomed to maintaining control in their home and occupational responsibilities; what might happen once focus is shifted to their changing bodies where biological control is not possible? The next section details how the issues and constructs surrounding individual, contextual characteristics and stress will be addressed in the present study.

THE PRESENT STUDY
PSYCHOSOCIAL STRESS, PERSONALITY AND CONTEXTUAL FACTORS:
LINKS TO PREGNANCY AND BIRTH OUTCOMES

The literature review up to this point has attempted to integrate, from an Institute for Social Research model perspective, research on stress and its impact on pregnancy outcome. It has covered the different components within the construct of stress, individual characteristics, context characteristics and pregnancy outcome. Hence, the present investigation attempts to evaluate this process model by examining the moderating effects that personal disposition and context have on the established relationship between stress and health.

Consistent with the ISR model, individuals perceive stressors depending on 1) the context in which the stressor occurs and 2) the individual's resources and personal disposition that enable him/ her to react to the stressful situation. Past literature suggests that stressors experienced in the third trimester of pregnancy are capable of jeopardizing pregnancy outcome. Social support during pregnancy has been one established moderator of this stress-health relationship. Yet, in accordance with systems theory, multiple domains, such as the workplace, the marital relationship, and personality style must be considered in concert.

Therefore, exploratory analyses examine possible relationships between personal disposition and pregnancy outcome, for example, assessing links between Type A personality, desire for control during the transition, and pregnancy outcome.

Given their hard-driving competitive nature and tendencies for cardiovascular functioning, will Type A women have more difficult labor and deliveries? Or does a composite of personality characteristics and emotional functioning together play a moderational role in buffering stress that may prove detrimental to pregnancy outcome? The current study attempts to address Type A mothers and the effects that their lifestyles may have on their infants.

Figure 3 depicts the model under focus. Arrows between variables are the relationships that will be examined for this study. The hypotheses under investigation are discussed in the next section. The method by which the relationships among the variables of interest will be evaluated in the following section.

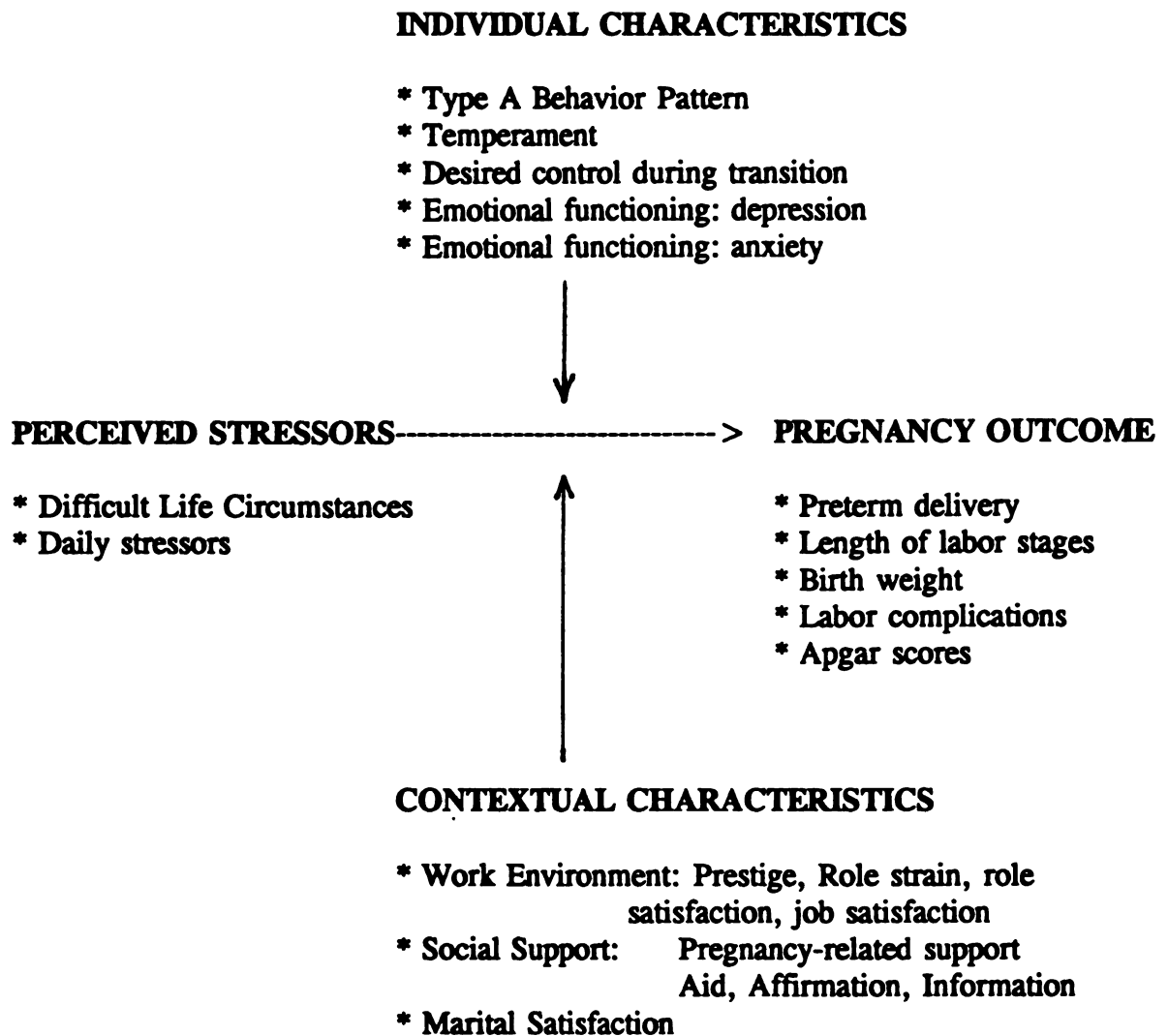


Figure 3.
Model of psychosocial stress, personality and contextual factors and the links to pregnancy outcome

HYPOTHESES

The goal of this dissertation is to examine, from an ISR model of stress, the relationship between stress and pregnancy outcome. Moderators that may be involved in this relationship will also be analyzed. In sum, the following research inquiries will be addressed:

- 1. The initial purpose of the proposed exploratory study is to assess the relationship between experienced stressors and pregnancy outcome. Experience with many stressors is expected to be highly associated with labor and delivery complications and poor infant outcome.**
- 2. In accordance with systems theory, contextual influences on the stress-birth outcome connection must also be considered. One purpose of the present research is to investigate the relationship between stress and pregnancy outcome as moderated by contextual characteristics of work environment, social support and marital satisfaction. The different types of contextual constructs are proposed to be potential predictors or moderators of the stress-pregnancy outcome relationship.**
- 3. Individual differences exist in how personal resources help individuals to cope with stressors. The third purpose of the study is to assess the relationship between stress and pregnancy outcome across time as moderated by the individual's personality characteristics of Type A personality, temperament, control, coping style,**

expected social support, and emotional functioning (depression and anxiety).

Individual personality constructs may play the role of predictors or moderators in the stress-pregnancy outcome relationship. These personality constructs include Type A, easy/difficult temperament, desired control, social support, and emotional functioning.

4. Based on evidence previously presented, Type A behavior pattern has been associated with poor health and links to the development of cardiovascular disease.

Can the same linkages be made in relation to pregnancy progress and labor and delivery? Given the literature associating Type A behavior and poor health outcomes, Type A women are predicted to have more labor and delivery complications, rely less upon others, and desire more control over the course of the pregnancy. More specifically, are the mean levels of all variables significantly different for Type A and Type B expectant career women?

5. Another purpose of the proposed study is to assess different pathways that may exist for Type A and Type B women, utilizing the same individual and contextual constructs as specified in Hypotheses 2 and 3.

6. The final purpose of the study is to test the proposed model patterned after the ISR model of stress, including individual characteristics, contextual characteristics and how these play a role in the relationship between stress and pregnancy outcome will be tested. Unhealthy individual characteristics and unsupportive environment will

negatively influence the relationship between stress and pregnancy outcome. Type A, Control and Psychological Indicators of stress, social support, and work satisfaction will jointly predict poor pregnancy outcome.

This study uses data from the MSU Becoming A Parent Study, a short-term comparative study of psychosocial changes during the transition to parenthood. Specifically, measures are employed that are pertinent to the third trimester of pregnancy and post reports of labor and delivery.

The measures utilized to index constructs related to the perceived stress experience in daily life include those assessing: difficult life circumstances and daily life stress and satisfaction, as perceived by the mother to be. The particular stress measures that are used to assess stressors and the scores derived from these measures are shown in Table 2.

Indexes of pregnancy outcome used in this study pertain to both positive and negative birth outcomes. The following constructs will be measured in order to index birth outcome: length of gestation period (preterm delivery of less than 37 weeks), length of labor stages, labor complications, infant birthweight, infant Apgar scores.

Table 2.
Constructs and Measures

Stress Measures

Construct	Measure
Long term stressors	Difficult Life Circumstances
Daily stressors	Life Stress & Disappointments

Contextual Measures

Construct	Measure
Employment history	Women's Life Situation Survey
Role satisfaction	Women's Life Situation Survey
Role strain	Women's Life Situation Survey
Satisfaction with job	Women's Life Situation Survey
Satisfaction with division of labor in home	Women's Life Situation Survey
Work satisfaction (specifics)	Work Satisfaction Scale
Occupational Prestige	Duncan Socioeconomic Index
Functional social support	Norbeck Social Support Scale
Number in support network	Norbeck Social Support Scale
Marital satisfaction	Dyadic Adjustment Scale

Individual Characteristic Measures

Construct	Measure
Temperament	Dimensions of Temperament Survey
Type A personality	Jenkins Activity Survey
Desired control	Expectations Questionnaire
Desired pregnancy-related social support	Expectations Questionnaire
Depression	Center for Epidemiological Studies Depression Scale
Anxiety	State-Trait Anxiety Inventory

Pregnancy Outcome Measures

Construct	Measure
Preterm delivery	Medical record information
Length of labor stages	Medical record information
Labor Complications	Medical record information & Maternal self-report
Birthweight	Medical record information & Maternal self-report
Apgar scores	Medical record information

Moderators that could potentially influence the relationship between stress and pregnancy outcome will also be examined. The potential moderating role of the following individual characteristic variables will be assessed: Type A personality, temperament, control, coping style, and emotional functioning, more specifically, the levels of depression and anxiety felt during the third trimester. In addition, the moderating role of contextual characteristic variables will be examined. These include aspects of work environment (prestige, role strain, role satisfaction, job satisfaction), social support (pregnancy-related support and aid, affirmation and information), and marital satisfaction.

A more detailed description of the measures utilized, the sample examined, and the procedure used to collect the data for this investigation is presented in the following section.

METHOD

Method

Subjects The participants were 80 pregnant women, ranging in age from 18-37 yrs ($M = 26.77$, $SD = 4.1$), each expecting their first child. The mean education level for the sample was a college degree, and the mean level of occupational prestige was 45 on a scale of 18 to 88.1. The sample was primarily Caucasian (78%), and married (80%). By focusing on first births, this bars any women who have already experienced past births. Employment status, age of subjects, and socioeconomic status are balanced for an education minimum of high school completion. Examining a sample of women 18-37 years of age increases the likelihood that Type A behavior will be more readily expressed. This sample includes a variety of occupations, ranging from unskilled and clerical workers to managers and executives.

Recruitment: All first time mothers-to-be were volunteers, recruited through Sparrow Hospital's Family Care Clinic, Michigan State University Clinical Center, Butterworth OB Gyn Clinic, The Physician's group and through Lansing and Grand Rapids area prenatal classes. A focus on these two areas insures both ethnic and socioeconomic diversity. Women were recruited into the study at the time for their first prenatal visit. Each participant met the following criteria: 1. Length of pregnancy < 24 weeks at first prenatal visit, 2. nulliparous, 3. no chronic diseases, e.g. Diabetes mellitus, hypertension, cancer, etc. which would place the woman in a

"high-risk" pregnancy category and 4. singleton pregnancy.

Procedure

All women were approached by a nurse in the hospital/ clinic waiting room. He/she briefly described the research project, to see if the patient was interested in participating in the project. Each woman was given a flyer explaining the study, and consent forms were distributed. A phone call followed, to make arrangements for the woman to receive the questionnaires. Adjustments were made for the researcher to go to the subject's home or workplace when difficulties arose. Each woman was given a flyer explaining the study, and consent forms were distributed.

Questionnaires were mailed to the woman's home, and participants were able to return the completed packets using prepaid return envelopes. Upon receipt of the completed questionnaire packet, the women were reimbursed \$5.00 for their time spent completing the questionnaires.

Design

Data were gathered in two different methods. The original project design involved data collection at three points in time: upon entrance into the study at the first prenatal care visit, at the middle of the third trimester, and eight weeks postpartum. We anticipated that some subjects would deliver prematurely, and were prepared for the possibility of not being able to obtain three data collection points for all participants. The group that was administered 3 sets of questionnaires throughout

the pregnancy were named "3-wave" subjects.

Initial recruiting attempts proved difficult and slow, due to the number of women under the age of 18 who were ineligible for participation. We decided to recruit additional subjects from expectant parent organizations. Since most participants do not begin classes until the last trimester of the pregnancy, an adjustment to the original design was made. The second method of data collection then required administration of packets at two points: during the last trimester of the pregnancy and 8 weeks postpartum. These subjects were labeled "2-wave" subjects. The current sample under investigation included 40 "3-wave" subjects and 43 "2-wave" subjects.

In order to conduct the current analyses, data from the third trimester of pregnancy was utilized, as well as the data collected eight weeks after the birth of the babies. For the subjects who received three "waves" of questionnaires, demographic information, Type A scores and the Women's Life Situation Survey were extracted from the first set of questionnaires. All remaining questionnaires data were extracted from the second set of questionnaires administered in the last trimester of pregnancy. For the subjects who received two "waves" of questionnaires, all questionnaire information was extracted from the first set of questionnaires, also administered in the last trimester of pregnancy. The only information abstracted from the last "waves" of questionnaires for both types of subjects included self-reported birth complications that occurred during labor and delivery.

Measures

The ISR model of stress (Kahn, 1981) emphasizes the importance of studying contextual and individual characteristics as mediators that influence the pathway between stress and health. In keeping with this model, the purpose of the present study is to examine the relationship between perceived stressors experienced during the third trimester of pregnancy and their relationship to birth outcome as mediated by individual and contextual influences.

In order to assess mediational influences on stress and pregnancy outcome, information regarding perceived levels of stress, individual characteristics, and contextual characteristics were collected during the third trimester of pregnancy. Assessment of individual characteristics was obtained by having participants complete self-ratings of 1) number and types of long term stressors, 2) daily stressors, 3) temperamental style, 4) Type A behavior, 5) depression, 6) anxiety, and 7) coping style.

In order to assess contextual characteristics during the third trimester, information from each participant was obtained regarding 1) social support network, 2) perceived desire of pregnancy-related social support, 3) marital satisfaction, and 4) employment characteristics (occupational prestige, role strain and satisfaction, and job satisfaction).

Finally, pregnancy outcome was obtained from participants and medical chart information. Indices of the progress of labor and delivery and infant outcome include premature delivery, length of labor stages, complications in labor, infant viability as

measured by Apgar scores, and infant birthweight.

The Appendix contains copies of all measures relevant to the present study, in the order listed below. Scale reliabilities for each of these measures is included in the results section.

Stress Measures

Difficult Life Circumstances

The Difficult Life Circumstances Scale (Barnard, Johnson, Booth & Bee, 1989) is a 28-item scale that assesses the presence of long-term family stressors. Examples of these stressors include: having problems with a credit rating, having an abusive partner, having a household member with a long-term illness, having trouble finding a suitable place to live, incarceration, and dependency on drugs. Two of the questions were deleted because they assessed situations involving children. The subject is asked to answer yes or no, depending on whether the situation is a current problem for them. Scores were based on the number of circumstances that applied, and could range from 0 to 26. A cutoff score of 6 indicated a case at high risk for family, parenting and child outcomes (Barnard et al, 1989). In a study by Krener et al (1986), the mean number of difficult life circumstances was 5.0; chronic problem families reported a mean of 6.2, and more successfully functioning families reported a mean of 4.2. Barnard et al (1989) report test-retest reliabilities ranging between .4 and .7. The present study is the first one to be utilized in a population of expectant pregnant women.

Life Stress and Disappointments

This instrument assesses the amount of stress the individual perceives he/she has in different aspects of daily life. The instrument was created by Alejano (1992), as an adaptation of the Hassles and Uplifts Scale (Kanner, Coyne, Schaefer & Lazarus, 1981). The scale was designed to assess how daily events impacted on their happiness, stress levels and amount of time spent thinking about the event. The scale uses similar items as the hassles and uplifts scale, but goes beyond indicating how often each event occurred in the last month. Three scales are used for the 53 items, and the subject is asked to rate 1. How happy/ satisfied they are with the situation, 2. Whether or not it is a source of stress, and 3. The amount of time they spend thinking about the situation. They are also asked to list the three items with which they are most satisfied and the three items with which they are most disappointed. Additional reliability and validity analyses are currently underway with other adult samples.

Contextual Measures

The Women's Life Situation Survey

Since being employed may be stressful for most pregnant women, detailed information was collected on each woman's occupation, education, employment situation, reasons for working, physical exertion required on the job, job satisfaction, and plans for employment after the birth of the baby. The Women's Life Situation Survey (WLSS; Lerner, 1989) was used for this purpose. The WLSS was designed to assess the characteristics of a woman's employment and living situation and was

modified for this sample, specifically by deleting questions regarding children. This close-ended questionnaire includes information about 1) the mother's final level of education, 2) employment history, 3) role satisfaction and strain, 4) how satisfied the woman is with her employment situation, satisfaction with the division of labor in the home, and current marital status.

The satisfaction items are rated on a five-point forced-choice scale, with high scores indicating greater satisfaction. Perceived role difficulty is rated similarly, with increasing scores corresponding to an increase in experienced difficulty.

One subscale was formed within the WLSS, which pertained to satisfaction with one's own employment situation, consisting of five items in which the respondent rated her satisfaction with following aspects of employment: the job, the salary, the hours, the responsibility, and the status. This subscale on past studies (Hess, 1990) has yielded a Cronbach alpha internal consistency coefficient of .83 for women.

Work Satisfaction

The Work Satisfaction scale created by Pistrang (1984), assessed the degree to which the respondent obtained specific satisfactions of psychological rewards from her work. Items include questions regarding aspects of the occupation, including accomplishment, job usefulness, and opportunities for self-expression. Each item is rated on a 5-point forced choice scale, ranging from "never" to "very often. This 25-item scale has yielded a coefficient alpha of .94 (Pistrang, 1984). Additional

information on reliability and validity of this measure does not currently exist.

Occupational Prestige

The revised Duncan Socioeconomic Index Scores (Featherman & Hauser, 1980) were utilized for establishing occupational prestige scores for each of the participants in the study. The original index (Duncan, 1961) was developed to estimate the Nort-Hatt prestige ratings for census occupations. Each score is derived using a regression equation. These index scores assign prestige score which takes into consideration years of education, salary, and social prestige associated with each occupation. Stevens & Featherman (1980) updated the scale for 1970 census occupation codes. These three-digit scores range from 13.8 (private household workers-- allocated) to 88.4 (physicians and lawyers).

The Norbeck Social Support Scale

Each woman rated the type and degree of social support she received from her partner, friends, family and employer. The Norbeck Social Support Questionnaire was used to measure three dimensions of social support: functional support (affect, affirmation and aid), network, and loss (Norbeck, Lindsey & Carrieri, 1981). This scale assesses the amount of social support the individual feels they receive from family and friends. The nine items ask the subject to rate how dependable they feel their family members and friends are in several situations. Responses are made on a 5-point forced-choice scale, varying from "Not at all" to "A great deal". Evidence

for construct and concurrent validity, strong internal consistency (range .95 to .98) and excellent test-retest reliability (range .85 to .92) have been demonstrated among various ethnic groups (Norbeck, Lindsey & Carrieri, 1981; Norbeck, Lindsey & Carrieri, 1983).

Marital Satisfaction: The Dyadic Adjustment Scale

The Dyadic Adjustment Scale (DAS; Spanier, 1976) was used to assess the perceived quality of the subjects' marital relationships. The DAS is a frequently used measure of marital adjustment (e.g., Jacobson & Moore, 1981; Johnson & Greenberg, 1985) that assesses aspects of the marriage such as satisfaction, communication, affection, similarity of values and global adjustment. Several investigations have demonstrated that the DAS is a psychometrically reliable and valid measure that discriminates happily married from unhappily married and divorced samples (e.g. Jacobson & Margolin, 1979; Whiffen & Gottlib, 1991). Spanier (1976; Spanier & Thompson, 1982) reports evidence for content, criterion-related, concurrent, and construct validity. Alphas ranging from .73 to .96 have been reported for the DAS and its subscales.

Individual Characteristics Measures

Temperament: The Dimensions of Temperament Survey.

Each woman rated her temperament or behavioral style using the Dimensions of Temperament Survey (Windle & Lerner, 1986, Windle et al, 1986). This 54-item

qu

lev

Fl

R:

Sc

inc

to

ea

att

of

co

co

de

an

Su

an

al,

questionnaire assesses temperament along nine orthogonal dimensions: 1. Activity level-general; 2. Activity level- sleep; 3. Approach-Withdrawal; 4. Flexibility-rigidity; 5. Mood; 6. Rhythmicity-sleep; 7. Rhythmicity-eating; 8. Rhythmicity- daily habits; and 9. Task orientation.

The response format for each item is 1 = usually false to 4 = usually true.

Scoring DOTS-R involves forming attribute scores by summing the scores on individual items. Higher DOTS-R scores indicate higher levels of activity, a tendency to approach, higher flexibility, a positive mood, higher levels of rhythmicity in sleep, eating, and daily habits, and a higher task orientation level.

Internal consistency coefficients (Cronbach alphas) for the above nine DOTS attributes are .75, .81, .77, .62, .80, .69, .75, .54, and .70, respectively for a sample of 244 sixth graders. Construct validity for the DOTS-R has been reported for college students by Windle et al (1986).

Type A Personality: The Jenkins Activity Survey

The Jenkins Activity Survey (Jenkins, 1978) assessed whether each woman could be classified as having a Type A personality. This classification's major descriptive elements are extremes of competitive achievement striving, impatience, and hostility. Of the several measures of Type A behavior, the Jenkins Activity Survey (Jenkins, 1978) has the strongest construct validity (Matthews et al, 1982), and has the broadest use in studies of Type A behavior involving women (Lawler et al, 1983, 1984, Van Egeren, 1979, Jenkins et al, 1967). The self-administered Jenkins

1

2

3

4

5

6

ge

su

des

how

Activity Survey assesses the major behavioral manifestations of Type A behavior (Jenkins et al, 1967 and Matthews et al, 1982).

Each woman was screened for the Type A behavior pattern, using the Jenkins Activity Survey (Jenkins, 1978). This measure determines whether or not an individual has tendencies to be Type A (driven, competitive) or Type B (less stressed, less time-conscious). The 52 items ask about different aspects of patience, time commitments, work habits, hurried behaviors, emotions and social interactions.

The survey is a self-report multiple-choice questionnaire of 52 items designed to measure the Type A behavior pattern found to be strongly associated with the risk of coronary heart disease. The test is scored on four scales: the Type A scale, which assesses the multifactorial clinical construct of the coronary-prone behavior pattern, and three factorially independent components of this broad construct: speed and impatience, job involvement, and hard-driving and competitive. Examples of these subscales are included in Table 3.

Jenkins et al (1965) have reported an alpha .83 for female subjects, and a general range of .73 to .85 for all populations for all Jenkins Activity Survey subscales.

