Sponsoring Committee: Professor Ardis R. Swanson, Chairperson
Professor Patricia Winstead Fry, and
Professor Robert Q. Young

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE MAGNITUDE OF LIFE STRESS, APPRAISAL OF ADJUSTMENT TO LIFE STRESS AND THE OCCURRENCE OF CONCEPTION AMONG WOMEN OF CHILDBEARING AGE

by

Marianne Theresa Roncoli

Submitted in partial fulfillment of the requirements
for the Doctor of Philosophy degree in the
School of Education, Health, Nursing, and the Arts Professions
New York University
1980

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AN ABSTRACT OF

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ABSTRACT

The purpose of this investigation was to explore the relationship between life stress and conception. Previously, it had been reported that women who were pregnant sustained life stress equal to or greater than people who sustained serious illness. This investigator attempted to prospectively establish what had been retrospectively found and to make a theoretical contribution to the understanding of the relationship between life stress and health status.

Prior to this investigation empirical evidence suggested that the occurrence of life stress may be causally related to the onset of pregnancy. A pathway of life stress to illness reported in the literature was utilized for deriving a similar pathway leading to conception.

The hypotheses that were tested were:

1) Women with high magnitude of life stress are more likely to conceive than women with low magnitude of life stress.

2) Women with a high appraisal of adjustment to life stress are more likely to conceive than women with a low appraisal of adjustment to life stress events.

3) Women who conceive are more likely to have a change in appraisal of adjustment from higher to lower appraisal than women who do not conceive.

Respondents for this study consisted of two-hundred and fifty (250) alumni from a local suburban state college, between the ages of 21 and 35, of middle-class status. Using coital-related contraceptive

devices or no contraception at all, desiring to be pregnant now or in the near future, or having no desire to be pregnant ever, these respondents completed a Recent Life Changes Questionnaire (RLCQ) and a General Information Questionnaire which they were mailed in November of 1978. In May of 1979, they completed and returned to the investigator the RLCQ where they reappraised life stress events that they had previously reported experiencing and indicated new events that had occurred to them during the intervening six months. They also completed and returned a Conception Information Form where they indicated whether or not they had conceived during the intervening six months.

The data was analyzed using chi-square analysis. Results were accepted at the 0.05 level of significance. None of the hypotheses were supported.

Supplementary analysis using t-tests for independent samples indicated a significant difference between the pregnant and non-pregnant groups based on the means of the subscales of items related to work and interpersonal relationships primarily i.e., women who conceived experienced less stress related to employment and interpersonal relationships than did women who did not conceive. Discriminant analysis of the difference between the pregnant and non-pregnant groups yielded a discriminant function that suggested that women who sustained a stable life style i.e., lived in a permanent residence, did not work outside the home, were married and wanted to be pregnant were more likely to have conceived in the intervening six months. The entire sample sustained high life stress. The women who conceived sustained a higher magnitude of life stress in the intervening six months than the women who did not conceive.

The existence of a stable life style together with the high overall life stress report and the increase in stress among the pregnant women in the intervening six months suggests that a complex relationship between life stress and conception exists.

ACKNOWLEDGEMENTS

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CHAPTER I

THE PROBLEM

Introduction

This investigation concerns the social, environmental and biological antecedents of conception. Through an examination of the relationship of life stress and the occurrence of conception, this study adds to a body of knowledge surrounding one of the most extraordinary and, at the same time, ordinary of human events.

Statement of the Problem

What is the relationship between the magnitude of life stress, appraisal of adjustment to life stress and the occurrence of conception in women of childbearing age?

Subproblems

1. What is the relationship between the magnitude of life stress and the occurrence of conception?

2. What is the relationship between the appraisal of adjustment to life stress and the occurrence of conception?

3. What is the relationship between a change in appraisal of adjustment to life stress and the occurrence of conception?

Definitions

Life Stress is an individual's experience of life change.

It is measured by totalling life stress events and computing appraisal of adjustment to life stress.

Life Stress Events are social, interpersonal or demographic changes in a person's life measured by the Recent Life Changes Questionnaire (RLCQ).

Life Change Unit (LCU) is a standard amount of adjustment required of a life stress event on a scale of 0 - 100 measured by the Recent Life Changes Questionnaire (RLCQ).

Magnitude of Life Stress is the degree of stress experienced by a person in relation to the social, interpersonal or demographic changes in one's life. It is measured by summing the life change units (LCU) for all life stress events checked on the Recent Life Changes Questionnaire (RLCQ).

High Magnitude of Life Stress is life stress greater than a life crisis score of 300 LCU's measured on the Recent Life changes Questionnaire (RLCQ).

Low Magnitude of Life Stress is life stress less than a life crisis score of 300 LCU's measured on the Recent Life Changes Questionnaire (RLCQ).

Subjective Life Change Unit (SLCU) is an individual's own subjective estimation of the amount of adjustment required of his life stress events on a scale of 0 - 100 measured by the Recent Life Changes Questionnaire (RLCQ).

Appraisal of Adjustment to Life Stress is an individual's coping reserve where one's appraisal of life stress is compared to a norm. It is measured by comparing the total subjective estimation of adjustment to life stress events (SLCU) with the standard adjustment to life stress events (LCU) on the Recent Life Changes Questionnaire (RLCQ).

High Appraisal of Adjustment to Life Stress is a measure of low coping reserve where the subjective estimation of adjustment (SLCU) is higher than the total LCU score.

Low Appraisal of Adjustment to Life Stress is a measure of high coping reserve where subjective estimation of life stress events (SLCU) is lower than the total LCU score.

Change in Appraisal of Adjustment is a measure of change in coping reserve; a difference in subjective estimation of adjustment over time. It is measured by subtracting the sum of SLCU's observed at the end of the testing period from the SLCU's observed at the beginning of the testing period.

Conception is the union of the human sperm and ovum confirmed by a woman's self-report of positive pregnancy test and is measured by the Conception Information Form.

Delimitations

The sample was limited to white, middle class, females ages 21 - 35. These delimitations were based on the reported differential

in parity and abortion rates among various ages,[1] races,[2] and social classes.[3] In addition, women with chronic mental or physical diseases were excluded, since it has been reported that there is a greater frequency and severity of life stress events in a chronically ill population.[4] Variability in reporting of stress events has been associated with differing educational and intellectual levels.[5] Therefore, only women with at least a high school education were included in the sample.

Women using any contraceptive measure that is not coital-related such as oral contraception, sterilization or intrauterine devices (IUD) were eliminated. Vaughan and others demonstrated that women who use contraceptive measures during sexual intercourse are more likely to conceive than women who use contraceptive measures

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[1]James Lambert, "Survey of 3,000 Unwanted Pregnancies," British Medical Journal 4 (October 1971): 156-60.

[2]Robert F. Roberts and Eun Sul Lee, "Minority Group Status and Fertility Revisited," American Journal of Sociology 80 (September 1974): 503-23.

[3]Ibid.

[4]Allen R. Wyler, Minora Masuda, and Thomas H. Holmes, "Magnitude of Life Stress Events and Seriousness of Illness," Psychosomatic Medicine 33 (March-April 1971): 115-22.

[5]Richard H. Rahe et al., "Illness Prediction Studies," Archives of Environmental Health 25 (September 1972): 192-97; R. L. Casey, Minora Masuda, and Thomas H. Holmes, "Quantitative Study of Recall of Life Events," Journal of Psychosomatic Research 11 (August 1967): 239-47, and H. John Thurlow, "Illness in Relation to Life Situations and Sick-Role Tendency," Journal of Psychosomatic Research 15 (March 1971): 73-88.

that do not interfere with intercourse.[6] In addition, Wilcoxon, Schrader and Sherif report that women taking oral contraceptives were very variable in their reporting of stressful life events.[7]

Women who did not intend to conceive and who wanted to delay getting pregnant were included in the sample as well as those who intended to conceive. Several researchers suggested that intention to conceive is a powerful variable in determining whether or not women do conceive and whether or not contraceptive measures are effective.[8] However, it has been demonstrated that in spite of lack of intention, women will conceive especially while using coital-related contraceptive measures.[9] Also, women using coital-related contraceptive measures who want to delay conception are more likely to conceive than women who want to prevent conception altogether.[10]

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[6]Barbara Vaughan et al., "Contraceptive Failure Among Married Women in the United States, 1970-1973," Family Planning Perspectives 9 (November-December 1977): 251-58.

[7]Linda A. Wilcoxon, Susan L. Schrader, and Carolyn W. Sherif, "Daily Self-Reports of Activities, Life Stress Events, Moods and Somatic Changes During the Menstrual Cycle," Psychosomatic Medicine (November-December 1976): 399-417.

[8]Warren B. Miller, "Relationship Between the Intendedness of Conception and the Wantedness of Pregnancy," Journal of Nervous and Mental Diseases 159 (December 1974): 396-406; Warren B. Miller, "Psychological Vulnerability to Unwanted Pregnancy," Family Planning Perspectives 9 (Fall 1973): 199-201; Vaughan et al., "Contraceptive Failure," p. 253; Philip C. Sagi, Robert G. Potter, and Charles F. Westoff, "Contraceptive Effectiveness as a Function of Desired Family Size," Population Studies 15 (March 1962): 291-96 and Norman B. Ryder, "Contraceptive Failure in the United States," Family Planning Perspectives 5 (Summer 1973): 133-42.

[9]Miller, "Intendedness of Conception and Wantedness of Pregnancy," pp. 396-406 and Vaughan et al, "Contraceptive Failure," p. 258.

[10]Vaughan et al., "Contraceptive Failure," p. 253.

Summary of Related Literature and Theoretical Rationale

The literature demonstrated that major theorists and researchers have identified life stress as an antecedent of illness behavior.[11] In addition, research has demonstrated that not only life stress, but also several intervening variables mediate life stress and illness. The timing of life stress,[12] the permeability of psychological defenses,[13] the activation of physiological mechanisms,[14]

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[11]Walter B. Cannon, Bodily Change in Pain, Hunger, Fear and Rage (New York: Appleton-Century Crofts, 1967); Adolf Meyer, The Common-Sense Psychiatry of Dr. Adolf Meyer, Alfred Lief, ed., (New York: McGraw Hill Book Co., Inc., 1948), pp. 420-22; Harold G. Wolff, S. G. Wolff and C. C. Hare, eds., Life Stress and Bodily Disease (Baltimore: Williams and Wilkins, 1950), pp. 1059-94, and Hans Selye, The Stress of Life (New York: McGraw Hill Paperbacks, 1956).

[12]Richard H. Rahe et al., "Social Stress and Illness Onset," Journal of Psychosomatic Research 8 (July 1964); 34-44.

[13]Lawrence E. Hinkle and Harold G. Wolff, "Ecological Investigation of the Relationship Between Illness, Life Experiences and the Social Environment," Annals of Internal Medicine 49 (December 1958): 1373-88; Lawrence E. Hinkle et al., "The Distribution of Sickness Disability in a Homogeneous Group of 'Healthy Adult Men,'" American Journal of Hygiene 64 (September 1956): 220-42.

[14]Warren B. Miller and Ron Rosefeld, "A Psychophysiological Study of Denial Following Acute Myocardial Infarction," Journal of Psychosomatic Research 19 (February 1975): 43-50; Henry M. Fox et al., "Urinary 17-Hydroxycorticoid and Uropepsin Levels with Psychological Data: A Three Year Study with One Subject," Archives of Internal Medicine 101 (May 1958): 859-71; S. R. Hill et al., "Studies on Adrenalcortical and Psychological Responses to Stress in Man," Archives of Internal Medicine 97 (March 1956): 269-78, and Minora Masuda, Kenneth P. Perko, and Robert G. Johnston, "Physiological Activity and Illness History," Journal of Psychosomatic Research 16 (April 1972): 129-36.

and the utilization of coping reserves[15] have been identified as steps in the pathway. Furthermore, the sociological,[16] biological,[17] environmental,[18] and psychological[19] research on conception and fertility suggested that pregnancy, like illness is a function of

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[15]Gilberto de Araujo et al., "Life Change, Coping Ability and Chronic Intrinsic Asthma," Journal of Psychosomatic Research 17 (December 1973): 359-63; Donald L. Dudley et al., "Long Term Adjustment, Prognosis and Death in Irreversible Diffuse Obstructive Pulmonary Syndrome," Psychosomatic Medicine 31 (July-August 1969): 310, and Ulf Lundberg and Tores Theorell, "Scaling of Life Events in Three Diagnostic Categories," in Barbara S. Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effects (New York: John Wiley and Sons, 1974), pp. 30-37.

[16]Robert E. Roberts and Eun Sul Lee, "Minority Group Status and Fertility Revisited," American Journal of Sociology 80 (September 1974): 503-23; Aziz Bindary, Colin B. Baxter and T. H. Hollingsworth, "Urban and Rural Differences in the Relationship Between Women's Employment and Fertility: A Preliminary Study," Journal of Biosocial Science 5 (April 1973): 159-67; William B. Clifford, "Modern and Traditional Value Orientations and Fertility Behavior," Demography 8 (February 1971): 37-48; Marcus Felsom and Mauricio Solaun, "The Fertility-Inhibiting Effect of Crowded Apartment Living in a Tight Housing Market," American Journal of Sociology 80 (May 1975): 1410-29, and Arthur G. Neal and Theodore H. Groat, "Alienation Predictors of Differential Fertility," American Journal of Sociology 80 (March 1975): 122-26.

[17]Philip Cheifitz, N. Gaffud and Joseph F. Dingman, "Effects of Bilateral Adrenalectomy and Continuous Light on the Circadian Rhythm of Corticotropin in Female Rats," Endocrinology 82 (June 1968): 1117-24; H. H. Feder, K. Brown-Grant, and C. S. Corker, "Preovulatory Progesterone and Adrenal Cortex and the 'Critical Period' for Luteinizing Hormone Release in Rats," Journal of Endocrinology 50 (May 1971): 29-39, and Sheldon Kapen et al., "Episode Release of Luteinizing Hormone at Mid-Menstrual Cycle in Normal Adult Women," Journal of Clinical Endocrinology and Metabolism 42 (June 1976): 1031-40.

[18]A.S. Parkes, "Seasonal Variation in Human Sexual Activity," in J. M. Thodary and A. S. Parkes, eds., Genetic and Environmental Influences on Behavior (New York: Plenum Press, 1968): pp. 128-45 and Carl L. Erhardt, Frieda G. Nelson and Jean Pakter, "Seasonal Patterns of Conception in New York City," American Journal of Public Health 61 (November 1971): 2246-58.

[19]Miller, "Intendedness of Conception and the Wantedness of Pregnancy," pp. 396-406 and Miller, "Psychological Vulnerability," pp. 199-201.

the same pathway of life stress events. In an attempt to conceptualize the reproductive process, this investigator proposed that the same stress model that illustrates the pathway of life stress events and illness[20] be utilized in explaining the determinants of conception and subsequent pregnancy.

The first step along the pathway, the magnitude and timing of life stress events, has been demonstrated to occur not only with illness, but also with pregnancy.[21] That similar inferences can be made concerning life stress events and the incidence of conception was first demonstrated by Rahe and others. These researchers found that life stress events of high magnitude were not only temporally associated with serious illness but also with pregnancy. Also, they found serendipitously that life stress events not only occurred during pregnancy, but also were associated with the planning and timing of conception.[22] These findings were based solely on retrospective findings.

This investigator prospectively proposed that the temporal relationship of high magnitude of life stress events to the occurrence of conception is similar to the temporal relationship

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[20]Richard H. Rahe, "Pathway Between Subjects' Recent Life Changes and Their Near-Future Illness Reports," in Dohrenwend and Dohrenwend, eds., Stressful Life Events, pp. 74-79.

[21]Rahe, "Social Stress and Illness Onset," pp. 34-44.

[22]Ibid.

between life stress events and illness. It was proposed that conception, like illness, is a response to stress. Therefore, it was hypothesized that women with high magnitude of life stress will be more likely to conceive than women with low magnitude of life stress.

The findings of several investigators lended support to this hypothesis. Erhardt, Nelson and Pakter[23] and Parkes[24] demonstrated that the occurrence of marriages, vacations and holidays correspond to seasonal peaks in conception rates. Also, Miller found that maturational crises such as births and menopause increase the likelihood of unplanned and unwanted conception.[25] All these events were examples of life stress events considered collectively by Rahe in his investigation cited earlier on life stress events, disease and pregnancy.[26]

The second step along the pathway between life stress events and illness according to the Rahe model is the penetration of psychological defenses. Hinkle and others have demonstrated that

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[23]Erhardt, Nelson and Pakter, "Seasonal Patterns of Conception in New York," pp. 2246-58.

[24]Parkes, "Seasonal Variation," pp. 128-35.

[25]Miller, "Intendedness of Conception and the Wantedness of Pregnancy," pp. 396-406 and Miller, "Psychological Vulnerability," pp. 199-201.

[26]Rahe et al., "Social Stress and Illness Onset," pp. 34-44.

not only life stress events but those which are experienced as significant life stress events effect illness behavior.[27] Furthermore, the penetration of psychological defenses, the second step along the pathway is demonstrated by the activation of physiological mechanisms, the third step along the pathway.[28] Several investigators have demonstrated a correlation between physiological change and the penetration of defenses such as denial, repression and suppression.[29] Therefore, this investigator derived from the above literature that significant life stress events, events that penetrate psychological defenses, generate physiological change.

One's ability to cope with physiological activation is determined by one's coping reserves, the utilization of which is the next step in the pathway between life stress events and illness. Rahe states that individuals who appraise adjustment to life stress events higher than the norm have low coping reserves and those who rate adjustment to life stress events lower than the norm have high coping reserves.[30] Several investigators suggest that coping reserves

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[27]Hinkle and Wolff, "Ecological Investigation of Relationship Between Illness," pp. 1373-88 and Hinkle et al., "Distribution of Sickness Disability," pp. 220-24.

[28]Rahe, "Pathway Between Subjects' Recent Life Changes," pp. 75-76.

[29]Fox et al., "Urinary 17-Hydroxycorticoids and Uropepsin Levels with Psychological Data," pp. 859-871; Hil et al., "Adrenal Cortical and Psychological Responses to Stress," pp. 269-272, and Miller and Rosenfeld, "Psychophysiological Study of Denial," pp. 43-50.

[30]Rahe,"Recent Life Changes Questionnaire: 1974 Revision." (Mimeographed).

are depleted prior to the onset of illness.[31] Other studies demonstrate that coping reserves are increased following illness.[32]

This writer proposed that the change in coping reserves surrounding the experience of conception is similar to the change in coping reserves surrounding the experience of acute illness i.e., low coping reserves measured in high appraisal of adjustment occurs prior to conception and restoration of high coping reserves measured in low appraisal of adjustment occurs following conception. Therefore, it was hypothesized that women with high appraisal of adjustment to life stress would be more likely to conceive than women with low appraisal of adjustment to life stress. Furthermore, it was hypothesized that women who conceived would have a greater change in appraisal of adjustment from higher to lower following conception.

Hypotheses

In view of the above it was hypothesized that:

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[31] de Araujo et al., "Life Change, Coping Ability and Chronic Intrinsic Asthma," pp. 359-363; Holmes et al., "Experimental Study of Prognosis," pp. 235-252, and Dudley et al., "Long Term Adjustment, Prognosis and Death," pp. 310-325.

[32] Lundberg and Theorell, "Scaling of Life Events in Three Diagnostic Categories," pp. 110-112; Sullivan, Schizophrenia, pp. xi-xxiii, and Krahenbuhl and Remington, "Belligerent Blood Cells," pp. 52-59.

1. Women with a high magnitude of life stress are more likely to conceive than women with a low magnitude of life stress.

2. Women with a high appraisal of adjustment to life stress are more likely to conceive than women with a low appraisal of adjustment to life stress.

3. Women who conceived are more likely to have a change in appraisal of adjustment from higher to lower appraisal than women who did not conceive.

Significance of the Study

A current trend in parent-child health is to remove pregnancy from the illness category. Controversies over home delivery versus hospital delivery, self-help versus professional care, fetal monitoring versus nursing care and midwifery versus traditional obstetrical medical management are enthusiastically debated in the professional and public sectors.[33] Underlying these controversies are beliefs concerning whether or not pregnancy should be treated like illness. If it is like an illness, then professional practitioners, preferably

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[33]Boston Women's Health Book Collective, Our Bodies, Our Selves, (New York: Simon and Schuster, 1973), pp. 157-59; Ann L. Clark and Dyanne D. Affonso, "Legal, Moral and Ethical Considerations," in Ann L. Clark and Dyanne D. Affonso, eds., Childbearing: A Nursing Perspective (Philadelphia: F. A. Davis Co., 1976), pp. 877-79, and Florence Langhorne, "Fetal Monitor: A Friend or Foe?", American Journal of Maternal-Child Nursing 1 (September-October 1976), 313-14.

medical doctors, should "treat" pregnancy in a hospital where the availability of medical technology is assured and complications can be managed. If it is not an illness, then knowledgeable lay people or midwives can assist pregnancy and labor and delivery to its natural conclusion.

It was the purpose of this investigation to reconsider the similarities between pregnancy and illness. This investigator proposed that conception, the onset of pregnancy, like illness, is a response to life stress. By examining the appraisal of adjustment to life stress before and after conception, this researcher hoped to establish conception as a "constructive" way of dealing with life change.

The notion of illness as a "constructive" way of dealing with life change and physiological activation it arouses was not a new one. Selye cited that disease is a way of adapting to stress, the body's way of restoring homeostasis. He identified specific diseases of adaptation such as hypertension, peptic ulcer, and toxemia of pregnancy which activate the general adaptation syndrome.[34] This investigator proposed that all illness and bodily change including conception and pregnancy, regardless of its ability to activate the general adaptation syndrome, is a way of responding to stress.

To consider illness as a "constructive" way of dealing with life change is in the very tradition of nursing of which Florence

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[34]Hans Selye, The Stress of Life (New York: McGraw Hill Book Co., 1956), pp. 125-84.

