A Study of the Onset, Severity and Frequency of Illness as Related to Life Changes and Coping Mechanisms

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A STUDY OF THE ONSET, SEVERITY AND FREQUENCY OF ILLNESS AS RELATED TO LIFE CHANGES AND COPING MECHANISMS

By

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Abstract

A study which investigated the relationships between the onset, frequency and severity of past and present illnesses, with life changes and coping mechanisms was carried out. Subjects consisted of three levels of health care: (1) symptom-free (N=88); (2) minor illness (N=72), and (3) hospital patients (N=100). Three measures were employed to test these relationships: (1) the Schedule of Recent Experience (SRE); (2) the Medical History Check-List (MHCL) and, (3) the Boston University Personality Inventory (BUPI). In addition, Seriousness of Illness Rating Scale (SIRS) mean values or severity weights were assigned to subjects' physician diagnosed illnesses.

As expected, the amount of life change experienced by the subjects was directly related to the amount, frequency and severity of illness encountered. As well, life changes clustered around the 0-6 month period prior to illness onset for individuals who had a present illness diagnosed. The hospital patients had the highest amount of life change of all subject-groups. Subjects responses to the life events items were unrelated to the demographic variables of the SRE.

The amount of life changes, as well as the amount of self-reported MHCL illness, differed significantly
between all subject-groups. Also, the passage of time (measured by the three time periods) had no effect on these differences. Therefore, the LCU scoring method appears to be a valid one in predicting the level of health care attained by subjects up to two years prior to the onset of illness. In addition, the amount of illness subjects encounter prior to the onset of a present disease may be indicative of the severity and duration of their present illness.

As expected, subjects who exhibited good coping ability and a mild to moderate amount of life changes had the least amount of self-reported illness of all groups.
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Introduction

Implications of Stress

Shifts and changes in the psychological climate experienced by the human organism can bring about stress by generating emotional or affective changes (e.g., worry, upset, conflict, uncertainty, happy anticipation and joy). Indeed, the very anticipation of change can trigger stress — also referred to as the adaptive reaction (Toffler, 1970). Specifically, when one is placed in a prolonged situation that demands a complex set of physical and psychological reactions, and in which such pressure is sustained, coping occurs in terms of an adaptive reaction — stress. However, when individuals are forced to make repeated adaptations to novelty, and especially when they are compelled to adapt to certain situations involving conflict and uncertainty, the body's reserve of energy is eventually drained. Accordingly, the individual's coping abilities are reduced.

Not surprisingly, conditioned anxiety apparently plays an important role in the stress situation. Anxiety is a motivating state of arousal, and the direction of the behavior thereby motivated is one of withdrawal from the anxiety-stimulating situation (Mowrer, 1961). Since any behavior with a history of consistently reducing anxiety tends to be strongly learned, avoidance behaviors may take innumerable forms. Some of these
behaviors may be, in the long run, highly unadaptive, or even maladaptive. For example, if an individual is repeatedly placed in stressful situations he may be able to cope owing to a conditioned state of anxiety. However, if an individual has never experienced a particular type of stress (e.g., failure) the absence of learned coping responses may lead to more disastrous consequences relative to that seen in a person who has been conditioned to deal effectively with the stressor (Seligman, Klein & Miller, 1975). Furthermore, anxiety, as many other emotional states, serves as a motive for behavior. Anxiety itself is a motive for avoidance behaviour brought on by a fear drive, and thus a large part of human motivation is a search to avoid anxiety (Mowrer, 1961). Accordingly, stress or anxiety can be induced by the need to alter one's way of life, to trade jobs, social pressures, status shifts, life style modifications, in fact, anything that forces us to confront the unknown.

Given this state of affairs, it is not unlikely that by enhancing the pace of scientific, technological and social change, we are interfering with the chemistry and biological stability of the organism. There are, however, limits on adaptability, for finite boundaries exist; man is not infinitely resilient. Thus, each response, each adaptive reaction, or stress situation exacts a price by wearing down
the body until, in some individuals, perceptible tissue damage results. In effect there are limits to the amount of change the human organism can absorb, and that by endlessly accelerating change without first determining these limits, some individuals may be subjected to demands they simply cannot tolerate. When we increase the rate of change indiscriminately, the health of those least able to adapt, as well as their ability to act rationally on their own behalf, may be undermined. Just as the body cracks under the strain of environmental overstimulation, the mind and its decision making processes behave erratically when overloaded. Berlyne (1970) has described this state of affairs as follows: "The central nervous system...is designed to cope with environments that produce a certain rate of... stimulation. It will naturally not perform at its best in an environment that overstresses or overloads it." "...experiments point unequivocally to the existence of what might be called an "adaptive range" below which and above which the individual's ability to cope simply falls apart." Stress symptoms may be the response to overstimulation. They occur when the individual is forced to operate above his adaptive range. Miller (1970)
The anxiety tolerance level is that level at which the individual can stand without serious psychological harm or maladjustment.