Expectations Questionnaire Subscales: Desired Control and Social Support

The Expectations Questionnaire Battery (Alejano & Frassetto, 1992) was designed to assess each woman's expectations regarding the pregnancy (wantedness, how she expects it to go), delivery, parenting competence, paternal involvement in

C
C
W

E
m
in
(n
be
20
wit

childcare and parenting, and expectations regarding her future employment.

This measure addresses the participants's expectations on several aspects of the pregnancy. Areas include physical changes, expectations about the course of the pregnancy, expectations for labor and delivery, child care expectations, and expectations for becoming a first time parent. This measure also includes sections on personal beliefs about pregnancy, and choices and control during the course of pregnancy. Several five-point forced-choice scales allow individuals to indicate whether they agree or disagree with statements.

As a newly created measure, no reliability information has yet been established. Yet in past analyses including 39 subjects from the current study, alphas of .72 for the desire for control scale and .63 for the pregnancy-related support scale were obtained.

Mental Health Functioning: Depression

To assess each woman's experience of stress, we used the Center for Epidemiological Studies Depression Scale (CESD). This scale is a self-report "state" measure of depressive symptomatology that was developed for research applications, initially for use in epidemiologic surveys of depression within the general (nonpsychiatric) population. It assesses three components of depressive symptoms: 1. behavioral, 2. cognitive, and 3. happiness-sadness. Subjects are asked to respond to 20 statements describing particular ways they might have felt during the past week, with answers ranging from 0) "Rarely or none of the time" to 3) "Most or all of the

t

8

(

r

S

a

s

s

c

i

.

a

F

o

P

f

time". The possible range of total scores is 0-60, with higher scores reflecting greater distress. The CESD appears to have adequate psychometric properties (Radloff, 1977; Roberts & Vernon, 1983; Weissman et al, 1977) Radloff (1977) has reported coefficient alphas of .84, .85, .90

Mental Health Functioning: Anxiety.

In the present investigation, the State-Trait Anxiety Inventory Form Y by Spielberger (1983) yields information on the individual's level of both "state" anxiety and "trait" anxiety. The 20 state-anxiety items ask the subject to respond to statements describing how they feel "right now". The 20 trait-anxiety items ask the subject to respond to statements describing how they "usually feel". Items were rated on a 4-point scale ranging from "not at all (1) to "very much" (4). Higher totals indicate greater anxiety levels. Concurrent validity and test-retest reliability (range .73 to .86) has been reported by Spielberger et al, 1970. Alpha coefficients for state anxiety was reported at .93 for women, and .91 for trait anxiety.

Pregnancy Outcome Measures

Medical Record Information

Information abstracted from medical charts were quantified for analyses. The outcomes include the following list.

Preterm delivery Dates of delivery and number of weeks of gestation were recorded for each birth. An infant born less than 37 weeks gestation was defined as a preterm

baby. Hence, the expected range of weeks of gestation was between 30 weeks and 40 weeks. Medical charts contain many different calculations of gestational age, including those based on self-report of last menstrual period, physician-based estimates based on pelvic examinations, and ultrasound results. Time of delivery was coded as clearly full term (38 or more weeks gestational age) at birth, marginally preterm (36 or 37 weeks gestational age), or clearly preterm (fewer than 36 weeks gestational age).

Length of Labor Stages The length of labor stages were recorded in minutes for the three stages of labor. The first stage is defined as the period when regular intense contractions begin until the cervix is fully dilated. The second stage begins once the cervix is fully dilated, and the newborn's head pushes through the cervix into the vagina. The third labor stage is defined as the period when the placenta separates from the uterine wall, and afterbirth is delivered.

Complications The number of birth complications was quantified according to the number of complications that occurred during labor progress and delivery. Examples of birth complications are umbilical cord complications (wrapped around the infant's neck), and emergency c-sections. The variable is a summation of the number of complications that appear on the complications checklist. A copy of the complications checklist is attached to the appendix, at the end of the measures.

Birthweight Birthweights in grams were recorded for each newborn. Birthweight were used as a continuous dependent variable in analyses because categorical birth outcomes such as normal versus low birthweight are less reliable and yield poorer statistical power in data analyses. Newborns who weigh less than 2500 grams were classified as a low birthweight infant. Generally, normal full-term babies weigh 3500 gms.

Apgar scores The Apgar Scale (Apgar, 1953) is an assessment scale conducted at 1 and 5 minutes after birth. Infant characteristics of heart rate, respiratory effort, muscle tone, reflex irritability and color are scored on a scale from 0 to 2. Two points are given if the infant is in the best possible condition for a particular sign, and no points are assigned if the sign is not present. 1 point is given for all conditions between 0 and 2. Individual scores are totaled to give a measure of the infant's overall physical condition. The highest total score an infant can obtain is 10. An infant with a score of less than 4 is considered to be in poor condition and to require immediate medical attention. Total scores at 1 and 5 minutes were recorded for data analysis.

Maternal Self-report of birth outcome

8 weeks after the birth of the baby, mothers completed a questionnaire regarding her perceptions of how the labor and delivery proceeded. These open-ended questions were coded into a complications scheme, and were compared to

information abstracted from medical records. The responses may also be dichotomized as the absence or presence of birth complications.

Results

Data assessment

Data were entered into a computer file and screened for accuracy. Frequency analyses were run to further check the accuracy of the data, which revealed a small number of missing cases for some outcome variables. This was expected, considering that some information from medical records was not available due to the fact that these participants were from out-of-state. The effect of missing values on the analyses was examined by computing a dummy variable, coding subjects 1 = present, 2 = missing. A comparison of the two samples revealed no significant differences on all other variables. To preserve an adequate sample size, all further analyses were conducted using the regression substitution for all missing values. According to Little and Rubin (1987), this method is a conservative procedure for coping with item non-response.

Scale analyses

Scale reliabilities were examined using coefficient alpha internal consistency estimates. Initial estimates of internal consistency reliability ranged from .60 to .95 across scales. These alphas are recorded in Table 3.

Table 3.
Reliability Estimates for Scales

Stress Measures

Measure	Scale Alpha
Difficult Life Circumstances	.66
Life Stress & Disappointments	.91

Contextual Measures

Measure	Scale Alpha
Norbeck Social Support Scale: Affect, Affirmation and Aid	.95
Dyadic Adjustment Scale: Marital Satisfaction	.95
Feelings About Work Scale	.96
Expectations of mate during pregnancy	.84
Single item measures: no alphas reported	
Role difficulty	--
Work Satisfaction	--
Satisfaction with division of labor in home	--
Duncan Socioeconomic Index of Occupational Prestige	--
Number in support network	--

Individual Characteristic Measures

Measure	Scale Alpha
Dimensions of Temperament Survey (DOTS)	
* Approach-Withdrawal	.72
* Activity Level: General	.85
* Activity Level: Sleep	.91
* Flexibility-Rigidity	.84
* Mood	.89
* Task Orientation	.79
Easy/ Difficult Temperament Scale	.73

Jenkins Activity Survey	
* Type A personality	.70
* Speed-Impatience	.59
* Hard-Driving & Competitive	.82
* Job Involvement	.74
Ctr for Epidemiological Studies Depression Scale	.89
State-Trait Anxiety Inventory: State	.92
Psychological Indicators Scale	.77
Expectations Questionnaire: Desired control	.60

Item-total correlations were examined to determine whether some of the scales exhibiting lower internal consistency estimates might be altered to increase reliability. For each of the scales, none of the items were dropped.

It is worthy to note that for the Difficult Life Circumstances Questionnaire, high alphas were not expected due to the variation in types of difficult life circumstances. For example, the severity of items "Does your mate physically abuse you?", and "Do you have difficulty making payments on bills?" do not necessarily imply a relationship. The questionnaire serves as a checklist of long term stressors.

Summary of Dependent Variables

On average, the labor and delivery characteristics of these women do not include many extreme or severe complications. Eighteen caesarean sections were performed, and the range of number of complications were from 0 to 7, out of a possible 30. Eighty-five percent of the sample had 3 or fewer complications. Six percent of the births were premature, as defined by 37 or fewer weeks of gestation. The average birthweight of the infants was 7 lbs, 11 oz., with Apgar scores of 9 on average for the infants. As illustrated, this sample of women did not appear to have a great range of complications or problem pregnancies.

Descriptive Analyses

Means, standard deviations, and variable intercorrelations were calculated for all of the measures used in the study, and are presented in Table 4.

As described earlier in the sample section, the group of women in the study are highly educated with a mean age of 27, have fairly prestigious occupations, and are primarily caucasian career women. Yet, within this seemingly homogenous sample, the long term stressors experienced by these women were positively correlated with levels of anxiety and depression, and negatively correlated with work satisfaction and marital satisfaction.

[illegible]

16. Social Support	212.15	102.27
17. Marital Satisfaction	110.29	26.40

Variable	12	13	14	15	16	17	18	19	20	21	22	23
Stress Variables												
1. Difficult Life Circumstances	-0.08	.41 [^]	.36 [^]	0.14	0.06	-.37 [^]	-0.1	-0.16	0.19	-.33 [^]	-.27 [*]	-.29 [^]
2. life stress/disappointments	-0.05	.30 [^]	.27 [^]	-0.01	0.17	-0.03	0	0.11	0.05	-0.18	-0.1	-0.14
Individual Variables												
3. Approach-Withdrawal	0.07	-0.13	-0.19	-0.11	0.04	0.06	0.1	0.19	-0.06	0.12	0.05	-0.01
4. Activity Level:General	0.04	0.15	0.05	0.16	-0.03	-0.09	-0.09	-0.08	0.13	-0.12	-0.19	-0.05
5. Activity Level:Sleep	.26 [*]	.27 [*]	0.12	.30 [^]	0.05	-0.015	-0.09	-0.03	0.11	0.1	-.22 [*]	-0.05
6. Flexibility-Rigidity	0.14	-.31 [^]	-.38 [^]	-.26 [*]	0.09	.29 [^]	0.14	0.21	-0.11	0.12	0.1	0.09
7. Mood	-0.05	-.37 [^]	-.34 [^]	-0.17	0.15	.43 [^]	0.14	.36 [^]	-0.016	0.08	0.02	0.09
8. Task Orientation	0.1	-0.13	-0.01	-0.02	-0.15	.32 [^]	0.01	0.07	-0.16	-0.02	-0.07	0.06
9. Type A	0.05	0.06	-0.05	0.1	-0.14	-0.1	0	-0.14	0.13	0.12	0.12	0.04
10. Speed-impatience	0	-0.04	-0.02	0.11	-.26 [*]	-0.01	-0.09	-0.17	0.02	0.02	-0.01	-0.04
11. Hard Driving-Competitive	0.14	0.16	0.11	-0.14	-0.12	-0.08	-0.03	0.18	-0.05	-0.07	-0.09	-0.16
12. Job Involvement		0.02	0.09	-0.13	-0.1	-0.38	-0.21	0.17	-0.15	0.07	-0.01	0.02
13. Depression			.61 [^]	.36 [^]	-0.05	-.38 [^]	-0.21	-0.15	.28 [^]	-.23 [*]	-0.19	-.28 [^]
14. Anxiety				.24 [*]	-0.05	-.38 [^]	-.24 [*]	-0.09	.26 [*]	-0.25	-.26 [*]	-0.21
15. Desired Control					-0.06	-0.2	-0.06	-0.21	0.07	0.05	-0.06	0.03
Contextual Variables												
16. Social Support						-0.02	.23 [*]	0.1	0.1	0.1	-0.01	0.2
17. Marital Satisfaction							0.07	.53 [^]	-.27 [*]	0.09	0.06	0.11

Variable	24	25	26	27	28	29	30	31	32	33	34
Stress Variables											
1. Difficult Life Circumstances	-.19 [^]	0.11	-0.11	0.06	-0.02	0.11	0.15	0.03	-0.11	-0.2	0.11
2. life stress/disappointments	0.05	-0.19	0.08	0.12	.23 [*]	-0.01	-.22 [*]	0.09	-0.06	-0.12	-0.07
Individual Variables											
3. Approach-Withdrawal	-0.01	0.12	0.06	0.06	-0.15	-0.13	-0.03	0.2	-0.1	-0.14	0.14
4. Activity Level:General	-0.15	-0.17	-0.02	-0.06	-0.07	-.32 [^]	-0.14	0.17	-0.12	-0.14	0
5. Activity Level:Sleep	-0.17	-0.18	0.04	0.03	-0.01	-0.04	.20 [*]	-0.05	0.03	0.07	0.08
6. Flexibility-Rigidity	0.03	0.1	0.08	0.09	-0.08	-0.13	-0.02	0.18	-0.09	-0.02	.30 [^]
7. Mood	0.02	-0.05	0.04	0.16	-0.06	0.02	-0.07	.23 [*]	-0.03	-0.15	0.02
8. Task Orientation	0.03	-0.1	0.04	-0.09	0.06	0.06	.32 [^]	-.23 [*]	-0.01	0.21	-0.01
9. Type A	0	-.23 [*]	0.03	-0.12	-0.09	-0.01	-0.11	-0.12	0.03	0.09	-0.09
10. Speed-Impatience	0.11	-0.22	0.02	-.23 [*]	0.08	0.08	-0.17	-0.1	-0.04	0.14	-0.09
11. Hard Driving-Competitive	-0.04	0.13	-0.09	-0.12	0.09	-0.19	0.01	-0.08	-0.06	0.04	-.27 [*]
12. Job Involvement	-0.05	-0.19	0.04	-0.15	-0.01	-0.16	0.01	0.12	-0.05	.24 [*]	-0.02
13. Depression	-0.18	0	-0.15	-0.1	0.12	-0.05	-0.02	-.29 [^]	-0.01	-0.15	-0.05
14. Anxiety	-0.13	0.04	-0.12	-0.07	0.04	0.03	-0.05	-0.15	-0.13	-0.13	-0.07
15. Desired Control	-0.03	-.34 [^]	0.1	-0.05	0.02	0.06	0.15	-0.02	-0.02	-0.13	-0.1
Contextual Variables											
16. Social Support	0	0.13	0.08	.95 [^]	0.07	0.04	-0.06	0.04	0.13	0.1	-0.06
17. Marital Satisfaction	0.17	-0.12	.35 [^]	0.01	-0.16	-0.03	0.06	0.08	-0.03	-0.18	0

Variable	X	SD	19	20	21	22	23	24	25	26	27
18. Feelings About Work	91.74	16.59	0.14	0.12	.38^	.25*	.34^	.36^	0.09	0.05	.25*
19. Expectations of Mate	74.09	10.91		-.25*	0.16	0.05	.22*	0.13	0.05	0.18	0.13
20. Role Difficulty	2.49	0.58			-0.14	-0.09	-0.1	-0.02	0.1	0.01	0.09
21. Work Satisfaction:Status	3.80	0.99				.59^	.78^	.27^	0	0.2	0.14
22. Work Satisfaction:Salary	3.50	1.22					.51^	0.21	0.02	0.03	0.03
23. Work Satisfaction:Responsibility	3.93	0.91						0.2	0.06	.25*	0.24
24. Work Satisfaction:Overall	4.08	1.22							-0.09	.22*	0.01
25. Satisfaction with Division of Labor	2.60	1.59							0	0	0.13
26. Occupational Prestige	45.54	19.77									0.13
27. Number in Support Network	11.67	5.36									
Pregnancy Outcome Variables											
28. Weeks Gestation	39.30	1.40									
29. Length of Labor :Stage 1	374.04	273.69									
30. Length of Labor:Stage 2	55.40	48.40									
31. Number of Labor Complications	2.00	1.50									
32. Birthweight	7.70	1.10									
33. Apgar Scores at 5 Minutes	8.70	1.09									
34. Caesarean Section	1.75	0.41									

Variable	28	29	30	31	32	33	34
18. Feelings About Work	-0.05	.25*	0.16	0.01	0.16	0.03	-0.1
19. Expectations of Mate	-0.19	-0.04	.26*	0.03	0.05	0.08	-0.09
20. Role Difficulty	0.08	0.13	-0.19	-0.11	0.01	0.05	0.09
21. Work Satisfaction:Status	0.05	0.14	0.21	-0.03	-0.1	0.17	0.03
22. Work Satisfaction:Salary	0.14	0.1	0.14	0.15	-0.11	-0.05	0.02
23. Work Satisfaction:Responsibility	0	0.05	0.16	0.01	-0.04	0.18	-0.01
24. Work Satisfaction:Overall	0.06	0.09	-0.08	-0.09	0.03	0	0
25. Satisfaction with Division of Labor	-0.08	0	0.01	-0.11	-0.02	0.13	0.1
26. Occupational Prestige	-0.13	0.05	-0.04	0.04	0.03	0.14	0.13
27. Number in Support Network	0.06	0.08	-0.06	0.05	0.15	0.08	-0.05
Pregnancy Outcome Variables							
28. Weeks Gestation	0.07	-0.15	-0.11	.26*	-0.06	-0.15	
29. Length of Labor :Stage 1		.26*	-.22*	0.18	-0.02	.53^	
30. Length of Labor:Stage 2			-0.11	0.01	0.1	-.26*	
31. Number of Labor Complications				-0.08	-.23*	-.32^	
32. Birthweight					-0.08	-.26*	
33. Apgar Scores at 5 Minutes						0.01	
34. Caesarean Section							

* An '*' indicates $p \leq .01$, an '^' indicates $p \leq .05$.

In addition, examination of the correlations revealed that the role difficulty experienced by these participants was positively related to levels of depression and anxiety, and negatively related to marital satisfaction and expectations that the mate would assist throughout the pregnancy.

Finally, the last set of correlations that are of interest to note are those associated with psychological indicators, which is a combination of anxiety and depression. The level of psychological anxiety and depression was found to be positively correlated with difficult life circumstances, desired control during pregnancy, daily hassles, and negatively correlated with feelings about work and number of complications experienced during labor and delivery.

Regression analyses

In order to determine which of the independent variables was most predictive of poor pregnancy outcome, regression analyses were performed. In accordance with the ISR model of stress, hypothesis 1 noted that experience with many stressors was expected to be highly associated with labor complications and poor infant outcome. Table 5 includes the list of individual indicators used in the series of regression analyses. Number of labor complications was used to predict psychological indicators and difficult life circumstances, using a forced entry procedure. The lack of predictive relationship between long term stress and number of complications leads to the conclusion that hypothesis 1 received no support.

Tab
Indi

De

Te

Table 5.

Individual indicators used in regression analyses for hypotheses 3 and 4.

Dependent Variables

Number of labor and delivery complications
Psychological indicators

Tested Predictors

Individual Characteristics

Type A personality
Temperament
Desired control

Contextual Characteristics

Social Support
Work Satisfaction
Feelings about work
Marital Satisfaction

Stressors

Difficult Life Circumstances

To test the possibility that other variables may be more directly predictive of labor complications, a step-wise regression procedure was used to regress number of complications upon the remaining independent variables. The only variable to enter the equation was the scale for easy/difficult temperament. This single variable produced a multiple R of .25 ($F(1,78) = 5.39, p < .05$), indicating that temperament accounted for approximately 6 % of the variance in number of labor complications. in this case, easy temperament was associated with more complications.

Another set of step-wise regressions was performed with psychological indicators, in order to investigate a possible relationship with difficult life circumstances. It was possible that somehow psychological indicators would be the key link between stress and number of complications. Three variables entered the equation predicting labor complications: easy temperament, increasing numbers of difficult life circumstances, and high desire for control. These three variables produced a multiple R of .61 ($F(3,76) = 14.95, p < .01$), indicating that together these three variables accounted for approximately 37% of the variance in degree of psychological indicators. These regression analyses are presented in Table 6.

Table 6.
Regression Results for Hypothesis 2 and 3

Dependent Variable: Number of Complications

<u>Predictor</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Temperament	.25	.065	.065*

Dependent Variable: Psychological Indicators

<u>Predictors</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Difficult Life Circumstances	.39	.18	
Temperament	-.35	.34	
Control	.19	.37	.03*

* denotes $p < .05$

** denotes $p < .01$

N=80

p

p

c

C

o

su

in

at

A

pr

A

sa

o?

de

The results of these regressions provides partial support for hypothesis 3 and provides no support for hypothesis 2. Since the results yielded no support for the primary stress-poor birth outcome relationship, it was not possible to test individual characteristic and contextual characteristic variables as mediators of the relationship. Only individual characteristics appear to contribute to the number of complications occurring during labor and delivery.

The model resulting from these analyses is depicted in Figure 4.

As illustrated, the model does not include any contextual variables of social support, marital satisfaction or work-related constructs. This reduced model of individual characteristic influences on birth outcome was utilized in the remaining analyses.

Analyses Comparing Type A and Type B Women

For the entire sample, the environmental variables did not contribute as predicted. Instead, the focus was placed exclusively on personality and temperament. Although Type A behavior did not prove to be a predictor of labor complications, the sample was divided into two groups (based on scores on the Jenkins Activity Survey) of Type A (n=33) and Type B (n=47), to assess possible differences in labor and delivery progress between the two groups.

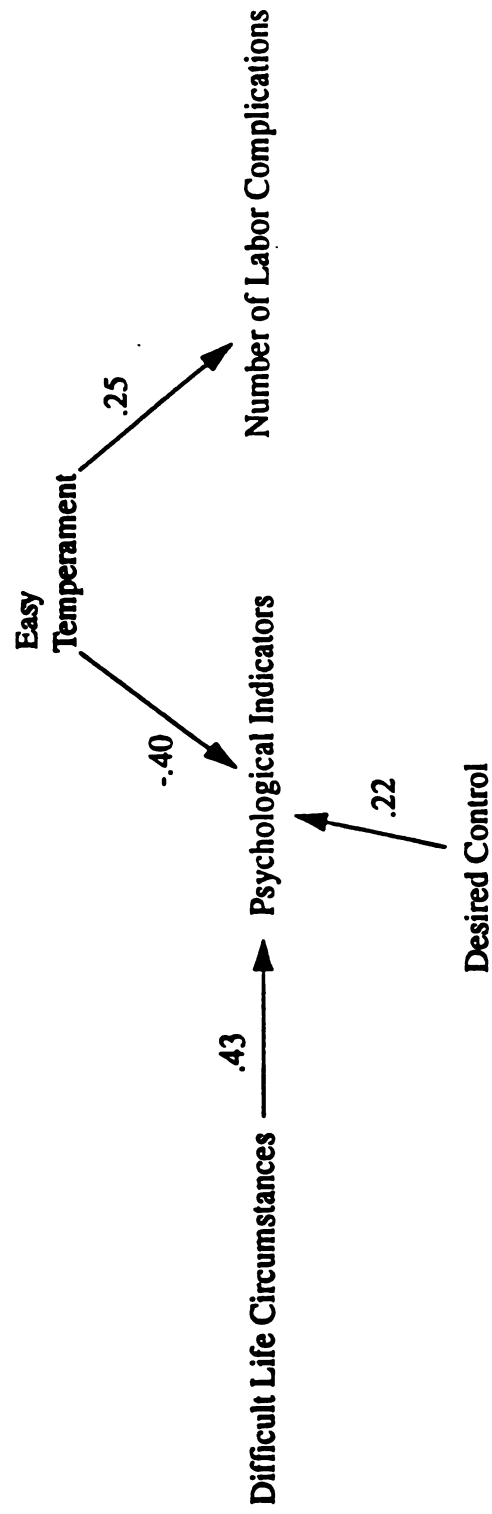


Figure 4.
Regression model predicting labor complications
Regression coefficients are included.

Descriptive analyses

Results from independent samples T-tests reveal that few differences between the two groups existed. The results for these analyses are presented in Table 7.

The only significant differences were with temperament flexibility (Type A mean = 16.31, Type B mean = 17.96, $p < .01$) and division of labor in the home (Type A mean = 2.10, Type B mean = 2.99, $p < .01$). These results failed to support any of the proposed differences between Type A and B women. Although these analyses failed to find significant differences between the two types of personality, regression analyses were performed to assess path differences specified in Hypothesis 5.