Nightingale first spoke:

> Shall we begin by taking it as a general principle -- that all disease, at some period or other of its course, is more or less a reparative process, not necessarily accompanied with suffering; an effort of nature to remedy a process of poisoning or of decay, which has taken place weeks, months, sometimes years beforehand, unnoticed, the termination of the disease being then, while the antecedent process was going on, determined?[35]

This investigator proposed that any change in health status including conception and pregnancy can be substituted for "disease" in Nightingale's words. Like disease, conception and pregnancy were "reparative processes" that are not "necessarily accompanied by suffering" a response to events that have taken place "weeks, months, sometimes years beforehand."

Nightingale's words suggest, furthermore, that professional nursing address itself to diagnosing and treating people's responses to changes in the human condition rather than concentrating on the clinical manifestations of disease. What implications do the above notions regarding conception and pregnancy have for maternity care? The formulations of this study were expected to lend support to a professional nursing focus on the antecedents of the clinical course of pregnancy rather than on the clinical indicators themselves to which the practices of medicine and midwifery are directed. A

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[35]Florence Nightingale, Notes on Nursing: What it is and What it is Not (New York: Dover Publications, Inc., 1969), p. 7.

professional nurse, for example, would take an "historical" approach to family planning, adolescent pregnancy, infertility and the clinical course of pregnancy itself, while the physician and midwife would be involved in diagnosing and treating the "symptoms" of pregnancy.

The variables involved in the process of family planning, however, suggest that although birth control and abortion represent attempts to limit population growth and limit family size, they are not always effective. With contraceptive methods available to prevent conception in the first place, the question of why unwanted and unplanned pregnancies occur and are subsequently terminated is a provocative one. In addition to failure of contraceptive measures, unwanted pregnancies are viewed as a function of social class,[36] unconscious motivation,[37] neuroticism,[38] needs for approval,[39] deprivation,[40]

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[36]Roger W. Rochat, Carl W. Tyler, and Albert K. Schoenbucher, "An Epidemiological Analysis of Abortion in Georgia," American Journal of Public Health 61 (March 1971): 543-52.

[37]J. F. Pearson, "Pilot Study of Single Women Requesting a Legal Abortion," Journal of Biosocial Science 3 (October 1971): 417-48.

[38]Warren B. Miller, "The Psychological Antecedents of Conception Among Abortion Seekers," Western Journal of Medicine 122 (January 1975): 12-19.

[39]Georgiana M. Selslad, Jerome R. Evans and Wayne H. Welcher, "Predicting Contraceptive Use in Post Abortion Patients," American Journal of Public Health 65 (July 1975): 711-13.

[40]Charlotte Ingham and Madeline Simms "Study of Applicant for Abortion at the Royal Northern Hospital," Journal of Biosocial Science 4 (July 1972): 351-69.

family disharmony[41] and ignorance.[42] Furthermore, the failure of acceptable and frequently used contraceptive measures to prevent conception does not seem to be explained by social and motivational factors alone. Several researchers report that anywhere from 2 to 20 percent of women using safe, reliable contraceptive measures conceive.[43] The above findings suggest that birth control measures that prevent implantation or alter endocrine functioning are not always successful in preventing pregnancy. This investigator suggests that exploration of the antecedent life stress that occur prior to conception would be helpful in determining the women most susceptible to unwanted and unplanned conception.

Similarly, the problem of adolescent pregnancy baffles all parent-child health professionals. Pressner concludes that prevention of the first pregnancy is the key to prevention of subsequent fertility among young, poor black women.[44] If pregnancy is viewed as a "constructive"

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[41]Evelyn Hamil and I. M. Ingram, "Psychiatric and Social Factors in the Abortion Decision," British Medical Journal 1 (February 1974): 229-32.

[42]R. W. Beard, et al., "Kings Termination Study II: Contraceptive Practice Before and After Outpatient Termination of Pregnancy," British Medical Journal 1 (March 1974): 418-21.

[43]Yolande Luciere, "Factors Influencing Conception in Women Seeking Termination of Pregnancy," Medical Journal of Australia 1 (June 1975): 824-27; Vaughan et al., "Contraceptive Failure," pp. 251-58, and Ryder, "Contraceptive Failure," p. 133.

[44]Harriet B. Pressner, "The Timing of the First Birth, Female Role and Black Fertility," Millbank Memorial Fund Quarterly 49 (July 1971): 329-61.

response to life stress events, the problem of adolescent pregnancy is redefined. Pregnancy may serve the "constructive" function of consolidating identity in the face of the developmental crisis of adolescence. However, by confirming motherhood and childbearing as the focus of one's life, the adolescent mother is vulnerable to subsequent pregnancies and is limited in options and roles. To prevent life stress beyond the maturational crisis of adolescence itself and to explore and work through inevitable life stress with the potential pregnant adolescent is an appropriate focus given the above formulations.

Given the above, the problem of "psychogenic infertility" is redefined. Although the findings are inconsistent, they suggest that adoption may be causally related to subsequent conception in cases of "psychogenic infertility."[45] If adoption is viewed as life stress event, the findings may be a function of the magnitude and timing of this and other life stresses. If life stress is identified as a causative factor in the chain of events leading to conception, then the prescription of life stresses for infertile couples has therapeutic import.

Finally, the professional nursing focus on the antecedents of pregnancy suggests a redefinition of the clinical course of

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[45]Francois M. Mai, "Conception After Adoption: An Open Question," Psychosomatic Medicine 33 (November-December 1971): 509-14.

pregnancy. In parent-child nursing, it is convenient to conceptualize pregnancy to include three phases--antepartum, intrapartum and postpartum. Each of these phases are subdivided according to the physiological, anatomical and psychological events that are characteristic of that phase. If the formulations of this investigation are valid, then these three phases of pregnancy can be explored "historically" against the backdrop of significant life stress. For example, although it is expected that women will be ambivalent about being pregnant during the first trimester, it is important to consider her ambivalence against the backdrop of significant life stress that may have preceded her pregnancy. Her mixed feelings may be a response not only to the prospects of a new baby, but also to a new house, a new husband and a new mother-in-law. In other words, women who are pregnant sustain as much, if not more, life stress than anyone during any phase of life.

In conclusion, this investigator offered theoretical and practical considerations in answer to the controversies in parent-child health care. This author suggested that by considering conception and pregnancy as "constructive" responses to life stress, the territoriality of parent-child health care could be re-assessed. It was suggested that an "historical" approach to parent-child health care be the domain of professional nursing, the clinical course of pregnancy itself be the domain of midwives either lay or professional, and complications and disruptions of the pregnancy cycle remain the domain ofmedicine.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The present investigation explores the relationship between life stress events, the appraisal of adjustment to life stress events and the occurrence of conception. The following review of the literature presents a background from which hypotheses were developed.

Life Stress Events and Illness Behavior

In 1929 Cannon laid the theoretical foundation for the investigation of stress when he suggested a relationship between the major emotions and bodily change.[1] In the 1930's, Adolf Meyer attempted to systematize environmental causes of illness. Through the development of the "life chart," he incorporated into the etiology of disease the notion of environmental change including "changes of habitat, of school entrance, graduations or changes, or failures; the various jobs; the dates of possible important births and deaths in the family."[2]

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[1]Walter B. Cannon, Bodily Changes in Pain, Hunger, Fear and Rage (New York: Appleton-Century Crofts, 1967).

[2]Adolf Meyer, The Common-Sense Psychiatry of Dr. Adolf Meyer, ed., Alfred Lief (New York: McGraw Hill Book Co., Inc., 1948), pp. 420-22.

In 1949, Wolff summarized the findings of previous investigators and concluded that for an individual the significance of an event, temperament, past experience, characteristics of protective reactions, and the present situation are intervening variables in the relationship between life stress and bodily disease.[3] To this day, his conclusions are enthusiastically debated amid conflicting empirical findings.

In 1956, Selye defined stress as manifested by the General Adaptation Syndrome, a mechanism of pituitary-adrenal functioning. He concluded that stress was an integral part of life and that psychosomatic disease was the body's way of adapting.[4] Specific endocrine function was added to the list of intervening variables in the relationship between stress and disease.

As the above investigators suggest, the nature of the relationship between life stress events and illness behavior is a complex one that involves consideration of several intervening variables. In an attempt to conceptualize the pathway between life stress events and illness behavior, Rahe cites the timing of stressful events, the permeability of psychological defenses, the activation of physiological mechanisms and the utilization of coping

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[3]Harold G. Wolff, S. G. Wolf and C. C. Hare, eds., Life Stress and Bodily Disease (Baltimore: The Williams and Wilkins Co., 1950), pp. 1059-94.

[4]Hans Selye, The Stress of Life (New York: McGraw Hill Book Co., 1956; McGraw Hill Paperbacks, 1956).

reserves as the variables to be considered.[5]

Two years prior to disease onset, especially the previous six months, has been shown to be a critical period during which the occurrence of life stress events affects illness behavior.[6] Rahe and others investigated the relationship between the magnitude and timing of life stress events and the occurrence of particular diseases. They found that people with tuberculosis and cardiac disease revealed patterns of increasing social stress prior to their illnesses. In addition, pregnant women were similar to the above groups with respect to recent experiences also. They concluded that:

> both pregnancy samples revealed patterns of increasing social stress virtually identical to the disease group. Marriage appeared to make no difference in the magnitude of antecedent stress. This suggests that the changes observed may well play a role in determining the planning of or the susceptibility to conception and hence, the timing of pregnancy.[7]

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[5]Richard H. Rahe, "Pathway Between Subjects' Recent Life Changes and Their Near-Future Illness Reports: Representative Results and Methodological Issues," in Barbara S. Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effect (New York: John Wiley and Sons, 1974), pp. 74-79.

[6]Richard H. Rahe, John D. McKean and Ransom J. Arthur, "A Longitudinal Study of Life Change and Illness Patterns," Journal of Psychosomatic Research 10 (April 1967): 355-66; Richard H. Rahe and Thomas H. Holmes, "Social Psychologic and Psychophysiologic Aspects of Inguinal Hernia," Journal of Psychosomatic Research 8 (October 1965): 487-91, and Richard H. Rahe et al., "Subjects' Recent Life Changes and Coronary Heart Diseases in Finland," American Journal of Psychiatry 130 (November 1973): 1222-26.

[7]Richard H. Rahe et al., "Social Stress and Illness Onset," Journal of Psychosomatic Research 8 (July 1964): 34-44.

This serendipitous finding suggests that pregnancy, like illness, may be precipitated by stress.

The timing and magnitude of life stress events on the course and outcomes of pregnancy has been explored by several researchers with conflicting results. In her prospective investigation of the relationship between maternal stress and prematurity, Downs found that women with greater stressful occurrences had a greater incidence of low birth weight deliveries than those women without stressful occurrences.[8] Likewise, Gorsuch and Key prospectively found that life stress events in the second and third trimesters of pregnancy contributed to abnormalities in pregnancy and labor and delivery.[9] Conversely, Williams and others retrospectively found that women who delivered premature infants had no greater incidence in life stress events during pregnancy than women who delivered full term infants.[10] Differences in research designs, sample characteristics and reporting of significance of life stress events varied in the above studies.

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[8]Florence S. Downs, "An Investigation of Maternal Stress in Primigravidas As a Factor in the Production of Neonatal Pathology," (Ph.D. dissertation, New York University, 1964).

[9]Richard L. Gorsuch and Martha K. Key, "Abnormalities of Pregnancy as a Function of Anxiety and Life Stress," Psychosomatic Medicine 36 (July-August 1974): 352-62.

[10]Cindy C. Williams et al., "Pregnancy and Life Change," Journal of Psychosomatic Research 19 (April 1975): 123-29.

Downs investigated lower class clinic populations prospectively. On the other hand, Williams and others investigated a middle class population retrospectively. Only Downs considered the significance of the life stress events to the individual by interviewing subjects. The above findings suggest that the pathway between stress and illness is a complicated one requiring consideration of many intervening variables.

The second variable along the pathway between stress and illness, permeability of psychological defenses, has received widespread consideration in the literature. According to Rahe's scheme, life stress events are "filtered" as they encounter psychological defenses that deflect or transmit the meaning or significance of events.[11] Therefore, it is not life stress events alone that effect illness behavior, but significant life stress events.

Utilizing both prospective and retrospective designs extending over a twenty year period with samples of over a thousand, Hinkle and his associates began to investigate illness among people with both stable and catastrophic social environments. During his investigations of men and women career telephone operators,[12] blue collar workmen,[13]

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[11]Rahe, "Pathway Between Subjects Recent Life Changes," p. 74.

[12]Lawrence E. Hinkle and Harold G. Wolff, "Ecological Investigation of the Relationship Between Illness, Life Experiences and the Social Environment," Annals of Internal Medicine 49 (December 1958): 1373-88 and Lawrence E. Hinkle et al., "The Effect of Exposure to Culture Change, Social Change and Changes in Interpersonal Relationships on Health," in Barbara S. Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effects, (New York: John Wiley and Sons, 1974), pp. 30-37.

[13]Lawrence E. Hinkle et al., "The Distribution of Sickness Disability in a Homogeneous Group of 'Healthy Adult Men,'" American Journal of Hygiene 64 (September 1956): 220-42.

Chinese-born immigrants to New York City in the 1950's,[14] refugees of the Hungarian Revolution of 1956,[15] and American prisoners of war during the Korean conflict,[16] Hinkle observed that rather than being randomly distributed, illness was distributed in such a way that a few people had a great many disabling illnesses, some had a moderate number, many had very few and some had none. In addition, those who had the most disabling illnesses also had the greatest variety and the most days of disability. Likewise, those who had the least disability had less variety of disabling illnesses and fewer days of disability. Moreover, after careful examination of the extremes of occurrence, Hinkle concluded that in spite of major upheavals either social, interpersonal, or demographic, some people did not get ill. They appeared to have developed an "insulation" from the effects of drastic changes in their lives and did not consider these changes as very stressful. From these investigations,

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[14]Lawrence E. Hinkle et al., "Studies in Human Ecology, Facts Relevant to the Occurrence of Bodily Illness and Disturbances in Mood, Thought and Behavior in Three Homogeneous Population Groups," American Journal of Psychiatry 114 (September 1957): 212-20.

[15]Lawrence E. Hinkle et al., "Hungarian Refugees: Life Experiences and Features Influencing Participation in the Revolution and Subsequent Flight," American Journal of Psychiatry 116 (July 1959): 16-19.

[16]Lawrence E. Hinkle and Harold G. Wolff, "Communist Interrogation and Indoctrination of 'Enemies of the State': Analysis of Methods Used by the Communist State Police (A Special Report)," Archives of Neurology 76 (February 1956): 115-74.

Hinkle concluded that it is axiomatic that the individual's response to stress is a function of the personal meaning of the stressful event to the individual. Supporting this notion, Thurlow found that when exploring social change and illness experience, items related to subjective social change showed a stronger relationship to illness than did more objective social change items.[17]

Considering Rahe's theoretical formulations again, another intervening variable along the pathway of life stress events and illness, i.e.,physiological activation, needs to be considered. Physiological response is "proof of the pudding" that psychological defenses have been penetrated.[18] That physiological change is a function of the penetration of psychological defenses is suggested by Miller and Rosenfeld in their investigation of psychophysiological changes following myocardial infarction. These investigators compared cardiac enzyme levels, catecholamine secretion, anxiety and denial of ten patients through the first week following admission to a coronary care unit. These investigators found a negative correlation between plasma levels of total epinephrine and the patients' perception of the seriousness of his illness. With increasing secretion of this stress-related hormone secretion, there was decrease in perception

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[17]H. John Thurlow, "Illness in Relation to Life Situation and Sick-Role Tendency," Journal of Psychosomatic Research 15 (March 1971): 73-88.

[18]Rahe, "Pathway Between Subjects' Recent Life Changes," p. 75.

of seriousness of illness.[19]

Additional research[20] on the relationship between the strength of psychological defenses and physiological change suggest that increasing levels of 17-hydroxycorticosteroids and 17-ketosteroids, the by-products of adrenal cortical and adrenal medullary responses to stress, are related to the breakdown of defenses such as denial, suppression and repression. Several investigators suggest that not only the amount of physiological change but also the periodicity of physiological change may be related to the occurrence of illness behavior. Curtis suggests that the periodicity of endocrine secretion is the physiological "link in the chain of psychosomatic events mediating organic illness."[21] Masuda, Perko and Johnson found

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[19]Warren B. Miller and Ron Rosenfeld, "A Psychophysiological Study of Denial Following Acute Myocardial Infarction," Journal of Psychosomatic Research 19 (February 1975): 43-50.

[20]Henry M. Fox et al., "Urinary 17-Hydroxycorticoid and Uropepsin Levels with Psychological Data: A Three Year Study of One Subject," Archives of Internal Medicine 101 (May 1958): 854-71, Henry M. Fox, "Effect of Psychophysiological Research on the Transference," Journal of American Psychoanalytical Association 6 (July 1958): 413-32; S. R. Hill et al., "Studies on Adrenalcortical and Psychological Responses to Stress in Man," Archives of Internal Medicine 97 (March 1956): 269-70 and N. D. Rizzo et al., "Concurrent Observations of Behavior Changes and of Adrenocortical Variations in a Cyclothymic Patient During a Period of 12 months," Annals of Internal Medicine 97 (October 1954): 798-815.

[21]George C. Curtis, "Psychosomatics and Chronobiology: Possible Implications of Neuroendocrine Rhythms," Psychosomatic Medicine 34 (May-June 1972): 245.

a positive relationship between individual variability in excretion of a noradrenalin and the magnitude of illness history.[22] However, the urinary 17-ketosteroid level, but not its variability, was found to be related to illness history.[23] The above findings suggest that variability in adrenal medullary secretions (adrenalin and noradrenalin) employed in the "fight-or-flight" mechanism is related to illness. On the other hand, the levels of adrenal cortical secretions utilized daily in response to stress is related to the occurrence of illness.

The above formulation explains Hinkle's findings cited earlier that the people who sustain drastic environmental change appear to be insulated from environmental events and do not become ill. In these instances, psychological defenses have not been penetrated and, subsequently, physiological activation has not taken place.

The utilization of coping reserves represents still another variable along the pathway of life stress events and illness behavior. By coping, Rahe means "whether or not subjects successfully 'absorb' their physiological activation. If they cope successfully with their physiological activation symptoms cease."[24]

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[22]Minora Masuda, Kenneth P. Perko and Robert G. Johnson, "Physiological Activity and Illness History," Journal of Psychosomatic Research 16 (April 1972): 129-36.

[23]Ibid., p. 131.

[24]Rahe, "Pathway Between Subjects' Recent Life Changes," p. 79.

One method of measuring coping with physiological activation has been the Health Opinion Survey (HOS) which measures the degree of body symptom recognition.[25] Rahe and others prospectively compared the occurrence of life stress events with subjects' perception of bodily symptoms with symptomatology being highly correlated with high life stress events during the most recent previous six month interval.

Several investigators have explored the relationship between coping ability and morbidity in chronic illness. All of these investigators found a decrease in coping ability prior to exacerbation of illnesses such as chronic asthma,[26] pulmonary tuberculosis,[27] and emphysema.[28] Moreover, Holmes found that coping ability remained relatively constant over time in the case of chronic pulmonary tuberculosis patients.[29] From these findings it can be concluded that

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[25]Allister M. MacMillan, "Health Opinion Survey: Technique for Estimating Prevalence of Psychoneurotic and Related Types of Disorders in Communities," Psychological Reports 2 (June 1957): 325-39.

[26]Gilberto de Araujo et al., "Life Change, Coping Ability and Chronic Intrinsic Asthma," Journal of Psychosomatic Research 17 (December 1973): 359-63.

[27]Thomas T. Holmes et al., "Experimental Study of Prognosis," Journal of Psychosomatic Research 5 (October 1961): 235.

[28]Donald L. Dudley et al., "Long Term Adjustment, Prognosis and Death in Irreversible Diffuse Obstructive Pulmonary Syndromes," Psychosomatic Medicine 31 (July-August 1969): 310.

[29]Holmes et al., "Experimental Study of Prognosis," p. 235.

in the case of chronic illness, coping ability remains relatively constant decreasing insignificantly just prior to illness behavior.

Does coping ability remain constant prior to and after acute illness experience? The findings by Lundberg and Theorell suggest that coping ability may increase following acute myocardial infarction. These investigators found that patients sustaining myocardial infarction tended to rate adjustment to life stress events lower than healthy controls.[30] Following Rahe's scheme for determining "coping reserve," these patients following a myocardial infarction had higher coping reserves than normal healthy people. Unfortunately, this study did not provide prospective data of both pre and post-infarction appraisal of adjustment to life stress events.

A few clinical investigators have made the clinical observation that support the notion that coping with physiological activation may increase following acute illness. Sullivan observed that when acute adolescent schizophrenic patients were allowed to "work through" acute schizophrenic episodes as opposed to being treated with drugs and/or repressive therapy, coping ability was increased and chronicity was avoided.[31]

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[30]Ulf Lundberg and Tores Theorell, "Scaling of Life Events in Three Diagnostic Categories," in Tores Theorell, "Life Events Before and After the Onset of a Premature Myocardial Infarction," in Barbara S. Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effects (New York: John Wiley and Sons, 1974), pp. 110-12.

[31]Harry Stack Sullivan, Schizophrenia as a Human Process (New York: W. W. Norton, 1962), pp. xi-xxiii.

Similarly, at the turn of the century, before the advent of antibiotic therapy, a New York physician, William B. Coley found that when a patient with inoperable cancer developed an acute skin infection, his tumor decreased in size.[32] Subsequently, he injected cancer patients with extracts of mixed bacteria with inconsistent results.

Presently, this form of treatment is an avid preoccupation of cancer researchers.[33] It is suggested that by activating the immune mechanisms of the body, acute infectious illness actually increases a cancer patient's ability to cope with physiological activation. Findings remain inconsistent, however, amid the search for the antigen-specific organism for each cancer type. Perhaps the inconsistencies are a function of varied life stress events to which the cancer subjects are subjected.