Murray (1967) also believes that behavior is functionally dependent upon the central nervous system. Furthermore, he suggested that there are many needs which play an important role in the organization and function of personality. Some of these include: affiliation, coherence, nurturance, dominance, autonomy, achievement, sex, acquisition and order. In addition, according to Murray, personality is revealed in the concrete activities of the individual over a period of time. These activities may be internal—thoughts, memories, fantasies— or external, comprising the individual's attempt to cope with environmental events. Therefore, one may suggest that an individual's attempt to satisfy his many needs, as well as function within society, may generate a great deal of psychological and physiological stress.

By forcing people to adapt to an accelerated pace of life, to confront novel situations and to
satisfy their many needs, ... to some extent is subjected to cognitive overstimulation. Some people can tolerate more novelty than others by thriving on change, or through processes of conditioned anxiety. However, it is the structure of our society that basically determines the mix of decisions man must make and the pace at which they must be made. Thus, the cumulative impact of sensory, cognitive and decisional overstimulation, as well as the physical effects of neural or endocrine overload, creates illness in our society, for no one can be pushed above his adaptive range without suffering disturbance or disorientation (Toffler, 1970).

The implications of stress on physical well being have recently begun to register, for there is increasing evidence that repeated stimulation of the adaptive reaction-stress, can be seriously damaging and that excessive activation of the endocrine system leads to irreversible "wear and tear". For example, Levi (1969) has shown in his experiments that even quite small changes in the emotional climate or in interpersonal relationships can produce marked changes in body chemistry.

In addition, Seyle (1974) has reported that the specific results of the two events, sorrow and
joy, are completely different, yet their stressor effect—the non-specific demand to readjust oneself to an entirely new situation may be the same. Thus, they may provoke an identical biochemical reaction in the body.

In conclusion, it may be suggested that: "States of health or diseases are the expressions of the success or failure experienced by the organism in its efforts to respond adaptively to environmental challenges" (Dubos, 1965). Some of these challenges may appear as competitive situations, functions within a crowded environment, or the anticipation of change.

One should note at this point, that the effects of stress on adaptation may not be as easily defined as outlined by these authors. Thus, their assumptions should be considered plausible but necessarily binding, since the response of each human organism is uniquely individual.
Review of the Literature

Susceptibility to illness

Masuda, Perko & Johnston (1972) suggested that disease in man can be viewed as a psychophysiological response that is maladaptive in the sense that it is a protective reaction, which may be inappropriate in kind or in magnitude. Disease states are often the result of the malfunctioning of internal mechanisms, which then enhance vulnerability to illness. Masuda et al., (1972) investigated changes in the sympathetic nervous system and adrenal cortex as indices of responders to environmental changes by using the Schedule of Recent Experience (SRE) and the Seriousness of Illness Rating Scale (SIRS). The findings of a relationship between subjects' variability in excretion of noradrenalin metabolite and the magnitude of the subjects' illness history suggested that maladaptiveness may be due to hyperfunction and/or hyperlability (excessive instability) of certain physiological systems. Further, the more threatening and chronic the environment the greater the probability of disease. It is likely, of course, that individual perceptions, life styles, attitudes and recall are factors which enter into illness reporting and that the accuracy of the illness data is constrained
by these factors.

The specific meaning of the data that have been adduced in relation to the great variety of illnesses exhibited is unclear. However, the concept that maladaptive physiology is a factor in illness and that the latter may be due to a magnitude of functions in one channel and/or an extreme instability or lability, in another, is tenable.

Hinkle et al., (1958) investigated the relationship between life experience, personality characteristics and general susceptibility to illness. One hundred male and female Chinese immigrants who had experienced many major life changes and adaptations were evaluated utilizing various psychological measures (i.e., Rorschach, Wechsler-Bellevue, Human Figure Drawing Test). They were also interviewed by an internist who obtained a factual biography and a review of all illnesses past and present. A physical examination and laboratory tests were used to clarify diagnostic questions. A psychiatrist assessed personality features through interviews. A sociologist and anthropologist obtained information in an attempt to understand subjects' reactions to various life situations within a cultural context.

Each subject was ranked according to the rate of episodes of illness per annum, over a 20 year period
of his life. The subjects were selected for comparison concerning illness occurrence on the basis of their rank. The more frequently ill subjects perceived their lives as more challenging, more demanding and more conflict-laden and experienced more disturbances of bodily processes and of mood, thought and behavior, as a result of their efforts to adapt to a greater number of perceived challenges.

Their findings suggested that the determinants of general susceptibility to illness are both genetic (in the sense that there are known familial occurrences of many of the illnesses experienced by the subjects with a high frequency of illness) and environmental, but that the actual life situations encountered are less important in this respect than in the way in which these situations are perceived. The authors conclude that episodes of illness are not distributed at random among members of the general population, but that among the members there is a general susceptibility to illness. These conclusions are supported by findings cited in later studies (i.e., Holmes & Rahe, 1967; Wyler, Masuda & Holmes, 1971).