Regression Analyses

In order to determine the different pathways hypothesized for each Type group, regression analyses were performed in much the same manner as with the entire sample. Again, for each group, contextual variables did not enter equations predicting number of complications. A different picture emerged for each group. The results from these regressions are found in Tables 8 and 9, and are illustrated in Figure 5.

Table 7.
Mean differences between Type A and Type B women

Measure	Type A	Type B
	Mean (SD)	Mean (SD)
Stress Measures		
Difficult Life Circumstances	2.8 (2.4)	3.0 (2.6)
Life Stress/ Disappointments	102.0 (25.2)	97.7 (23.9)
Individual Characteristics		
Depression	14.8 (7.3)	14.6 (9.7)
Type A**	27.9 (4.7)	14.2 (5.0)
Speed-Impatience**	22.5 (7.5)	14.2 (6.3)
Hard-Driving/ Competitive**	22.6 (8.0)	16.3 (6.1)
Job Involvement	18.3 (8.8)	17.6 (7.1)
Approach-Withdrawal	15.7 (3.1)	16.7 (2.7)
Task Orientation	21.0 (3.0)	20.3 (3.7)
Mood	23.8 (3.8)	24.3 (3.7)
Flexibility-Rigidity*	16.3 (4.1)	18.0 (3.1)
State Anxiety	34.6 (10.4)	33.4 (11.3)
Activity level: general	18.5 (4.1)	18.1 (4.4)
Activity level: sleep	12.6 (2.8)	11.4 (3.4)
Desired control	22.9 (4.2)	21.4 (4.6)
Contextual Characteristics		
Social Support Scale	191.0(106.2)	227.0(97.8)
Work Satisfaction	4.0 (1.4)	4.1 (1.1)
Work Satisfaction: Salary	3.5 (1.1)	3.5 (1.3)
Work Satisfaction: Status	4.0 (0.7)	3.7 (1.1)
Role difficulty	2.6 (0.5)	2.4 (0.6)

Expectations of mate	73.2 (12.7)	74.7 (9.7)
Feelings About Work	92.1 (15.7)	91.5 (17.4)
Work Satis: Responsibility	4.0 (.85)	3.9 (.96)
Occupational Prestige	45.7 (23.4)	45.5 (17.0)
Marital Satisfaction	108.8 (31.0)	111.4 (23.0)
Satisfaction with division of labor in home*	2.1 (1.6)	3.0 (1.5)
Pregnancy Outcomes		
Weeks Gestation	39.3 (1.6)	39.4 (1.4)
Length of Stage 1 labor	342.0 (320.9)	396.5 (236.1)
Length of Stage 2 labor	49.9 (48.3)	59.3 (48.5)
Number of complications	1.9 (1.3)	2.2 (1.7)
Apgar at 5 minutes	8.9 (0.4)	8.6 (1.4)
Birthweight	5.9 (2.2)	6.1 (2.1)
Caesarean section	1.6 (0.5)	1.8 (0.4)

* denotes mean difference significant at $p < .05$

** denotes mean difference significant at $p < .01$

Table 8.
Regression results for Type B sample

Type B group

Dependent Variable: Number of Complications

<u>Predictor</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Psychological Indicators	-.33	.11	.11*

Dependent Variable: Psychological Indicators

<u>Predictor</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Difficult Life Circumstances	.43	.28	.28*
Desire for Control	.36	.40	.12**

* denotes $p < .05$

** denotes $p < .01$

N=47

Table 9. 125
Regression analyses for Type A sample

Type A group

Dependent Variable: Number of Complications

<u>Predictor</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Temperament	.71	.13	
Education	-.41	.32	
Psychological Indicators	.35	.38	.06 (.07 signif)

Dependent Variable: Psychological Indicators

<u>Predictor</u>	<u>Beta</u>	<u>Total R</u>	<u>Change R</u>
Temperament	-.69	.48	.48**

* denotes $p < .05$

** denotes $p < .01$

N=33

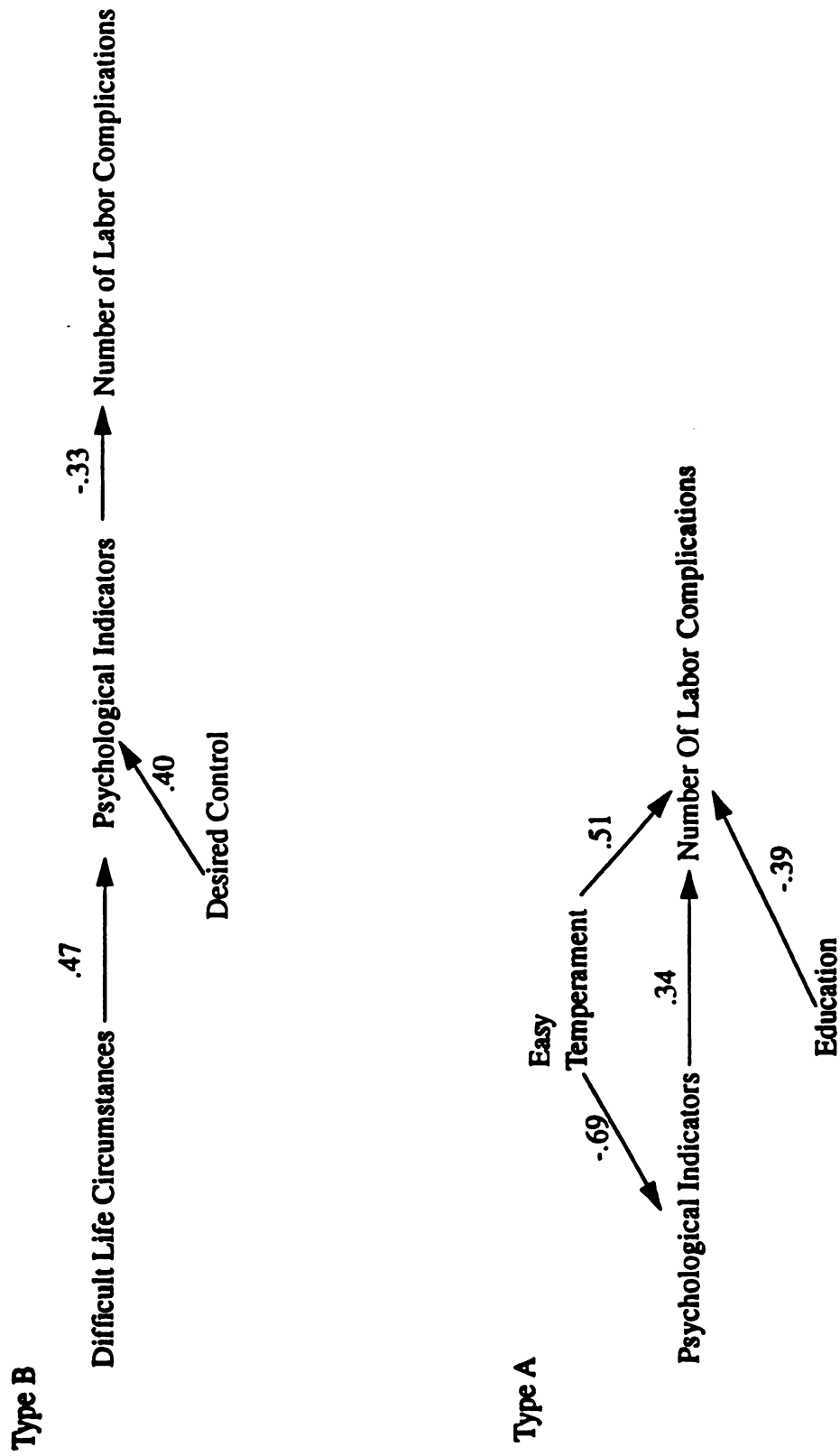


Figure 5.
Regression models predicting labor complications for
Type A and Type B groups Regression coefficients are included.

Type B women

For Type B individuals, psychological indicators accounted for approximately 10 % of the variance in the number of labor complications. The greater the amount of anxiety and depression felt by these women predicted the larger number of labor complications experienced. This variable produced a multiple R of .33 ($F(1,45)=5.40, p<.05$). In turn, difficult life circumstances and desire for control both entered the equation predicting psychological indicators. A multiple R of .63 ($F(2,44)=14.42, p<.01$), resulted, accounting for approximately 40% of the variance.

Testing mediators in this case was not possible because of the lack of significance in the relationship between difficult life circumstances and number of complications.

Type A women

For Type A individuals, temperament, education level, and psychological indicators accounted for approximately 37% of the variance in number of labor complications. These variables yielded a multiple R of .61 ($F(3,29)=5.87, p<.05$). It is important to note that the change in F resulting from the addition of psychological indicators was close to significance (.073), and that the addition of the link between psychological indicators and labor complications is therefore tentative.

Easy temperament also accounted for 48% of the variance in psychological indicators, with a multiple R of .69 ($F(1,31)=28.66, p<.01$).

Test

betw

the

sign

the

also

(19

app

num

Res

sty

dis

pr

su

de

a

r

Testing for mediators/moderators

Hierarchical regression was used to test for the potential mediating relationship between psychological indicators, temperament and number of complications, using the method suggested by James and Brett (1984). These results were not found to be significant. An alternative test to see if temperament played a moderational role in the relationship between psychological indicators and number of complications was also conducted using the method suggested by Bartlett, Bobko, Mosier & Hanan (1978), and this relationship was also found to be not significant. Therefore, it appears that temperament, education level and psychological indicators jointly predict number of complications.

Regression Analysis Conclusions

For the present sample, individual personality characteristics and behavioral style appear to have significant effects on the number of complications experienced during first-time labor and delivery. Contextual characteristics did not contribute to predictions of labor and delivery outcome as predicted. These results do not provide support for the direct links between long term stressors affecting the labor and delivery of first-time mothers, as proposed in hypotheses 1, 3, and 6.

When the sample was divided into Type A and Type B personality groupings, a different pattern among predictors emerged. Temperament appears to play a greater role in its influence on number of labor complications for Type A women. The

psychological indicators as predictors for number of complications were found to be negatively related for Type B women, whereas predictors for number of complications were positively related for Type A women.

Given these findings on individual personality characteristics, a final series of analyses was performed to test the overall ISR-based model of stress and birth complications.

Factor analyses

Exploratory factor analysis using SPSS for Windows was performed in order to test the factor structure of constructs to be used in further analyses. Principal components factor analyses with varimax (and oblimin) rotation of 10 and specification of eigenvalues greater than 1.0 produced 10 factors. These factors are presented in Table 10.

Upon examination of the intercorrelations between individual characteristic variables, attempts to create new scales were made wherever possible. For example, temperament subscales "Approach-withdrawal", "Mood" and "Flexibility-Rigidity" factored together, and as a result were combined to create an "Easy/Difficult" scale since there are several of the Easy/ Difficult characteristics as asserted by Thomas and Chess (1977). This new scale yielded a reliability alpha of .73, and was utilized in subsequent analyses.

Seven factors (Type A, Stress Indicators, Control, Work Satisfaction, Social Support and Birth Outcomes) were retained for analysis. The difficulty in

interpretation of the remaining factors suggested that they be excluded from further analyses.

Table 10.
Principal Components Factor Analysis for Predictors

FACTORS	1	2	3	4	5
1. STRESS INDICATORS					
Depression	-.77				
State Anxiety	-.78				
Difficult Life Circumstances	-.59				
2. TYPE A BEHAVIOR					
Type A		.87			
Speed-Impatience		.72			
Hard-Driving/ Competitive		.68			
3. WORK SATISFACTION					
Work Satisfaction: Status			.93		
Work Satis: Responsibility			.85		
Work Satisfaction: Salary			.74		
4. ACTIVITY LEVEL					
Activity level: general				.72	
Activity level: sleep				.71	
Work Satisfaction				-.48	
5. SOCIAL SUPPORT					
Social Support Scale					.67
Life Stress/ Disappointments					.64
Task Orientation					-.55

FACTORS	6	7	8	9	10
6. TEMPERAMENT					
Approach-Withdrawal	.87				
Mood	.72				
Flexibility-Rigidity	.64				
7. JOB INVOLVEMENT					
Job Involvement		.86			
8. ROLE DIFFICULTY					
Role difficulty			-.78		
Expectations of mate			.46		
Feelings About Work			-.45		
9. PRESTIGE					
Occupational Prestige				.80	
Marital Satisfaction				.56	
10. CONTROL					
Satisfaction with division of labor in home					-.86
Desired control					.54

Test

ISR

mul

Sor

LIS

dat

unc

late

the

the

St

be

sh

Testing the proposed structural equation model

Once factors were established, they were fit into the model patterned after the ISR model of stress (Kahn, 1984). This model is depicted in Figure 6, and the multiple indicators creating each latent construct are described in Table 11.

The path analysis program used in the analyses was LISREL 7 (Joreskog & Sorbom, 1981), a program designed to give a measure of fit of the model to the data. LISREL allows one to test the degree to which some hypothesized model fits a set of data. The program determines whether or not measured variables are "indicators" of underlying latent constructs, and also tests the hypothesized relationships between the latent variables.

PRELIS was run as a preliminary step to create a covariance matrix that would then be utilized in subsequent LISREL analyses. Once the variables were entered into the program, several problems occurred.

The model failed to converge to a solution, after as many as 1000 iterations. Standard estimates, T-values, modification indices and standardized residual could not be computed, therefore disallowing any indices that would indicate which factors should be dropped from the model for re-analysis.

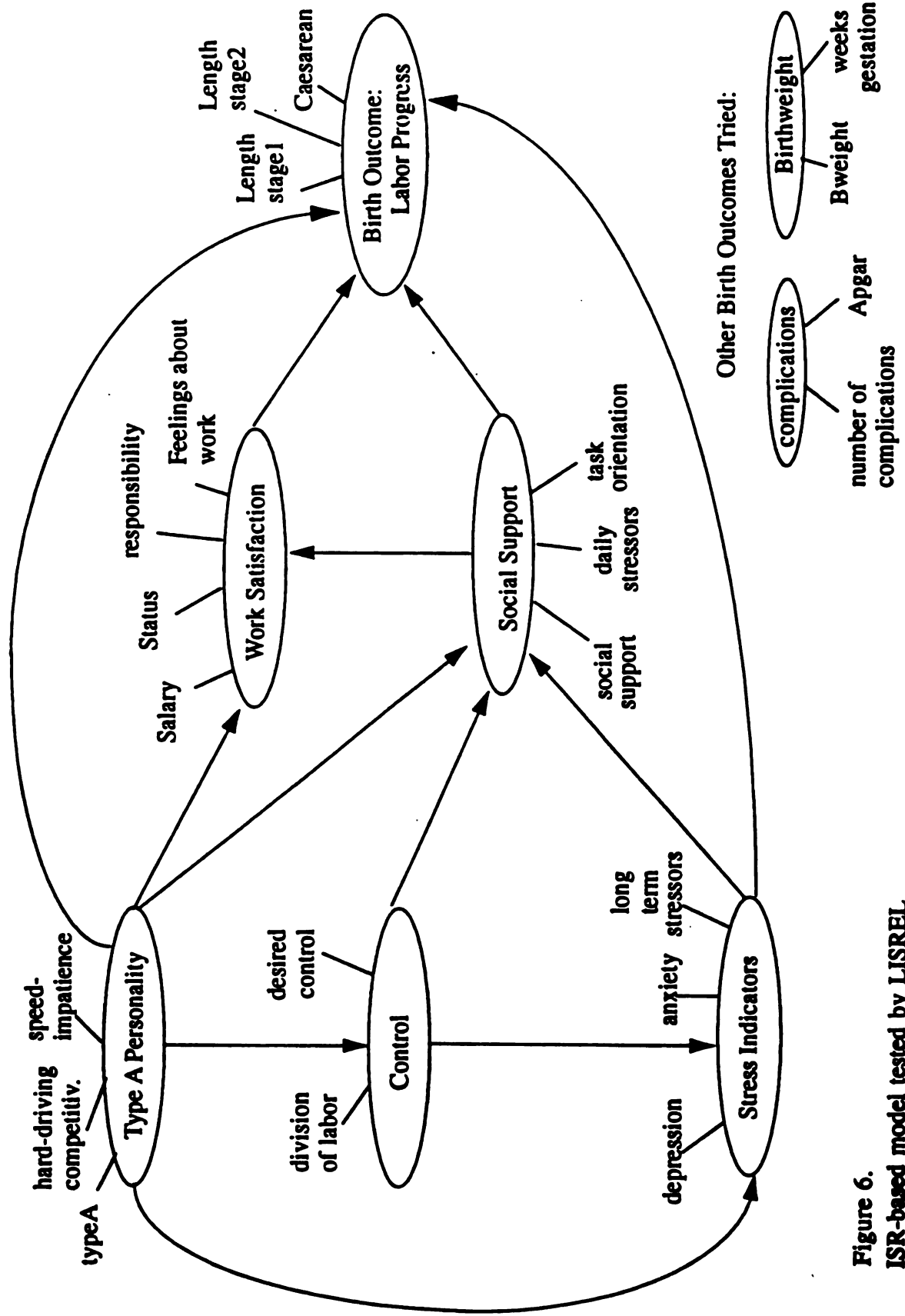


Figure 6.
ISR-based model tested by LISREL

Table 1
Latent
equati

Latent
Type 1

Contro

Stres

Work

Socia

Birth

Table 11.

Latent constructs and individual indicators tested in structural equation model for hypothesis 2.

<u>Latent Construct</u>	<u>Individual Indicators</u>
Type A personality	Type A Hard Driving/ Competitive Speed-Impatience
Control	Division of labor in home Desired control during pregnancy
Stress Indicators	Depression Anxiety Long term stressors
Work Satisfaction	Satisfaction with salary Satisfaction with job status Satisfaction with responsibility
Social Support	Total support received Daily life stress/ disappointments Task orientation
Birth Outcome	
Labor Progress	Length of stage 1 labor Length of stage 2 labor Caesarean section
Complications	Number of complications Apgar score at 5 minutes
Birthweight	Birthweight Weeks gestation

A preliminary solution provided for the purpose of tracing the source of the problem was calculated, with a chi-square of 151.31 with 68 degrees of freedom ($p=.000$), goodness of fit index of .803, and the adjusted goodness of fit index of .695.

Low sample size may be the primary reason for failure of model convergence. A sample size of 80 is small for LISREL analyses. Another primary reason may be poor overall model fit, in which case, the combination of chosen variables may be poor predictors of birth outcome. Alternatively, designated paths may be incorrectly hypothesized. With this in mind, an attempt was made to reduce the number of model components. The reduced model is illustrated in Figure 7.

Again, problems occurred with the revised model, in which the solution was found non-admissible after 250 iterations. For this model, the preliminary solution yielded results of a chi-square of 79.02 ($p=.023$), goodness of fit index of .878, and an adjusted goodness of fit index of .803. Even after several attempts were made to modify the LISREL program, it was decided that the problems of low sample size and poor model fit plagued the model and would not yield any usable results.

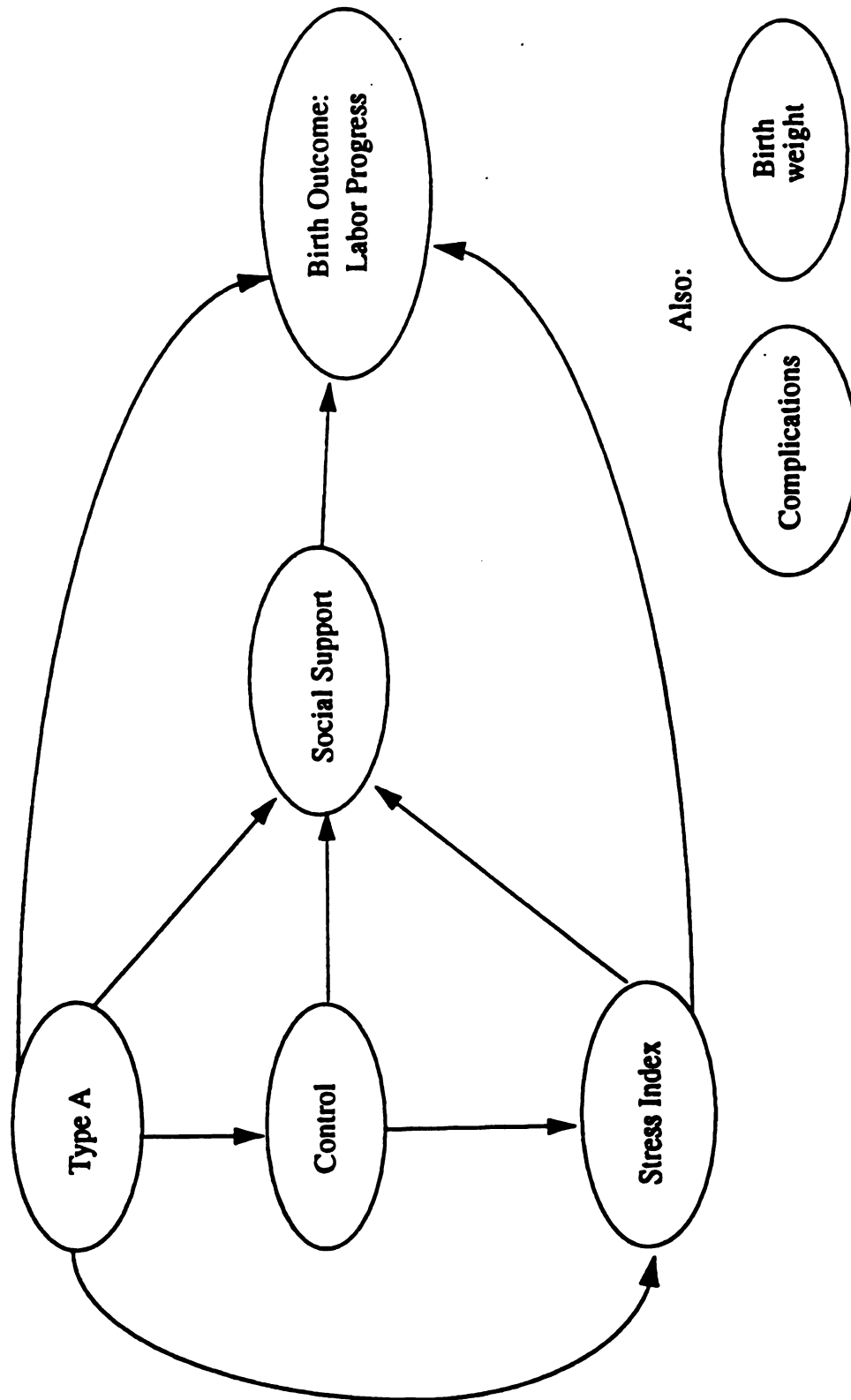


Figure 7.
Reduced LISREL model

DISCUSSION

This prospective study examined the influence of stress, individual characteristics and contextual characteristics on birth outcome in first time mothers. The models presented were patterned after the Institute for Social Research model of stress which depicts the contributions of multiple individual and contextual indicators on health outcome. The results provide evidence for the influence of personality and temperamental characteristics on pregnancy outcome.

The characteristics of the present sample were homogeneous in nature. The majority of participants in the current study were Caucasian, in their late 20's, with at least a college degree, married and pursuing a career. Although variability in the sample is warranted in a study of pregnancy outcome, the homogeneous nature of the sample controlled for any influences of education or income that could have contributed to the outcomes. The results are applicable solely to middle class Caucasian working women.

Some of the proposed hypotheses were not empirically supported. In the next section the major findings of the present study will be discussed. The theoretical and practical implications of these findings will then be considered, along with the limitations of the present study. Finally, further research directions will be discussed.

Study Results

The initial set of analyses assessed the relationship between experienced

stressors and pregnancy outcome. Experience with many stressors was expected to be highly associated with labor and delivery complications and poor infant outcome. Results from correlations showed no direct relationship between stress and pregnancy outcomes. Instead, relationships between long term stressors, role difficulty and psychological indicators provided insight to what individual and contextual variables were related to each other. The results provided a composite picture of relationships between difficult life circumstances, low marital satisfaction, higher levels of anxiety and depression, and low work satisfaction. The difficulty these women were experiencing in balancing wife and employee roles was related to increased levels of depression and anxiety, low marital satisfaction, and low expectations of their mates helping during the transition to parenthood. This finding supports existing literature on role strain and overload (Verbrugge, 1986; Repetti, Matthews & Waldron, 1989).