Incidence of Conception

The factors related to fertility and conception are numerous and complex and have captured the interests of medical, social and biological scientists. For the purposes of this investigation, the biological, environmental, social and psychological antecedents of conception are considered.

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[32]James L. Krahenbuhl and Jack S. Remington, "Belligerent Blood Cells: Immunotherapy and Cancer," Human Nature 1 (January 1978): 52.

[33]Ibid., pp. 52-59.

Biological Antecedents of Conception

Conception is defined as the union of the sperm of the male and the ovum of the female. It is generally believed that fertilization takes place in the end of the fallopian tube. The sperm penetrates the ovum, where their pronuclei join and pregnancy is initiated.[34]

The timing of fertilization is intimately related to the timing of ovulation in the female. At the climax of the follicular phase of the menstrual cycle, luteinizing hormone (LH) which is secreted by the anterior lobe of the pituitary gland is released in a pulsating fashion at high levels for twenty-four hours. Within a few hours of this "LH surge" an ovum is released by the ovary. Thus, ovulation is accomplished and, within twenty-four to forty-eight hours, fertilization takes place.[35]

The timing of the "LH surge" has been a subject of a considerable amount of both animal and human research. Armstrong offers the hypothesis that adrenal steroids (perhaps progesterone) may be mediators of the effects of certain environmental factors (e.g., light schedule) upon the timing of LH secretion in rats.[36] Cheifitz found that the diurnal adrenal corticosterone secretion in rats reaches its

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[34]Ann L. Clark and Dyanne D. Affonso, Childbearing: A Nursing Perspective (Philadelphia: F. A. Davis Co., 1976), p. 141.

[35]Ibid., p. 142.

[36]David T. Armstrong and Thomas J. Kennedy, "Role of Luteinizing Hormone in the Regulation of the Rat Estrous Cycle," American Zoologist 12 (May 1972): 245-55.

nadir before dawn, begins to rise in the morning and reaches its peak later in the day.[37] Feder and others have shown that in rats, on the morning of proestrus (the period just prior to ovulation), peripheral plasma progesterone levels rise in parallel with the rising corticosterone levels. At the time of the "critical period" for the LH release, the increase in levels of progesterone and corticosterone diverge sharply, progesterone rising much faster and corticosterone leveling off.[38] Cheifitz found that if the circadian adrenal rhythm is interrupted, LH secretion and subsequently ovulation will not occur. Adrenalectomized rats placed in constant light did not secret LH unless exogenously administered progesterone.[39]

That this sequence of events will occur in humans is speculatory. Curtis cites that the diurnal excretion of 17-hydroxycorticosteroids, the urinary by-products of adrenal cortical secretion, have a similar diurnal rhythm in humans as corticosterone secretion has in rats.[40]

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[37]Philip Cheifitz, N. Gaffud and Joseph F. Dingman, "Effects of Bilateral Adrenalectomy and Continuous Light on the Circadian Rhythm of Corticotropin in Female Rats," Endocrinology 82 (June 1968): 1117-24.

[38]H. H. Feder, K. Brown-Grant, and C. S. Corker, "Preovulatory Progesterone and Adrenal Cortex and the 'Critical Period' for Luteinizing Hormone Release in Rats," Journal of Endocrinology 50 (May 1971): 29-39.

[39]Cheifitz et al., "Effects of Bilateral Adrenalectomy and Continuous Light on the Circadian Rhythm of Corticotropin in Female Rats," pp. 1117-24.

[40]Curtis, "Psychosomatics and Chronobiology," p. 245.

Also, Kapen and others examined the LH secretory patterns and sleep patterns of twelve normal adult women premenstrually and found that LH secretory patterns followed the patterns of rem and nonrem sleep. In addition, they found that in some of the subjects, the "LH surge" was likely to occur at the end of the sleep cycle.[41] This is analogous to the end of the proestrus cycle in rats. Also, Curtis cites that there is some evidence to support the notion that LH secretion in both men and women reaches its daily height just before awakening regardless of menstrual cycle phase.[42]

Given the similar patterns of adrenal cortical secretion in rats and humans and given the notion that the "LH surge" in rats is a function of environmental events such as sleep-wake cycles mediated by adrenal cortical secretions, it is logical to assume that the "LH surge" in the human female may also be a function of environmental events mediated by the adrenal cortex.

Environmental Antecedents of Conception

Examining the immediate environments of mice, several authors suggest that environmental stress may be associated with increased fertility. Paris and others found that after exposure

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[41]Sheldon Kapen et al., "Episodic Release of Luteinizing Hormone at Mid-Menstrual Cycle in Normal Adult Women," Journal of Clinical Endocrinology and Metabolism 42 (June 1976): 1031-40.

[42]Curtis, "Psychosomatics and Chronobiology," p. 243.

to heat and immobilization stress for one week, normal estrus female mice demonstrated a greater incidence of conception and increased litter size than either immature or aged females.[43] In a subsequent investigation, Paris and Ramaley attempted to explain their earlier findings and concluded that in mice under stress the presence of adrenal rhythm is associated with fertility and the absence of such a rhythm is correlated with infertility.[44] From these findings, it can be concluded that neuroendocrine rhythm regularity is a factor in the mediation of environmental and biological events in mice.

The seasonal influences on human conception and birth have been considered by two authors. In reviewing the seasonal patterns of conception from 1960-67 in New York City, Erhardt, Nelson, and Pakter found that conceptions (calculated from the date of last menstrual period) were most likely to occur in November and December regardless of pregnancy order, maternal age, ethnic group or hospital service, and they were least likely to occur during the spring and summer. He suggested that there was minimal support for the notion that the 20 percent increase in marriages during the summer months was a possible contributing factor.[45]

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[43]Allan Paris, Patrick Kelly and Judith A. Ramaley, "Effects of Short Term Stress Upon Fertility. II After Puberty," Fertility and Sterility 24 (July 1973): 540-45.

[44]Allen Paris and Judith A. Ramaley, "Adrenal-Gonadal Relations and Fertility: The Effects of Repeated Stress Upon the Adrenal Rhythm," Neuroendocrinology 15 (October 1974): 126-36.

[45]Carl L. Erhardt, Frieda G. Nelson and Jewn Pakter, "Seasonal Patterns of Conception in New York City," American Journal of Public Health 61 (November 1971): 2246-58.

Parkes examined the seasonal variation in fertility in the United Kingdom from 1956 through 1960 and found a large summer peak in conceptions and a smaller winter one.[46] He suggested that the seasonal variation was reminiscent of the one-time festivals celebrating the longest and shortest days of the year, the vestiges of which take the form today of summer vacations and Christmas and New Year holidays.

Although no clear seasonal variation in conception rates are apparent, the variables cited above--marriage, vacations and holidays--represent life stress events warranting a change in daily routine and adjustment to that change.

Social Antecedents of Conception

The commonly held notion that the rich get richer and the poor get babies has a considerable amount of empirical verification. World-wide, the poorer developing countries have a percentage decline in birth rates much lower than the developed countries over the past twenty-five years. For example, Bangladesh and Nigeria, developing countries, have a crude birth rate that has remained at 49.6/1000 population as opposed to the greatest percentage declining nation in the developed world, Finland, which has a current birth rate of 13.3/1000 population.[47]

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[46] A. S. Parkes, "Seasonal Variation in Human Sexual Activity," J. M. Thodary and A. S. Parkes, eds., Genetic and Environmental Influence on Behavior (New York: Plenum Press, 1968): pp. 128-45.

[47] W. Parker Maudlin, "Fertility Trends: 1950-1975," Family Planning Perspectives 7 (September 1976): 242-47.

The sociological antecedents of conception illustrate the difficulties in defining the nature and magnitude of environmental events as they relate to conception rates. Independently, several researchers found that poor, traditional, black, rural women are more likely to get pregnant than middle class, modern, white, urban women. These findings are consistent and hold up in both prospective and retrospective designs. However, the theoretical basis for causality suggest the same environmental antecedents for both an increase in fertility and a decrease in fertility. For example, Roberts and Lee,[48] Bindary, Baxter, and Hollingsworth,[49] and Clifford[50] demonstrated that the environmental stresses of poverty and social oppression lead to an increase in fertility. While Felsom and Solaun[51] suggested that the environmental stresses of crowded urban living lead to a decrease in fertility. This latter finding is consistent with animal research on crowding and fertility.[52] If environmental stress

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[48]Robert E. Roberts and Eun Sul Lee, "Minority Group Status and Fertility Revisited," American Journal of Sociology 80 (September 1974): 503-23.

[49]Aziz Bindary, Colin B. Baxter and T. H. Hollingsworth, "Urban-Rural Difference in Relationship Between Women's Employment and Fertility: A Preliminary Study," Journal of Biosocial Science 5 (April 1973): 159-67.

[50]William B. Clifford, "Modern and Traditional Value Orientations and Fertility Behavior," Demography 8 (February 1971): 37-48.

[51]Marcus Felsom and Mauricio Solaun, "The Fertility-Inhibiting Effects of Crowded Apartment Living in a Tight Housing Market," American Journal of Sociology 80 (May 1975): 1410-29.

[52]Edward T. Hall, The Hidden Dimension (New York: Doubleday Anchor Books, 1969), p. 19-44.

has been demonstrated to cause both an increase and a decrease in fertility, what in the nature of environmental stress accounts for this dual directionality?

Further examination of the above findings suggest that socioeconomic status is the most significant predictor of fertility. It is interesting to note that Neal and Groat found that with socioeconomic status and religion held constant, a sense of meaninglessness, social isolation, normlessness and powerlessness were predictors of high levels of fertility.[53] However, these very characteristics are often associated with poverty and social oppression. In addition, Felsom and Solaun found that with lower class families, decrease in available space did not lead to a decrease in fertility.[54] Therefore, it follows that the stresses of poverty and social oppression create a sense of meaningless and hopelessness which is associated with a high level of fertility regardless of available space.

Psychological and Interpersonal Antecedents of Conception

Motivational factors have been the most often cited psychological antecedents of conception. Miller examined the motivational factors along the life cycles of women in terms of intendedness and wantedness of conception. He found that women who "planned" or "intended" their

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[53]Arthur G. Neal and Theodore H. Groat, "Alienation Predictors of Differential Fertility," American Journal of Sociology 80 (March 1975): 1220-26.

[54]Felsom and Solaun, "The Fertility-Inhibiting Effect of Crowded Apartment Living," p. 1410.

pregnancies wanted their pregnancy more often than women who had an unplanned conception.[55] This finding is important considering that of a sample of under four hundred mothers, less than half planned or intended their pregnancies whereas, three fifths of their pregnancies were fully wanted. Considering these two variables of "intendedness" and "wantedness" in relation to conception during the life cycle of women, Miller noted four particularly vulnerable points when intendedness was likely to be low: the period around the time of marriage; the period immediately after the birth of the first child; the extended period beyond the first child; and, the period at the end of the childbearing age.[56] Although "intendedness" is low at these times, these four periods represent times that require considerable adjustment on the part of a woman and her family.

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[55]Warren B. Miller, "Relationship Between the Intendedness of Conception and Wantedness of Pregnancy," Journal of Nervous and Mental Diseases 159 (December 1974): 396-406 and Warren B. Miller "Psychological Vulnerability to Unwanted Pregnancy," Family Planning Perspective 5 (Fall 1973): 199-201.

[56]Ibid.

CHAPTER III

METHODOLOGY

The Sample

A sample consisting of 250 females who are alumni of Trenton State College, Trenton, New Jersey were used for this investigation. Permission was obtained from the executive board of the Nursing Alumni Association to utilize their mailing lists. The board unanimously agreed.

In November of 1978, questionnaires were mailed to two thousand (2000) alumnae of Trenton State College, Trenton, New Jersey. Beginning with the most recent graduating class, every third female name was systematically selected from a computerized mailing list until 2000 names and addresses were accumulated. In response to this first mailing, 631 (30%) of the alumnae completed and returned the questionnaires to the investigator. (See Table 1.)

In May of 1979, the 631 subjects who responsed to the first questionnaire received a follow-up questionnaire. In response to this second mailing, 512 (81%) of the questionnaires were returned (See Table 1.)

The first 250 women who returned questionnaires from both the November and May mailings and who satisfied the delimitations of the study were selected as subjects for this investigation.

All of the women were white, between the ages of 20 and 35. At the time of completion of the first questionnaire, 93 (37%) were

TABLE 1

RESPONSE TO SURVEY

Number of Questionnaires Mailed		Number Returned	Percent Returned
November 1978	2000	631	30%
May 1979	631	512	81%

married and 12 (4.6%) out of 250 (100%) had at least one child. In terms of socioeconomic status, 227 (90%) fell within the II-IV range.[1] All of the subjects were college graduates and most were working (81%) in minor professional or managerial positions.[2] Only 28 (11%) were not working outside the home with most women (71%) working daytime hours. Also, 147 (59%) of the subjects resided in a home that was owned by the head of household.(See Table 2.)

Only 20 (8.4%) of the sample reported minor health problems which included illnesses that were under the median rank order (63) on the Seriousness of Illness Rating Scale[3] (See Table 2.)

Of the 250 women chosen for study, 18 reported conceiving a child between November '78 and May '79. Of these 18 women, 8 reported planning their pregnancy and 2 reported using contraceptive measures at the time of conception.(See Table 3.)

The contraceptive measures used by these 250 women varied although they were all coitally-related. The most frequently used contraceptive measures were the condom (33.6%) and the diaphragm (32%). Over one third

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[1]Hollingshead,August B., "Two Factor Index of Social Position," Yale, New Haven, Connecticut, 1965. (Mimeographed.)

[2]Ibid. Occupation was categorized using Hollingshead's criteria.

[3]Allen R. Wyler, Minoru Masuda and Thomas H. Holmes, "Seriousness of Illness Rating Scale," Journal of Psychosomatic Research 11 (July 1968): pp. 363-68. In this study, both medical and non-medical people were asked to rank 126 common illnesses as to their seriousness. The median rank was for gonorrhea (63) with the highest rank (126) given to leukemia and the lowest (1) to dandruff.

TABLE 2

DESCRIPTION OF SAMPLE

DEMOGRAPHIC DATA (n = 250)

		Frequency	Percent
Age	20-21	9	(3.6)
	22-25	194	(77.6)
	26-30	34	(13.6)
	31-35	13	(6.2)
		250	(100)
Marital Status			
	Single-widowed-separated	157	(63)
	Married-living with someone	93	(37)
		250	(100)
Children			
	None	238	(95.2)
	One or more	12	(4.6)
		250	(100)
S.E.S.			
	I	12	(4.8)
	II	106	(42.4)
	III	61	(24.4)
	IV	60	(24.0)
	V	11	(4.4)
		250	(100)
Type of Residence			
	Own home or apartment	147	(59)
	Rent home or apartment	103	(41)
		250	(100)
Occupation			
	Professional or managerial	203	(81)
	Non-professional	47	(19)
		250	(100)
Job Hours			
	Daytime	177	(71)
	Variable	73	(29)
		250	(100)
Presently Working			
	Yes	222	(89)
	No	28	(11)
		250	(100)
Minor Health Problems			
	Yes	20	(8.4)
	No	230	(91.6)
		250	(100)

(37%) reported that they did not use any method of birth control. One half (47.2%) of the sample reported having sexual intercourse more frequently than once per week and one half (52.8%) reported having intercourse less frequently than once per week (see Table 3).

Intention to conceive varied depending on the time frame indicated. Only 23 (9%) reported wanting to have a child at present (Nov. '78). However, 234 (94%) reported that they would like to be pregnant at some time in their life (see Table 3).

Instruments

The Recent Life Changes Questionnaire

The Recent Life Change Questionnaire (RLCQ) was used to measure life stress events. This questionnaire is the 1974 revision of the Schedule of Recent Experiences originally devised in 1949.[4] Originally developed from interviews, it has been utilized with over 5000 subjects to determine the quality and quantity of life events as they cluster around disease onset.

From 1949 to the present the Schedule of Recent Experiences has been revised three times. From the Schedule of Recent Experiences, Holmes and Rahe formalized and attempted to rank order the magnitude of life stress events and developed the Social Readjustment Rating Scale

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[4]Richard H. Rahe, "Recent Life Changes Questionnaire: 1974 Revision," Department of the Navy, Naval Health Research Center, San Diego, California. Mimeographed material.

TABLE 3

DESCRIPTION OF SAMPLE

CONCEPTION RELATED INFORMATION

	Yes Frequency(%)	No Frequency(%)	Total
Conceptions (n = 250) between November 1978 and May 1979	18(7.2)	232(92.8)	250
Planned Pregnancy?	8(44.4)	10(55.6)	18
Using B.C. measures at time of concept.?	2(11.1)	16(88.9)	18
Use of Contraceptive Measures (n = 250)			
Diaphragm	81(32)	169(67.6)	250
Rhythm	45(18)	205(82.0)	250
Billings	9(3.6)	241(96)	250
Condom	84(33.6)	166(66.4)	250
Rhythm and Condom	28(11)	222(89)	250
Rhythm and Billings	6(2)	244(98)	250
None	92(37)	158(63)	250
Other	33(13)	217(87)	250
Do you want to be pregnant now?	23(9)	227(91)	250
Do you want to be pregnant in near future?	59(24)	191(76)	250
Do you want to be pregnant ever?	234(94)	16(6)	250

Frequency of Sexual Intercourse	
Less than once/week	132(52.8%)
Greater than once/week	118(47.2%)
	250(100%)

in 1964.[5] From 1965-1968, Rahe adjusted the items on this scale for use with military populations.[6] In addition, this version has been translated into Scandinavian and has been utilized for study with patients sustaining myocardia infarction.[7] Finally, as a result of validity and reliability work, the Schedule of Recent Experiences has been revised as the Recent Life Change Questionnaire which was utilized in this study.

Validity and Reliability of Instrument

The original Social Readjustment Rating Scale consisted of 43 items "evolving usually from ordinary, but sometimes from extraordinary, social and interpersonal transactions. These events pertain to major areas of dynamic significance in the social structure of the American way of life. These include family constellation, marriage, occupation, economics, residence, group and peer relationships, education, religion, recreation and health."[8]

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[5]Thomas H. Holmes and Richard H. Rahe, "The Social Readjustment Rating Scale," Journal of Psychosomatic Research 11 (August 1967): 213-18.

[6]Richard H. Rahe, John D. McKean and Ransom J. Arthur, "A Longitudinal Study of Life Change and Illness Patterns," Journal of Psychosomatic Research 10 (April 1967): 355-66.

[7]Tores Theorell and Richard H. Rahe, "Psychosocial Factors and Myocardial Infarction I. An Inpatient Study in Sweden," Journal of Psychosomatic Research 15 (March 1971): 355-66.

[8]Holmes and Rahe, "The Social Readjustment Rating Scale," pp. 214-15.

Originally, these items were rated by a sample of convenience of 394 subjects as a paper-and-pencil test. Subjects rated items as to the amount of readjustment required regardless of meaning or social desirability on a scale of 0-1000. A median score of 500 was pre-assigned to "marriage" and subjects were asked to rate all items above or below this median. From the responses of all 394 subjects, a mean score for each item was determined. Then, this mean score was divided by 10 and arranged in rank order.[9]

The consensus as to the relative order and magnitude of these mean scores has been studied exhaustively. From all the reliability estimates reported, there is variability from as high as .90 to as low as .26. Across different age groups, coefficients of .90,[10] .97,[11] and .89[12] have been reported; across different races coefficients of .82;[13]

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[9]Ibid., p. 216.

[10]Ibid., p. 215.

[11]S. Pasley, "The Social Readjustment Rating Scale: A Study of the Significance of Life Events in Age Groups Ranging from College Freshman to Seventh Grade," as part of Tutorial in Psychology, Chatham College, Pittsburgh, 1969 reported in Dohrenwend and Dohrenwend, eds., Stressful Life Events: Their Nature and Effects (New York: John Wiley and Sons, 1974): p. 53.

[12]Rahe, "The Pathway Between Subjects' Recent Life Changes and Their Near-Future Illness Reports," in Dohrenwend and Dohrenwend, eds., Stressful Live Events: Their Nature and Effects, p. 82.

[13]Holmes and Rahe, "The Social Readjustment Rating Scale," pp. 213-18.

across different cultures from .735 to .89;[14] across different educational and professional levels correlations of .26 to .90;[15] between time intervals of test administration correlations of .90 for 2 weeks to .26 for 2 years,[16] and for different time intervals over which life changes are summed, from .55 for 6 month intervals to .61 for 12 month intervals.[17]

Concerning the above, the major sources of variability are related to educational and professional levels of respondents, i.e., the facilitating skills that the respondents bring with them to the test situation. In view of this finding, the educational and professional levels of all subjects were comparable.

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[14]Minora Masuda and Thomas H. Holmes, "The Social Readjustment Rating Scale: A Cross-Cultural Study of Japanese and Americans," Journal of Psychosomatic Research 11 (August 1967): 227-37; Richard H. Rahe et al., "The Social Readjustment Rating Scale: A Comparative Study of Swedes and Americans," Journal of Psychosomatic Research 15 (September 1971): 241-49; David K. Harmon, Minora Masuda and Thomas H. Holmes, "The Social Readjustment Rating Scale: A Cross-Cultural Study of Western Europeans and Americans," Journal of Psychosomatic Research 14 (December 1970): 391-400, and A. Komaroff, Minora Masuda and Thomas H. Holmes, "The Social Readjustment Rating Scale: A Comparative Study of Negro, Mexican and White Americans," Journal of Psychosomatic Research 12 (August 1968): 121-28.

[15]R. L. Casey, Minora Masuda, and Thomas H. Holmes, Quantitative Study of the Recall of Life Events," Journal of Psychosomatic Research 11 (August 1967): 239-47 and Richard H. Rahe et al., "Illness Prediction Studies," Archives of Environmental Health 25 (September 1972): 192-97.

[16]Casey, et al., "Quantitative Study," pp. 239-47.