Canter, Imboden & Cluff (1966) also examined frequency of illness as a function of prior psychological vulnerability and contemporary stress. The latter(stress) was defined as the work setting of the
subjects, which involved risk of contamination by accidental exposure to a virulent agent in a biological laboratory. Ninety-three "psychologically vulnerable" and 219 "non-vulnerable" subjects, as defined by scores on the MMPI and the Cornell Medical Index, were compared on their subsequent histories of accident stress experiences and their number of visits to a medical dispensary for complaints of physical illness during an 18 month period. Both groups had an equal number of accident stress experiences. However, psychological vulnerability and accident stress were significantly associated with higher illness rates when considered independently, and in combination, were associated with even higher illness rates.

The fact that the onset of disease occurs in a setting of significant environmental alterations requiring a major change in ongoing adjustment of the individual appears to have relevance to the ecology and epidemiology of disease. Psychophysiological studies (Rahe et al., 1964) indicate that naturally occurring and experimentally induced life situations which threaten the security of the individual and evoke attempts at adaptive behavior, also evoke significant alterations in the function of most bodily tissues, organs and systems. When sustained, these changes in function, in addition to engendering disturbing symptoms and tissue damage, often enhance the body's vulnerability
or susceptibility to the noxious effects of a wide spectrum of etiologic agents. Thus, any set of environmental factors which significantly alters the steady state of the individual increases the probability that bodily resistance to disease will be lowered. These findings further substantiate the results of studies previously cited.

The Social Readjustment Rating Questionnaire

Throughout the literature there exists a body of retrospective studies documenting the association between a person's life stress, life changes, personal loss and other measures of social upheaval with the subsequent recognition of illness in that individual.

One of the most significant of these studies is that of Holmes & Rahe (1967) who discuss the development of the Social Readjustment Rating Scale (SRRS). They state that previous studies (i.e., Rahe et al., 1964) had established that a cluster of social events requiring change in the ongoing life adjustment of an individual was significantly related to the time of illness onset. It had been adduced that this clustering of social or life events achieves etiologic significance as a necessary, but not sufficient cause of illness and accounts in part for the time of illness onset.

Numerous studies have found the relationship
between what has been variously called "life stress", "emotional loss", etcetera, to be related to illness onset (Rahe & Holmes, 1965). Thus, the literature notes that life events are at least contributory to illness onset.

The area of research concerning life events and illness onset was initiated by Holmes & Masuda (1940). They used the life chart device developed by Adolf Meyer in 1898. More than 5000 patients were tested to study the quality and quantity of life events that were empirically observed to cluster at the time of disease onset.

Many of the life events denoted stressful were those enumerated by Meyer and are part of the SRRC. The Social Readjustment Rating Questionnaire items were evolved from social and interpersonal transactions and pertain to major areas of dynamic significance in the social structure of contemporary way of life. The items include family constellation, marriage, occupation, residence, group and peer relationships, religion, recreation and health. Each item was constructed to contain life events whose advent is either indicative of, or requires a significant change in the ongoing life pattern of the individual.

Thus, the emphasis of the measure is on changes for the individual from the existing lifestyle.
and not on the psychological meaning, emotion or social desirability of the life events items. Only some of the items are 'negative' or stressful in the conventional sense, many are socially desirable and consonant with values of achievement, success, self-reliance, materialism, efficiency and the future. Thus, social readjustment measures the intensity and time necessary to accommodate to a life event, regardless of the desirability of the event.

Holmes & Rahe (1967) administered the SRRQ, denoted as a scaling instrument for life changes determined to precede major health changes (i.e., illness onset) to 394 subjects, to develop some estimate of the magnitude of such events and to provide a quantitative basis for new epidemiological studies of disease. Within their random sample they found consensus of the relative order and magnitude of events between subjects to be $r=0.90$ (except white and Negro which was $r=0.82$). For all subjects this consensus was statistically significant.

To standardize this method further, three measures of central tendency were systematically evaluated (Masuda & Holmes, 1967a): the arithmetic mean, the geometric mean and the median. There was a close
parallel to the rank order of all three measures of central tendency. Kendall's coefficient of concordance for the rank ordering of the three measures was 0.999.

Replication of the scaling method has been made on two American samples. Ruch & Holmes (1971) compared the ranking of life events assigned by a college population (average age was 18 years) with the original sample and found a very high coefficient of correlation (Spearman's rho=0.97).

Coddington (1972a,b) modified the SRRQ in order that certain items would relate to the events that occur in the lives of children as well as to establish the relative value and the rank order of different events. A different list of experiences was constructed for each of preschool, elementary, junior-high and senior high school age groups. The method for producing each age group scale was that used in generating the SRRS, that is, the amount of social-psychological readjustment a child undergoes during a specific time period is determined by summing the life change units (LCU). The raters were teachers, pediatricians and mental health workers (N=243). Inter-rater agreement was high with rank-order correlations of 0.90 or greater, suggesting that the raters essentially agreed on the relative importance of all items. Using the new scale to quantify recent childhood experiences, Coddington constructed an age-related curve of average social readjustment.
scores that is analogous to a growth curve since he felt
the method had merit as a clinical research tool.