When the psychological indicators of depression and anxiety were combined into a single variable, they were also found to be positively correlated with desire for control, negative feelings about work and decreased number of labor complications. In summary, the psychological states of these women during the third trimester appear to be closely linked with marital, occupational and role difficulty factors. These findings are well supported by past literature linking depression and marital difficulties, (Ballinger et al, 1979), internal conflict regarding becoming a mother, and feminine identification during the transition (Hopkins et al, 1984).

Although the direct link between indicators of daily and long term stress and other variables did not yield significant results, other indicators were hypothesized to

also contribute to birth outcome.

Hypotheses 2 and 3 were then assessed using multivariate regression analyses utilizing single scale scores. Together, these hypotheses attempted to assess the contribution of contextual and personality constructs as additional predictors and/or moderators of the weak relationship between stress and pregnancy outcome for this sample.

Previous research has indicated that moderators may influence the pathway between stressors and health consequences (Kahn, 1984). The context in which a person encounters a stressor can alter reactions and consequences (Caplan, 1972; Nuckolls et al, 1972; Cobb & Kasl, 1977; Eaton, 1978; Gore, 1978; House & Wells, 1978). The contextual factors of work environment, social support and marital satisfaction were used in regression analyses predict the number of labor complications. The results revealed that none of the proposed contextual variables were found to predict labor complications, nor were they found to moderate the relationship between difficult life circumstances and labor complications. This contradicts findings asserted by Kahn (1984).

Contextual characteristics do not seem to play a role in labor complications with this sample, and this may be for several reasons. Restriction in variance for each of the contextual variables may be the key to reasons for their lack of influence on pregnancy outcome. Since the majority of participants in the study have at least a college degree and established careers, they may be occupying positions where they are satisfied with most aspects of their employment. This finding is not surprising,

and supports large population-based studies that indicate that sociodemographic characteristics such as disadvantaged community, non-Caucasian race, younger maternal age and low maternal education attainment are associated with poor labor outcome, such as low birthweight (Kramer, 1987; also see Istvan, 1986 for a review).

In addition, extreme difficulty in balancing the roles of wife and employee may not be an issue in this sample. It could be that because of their educational level and income coupled with the fact that they have no children, the role strain of these women is not high enough to have an impact on the daily stressors they experience.

The amount of social support the present sample is receiving may also be at a level where differences between people receiving low and high amounts of support do not contribute to or buffer the stress experienced by these women. This also provides indirect support for existing studies linking social support and birth outcome, such as key studies by Norbeck and Tilden (1983) and Schaefer, Coyne and Lazarus (1981).

Finally, marital satisfaction for this group of expectant mothers is also relatively high, and at the third trimester, these couples may be feeling more happy and secure in anticipation of the impending birth of their first child. Findings by Meyerowitz and Feldman (1966), Wallace and Gottlib (1990) and Belsky et al (1983) support this result.

In summary, contextual variables do not seem to contribute to the stress in the daily lives of these women, nor do these variables interact with other variables to influence number of labor complications. The sample appears to have the characteristics of satisfactorily employed, happily married, and adequately supported

working women. With the consistency of contextual variables across subjects relatively established, the focus will now turn to individual characteristics as contributors and moderators of number of labor complications experienced by these women.

The Contribution of Individual Characteristics

Individual characteristics include aspects of personality and behavioral style, in particular Type A behavior pattern, temperament, desire for control and psychological functioning. These individual characteristics can help to determine how an individual is prone to react in situations, in this case, in an anticipatory health situation which is fraught with anxiety, worry, and excitement over the uncertainty of labor and the health of their newborn child.

Individual scale scores for Type A behavior were used in similar regression equation models to predict the number of labor complications as well as in the prediction of psychological indicators. The results of these analyses indicated that temperamental style influenced the number of labor complications that occurred during labor and delivery. This inconsistent finding revealed that the easier the temperamental style of the mother during pregnancy (i.e., approaches others, has generally positive mood and is flexible), the more labor complications she is likely to experience.

These results appear counterintuitive, which would indicate that easy temperamental style would help to buffer the mother from poor birth outcome.

Currently, no studies exist to support the connection between temperament and health. One possible interpretation may be that the easy temperament behavioral style implies that they did not feel they had control, and that they felt they could rely on others to help them with any difficulties. This may have affected how they followed prenatal regimens, which may have been lax. As a result, they may have been ill-prepared, which may have influenced their prenatal care. In addition, their "easy" temperamental style may have led them to have expectations for labor and delivery that did not match their actual experience. For example, if they expected an "easy" time during labor and delivery, their anxiety could have increased dramatically when they actually went into labor and delivery. This potential dramatic increase could have precipitated more difficulties for these women. In turn, these behaviors and expectations may have led to unanticipated complications.

Of course, other factors may also be accountable for this relationship that were not measured in the present study. For example, women with easy temperament may have poor coping skills in stressful situations so stress moderated the effects. Difficult temperamental women may have good coping skills, and may take labor and delivery as a challenge.

Contribution of Psychological Indicators

Additional analyses used individual characteristic variables to predict psychological indicators. These analyses were done in order to determine what variables may be contributing to the emotional state of these women, and to see if

long term stressors would enter the predictive equation. Difficult life circumstances, difficult temperament, and desired control were found to significantly relate to psychological indicators. To reiterate, the more difficult life circumstances the mother experienced, along with the amount of desired control she wished to have during the course of pregnancy and the more difficult temperament she possessed, the greater the amount of depression and anxiety she was likely to experience during the third trimester of pregnancy.

This result is consistent with past literature linking stress and depressive symptomatology during pregnancy (O'Hara, 1986; O'Hara et al, 1983). In addition, desire to retain control during pregnancy results in emotional distress if the woman feels she will not be able to count on others to help. Her expectations for being the sole person to make decisions, prepare and provide for the baby add to her anxiety and stress. Further, if these individuals also possess a difficult temperament, they are apt to withdraw from assistance, have negative mood states and are rigid in behavior. In the context of pregnancy and impending motherhood, which requires flexibility, positive and approach behaviors, these temperamental characteristics are likely to result in higher levels of depression and anxiety, and could make it more difficult to handle daily challenges.

A New Model

The model resulting from the set of analyses for hypotheses 2 and 3 is shown in Figure 6. In summary, for this sample of first time mothers, individual

characteristics appear to contribute to the number of complications occurring during labor and delivery. The proposed links between stress and birth outcome were not supported, and this may be due in part to the homogeneity of the sample. Sample limitations will be discussed at length in a later section.

For the overall sample of women, Type A behavior did not appear to have any influence over pregnancy progress, as predicted. To review, Type A women are characterized as individuals who are generally more time conscious, impatient, hard driving, competitive, and are more involved with their careers. A series of analyses were designed to investigate hypotheses 4 and 5, which assessed differences between Type A and B women.

Type A, Type B and pregnancy outcome

Given the literature associating Type A behavior and poor health outcomes, hypothesis 4 stated that Type A women would have more labor and delivery complications, rely less upon others for support, and desire more control over the course of the pregnancy. Because Type A behaviors are viewed as pervasive work style characteristics, it was expected that Type A women would exhibit these behaviors in relation to the pregnancy.

The results from a series of T-tests found few significant differences between Type A and Type B women, in which Type B women had more temperamental flexibility and greater satisfaction with division of labor at home. This may be due to the controlling nature of Type A individuals who are apt to take care of everything

themselves, rather than delegate and share responsibility with others (Clark & Miller, 1990).

It is important to note that in spite of the personality differences between the two groups of women, the labor and delivery progress and outcomes were essentially identical. Given these results, hypothesis 4 was not supported. Type A and B women did not differ in labor and delivery complications, social support, or desire for control over the course of pregnancy.

Hypothesis 5 alternatively addressed the differences in relationships between individual variables within each group of women.

A similar series of regression analyses conducted for hypotheses 2 and 3 were conducted for each of the groups as specified in hypothesis 5. Figure 7 illustrates the significant pathways found for Type A and Type B women. Upon investigation of these two resulting models, one can see differences in the variables and directional pathways. When these models are compared to the model including the entire sample, one can see key relationships emerge between psychological indicators and number of complications. The model for Type B individuals will be discussed first, followed by the model for Type A individuals.

Type B. As found in the total sample model (Figure 6), the model for Type B women notes that the more life stressors and the more control they desire during the course of pregnancy, the more depressed and anxious they become during the third trimester. This repeats the same pattern found with the entire sample, and is not

surprising. A surprising link between psychological indicators and number of complications was found, however. For Type B women, the more emotional distress they experience during the third trimester of pregnancy, the fewer the number of complications they have in labor and delivery. Yet psychological indicators were found to account for 10% of the variance, which leaves the possibility that other variables may account for more variance. It is likely that alternative variables including prenatal care regimen, health status, and physiological reactivity to stressors, may all add additional variance to this outcome.

It is clear that other variables probably intervene or are better predictors for birth outcome. Type B women are characterized as less anxious about time, less competitive, and are more patient than their Type A counterparts. Perhaps they are less anxious about the birth, take more time to make preparations, and do not handle situations with last-minute urgency. Perhaps the less-urgent nature of Type B women may be buffering them from having complications in spite of the stress, depression and anxiety they are feeling. Alternatively, although Type B women are reporting higher levels of depression and anxiety, there may be differences in how they are perceiving their own distress and therefore in how it is affecting their physiology.

It is key to note that temperament does not enter the picture for Type B individuals, perhaps because they all possess similar constant levels of approachability, positive mood and flexibility. Type A women, on the other hand, display a different profile.

Type A. Figure 7 illustrates the alternative pathways between a different combination of variables. For this sample, the key results revealed that three indicators predicted number of labor complications. For Type A individuals, easy temperament, high emotional distress and lower educational level predict the number of complications.

The pathway linking third-trimester emotional distress and number of complications has been supported by the literature (Rofe, Blittner & Lewin, 1993; McDonald & Christakos, 1963; Brown et al, 1972; Gorsuch & Key, 1974; Crandon, 1979a,b; Standley et al, 1979; Barnett & Parker, 1986), and the link between education and number of complications may be explained by the amount of knowledge these women have about the process of labor and delivery and prenatal care. Women who have attained higher levels of education are likely to be more prone to educating themselves. If they were less informed about the importance of prenatal care and did not enroll in preparatory classes, or take precautions, their lack of knowledge may influence the course of labor and eventual complications. The difficult component to explain, as with the larger sample, is the additive effect of easy temperament.

Together these three variables account for 37% of the variance.

What can be said for the role of temperament in Type A women? As the sole predictor of psychological indicators, difficult temperament was significantly related to an increase in emotional distress. Results from a hierarchical regression concluded that temperament did not serve as a moderator or mediator in the pathway between psychological indicators and number of complications. The effect of possessing Type

A personality with the addition of difficult, rigid inflexible behavioral style appear to contribute to the levels of anxiety and depression experienced during third trimester pregnancy.

Yet within the same model, easy temperament appears to contribute to the number of complications a Type A woman experiences in labor and delivery. This finding appears counterintuitive, yet this result was also found with the entire sample. The relationship between these two variables is stronger for Type A women than in the entire sample, yet the influence of temperament is also accompanied by the influence of psychological indicators and education level.

As implied in the conclusion for the overall sample, perhaps the concept of easy temperament serves as a relative indicator of "laziness" or "unpreparedness", whereupon these individuals may be less prepared for the labor and delivery. The "lax" aspect may be measured by lack of attendance in Lamaze classes and adherence to prenatal care regimens. Since the actual participation and preparedness of these women was not assessed, it is not possible to know whether this explanation or other indicators may better explain this counterintuitive link between temperament and labor complications for this sample. At the very least, it provides an interesting possibility about the role of temperament in adaptive functioning. While easy temperament is found to have the strongest link to adaptive functioning in interpersonal relationships, as documented in literature on parent-child relations and teacher-child relationships, perhaps there are some situations where "easy" characteristics are not adaptive. For example, nursing home residents who exhibited difficult temperamental behaviors were

found to live longer and experienced fewer health-related problems during their stay (J. Lerner, 1994, personal communication). It appears that the senior citizens who adamantly and continually vocalized their needs and complaints received more attention and proper care. In parallel, perhaps women who are demanding and difficult receive better prenatal care which enhances smooth transition during labor and delivery.

In summary, differences in progress are apparent for Type A and B career women transitioning through their first pregnancy. Temperament appears to have a greater influence on number of labor complications for Type A women, and does not enter the model for Type B women. When comparing the influence of psychological indicators between the two personality types, the results reveal a positive relationship with labor complications for Type A women, and a negative relationship with labor complications for Type B women. Because of the confusion in interpretation of these relationships, a reevaluation of the variables is in order.

Reanalysis of personality and psychological indicators

The distribution of levels of Type A and Type B personality were analyzed to further define the subsamples. For Type A women, the distribution was fairly even across the range of Type A scores, therefore degree of "Type A-ness" was made possible for interpretation. On the other hand, the distribution of "Type B-ness" was skewed towards the neutral end of the Type B continuum. In other words, there were

fewer individuals on the extreme end of the scale, as compared to the larger number of individuals who were more neutral, or closer to the lower end of the Type A scale. The Type B group was then more neutral than true Type Bs. The skewedness of the distribution may be partly responsible for the surprising link found between psychological indicators and number of complications. The skewed sample of Type B women may have attenuated these results. Perhaps the inclusion of more extreme Type B individuals might bring the correlation to a more positive direction, with the reasoning that a greater range across the Type B continuum might experience similar anxiety and depression levels similar to their Type A counterparts.

In addition, examination of the depression and anxiety scores yielded findings that 68% of the entire sample would be classified as "not depressed", as designated by the Center for Epidemiologic Studies guidelines (Devins & Orme, 19). Only 6% would be classified as severe in depressive symptoms, with the remaining 26% classified as "mild" and "moderate". In addition, the anxiety levels of the entire sample (mean= 33.4) fall below the normative sample of working women (mean= 35.2, SD=10.6). Within this sample of 80 pregnant women, depression and anxiety are not necessarily indicators of negative extreme psychological state, but rather are indicators of anxious anticipation, apprehension and worry about a health event that is both positive and uncertain. This score may be an indicator of "good stress", which propels an individual to take action rather than to withdraw from the situation. Instead, the scale might be renamed "Emotional Anticipatory Excitement".

With this alternative label in mind, the models for Type A and B might be

interpreted quite differently. Instead, the negative relationship between "anticipatory excitement" and number of complications for Type B women may be explained that for these normally low-urgency, patient women, the excitement they feel is not one of which they are normally accustomed. Therefore, their emotional state is brought up to a level which is actually beneficial or necessary for the labor and delivery to progress. The raised emotional state influences their physiology, which in turn positively influences the progress of the labor and delivery.

As for the Type A women, they are already accustomed to feelings of anticipatory excitement in the urgent way they cope with challenges. The additional emotional excitement they feel with the pregnancy pushes them beyond the suitable level of arousal, which negatively influences the progress of the labor and delivery. Finally, further investigation is needed as to the meaning of temperament as applied to an adult population. Measures of temperament are widely used for populations of children in the context of parental care for easy or difficult children. As noted earlier, it is still unclear as to the true definition of "easy" and "difficult" temperament are for adults.

An Attempt at Structural Equation Modeling

The final set of analyses attempted to address Kahn's (1984) ISR model of stress in the context of pregnancy outcome. By taking a biopsychosocial and developmental contextualism approach, key constructs were examined in a system.

The first task at hand was to reduce the large number of data points into

interpretable factors. Factor analysis of the multiple indicators suggested that the reduced number of components for the present sample were Type A personality, control, stress indicators, work satisfaction, social support, and three indicators of birth outcome: labor progress, complications and birthweight. All of these factors made conceptual sense with the exception of social support which was a combination of social support, daily stressors, and less of a temperamental task orientation.

Conceptually, people with many daily hassles who have access to a support network might also have difficulty focusing on tasks, if they feel they can rely on others or feel overwhelmed by the daily stressors. The factor was named after its largest loading factor--total support received from the network of friends and family. How these variables play a concerted role in predicting pregnancy outcome were examined by subjecting them to a structural equation model analysis.

Hypothesis 6 proposed the testing of a systems model assessing the contribution of individual characteristics and contextual characteristics in the relationship between stress and pregnancy outcome. Taken together, unhealthy individual characteristics with an unsupportive environment were expected to negatively influence the relationship between stress and pregnancy outcome. Together as a system, Type A, Control and Psychological Indicators of stress, social support, and work satisfaction were hypothesized to conjointly predict poor pregnancy outcome.

The analyses involved in testing the relationships between constructs in Figure 3 included the use of LISREL, a path analysis program that assesses goodness of fit of the proposed model to the data. These constructs were created by submitting

individual scale scores to a factor analysis and then using the resulting factors in the structural equation model, depicted in Figure 6.

Failure of convergence of the model within the program led to the conclusion that the proposed models were not testable on a small sample size, or alternatively, the combination of chosen factors were incorrect, and that an alternative combination of predictors would better fit the sample. Several combinations were subjected to the program (e.g., Figure 6), and still no convergence estimates resulted. It was decided that a different combination of constructs could be tested at a later time with a larger sample size.

Theoretical Implications

Past research has examined influences on poor pregnancy outcome from psychological and physiological viewpoints, all culminating in a body of conflicting and inconsistent research. The present study examined a testable model of the influences of individual personality and environmental context on pregnancy outcome, as an attempt to model how these influences coact and interact to influence labor and delivery and infant outcome.

The data failed to support the key component of the model, the link between life stressors and pregnancy outcome. Instead, a new model was created where individual personality characteristics and behavioral style accounted for part of the puzzle that explains poor labor outcome. At present, no other studies take these personality variables into consideration when addressing labor outcome.

An attempt was made in the present study to examine the linear relationship between individual and contextual variables and their joint effect on pregnancy outcome. In this study, individual characteristics were defined as beginning points, to be altered by context with experience. It is possible that the relationship between these variables is not linear, but instead constantly interact throughout the entire course of pregnancy. Statistical power issues prevented testing of this type of relationship. Although the current study was prospective in nature, the data only offer a snapshot of one point in time during the third trimester of pregnancy and how it influences labor and delivery outcome.

Model Revisions

Currently, no overall empirical model has been proposed to combine the merits of all studies, to link the multiple aspects of individual differences and environmental differences which play a role in predicting birth outcome. Several researchers continue to isolate populations, testing smaller models, explaining parts of the very complex picture of psychology and psychophysiology. For the current sample, the adaptation of the ISR model of stress might be revised. For example, contextual moderators in the present model may be tested as stressors themselves. Moderators in this model may be key predictors, such as emotional functioning.

Overall, partial support for the developmental-contextual view and the biopsychosocial model has been gained in the present study. Links between personality characteristics, behavioral style characteristics (temperament) and birth

outcomes have been uncovered for future investigations. Larger, more in-depth studies need to continue to assess these links and the process by which personality and behavioral characteristics influence physiological and physical states.

Study Limitations

Consideration of several limitations of the present study is warranted. First, the original intention for sampling a pregnant population was to avoid selecting a restricted sample. Recruitment for the pregnancy project was aimed at two low to middle class communities-- Lansing and Grand Rapids, Michigan. Unfortunately, due to limited resources to compensate participants, most women who accepted the invitation to participate tended to be those knowledgeable about the process and importance of research. Although the project's goal was to include a diverse population, time constraints dictated acceptance of those who were willing to participate, regardless of SES background, education and ethnicity. The recruitment of 119 couples to participate took over eighteen months. The sample was then comprised of college educated Caucasian women with access to health care. Time restrictions did not allow for the further recruitment of a more diverse sample.

Therefore, the restriction in sample diversity led to additional restrictions in range of life stress experiences and poor pregnancy outcome such as low birthweight, incidence of c-sections and preterm delivery. In order to find representative ratios similar to the larger population, sample sizes up to the 1,000s may be necessary.

Hence, the makeup of the sample was biased against finding significant

differences from the beginning. In addition, from the original 119 women recruited to the study, only 80 had completed data that were usable. All participants had completed questionnaires during their third trimester as well as questionnaires eight weeks after their babies were delivered. In addition, medical information had to be made available by abstraction from medical records or by phone for out-of-state participants.

In addition, a sample size of 80 is moderate in comparison to many studies involving pregnancy. Much of the problem of low sample sizes has arisen from problems in sample attrition over time for longitudinal studies. For example, the birth of a baby may also include a move for first-time parents to a larger home, hence increasing the chance of losing subjects. Although 80 is a moderate sample size for pregnancy research, the number is low enough to be subject to power issues when statistical analyses are conducted. For example, the sample size may have constricted variance so that it produced a problem with the model analyses. Low sample size affects correlation matrices which in turn constrict the variance/ covariance matrix and can ultimately hinder a structural equation modeling attempt. Power issues become even more important when dividing the sample into even two smaller groupings. Many of the analyses run in the present study were subject to power problems, beginning with the interpretation of relationships based on an "almost significant" level of $p=.07$ and ending with the LISREL analyses. It is clear that a larger sample size may weaken or strengthen the results of the present study.

Another source of study limitations deals with measurement issues. Most of

the measures were well-established highly-used instruments. Yet, there is always the chance of missing a key questionnaire that would contribute more meaningful information, or alternatively the questionnaires did not tap into the actual constructs adequately. Many of the measures had never been used with pregnant samples, hence this raises the question of validity of the measures.

The questionnaires in the present study may not have been the best instruments to yield variance in this restricted sample. For example, the marital satisfaction scale perhaps measured what spouses actually did, rather than measured the amount of satisfaction felt and received by these expectant mothers. As an additional example, other constructs that could have been measured include individual differences in primary and secondary appraisal of stress, and a health locus-of-control questionnaire designed to measure adherence to prenatal regimens.

Finally, an obvious missing piece to the study was measurement of physiological changes that were occurring during the third trimester of pregnancy when the questionnaires were completed. Physiological indicators of stress reactivity would have provided the missing component within the model.

Future Research Directions

Although sample limitations in the present study precluded a resolution of several interesting questions, several future directions to continue research are indicated from these findings. First, it is evident that future research should include a larger sample of individuals from a more diverse population to enable an examination

of the influence of stress on pregnancy outcomes. Although past research has viewed poor birth outcome as resulting from multiple environmental causes, the results of the present study suggest that birth outcome is also strongly influenced by personality characteristics. Further research examining the mechanisms behind the influence of temperament on birth outcome is suggested by the present study. With larger numbers, additional research can assess the relationships between paths that are weak or not evident, for example, the relationship between difficult life circumstances and birth outcome.

For future studies, very large samples will be needed to assess differences in labor and delivery outcome to reach population norms of 6-15% preterm or problem deliveries. This way, examination of a group of individuals in extreme situations may be better assessed. Additional research directions should also include measurement of physiological influences and prenatal regimens. Within a biopsychosocial systems model, future studies might attempt to address nervous and endocrine systems in the model by inclusion of biological markers such as catecholamines and corticosteroids. Mapping changes in the level of hormones across time may provide insight as to what is taking place in the environment of the developing fetus. It may provide a physiological marker for how stress is influencing the body during pregnancy. Medical information can be further examined such as physiological changes that may change during labor, such as blood pressure readings.

Furthermore, inclusion of prenatal education, frequency of checkups and prenatal regimen would help provide measurement of the amount of knowledge each

woman gains before she enters the delivery room. For the current sample, every participant except three reported attending prenatal education classes, but the more interesting point would be to measure what they actually learned and practiced from the classes. Frequency of monthly checkups and prenatal regimen would also serve to provide information on prenatal precautions, monitoring diet and health during the gestational period, and whether or not they adhere to their physician's instructions. Personality factors may be linked to adherence to prenatal regimen, determining who is more apt to follow strict or lax prenatal regimens.