[17]Blair W. McDonald et al., "Reliability of Life Change Cluster Scores," British Journal of Social and Clinical Psychology 11 (December 1972): 407-409.

Also, the length of time between test and retest was considered. Casey and others[18] reported a decrease in reliability of .90 on retest after 2 weeks, .64 and .74 on retest after 8 months, .52 and .61 on retest after 10 months and .26 on retest after 2 years. In view of Casey's findings, the retest period of six months proposed in this investigation insured a reliability of at least .52 to .74.

In addition, the time interval over which items are being summed has specific implications for this investigation. Casey and others found that following test-retest with an intervening period of nine months a correlation of .744 was obtained between 55 subjects' recall of life stress events summed over a one year period.[19] Also, McDonald found a correlation of .61 between recall of events of 88 subjects on initial testing and retest at six months for a one year period.[20] McDonald also found a greater reliability when events were summed over a one year period than when events were summed over 6 month intervals.[21] In view of the above, this investigator collapsed the two time periods of "0-6 months" and "7-12 months" into "1 year" and "13-18 months" and "19-24 months" into "2 years" on the RLCQ (see Appendix 1).

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[18]Casey et al., "Quantitative Study," pp. 239-47.

[19]Ibid., pp. 239-47.

[20]McDonald et al., "Reliability of Life Change," p. 408.

[21]Ibid.

Since change in appraisal of adjustment to life stress events between the time of initial testing and retest after six months, the original RLCQ which respondents answered at the time of initial testing was re-administered. After six months, respondents were asked to reappraise adjustment to the life events they experienced at the time of initial investigation.

The most recent version of the Recent Life Changes Questionnaire included 14 items for which no standard Life Change Units were available. In an attempt to establish standard weights for these items, this investigator asked 76 undergraduate nursing students at Trenton State College to indicate on a scale of 0-1000 how much adjustment most people would think these 14 events required (See Appendix 3.)

These 76 respondents were between the ages of 20 and 35, white, middle-class. The majority (84%) were single and 5 (7%) reported the existence of chronic health problems. All denied being pregnant at the time and 5 (7%) reported using birth control pills.

Each score was divided by ten (10) and the mean and standard deviation of each score was computed for all 14 items (see Table 4). If the comparison of these measures yielded a significant correlation, it could be concluded that these weights were a reliable estimate of standard adjustment. Using this scaling method, it would be expected that with increasing magnitude of scores, there would be increasing variability.[22] The Pearson Product-Moment Correlation (r = .332) was

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[22]See page 56 below for discussion of scale of magnitude estimation.

TABLE 4

COMPARISON OF MEANS AND STANDARD DEVIATIONS

OF 14 UNWEIGHTED ITEMS (n = 14)

Item No.	Item	Mean	S.D.
5	Major Dental Work	28	21.8
13	Taking Courses by mail or in spare time	19.4	17.0
21A	Divorce of Parents	71.3	19.3
21B	Remarriage of Parents	65.9	20.4
32	Miscarriage or Abortion	69.2	19.8
33	Birth of Grandchild	35.7	19.9
44	Change in political beliefs	21.6	16.4
45	New Close Personal Relationship	41.1	17.6
46	Engagement to Marry	50.5	19.4
47	A "falling-out" of a close personal relationship	65.7	23.0
48	Boyfriend problems	49.8	22.5
49	A loss or damage of personal property	44.1	25.5
50	An accident	61.2	22.5
51	Major decision regarding immediate future	56.0	17.4

$r = .332$, 12 df, $p \neq .05$

not significant, however. Since the correlation of the geometric mean and its standard error has been used in the past as a test of reliability, the use of the arithmetic mean and its standard deviation yielded scores that are inflated. For the purpose of this investigation, it was concluded that until further validity and reliability work can be done, these items were deleted from the determination of magnitude of life stress, appraisal of adjustment to life stress and total reappraisal of adjustment.

Although the data suggests that variability in weighting of life stress events does not depend on age, the majority of research has been done on older populations generally believed to be more susceptible not only to chronic illness, but also to heavily weighted life stress events such as death of a spouse, loss of job, change in residence, etc. Although younger aged groups may agree with adults as to the weighting and ordering of life stress events, their actual experience with heavily weighted items has been different than adults. Primarily from studies of military populations where the majority of subjects were young single men, Rahe has found that there is very little difference in the weights of events that these subjects report experiencing. On the basis of these findings, Rahe has suggested that a Simple Unit Scoring Method where each life event is ascribed a value of 1 be utilized with younger aged subjects. Comparison of Life Change Unit Scores and Simple Unit Scores has yielded correlation of .89.[23] However, Rahe

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[23]Rahe, "Pathway Between Subjects," p. 82.

TABLE 5

COMPARISON OF NUMBER AND MAGNITUDE OF LIFE STRESS EVENTS FOR 14 WOMEN OF CHILDBEARING AGE

X	Sum of Events	Sum of LCU*
1	9	120
2	6	153
3	11	175
4	8	254
5	27	433
6	20	183
7	42	235
8	16	277
9	22	284
10	18	421
11	11	285
12	22	398
13	27	356
14	37	585
Mean	20	297
S.D.	10	128

r = .55, 12 df, p .05

*See Appendix for weights.

has reported that women of childbearing age experience life stress events equal in magnitude to events experienced by an older population sustaining serious illness.[24]

How are the above inconsistencies explained? This investigator proposes that women of childbearing age sustain more life stress experiences than single men in a stable, controlled military environment. In order to determine the appropriateness of the scaling method for women of childbearing age, this investigator administered the RLCQ and the General Information Questionnaire to 14 graduate nurses in the Registered Nurse Program at Trenton State College. (See Appendix 1.) Subjects were asked to complete the General Information Questionnaire, check which life events they experienced over the time periods indicated, and rate the reported events on a scale of 0-100. The test was administered prior to regularly scheduled class. From the General Information Questionnaire, it was determined that the subjects met the delimitation established for this investigation. They were all white, middle-class and of childbearing age. None of the subjects were using oral contraceptive measures. Three were using a coitally-related contraceptive measure (IUD). None of the subjects reported being pregnant at the time of testing.

A comparison of the sum of life stress events reported and the sum of the Life Change Unit Scores for events was made. A Pearson Product-Moment Correlation of .55 was obtained which was significant at .05 level. (See Table 5.)

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[24]Rahe et al., "Social Stress and Illness Onset," p. 43.

It is concluded, therefore, that the number of life change units experienced by the respondents increased with the magnitude of events. Rahe, however, reported a much higher correlation of .89, suggesting that women of childbearing age have slightly more life stress events and these are of higher magnitude than single, military enlisted men of similar age.

In view of the above, the life change unit method of scoring was retained in this investigation. Magnitude rather than number of life stress events was measured.

The data on the content validity of the Schedule of Recent Experiences suggests that information obtained by questionnaire is as valid as an interview as to subjects' recent life change experience. When interviewers probed into respondents' answers, they found that subjects rarely, if ever, listed life stress events which they had not experienced. For example, Rahe et al. compared the responses of their spouses who answered the questionnaire "as if" they were the patients. They found an inter-pair correlation of between .50 and .75 suggesting that patients don't report events that do not happen to them.[25]

The validity of recall of life stress events was indirectly measured by Casey and others. These investigators used the Schedule of Recent Experiences to demonstrate that consistency of recall is

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[25]Richard H. Rahe, "Finnish Subjects' Recent Life Changes, Myocardial Infarction, and Abrupt Coronary Death," Unit Report 72-40, U. S. Navy Medical Neuropsychiatric Research Unit, San Diego, California, 1973.

related to the saliency of life events. The data suggested that if the event is important to the individual, it will be recalled consistently and indirectly reflect validity of recall. The Schedule of Recent Experiences was administered to 55 subjects twice, the second administration occurring nine months after the first. The stability coefficients were significant at .005 level. Although number of events recalled decreased over time, that which was recalled was consistent with amount recalled beginning after the first year.[26]

Appraisal of Adjustment to Life Stress Events

In the three revisions of the original Schedule of Recent Experiences leading to the RLCQ, the greatest change involved the inclusion of the Subjective Life Change Unit Scaling System (SLCU method). The Schedule of Recent Experiences originally asked respondents to indicate whether or not an event on the scale occurred. The events had been pre-assigned weights (Life Change Units) based on the consensus of ratings obtained on the Social Readjustment Rating Scale. The weight was determined, as stated earlier, by subjects estimating the amount of adjustment required of each event on the scale from 0-1000 (later changed from 0-100). Most of the reliability coefficients reported above involved determining the consistency of magnitude estimation of these events.

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[26]Casey et al., "Quantitative Study of Recall," pp. 239-47.

The Subjective Life Change Unit Scaling system asks respondents not only to indicate whether or not they have experienced an event, but to go back and rate their own experiences on a scale of 0-100.[27]

The retrospective nature of most research designs prohibited this type of rating. People who had already experienced illness were the subjects of most early investigations. It was considered that illness would influence the significance of life stress events such that it could not be determined whether the magnitude of life stress was caused by illness or whether illness caused increased magnitude estimations. By comparing incidence of occurrence of life stress events in a "sick" population with a standard for which there was a social consensus, the effect of illness on appraisal of adjustment was controlled.[28] The revised Recent Life Change Questionnaire including the Subjective Appraisal of Adjustment is more appropriate for prospective designs of which this study is an example.

Scale of Magnitude Estimation

Most of the research in the behavioral sciences utilizes scaling methods that are of the nominal, ordinal or interval variety. The type of scale utilized in the Recent Life Changes Questionnaire, however,

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[27]Richard H. Rahe, "Recent Life Changes Questionnaire: 1974 Revision," Unpublished material, Department of the Navy, Naval Health Research Center, San Diego, California.

[28]Ibid.

is a ratio scale. Respondents are asked to rate items in terms of a modular stimulus, marriage with a pre-assigned weight of 50, on a scale of 0-100. In other words, in measurement terms, respondents are asked to convert ordinal or internal information into a ratio scale. They are asked to treat estimation of psychological magnitude of adjustment "as if" magnitude estimations could be subjected to arithmetic operations such as addition and subtraction.

The basic assumptions underlying this type of measurement is taken from the field of psychophysics where it is assumed that magnitude estimation of psychological phenomena can be measured on the same type of scale as magnitude estimation of physical phenomena such as height and weight.[29]

When evaluating the magnitude estimation of appraisal of adjustment, it is important to consider to what extent the magnitude estimation meets the requirements of a ratio scale. Although the range of the scale and the modular stimulus are specified as Stevens recommends,[30] the additivity of magnitude estimations are not clearly linear. For example, it cannot be stated that "death of a spouse" with a LCU score of 100 requires twice as much adjustment as "marriage" with an LCU score of 50.

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[29]Stanley Smith Stevens, "A Metric for the Social Consensus," Science 151 (February 1966): 530.

[30]George A. Gescheider, Psychophysics: Method and Theory (New York: Halsted Press, John Wiley and Sons, 1976): pp. 117-18.

Instead of a linear relationship, a geometric relationship exists between stimuli and their magnitude estimations. Stevens states that magnitude estimations for sensory dimensions increase by some power exponent.[31]

The RLCQ asks for magnitude estimation of appraisal of adjustment of life stress events that are non-metric, nominal continua. Events such as "death of a spouse," "marriage," "vacations" and "holidays" cannot be arranged in any ordinal or interval fashion. Stevens suggests, however, that a power function can be indirectly determined by considering the ratio of variability to magnitude of appraisal of adjustment scores. Following Ekman's Law where variability in scores is a function of magnitude of scores,[32] Masuda and Holmes determined the geometric mean of assigned weights to life stress events and compared this to the standard error of the geometric mean.[33]

The use of the geometric mean rather than the arithmetic mean takes into account the ratio of magnitude and variability which Ekman's Law suggests. Between the geometric mean and its standard error, Masuda and Holmes found a linear relationship of .955. In other words, as magnitude estimation increased so did variability increase. Therefore,

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[31]Ibid., pp. 86-87.

[32]Ibid., p. 160.

[33]Minora Masuda and Thomas H. Holmes, "Magnitude Estimations of Social Readjustments," Journal of Psychosomatic Research 11 (August 1967): 219-25.

although it cannot be said that magnitude estimation of appraisal of adjustment of 100 is twice the score of 50, it can be said that the variability of a score of 100 is twice the variability of a score of 50.

Paykel and others were unable to replicate these findings.[34] In her preliminary investigation cited earlier this investigator was unable to support the validity of magnitude estimation either. However, estimation of variability did not take into account the geometric mean or its standard error in either case.

The findings by Masuda and Holmes speak to the validity and reliability of magnitude estimation of appraisal of adjustment when the geometric mean and its standard error are considered.

Research Design

The type of design utilized in this investigation is a prospective one with observations at beginning and end of 6 month interval.

Subjects were mailed a letter of introduction, the General Information Questionnaire, the Recent Life Changes Questionnaire I and a letter of agreement. (See Appendix 1.)

They were asked to complete all questionnaires and return them to the investigator.

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[34]Eugene S. Paykel, Brigitte A. Prusoff, and E. H. Uhlenhuth, "Scaling of Life Events," Archives of General Psychiatry 25 (October 1971): 340-47.

When the questionnaires are returned, this investigator included in her sample those subjects who met the delimitations of the investigation. These subjects were subsequently evaluated at the end of a six month period. The beginning and end of the "six month interval" was determined by the postmark on the mailed questionnaires.

At the end of the six month interval, the life stress events that the respondents checked on the RLCQ I were entered by the investigator on the RLCQ II. (See Appendix 2.) With the adjustment score column left blank, the RLCQ II was returned to the respondents who then re-rated their adjustment to the previously sustained and previously appraised life stress events. At this time respondents were also asked to check and appraise any life stress events that they sustained during the intervening six month interval. Also, respondents were asked to complete the Conception Information Form (see Appendix 2) and return it along with the RLCQ II to this investigator.

Determination of Sample Size and Choice of Statistics

Since reported birth rate for 1975 in the state of New Jersey was 12.3/1000 population,[35] it is appropriate to assume that the "effect size" in the general population is small. When an investigator is dealing with proportions or dichotomous variable, Cohen states that

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[35]New Jersey State Department of Health, New Jersey Health Statistics, 1975 (Trenton, N.J.), p. 72.

determination of "effect size" must be done "intuitively" on the basis of what the investigator expects to find in a given population.[36] Concerning the expected effect size of conception in the state of New Jersey, interpolation of reported statistics of birth rate controlling for age, sex and race of the population yields a birth rate of 85.2/1000 (21/250) white females between the ages of 20 and 34.[37]

The N needed to get a desired effect size by chi-square analysis at .05 level of significance with 1 degree of freedom at a power of .95 is 250.[38] A power of .95 will increase the probability that the hypothesized results will show up on statistical analysis. An N of 250 would ensure an expected frequency of at least 9 for all cells in a 2 x 2 chi-square contingency table.

The variables under investigation for each hypothesis were both continuous and dichotomous. The "occurrence of conception" was dichotomous and "magnitude" and "appraisal of adjustment" to life stress were continuous. Since one variable was dichotomous, nonparametric statistics were utilized. For the purposes of this investigation the "magnitude of life stress" and "appraisal of adjustment to life stress" was artificially dichotomized into "high magnitude, low magnitude" and

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[36] Jacob Cohen, Statistical Power Analysis for the Behavioral Sciences (New York: Academic Press, 1969), p. 218.

[37] New Jersey State Department of Health, New Jersey Health Statistics...., p. 28.

[38] Cohen, Statistical Power Analysis..., p. 252.

"high appraisal, low appraisal" respectively.[39] With this artificial dichotomy, the ratio data obtained from the RLCQ was converted into nominal data for purposes of chi-square analysis. For analysis of ancillary findings, the continuous variables in this investigation were not dichotomized and parametric statistical procedures were employed.

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[39]Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw Hill Book Co., 1956), pp. 22-23 and James Popham and Kenneth A. Sirotnik, Educational Statistics: Use and Interpretation (New York: Harper and Row, 1973), pp. 268-272.

CHAPTER IV

ANALYSIS OF DATA

The data from two hundred and fifty (250) respondents who completed the Recent Life Changes Questionnaires I and II, the General Information Questionnaire, and the Conception Information Form was prepared for computer analysis utilizing the Statistical Package for the Social Sciences (SPSS) manual.

Since non-parametric statistical procedures were employed to test the hypotheses, no assumptions were held regarding the distribution of scores on the measures of magnitude of life stress, appraisal of adjustment to life stress or change in appraisal of adjustment to life stress. The only assumption that was made was that the groups or categories utilized in each analysis be mutually exclusive.[1]

Since the measure of magnitude of life stress, however, was a continuous measure that was dichotomized into two groups measuring "high" and "low" magnitude, the predetermined line of demarcation of 300 LCU's was evaluated for its resemblance to the sample population. The mean and standard deviation of the magnitude of life stress reported in the sample (N = 14) used above[2] to test for the reliability of the

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[1]Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw Hill Book Co., 1956), pp. 2-3, 31.

[2]See p.52, Table 5, Comparison of Number and Magnitude of Life Stress Events for 14 Women of Childbearing Age.

TABLE 6

COMPARISON OF MEANS AND STANDARD DEVIATIONS OF TOTAL MAGNITUDE OF LIFE STRESS OF SAMPLE FOR PRELIMINARY INVESTIGATION AND TOTAL SAMPLE

Group	Mean LCU	Standard Deviation
Preliminary Investigation (N = 14)	297	128
Total Sample (N = 250)	361	158

TABLE 7

DISTRIBUTION OF SCORES ON MEASURES OF MAGNITUDE

OF LIFE STRESS AND APPRAISAL OF ADJUSTMENT OF LIFE STRESS

(N = 250)

Measures of Life Stress	Mean	S.D.	Range	Skewness
Magnitude of Life Stress	361	158	969	0.4
Appraisal of Adjustment to Life Stress (November 1978)	580	441	4508	3.1
Re appraisal of Adjustment to Life Stress (May 1979)	620	373	2308	0.8

instrument was compared with the mean and standard deviation of the total sample (N = 250) used to test the hypotheses. (See Tables 6,7.) Since the means and standard deviations were comparable, it was decided to use 300 LCU's as an appropriate point of demarcation of "high" and "low" magnitude of life stress.

Hypothesis I

It was hypothesized that:

> Women with a high magnitude of life stress would be more likely to conceive than women with a low magnitude of life stress.

This hypothesis was not supported. (See Table 8.)

Hypothesis II

It was hypothesized that:

> Women with a high appraisal of adjustment to life stress would be more likely to conceive than women with a low appraisal of adjustment to life stress.

This hypothesis was not supported. (See Table 9.)

Hypothesis III

It was hypothesized that:

> Women who conceived would be more likely to have a change in appraisal of adjustment from higher to lower appraisal than women who did not conceive.

This hypothesis was not supported. (See Table 10.)

TABLE

HYPOTHESIS I

CHI-SQUARE ANALYSIS OF THE DIFFERENCE BETWEEN PREGNANT AND NON-PREGNANT GROUPS AND HIGH AND LOW MAGNITUDE OF LIFE STRESS (N = 250)

	Low Magnitude of Life Stress		High Magnitude of Life Stress		Row Totals
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	
Pregnant Women (conceived within intervening 6 months)	6.1	7	11.8	11	18
Non-pregnant Women (did not conceive in intervening 6 months)	78.8	78	153.1	154	232
Column Totals		85 (34.0%)		165 (66.0%)	250

Chi-square = 0.20, 1 df, p = 0.64, N.S.

TABLE 9

HYPOTHESIS II

CHI-SQUARE ANALYSIS OF THE DIFFERENCE BETWEEN PREGNANT AND NON-PREGNANT GROUPS AND HIGH AND LOW APPRAISAL OF ADJUSTMENT TO LIFE STRESS (N = 250)

	Low Appraisal of Adjustment to Life Stress (High Coping Reserve)		High Appraisal of Adjustment to Life Stress (Low Coping Reserve)		Row Totals
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	
Pregnant Women (conceived within intervening 6 months)	2.5	5	15.4	13	18 (7.2%)
Non-pregnant Women (did not conceive within intervening 6 months)	33.4	31	198.6	201	232 (92.8%)
Column Totals		36 (14.4%)		214 (85.6%)	250 (100%)

Chi-square = 2.81, 1 df, p = 0.09, N.S.

TABLE 10

HYPOTHESIS III

CHI-SQUARE ANALYSIS OF THE DIFFERENCE BETWEEN THE PREGNANT AND NON-PREGNANT GROUPS AND DIRECTION OF CHANGE IN APPRAISAL OF ADJUSTMENT TO LIFE STRESS (N = 250)

	Change in Appraisal of Adjustment from Lower to Higher (SLCU) (Decrease in Coping Reserve)		Change in Appraisal of Adjustment from Higher to Lower (SLCU) (Increase in Coping Reserve)	
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency
Pregnant Women (conceived with intervening 6 months)	11.0	10	6.9	8
Non-pregnant Women (did not conceive within intervening 6 months)	143.0	144	89.0	88
Column Totals		154 (61%)		96 (38.4%)

Chi-square = 0.29, 1 df, p = 0.58, N.S.

Ancillary Findings

Further analysis of the relationship between the magnitude of life stress, the appraisal of adjustment to life stress in both Nov. '78 and May '79 and the incidence of conception was conducted. The variables, magnitude of life stress and appraisal of adjustment to life stress had been artificially dichotomized for the purpose of hypotheses testing. Further analysis involved treating these variables as both continuous as well as dichotomous. Parametric and non-parametric statistical procedures were used accordingly.

For the purpose of further analysis, it was decided to compare the total magnitude and appraisal scores with and without the LCU scoring weights of the 14 additional items reported above in Chapter III.[3] The intercorrelations between the scores utilizing the 14 items and the total scores without these items are significant i.e., the concurrent validity coefficients comparing the two scales is between 0.56 and 0.93.(See Table 11.)