The Schedule of Recent Experience (SRE)

The findings of the cited studies resulted in
the development of the SRRS, which assigns magnitudes
to each of the 42 life change events in terms of amount,
severity and duration of adjustment. In addition, the
Schedule of Recent Experience (SRE) was established.
The SRE is a self-administered paper and pencil survey
which lists these life changes by year and frequency of
occurrence, respectively (see Appendix A). The SRE consists
of 42 of the 43 SRRS items. Each item has a life change
unit (LCU) or mean weight derived from the SRRS (see
Appendix B).

The life changes are scaled according to their
estimated amount of life pattern change (LCU) for a subject,
and the degree of readjustment required in coping with
each change. The position of each life change category
on the SRRS and SRE scales is indicated by the number
of LCU's estimated to apply to it. The LCU weights on
the SRE range from 11 (for the item 'minor violations
of the law') to 100 (item 'death of a spouse'). Thus,
a subject's yearly life change can be numerically
represented by the total of that year's LCU's.
The LCU values had been previously determined in an unpublished study by Holmes & Rahe (Holmes & Masuda, 1973). The SRE items were mailed to 200 resident physicians and they were asked to list all 'major health changes' by year of occurrence that they had experienced in the past ten years. The items subscribed to in the SRE by the subjects were assigned their values from the SRRS. The values were then summed for each year and the total life change units (LCU) were derived for each subject for the decade under study.

A total of 96 diseases or changes in health status were reported by the 200 physicians who responded. On the basis of previous studies (Rahe et al., 1964) an arbitrary criterion was established for the temporal association of an illness or health change with life change events: a reported change in health must occur within a two year period following the occurrence of a cluster of life changes. This two year period was the time when the subject was "at risk" after the life change clustering.

Eighty-nine of the 96 major health changes reported (93%) (involving such categories as infectious, allergic, musculoskeletal & psychosomatic) were associated with a clustering of life changes whose values summed to at least 150 LCU's per year. A 'life crisis' was thus defined as any clustering of life change events whose individual values summed to 150 LCU's or
more, in one year. Thus, the range of 'life crises' are:

- Mild life crisis = 150-199 LCU's
- Moderate life crisis = 200-299 LCU's
- Major life crisis = 300+ LCU's

Further analysis of the data indicated a direct relationship between the magnitude of the life crisis and the risk of health change. As the LCU's increased, so did the percentage of illnesses associated with the life crisis. Of the life crises between 150 and 199 LCU, 37% had an associated health change. This association rose to 51% for crises between 200 and 299 LCU and to 79% for crises with scores of 300 LCU or more.

Almost all of the crises that most people experience in their lifetime are private events such as the death of a relative or friend, illness or economic setback. At the same time, stressful life events are necessarily part of everyone's experience. Holmes & Rahe (1967) identified two categories of items which constitute the SRE: those indicative of the life style of the individual and those indicative of occurrences involving the individual. Life style was defined by the authors as the ongoing pattern of an individual, with the emphasis on change from the existing steady state and not on psychological meaning, emotion or social
desirability (e.g., major change in eating-sleeping-social-or personal habits; major change in usual type and/or amount of recreation, etcetera).

The authors found one theme common to all these events, that the occurrence of each usually evoked, or was associated with, some adaptive or coping behavior on the part of the individual involved. The authors conclude that individuals who have experienced events that yield higher total readjustment scores are more likely to be ill during a subsequent observation period. Among those who become ill, those with higher total score (LCU) suffer a large number of illnesses. These assumptions seem to be supported in the light of past and present research involving these phenomena.

The SRE was tested for its' reliability and validity by Casey et al., (1967) who stated that consistency of recall is similarly related to the saliency of life events. They suggest that if an event is recalled consistently it is salient to the individual and this saliency may indirectly reflect validity of recall. Eighty-nine (89) physicians completed the SRE in 1964. In 1965, the same instrument was again completed by 54 of the 88 subjects. Thus, 54 paired sets of records were obtained, with the time interval of approximately nine months between the initial response or Time 1 (T1) and the second response or Time 2 (T2).
The data were analyzed to determine the stability of the questionnaire and factors affecting consistency of recall. LCU's were used to assign a magnitude of significance to these events over a ten year period (1957-1963). Only the most recent year (1963) was studied for factors affecting recall. Differences between subjects' Time 1 and Time 2 existed, but the mean total scores were of approximately equal magnitude. Thus, they concluded it takes longer than nine months to effect the magnitude of recall.

The Pearson Product Moment correlations for the questionnaire, based upon the total LCU's, were highly significant for the three years examined (1957, 1960 and 1963). The passage of time was found to effect the magnitude of individual scores but, seemingly had no effect on the consistency of the scores. In other words, if an individual responded consistently to the same item on two separate occasions, nine months apart, it is apparent that the item event had salience for him and his consistent recall may indirectly be a reflection of validity of recall. The parallel relationship between saliency of the life event and the consistency of recall was highly significant. Thus, the reliability of the SRE was established, for the items responded to more consistently had higher item values (also called magnitude or salience) and vice versa.