The current study is part of a larger study examining the transition to parenthood of couples expecting their first infants. Additional research using this sample is possible, for inclusion of points of data collection ($n=38$). Changes across first trimester, third trimester and 8 weeks postnatal may be assessed for stability of personality constructs during two phases of pregnancy, rather than a single third trimester timepoint. Other future studies may attempt to include measurement points at every month of the pregnancy.

Finally, future research directions in the field of pregnancy research call for multidisciplinary collaboration amongst colleagues in psychology, obstetrics and gynecology, medical anthropology, epidemiology and nursing. Each discipline has taken attempts at solving parts of the pregnancy puzzle. Taking a biopsychosocial approach in combination with a developmental contextualism approach would be a way to integrate multiple disciplines to organize the multiple factors at work during the transitional event of pregnancy.

APPENDIX

APPENDIX

MEASURES USED IN THE PRESENT STUDY

I. Stress Measures

Difficult Life Circumstances *
Life Stress & Disappointments

II. Contextual Measures

Women's Life Situation Survey
Feelings About Work Scale
Duncan Socioeconomic Index
Norbeck Social Support Scale
Spanier Dyadic Adjustment Scale

III. Individual Characteristic Measures

Dimensions of Temperament Survey
Jenkins Activity Survey *
Expectations Questionnaire
Center for Epidemiological Studies Depression Scale
State-Trait Anxiety Inventory *

IV. Pregnancy Outcome Measures

Obstetric Complications Scale

* Because of copyright laws, these questionnaires are not included in the Appendix

ID#: - - - -
Wave: - - - -
Form: 1 0 1

DEMOGRAPHIC INFORMATION

Today's date _____
Week of pregnancy _____
Due Date _____

1. Gender: Female ☐ Male ☐
2. Age (years) _____
3. Are you currently employed? Full time ☐
Part time ☐
What is your occupation? _____
4. Do you do volunteer work? Please describe briefly _____
5. What is the highest level of education you have completed?
☐ High School or less
☐ Technical or trade school
☐ Some college
☐ College degree
☐ Some graduate study
☐ Graduate degree
6. Marital Status
☐ Single
☐ Cohabitating
☐ Divorced, remarried
☐ Married
☐ Separated
☐ Divorced
☐ Widowed
☐ Widowed, remarried
7. Have you ever fathered a child before?
Yes ☐
No ☐
8. How many children would you eventually like to have?

9. Do you have plans for your mate to work during the pregnancy?
Yes, full time ☐
Yes, part time ☐
No ☐

ID#: _ _ _ _

10. Do you plan for your mate to return to work after the birth of your child?

Yes ☐
No ☐

11. Were you using birth control when you learned your mate was pregnant?

No ☐
Yes ☐ What method? _____

12. This pregnancy was

☐ expected
☐ unexpected
☐ planned

13. Do you belong to any organizations or groups?

Yes ☐
No ☐

Please list them below, and indicate your level of involvement in each

- a. Paid membership only
b. Officer
c. Involvement in activities/ projects
d. Attend meetings

Organizations	Level of Involvement
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

14. Ethnic Background

☐ Asian
☐ Black
☐ Caucasian
☐ Hispanic
☐ Native American
☐ Other (specify) _____

ID#: _ _ _ _

Please indicate what your total family income last year was before deductions and taxes. Include family income from all sources.

- ☐ a. < \$5,000
- ☐ b. \$5,000 - 9,999
- ☐ c. \$10,000 - 14,999
- ☐ d. \$15,000 - 19,999
- ☐ e. \$20,000 - 24,999
- ☐ f. \$25,000 - 29,999
- ☐ g. \$30,000 - 34,999
- ☐ h. \$35,000 - 39,999
- ☐ i. \$40,000 - 44,999
- ☐ j. \$45,000 - 49,999
- ☐ k. \$50,000 - 54,999
- ☐ l. \$55,000 - 59,999
- ☐ m. \$60,000 - 64,999
- ☐ n. > \$65,000

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!!!!

Life Stress and Disappointments Questionnaire

The following is a list of different aspects of daily life that most of us worry about at one time or another. We would like to see just how much these events have affected your life during your pregnancy (the last 9 months).

Please read each statement. If the statement is not applicable to you, please check the "Not Applicable to me" box.

For the remaining 3 columns, A, B and C, we would like you to use the following scales to indicate how you feel about each statement. We suggest going through the entire list, going down Column A, then go to Column B then to Column C.

At the end of the list, we would like you to add 3 short term goals and 3 long term goals that apply to you. You should also answer questions about these goals in the same way.

For COLUMN A:

Read the statement, and indicate whether or not you are happy and SATISFIED or unhappy and DISAPPOINTED with the situation. Please use the following scale:

1	2	3	4	5
Very Happy/ Very Satisfied	Moderately Happy/ Moderately Satisfied	Somewhat Happy Somewhat Satisfied	Mildly Unhappy/ Mildly Disappointed	Very Unhappy/ Very Disappointed

For COLUMN B:

Read the statement, and indicate whether or not it is a SOURCE OF STRESS for you. Please use the following scale:

1	2	3	4	5
NOT a stress factor	Rarely Stressful	Somewhat Stressful	Mildly Stressful	Very Stressful

For COLUMN C:

Read the statement, and indicate the AMOUNT OF TIME you spend thinking about this situation. Please use the following scale:

1	2	3	4	5
NOT at all	Rarely	Sometimes	Frequently	All the time

For Example:

	Not Applicable	A	B	C
Your salary		2	3	3

Statement	Not Applicable to me.	A How happy or satisfied?	B Is this a Source of Stress?	C Do you think about this a lot?
Your salary				
Your budget				
Your savings				
Your workload				
Your workplace				
Your supervisor				
Your co-workers				
Your occupation				
Your marital/ dating relationship				
Intimacy with mate				
Intimacy with friends				
Open communication with mate				
Open communication with friends				
Possessions/ toys				
Amount of vacation time taken				
Relationship with parents				
Relationship with siblings				
Relationship with children				
Relationship with grandparents				
Your pets				
Amount of free time you have				
Time for hobbies				

Statement	Not Applicable to me.	A How happy or satisfied?	B Is this a Source of Stress?	C Do you think about this a lot?
Amount of time allotted for exercise				
Results from your exercise				
Your diet (foods eaten)				
Your weight				
Your body shape				
Your appearance in general				
Feelings about yourself				
How much you procrastinate or put things off				
Your sex life				
Your neighborhood conditions				
Your living (home) conditions				
The # of people you live with				
Your roommates				
Your car/ form of transportation				
Amount of stress in life				
Life in general				
Division of household chores in general				
Division of household chores: Cooking				
Division of household chores: Cleaning				
Division of household chores: Laundry				
Home improvement				
Meeting your family's demands				

Statement	Not Applicable to me.	A How happy or satisfied?	B Is this a Source of Stress?	C Do you think about this a lot?
Living up to your family's expectations				
Getting daily errands done				
Managing/ Running the household				
The economy				
The environment				
Religion				
The state of the world				
Government/ Political issues				
News events				
Please list three short term goals: 1. _____				
2. _____				
3. _____				
Please list three long term goals: 1. _____				
2. _____				
3. _____				

Please list the 3 items (beginning with the happiest) with which you are most happy and satisfied.

1. _____
2. _____
3. _____

Please list the 3 items (beginning with the most disappointing) with which you are most disappointed or unhappy.

1. _____
2. _____
3. _____

ID#: - - - -
 Wave: - - - -
 Form: I U 4

WOMEN'S LIFE SITUATION AND FAMILY SURVEY

Your Birthdate:
 Month Day Year

1. Have there been any changes in your family in the last 6 months, aside from your pregnancy? If "yes", please explain.

2. Has there been a change in your marital status in the last 6 months?

_____ yes _____ no. If "yes", I have

Remarried	1
Separated	2
Divorced	3
Widowed	4
Married	5

3. How long have you been married to your current spouse?

 Years Months

4. Are you currently employed?

No	1
Yes, part-time	2
Yes, full-time	3

5. If you are presently employed, please circle the number below which best describes your job. If your job is not described below, please write it down on the last blank line marked Other. Please circle only one response.

<u>Clerical worker</u> , such as bank teller, bookkeeper, secretary, typist, or mail carrier	01
<u>Craftsman</u> , such as baker, automobile mechanic, machinist, painter, plumber, or carpenter	02
<u>Farmer</u> , or farm manager	03
<u>Laborer</u> , such as construction worker, car washer, sanitary worker, or farm laborer	04
<u>Manager, or administrator</u> , such as sales manager, office manager, school administrator, or restaurant manager . .	05
<u>Military service worker</u> , such as career officer, or enlisted man or woman in the Armed Forces	06
<u>Operative worker</u> , such as meat cutter, assembler, machine operator, welder, or taxicab, bus, or truck driver . . .	07
<u>Professional worker</u> , such as accountant, artist, registered	

ID#: _ _ _ _

- nurse, engineer, librarian, social worker, actor, actress,
athlete, politician, but not including teacher 08
- Professional worker, such as clergyman, dentist, physician,
lawyer, scientist, or college teacher 09
- Proprietor or business owner, such as the owner of a small
business, a contractor, or a restaurant owner 10
- Protective service worker, such as a detective, police officer
or guard, sheriff, or fire fighter 11
- Sales worker, such as a salesperson, an advertising or insurance
agent, or a real estate broker 12
- School teacher, such as an elementary or secondary school
teacher 13
- Service worker, such as barber, beautician, practical nurse,
private household worker, janitor, waiter, or waitress. . . 14
- Technical worker, such as draftsman, medical or dental technician,
or computer programmer 15
- Other 16
(Please describe _____)

6. Please circle the number which most closely represents how
satisfied you are with being employed or with not being employed.

Very Dissatisfied	1
Somewhat Dissatisfied	2
Neutral	3
Somewhat Satisfied	4
Very Satisfied	5

7. If you are presently employed, please circle the number which best
represents how satisfied you are with the following aspects of your
job:

	Very Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Very Satisfied
Salary	1	2	3	4	5
Hours	1	2	3	4	5
Responsibility	1	2	3	4	5
Status	1	2	3	4	5

8. Whether you are employed or not, there are no doubt many tasks that

ID#: - - - -

you face each day (for example, those related to being a wife/ girlfriend, employee, or community volunteer). We would like you to rate the degree of difficulty you find in trying to balance all of your various roles. Do you find it to be:

- | | |
|---|---|
| Easy all the time | 1 |
| Easy most of the time | 2 |
| Easy half of the time; difficult half of the time | 3 |
| Difficult most of the time | 4 |
| Difficult all of the time | 5 |

9. Which response best describes the division of labor in your home with respect to household chores?

- | | |
|--|---|
| Wife does major share of household chores | 1 |
| Husband does major share of household chores | 2 |
| Housekeeper/paid employee does major share of household chores | 3 |
| Husband and wife share the household chores equally | 4 |
| Other | 5 |

(please indicate _____)

10. Please circle the response which most closely represents how satisfied you are with each of the following aspects of marital life:

	Very Dis- satisfied	Somewhat Dis- satisfied	Neutral	Somewhat Satisfied	Very Satisfied	Does Not Apply
Division of labor for household chores	1	2	3	4	5	6
Husband's employment	1	2	3	4	5	6
Husband's salary	1	2	3	4	5	6
Husband's employment hours	1	2	3	4	5	6
Husband's employment respon- sibilities	1	2	3	4	5	6

ID#: - - - -

Husband's
status at his
place of
employment

1

2

3

4

5

6

Comments: If you are dissatisfied with any of the above, please
indicate why:

11. The next set of questions are about things that may affect your general health. Please tell us if any of these have applied to you over the last six months.

OVER THE LAST SIX MONTHS:

Yes No

Have you ever needed a strong cup of coffee first thing in the morning to calm your nerves?	1	2
Have you ever needed to exercise regularly to feel good?	1	2
Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (eye-opener)?	1	2
Have people annoyed you by criticizing your eating habits?	1	2
Have people annoyed you by criticizing your drinking habits?	1	2
Have people annoyed you by criticizing your smoking habits?	1	2
Have you ever felt bad or guilty about your drinking?	1	2
Have you ever felt you ought to cut down on your eating?	1	2
Have you ever felt you ought to cut down on your drinking?	1	2

My overall health is. (Choose one):

Excellent	1
Good	2
Fair	3
Poor	4

THANK YOU VERY MUCH. Any additional comments about yourself or your husband that you would care to provide would be most welcome and appreciated.

ID# — — — —
 Form 115

FEELINGS ABOUT WORK

Directions: People differ in how they feel about their daily activities at work. For example, some people feel that their work makes them feel useful, while others don't feel this at all. Think about your daily activities at work and for each item circle how often you experience it. Thank you for your cooperation.

	NEVER	Seldom	SOME- TIMES	OFTEN	VERY OFTEN
1. Gives me a sense of challenge.....	1	2	3	4	5
2. Gives me a feeling of self-fulfillment	1	2	3	4	5
3. Makes me feel like I'm contributing to society.....	1	2	3	4	5
4. Gives me an opportunity to learn new things.....	1	2	3	4	5
5. Makes me feel important.....	1	2	3	4	5
6. Gives me a feeling of authority.....	1	2	3	4	5
7. I get respect from others for my work	1	2	3	4	5
8. Gives me an opportunity to use my talents and abilities.....	1	2	3	4	5
9. Gives me a feeling of prestige or status.....	1	2	3	4	5
10. Makes me feel good about myself.....	1	2	3	4	5
11. Allows me to be creative.....	1	2	3	4	5
12. Gives me a feeling of independence....	1	2	3	4	5
13. Gives me the opportunity for contact with people.....	1	2	3	4	5
14. I get feedback that I'm doing a good job	1	2	3	4	5
15. Gives me an opportunity for indepen- dent thought or action.....	1	2	3	4	5
16. Makes me feel useful.....	1	2	3	4	5

	NEVER	SELDOM	SOME- TIMES	OFTEN	VERY OFTEN
17. Makes me feel competent.....	1	2	3	4	5
18. Gives me a sense of accomplishment or achievement.....	1	2	3	4	5
19. Allows me to make important decisions.	1	2	3	4	5
20. Gives me an opportunity for self- expression.....	1	2	3	4	5
21. Gives me a feeling of self-worth.....	1	2	3	4	5
22. I get appreciation from others for my work	1	2	3	4	5
23. Gives me the opportunity for personal growth and development.....	1	2	3	4	5
24. Gives me satisfaction from knowing I was doing a job well.....	1	2	3	4	5
25. Gives me an opportunity to make friends.....	1	2	3	4	5

Directions: Below are some statements about your employment. Please read each one carefully and check one box for each statement. Thank you.

	Yes	No	Don't Know
1. People where I work are very friendly.	___	___	___
2. My job is very boring.	___	___	___
3. I get the feeling of achieving something worthwhile in my job.	___	___	___
4. I only do my job because I need the money.	___	___	___
5. My boss is always ready to discuss people's problems.	___	___	___
6. My boss takes the work I do too much for granted.	___	___	___
7. I wish I had more security in my job.	___	___	___
8. There is a happy atmosphere in the place where I work.	___	___	___
9. I really dislike my job.	___	___	___
10. My boss is fair to everyone.	___	___	___
11. Where I work, management asks workers first about changing anything that affects them.	___	___	___
12. I am unhappy with my working conditions.	___	___	___



I.D. # _____
 Wave _____
 Form 105 _____

SOCIAL SUPPORT QUESTIONNAIRE

PLEASE READ ALL DIRECTIONS ON THIS PAGE BEFORE STARTING.

Please list each significant person in your life on the right. Consider all the persons who provide personal support for you or who are important to you.

Use only first names or initials, and then indicate the relationship, as in the following example:

Example:

	First name or initials	Relationship
1.	MILLERBIN D.	MOTHER
2.	THOMAS J.	FRIEND
3.	ANN TANNETTIE G.	FRIEND
4.	JASON D.	FATHER
5.	CINDY G.	NEIGHBOR

etc.

Use the following list to help you think of the people important to you, and list as many people as apply in your case.

- spouse or partner
- family members or relatives
- friends
- work or school associates
- neighbors
- health care providers
- counselor or therapist
- minister/priest/rabbi
- other

You do not have to use all 24 spaces. Use as many spaces as you have important persons in your life.

PERSONAL NETWORK

	First name or initials	Relationship
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____
11.	_____	_____
12.	_____	_____
13.	_____	_____
14.	_____	_____
15.	_____	_____
16.	_____	_____
17.	_____	_____
18.	_____	_____
19.	_____	_____
20.	_____	_____
21.	_____	_____
22.	_____	_____
23.	_____	_____
24.	_____	_____

For each person you listed, please answer the following questions by writing in the number that applies.

- 1= not at all
- 2= a little
- 3= moderately
- 4= quite a bit
- 5= a great deal

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page.

[illegible]

I.D. # _____

5. If you needed to borrow \$10, a ride to the doctor, or some other immediate help, how much could this person usually help?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____

6. If you were confined to bed for several weeks, how much could this person help you?

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slightly textured appearance and is set against a dark background.

I.D. # _____

7. How long have you known
this person?

- 1= less than 6 months
2= 6 to 12 months
3= 1 to 2 years
4= 2 to 5 years
5= more than 5 years

8. How frequently do you usually
have contact with this person?
(Phone calls, visits, or letters)

- 5= daily
4= weekly
3= monthly
2= a few times a year
1= once a year

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

9. During the past year, have you lost any important relationships due to moving, a job change, divorce or separation, death, or some other reason?

- ____ No
____ Yes

IF YES:

9a. Please indicate the number of persons from each category who are no longer available to you.

- _____ spouse or partner
_____ family members or relatives
_____ friends
_____ work or school associates
_____ neighbors
_____ health care providers
_____ counselor or therapist
_____ minister/priest/rabbi
_____ other (specify) _____

I.C. # _____

9b. Overall, how much of your support was provided by these people who are no longer available to you?

- _____ 0. none at all
- _____ 1. a little
- _____ 2. a moderate amount
- _____ 3. quite a bit
- _____ 4. a great deal

I.S. # _____
 Wave: _____
 Form 102

MARITAL SCALE

Most persons have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

	Always Agree	Almost Always Agree	Occa- sionally Disagree	Fre- quently Disagree	Almost Always Disagree	Always Dis- agree
1. Handling family finances						
2. Matters of recreation						
3. Religious matters						
4. Demonstrations of affection						
5. Friends						
6. Sex relations						
7. Conventionality (correct or proper behavior)						
8. Philosophy of life						
9. Ways of dealing with parents or in-laws						
10. Aims, goals, and things believed important						
11. Amount of time spent together						
12. Making major decisions						
13. Household tasks						
14. Leisure time interests and activities						
15. Career decisions						

I.B. # _____
 Name: _____
 Room: 105

	All the time	Most of the time	More often than not	Occasionally	Rarely	Never
16. How often do you discuss or have you considered divorce, separation, or terminating your relationship?						
17. How often do you or your mate leave the house after a fight?						
18. In general, how often do you think that things between you and your partner are going well?						
19. Do you confide in your mate?						
20. Do you ever regret that you married? (or lived together)						
21. How often do you and your partner quarrel?						
22. How often do you and your mate "get on each other's nerves?"						

23. Do you kiss your mate?	Every Day _____	Almost Every Day _____	Occasionally _____	Rarely _____	Never _____
24. Do you and your mate engage in outside interests together?	All of them _____	Most of them _____	Some of them _____	Very few of them _____	None of them _____

I.D. # _____
 Wave: _____
 Form _____ 102

How often would you say the following events occur between you and your mate?

	Never	Less than once a month	Once or twice a month	Once or twice a week	Once a day	More often
25. Have a stimulating exchange of ideas.						
26. Laugh together.						
27. Calmly discuss something.						
28. Work together on a project.						

These are some things about which couples sometimes agree and sometime disagree. Indicate if either item below caused differences of opinions or were problems in your relationship during the past few weeks (check yes or no).

Yes No

29. _____ Being too tired for sex.
 30. _____ Not showing love.

31. The dots on the following line represent different degrees of happiness in your relationship. The middle point, "happy," represents the degree of happiness of most relationships. Please circle the dot which best describes the degree of happiness, all things considered, of your relationship.

0	1	2	3	4	5	6
.	.	.	.	.	.	.
Extremely Unhappy	Fairly Unhappy	A little Unhappy	Happy	Very Happy	Extremely Happy	Perfect

I.D. # _____
Wave: _____
Form _____ 102

32. Which of the following statements best describes how you feel about the future of your relationship?

- _____ I want desperately for my relationship to succeed, and would go to almost any length to see that it does.
- _____ I want very much for my relationship to succeed, and will do all I can to see that it does.
- _____ I want very much for my relationship to succeed, and will do my fair share to see that it does.
- _____ It would be nice if my relationship succeeded, but I can't do much more than I am doing now to help it succeed.
- _____ It would be nice if it succeeded, but I refuse to do any more than I am doing now to keep the relationship going.
- _____ My relationship can never succeed, and there is no more that I can do to keep the relationship going.

ID#: — — — —
 Wave: — — — —
 Form: 101

HOW I BEHAVE

Please circle the answer that best describes how you generally behave.
 Please circle only one number for each statement.

	Really FALSE for me	Sort of FALSE for me	Sort of TRUE for me	Really TRUE for me
1. It takes me a long time to get used to a new thing in my home.	1	2	3	4
2. I can't stay still for long.	1	2	3	4
3. I laugh and smile at a lot of things.	1	2	3	4
4. Once I am involved in a task, nothing can distract me from it.	1	2	3	4
5. I keep working at a task until it's finished.	1	2	3	4
6. I move around a lot.	1	2	3	4
7. I can make myself at home anywhere.	1	2	3	4
8. I can always be distracted by something else, no matter what I may be doing.	1	2	3	4
9. I stay with an activity for a long time.	1	2	3	4
10. If I have to stay in one place for a long time, I get very restless.	1	2	3	4
11. I usually move towards new objects shown to me.	1	2	3	4
12. It takes me a long time to adjust to new schedules.	1	2	3	4
13. I do not laugh or smile at many things.	1	2	3	4

ID#: — — — —
 Wave: — — — —
 Form: I U 1

	Really FALSE for me	Sort of FALSE for me	Sort of TRUE for me	Really TRUE for me
14. If I am doing one thing, something else occurring won't get me to stop.	1	2	3	4
15. My first reaction is to reject something new or unfamiliar to me.	1	2	3	4
16. Changes in plans make me restless.	1	2	3	4
17. I often stay still for long periods of time.	1	2	3	4
18. Things going on around me can <u>not</u> take me away from what I am doing.	1	2	3	4
19. Once I take something up, I stay with it.	1	2	3	4
20. Even when I am supposed to be still, I get very fidgety after a few minutes.	1	2	3	4
21. I am hard to distract.	1	2	3	4
22. On meeting a new person I tend to move towards him or her.	1	2	3	4
23. I smile often.	1	2	3	4
24. I never seem to stop moving.	1	2	3	4
25. It takes me no time at all to get used to new people.	1	2	3	4
26. I move a great deal in my sleep.	1	2	3	4
27. I do not find that I laugh often.	1	2	3	4
28. I move toward new situations.	1	2	3	4
29. I move a lot in bed.	1	2	3	4

ID#: — — — —
 Wave: — — — —
 Form: 1 0 1

	Really FALSE for me	Sort of FALSE for me	Sort of TRUE for me	Really TRUE for me
30. In the morning, I am still in the same place as I was when I fell asleep.	1	2	3	4
31. When things are out of place, it takes me a long time to get used to it.	1	2	3	4
32. I don't move around much at all in my sleep.	1	2	3	4
33. My mood is generally cheerful.	1	2	3	4
34. I resist changes in routine.	1	2	3	4
35. I laugh several times a day.	1	2	3	4
36. My first response to anything new is to move my head toward it.	1	2	3	4
37. Generally I am happy.	1	2	3	4
38. I never seem to be in the same place for long.	1	2	3	4
39. I wake up at different times	1	2	3	4
40. I eat about the same amount for dinner whether I am home, visiting someone, or traveling.	1	2	3	4
41. I take a nap, rest, or break at the same times every day.	1	2	3	4
42. I usually get the same amount of sleep each night.	1	2	3	4
43. I seem to get sleepy just about the same time every night.	1	2	3	4
44. I get hungry about the same time each day.	1	2	3	4

ID#: — — — —
 Wave: — — — —
 Form: 1 0 1

	Really FALSE for me	Sort of FALSE for me	Sort of TRUE for me	Really TRUE for me
45. When I am away from home I still wake up at the same time each morning.	1	2	3	4
46. I eat about the same amount at breakfast from day to day.	1	2	3	4
47. I feel full of pep and energy at the same time each day.	1	2	3	4
48. I eat about the same amount at supper from day to day.	1	2	3	4
49. I wake up at the same time on weekends and holidays as on other days of the week.	1	2	3	4
50. My appetite seems to stay the same day after day.	1	2	3	4
51. The number of times I have a bowel movement on any day varies from day to day.	1	2	3	4
52. I usually eat the same amount each day.	1	2	3	4
53. I have bowel movements at about the same time each day.	1	2	3	4
54. No matter when I go to sleep, I wake up at the same time each morning.	1	2	3	4



I.D. # _____
 Wave _____
 Form 110 A

EXPECTATIONS QUESTIONNAIRE BATTERY (Mothers)

Please indicate on a scale of 1 to 5 how much you agree/disagree with the following statements about what you expect from your husband/mate.