Also, it is noted that the Recent Life Changes Questionnaire is divided into subscales of events of "health," "work," "home and family," "personal and social," and "financial."[4] Since eight (8) of the

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[3]See Table 4, Comparison of Means and Standard Deviations of 14 Unweighted Items for description of items.

[4]Richard H. Rahe, William M. Pugh, Jeanne Erickson, et al., "Cluster Analysis of Life Changes," Archives of General Psychiatry (October 1971): 330-32 and William H. Pugh, Jeanne Erickson, Robert T. Rubin et al., "Cluster Analysis of Life Changes: Method and Replication in Navy Subpopulations," Archives of General Psychiatry (October 1971): 333-39.

TABLE 11

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN TOTAL LIFE STRESS MEASURES WITH AND WITHOUT PREVIOUSLY UNWEIGHTED 14 ITEMS (N - 250)*

	Total Score With 14 Items				Total Score Without 14 Items			
Total Score With 14 Items	Magnitude	Appraisal in Nov.'78	Reappraisal in May '79	Number	Magnitude	Appraisal in Nov.'78	Reappraisal in May '79	Number
Magnitude	1.000	0.69	0.67	0.91	0.93	0.64	0.61	0.85
Appraisal in Nov.'78		1.00	0.64	0.61	0.66	0.97	0.61	0.58
Reappraisal in May '79			1.00	0.75	0.63	0.60	0.96	0.72
Number				1.00	0.88	0.56	0.71	0.97
Total Score Without 14 Items								
Magnitude					1.00	0.70	0.64	0.90
Appraisal in Nov.'78						1.00	0.61	0.57
Reappraisal in May '79							1.00	0.73
Number								1.00

*$p < 0.001$ for all values of r

fourteen (14) items deleted from the initial hypotheses testing comprise a portion of these subscales which will be used in further analysis and since the validity coefficients reported above are within an acceptable range, the investigator has decided to include the weights of these (14) fourteen previously unscored and excluded items in all subsequent analysis.

Hypothesis I

No significant difference between the pregnant and non-pregnant groups and the high and low magnitude of life stress was demonstrated. As was mentioned above, the subscales of life stress were used to compare differences between the pregnant and non-pregnant groups. The means of each of the LCU scores for each of the subscales was computed and used to differentiate between high and low magnitude of life stress (see Table 12). No significant difference between the pregnant and non-pregnant groups and the high and low magnitude of life stress for each subscale was noted at the 0.05 level of significance.

Since the scale of magnitude of life stress was dichotomized for the purpose of hypotheses testing, it was decided that the difference between the pregnant and non-pregnant groups of women would be explored by examining the entire range of total magnitude of life stress. A t value for independent samples comparing the means of magnitude of life stress between the pregnant and non-pregnant groups was computed. No significant difference between the means was noted for either a one or two-tailed test. However, when a t value for independent samples was computed for each of the subscales of magnitude of life stress, a

TABLE 12

MEANS OF TOTAL MAGNITUDE OF LIFE STRESS AND APPRAISAL OF ADJUSTMENT TO LIFE STRESS FOR EACH SUBSCALE (N = 250)

Subscale	Mean Magnitude	Mean Appraisal In November '78	Mean Reappraisal in May 1979
Health (Item #1 - 6)	90	70	110
Work (Item #6 - 13)	150	175	200
Home (Item #14 - 21B)	120	108	210
Marriage (Item #22 - 33)	90	60	150
Interpersonal (Item #36, 41, 45, 46, 47, 48)	80	105	125
General - Social (Item #34, 35, 37, 30-40, 42, 43, 50, 51, 49, 44)	150	160	225
Financial (Item #52 - 55C)	50	60	100

significant difference between the mean scores on "work" was noted at the 0.03 level of significance. (See Table 13.)

Further analysis regarding subscales within the Recent Life Changes Questionnaire was conducted. Brown[5] and Masuda and Holmes[6] suggest that life stress items related to loss or separation represent a subscale or category with the entire scale that may be a better predictor of health change than all of the items taken together. For the purpose of this investigation, those items related to loss of health, work, family members, separation from spouse, loss of interpersonal relationships, loss of personal property for financial security (see Appendix 5) were selected. The difference between the total mean scores of these "loss" items between the pregnant and non-pregnant group was not significant.

Another subscale within the Recent Life Changes Questionnaire that has been identified is that of the degree of "subjectivity-objectivity" of items. A subjective item would be one where subject would have to make adjustment as to whether or not it occurred. An objective item, on the other hand, requires reporting the obvious. (See Appendix 6.) For example, "change in number of arguments with spouse" would be a subjective item whereas "marriage" would be an objective item.

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[5]George W. Brown, "Meaning, Measurement, and Stress of Life Events," in Dohrenwend and Dohrenwend, Stressful Life Events: Their Nature and Effects (New York: John Wiley and Sons, 1974), pp. 217-43.

[6]Minora Masuda and Thomas H. Holmes, "Life Events: Perceptions and Frequencies," Psychosomatic Medicine 40 (May 78): 236-61.

TABLE 13

T-TEST FOR INDEPENDENT SAMPLES

COMPARISON OF THE MEANS OF THE MAGNITUDE OF LIFE STRESS

BETWEEN THE PREGNANT AND NON-PREGNANT GROUPS (N = 250)

Magnitude of Life Stress	N	Mean	S.D.	S.E.
Pregnant Group	18	448	199	47
Non-pregnant Group	232	499	226	14

t value = -1.04, 20 df, p = 0.29, N.S.

Magnitude of Life Stress for Subscale "Work"				
Pregnant Group	18	70	41	9
Non-pregnant Group	232	100	58	3

t value = -2.14, 248 df, p = 0.033 (two-tailed)
p = 0.016 (one-tailed)

Thurlow[7] demonstrated that "subjective" life change items may be better predictors of change in health status than "objective" items. Therefore, for the purpose of this investigation "subjective" life change items (see Appendix 6) were selected from the questionnaire and the difference between the means of these items between the pregnant and non-pregnant groups were computed. No significant difference was found.

Finally, the difference between the pregnant and non-pregnant group and the high and low magnitude of life stress was computed using chi-square controlling for each of the demographic variables including age, socioeconomic status, marital status, number of children, occupation, job hours, use of coital-related contraceptive measures, desire to be pregnant and frequency of sexual intercourse. No significant difference between groups was noted.

Hypothesis II

The difference between the pregnant and non-pregnant group and high and low appraisal of adjustment to life stress was not significant at the 0.05 level. When appraisal of adjustment to life stress events was computed, however, including the 14 additional items a relationship between conception and appraisal of adjustment between groups was noted at the 0.03 level of significance using chi-square analysis. (See Table 14.) Like the scale of magnitude of adjustment to life stress, appraisal of

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[7]H. John Thurlow, "Illness in Relation to Life Situation and Sick-Role Tendency," Journal of Psychosomatic Research 15 (March 1971): 73-88.

TABLE 14

CHI-SQUARE ANALYSIS OF DIFFERENCE BETWEEN PREGNANT AND NON-PREGNANT GROUPS AND APPRAISAL OF ADJUSTMENT TO LIFE STRESS INCLUDING 14 ADDITIONAL ITEMS (N = 250)

	Low Appraisal of Adjustment to Life Stress (High Coping Reserve)		High Appraisal of Adjustment to Life Stress (Low Coping Reserve)		Row Totals
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	
Pregnant Women	4.3	8	13.7	10	18 (7.2%)
Non-Pregnant Women	55.5	52	176.3	180	232 (92.8%)
Column Totals	60 (24.%)			190 (76%)	250 (100%)

Chi-square = 3.31, 1 df, p = 0.03

Phi Coefficient = 0.13, p = 0.01

adjustment was dichotomized as either higher or lower than the total magnitude of adjustment.

To determine the difference between the means of the total range of appraisal scores between the pregnant and non-pregant group, a t-test was computed. No significant difference was found. However, when the subscales of life stress were used to compare the differences between the pregnant and non-pregnant groups, the subscale of "Work" was found to be significant at the 0.004 level. (See Table 15.)

HypothesisIII

No difference between the change in appraisal of adjustment between the pregnant and non-pregnant groups was noted. Like the scale of appraisal of adjustment to life stress, change in appraisal of adjustment was dichotomized as to whether the appraisal score in November '78 was higher or lower than the reappraisal score in May '79.

When the total range of scores for reappraisal of adjustment in May '79 was considered in relation to the difference between the pregnant and non-pregnant group, the difference between the means was significant at the 0.05 level. (See Table 16.) Aslo, when the means and the subscales were compared, the difference between the pregnant and non-pregnant groups were significant for the subscales of "Work," "Interpersonal Relationships," and "General Life Change" at the 0.05, 0.02 and 0.04 level of significance respectively. (See Table 16.)

Additional Differences between the Pregnant and Non-Pregnant Group

In addition to the differences noted above, the pregnant and non-pregnant group differed with regard to marital status, intention to

TABLE 15

T-TEST FOR INDEPENDENT SAMPLES

COMPARISON OF MEANS OF APPRAISAL OF ADJUSTMENT TO LIFE STRESS

BETWEEN THE PREGNANT AND NON-PREGNANT GROUPS (N = 250)

Total Appraisal of Adjustment to Life Stress	N	Mean	S.D.	S.E.	F Value	F Prob.
Pregnant Group	18	595	385	90	2.00	0.097
Non-Pregnant Group	232	747	544	35		
t value = -1.16, 247 df, p = 0.24, N.S.						
Appraisal of Adjustment to Life Stress Subscale - Work						
Pregnant Group	18	105	93	22	2.68	0.021
Non-Pregnant Group	232	182	153	10		
t value = -3.17, 24 df, p = 0.004, (two-tailed) p = 0.002, (one-tailed)						
Appraisal of Adjustment to Life Stress - Subscale - Interpersonal Relationships						
Pregnant Group	18	68	90	21	1.28	0.568
Non-Pregnant Group	232	107	102	6		
t value = -1.59, 248 df, p = 0.112 (two-tailed) p = 0.056 (one-tailed)						

TABLE 16

T-TEST FOR INDEPENDENT SAMPLES

COMPARISON OF THE MEANS OF REAPPRAISAL OF ADJUSTMENT SCORES

IN MAY 1979 BETWEEN PREGNANT AND NON-PREGNANT GROUPS (N = 250)

Total Reappraisal of Adjustment Scores

	N	Mean	S.D.	S.E.	F Value	F Prob.
Pregnant Group	18	607	360	84	1.71	0.198
Non-Pregnant Group	232	794	470	30		

t value = -1.65, 248 df, p = 0.05 (one-tailed)

Subscale of "Work"

Pregnant Group	18	133	105	24	1.73	0.105
Non-Pregnant Group	232	196	148	9		

t value = -1.76, 248 df, p = 0.04 (one tailed)

Subscale of "Interpersonal Relationships"

Pregnant Group	18	55	76	17	2.10	0.076
Non-Pregnant Group	232	166	110	7		

t value = -2.31, 248 df, p = 0.022, (two-tailed)
p = 0.011, (one-tailed)

Subscale of "General Life Stress"

Pregnant Group	18	121	93	22	2.04	0.08
Non-Pregnant Group	232	185	133	8		

t value = -1.99, 248 df, p = 0.047, (two-tailed)
p = 0.023, (one-tailed)

be pregnant, use of coital-related contraceptive measures, and the magnitude of life stress that occurred in the intervening 6 months. (See Table 17.)

To determine the significance of the difference between the pregnant and non-pregnant groups a discriminant analysis of the two groups utilizing the demographic data as discriminating variables was computed. In order to perform this analysis, however, 18 non-pregnant cases were randomly selected from the sample of 250. A comparison of these non-pregnant cases and total sample (see Table 19) suggest that these groups are comparable.

One discriminant function was obtained accounting for the variance in the two groups. (See Table 18.) The association between the single function and the pregnant and non-pregnant group yielded a canonical correlation of 0.70, suggesting that the one function is able to discriminate between the two groups.

The significance of any discriminant function, however, is determined by examining Wilk's lambda and the level of significance of the chi-square conversion when each discriminant function in an analysis is subsequently removed. The smaller the value of Wilk's lambda between 0 and 1, the greater the amount of discriminating information remains in the function.[8]

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[8]William R. Klecka, "Discriminant Analysis," in Norman H. Nie et al., eds., Statistical Package for the Social Sciences (New York: McGraw Hill, 1975), pp. 441-43.

TABLE 17

CHI-SQUARE ANALYSIS OF THE RELATIONSHIP BETWEEN PREGNANCY AND SELECTED VARIABLES (N = 250)

Marital Status

	Single - Alone		Married - Living with Someone		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Pregnant Group	11.2	4	6.7	14	18 (7.2%)
Non-Pregnant Group	144.7	152	87.2	80	232 (92.8%)
Column Totals	156 (62.4%)		94 (37.6%)		250 (100%)

Chi-square = 19.76, 1 df, $p < 0.001$

Do You Want to be Pregnant Now?

	Yes		No		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Pregnant Group	1.6	7	16.3	11	18 (7.2%)
Non-Pregnant Group	21.3	16	210.6	216	232 (92.8%)
Column Totals	23 (9.2%)		227 (90.8%)		250 (100%)

Chi-square = 20.53, 1 df, $p = 0.0001$
Phi Coefficient = 0.28, $p < 0.001$

Table 17 continued

Do You Want to be Pregnant in the Near Future?

	Yes		No		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Pregnant Group	4.2	11	13.7	7	18 (7.2%)
Non-Pregnant Group	54.7	48	177.2	184	232 (92.8%)
Column Totals	59 (23.6%)		191 (76.4%)		250 (100%)

Chi-square = 19.16, 1 df, $p < 0.001$
Phi Coefficient = 0.27, $p < 0.001$

Use Condom as a Form of Birth Control

	Yes		No		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Pregnant Group	6.0	2	11.9	16	18 (7.2%)
Non-Pregnant Group	77.9	82	154.0	150	232 (92.8%)
Column Totals	84 (33.6%)		166 (66.4%)		250 (100%)

Chi-square = 4.39, 1 df, $p = 0.03$

New Events Within Past 6 Months

	High Magnitude LCU		Low Magnitude LCU		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Pregnant Group	15.40	12	2.59	6	18 (7.2%)
Non-Pregnant Group	198.5	202	33.4	30	232 (92.8%)
Column Totals	214 (85.6%)		36 (14.4%)		250

Chi-square = 5.64, 1 df, $p = 0.01$ Phi Coefficient = 0.15, $p < 0.01$

TABLE 18

DISCRIMINANT ANALYSIS

(N = 36)

Group 1 - Pregnant Group	N = 18
Group 2 - Non-pregnant Group	N = 18

Function	Eigenvalue	Percentage of Variance	Canonical Correlation
1	1.00	100.00	0.70

After Function Removed	Wilk's Lambda	Chi-Squared	df	Significance
0	0.49	19.81	11	0.04

TABLE 19

COMPARISON OF DISTRIBUTION OF DISCRIMINATING VARIABLES BETWEEN THE TOTAL SAMPLE (N = 250) AND RANDOM SAMPLE (N = 18) OF TOTAL SAMPLE

	Total Sample (N = 250) Frequency (%)	Random Sample (N = 18) Frequency (%)
Discriminating Variables		
Age - 20-21	9 (3.6)	1 (6)
22-25	194 (77.6)	13 (72)
26-30	34 (13.6)	3 (17)
31-35	13 (6.2)	1 (6)
	250 (100%)	18 (100%)
Marital Status		
Single-widowed-separated	157 (63)	12 (67)
Married-Living with someone	93 (37)	6 (33)
	250 (100%)	18 (100%)
Using Contraceptive Measures?		
Yes	158 (63)	8 (56)
No	92 (37)	10 (44)
	250 (100%)	18 (100%)
Live in Permanent Residence?		
Yes	147 (59)	15 (33)
No	103 (41)	3 (17)
	250 (100%)	18 (100%)
Have Children?		
Yes	12 (4.6)	2 (11)
No	238 (95.2)	16 (89)
	250 (100%)	18 (100%)

Table 19 continued

Discriminating Variables	Total Sample (N = 250) Frequency(%)	Random Sample (N = 18) Frequency(%)
Presence of Minor Health Problems?		
Yes	20 (8.4)	1 (6)
No	230 (91.6)	17 (94)
	250 (100%)	18 (100%)
Presently Employed?		
Yes	222 (89)	18 (100%)
No	28 (11)	0 (0)
	250 (100%)	18 (100%)
Want to be Pregnant Now?		
Yes	23 (9)	1 (6)
No	227 (91)	17 (94)
	250 (100%)	18 (100%)
Want to be Pregnant in the Near Future?		
Yes	59 (24)	3 (17)
No	191 (76)	15 (83)
	250 (100%)	18 (100%)
Want to be Pregnant Ever?		
Yes	234 (94)	15 (89)
No	16 (6)	2 (11)
	250 (100%)	18 (100%)
Frequency of Sexual Intercourse ?		
Greater than one/week	132 (53)	10 (56)
Less than once/week	118 (47)	8 (44)
	250 (100%)	18 (100%)

In this analysis, Wilk's lambda and its chi-square conversion is significant at the 0.04 level suggesting that without any function removed, in the one existing function, a significant amount of discriminating information exists. (See Table 18.)

To determine the relative contribution of each of the discriminating variables to the specified function, the standardized discriminant function coefficients are computed. (See Table 20.) Age, permanence of residence, employment, frequency of sexual intercourse are strongly negatively associated with the specified function while marital status and desire to be pregnant appear to be positively associated with this function.

A discriminant analysis was also computed evaluating the subscales of magnitude of adjustment and appraisal of adjustment to life stress events. No significant function was derived that could discriminate or explain the difference between the pregnant and non-pregnant group with regard to the magnitude and appraisal of adjustment to life stress events.

Differences in the Reporting of Life Stress Events

Several discreet groups differed in their reporting of life stress events. Age, job hours, work status, desire to be pregnant now and permanence of residence were significantly negatively correlated with the magnitude of life stress events. Use of contraceptive measure (coital-related), presence of health problems were significantly positively correlated with high magnitude of life stress events. (See

TABLE 20

STANDARDIZED CANONICAL DISCRIMINANT

FUNCTION COEFFICIENTS (N = 36)

Discriminating Variables	Function 1
Age	-0.45
Marital Status	0.42
Use of Contraceptive Measures	0.13
Type of Residence	-0.40
Children	-0.24
Existence of Minor Health Problems	-0.11
Presently Employed	-0.70
What to be Pregnant Now?	0.68
Want to be Pregnant Later?	0.47
Want to be Pregnant Ever?	-0.06
Frequency of Sexual Intercourse	-0.63

Table 21.) The use of contraceptive measures, the presence of health problems, the permanence of residence, job hours, work status, and desire to be pregnant at the present time were correlated with magnitude of adjustment, appraisal of adjustment and reappraisal of adjustment--all three measure of life stress. (See Table 21.)

Exploring the mean differences in the reporting of life stress, the investigator found that those who were working had a lower mean stress than those who were not working; those who worked during the day time had lower mean stress than those whose job hours were variable; and, those who had health problems had a higher mean stress than those who did not report any health problems. (See Table 22.)

Finally, the differences between the appraisal of adjustment in Nov. '78 and May '79 of the investigation were explored i.e., the differences between appraisal and reappraisal of adjustment to life stress events.

Using a correlated *t*-test to determine the differences between the mean scores, this investigator found that subjects rated events higher in May than they did in November. The difference was significant at 0.04 level. Exploring the differences between the subscales of appraisal and reappraisal, it was found that the mean appraisal of health-related items, work-related items, general stress-related items and finance-related items was lower in November of 1978 than in May of 1979. The differences were significant at the 0.004, 0.036, 0.008 and 0.001 levels respectively. (See Table 23.)

Finally, those who were the first to respond (130 subjects) reported lower life stresses than the last to respond (120 subjects). (See Table 24.)