These findings have been further corroborated
by Mendels & Weinstein (1972). They asked subjects to state the relative degree of necessary adjustment they felt was required of the SRE life events items. The authors found a 0.93 correlation between their subjects' responses and those originally reported by Holmes & Rahe (1967) in spite of differences in age and education. These results offer support for the usefulness of the SRE instrument in evaluating the relationship between life events and other subject variables.

Demographic variables in cross-cultural studies

One consistent question posed in this area of research concerns the relationship between demographic variables (e.g., age, sex, marital status, education, religion, social class, race and ethnic background) and subjects' responses to the SRE and SRRS items. These factors have proven to exert little influence upon subjects' judgements of the relative significance of the 43 life events constituting the SRRS and the 42 events of the SRE. Holmes & Rahe (1967) for example, found a high degree of consensus between groups and among individuals about the significance of life events under study that transcends differences in age, sex, marital status, etcetera.

Cross-cultural studies have incorporated the
demographic factors with life events. Komaroff, Masuda & Holmes (1968) gave a verbal S.S.R.S.E. to Negro and Mexican-Americans. The mean scores and rank order of the 43 S.R.R.Q. items for the Mexican and Negro-Americans were compared with the scores of the white-American, middle income group of Holmes & Rahe (1967).

A comparison of the mean item score and rank orders showed a high degree of concordance between the white-American and Negro groups; the white-American and Mexican-American groups and between the Mexican-American and Negro groups. Thus, the three population groups ranked the items in a very similar fashion. The coefficients also indicated that the two subgroups were more closely related to each other than to the white-American middle income group.

Rahe (1969) compared Caucasian-Americans, Negro and Mexican-Americans, Japanese, Danish, Swedish and Hawaiian cultures. All seven groups (N=792) differed from each other on all or some of the demographic variables of the S.R.E. Subjects were asked to rank order the life change events as to their relative importance or significance. Life change scaling results were compared in terms of their rank ordering among these seven different cultural and American subculture groups. The overall coefficients of correlation (Spearman's rho) between individual groups ranged from 0.62 to 0.94.
making them highly significant. It is apparent that
despite many cross-cultural differences, similarities
among twentieth century cultures appear to exist in terms
of the relative importance of life events.

Harmon, Masuda & Holmes (1970) administered
the SRRQ to French, Belgian and Swiss samples via a
French language translation. A very high concordance
among the rankings for all European groups was observed
($r = 0.93, 0.94, 0.96$). The European sample ($N=139$)
was compared to the white-American sample of Holmes &
Rahe (1967), ($N=195$). A high correlation of relative
rank ordering was observed among the Americans and the
Europeans ($r = 0.89$), although some differences in
cultures and living conditions were reflected in the
SRRQ's. These results tend to support the findings of
numerous retrospective studies in which subjects from
various cultures and/or countries ranked the life
events items of the SRRQ in significantly concordant
fashions.

Impending health change and Naval personnel

Among the diverse populations tested for
relationships between life change and illness onset,
Rahe, Mahan & Arthur (1970) predicted eventual or
future health change in a naval setting. This prediction
was based on prior life changes of 2,463 Navy personnel,
96 enlisted men and 125 officers (N=2,684). A military version of the SRE was administered and LCU values were summed for each of the 4 pre-cruise, 6 month intervals for each subject. Correlations were computed between subjects' SRE results and their shipboard illness histories.

Only the rank ordering of subjects, according to their LCU totals for the 6 month period prior to the cruise demonstrated a significant correlation with the illness criteria. Thus, the most immediate past-6 month LCU total was used in the analyses. The results indicated a significant positive relationship between subjects' pre-cruise life change intensity and their number of reported illnesses while at sea.

As had been found in other studies (i.e., Rahe et al., 1974; Rahe, McKean & Arthur, 1967) a linear relationship was reported between the subjects' recent life change intensities and their cruise period illness rates. The findings of these studies are perhaps more impressive when it is recognized these experiments dealt with a very restricted portion of the spectrum of stress and disease; that is, most illnesses experienced by the subjects were upper respiratory in character and thus, minor in terms of severity. The question is raised as to whether or not certain kinds of illnesses are better predicted by recent life change (LCU) data than others. However, since the life change (LCU) data were only analysed at the 0-6 month
interval before illness onset, it leaves the reader questioning the relevance of the less recent LCU time periods in predicting illness onset.

Rahe, McKean & Arthur (1967) collected the health records of 50 Navy and Marine personnel, who were ultimately discharged and separated from the service for psychiatric illness. These records were selected at random to study life change and illness patterns. Each year of active duty was analysed for these changes, they were scaled and summed; the same was done for yearly illness experience. Both life changes and illnesses were seen to cluster during certain years. In general, a cluster year of life changes was seen to occur immediately prior to an illness or a clustering of illnesses. The more severe illnesses were preceded by cluster-years of higher life change magnitude than years prior to minor illnesses. Illness distribution among the sample proved to be far more similar to that of the general population than one might expect. Apparently, even among a group of psychiatrically disabled persons a few of the members had the most illnesses, which is in accord with findings in a normal population (i.e., Hinkle et al., 1958).