	1 Disagree Strongly	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
1. To read information about the pregnancy.					
2. Help in preparing for the baby (room, clothes, etc.)					
3. To attend Lamaze classes.					
4. Consoling you/tending to your needs.					
5. Accompanying you to doctor's office.					
6. Being sensitive to changes in your body and moods.					
7. During labor I want my husband/mate there.					
8. I want my mate to be actively involved in labor (coaching, comforting, etc.)					
9. To be an advocate (during labor) to help you get what you want.					
10. Giving physical comfort (backrubs, helping you up).					

I.D. #

	1 Disagree Strongly	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
11. Cutting the umbilical cord.					
12. Holding the baby, getting to know him/her.					
13. I expect my mate to help with caregiving activities for the baby, like changing diapers, feeding, soothing.					
14. My mate and I will share financial duties (i.e., paying bills, car payments, balancing accounts).					
15. My mate should do half of the household chores, like laundry, cooking, grocery shopping, housecleaning.					
16. Childcare arrangements will be equally our responsibility.					
17. If our child cries during the night, I expect us to share responsibility for soothing/tending the child's needs.					
18. When the child is sick, we will equally take responsibility for childcare and doctor visits.					



I.D. # _____

Body Changes

1. How much weight do you expect to gain? _____
2. Do you have any feelings regarding weight gain? _____
3. Do you expect your body to be the same after the baby's born? _____
If your body isn't the same after the baby,
will this pose a problem? _____
4. How long do you think it will take to regain your
figure after the baby? _____
5. How much weight do you expect to gain during your pregnancy? _____
6. What kind of side effects, if any, do you expect
from
pregnancy? _____
7. What kind of positive effects do you expect from pregnancy? _____

Exercise/ Health

1. I currently exercise regularly. _____
2. My exercise level now is different from prepregnancy. _____
3. How is it different? _____
4. I exercise _____ times per week.
5. How long are your exercise periods? _____
6. List the types of exercise activities that you do:
 1. _____
 2. _____
 3. _____
 4. _____
 5. _____
7. Are you eating differently now that you are pregnant?
If so, how? _____
8. I feel restricted by other people's views about what I eat during my
pregnancy?
— No
— Yes

Please feel free to expand on any of your responses-(below and on the
back of the page.)

I.D. # _____

Choices

	1 Not at all like me	2 Unlike me	3 Like me	4 Somewhat like me	5 Very much like me
1. I need to be able to keep track of my weight.					
2. I need to be able to exercise regularly.					
3. I need to maintain a balanced diet.					
4. I am aware of my menstrual cycle and when my period occurs.					
5. Changes in my body make me uncomfortable.					
6. I feel the need to see a physician regularly.					
7. I pay close attention to my physical appearance.					
8. I want to be the sole person making decisions about pain relief during my labor.					
9. It is important for me to chose the setting in which I deliver (i.e., home, hospital delivery room, hospital birthing room.					

	1 Not at all like me	2 Unlike me	3 Like me	4 Somewhat like me	5 Very much like me
10. I want to be the only person to make decisions about the pregnancy and birth, in the case of an emergency.					
11. In the case of an emergency, during labor and delivery, I would leave decisions totally up to the staff.					
12. I would feel self-conscious if I were to make a lot of noise during delivery.					
13. I feel the need to have the baby quickly (a short labor)?					
14. I need to have everything planned in advance?					

Return to work expectations

1. What is your current occupation? _____
2. When do you intend to stop working to have the baby? _____
3. When do you intend to return to work after the baby? _____
4. When you return to work, do you intend to work full or part time? _____
5. Does your place of work have a Maternal/ Paternal Leave Policy? _____
If there is such a policy, is it a flexible one?(Please describe)

CHILDCARE EXPECTATIONS

- _____ 1. I expect to place my child in a childcare arrangement when I return to work.
- _____ 2. I plan to take sole responsibility for making childcare arrangements.



I.D. # _____

- _____ 3. I plan to take sole responsibility for transporting my child to childcare.
- _____ 4. I expect my husband to help in getting the child ready for childcare in the morning.
- _____ 5. I expect my husband to share equally in the financial costs of childcare.
- _____ 6. I expect childcare to be a stress-free arrangement.
- _____ 7. It is very important that the person who cares for my child to have the same philosophy on childrearing.
- _____ 8. I expect my child to spend _____ hours per week in childcare.

MOTHERING

On a scale of 1 to 5 please rate the following statements:

	1 Disagree Strongly	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
1. It is important that I breastfeed my child.					
2. If I nurse my baby, it is important to me that it be the major source of nourishment for the first 6 months.					
3. I want to bottlefeed my child exclusively.					
4. I want my child to be able to nurse from the bottle so that my husband/family can share in the feeding experience.					
5. Someday I want to be my child's best friend.					

I.D. # _____

	1 Disagree Strongly	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
6. I do not feel it important to be my child's best friend.					
7. I expect the relationship between myself and my child to be a close one throughout their childhood.					
8. I expect to read as much as I can to be informed about child development issues.					
9. I expect to rely on other's advice on childrearing issues.					
10. I expect to use my family and friends' support throughout my child's development.					
11. Discipline: I expect to rely on others' advice on discipline.					

I.D. # _____

1. Have you had any special cravings? Please describe.

2. Is continuing the family line an important issue for this pregnancy?

3. Do you worry about physical problems with your baby?

4. Do you worry about the possibility of a pregnancy complication (miscarriage, stillbirth, preterm delivery, caesarean section)?

5. Do you have any fears about your pregnancy?

EXPECTATIONS FOR CHILDBIRTH

1. Are you planning on attending any childbirth preparation classes?
Yes, I am currently enrolled ____
Yes, I plan to enroll ____
No ____

If yes, who are these classes arranged by?

If you are not planning to attend childbirth classes, please check below (you may check off more than one):

- ___ I know all I need to know from things I've read, and/ or talking to other women who have had babies.
- ___ It is not convenient for me to attend classes (distance, time, cost)
- ___ There is no point, you can't learn how to give birth.
- ___ I get the information I need from my clinic or doctor.
- ___ Other: please describe:

I.D. # _____

During your pregnancy, you will probably have seen various different professionals (doctors, clinicians, nurses, etc.). We are interested in the information that they give you about labor and birth.

2. When talking to these professionals, are you able to discuss the things you want to with them fully?

____ Yes, always
 ____ Yes, most of the time
 ____ Only occasionally
 ____ Hardly ever
 ____ No, never

3. When talking to medical practitioners, are you as assertive as you want to be?

____ Yes, I am always as assertive as I want to be
 ____ Sometimes I am, but sometimes I am not
 ____ No, I am hardly ever as assertive as I want to be

4. How much do you want to know about what might happen during labor and delivery?

____ I'd rather not know anything
 ____ I just want to know the basics
 ____ I want to know most things, but not things that will upset or worry me.
 ____ I want the staff to decide how much I ought to know
 ____ I want to know as much as possible

5. Below are some things that women may be given during labor. How do you feel about each of the following?

Please choose one of the following

Don't know enough to make a choice	Definitely don't want	Prefer not to have	Don't mind	Would like	Definitely do want
1	2	3	4	5	6

- A. An enema
 B. To be shaved
 C. External Fetal heart monitoring at intervals
 D. External Fetal heart monitoring continuously
 E. Internal Fetal heart monitoring continuously
 F. Intravenous fluids
 G. An episiotomy
 G. Pelvic exams



I.D. # _____

LABOR EXPECTATIONS

We are interested in how women think about the sensations they experience in labor. Please read the following questions. Please check the boxes that apply to you:

	1 Strongly Agree	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
6. I expect the labor to be painful.					
7. I cannot tolerate most kinds of pain well at all.					
8. I am worried about dealing with the pain in labor.					
9. I worry about situations that may be potentially painful in everyday life (for example, like going to the dentist)?					
10. I want the most pain-free labor that drugs can give me.					
11. I intend to use breathing and relaxation exercises during labor?					
12. I expect breathing and relaxation exercises to be very useful in controlling the pain					

I.D. # _____

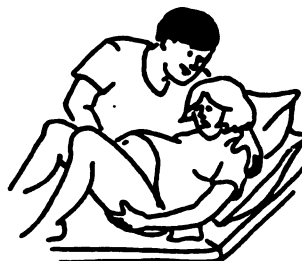
	1 Disagree Strongly	2 Disagree	3 Agree Somewhat	4 Agree	5 Agree Strongly
13. I am thinking of using an alternative method of pain relief (i.e. hypnosis, acupuncture, massage)					
14. I seem to be able to handle pain better than most people.					
15. I use the minimal amount of drugs to keep pain manageable (i.e. for headache relief)					
16. I plan to use the minimal amount of drugs to keep labor pains manageable.					
17. I want to have a completely drug-free labor.					

18. Do you see labor pain as different from other kinds of pain?

— If yes, please explain:

— No

— I don't know



I.D. # _____

PERSONAL BELIEFS

Pregnancy is often thought to be a special time by families with certain unique privileges and restrictions, we would like you to describe some of these.

Please describe any restrictions pregnant women should follow...

PREGNANCY-BODY IMAGE

Are there any special privileges which pregnant women have? Please list:

Are there any beliefs or superstitions in your family which relate to pregnancy..... (Please list and state if you agree/disagree with them)

Is there anything special which a pregnant woman should be careful about?

Should pregnant women be treated differently than nonpregnant women?



HOW MY WEEK HAS BEEN

Circle the number for each statement which best describes how often you felt or behaved this way-DURING THE PAST WEEK.

	Rarely or None of the Time (Less than 1 Day)	Some or a Little of the Time (1-2 Days)	Occasionally or a Moderate Amount of Time (3-4 days)	Most or All of the Time (5-7 Days)
DURING THE PAST WEEK:				
1. I was bothered by things that usually don't bother me.	0	1	2	3
2. I did not feel like eating: my appetite was poor.....	0	1	2	3
3. I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
4. I felt that I was just as good as other people.....	0	1	2	3
5. I had trouble keeping my mind on what I was doing.	0	1	2	3
6. I felt depressed.....	0	1	2	3
7. I felt that everything I did was an effort.....	0	1	2	3
8. I felt hopeful about the future.	0	1	2	3
9. I thought my life had been a failure.....	0	1	2	3
10. I felt fearful.....	0	1	2	3
11. My sleep was restless...	0	1	2	3
12. I was happy.....	0	1	2	3
13. I talked less than usual.	0	1	2	3
14. I felt lonely.....	0	1	2	3
15. People were unfriendly..	0	1	2	3
16. I enjoyed life.....	0	1	2	3
17. I had crying spells.....	0	1	2	3
18. I felt sad.....	0	1	2	3
19. I felt that people disliked me.	0	1	2	3
20. I could not get "going".	0	1	2	3

Obstetric Complications Scale*

1. Gestational age <37 wks or >42 wks
2. Birth weight <2.5 Kg or >4 Kg
3. Previous abortions
4. Disproportionate pelvis
5. Blood group incompatibility
6. Bleeding during pregnancy
7. Infections or acute medical problems during pregnancy
8. Drugs given during pregnancy
9. Maternal chronic disease
10. Drug abuse
11. Blood pressure during pregnancy <140/90 mm Hg
12. Albumiuria
13. Hyperemesis
14. Hemoglobin at delivery >12 gm
15. Multiple birth
16. Membranes ruptured prior to delivery
17. Caesarean section
18. Forceps delivery
19. Duration, first stage >20 hrs
20. Duration, second stage >120 min
21. Duration, third stage >30 min
22. Administration of oxytocin
23. Intrapartum drugs
24. Stained amniotic fluid
25. non-cephalic fetal presentation
26. Intrapartum fetal heart rate <100/min or >160/min
27. Nuchal or knotted cord
28. Cord prolapse
29. Placental infarction
30. Placental previa or abruptio
31. Onset of newborn respiration within >6 min
32. Resuscitation needed
33. Apgar score at 1 min <7
34. Apgar score at 5 min <7
35. Incomplete membranes
36. Manual delivery of placenta
37. Placental weight <300 g
38. Amniotomy
39. Oedema
40. Ketonuria
41. Threatened abortion-bleeding

* Compilation of Precht1 Scale and Chalmers Scale

LIST OF REFERENCES

LIST OF REFERENCES

- Aaronson, L.S. (1989). Perceived and received support: Effects on health behavior during pregnancy. Nursing Research, 38, 4-9.
- Abramson, L.Y., Seligman, M.E., & Teasdale, J.P. (1978). Learned helplessness in humans, critique and reformulation. Journal of Abnormal Psychology, 87, 47-74.
- Adamson, K., Mueller-Heubach, E., & Myers R.E. (1971). Production of fetal asphyxia in the rhesus monkey by administration of catecholamines to the mother. American Journal of Obstetrics & Gynecology, 109, 248-262.
- Albrecht, S.A., & Rankin, M. (1989). Anxiety levels, health behaviors, and social support systems of pregnant women. Maternal-Child Nursing Journal, 18, 49-59.
- Alegre, A., Rodriguez-Escudero, F.J., Cruz, E., et al. (1984). Influence of work during pregnancy on fetal weight. Journal of Reproductive Medicine, 29, 334-336.
- Andrews, G., Tennant, C., Hewson, D.M., Vaillant, G.E. (1978). Life event stress, social support, coping style, and risk of psychological impairment. The Journal of Nervous and Mental Disease, 166, 307-316.
- Apgar, V. (1953). A proposal for a new method of evaluation of the newborn infant. Current Researches in Anesthesia & Analgesia, 32, 260-267.
- Armstrong, B.G., Nolin, A.D., & McDonald, A.D. (1989). Work in pregnancy and birth weight for gestational age. British Journal of Indian Medicine, 46, 196-199.
- Ascher, B.H. (1978). Maternal anxiety in pregnancy and fetal homeostasis. Journal of Obstetric, Gynecologic, and Neonatal Nursing, 7, 18-21.
- Axelsson, G., Rylander, R., & Molin, I. (1989). Outcome of pregnancy in relation to irregular and inconvenient work schedules. British Journal of Indian Medicine, 46, 393-398.

- Bakketeig, L.S. & Hoffman, H.J. (1981). Epidemiology of preterm birth: results from a longitudinal study of births in Norway. In M.G. Elder & C.H. Hendricks (Eds.). Preterm Labor. Butterworths, London:
- Ballantyne, J.W. (1904). Manual of antenatal pathology and hygiene. Vol. II. The Embryo. Edinburgh: William Green & Sons.
- Ballinger, C.G., Buckley, D.E., Naylor, G.J., & Stansfield, D.A. (1979). Emotional disturbance following childbirth: Clinical findings and urinary excretion of cyclic AMP. Psychological Medicine, 9, 293-300.
- Barnett, B., & parker, G. (1986). Possible determinants, correlates and consequences of high levels of anxiety in primiparous mothers. Psychological Medicine, 16, 177-185.
- Bartlett, C.J., Bobko, P., Mosier, S.B. & Hannan, R. (1978). Testing for fairness with a moderated multiple regression strategy: An alternative to differential analysis. Personnel Psychology, 31, 233-241.
- Baruch, G.K., Biener, L., & Barnett, R.C. (1987). Women and gender in research on work and family stress. American Psychologist, 42, 130-136.
- Baum, A., Grunberg, N.E., & Singer, J.E. (1982). The use of psychological and neuroendocrinological measurements in the study of stress. Health Psychology, 1, 217-236.
- Belsky, J., Lang, M.E., & Rovine, M. (1985). Stability and change in marriage across the transition to parenthood: A second study. Journal of Marriage and the Family, 47, 855-865.
- Belsky, J. & Pensky, E. (1988). Marital change across the transition to parenthood. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Belsky, J., Spanier, G., & Rovine, M. (1983). Stability and change in marriage across the transition to parenthood. Journal of Marriage and the Family, 45, 567-577.
- Berkman, L.F. & Syme, S.L. (1979). Social networks, host resistance, and mortality: A nine-year followup study of Alameda County residents. American Journal of Epidemiology, 109, 186-204.
- Berkowitz, G.S. & Kasl, S.V. (1983). The role of psychosocial factors in spontaneous preterm delivery. Journal of Psychosomatic Research, 27, 283-290.

- Berkowitz, G.S. (1985). Clinical and obstetric risk factors for preterm delivery. Mt. Sinai Journal of Medicine, 52, 239-35, 72-76.
- Berle, B., & Javert, C. (1954). Stress and habitual abortion. Obstetrics and Gynecology, 3, 298-306.
- Bibring, G. (1959). Some considerations of the psychological processes in pregnancy. Psychoanalytic Study of the Child, 14, 113-121.
- Bibring, G., Dwyer, D.F., Huntington, D.S., & Volenstein, A.F. (1959). Considerations of the psychological processes in pregnancy. Psychoanalytic Study of the Child, 15, 113-121.
- Billings, A.G., & Moos, R.H. (1982). Social support and functioning among community and clinical groups: A panel model. Journal of Behavioral Medicine, 5, 295-311.
- Blau, A., Slaff, B., & Easton, K. (1963). The psychogenic etiology of premature births. Psychosomatic Medicine, 25, 201-211.
- Breslow, L. & Buell, P. (1960). Mortality from coronary heart disease and physical activity of work in California. Journal of Chronic Disease, 11, 615-626.
- Brooks, G.W. & Mueller, E.F. (1966). The relationship of serum urate levels to drive, achievement, and leadership in university professors. Journal of American Medical Association, 195, 1476-1481.
- Brodkin, A.M., Shrier, D.K., & Buxton, M. (1982). Parenting and professionalism- a medical school elective. Journal of American M.W.A., 37, 227-230.
- Brooks-Gunn, McCormick, & Heagarty (1988). Preventing infant mortality and morbidity: Developmental Perspectives. American Journal of Orthopsychiatry, 58(2), 288-296.
- Broom, B.L. (1984). Consensus about the marital relationship during transition to parenthood. Nursing Research, 33, 223-228.
- Brown, E.R. (1984). Long term sequelae of preterm birth. In F. Fuchs & P.G. Stubblefield (Eds.), Preterm Birth: Causes, Prevention and Management. New York: Macmillan.
- Brown, S.S. (1985). Can low birth weight be prevented? Family Planning Perspectives, 17(3), 112-118.

- Brown, M.A. (1986). Social support, stress, and health: A comparison of expectant mothers and fathers. Nursing Research, 35, 72-76.
- Brown, W.A., Grodin, J., & Manning, T. (1972). Prenatal psychological state and the use of drugs in labor. American Journal of Obstetrics & Gynecology, 113, 598-601.
- Bryce, R. (1991). The epidemiology of preterm birth. In M. Kiely (Ed.), Reproductive and perinatal epidemiology. Boca Raton, FL: CRC Press.
- Bryce, R. & Stanley, F., unpublished data.
- Burke, R.J., Weir, T.A. (1980). Personality value and behavioral correlates of the Type A individual. Psychological Reports, 46, 171-181.
- Burke, R.J. (1983). Early parental experiences, coping styles, and Type A behavior. Journal of Psychology, 113, 161-170.
- Burks, N., & Barclay, M. (1985). Everyday problems and life change events: ongoing versus acute sources of stress. Journal of Human Stress, 27-35.
- Burnes-Bolton, L. (1988). Analysis of social support and stress factors within a preterm and fullterm birth outcome. California: Unpublished doctoral dissertation.
- Burns, J.K. (1976). Proceedings: relation between blood levels of cortisol and duration of human labour. Journal of Physiology, 254, 12.
- Burstein, I., Kinch, R.A.H., & Stern, L. (1974). Anxiety, pregnancy, and labor and the neonate. American Journal of Obstetrics & Gynecology, 118, 195-199.
- Bustemante, B. & Crabbe, J. (1984). Parotid saliva cortisol in normal subjects: Increase during pregnancy. Journal of Steroids and Biochemistry, 20, 1333-1336.
- Campbell, E.A., Linton, E.A., Wolfe, C.D., Scraggs, P.R., Jones, M.T. & Lowry, P.J. (1987). Plasma corticotropin-releasing hormone concentrations during pregnancy and parturition. Journal of Clinical Endocrinology and Metabolism, 64, 1054-1059.
- Caplan, R.D. (1972). Organizational stress and individual strain: A social-psychological study of risk factors in coronary heart disease among administrators, engineers and scientists. Dissertation Abstracts International, 32, 6706b-6707b.