TABLE 21

PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN DISCREET GROUPS WITHIN THE SAMPLE AND MEASURES OF LIFE STRESS

	Age	Use of Contraception	Health Problems	Permanence of Residence	Working	Job Hours	Wanting to be Pregnant Now
Total Magnitude of Life Stress (LCU's)	-0.10*	0.21***	0.28***	-0.18**	-0.17**	-0.24***	-0.10*
Total Appraisal of Adjustment to Life Stress Events (SLUC's)	N.S.	0.18**	0.18**	-0.12*	-0.11*	-0.21***	-0.10*
Total Reappraisal of Adjustment to Life Stress Events (SLCU's)	N.S.	0.15*	0.24***	-0.17*	N.S.	-0.24***	-0.12*

*$p < 0.04$
**$p < 0.002$
***$p < 0.001$

TABLE 22

T-TEST FOR INDEPENDENT GROUPS

COMPARISON OF THE MEANS OF MAGNITUDE OF LIFE STRESS BETWEEN

DISCREET GROUPS WITHIN THE SAMPLE (N = 250)

Presently Employed Outside of the Home

Total Magnitude of Life Stress	N	Mean	S.D.	S.E.	F Value	F Prob.
Presently Employed	222	481	222	14	1.16	0.66
Presently Not Employed	28	608	206	38		

t value = -2.85, 248 df, p = 0.005 (two-tailed)
p = 0.002 (one-tailed)

Job Hours

Work Daytime Hours	177	460	212	15	1.16	0.43
Work Variable Job Hours	73	581	228	26		

t value = -4.01, 248 df, p < 0.0001 (two-tailed)
p < 0.0001 (one-tailed)

Existence of Minor Health Problems

Reported Health Problems	20	710	194	43	1.24	0.59
Denied Having Health Problems	230	477	216	14		

t value = 4.65, 248 df, p < 0.0001 (two-tailed)
p < 0.0001 (one-tailed)

TABLE 23

CORRELATED T-TEST

COMPARISON OF THE MEANS OF APPRAISAL OF ADJUSTMENT IN

NOVEMBER 1978 AND REAPPRAISAL OF ADJUSTMENT IN MAY 1979

(N = 250)

Total Scales	Means	S.D.	S.E.
Total Appraisal of Adjustment to Life Stress	557	388	64
Total Reappraisal of Adjustment to Life Stress	632	417	69
t value = -1.66, 249 df, p = 0.09 (one-tailed) p = 0.04 (two-tailed)			
"Health" Subscales			
Appraisal of Adjustment	69	83	5
Reappraisal of Adjustment	79	85	5
t value = -2.89, 249 df, p = 0.004 (two-tailed) p = 0.002 (one-tailed)			
"Work" Subscales			
Appraisal of Adjustment	176	151	9
Reappraisal of Adjustment	191	146	9
t value = -2.10, 249 df, p = 0.036 (two-tailed) p = 0.013 (one-tailed)			
"General Life Change" Subscale			
Appraisal of Adjustment	166	129	8
Reappraisal of Adjustment	180	131	8
t value = -2.67, 249 df, p = 0.008 (two-tailed) p = 0.004 (one-tailed)			

Table 23 continued

	Means	S.D.	S.E.
"Finance" Subscale			
Appraisal of Adjustment	54	57	3
Reappraisal of Adjustment	67	69	4

t value = -3.54, 249 df, $p < 0.0001$ (two-tailed)

TABLE 24

CHI-SQUARE ANALYSIS OF RELATIONSHIP BETWEEN THE PROMPTNESS OF RESPONSE AND THE MAGNITUDE OF LIFE STRESS

	First 130 to Respond to Mailed Questionnaire		Last 120 to Respond to Mailed Questionnaire		
	Expected Frequency	Observed Frequency	Expected Frequency	Observed Frequency	Row Totals
Low Magnitude Stress	44.2	57	40.8	28	85 (34.0%)
High Magnitude Stress	85.8	73	79.0	92	165 (66.0%)
Column Totals	130 (52.0)		120 (48.0%)		250 (100%)

Chi-square = 11.94537, 1 df, p = 0.003

CHAPTER V

DISCUSSION OF FINDINGS

Two hundred and fifty (250) women participated in an investigation of the relationship between life change and the incidence of conception. Although it was hypothesized that women with high magnitude of life stress and high appraisal of adjustment to life stress would be more likely to conceive than those women with low magnitude of life stress and low appraisal of adjustment, these hypotheses were not supported. Also, women who conceived did not demonstrate a greater change in appraisal from higher to lower than women who did not conceive.

Since the data on life stress events had been artificially dichotomized for the purpose of hypotheses testing, subsequent analysis examined the difference between the pregnant and non-pregnant groups with regard to all the demographic variables and the entire range of LCU and SLCU scores. Also, the differences in reporting of life stress events among the discreet groups in the sample was explored using the entire range of life stress scores. Also, the Recent Life Changes Questionnaire was amended for subsequent analysis to include 14 additional items for which weights were obtained and reported in Chapter III.[1]

Hypothesis I

No direct relationship between the magnitude of life stress and

[1]See Table 4, Comparison of Means and Standard Deviation of 14 Unweighted Items for description of items.

the occurrence of conception was demonstrated. However when at t-test for independent samples was performed on each of the subscales within the RLCQ, it appeared that women who conceived had lower magnitude of stress with regard to work-related items than women who did not conceive. That no relationship between the entire scale of magnitude of life stress and pregnancy was established does not rule out a relationship between life stress and conception. Indirect contamination or spuriousness in the relationship between the variables needs to be considered and will be discussed later. Furthermore, Horowitz suggests that the reporting of life stress events may be, in the final analysis, related to the social roles played by the respondents which would make them ineligible for certain life stress.[2] For example, in this investigation it would seem that married women anticipating pregnancy would be out of the work force and therefore ineligible for stress with regard to work-related items.

Hypothesis II

When the fourteen (14) additional items are included in the determination of appraisal of adjustment to life stress events, more women who conceived than would be expected by chance had a high coping reserve, low appraisal of adjustment, prior to becoming pregnant, than

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[2]Mardi Horowitz, Catherine Schaefer, Donald Hiroto et al., "Life Event Questionnaire for Measuring Presumptive Stress," Psychosomatic Medicine 39 (November-December 1977): 413-31.

did women who did not conceive. However, when a t-test for independent samples was applied to the mean appraisal scores between the group who conceived and the group that didn't, no significant difference between the total mean scores was demonstrated. Given the inconsistency of findings together with the fact that with one degree of freedom and that with a large sample size it is possible that a very slight difference between groups would appear in determining chi-square values at an accepted level of significance, it is concluded that this finding is not significant and the hypothesis is not supported.

Measuring the "subjective appraisal," the t-test demonstrated an interesting difference between the two groups. Again, work-related items were not as significant for the women who conceived as for those who didn't. Similarly, stress surrounding interpersonal relationships was less significant for women who conceived. Again, the ineligibility of certain life stresses for women anticipating pregnancy may explain this difference. Women who are married, planning a family, may be more home-oriented, child-oriented, family oriented, and, therefore, less attentive and susceptible to stresses in other areas.

Hypothesis III

No difference in appraisal of adjustment between Nov. '78 and May '79 was noted between those who conceived and those who didn't. However, when the reappraisal scores, the measure of appraisal to life stress events in May '79 were examined regardless of magnitude of life stress score or appraisal, of adjustment in Nov. '78, differences between the

groups emerged. The group that conceived demonstrated a lower total reappraisal, reappraisal with regard to work, interpersonal relationships and general life stress than the group that did not conceived. In other words, pregnant women were less likely to have had employment problems and job related stress in May, just as they did in November. Similarly, they were less likely to appraise events related to sexual difficulties, close, personal relationships, boyfriend problems, etc., as highly stressful, than non-pregnant women. They were less likely to find events related to changes in personal habits, life style, religious or political beliefs as significant as non-pregnant women. Again, married, pregnant women anticipating childbearing would be ineligible for these life stresses as they do not fit into the social role of a child-oriented women.[3]

Methodological Considerations

Concurrent Validity of the measures of Life Stress--As was demonstrated in Chapter III, all of the measures of stress were highly intercorrelated with each other. These correlations, as high as 0.93, suggest that the measures of stress are not exclusive of one another i.e., a measure of magnitude will predict a measure of appraisal, reappraisal and number of events.

The high intercorrelations, multicollinearity, is most evident

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[3]Helena Znaniecki Lopata, Occupation: Housewife (New York: Oxford University Press, 1971), pp. 64-65.

when comparison of the identical stress measures with and without the 14 additional items. For example, magnitude of adjustment with the fourteen items is correlated with magnitude of adjustment without the 14 items at 0.93. The highest other correlation is between magnitude and number of events (0.91). This finding supports the literature reported above, that number of events may be as acceptable a measure of life stress as any other for this age population. This group is likely to experience a great number of events but, they will be of similar weights. An older population, on the other hand, is likely to experience fewer events but, they will be of high magnitude.[4]

Measures of appraisal and reappraisal are the next most highly correlated (0.67 - 0.69). This finding suggests a certain stability in the appraisal of life events. Those who rate events high at one point are likely to rate those events high at another. In this regard, Horowitz[5] reports test-retest correlations of 0.80.

Construct Validity of the Measure of Life Stress--Throughout subsequent analysis, subscales within the Recent Life Changes Questionnaire were used.

How valid are these subscales? Are they measuring the specific, discreet constructs within the RLCQ validly and reliably? The clusters

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[4]Horowitz, "Life Event Questionnaire," pp. 413-31 and Minora Masuda and Thomas H. Holmes, "Life Events: Perceptions and Frequencies," Psychosomatic Medicine 40 (May 1978): 236-61.

[5]Horowitz, "Life Event Questionnaire," pp. 413-431.

determined from Navy samples included "Personal and Social," "Work," "Marital," and "Disciplinary."[6] The clusters suggested by Rahe included "Health," "Home and Family," "Personal and Social," "Work," and "Financial."[7] The clusters from Navy samples were considered inappropriate for a sample of potential pregnant women and Rahe's categories were determined theoretically without construct validity data. For the purpose of this investigation, the categories offered by Rahe made theoretical sense to the investigator and were used as a guide to divide categories into "Health," "Work," "Home," "Marriage," "Interpersonal," "Social," and "Financial."

When the means of the subscales for magnitude, appraisal and reappraisal of adjustment to life stress were used in ancillary analysis they consistently demonstrated a subscale of "Work" and "Personal" and "Social." This investigator suggests that specific subscales do exist within the RLCQ. To determine the validity of these subscales, however, factor analysis would need to be done.

Content Validity of Stress measures--The measure of the differences between appraisal and reappraisal as a measure of coping ability is suspect. For the purpose of this investigation, an increase in appraisal

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[6]Richard H. Rahe, William M. Pugh, Jeanne Erickson, et al., "Cluster Analysis of Life Changes," Archives of General Psychiatry (October 1971): 330-32 and William H. Pugh, Jeanne Erickson, Robert T. Rubin et al., "Cluster Analysis of Life Changes: Method and Replication of Navy Subpopulations," Archives of General Psychiatry 25 (October 1971): 333-39.

[7]Richard H. Rahe, "Recent Life Changes Questionnaire: 1974 Revision." Department of the Navy, Naval Health Research Center, San Diego, California, 1974. (Mimeographed.)

over 6 months would indicate a decrease in coping ability and a decrease in appraisal would indicate an increase in coping ability. However, subjects may have been led to test their memory rather than their change in appraisal of stress. Each item that was initially checked in November was supplied in May and subjects were asked to rate adjustment to the event as they experienced it in November...not in May. The literature suggests that recall of life events is related to the significance of the event.[8] By supplying the subjects with the previously mentioned items, the invetigator was not providing them with an opportunity to recall "significant" events nor was she asking them to provide their current appraisal of stress.

Reliability of the Recent Life Changes Questionnaire--All of the measures of stress were in the Life Crisis range.[9] Sixty-six percent (66%) of the sample reported a high magnitude of life stress; eighty-five percent (85.6%) of the sample reported a high appraisal of adjustment to life stress and sixty-one percent (61%) of the sample reported a high reappraisal of adjustment to life stress from lower to higher appraisal. Are these findings a function of response bias in the completion of the questionnaire, a function of the nature of this particular population studied or a function of environmental events in general?

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[8] R.L. Casey, Minora Masuda and Thomas H. Holmes, "Quantitative Study of Recall of Life Events," Journal of Psychosomatic Research 11 (August 1967): 239-47.

[9] Richard H. Rahe, "Life Crisis and Health Change," in Philip R. A. May and J.R. Wittenborn, eds., Psychotropic Drug Response: Advances in Prediction (Charles C. Thomas: Springfield, Illinois, 1969), pp. 92-125.

The literature does not report the use of the Recent Life Changes Questionnaire in a mail survey. It is possible that of the 2000 people who returned the questionnaires, the 640 responded because they were the most stressed to begin with. However, when the responses of the first 130 respondents are compared with the responses of the last 120 respondents, the most eager to respond were not the most stressed. There appears to be some relationship between the promptness of return and magnitude of stress with a bias of later returnees being the most stressed.

The literature does report, however, that this sample of women are more likely to rate life stress as more significant, as requiring more adjustment, than others. Women tend to appraise events higher than men, younger people tend to appraise events higher than those over 65 and people with a college education tend to appraise events higher than those without a college education.[10] This sample is likely to rate events higher as they are young, college-educated women.

Are there environmental differences in the reporting of life stress events? Are people in general and this sample in particular sustaining more stress which would account for the high magnitude, appraisal and reappraisal and would make the standardized weights "obsolete"? As has already been reported, the high correlation between appraisal and reappraisal ($r = 0.69 - 0.69$) suggests that there is stability, test-retest reliability, in the reporting of life stress events.

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[10]Horowitz, "Life Event Questionnaire," pp. 413-431 and Masuda and Holmes, "Life Events: Perceptions," pp. 236-62.

Highly appraised items remain highly appraised over time. However, it is interesting to note that when the means between the subscales of appraisal and reappraisal are correlated, a difference in appraisal of adjustment between the November and May scores were noted on the subscales of "Work," "Health," "Social-General," and "Finance." Present economic forecasting suggests an economic recession in the United States, an "energy crisis" suggests a change in American life style, and the winter time in which this study occurred suggests that subjects were subjected to extremes of weather. If the changes in reporting of life stress over time are accepted as an indicator of social and environmental change, then environmental differences have inflated the reporting of life stress events.

Despite response bias, the characteristics of this sample together with the characteristics of the present social and economic climate account for the high magnitude, high appraisal and high reappraisal of adjustment to life stress events. On the basis of the above, it is concluded that the instrument is a reliable measure of life stress.

Internal Validity of the Investigation--The prospective nature of this investigation has eliminated a major source of invalidity that has plagued investigations of the relationship between life stress and illness--direct contamination. In other words, the occurrence of conception could not have influenced the reporting of the frequency and magnitude of life stress events. However, the requirements of

explanatory research demand that the issue of "spuriousness"[11] be addressed. The fact that no direct relationship between life stress and conception has been demonstrated does not rule out a relationship between life stress and conception, it introduces the possibility that a more complex relationship between variables exist. The foregoing theoretical discussion of findings will demonstrate this.

Theoretical Considerations

The theoretical rationale initially proposed suggested that a similar pathway of life stress occurred between conception and illness. Conception, like illness, was to be the consequence of a similar pathway of life stress; the timing of life events, the penetration of psychological defenses, the activation of physiological mechanisms and the utilization of coping reserves. The hypotheses were designed to establish the timing of events and the utilization of coping mechanisms as steps in the pathway. A direct linear relationship was not established.

If a relationship between life stress and conception exists, it is more complex than could be elucidated by the design of this investigation.

It was expected that women who conceived would be under great stress. When differences between the pregnant and non-pregnant group were explored only differences in the demographic variables were

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[11] George W. Brown, "Meaning, Measurement, and Stress of Life Events," in Barbara Snell Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effects (John Wiley and Sons: New York, 1974), pp.218-19.

noted between the groups. The discriminant analysis suggested rather than having lives in an upheaval, these pregnant women before conceiving had very stable lives....they were likely to be unemployed outside the home, living in a permanent residence, be married, be older. In addition, they wanted to be pregnant now and in the near future.

Although the discriminant analysis did not demonstrate any difference in the reporting of life stress events on any of the subscales, did not identify a discriminant function of stress to explain differences between the two groups, other findings suggest that stress is lower for those who had a more stable life style in general. In the entire sample, those who wanted to be pregnant, those who had a transient residence, those who worked variable job hours and those who were unemployed reported less stress than those who didn't want to be pregnant at the present time, those who had a permanent residence, those who worked during the day time at full time employment.

From the above findings it would appear that motive and opportunity would have the greatest explanatory power, be the greatest predictor of subsequent fertility. However, it is significant to note that during the intervening six months, the women who conceived reported experiencing a higher magnitude of life stress than those who didn't conceive, suggesting that life stress occurs in and around the experience of pregnancy. Also, inconsistent findings among researchers exploring the relationship between stress and pregnancy suggest that the role of life stress in pregnancy is present but ill-defined.

Although several investigators have reported a significant relationship between life changes and obstetrical complications utilizing

both prospective and retrospective designs,[12] Jones found a negative relationship between magnitude of life change and complications of labor and delivery. As in the case of this investigation, however, he observed that his sample of pregnant women reported an overall high absolute magnitude of life change of 300 LCU or more.[13] Therefore, subjects with even a "lower" life change score were still largely within the high range from an absolute standpoint. He suggested that the negative correlation between the magnitude of life change and the number of obstetrical complications which contradicted earlier findings, represented a curvilinear rather than linear relationship between the variables. In other words, a positive relationship may have existed between the magnitude of life change and pregnancy outcomes when life change scores were below a certain level. This positive relationship, however, may have disappeared in his investigation because his total LCU scores were of such high magnitude.[14]

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[12]Richard L. Gorsuch and Martha K. Key, "Abnormalities of Pregnancy as a Function of Anxiety and Life Stress," Psychosomatic Medicine 36 (July-August 1974): 352-62; Cindy C. Williams, et al., "Pregnancy and Life Change," Journal of Psychosomatic Research 19 (April 1975): 123-129; K. B. Nuckalls, J. Cassel and B. Kaplan, "Psychological Assets, Life Crisis and the Prognosis of Pregnancy," American Journal of Epidemiology 95 (May 1972): 431-41; and, Florence S. Downs, "An Investigation of Maternal Stress in Primigravidas As a Factor in the Production of Neonatal Pathology" (Ph.D. dissertation, NYU, 1964).

[13]Arthur C. Jones, "Life Change and Psychological Distress as Predictors of Pregnancy Outcomes," Psychosomatic Medicine 40 (August 1978): 402-12.

[14]Ibid.

The findings of this study suggest that because the measures of life stress indicated an overall high magnitude, appraisal and reappraisal of life stress and because of discriminant and other subsequent analysis indicate stable role consolidation before conception and an increase magnitude of stress after conception, a non-linear relationship between the timing and magnitude of life stress surrounding the experience of conception may exist.

The question arises as to the theoretical importance of a curvilinear relationship between the magnitude and timing of life stress surrounding the experience of conception. Several authors suggest that before conception, "role consolidation" in anticipation of parenthood occurs.[15] his investigator proposes that following life change of significant magnitude, a potentially pregnant woman organizes her life in such a way as to consolidate her role as a mother and as such make herself ineligible for, insulated against, and inattentive to life stresses in many areas. (See Table 25.)

In terms of the pathway of life stress events, the timing of life events, the penetration of psychological defenses, the activation of physiological mechanisms reach a point at which "role consolidation" occurs. It is suggested that "role consolidation" demonstrated by

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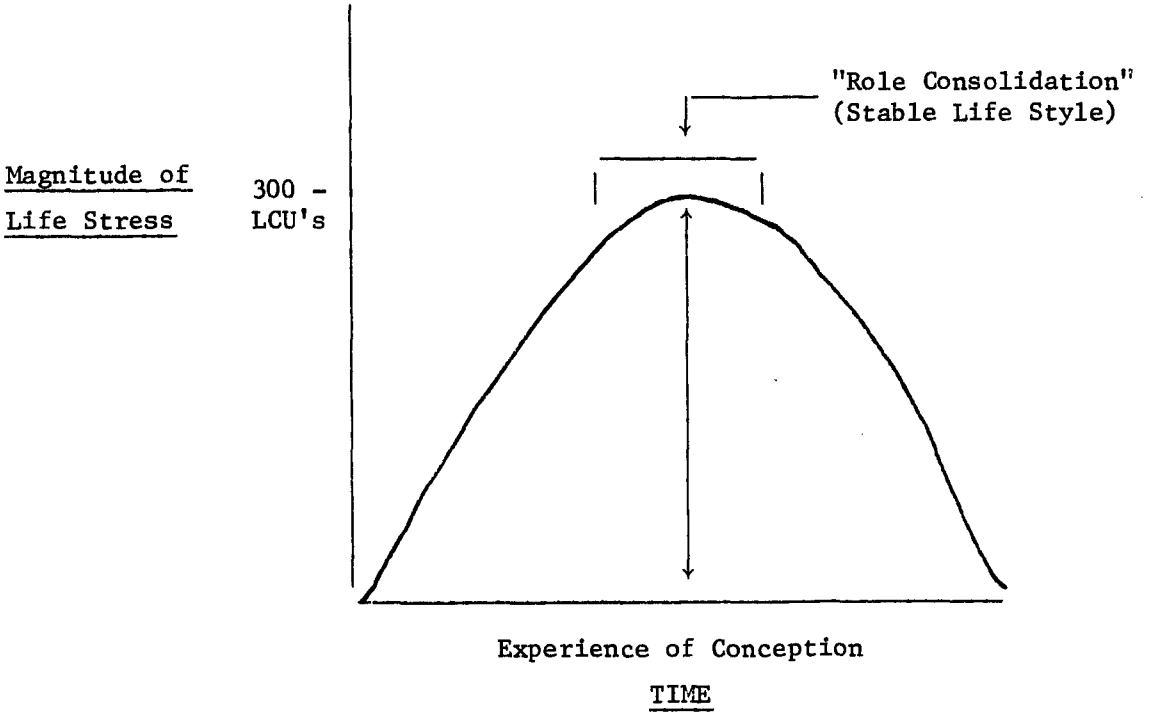
[15]E.E. LeMasters, "Parenthood as Crisis," in Howard J. Parad, eds., Crisis Intervention: Selected Readings (Family Service Association of America: New York, 1965), pp. 111-17; Lopata, Occupation: Housewife, pp. 182-223; Eileen Briggs, "Transition to Parenthood," Maternal-Child Nursing Journal 8 (Summer, 1979): 69-76 and, Elizabeth M. Whelan, The Pregnancy Experience: The Psychology of Expectant Parenthood (W.W. Norton and Co.: New York, 1978), pp. 23-64.

TABLE 25

PROPOSED RELATIONSHIP BETWEEN MAGNITUDE AND TIMING

OF LIFE STRESS SURROUNDING THE EXPERIENCE OF CONCEPTION



stability of life style is a more valid indicator of "coping reserve" than the measure utilized.

Summary

On the basis of the above, no direct linear relationship between life stress events and conception has been demonstrated. The women who conceived did not differ from the women who did not conceive in the reporting of life stress. However, they did differ from the non-pregnant group in the manner in which they coped with life stress, in the way in which they stabilized their roles in life. Women who conceived demonstrated greater "role consolidation" than women who did not conceive.

CHAPTER VI

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Summary

The purpose of this investigation was to explore the relationship between life stress and conception. Previously, it had been reported that women who were pregnant sustained life stress equal to or greater than people who sustained serious illness.[1] This investigator attempted to prospectively establish what had been retrospectively found and to make a theoretical contribution to the understanding of the relationship between life stress and health status.

Prior to this investigation empirical evidence suggested that the occurrence of life stress may be causally related to the onset of pregnancy. A pathway of life stress to illness reported in the literature was utilized for deriving a similar pathway leading to conception.[2]

The hypotheses that were tested were:

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[1]Richard H. Rahe et al., "Social Stress and Illness Onset," Journal of Psychosomatic Research 8 (July, 1964): 34-44.