A similar finding is documented by Rahe & Arthur (1968) who studied a similar population (3,000 U.S. Naval personnel) and used the same instrument (a revised version of the SRE) to scale life changes.
over a four year period. Mean LCU totals for the illness periods were found to be uniformly twice the magnitude of the LCU totals for the healthy intervals. The life change intensity, as measured by the LCU method (assigning an LCU weight to each life change subscribed to by a subject) rose significantly above a healthy baseline value before, during and after, illness occurrence. The LCU build-up and fall-off surrounding illness experience attained a peak of LCU build-up at the 6-month illness period.

Rahe & Arthur (1968) formulated a dichotomy in which all life changes preceding clinical recognition of an illness were considered to have exerted a causal influence on the illness process and all those life changes following illness onset were assumed to have resulted from the illness. Life changes that occurred in very close temporal proximity to an illness were assumed to have exerted both a causative influence upon the illness process as well as reflecting behavioral changes resulting from the illness experience itself.

An important finding of the Rahe & Arthur (1968) study was that life-change data seen following illness experience was a reversed and nearly symmetrical picture of its counterpart prior to illness. These data then, suggest that previous and opposing arguments on whether life-changes precede (causal relationship)
or follow (resultant relationship) a wide variety of illnesses may be equally valuable.

In contrast to many of the cited studies, Casey et al. (1970) found opposing results. They administered a revised version of the SRE to 206 subjects, who were army trainees about to begin a mentally and physically stressful eight week training period. Subjects were divided into three groups according to their level of health care: (1) no health care; (2) low health care (visits only to a dispensary); and (3) high health care (visits to a specialty clinic or hospitalization). Contrary to prediction, subjects who had high LCU scores covering the 12 months prior to induction did not experience more illness during basic training. The life change (LCU) scores did not differentiate subjects who presented an illness from those who did not. These results contradict others from military and civilian populations, including the study of Rahe & Arthur (1968), in which LCU scores have been significantly related to the occurrence of illness. However, a major difference in subject populations may be responsible for the findings. Rahe & Arthur (1968) studied trained Naval personnel, while the above study tested young, inexperienced army recruits. Twice as many subjects
in Casey's study reported illnesses than did subjects in Rahe & Arthur's (1968) study, for a comparable period of time. Casey et al., (1970) concluded that this probably reflects the stressfulness of basic training considering the fact that many men may have gone on sick call for reasons other than genuine illness. Thus, the phenomena of 'disease-free health care seekers' (especially those who had low life change scores) would bias the data heavily against the relationship between LCU scores and the occurrence of illness in any setting. Since the authors were unable to discern 'real' illness from 'false' illness on the subjects' medical records, their findings are questionable.

In the studies cited, most have found significant relationships between life events and illness using such diverse populations as naval personnel aboard ship, college students, naval aviators and hospital physicians. The following studies may be included in this group.

Life events and mental status

Myers et al., (1972) reported on relationships between changes in life events and changes in psychiatric symptomatology in a community sample of 720 adults. Demographic, physical and mental health status data were gathered from these subjects. A list of 62 events
was devised (based upon selected items from Holmes &
Rahe's SRRQ and SRE). Subjects were asked, individually,
if any of these events had occurred to them in the
previous year.

Over a two year period it was found that the
greater the net change in life events the more likely
was the subject's mental health status (as measured
by items which have been found to discriminate between
psychiatrically sick and healthy populations) to have
changed. A net increase in life events was associated
with a worsening of symptoms, while a net decrease
resulted in improvement. The results of this study
support previous work in which a positive relationship
was found to exist between occurrences of "stress",
"life crises" or "life events" and the onset of
physical illness and/or the presence of psychiatric
symptomatology (Myers et al., 1971). These results tend
to support findings reported in studies of the
psychiatric mode. However, it would have been beneficial
to examine the respondents subjective perceptions of
the stressfulness of the events, similar to the
method used in ranking the items of the SRRQ.

Again, in support of the study, McKegney et
al., (1970) tested 123 patients with either ulcerative
colitis or Crohn's disease (disease in either the large
or small bowel). They assessed demographic character-
istics, life events, psychosocial and behavioral
variables, diagnosis and severity of physical disease and measures of emotional disturbance. The two disease groups were similar, in that both groups had a high incidence of emotional disturbance, psychiatric diagnosis and significant disease onset situations.

In both syndromes, there was a high positive correlation between the severity of the emotional disturbance (as measured by the Cornell Medical Index) and the seriousness of the physical illness (based on medical histories and physician ratings). Thus, these data appear to support the theory that similar personality and life events factors contribute to, and may be necessary for, the development and severity of these physical diseases. For example, these two somatic processes represent ends of a spectrum of biological responses to similar psychosocial and personality factors in terms of 'response specificity'.