- Caplan, R.D. & Jones, K.W. (1975). Effects of work load, role ambiguity, and Type A personality on anxiety, depression, and heart rate. Journal of Applied Psychology, 60, 713-719.
- Chalmers, B. (1982). Psychological aspects of pregnancy: Some thoughts for the eighties. Social Science and Medicine, 16, 323-331.
- Chamberlain, G., & Garcia, J. (1983). Pregnant women at work. The Lancet, 228-230.
- Chapple, P.A., & Furneaux, W.D. (1964). Changes of personality in pregnancy and labor. Proceedings of the Royal Society of Medicine, 57, 260-261.
- Ching, J., & Newton, N. (1982). A prospective study of psychological and social factors in pregnancy related to preterm and low birth- weight deliveries. In H.J. Prill & M. Stauber (Eds.), Advances in Psychosomatic Obstetrics and Gynecology. New York: Springer-Verlag.
- Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38, 300-314.
- Cobb, S. & Kasl, S. (19). Terminations: The consequences of job loss. DHEW (NIOSH) Publication no. 77-224, NIOSH Research Report.
- Cohen, R. (1979). Maladaptation to pregnancy. Seminars in Perinatology, 3, 15-24.
- Cohen, S. & Hoberman, H.M. (1983). Positive events and social supports as buffers of life change stress. Journal of Applied Social Psychology, 13, 99-125.
- Cohen, S. (1980). Aftereffects of stress on human performance and social behavior: A review of research and theory. Psychological Bulletin, 88, 82-108.
- Coleman, A., & Coleman, L. (1971). Pregnancy: The psychological experience. New York: Herder and Herder.
- Collins, N.L., Dunkel-Schetter, C., Lobel, M., & Scrimshaw, S.C.M. In press. Social support in pregnancy: Psychosocial correlates of birth outcomes and postpartum depression. Journal of Personality and Social Psychology, 1-44.
- Cooper, C.L., & Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. Journal of Occupational Psychology, 49, 11-28.
- Cowan, C.P. & Cowan, P.A. (1988). Who does what when partners become parents:

- Implications for men, women, and marriage. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Cowan, C.P., Cowan, P.A., Heming, G., Garrett, E., Coysh, W.S., Coyne, J.C., & Lazarus, R.S. (1980). Cognitive style, stress perception, and coping. Handbook on Stress and Anxiety. San Francisco: Jossey-Bass.
- Cowan, C.P., Cowan, P.A., Heming, G., Garrett, E., Coysh, W., Curtis-Boles, H., & Boles, A. (1985). Transitions to parenthood: His, hers, and theirs. Journal of Family Issues, 6, 451-481.
- Coyne, J.C. & Lazarus, R.S. (1980). Cognitive Style, Stress Perception, and Coping. In L. Kutash, L.B. Schlesinger (Eds.) Handbook on Stress and Anxiety. San Francisco: Jossey-Bass.
- Crandon, A.J. (1979a). Maternal anxiety and obstetric complications. Journal of Psychosomatic Research, 23, 109-111.
- Crowley, A.E. (1986). 86th annual report on medical education in the United States. Journal of the American Medical Association, 256, 1545-1546.
- Curtis-Boles, H., & Boles, A.J. (1985). Transition to parenthood: His, hers, and theirs. Journal of Family Issues, 6, 461-481.
- Cutrona, C.E. (1984). Social support and stress in the transition of parenthood. Journal of Abnormal Psychology, 4, 378-390.
- Dean, A., & Lin, N. (1977). The stress-buffering role of social support. Problems and prospects for systematic investigation. Journal of Nervous and Mental Disease, 165, 403-417.
- Dearborn, M.J., & Hastings, J.E. (1987). Type A personality as a mediator of stress and strain in employed women. Journal of Human Stress, 53-60.
- Dembroski, T.M. & MacDougall, J.M. (1978). Stress effects on affiliation preferences among subjects possessing the Type A coronary-prone behavior pattern. Journal of Personality and Social Psychology, 36, 23-33.
- DeMeis, D.K., Hock, E., & McBride, S.L., 1986. The balance of employment and motherhood: A longitudinal study of mothers' feelings about separation from their first-born infants. Developmental Psychology, 22(5), 627-632.
- Detre, K.M., Feinleib, M., Matthews, K.A., Kerr, B.W. (1987). The federal women's study. In E.D. Eaker, B. Packard, N.K. Wenger, T.B. Clarkson, & H.A.

- Tyroler (Eds.), Coronary heart disease in women: Proceedings of an N.I.H. workshop. New York: Haymarket Doyma.
- Deutsch, F.M., Fleming, A., & Brooks-Gunn, J. (1988). Information-seeking and maternal self-definition during the transition to motherhood. Journal of Personality and Social Psychology, 55, 420-431.
- Devereux, R.B., Pickering, T.G., Harshfield, G.A., Kleinert, H.D., Denby, L., Clark, L., Pregibon, D., Jason, M., Kleiner, B., Borer, J.S., and Laragh, J.H. (1983). Left ventricular hypertrophy in patients with hypertension: importance of blood pressure response to regularly recurring stress. Circulation, 68, no 3, 470-476.
- Dimsdale, J. & Moss, J. (1980a). Plasma catecholamines in stress and exercise. Journal of the American Medical Association, 243, 340-342.
- Dimsdale, J. & Moss, J. (1980b). Short-term catecholamine response to psychological stress. Psychosomatic Medicine, 42, 493-497.
- Drage, J.S., Kennedy, C., Schwarz, B.K. (1964). The Apgar score as an index of neonatal mortality. Obstetrics & Gynecology, 24, 222-230.
- Drew, J.H., Beischer, N.A., Walstab, J.E., Lieng, S.T., & Stronge, J.M. (1988). Contribution of prematurity and low birthweight to neonatal death in Chinese and Western populations. Aust. N.Z.T. Obstetrics & Gynecology, 28, 190.
- Dubovsky, S.L., 1981. The psychophysiology of health, illness and stress. In R.C. Simons & H. Pardes (Eds.) Understanding human behavior in health and illness, 2nd ed. Baltimore, MD: Williams & Williams.
- Dyer, E.D. (1963). Parenthood as crisis: A re-study. Marriage and Family Living, 25, 196-201.
- Eaton, W.W. (1978). Life events, social supports, and psychiatric symptoms: A reanalysis of the New Haven data. Journal of Health and Social Behavior, 19, 230-234.
- Elliot, G.R. & Eisdorfer, C. (1982). Stress and human health: Analysis & implications of research. New York: Springer.
- Ellis, H. (1936). The psychic state during pregnancy. In H. Ellis, (Ed.), Studies in the psychology of sex (Vol. 2, pp 201-229). New York: Modern Library. (Original work published 1906).
- Emory, E.K., Hatch, M., Blackmore, & Strock, B. (under review). Psychophysiologic

responses to stress during pregnancy.

Fedrick, J. & Anderson, A.B.M. (1976). Factors associated with spontaneous preterm birth. British Journal of Obstetrics & Gynecology, 83, 342.

Feldman, S.S., & Nash, S.C. (1984). The transition from expectancy to parenthood: Impact of the first-born child on men and women. Sex Roles, 11, 61-78.

Fitzgerald, H.E. (1993). Developmental systems theory, systems dynamics and developmental methodology: Notes, definitions and references. Unpublished work.

Fleming, R., Baum, A., & Singer, J.E. (1984). Toward an integrative approach to the study of stress. Journal of Personality and Social Psychology, 46, 939-949.

Floyd, R.L. (1988). The relationship among personal resources, prenatal stress, and complications of pregnancy. Dissertation Abstracts International, 50(1B), 123.

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. Journal of Personality and Social Psychology, 46, 839-856.

Fox, M.E., Harris, R.E., & Brekken, A.L. (1977). The active-duty military: A new high-risk category. American Journal of Obstetrics and Gynecology, 129, 705.

Francis, P.L., Self, P.A., and Horowitz, F.D. (1987). The behavioral assessment of the neonate: an overview. In J.D. Osofsky (Ed.) Handbook of Infant Development. NY: John Wiley and Sons, Inc.

Frankenhaeuser, M. (1975). Sympathetic-adrenomedullary activity behavior and the psychosocial environment. In P.H. Venables & M.J. Christic (Eds.), Research in psychophysiology. New York: Wiley.

Frankenhaeuser, M. (1975a). Experimental approaches to the study of catecholamines and emotions. In L. Levi (Ed.)

Frankenhaeuser, M. (1981). Coping with job stress - A psycho-biological approach. In B. Gardell & G. Johansson (Eds.), Working life: A social science contribution to work reform. Winchester, England: Wiley.

Frankenhaeuser, M. & Johansson, G. (1976). Task demand as reflected in catecholamine excretion and heart rate. Journal of Human Stress, 2, 15-23.

Frankenhaeuser, M., Lundberg, U., VonWright, M.R. (1986). Urinary monoamine

metabolites as indices of mental stress in healthy males and females. Pharmacological Biochemical Behavior, 24, 1521-1525.

French, J.R.P., Jr. (1974). Person role fit. In A McLean (ed.), Occupational Stress. Springfield, Ill.: Thomas.

Friedman, M., Byers, S.O., Diamant, & Rosenman, R.H. (1975). Plasma catecholamine response of coronary-prone subjects (type A) to a specific challenge. Metabolism, 24, 205-210.

Friedman, M., and Rosenman, R.H. (1974). Type A Behavior and your heart. Greenwich, CT: Fawcett.

Gal, R. & Lazarus, R.S. (1975). The role of activity in anticipating and confronting stressful situations. Journal of Human Stress, 1 (December), 4-20.

Geiser, D.S. (1989). Psychosocial influences on human immunity. Clinical Psychology Review, 9, 689-715.

Glass, D.C. (1977). Development of behavior pattern A, in Behavior patterns, stress and coronary disease. Hillsdale, NJ: Erlbaum.

Glass, D.C. & Singer, J.E. (1972). Urban Stress. New York: Academic Press.

Greenglass, E.R. (1985). Psychological implications of sex bias in the workplace. Academic Psychology Bulletin, 7, 227-240.

Greenglass, E.R. (1990). Type A behavior, career aspirations, and role conflict in professional women. In M.J. Strube (Ed.) Type A behavior (Special Issue) Journal of Social Behavior and Personality, 5(1), 307-322.

Greenstein, T.N. (1986). Social-psychological factors in perinatal labor-force participation. Journal of Marriage and the Family, 48, 565-571.

Grimm, E. (1961). Psychological tension during pregnancy. Psychosomatic Medicine, 23, 520-527.

Grossman, F., Eichler, L., & Winickoff, S. (1980). Pregnancy, birth, and parenthood. San Francisco: Jossey-Bass.

Glick, I., Salerno, L., & Royce, J. (1965). Psychophysiologic factors in the etiology of preeclampsia. Archives of General Psychiatry, 12, 260-266.

Gore, S. (1978). The effect of social support in moderating the health consequences of

- unemployment. Journal of Health and Social Behavior, 19, 157-165.
- Gorsuch, R.L., & Key, M.K. (1974). Abnormalities of pregnancy as a functions of anxiety and life stress. Psychosomatic Medicine, 36, 352-362.
- Gotay, C. (1981). Cooperation and competition as a function of Type A behavior. Personality and Social Psychology Bulletin, 7, 386-392.
- Grunebaum, A., Minkoff, H., & Blake, D. (1987). Pregnancy among obstetricians: a comparison of births before, during, and after residency. American Journal of Obstetrics and Gynecology, 157, 79-83.
- Greenstein, T.N. (1986). Social-Psychological factors in perinatal labor-force participation. Journal of Marriage and the Family, 48, 565-571.
- Grossman, F.K. (1988). Strain in the transition to parenthood. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Gunter, L.M. (1963). Psychopathology and stress in the life experience of mothers of premature infants. American Journal of Obstetrics and Gynecology, 86, 333-340.
- Hall, D.T. & Hall, F.S. (1980). Stress and the two-career couple. In C.L. Cooper & R. Payne (Eds.), Current concerns in occupational stress. New York: Wiley, 243-266.
- Hanford, J. (1968). Pregnancy as a state of conflict. Psychological Reports, 22, 1313-1342.
- Hart, K. (1988). Association of type A behavior and its components to ways of coping with stress. Journal of Psychosomatic Research, 32(2), 213-219.
- Haw, M.A., 1982. Women, work and stress: A review and agenda for the future. Journal of Health and Social Behavior, 23, 132-144.
- Haynes, S.G. & Feinleib, M. (1980). Women, work and coronary heart disease: Prospective findings from the Framingham heart study. American Journal of Public Health, 70(2), 133-141.
- Heppner, P.P., Kampa, M., & Brunning, L. (1984). Problem solving appraisal as a moderator of stress. Paper presented at the meetings of the Ameircan Psychological Association, Toronto.

- Hiraoka, T. (1989). Relationship between social factors and urinary catecholamine concentrations in pregnant women. Acta Obstetrica Gynaecologica Japonica, 41, 20-26.
- Hobfoll, S.E., & Walfisch, S. (1984). Coping with a threat to life: A longitudinal study of self concept, social support, and psychological distress. American Journal of Community Psychology, 12, 87-100.
- Hobfoll, S.E. (1986a). The ecology of stress and social support among women. In S.E. Hobfoll (Ed.), Stress, Social Support and Women. Washington, DC: Hemisphere.
- Hobfoll, S.E. (1986b). The limitations of social support in the stress process. In I.G. Sarason & B.R. Sarason (Eds.), Social support: Theory, research, and application. The Hague, the Netherlands: Martinus Nijhof.
- Hobfoll, S.E., & London, P. (1986). The relationship of self- concept and social support to emotional distress among women during war. Journal of Social and Clinical Psychology, 4, 189-203.
- Hobfoll, S.E., & Leiberman, J.R. (1987). Personality and social resources in immediate and continued stress resistance among women. Journal of Personality and Social Psychology, 52, 18-26.
- Hock, E., (1980). Working and nonworking mothers and their infants: A comparative study of maternal caregiving characteristics and infant social behavior. Merrill-Palmer Quarterly, 26(2), 79-101.
- Hock, E., (1988). Working and nonworking mothers with infants: Perceptions of their careers, their infants' needs, and satisfaction with mothering. Developmental Psychology, 14(1), 37-43.
- Hock, E., Gnezda, M.T. & McBride, S.L., (1984). Mothers of infants: Attitudes toward employment and motherhood following birth of the first child. Journal of Marriage and the Family, 46(2), 425-431.
- Holden, C. (1980). Love Canal residents under stress. Science, 208, 1242-1244.
- Holmes, T.H., & Rahe, R.H. (1967). The social readjustment rating scale. Journal of Psychosomatic Research, 11, 213-218.
- Hopkins, J., Marcus, M. & Campbell, S.B. (1984). Postpartum depression: A critical review. Psychological Bulletin, 45(3), 498-515.

- Horowitz, M.J. (1975). Sliding meanings: A defense against threat in narcissistic personalities. International Journal of Psychoanalysis and Psychotherapy, 4, 167-180.
- House, J. (1974). Occupational stress and coronary heart disease: a review and theoretical integration. Journal of Health and Social Behavior, 15, 12-27.
- House, J.A. (1981). Work stress and social support. Reading, Mass.: Addison-Wesley.
- House, J.A., Robbins, C., & Metzner, H.L. (1982). The association of social relationships and activities with mortality: Prospective evidence from the Tecumseh community health study. American Journal of Epidemiology, 116, 123-140.
- House, J.S., & Wells, J.A. (1978). Occupational stress, social support, and health. In Alan McLean, Gilbert Black, & Michael Colligan (Eds.), Reducing Occupational Stress: Proceedings of a conference. U.S. Department of Health.
- Hricko, A., & Brunt, M. (1976). Working for your life: A women's guide to job health hazards. Berkely: Laobr Occupational Helath Program
- Istvan, J. (1986). Stress, anxiety, and birth outcomes: A critical review of the evidence. Psychological Bulletin, 100(3), 331-348.
- Jacobson, N.S., & Margolin, G. (1979). Marital therapy: Strategies bases on social learning and behavior exchange principles. New York: Bruner/Mazel.
- Jenkins, C.D. (1971a). Psychologic and social precursors of coronary disease. Part I. New England Journal of Medicine, 284, 244-255.
- Jenkins, C.D. (1965). The Jenkins Activity Survey for Health Prediction. Chapel Hill, NC: C.D. Jenkins, 1965.
- Jenkins, C.D. (1976). Recent evidence supporting psychologic and social risk factors for coronary heart disease. New England Journal of Medicine, 294, 1033-1038.
- Johansson, G., Aronsson, G. Lindstron, B.O. (1978). Social psychological and neuroendocrine stress reactions in highly mechanized work. Ergonomics, 21, 583-599.
- Johnson, C.L., & Johnson, F.A. (1977). Attitudes toward parenting in dual-career families. American Journal of Psychiatry, 134, 391-395.

- Johnson, S.M., & Greenbay, L.S. (1985). Differential effects of experiential and problem-solving interventions in resolving marital conflict. Journal of Consulting and Clinical Psychology, 53, 175-184.
- Kahn, R.L. (1981). Work stress and individual well-being. Labor-management cooperation: Recent efforts and results. Readings from the Monthly Labor Review, December 1982. (MSA Publication 6, DCR Bull. 2153). U.S. Department of Labor, Bureau of Labor Statistics. Washington, D.C.: U.S. Government Printing Office.
- Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D., & Rosenthal, R.A. (1964). Organizational stress: studies in role conflict and role ambiguity. New York: Wiley.
- Kaminski, M., Goujard, J., & Rumeau-Rouquette, C. (1973). Prediction of low birthweight and prematurity by a multiple regression analysis with maternal characteristics known since the beginning of pregnancy. International Journal of Epidemiology, 2, 194.
- Kaplan, S.R. (1982). Medical school and women over 30. J.A.M.W.A., 37, 39-50.
- Kasl, S.V. (1978). Epidemiological contributions to the study of work stress. In C.L. Cooper and R. Payne (Eds.), Stress at Work. New York: Wiley.
- Kasl, S.V. (1983). Pursuing the link between stressful life experiences and disease: A time for reappraisal. In Stress Research: Where do we go from here? Chichester, England: Wiley.
- Katz, V.L., Jenkins, T., Haley, L., AB, & Watson, A.B. (1991). Catecholemine levels in pregnant physicians and nurses: A pilot study of stress and pregnancy. Dept. Obstetrics and Gynecology, Univ. of North Carolina, School of Medicine, Chapel Hill, 77, 338-342.
- Katz, V.L., Miller, N.H., & Bowes, W.A., Jr. (1988). Pregnancy complications of physicians. Western Journal of Medicine, 149, 704-707.
- Kelly, K.E., & Houston, B.K. (1985). Type A behavior in employed women: relation to work, marital, and leisure variables, social support, stress, tension, and health. Journal of Personality and Social Psychology, 48(4), 1067-1079.
- Kessler, R., & Essex, M. (1982). Marital status and depression: The importance of coping resources. Social Forces, 61, 484-507.
- Kiecolt-Glaser, J.K., Garner, W., Spetchner, C., Hilliday, N., & Glaser, R. (1984).

Effects of stress on two components of the cellular immune response.
Advances, 1, 73.

- Kirschbaum, C. & Hellhammer, D.H. (1989). Salivary cortisol in psychobiological research: An overview. *Neuropsychobiology*, 22, 150-169.
- Klebanoff, M.A., Shiono, P.H., Rhoads, G.G. (1990). Outcomes of pregnancy in a national sample of resident physicians. *New England Journal of Medicine*, 323, 1040-1045.
- Kobasa, S.C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, 37(1), 1-11.
- Kobasa, S.C. (1982a). The hardy personality: Toward a social psychology of stress and health. In G.S. Sanders & J. Suls (Eds.), *Social psychology of health and illness* (pp 3-22). Hillsdale, NJ: Erlbaum.
- Kobasa, S.C. (1982b). Commitment and coping in stress resistance among lawyers. *Journal of Personality and Social Psychology*, 42, 707-714.
- Kopp, C.B. & Kaler, S.R. (1989). Risk in infancy. *American Psychologist*, 44, 224-230.
- Kramer, M. (1987). Intrauterine growth and gestational duration determinants. *Pediatrics*, 80(4), 502-511.
- Krantz, D.S. & Glass, D.C. (1984). Personality, behavior patterns and physical illness: Conceptual and methodological issues. In W.D. Gentry (Ed), *Handbook of behavioral medicine* (pp 38-86). New York: Guilford Press.
- Krener, P. (1986). *Topics in Early Childhood Special Education*, 16(3), 37-53.
- Labs, S.M., Wurtele, S.K. (1986). Fetal health locus of control scale: Development and validation. *Journal of Consulting and Clinical Psychology*, 54, 814-819.
- Lacey, H.M. (1979). Control, perceived control, and the methodological role of cognitive constructs. In L.C. Perlmutter & R.A. Monty (Eds). *Choice and perceived control*. Hillsdale, NJ: Erlbaum
- Lamont, R., Dunlop, P., & Crowley, P. (1983). Spontaneous preterm labour and delivery at under 34 weeks' gestation. *British Medical Journal* 286:454.
- LaRocco, J.M., House, J.S., & French, J.R.P. (1980). Social support, occupational stress, and health. *Journal of Health and Social Behavior*, 21, 202-218.

- LaRocci, J.M., & Jones, A.P. (1978a). Co-worker and leader support as moderators of stress-strain relationships in work situations. Journal of Applied Psychology, 63, 629-634.
- Lane, J.D., White, A.D. and Williams, R.B. (1984). Cardiovascular effects of mental arithmetic in Type A and Type B females. Psychophysiology, 21, 39-46.
- Lawler, K.A., Rixse, A., and Allen, M.T. (1983). Type A behavior and psychophysiological responses in adult women. Psychophysiology, 20, 343-350.
- Lawler, K.A., Schmied, L.A., Armstead, C.A., & Lacy, J.E. (1990). Type A behavior, desire for control, and cardiovascular reactivity in young adult women. Tennessee: Select Press.
- Lawler, K.A., Schmeid, L., Mitchell, V.P., and Rixse, A. (1984). Type A behavior and physiological responsivity in young women. Journal of Psychosomatic Research, 28, 197-204.
- Lazarus, R.S.(1966). Coping and the process of secondary appraisal: personality factors. In R.S. Lazarus (Ed.) Psychological Stress and the Coping Process. New York: McGraw-Hill.
- Lazarus, R.S. (1968). Emotions and adaptation: Conceptual and empirical relations. In W. Arnold (Ed.), Nebraska symposium on motivation. Lincoln: University of Nebraska Press.
- Lazarus, R.S. (1966). The measurement of psychological stress: Affects, motor-behavioral reactions, and alterations of adaptive functioning. In R.S. Lazarus (Ed.) Psychological Stress and the Coping Process. New York: McGraw-Hill.
- Lazarus, R.S. & Cohen, J.B. (1977). Environmental stress. In L. Altman & J.F. Wohlwill (Eds.), Human behavior and the environment: Current theory and research (Vol 2). New York: Plenum Publishing.
- Lazarus, R.S. & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer.
- Lazarus, R.S. & Folkman, S. (1986). Coping and adaptation. In W.D. Gentry (Ed.), The handbook of behavioral medicine. New York: Guilford.
- Lederman, R.P., Lederman, E., Work, B.A. & McCann, D.S. (1978). The relationship of maternal anxiety, plasma catecholamines, and plasma cortisol to progress in

- labor. American Journal of Obstetrics and Gynecology, 132, 495-500.
- Lederman, R.P., McCann, D.S., Work, B. & Harber, M.S. (1977). Endogenous plasma epinephrine and norepinephrine in last-trimester pregnancy and labor. American Journal of Gynecology, 129, 5-8.
- Levi, L. (Ed.) (1972). Stress and distress in response to psychosocial stimuli. Oxford, England: Pergamon Press.
- Levi, L., Frankenhaeuser, M., & Gardell, B. (1982). Report on work stress related to social structures and processes. In G.R. Elliot & C. Eisdorfer (Eds.) Stress and human health: Analysis & implications of research. New York: Springer.
- LeVita, E.M., Kush, L.K., Rothstein, G.D. & Brown, J.W. (1980). Auditory discrimination in human infants. Paper presented at the meeting of the Western Psychological Association, Honolulu.
- Liese, L.H., Snowden, L.R., & Ford, L.K. (1989). Partner status, social support, and psychological adjustment during pregnancy. Family Relations, 38, 311-316.
- Lein, L., Durham, M., Pratt, M., et al. Work and family life. Final report to the National Institute of Education, Center for the study of public policy. Cambridge, MA.
- LeMasters, E.E. (1957). Parenthood as crisis. Marriage and Family Living, 19, 352-355.
- Liefer, M. (1980). Psychological effects of motherhood: A study of first pregnancy. New York: Praeger.
- Lin, N. Simeone, R.S., Ensel, W.M., & Kuo, W. (1979). Social support, stressful life events, and illness: A model and an empirical test. Journal of Health and Social Behavior, 20, 108-119.
- Lips, H.M. (1985). A longitudinal study of the reporting of emotional and somatic symptoms during and after pregnancy. Social Science and Medicine, 21, 631-640.
- Long, B.C. (1988). Work-related stress and coping strategies of professional women. Journal of Employment Counseling, 25, 37-44.
- Mamelle, N., Laumon, B. & Lazar, P. (1984). Prematurity and occupational activity during pregnancy. American Journal of Epidemiology, 119(3), 309-322.