[2]Richard H. Rahe, "Pathway Between Subjects' Recent Life Changes and Their Near Future Illness Reports: Representative Results and Methodological Issues," in Barbara S. Dohrenwend and Bruce P. Dohrenwend, eds., Stressful Life Events: Their Nature and Effects (John Wiley and Sons, 1974), pp. 74-79.

1) Women with high magnitude of life stress are more likely to conceive than women with low magnitude of life stress.

2) Women with a high appraisal of adjustment to life stress are more likely to conceive than women with a low appraisal of adjustment to life stress.

3) Women who conceive are more likely to have a change in appraisal of adjustment from higher to lower appraisal than women who do not conceive.

Respondents for this study consisted of two-hundred and fifty (250) alumni from a local suburban state college, between the ages of 21 - 35, of middle-class status, using coital-related contraceptive devices, or no contraception at all, desiring to be pregnant now or in the near future, or having no desire to be pregnant ever. These respondents completed a Recent Life Changes Questionnaire (RLCQ), and a General Information Questionnaire which they were mailed in November of 1978. In May of 1979, they completed and returned to the investigator the RLCQ where they reappraised life stress events that they had previously reported experiencing and indicated new events that had occurred to them during the intervening six months. They also completed and returned a Conception Information Form where they indicated whether or not they had conceived during the intervening six months.

The data was analyzed using chi-square analysis. Results were accepted at the 0.05 level of significance. None of the hypotheses were supported.

Supplementary analysis using t-tests for independent samples indicated a significant difference between the pregnant and non-pregnant

groups based on the means of the subscales of items related to work and interpersonal relationships primarily, i.e., women who conceived experienced less stress related to employment and interpersonal relationships than did women who did not conceive. Discriminant analysis of the difference between the pregnant and non-pregnant groups yielded a discriminant function that suggested that women who sustained a stable life style, i.e., lived in a permanent residence, did not work outside the home, were married and wanted to be pregnant, were more likely to have conceived in the intervening six months. The total sample sustained high life stress. Women who conceived sustained a higher magnitude of life stress in the intervening six months.

A stable life style together with the high overall life stress report and the increase in stress among the women who had conceived in the intervening six months suggests that if a relationship between life stress and conception exists it is complex.

Conclusions

None of the hypotheses in this investigation were supported. Moreover, ancillary findings suggest that a "stable life style" is a better predictor of conception than life stress.

The validity and reliability of the R.L.C.Q. were acceptable for this investigation. Moreover, the internal validity of this prospective research design conclusively refutes the idea of a direct causal relationship between high magnitude of life stress and conception. Contrary to the earlier retrospective findings, life stress does not directly predict conception. If a relationship between these variables exists, it is more complex than was originally proposed.

Recommendations for Future Research

Further Analysis--With the consistent appearance of work and interpersonal relationships as subscales that differentiated between the discreet groups within the sample, the construct validity of these scales as distinct factors within the entire questionnaire is suggested. A factor analysis of the questionnaire using the subscales should be attempted. The use of each individual item is prohibitive. To analyze the questionnaire using individual items, implies that each person has a score on each item. Since respondents were asked to check items only if they had sustained them during the time periods indicated, many items, obviously, are not scored for each person. In measurement terms this means that for each item measuring magnitude of adjustment, for example, a subject could only earn a score of zero (0) or the assigned standard weight. There would be no variance in the scores as the mean and standard deviation would be identical. If the subscales were used as factors, however, everyone would have an opportunity to obtain a score on each subscale.

Follow-up study of this sample, in addition, could include asking the respondents to complete the Recent Life Changes Questionnaire asking them to rate each item as to how much adjustment they think it requires regardless of whether or not they had experienced it. With this information, the investigator could then use the subjects' own ratings as a standard for comparison rather than LCU weights. Furthermore, factor analysis using each item could then be done as continuous scores would be available.

Given the "stable life style" suggested in ancillary findings, a multiple regression analysis of the multiple independent variables suggested as predictive of pregnancy should be accomplished. On the basis of the findings, it is hypothesized that (1) women who are married experience low to moderate magnitudes of life stress, live in a permanent residence, are unemployed outside the home, and who want to get pregnant are more likely to conceive than single, transient, working women who don't want to be pregnant and experience high magnitude of life stress. To test the curvilinear relationship between life stress and conception, it could be hypothesized that (2) there is an interaction effect of the variables of magnitude of life stress, appraisal of adjustment to life stress and the reappraisal of adjustment to life stress and the incidence of conception.

Further Investigations--Since the demographic variables were so predictive of life stress, it is suggested that an investigation of the contribution of non-coital related contraceptive measures to the incidence of conception be explored. Although it was insignificant statistically, it is interesting to note, that 2 of the 16 women who conceived reported using birth control measures at the time of conception. In-depth interviews of these subjects might detect failure in contraceptive practice, failure in contraceptive method and/or additional predictive variables.

Many of the respondents included letters and cards explaining the nature and context of the stresses they reported. Brown has suggested that by rating the long and short term threat of life stress

events, the contextual meaning of the stress, one will have a better predictor of change in health status than just a check list of events.[3] A content analysis of these letters together with a follow-up interview would shed light on the contextual meaning of life stress. The follow-up interviews might best be directed to those who responded with letters and those who conceived within the intervening six months. This has been an extremely cooperative sample that has indicated that they are curious as to the results of this study and would be willing to participate in follow-up investigations.

It has been suggested that conception and illness share a common pathway of life stress events. Although this was not supported by the hypotheses, it has been suggested that a curvilinear relationship between the timing and the magnitude of life stress prior to conception may exist. Should subsequent research establish this relationship, it could be hypothesized that (1) pregnant women who sustain higher magnitude and appraisal of life stress, an "unstable" life style, will be more likely to sustain complications of pregnancy than pregnant women with a high magnitude and appraisal of life stress and a stable life style. If this hypothesis was supported, it would indicate that accompanying life stress, role consolidation is necessary to "insulate" women from further life stress, to make them ineligible for further significant life stress. If role consolidation does not occur, obstetrical

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[3]George W. Brown, "Meaning, Measurement, and Stress of Life Events," in Dohrenwend and Dohrenwend, eds. (John Wiley and Sons: New York, 1974), pp. 230-40.

complications would result as life stress would continue to escalate. Also, it could be proposed (2) that there would be an interaction effect of the magnitude, timing and appraisal of life stress, the stability of life style and the occurrence of obstetrical complications.

Clinical and Theoretical Implications of Study

The theoretical framework of this study suggests that by considering conception as a response to stress, issues surrounding family planning, infertility and adolescent pregnancy can be redefined. The findings of this study suggest that the stability of life style may be related to the occurrence of unwanted and unplanned pregnancy. For women who are pregnant and who do not want to be, perhaps, the stability of life style is what is planned and wanted rather than pregnancy itself. A pregnant adolescent sustaining the developmental crisis of adolescence may be consolidating her role as wife and mother, thereby becoming ineligible for additional life stress even though she is limiting her options and roles.

Originally, the investigator suggested that the prescription of life stress would be indicated for infertile couples. The findings suggest, however, that a change in life style would be a more appropriate prescription rather than a mere increase in life stress.

Also, the findings of this study suggest that professional nursing care, in addition to the care provided by a midwife and/or obstetrician, should include an historical approach to the life style, as well as the life events of the pregnant and pre-pregnant family.

Finally, the original propositions of this investigation suggest that conception, like illness, is a response to stress. On the basis of the findings of this study, the similarity between conception and illness can be re-evaluated.

The literature suggests that a high magnitude of life stress is a requirement for illness to occur. It is interesting to note that the illnesses most often reported are chronic in nature[4] e.g.,tuberculosis and heart disease. Could acute illnesses such as infections and the initial episodes of chronic illnesses "behave" like conception in response to stress? Could a "stable life style" surround the acute illness experience the way this investigation suggests that a "stable life style" surrounds conception? Could role consolidation (see Table 26) occur in the form of the "sick-role"? Furthermore, if this role consolidation does not occur, could the magnitude of life stress increase such that an individual becomes more susceptible to, eligible for, more serious illness of a chronic nature? The findings of this study suggest further inquiry into the nature of the relationship between life stress and illness.

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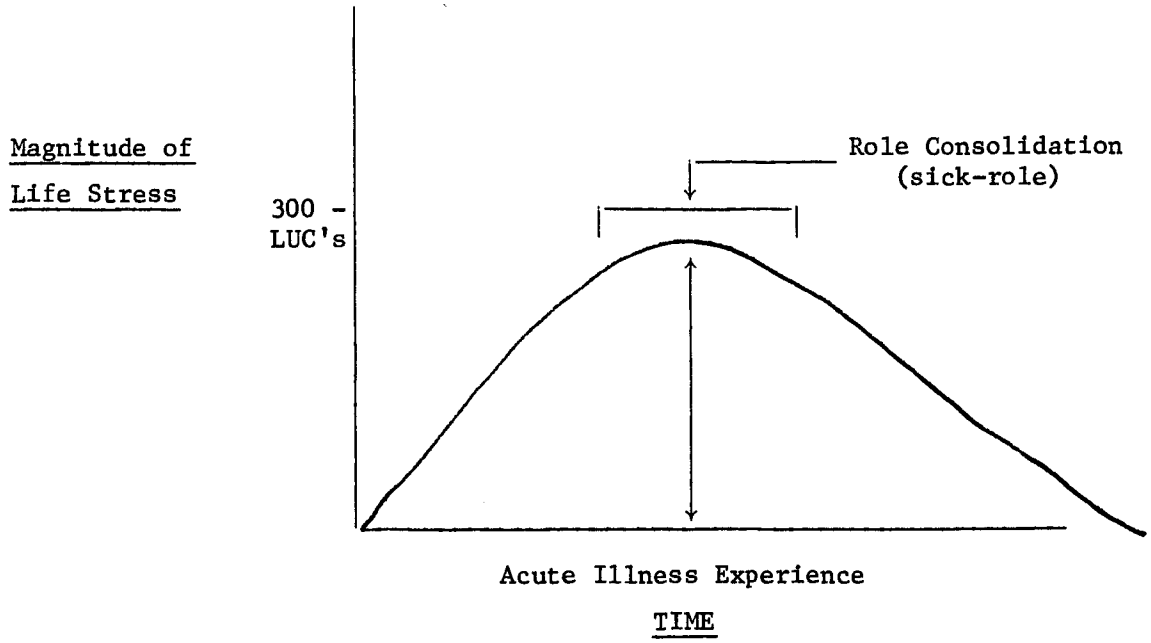
[4]Minora Masuda and Thomas H. Holmes, "Life Events: Perceptions and Frequencies," Psychosomatic Medicine 40 (May 1978): 236-61.

TABLE 26

PROPOSED RELATIONSHIP BETWEEN THE MAGNITUDE AND TIMING OF LIFE STRESS SURROUNDING THE ACUTE ILLNESS EXPERIENCE



APPENDICES

APPENDIX 1

Dear Respondent:

I am a faculty member in the Division of Nursing at Trenton State College and a Doctoral Candidate in Nursing at New York University.

Would you be willing to participate in my doctoral research on the relationship between Recent Life Changes and human reproductive behavior?

The research design of my study involves your providing responses to the enclosed questionnaires. Also, six months from now I will contact you again asking for additional responses assuming you are willing to participate.

Enclosed you will find a General Information Questionnaire, a Recent Life Changes Questionnaire, and a statement of agreement. If you are willing to participate, please complete these items and return them to me in the envelope provided.

The information you provide will be treated confidentially. Your responses will be included in group scores.

When my research is completed, I will be happy to inform you of my results.

Thank you for your cooperation.

Sincerely,

Marianne Roncoli, MA, RN
Assistant Professor, Division of Nursing, TSC
Doctoral Candidate, NYU

I _____ agree to participate in the doctoral research of Marianne Roncoli by completing the research questionnaires I receive.

I recognize that the information I provide will only be used in conjunction with her research.

I am aware that anonymity of my responses will be maintained at all times.

Signed _____

Date _____

GENERAL INFORMATION QUESTIONNAIRE

Please fill in the blanks below with the requested information.

Name _____

Address _____

1. Do you expect to be at the above address six months from now? Yes _____ No _____
2. If no to the above, at what address can you be reached six months from now? _____
3. Age _____
4. Occupation _____
5. Marital Status: Single _____ Married _____ Widowed _____ Separated _____ Divorced _____ Living with someone _____
6. Job Hours: Daytime _____ Evening _____ Nighttime _____
7. Race: White _____ Black _____ Other _____
8. Number of children: _____
9. Type of Residence: Home _____ Apartment _____ Own _____ Rent _____
10. Occupation of Head of Household: _____
11. Education of Head of Household: (last year of school completed) _____
12. Do you use birth control pills? Yes _____ No _____
13. Do you use any of the following forms of birth control?

Intrauterine device (IUD)	Yes _____	No _____
Diaphragm-Foam	Yes _____	No _____
Rhythm	Yes _____	No _____
Billings or Mucus Method	Yes _____	No _____
Sterilization	Yes _____	No _____
Vasectomy	Yes _____	No _____
Condom	Yes _____	No _____
Other _____	Yes _____	No _____

14. Do you have any chronic health problems? Yes _____ No _____

    If yes, describe _____

15. Are you presently pregnant? Yes _____ No _____
16. Would you like to be pregnant now? Yes _____ No _____

    Would you like to be pregnant in the near future? Yes _____ No _____

    Would you like to be pregnant ever? Yes _____ No _____
17. Frequency of heterosexual intercourse: less than 1/week _____ greater than 1/week _____

RECENT LIFE CHANGES QUESTIONNAIRE I*

I. Instructions for marking your recent life changes

To answer the questions below, mark an "X" in one or more of the spaces to the right of each question. If the event in question has occurred to you within the past two years, indicate when it occurred by marking in the appropriate box: 0-1 year ago, 1-2 years ago. It may be the case with some of the events below that you experienced them over both of the time periods listed for the past two years. If so, mark all the appropriate spaces. If the event has not occurred to you during the last two years (or has never occurred to you) leave all the spaces blank.

Now go through the questionnaire and mark your recent life changes. The column marked "Your Adjustment Score" will be explained at the end of the questionnaire.

	1-2 years ago	0-1 year ago	Your Adjustment Score
A. HEALTH			
Within the time periods listed, have you experienced:			
1. an illness or injury which:			
(a) kept you in bed a week or more, or took you to a hospital?	☐	☐	.....
(b) was less serious than described above?	☐	☐	.....
2. a major change in eating habits?	☐	☐	.....
3. a major change in sleeping habits?	☐	☐	.....
4. a change in your usual type and/or	☐	☐	.....
5. major dental work?	☐	☐	.....
B. WORK			
Within the time periods listed, have you:			
6. changed to a new type of work?	☐	☐	.....
7. changed your work hours or conditions?	☐	☐	.....
8. had a change in your responsibilities at work:			
(a) more responsibilities?	☐	☐	.....
(b) less responsibilities?	☐	☐	.....
(c) promotion?	☐	☐	.....
(d) demotion?	☐	☐	.....
(e) transfer?	☐	☐	.....
9. experienced troubles at work:			
(a) with your boss?	☐	☐	.....
(b) with co-workers?	☐	☐	.....
(c) with persons under your supervision?	☐	☐	.....
(d) other work troubles?	☐	☐	.....
10. experienced a major business readjustment?	☐	☐	.....
11. retired?	☐	☐	.....
12. experienced being:			
(a) fired from work?	☐	☐	.....
(b) laid off from work?	☐	☐	.....
13. taken courses by mail or studied at home to help you in your work?	☐	☐	.....
C. HOME AND FAMILY			
Within the time periods listed, have you experienced:			
14. a change in residence?			
(a) a move within the same town or city?	☐	☐	.....
(b) a move to a different town, city or state?	☐	☐	.....
15. a change in family "get-togethers"?	☐	☐	.....
16. a major change in the health or behavior of a family member (illness, accidents, drug or disciplinary problems, etc.)?	☐	☐	.....
17. major change in your living conditions (home improvements or a decline in your home or neighborhood)?	☐	☐	.....
18. death of a spouse?	☐	☐	.....
19. the death of a:			
(a) child	☐	☐	.....
(b) brother or sister?	☐	☐	.....
(c) parent?	☐	☐	.....
(d) other close family member?	☐	☐	.....
20. the death of a close friend?	☐	☐	.....
21. a change in the marital status of your parents?	☐	☐	.....
(a) divorce?	☐	☐	.....
(b) remarriage?	☐	☐	.....
22. marriage:	☐	☐	.....
23. a change in arguments with your spouse?	☐	☐	.....
24. in-law problems?	☐	☐	.....
25. a separation from spouse?	☐	☐	.....
(a) due to work?	☐	☐	.....
(b) due to marital problems?	☐	☐	.....
26. a reconciliation with spouse?	☐	☐	.....
27. a divorce?	☐	☐	.....
28. a gain in a new family member?			
(a) birth of a child?	☐	☐	.....
(b) adoption of a child?	☐	☐	.....
(c) a relative moving in with you?	☐	☐	.....
29. beginning or ceasing work outside the home?	☐	☐	.....
30. becoming pregnant?	☐	☐	.....
31. a child leaving home?			
(a) due to marriage?	☐	☐	.....
(b) to attend college?	☐	☐	.....
(c) for other reasons?	☐	☐	.....
32. having a miscarriage or abortion?	☐	☐	.....
33. birth of a grandchild?	☐	☐	.....
D. PERSONAL AND SOCIAL			
Within the time periods listed have you experienced:			
34. a major personal achievement?	☐	☐	.....
35. a change in your personal habits (your dress, friends, life-style, etc.)?	☐	☐	.....
36. sexual difficulties?	☐	☐	.....
37. beginning or ceasing college or school?	☐	☐	.....
38. a change of school or college?	☐	☐	.....
39. a vacation?	☐	☐	.....
40. a change in your religious beliefs?	☐	☐	.....
41. a change in your social activities? (clubs, movies, visiting, etc.)	☐	☐	.....
42. a minor violation of the law?	☐	☐	.....
43. legal troubles resulting in your being held in jail?	☐	☐	.....
44. a change in your political beliefs?	☐	☐	.....
45. a new, close, personal relationship?	☐	☐	.....
46. an engagement to marry?	☐	☐	.....
47. a "falling out" of a close, personal relationship?	☐	☐	.....
48. girlfriend (or boyfriend) problems?	☐	☐	.....
49. a loss or damage of personal property?	☐	☐	.....
50. an accident?	☐	☐	.....
51. a major decision regarding your immediate future?	☐	☐	.....
E. FINANCIAL			
Within the time periods listed, have you:			
52. taken on a moderate purchase, such as a T.V., car, freezer, etc.?	☐	☐	.....
53. taken on a major purchase or a mortgage loan, such as a home, business, property, etc.?	☐	☐	.....
54. experienced a foreclosure on a mortgage or loan?	☐	☐	.....
55. experienced a major change in finances?			
(a) increased income?	☐	☐	.....
(b) decreased income?	☐	☐	.....
(c) credit rating difficulties?	☐	☐	.....

II. Instructions for scoring your adjustment to your recent life changes

Persons adapt to their recent life changes differently. For example, some people find that the adjustment to a residential move is enormous, while others say very little life adjustment is necessary. Your are now asked to "score" each of your recent life changes (the ones that you marked with an "X") as to the amount of personal adjustment required by that event.

Your scores can range from 1 to 100 "points". For example, if you experienced a recent residential move and felt it required very little adjustment, you would choose a low number and place it in the blank to the right of that question's spaces. On the other hand, if you recently changed residence and felt it required considerable adjustment, you would place a high number in the blank to the right of that question's spaces. For intermediate adjustment scores you would choose intermediate numbers between 1 and 100.

Please go back through your questionnaire and for just those life changes you marked with an "X", write in your adjustment scores (between 1 and 100).

APPENDIX 2

Dear:

Several months ago you helped me with my doctoral research on recent life changes and human reproductive behavior. For this, I am most grateful. At that time I said that I would contact you again in order to complete my study.

Enclosed you will find a copy of the Recent Life Changes Questionnaire and a Conception Information Form. Please read the instructions, complete these forms and return them to me in the envelope provided.

Please know that it is vital to the completion of my study that you complete and return these questionnaires. I appreciate your cooperation very much and I will send you a copy of my results when the study is finished.

Thanks again.

Sincerely,

[redacted]

Marianne Roncoli, MA, RN
Assistant Professor of Nursing
Trenton State College

I would like a copy of the results of this study. Yes____No____

I would agree to be contacted again in six months for a follow-up study. Yes____No____

CONCEPTION INFORMATION FORM

Please complete the following "Conception Information Form" by marking "X" in appropriate space below.

1. Are you presently pregnant? Yes _____ No _____

If you answered **yes** to the above, please answer questions 2-5 below. If you answered **no** to the above, please go on to question 6.

2. If you are pregnant now, did you have a positive pregnancy test? Yes _____ No _____
3. If you are pregnant now, were you using birth control measures at the time you conceived? Yes _____ No _____
4. If you are *pregnant* now, do you want *this* pregnancy to go to term? Yes _____ No _____
5. If you are pregnant now, did you plan on this pregnancy? Yes _____ No _____
6. If you are **not** pregnant now, have you been within the last six months? Yes _____ No _____

If you answered **yes** to the last question, (#6), please answer questions 7-12 below. If you answered **no** to question 6, it is not necessary to answer the following questions.