The personality and life events factors were assessed by independent reviewers who studied patients' charts. The charts encompassed these factors while additional notations were made by the reviewers about patients' personality characteristics, psychiatric diagnoses and observed behaviors. Unfortunately, the authors failed to elaborate as to the method of personality assessment. This omission warrants confusion concerning the validity of such a procedure.
Furthermore, in this study, the patients usually denoted, with the influence of physician suggestions, the association between life events and illness onset. This influence is likely a contaminating variable and only truly prospective and carefully controlled studies on large, healthy populations may avoid such influences. Nonetheless, the onset situations found equally in both disease groups were usually very clear cut and, on face value, of a serious nature.

Focusing on the paradigm of life events and mental status, Keilner & Sheffield (1973) administered a questionnaire to 100 "neurotic" patients and 100 "normal" subjects, first in England and then in New Mexico. The purpose of the study was to examine the self-reported occurrence and distribution of symptoms in "normal" subjects over a one-week period and then to compare these findings with the self-reported occurrence of the same symptoms in "neurotic" patients. The rank order frequency of the symptoms was similar for both countries. However, "neurotics" and "normals" had different rank orders, in that, the most common symptoms in "normals" tended to be somatic, whereas in "neurotics" they tended to be overtly emotional. Both groups reported a high prevalence of symptoms, with "neurotics" reporting a significantly greater number of most symptoms.
Eastwood & Trevelayan (1972) compared psychiatric and normal (control) subjects to test the hypothetical relationship between physical and psychiatric disorders. They had previously found that there was a significant excess of physical disease in psychiatric versus control groups, especially in the case of coronary heart disease. They found that the distribution of major psychosomatic disorders (e.g., coronary heart disease, hypertension, asthma) was significantly in excess in the psychiatric sample.

Numerous studies have been carried out which support the link between psychiatric and/or emotional conditions and illness rates (e.g., Araujo et al., 1973; Brown, 1972; Constantini et al., 1973; Kidson, 1973; Laurer, 1973; Luborsky et al., 1975; Nelson et al., 1972; Philip & Caz, 1972; Rahe et al., 1974; Robbin et al., 1972; Rosenthal et al., 1973). However, sufficient mention has been made of this segment of the research in view of the main concern of this paper.

Life change and cardiac disease among Swedish patients

In support of the major aims of this paper, significant relationships between life events and illness have also been reported by Rahe & Lind (1971) who studied psychosocial factors and sudden cardiac death
on a subject population in Sweden. Informants (i.e., wives, relatives or friends) of the deceased subjects completed a Swedish version of the SRE covering the three years prior to the cardiac death of each subject. Individuals with, and without prior cardiac heart disease (CHD), (i.e., either the presence or absence of a prior history of cardiac disease or any other major illness) respectively, were studied. The results indicated that both groups had a significant increase in life change intensities during the final six months of their lives. The subjects' life change scores (LCU) increased three-fold in magnitude over that of other Swedish samples of survivors of myocardial infarction (i.e., Rahe & Paasikivi, 1971; Theorell & Rahe, 1971).

Psychosocial factors and myocardial infarction were studied by Thorell & Rahe (1971) on Swedish inpatients and comparison "healthy" subjects. The "healthy" subjects were defined as those who had never had signs or symptoms of cardiac heart disease. This definition was based on medical histories and physical examinations. The infarction subjects were divided into two equally numbered groups on the basis of whether or not they had previous signs or symptoms of CHD or other major illnesses during the 3-4 years prior to their current infarction. A Swedish version of the SRE and interviews were given, and subjects
reported life changes over each quarter-year for the 3 to 4 years prior to the onset of myocardial infarction (i.e., heart disease pertaining to the muscle tissue). The analyses of the quarter-year LCU totals revealed that infarction subjects, with no previous histories of CHD, showed a significant LCU build-up over the two years prior to their infarctions.

The infarction subjects with recent episodes of CHD, or other major illnesses, showed a significant increase in their LCU totals during the second year prior to the investigated infarction, coincident with the majority of previous episodes of CHD experienced by members of this group. There was a peaking of LCU totals during both the second and first years prior to infarction. LCU totals over the third and second year prior to infarction were compared for subjects with and without prior histories of CHD. Individuals with prior CHD histories had higher LCU totals but the difference fell short of significance. Life change unit total data for the healthy comparisons showed that their quarter-year LCU totals roughly approximated those LCU magnitudes of in-patients, when in-patients were healthy. Also, the comparison subjects' LCU totals suggested a baseline LCU value without significant variation over time.

An important limitation of the life changes
method became apparent during subject interviews. The SRE measured only the incidence rate of new life changes over each quarter-year and did not record long term or chronic life difficulties. The authors thought, nonetheless, that the measure was valid since some adaptation to a particular long-standing life change may take place during the interim.