- Mamelle, N., & Munoz, F. (1987). Occupational working conditions and preterm birth: A reliable scoring system. American Journal of Epidemiology, 126, 150-152.
- Mamelle, Measson, Munoz, de al Bastie, Gerin, Hanauer, Collet & Guyotat (1989). Development and use of a self-administered questionnaire for assessment of psychologic attitudes toward pregnancy and their relation to a subsequent premature birth. American Journal of Epidemiology, 130(5), 989-998.
- Matthews, K.A., Glass, D.C., Rosenman, R.H., and Bortner, R.W. (1977). Competitive drive, pattern A, and coronary heart disease: a further analysis of some data from the western collaborative group study, Journal of Chronic Disease, 30, 489-498.
- Matthews, K.A., Krantz, D.S., Dembroski, T.M., and MacDougall, J.M. (1982). Unique and common variance in Structured Interview and Jenkins Activity Survey measure of the type A behavior pattern. Journal of Personality and Social Psychology, 42, 303-313.
- Matthews, K. & Rodin, J. (1989). Women's changing work roles: Impact on health, family, and public policy. American Psychologist, 44, 1389-1393.
- McCormick, M.C., Gortmaker, S.L., & Sobol, A.M. (1990). Very low birth weight children: Behavior problems and school difficulty in a national sample. Journal of Pediatrics, 117, 687-693.
- McDonald, A.D., McDonald, J.C., Armstrong, B., Cherry, N.M., Nolin, A.D., & Robert, D. (1988). Prematurity and work in pregnancy. British Journal of Industrial Medicine, 45, 56-62.
- McDonald, R.L., & Christakos, A.C. (1963). Relationship of emotional adjustment during pregnancy to obstetric complications. American Journal of Obstetrics and Gynecology, 86, 341-348.
- McFarlane, A.H., Norman, G.R., Streiner, D.L., Roy, R. & Scott, D.J. (1980). A longitudinal study of the influence of the psychosocial environment on health status: A preliminary report. Journal of Health and Social Behavior, 21, 124-133.
- Michaels, G.Y. & Goldberg, W.A. (1988). The Transition to Parenthood: Current Theory and Research. Cambridge, MA: Cambridge University Press.

Miller, S.M.
Be

Miller, S.J.
co
He

Mills, J.L.
M
pr
18

Minter, F.
L.
F

Moore, D.
W
H

Morgan.
a
N

Mueller.
r
a

Mueller
a

Mumfor
i
h

Myers.

Myers.

Næye.

- Miller, S.M. (1979). Controllability and human stress: Method, evidence, and theory. Behavior Research and Therapy, 17, 287-304.
- Miller, S.M. (1980). Why having control reduces stress: If I can't stop the roller coaster, I don't want to get off. In J. Garber & M. Seligman (Eds.), Human Helplessness: Theory and Applications. New York: Academic Press.
- Mills, J.L., Braubar, B.I., Harley, E.E., Rhodes, G.G. & Berendes, H.W. (1984). Maternal alcohol consumption and birth weight: How much drinking during pregnancy is safe? Journal of the American Medical Association, 252, 1875-1879.
- Minter, R.E. & Kimball, C.P. (1980). Life events, Personality traits, and illness. In I.L. Kutash & L.B. Schlesinger (Eds.). Handbook on Stress and Anxiety. San Francisco: Jossey Bass.
- Moore, D.J. (1988). Perinatal statistics in Western Australia, 4th annual report of the Western Australian Midwives' Notification system 1986, Statistical ser. 10, Health Dept. of Western Australia, Perth.
- Morgan, K.C. & Hock, E. (1984). A longitudinal study of psychosocial variables affecting the career patterns of women with young children. Journal of Marriage and the Family, 46(2), 383-390.
- Mueller, D.P. (1980). Social networks: A promising direction for research on the relationship of the social environment to psychiatric disorder. Social Science and Medicine, 14A, 147-161.
- Mueller, C.W. & Parcel, T.L. (1981). Measures of socioeconomic status: Alternatives and recommendations. Child Development, 52, 13-30.
- Mumford, E., Schlesinger, H.J., & Glass, G.V. (1982). The effects of psychological intervention of recovery from surgery and heart attacks: An analysis of the literature. American Journal of Public Health, 72, 141-151.
- Myers, J.K., Lindenthal, J.J. & Pepper, M.P. (1972). Life events and mental status: A longitudinal study. Journal of Health and Social Behavior, 13, 398-406.
- Myers, R.E. (1972). The pathology of the rhesus monkey placenta. Acta Endocrinologica, 70 (Suppl. 166), 221-257.
- Naeye, R.L. & Peters, E.C. (1982). Working during pregnancy: Effects on the fetus. Pediatrics, 69(6), 724-727.

Nakano, K
beh

Nelson, D
ine

Newman, J
Pal
Pre

Newton, R
to

Newton, R
Psy
lab

Nilsson, A
Sci

Niswander
Bo

Norbeck, J
out
38.

Norbeck, J
ins

Norbeck, J
dis
stu

Nuckolls, J
anc
44

O'Hara, M
del

O'Hara, M
anc

- Nakano, K. (1990). Effects of two self-control procedures on modifying type A behavior. Journal of Clinical Psychology, 46(5), 652-657.
- Nelson, D.L. & Quick, J.C. (1985). Professional women: Are distress and disease inevitable? Academy of Management Review, 10(2), 206-218.
- Newman, P.R. & Newman, B.M. (19). Parenthood and adult development. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Newton, R.W. & Hunt, L.P. (1984). Psychosocial stress in pregnancy and its relation to low birth weight. British Medical Journal, 288, 1191-1194.
- Newton, R.W., Webster, P.A.C., Binu, P.S., Maskrey, N. & Phillips, A.B. (1979). Psychosocial stress in pregnancy and its relation to the onset of premature labour. British Medical Journal, 2, 411-413.
- Nilsson, A., & Almgren, P. (1970). Perinatal emotional adjustment. Acta Psychiatrica Scandinavica Supplements, 220, 1-141.
- Niswander, K.R. (1981). Obstetrics: Essentials of clinical practice (2nd ed.). Boston: Little Brown.
- Norbeck, J.S. & Anderson, N.J. (1989). Psychosocial predictors of pregnancy outcomes in low-income black, hispanic and white women. Nursing Research, 38, 204-209.
- Norbeck, J.S., Lindsey, A.M. & Carrieri, V.L. (1981). The development of an instrument to measure social support. Nursing Research, 30, 264-269.
- Norbeck, J.S. & Tilden, V.P., (1983). Life stress, social support, and emotional disequilibrium in complications of pregnancy: a prospective, multivariate study. Journal of Health and Social Behavior, 24, 30-46.
- Nuckolls, K.B., Cassel, J., & Kaplan, B.H. (1972). Psychosocial aspects, life crisis, and the prognosis of pregnancy. American Journal of Epidemiology, 95, 431-441.
- O'Hara, M.W. (1985). Depression and marital adjustment during pregnancy and after delivery. The American Journal of Family Therapy, 13, 49-54.
- O'Hara, M.W. (in press). Social support, life events, and depression during pregnancy and the puerperium. Archives of General Psychiatry.

- O'Hara, M.W., Neunaber, D.J., & Zekoski, E. M. (1984). A prospective study of postpartum depression: Prevalence, course, and predictive factors. Journal of Abnormal Psychology, 93, 158-171.
- Oliver, W.A. (1972). Childbirth expectancies and experiences as a function of locus of control and lamaze training. Dissertation Abstracts International, 33 (4B), 1802-3.
- Omer, H. & Everly, G.S. (1988). Psychological factors in preterm labor: Critical review and theoretical synthesis. American Journal of Psychology, 145, 1207-1513.
- Omer, H., Elizur, Y., Barnea, T., Friedlander, D. & Palti, Z. (1986). Psychological variables and premature labour: A possible solution for some methodological problems. Journal of Psychosomatic Research, 30, 559-565.
- Osofsky, J.D. (1987). Handbook of Infant Development, 2nd Ed. New York: John Wiley and Sons.
- Palkovitz, R. & Copes, M. (1988). Changes in attitudes, beliefs and expectations associated with the transition to parenthood. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Paneth, N. (1986). Recent trends in preterm delivery rates in the United States, in Prevention of Preterm Birth. New Goals and Practices in Prenatal Care. In E. Papiernik, G. Breart & N. Spira (Eds.). Inserm, Paris: College Inserm.
- Papiernik, E., Bouyer, J., Dreyfus, J., Collin, D., Winisdorffer, G., Guegen, S., Lecomte, M., & Lazar, P. (1985). Prevention of preterm birth: A perinatal study in Hagenaue, France, Pediatrics, 76, 154.
- Parke, R.D. & Beitel, A. (1988). Disappointment: When things go wrong in the transition to parenthood. In R. Palkovitz & M. Sussman (Eds.). Transitions to Parenthood. NY: Haworth Press.
- Pascoe, J.M., Chessare, J., Baugh, E., Urich, L. & Ialongo, N. (1987). Help with prenatal household tasks and newborn birth weight: Is there an association? Developmental and Behavioral Pediatrics, 8(4), 207-212.
- Peoples-Sheps, M.D., Siegel, E., Suchindran, C., Origasa, H., Ware, A., and Barakat, A. (1991). Characteristics of maternal employment during pregnancy: Effects on low birthweight. American Journal of Public Health, 81(8), 1007-1012.
- Pesce, A.J. & Kaplan, L.A. (1987). Methods in clinical chemistry. St. Louis: The

C.V. Mosby Company, pp 950-964.

Phelan, S. (1988). Pregnancy during residency: Obstetric complications. Obstetrics and Gynecology, 72(3), 431-436.

Phelan, S.T. (1992). Sources of stress and suport for the pregnanct resident. Academic Medicine, 67, 408-410.

Pickering, T.G., Harshfield, G.A., Kleinert, H.D., Blank, S., Laragh, J.H. (1982). Blood pressure during normal daily activities, sleep, and exercise, Journal of the American Medical Association, 247, no. 7, 992-996.

Pinneau, R.S. (1975). Effects of soical support on psychological and physiillogical stress. MI: Unpublished doctoral dissertation. Prechtl, H.F.R. (1980). The optimality concept. Early Human Development, 4, 201-205.

Prechtl, H.F.R. (1980). The optimality concept. Early Human Development, 4, 201-205.

Prechtl, H.F.R. (1982). Assessment methods for the newborn infant, a critical evaluation. In P. Stratton (ED.), Psychobiology of the human newborn. NY: Wiley.

Puff, H.F. & Moeckel, C.L. (1979). Managerial stress and the woman manager. Industrial Management, 21, 1-5.

Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. Journal of Applied Psychological Measures, 1, 355-401.

Rapoport, R.N., & Rapoport, R. (1978). Dual-career families: Progress and prospects. Marriage and Family Review, 1, 1-12.

Raub, W.F. (1989). High fiber diet may inhibit large-bowel neoplasia. Journal of the American Medical Association, 262, 2359.

Raub, W.F. (1990). High fibert diet may inhibit large-bowel newoplasia. Journal of the American Medical Association, 262, 2359.

Richardson, P. (1982). Significant relationships and their impact on childbearing: A review. Maternal-Child Nursing Journal, 11, 17-40.

Richardson, P. (1983). Women's perception of change in relationships shared with their husbands during pregnancy. Maternal-Child Nursing Journal, 12, 1-19.

- Riesch, S.K. (1984). Occupational commitment and the quality of maternal infant interaction. Research in Nursing and Health, 7, 295-303.
- Rizzardo, R., Magni, G., Cremonese, C., Rossi, R.T., & Cosentino, M. (1988). Variations in anxiety levels during pregnancy and psychosocial factors in relation to obstetric complications. Psychotherapy & Psychosomatics, 49, 10-16.
- Roeske, N.A., & Lake, K. (1977). Role models for women medical students. Journal of Medical Education, 52, 459-456.
- Rofe, Y., Blittner, M., & Lewin, I. (1993). Emotional experiences during the three trimesters of pregnancy. Journal of Clinical Psychology, 49, 3-11.
- Rosenman, R.H., Brand, R.J., Jenkins, C.D., Friedman, M., Straus, R., & Wurm, M. (1975). Coronary heart disease in the Western collaborative group study: Final follow-up of 8.5 years. Journal of the American Medical Association, 233, 872-877.
- Ross, M.G., Hobel, C.J., Bragonier, J.B., Bear, M.B., & Bemis, R. (1986). A simplified risk-scoring system for prematurity. American Journal of Perinatology, 3, 339.
- Rothstein, A. (1972). Depression in pregnancy as it relates to feminine identification conflict and perceived environmental support. Dissertation Abstracts International, 32, 5347-A.
- Rose, R.M. (1980). Endocrine responses to stressful psychological events. Psychiatric Clinics of North America, 3, 251-276.
- Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs: General and Applied, 80(1), 1-28.
- Rubenstein, A.H. (1977). A longitudinal study of psychological changes occurring during pregnancy. Dissertation Abstracts, 38, 2884-B.
- Sarason, J.G., Johnson, J.H., & Stegel, J.M. (1978). Assessing the impact of life changes: Development of the Life Experiences Survey. Journal of Consulting and Clinical Psychology, 46, 932-946.
- Sasaki, A., Shinkawa, O., Margioris, A.N., Liotta, A.S., Sato, S., Murikamin, O., Go,

- M., Shimizu, Y., Hanew, K., & Yoshinaga, K. (1987). Immunoreactive corticotropin-releasing hormone in human plasma during pregnancy, labor and delivery. Journal of Clinical Endocrinology and Metabolism, 64, 224-229.
- Schaefer, C., Coyne, J.C. & Lazarus, R.S. (1981). The health-related functions of social support. Journal of Behavioral Medicine, 4, 381-406.
- Schwartz, J.L. (1977). A study of the relationship between maternal life-change events and premature delivery. In J.L. Schwartz & L.H. Schwartz (Eds.). Vulnerable infants: A psychosocial dilemma. New York: McGraw-Hill.
- Schwartz, R.W. (1985). Pregnancy in physicians: Characteristics and complications. Obstetrics and Gynecology, 66(5), 672-676.
- Schwartz, A.J., Black, E.R., Goldstein, M.G., Jozefowicz, R.F., & Emmy, F.G. (1987). Levels and causes of stress among residents. Journal of Medical Education, 62, 744-753.
- Seligman, M.E.P. (1975). Helplessness: On depression, development and death. California: Freeman.
- Selye, H. (1956). The Stress of Life. New York: McGraw-Hill.
- Selye, H. (1978). The Stress of Life (rev. ed.). New York: McGraw-Hill.
- Shapiro, J. (1982). Attitudes of physician faculty members and residents towards the pregnant medical resident. Journal of Medical Education, 57, 483-486.
- Shereshefsky, P.M. & Yarrow, L.J. (1973). Psychological aspects of a first pregnancy. New York: Raven Press.
- Shipper, F., Kreitner, R., Reif, W.E., Lewis, K.E. (1986). A study of four psychometric properties of the Jenkins Activity Survey Type A scale with suggested modifications and validation. Educational and Psychological Measurement, 46, 551-564.
- Selye, H. (1956). The stress of life. New York: McGraw Hill.
- Sinal, S., Weavil, P., & Camp, M.G. (1988). Survey of women physicians on issues relating to pregnancy during a medical career. Journal of Medical Education, 63, 531-538.
- Sklar, L.S. & Anisman, H. (1981). Stress and cancer. Psychological Bulletin, 89,

369-406.

- Small, M.F. (1982). Reproductive failure in macaques. American Journal of Primatology, 2, 137-147.
- Smilkstein, G., Helsper-Lucas, A., Ashworth, C., Montano, D. & Pagel, M. (1984). Prediction of pregnancy complications: An application of the biopsychosocial model. Social Science and Medicine, 18, 315-321.
- Smith, R., Cubis, J., Brinsmead, M., Lewin, T., Singh, B., Owens, P., Eng-Cheng, C., Hall, C., Adler, R., Lowvelock, M., Hurt, D., Rowley, M. & Nolan, M. (1990). Mood changes, obstetric experience and alterations in plasma cortisol, beta-endorphin and corticotrophin releasing hormone during pregnancy and the puerperium. Journal of Psychosomatic Research, 34, 53-69.
- Smith, T.W., Brehm, S.S. (1981). Cognitive correlates of the Type A coronary-prone behavior pattern. Motivation & Emotion, 5, 215-223.
- Snowden, L.R., Schott, T.L., Awalt, S., & Gillis-Knox, J. (1988). Marital satisfaction in pregnancy: Stability and change. Journal of Marriage and the Family, 50, 325-333.
- Spanier, G.B. (1976). Measuring dyadic adjustment: New scale for assessing the quality of marriage and similar dyads. Journal of Marriage and the Family, 38, 15-28.
- Spanier, G.B. & Thompson, C.A. (1982). A confirmatory factor analysis of the Dyadic Adjustment Scale. Journal of Marriage and the Family, 44, 731-8.
- Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. (1970). Manual for the State-Trait Anxiety Inventory (Self-Evaluation Questionnaire). Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C.D., & Jacobs, G.A. (1979a). Emotional reactions to the stress of pregnancy and obstetric complications. In L. Carenza & L. Zichella (Eds.), Emotion and reproduction. London: Academic Press.
- Spielberger, C.D., & Jacobs, G.A. (1979b). Maternal emotions, life stress and obstetric complications. In L. Zichella & R. Pancheri (Eds.), Psychoneuroendocrinology in reproduction. Amsterdam: Elsevier: North Holland Biomedical Press.
- Spence, J.T., Helmreich, R.L., and Pred, R.S. (1987). Impatience Versus Achievement Strivings in the Type A Pattern: Differential Effects on Students' Health and

- Academic Achievement. Journal of Applied Psychology, 72, 522-528.
- Stamps, L.E. (1980). Relationship between heart rate indices of the orienting response and birth weight in normal full-term newborns. Developmental Psychobiology, 13, 33-35.
- Standley, K., Soule, B., & Copans, S.A. (1979). Dimensions of prenatal anxiety and their influence on pregnancy outcome. American Journal of Obstetrics & Gynecology, 135, 22-26.
- Steinberg, L. (1986). Stability of Type A behavior from early childhood to young adulthood. In P. Baltes, D. Featherman, & R. Lerner (Eds.), Life-span development and behavior. Hillsdale, NJ: Erlbaum.
- Steinberg, L. (1985). Early temperamental antecedents of adult Type A behaviors. Developmental Psychology.
- Stellman, J.M. (1977). Women's work, women's health. New York: Pantheon Books.
- Stokols, D., Ohlig, W., & Resnick, S.M. (1978). Perception of residential crowding, classroom experiences, and student health. Human Ecology, 6, 233-257.
- Stoney, C.M., Langer, A.W., and Gelling, P.D. (1986). The effects of menstrual cycle phase on cardiovascular and pulmonary responses to behavioral and exercise stress. Psychology, 23, 393-402.
- Strickland, B.R. (1978). Internal-external expectancies and health-related behaviors. Journal of Consulting and Clinical Psychology, 46, 1192-1211.
- Strube, M.J., Boland, S.M., Manfreda, P.A., & Al-Falaij, M. (1987). Type A behavior pattern and the self-evaluation of abilities: Empirical tests of the self-appraisal model. Journal of Personality and Social Psychology, 52, 956-974.
- Suls, J. (1982). Social support, interpersonal relations, and health: Benefits and liabilities. In G.S. Sanders and J. Suls (eds), Social Psychology of Health and Illness, Hillsdale, N.J.: Erlbaum.
- Suls, J. & Mullen, B. (1981). Life change in psychological distress: The role of perceived control and desirability. Journal of Applied Social Psychology, 11, 379-389.
- Theorell, T., Lind, E., Forberg, J., Karlsson, C.G. & Levy, L. (1972). Longitudinal study of 21 subjects with coronary heart disease: Life changes, catecholamine excretion and related biochemical reactions. Psychosomatic Medicine, 34,

505-516.

- Thompson, S.C. (1981). Will it hurt less if I can control it? A complex answer to a simple question. Psychological Bulletin, 90, 89-101.
- Tietjen, A.M., & Bradley, C.F. (1985). Social support and maternal psychosocial adjustment during the transition to parenthood. Canadian Journal of Behavioural Science, 17, 109-121.
- Tilden, V. (1983). The relation of life stress and social support to emotional disequilibrium during pregnancy. Research in Nursing and Health, 6, 167-174.
- Tilden, V. (1984). The relation of selected psychosocial variables to single status of adult women during pregnancy. Nursing Research, 33(2), 102-107.
- Touwen, B., Huisjes, H.J., Jurgens-v.d.Zee, A.D., Bierman-van Eendenburg, M.E.C., Smrkovsky, M., and Olinga, A.A.(1980). Obstetrical condition and neonatal neurological morbidity. An analysis with the help of the optimality concept. Early Human Development, 4, 207-228.
- U.S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics, Washington, D.C.: USDL Bulletin 2340, August, 1989.
- Van Egeren, L. (1979). Social interactions, communications, and the coronary-prone behavior pattern: A psychophysiological study. Psychosomatic Medicine, 41, 2-18.
- VanEgeren, L., Abelson, J., & Sniderman, L.(1983). Interpersonal and electrocardiographic responses of Type A's and Type B's in competitive socioeconomic games. Journal of Psychosomatic Research, 27, 53-59.
- Van Egeren, L. & Madarasmi, S. (1988). A Computer-Assisted Diary (CAD) for Ambulatory Blood Pressure Monitoring. American Journal of Hypertension, 1, 179-185.
- Van Egeren, L.F.(1984). Social Processes, Biology, and Disease. In W. Waid (Ed), Sociophysiology, NY: Springer-Verlag.
- Verbrugge, L. (1986). Role burdens and physical health of women and men. Women and Health, 11, 47-77.
- Vingerhoets, A.J.M., & Flor, P.J.M. (1984). Type A behavior and self-reports of coping preferences. British Journal of Medical Psychology, 57, 15-21.

- Vinokur, A., & Selzer, M. (1975). Desirable versus undesirable life events: Their relationship to stress and mental distress. Journal of Personality and Social Psychology, 32, 329-337.
- Vohr, B.R. & Garcia-Coll, C.T. (1988). Follow-up studies of high-risk low-birth-weight infants: Changing trends. In H.E. Fitzgerald, B.M. Lester, & M.W. Yogman (Eds.), Theory and research in behavioral pediatrics (pp. 1-65). New York: Plenum.
- VonBargen, D.M. (1983). Infant heart rate: A review of research and methodology. Merrill-Palmer Quarterly, 29, 115-149.
- Waldron, I. (1978). The coronary-prone behavior pattern, blood pressure, employment, and socioeconomic status in women, Journal of Psychosomatic Research, 22, 79-87.
- Waldron, I. (1978). Type A behavior pattern and coronary heart disease in men and women. Social Science Medicine, 12, 167-170.
- Waldron, I. (1980). Employment and women's health: An analysis of causal relationships. International Journal of Health Services, 10, 435-454.
- Walker, L.O. (1989). Stress process among mothers of infants: Preliminary model testing. Nursing Research, 38, 10-15.
- Wallace, P.M. & Gottlib, I.H. (1990). Marital adjustment during the transition to parenthood: stability and predictors of change. Journal of Marriage and the Family, 52, 21-29.
- Wallston, B.S., & Wallston, K.A. (1978). Locus of control and health: A review of the literature. Health Education Monographs, 6, 107-117.
- World Health Organization (1977). Manual of the International Statistical Classification of Disease, Injuries and causes of Death. Vol. 1. World Health Organization, Geneva.
- Wortman, C.B., & Brehm, J. (1975). Response to uncontrollable outcomes: An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), Advances in Experimental and Social Psychology. New York: Academic Press.
- Wortis, H. & Freedman, A. (1962). Maternal stress and premature delivery. Bulletin of the World Health Organization, 26, 285-291.

- Zajicek, E., & Wolkind, S. (1978). Emotional difficulties in married women during and after the first pregnancy. British Journal Medical Psychology, 51, 379-385.
- Zeichner, A., Edwards, P., Chong, G., Lifshitz, J.L., & Dalamater, A. (1983). Cognitive and physiological coping with stress in Type A males and females. Paper presented at the meetings of the Association for the Advancement of Behavior Therapy, Washington, DC.
- Zweig, S., LeFevre, M., & Kruse, J. (1988). The health belief model and attendance for prenatal care. Family Practice Research Journal, 8, 32-36.

MICHIGAN STATE UNIV. LIBRARIES



31293010317984