7. If you were pregnant within the last six months, but are not pregnant now, did you have a positive pregnancy test? Yes _____ No _____
8. If you were pregnant within the last six months, but are not pregnant now, were you using birth control measures at the time you conceived? Yes _____ No _____
9. If you were pregnant *within the last* six months, but are not pregnant now, *did* you have a *voluntary* abortion? Yes _____ No _____
10. If you were pregnant within the last six months, but are not pregnant now, did you have a miscarriage? Yes _____ No _____
11. If you were pregnant within the last six months, but are not pregnant now, did you plan on that pregnancy? Yes _____ No _____
12. If you were pregnant within the last six months, but are not pregnant now, did you want that pregnancy to go to term? Yes _____ No _____

RECENT LIFE CHANGES QUESTIONNAIRE II*

Six months ago, you marked with an "X" recent life changes you had experienced on the questionnaire below. In addition, you rated the amount of adjustment you felt the life changes required of you on a scale of 1-100. You entered the score in the column marked "Your Adjustment Score." The questionnaire below includes the "X" 's of the recent life changes you experienced **without** your corresponding adjustment scores.

Since I would like to find out whether your appraisal of adjustment changed over time, please go through the questionnaire and, in the column marked "Your Adjustment Score," re-appraise the life changes in terms of how much adjustment you think these changes required of you **at the time you were adjusting to them.**

Your score can range from 1-100 points. For example, if you experienced a residental move and felt it required very little adjustment, you would choose a low number and place it in the blank to the right of that question's boxes. On the other hand, if you changed residences and felt it required considerable adjustment, you would place a high number in the blank to the right of that question's boxes. For intermediate adjustment scores you would choose intermediate numbers between 1 and 100.

Please go back through your questionnaire and for just those life changes you marked with an "X," write in your adjustment scores (between 1 and 100).

The column marked "new events within past 6 mo. and their adjustment scores" will be explained at the end of this questionnaire.

	1-2 years ago	0-1 year ago	Your Adjust. Score	New Events within Past 6 mo. and their adjustment scores
A. HEALTH				
Within the time periods listed, have you experienced:				
1. an illness or injury which:				
(a) kept you in bed a week or more, or took you to a hospital?	☐	☐	___	...../.....
(b) was less serious than described above?	☐	☐	___	...../.....
2. a major change in eating habits?	☐	☐	___	...../.....
3. a major change in sleeping habits?	☐	☐	___	...../.....
4. a change in your usual type and/or amount of recreation?	☐	☐	___	...../.....
5. major dental work?	☐	☐	___	...../.....
B. WORK				
Within the time periods listed, have you:				
6. changed to a new type of work?	☐	☐	___	...../.....
7. changed your work hours or conditions?	☐	☐	___	...../.....
8. had a change in your responsibilities at work:				
(a) more responsibilities?	☐	☐	___	...../.....
(b) less responsibilities?	☐	☐	___	...../.....
(c) promotion?	☐	☐	___	...../.....
(d) demotion?	☐	☐	___	...../.....
(e) transfer?	☐	☐	___	...../.....
9. experienced troubles at work:	☐	☐	___	...../.....
(a) with your boss?	☐	☐	___	...../.....
(b) with co-workers?	☐	☐	___	...../.....
(c) with persons under your supervision?	☐	☐	___	...../.....
(d) other work troubles	☐	☐	___	...../.....
10. experienced a major business readjustment?	☐	☐	___	...../.....
11. retired?	☐	☐	___	...../.....
12. experienced being:				
(a) fired from work?	☐	☐	___	...../.....
(b) laid off from work?	☐	☐	___	...../.....
13. taken courses by mail or studied at home to help you in your work?	☐	☐	___	...../.....
C. HOME AND FAMILY				
Within the time periods listed, have you experienced:				
14. a change in residence?				
(a) a move within the same town or city?	☐	☐	___	...../.....
(b) a move to a different town, city or state?	☐	☐	___	...../.....
15. a change in family "get-togethers"?	☐	☐	___	...../.....
16. a major change in the health or behavior of a family member (illness, accidents, drug or disciplinary problems, etc.)?	☐	☐	___	...../.....
17. major change in your living conditions (home improvements or a decline in your home or neighborhood)?	☐	☐	___	...../.....
18. death of a spouse?	☐	☐	___	...../.....
19. the death of a:				
(a) child?	☐	☐	___	...../.....
(b) brother or sister?	☐	☐	___	...../.....
(c) parent?	☐	☐	___	...../.....
(d) other close family member?	☐	☐	___	...../.....
20. the death of a close friend?	☐	☐	___	...../.....
21. a change in the marital status of your parents?				
(a) divorce?	☐	☐	___	...../.....
(b) remarriage?	☐	☐	___	...../.....
22. marriage?	☐	☐	___	...../.....
23. a change in arguments with your spouse?	☐	☐	___	...../.....
24. in-law problems?	☐	☐	___	...../.....
25. a separation from spouse:				
(a) due to work?	☐	☐	___	...../.....
(b) due to marital problems?	☐	☐	___	...../.....
26. a reconciliation with spouse?	☐	☐	___	...../.....
27. a divorce?	☐	☐	___	...../.....
28. a gain of a new family member:				
(a) birth of a child?	☐	☐	___	...../.....
(b) adoption of a child?	☐	☐	___	...../.....
(c) a relative moving in with you?	☐	☐		...../.....
29. beginning or ceasing work outside the home?	☐	☐	___	...../.....
30. becoming pregnant?	☐	☐	___	...../.....
31. a child leaving home?				
(a) due to marriage?	☐	☐	___	...../.....
(b) to attend college?	☐	☐	___	...../.....
(c) for other reasons?	☐	☐	___	...../.....
32. having a miscarriage or abortion?	☐	☐	___	...../.....
33. birth of a grandchild?	☐	☐	___	...../.....
D. PERSONAL AND SOCIAL				
Within the time periods listed, have you experienced:				
34. a major personal achievement?	☐	☐	___	...../.....
35. a change in your personal habits (your dress, friends, life-style, etc.)?	☐	☐	___	...../.....
36. sexual difficulties?	☐	☐	___	...../.....
37. beginning or ceasing school or college?	☐	☐	___	...../.....
38. a change of school or college?	☐	☐	___	...../.....
39. a vacation?	☐	☐	___	...../.....
40. a change in your religious beliefs?	☐	☐	___	...../.....
41. a change in your social activities (clubs, movies, visiting, etc.)?	☐	☐	___	...../.....
42. a minor violation of the law?	☐	☐	___	...../.....
43. legal troubles resulting in your being held in jail?	☐	☐	___	...../.....
44. a change in your political beliefs?	☐	☐	___	...../.....
45. a new, close, personal relationship?	☐	☐	___	...../.....
46. an engagement to marry?	☐	☐	___	...../.....
47. a "falling out" of a close personal relationship?	☐	☐	___	...../.....
48. a boyfriend (or girlfriend) problem?	☐	☐	___	...../.....
49. a loss or damage of personal property?	☐	☐	___	...../.....
50. an accident?	☐	☐	___	...../.....
51. a major decision regarding your immediate future?	☐	☐	___	...../.....
E. FINANCIAL				
Within the time periods listed, have you:				
52. taken on a moderate purchase such as a a T.V., car, freezer, etc.?	☐	☐	___	...../.....
53. taken on a major purchase or a mortgage loan, such as a home, business, property, etc.?	☐	☐	___	...../.....
54. experienced a foreclosure on a mortgage or loan?	☐	☐	___	...../.....
55. experienced a major change in finances?				
(a) increased income?	☐	☐	___	...../.....
(b) decreased income?	☐	☐	___	...../.....
(c) credit rating difficulties?	☐	☐	___	...../.....

II. INSTRUCTIONS FOR SCORING "NEW EVENTS"

In all probability you have experienced recent life changes during the interim period between the time I first contacted you and now.

Please go back over the questionnaire and mark an "X" next to the recent life changes that you have experienced during the last six months. Please go back and write in your adjustment score from 1-100 just as you have done previously.

*Richard H. Rahe, 1974 Reprinted with permission.

APPENDIX 3

LIFE CHANGES QUESTIONNAIRE FOR 14 ADDITIONAL ITEMS

The following items are considered stressful life events that happen to people at some time in their lives. You are asked to rate the following items on a scale of 0-1000 in terms of the amount of adjustment required of each item. Only consider how much adjustment is required of people in general regardless of whether or not you have experienced the event.

Consider "getting married" as having a weight of 500. Assign a number weight to each item in terms of whether or not it requires more or less adjustment than "getting married."

1. Major dental work
2. Having taken courses by mail or having studied at home to help you in your work
3. Change in the marital status of your parents
   a) divorce
   b) remarriage
4. Wife having a miscarriage or abortion
5. Birth of a grandchild
6. Change in your political beliefs
7. New, close, personal relationship
8. Engagement to marry
9. "Falling out" of a close personal relationship
10. Girlfriend (or boyfriend) problems
11. Loss or damage of personal property
12. An accident
13. Major decision regarding your immediate future.

APPENDIX 4*

RECENT LIFE CHANGES QUESTIONNAIRE: 1974 REVISION

LCU SCORING WEIGHT	
	A. HEALTH
	Within the time periods listed, have you experienced:
53	1. an illness or injury which:
	(a) kept you in bed a week or more, or took you to the hospital?
	(b) was less serious than described above?
15	2. a major change in eating habits?
16	3. a major change in sleeping habits?
19	4. a change in your usual type and/or amount of recreation?
	* 5. major dental work?
	B. WORK
	Within the time periods listed, have you:
36	6. changed to a new type of work?
20	7. changed your work hours or conditions?
29	8. had a change in your responsibilities at work:
	(a) more responsibilities?
	(b) less responsibilities?
	(c) promotion?
	(d) demotion?
	(e) transfer?
23	9. experienced troubles at work:
	(a) with your boss?
	(b) with co-workers?
	(c) with persons under your supervision?
	(d) other work troubles?
39	10. experienced a major business readjustment?
45	11. retired?
47	12. experienced being:
	(a) fired from work?
	(b) laid off from work?
	*13. taken courses by mail or studied at home to help you in your work?
	C. HOME AND FAMILY
	Within the time periods listed, have you experienced:
20	14. a change in residence:
	(a) a move within the same town or city?
	(b) a move to a different town, city or state?
15	15. a change in family "get-togethers"?
44	16. a major change in the health or behaviour of a family member (illness, accidents, drug or disciplinary problems, etc.)?

LCU SCORING WEIGHT	
25	17. major change in your living conditions (home improvements or a decline in your home or neighborhood)?
100	18. the death of a spouse?
63	19. the death of a : (a) child? (b) brother or sister? (c) parent? (d) other close family member?
37	20. the death of a close friend?
	*21. a change in the marital status of your parents: (a) divorce? (b) marriage?

NOTE:
(Questions 22-32 concern marriage. For persons never married, go to Item 34.)

50	22. marriage?
35	23. a change in arguments with your spouse?
29	24. in-law problems?
	25. a separation from spouse:
45	(a) due to work?
65	(b) due to marital problems?
45	26. a reconciliation with spouse?
73	27. a divorce?
39	28. a gain of a new family member: (a) birth of a child? (b) adoption of a child? (c) relative moving in with you?
26	29. wife beginning or ceasing work outside the home?
40	30. wife becoming pregnant?
29	31. child leaving home: (a) due to marriage? (b) to attend college? (c) for other reasons?
	*32. wife having miscarriage or abortion?
	*33. birth of a grandchild?

D. PERSONAL AND SOCIAL

Within the time periods listed, have you experienced:

28	34. a major personal achievement?
24	35. a change in your personal habits (your dress, friends, life-style, etc.)?
39	36. sexual difficulties?
26	37. beginning or ceasing school or college?
20	38. a change of school or college?

13 39. a vacation?
19 40. a change in your religious beliefs?
18 41. a change in your social activities (clubs, movies, visiting)?
11 42. a minor violation of the law?
63 43. legal troubles resulting in your being held in jail?
*44. a change in your political beliefs?
*45. a new, close, personal relationship?
*46. an engagement to marry?
*47. a "falling out" of a close personal relationship?
*48. girlfriend (or boyfriend) problems(
*49. loss or damage of personal property?
*50. an accident?
*51. a major decision regarding your immediate future?

E. FINANCIAL

Within the time periods listed, have you:

17 52. taken on a moderate purchase, such as a T.V., car, freezer, etc.?
31 53. taken on a major purchase or a mortgage loan, such as a home, business, property, etc.?
30 54. experienceda foreclosure on a mortgage or loan?
38 55. experienced a major change in finances:
(a) increased income?
(b) decreased income?
(c) credit rating difficulties?

*new questions

SLCU INSTRUCTIONS:

B. INSTRUCTIONS FOR SCORING YOUR ADJUSTMENT TO YOUR RECENT LIFE CHANGES

Persons adapt to their recent life changes in different ways. Some people find the adjustment to a residential move, for example, to be enormous, while others find very little life adjustment necessary. You are now requested to "score" each of the recent life changes that you marked with an "X" as to the amount of adjustment you needed to handle the event.

Your score can range from 1 to 100 "points". If, for example, you experienced a recent residential move, but felt it required very little life adjustment, you would choose a low number and place it in the blank to the right of the question boxes. On the other hand, if you recently changed residence and felt it required a near maximal life adjustment, you would place a high number, toward 100, in the blank to the right of that question's

boxes. For immediate life adjustment scores you would choose intermediate numbers between 1 and 100.

Please go back through your questionnaire and for each recent life change you indicated with an "X", choose your personal life change adjustment score (between 1 and 100) which reflects what you saw to be the amount of life adjustment necessary to cope with or handle the event. Use both your estimates of the intensity of the life change and its duration to arrive at your scores.

---

*Richard H. Rahe, 1974.

APPENDIX 5

ITEMS RELATED TO LOSS ON RLCQ

A. HEALTH

1. An illness or injury which kept you in bed a week or more, or took you to a hospital.

B. WORK

12. Experienced being:
    a) fired from work
    b) laid off from work

C. HOME AND FAMILY

18. Death of a spouse

19. Death of a:
    a) child
    b) brother or sister
    c) parent
    d) other close family members

20. Death of a close friend

25. Separation from spouse:
    a) due to work
    b) due to marital difficulties

27. Divorce

31. A child leaving home:
    a) due to marriage
    b) to attend college
    c) other reasons

32. Having a miscarriage or abortion

D. PERSONAL AND SOCIAL

47. A "falling out" of a close personal relationship

49. Loss or damage of personal property

E. FINANCIAL

54. Experienced a foreclosure on a mortgage or loan

55b. Experienced a major decrease in income.

APPENDIX 6

OBJECTIVE-SUBJECTIVE CLASSIFICATION OF ITEMS ON RLCQ

Objective Items

1. An illness or injury which:
   a) kept you in bed a week or more, or took you to the hospital.
   b) was less serious than described above.
5. Major dental work.
11. Retired.
12. Experienced being:
    a) fired
    b) laid off from work
13. Taken courses at home.
14. Change in residence.
18. Death of a spouse.
19. Death of family member(s)
20. Death of a close friend
21. Change in marital status of parents:
    a) divorce
    b) remarriage
22. Marriage
25. Separation from spouse -
    a) due to work
    b) due to marital problems
27. Divorce
28. Gain in new family member.

Subjective Items

2. Major change in eating habits
3. Major change in sleeping habits.
4. Change in recreation habits.
6. Changed to a new type of work.
8. Had a change in responsibilities at work.
9. Experienced troubles at work.
10. Experienced a major business readjustment.
15. Change in family get-togethers.
16. Change in health of family member(s).
17. Change in living conditions.
23. Change in arguments with spouse.
24. In-law problems.
26. Reconciliation with spouse.
34. Major personal achievement.
35. Change in personal habits.
36. Sexual difficulties
40. Change in religious beliefs.
41. Change in social activities.
42. Minor violation of the law.

Objective Items

29. Beginning or ceasing work outside the home.
30. Becoming pregnant.
31. Child leaving home.
32. Having miscarriage or abortion.
33. Birth of a grandchild.
37. Beginning or ceasing school.
38. Change of college or school.
39. Vaction.
43. Legal troubles resulting in your being held in jail.
46. Engagement to marry.
54. Experienced a foreclosure on a mortgage or loan.
65. Experienced change in income:
    a) increased
    b) decreased
    c) credit-rating difficulties.

Subjective Items

44. Change in your political beliefs.
45. New close personal relationship.
47. "Falling-out" of a close personal relationship.
48. Girlfriend (or boyfriend) problems.
49. Loss or damage of personal property.
50. Accident.
51. Major decision regarding your immediate future.
52. A moderate purchase such as a T.V.
53. Major purchase.

APPENDIX 7

QUALIFICATIONS OF CANDIDATE

Marianne Roncoli
[redacted]
New York NY 10011
[redacted]

Born: June 26, 19[redacted]
Single
No dependents

Educational Preparation

School	Major	Degree	Year
Cornell Univ. NYH School of Nursing [redacted] NY, NY 10019	Nursing	BSN	1969
NYU-SEHNAP Division of Nursing [redacted] NY, NY 10003	Psychiatric-Adult Mental Health Nursing Minor - Clinical	MA	1973
NYU-SEHNAP (see above)	Nursing Doctoral Candidate ABD	PhD (pending)	1978

Professional Experience

Institution	Position	Responsibilities	Year
Memorial Hospital [redacted] NY, NY 10019	Staff Nurse Full time and per diem	Direct Patient Care Team leading Charge nurse, night 42-bed medical unit	1969-1970 full-time 1970-1973 per diem
Holy Name Hospital School of Nursing Teaneck Road Teaneck NJ	Assist. Inst. Full-Time	Lecture and supervision of diploma nursing students in psychiatric nursing	1970-1971
Woman's Psychotherapy Referral Service, Inc. [redacted]	Clinical Administrator	Created position, established SOP, intakes, referrals, chaired meetings, prepared annual reports.	Feb. 1973-Feb. 1974

Institution	Position	Responsibilities	Dates
Woman's Psychotherapy Referral Service, Inc.	Member of Board of Directors	Consultation and supervision of staff	Feb. 1974 present
NYU-SEHNAP Division of Nursing [redacted] Washington Square New York NY 10003	Instructor	Undergraduate (a) Lab and Seminar NSII (OBS) (b) Lab and Seminar NSIB (Basic Nursing) (c) Full course responsibility (NSIB) (d) Full course responsibility (NSII) (e) Independent Study Graduate (a) Lab and Seminar-Family (b) Full course responsibility Group Behavior (c) Independent Study	Fall 1973 and Spring 1974 Fall 1974 Summer 1975 Summer 1976 & 1977 Fall 1974 Spring 1975 Fall 1974 Fall 1974 Spring 1975 & Summer 1975 Spring 1974
Rutgers University Graduate Program Psychiatric Nursing Beck Hall Livingston Campus New Brunswick, NJ	Instructor Part-time	Supervision of first semester graduate students in group behavior	Fall 1975
William Paterson College of NJ	Assistant Professor Part-time	Supervision of senior under-graduate students in high-risk maternity - OPD	Fall 1976 Spring 1977
Private Practice	Psychoanalytic Psychotherapy	3-5 hours/week	Spring 1973-present
Trenton State College	Assist. Prof.	undergraduate Junior & Senior level	Fall 1977-present
City College [redacted] New York NY	Assist. Prof.		

Additional Courses

Course	Place	Instructor
Advanced Individual Psychotherapy I Fall 1974 10 weeks	New York through NJSNA Society of Certified Clinical Specialists	Sheila Rouslin
Advanced Individual Psychotherapy II Spring 1975 10 weeks	New York (see above)	Sheila Rouslin
Alone and Female: The Social and Psychological Determinants of Loneliness and Autonomy Spring 1975 12 weeks	New School for Social Research, Department of Human Relations	Susanne P. Schad-Somers, Ph.D.

Workshops Attended

Place	Topic	Dates
Rutgers University	State of the Arts Conference in Psychiatric Nursing	Fall 1973
Institute for Contemporary Psychotherapy [redacted] New York 10024	Symposium for Family Therapy	November 11, 1973
New York University	Sigma Theta Thau Research Day and Doctoral Students Homecoming	Spring 1974 Spring 1975 Spring 1976
Weekend Retreat	Doctoral Students Weekend - NYU	October 22-24, 1976
NYU Alumni Association	Sexuality Conference	Fall 1976
Herbert H. Lehman College Department of Nursing	Health Assessment Workshop	June 1977

Participation in Workshops

Place	Presentation	Dates
Women and Psychology Workshop New School, Graduate Faculty Center, 65 Fifth Avenue New York, New York	Paper: Feminist Psychotherapy: An Interpersonal Approach	September 18, 1974
1975 National Conference on Women and Health Boston, Massachusetts	Panel Presentation: Politics of Therapy	April 4-7, 1975
Woodstock Lecture Series Women's Center of Woodstock	Lecture: Feminist Psychotherapy	July 10, 1975
Women's Coffee House New York City	Panel Presentation: Feminist Referral Services in New York City	February 22, 1976
New York University Doctoral Student Colloquiam	Panel Presentation: Nurses in Private Practice	March 2, 1976
Woman and Success New School Graduate Center 65 Fifth Avenue, New York, NY	Chairperson and Panel Moderator of Workshop	April 24, 1977
Women and Psychology Four Phases: A Woman's Life New School, 66 West 12 Street New York, New York	Panel Moderator	November 20, 1976
Men and Women: Sex Roles in Psychology, New School 66 West 12 Street, New York, New York	Paper presented: Progression of Intimacy in Human Relationships	March 19, 1977

Professional Affiliations

NYSNA
Now - NY (Chairperson Steering Committee of Psychology Committee 1973-1974)
Sigma Theta Tau - Upsilon Chapter

Publications

Roncoli, Marianne, "Childhood's Funeral," (poem) Nursing Forum XI, No.2 (1972, p.185)

Roncoli, Marianne, "Bantering: A Therapeutic Strategy With Obsessional Patients." Perspectives in Psychiatric Care XII, No.4 (1974).

Courses Taken Relevant to Study

E16, 2001, 2002 - Educational Statistics
E10.2134 - Experimental Research
E35.2035 - Measurement and Evaluation II
E41.2303 - Research in Nursing
E41.3303, 3304 - Divisional Seminar I and II
E41.3313, 3314 - Dissertation on Proposal Seminar I and II
E14.2042 - Science and Human Values
E20.2051 - Personality and Social Structure
G89.2276 - Research in Psychotherapy

SELECTED BIBLIOGRAPHY

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