Rahno & Paasikivi (1971) studied the same illness factors with Swedish out-patients. These studies varied in that Theorell & Rahe (1971) tested subjects three months after the onset of myocardial infarction, whereas, the former study tested subjects one to four years after the onset. The procedure was implemented to answer two specific questions: (1) how would patients have reported their life change patterns prior to illness if they had been interviewed one or more years after their illness experience? and, (2) how many new life changes are "created" by their illnesses and how long do these "created" life changes last? In this study, patients were asked to give information regarding illness experiences and relatively recent life changes. This procedure was almost the reverse of previous life change and illness investigations (i.e., Theorell & Rahe, 1971).

If life changes recall is better for more recent events as might be anticipated, one might expect relatively little life changes recall surrounding the
distant illnesses and relatively more life changes reported for very recent time periods. Subjects completed the SRE and the highest quarter-year LCU totals occurred at the six month period prior to infarction. They also found that the mean quarter-year LCU's decreased to the baseline LCU level over the one year after onset.

Therefore, the "created" life changes equaled the LCU magnitude as pre-infarction life changes and extended over the one year span. Thus, the significant decrease in 6-month LCU totals by the middle of the second year following infarction, appears to support, in reverse, previous studies indicating build-up of LCU's surrounding illness experience. Rahe & Arthur (1968) found that LCU's rose significantly above a healthy baseline (20-30 LCU) value before, during and after illness occurrence. The LCU build-up and fall-off attained a peak of LCU build-up at the 6-month illness period. Assumptions made concerning these results may be noted in the formerly cited review of the Rahe & Arthur (1968) study. Unfortunately, Rahe & Paasikivi (1971) failed to elaborate on an explanation of the build-up and fall-off of LCU scores.

A similar finding was documented by Rahe et al., (1973) who studied subjects' recent life changes and coronary disease in Finland. The SRE was administered
by nurse-interviewers to 279 survivors of myocardial infarction and to informants of 226 subjects who had died from CAD. The results confirmed that subjects with the most severe coronary crises (sudden death) exhibited the highest increases in recent life changes; delayed death subjects exhibited the next highest, and survivors reported the smallest increases in recent life changes. In addition, survivor-subjects demonstrated significant increases (42% to 69%) in their final 6-month LCU totals over those for the corresponding interval one year earlier. Thus, whatever the subjects' LCU baseline, a relative increase in their LCU totals appeared to herald the onset of new coronary disease.

The results of these studies tend to indicate that it may be useful to include such possible precipitating factors as subjects' recent life changes in future prospective studies of coronary heart disease. These factors may predict higher percentages of subjects who will develop myocardial infarction or coronary death during the following year than is possible with the currently used risk factors (i.e., serum cholesterol levels and systolic blood pressure).
During the course of these investigations, inspection of the data suggested a positive relationship between the seriousness of illness (judged intuitively) and life change magnitude for the year prior to the onset of disease (i.e., Rahe & Arthur, 1968). Wyler, Masuda & Holmes (1968 & 1970) constructed a Seriousness of Illness Rating Scale (SIRS) to further discriminate the relationship between social stress and seriousness of illness by establishing a magnitude estimation of the "seriousness" of illness. The authors used a method similar to that employed in the development of the SRRS.

Five hundred units were assigned to the seriousness of a peptic ulcer and with this as the module item, 126 diseases were rated by two separate groups of physicians (N=117) and two separate groups of laymen (N=141). The rank order correlation (Spearman's) between the physician groups was 0.98. When the physicians were compared with the laymen, the correlation was 0.94, suggesting that the general public ranked disease items in a significantly concordant manner as did the physicians, who had a greater knowledge of disease.

Because of the high degree of correlation, the scores for the laymen and physician groups were combined and a new 'grand' rank order and mean were found for each disease. This was done to gain greater accuracy in attainment of an estim-
ation of 'average' degree of seriousness. The validity for such computations rests on the highly significant degrees of concordance and correlation. The values of the statistical coefficients show that both groups (medical and non-medical) with their respective subgroups, are samples from the same population.

Wyler, Masuda & Holmes (1971) investigated the number of life changes that patients had undergone during the two year period before onset of illness. The seriousness of illness was measured by the SIRS. The SIRS and the SRE were administered to 232 patients to examine the relationship between the amount of life change prior to the onset of illness and the seriousness of that illness.

Utilizing the SIRS, appropriate values were assigned to 42 disease states experienced by these patients. Six judges made independent classifications of the 42 illnesses encountered, in categories labelled: 'chronic ill-defined onset' and 'relatively well-defined onset'. The chronic illnesses included: dandruff, eczema, anemia, peptic ulcer, high blood pressure and diabetes. The acute illnesses included: mononucleosis, appendicitis, pneumonia, heart attack, stroke and kidney infection.

The data showed a significant positive relationship between the amount of life change and the seriousness of the chronic illnesses (Spearman's rho = 0.64). No significant relationship was found between life changes and infectious
diseases of acute onset. Furthermore, 36% of the life changes for the two year period were found during the 6-month period prior to the onset of the illness, which supports previous findings.

These data suggest that the greater the life change or adaptive requirement, the less the resistance to disease and the more serious the illness that develops. Thus, the concept of life change appears to have relevance to the areas of causation of disease, time of onset of disease, and severity of disease.

Day-to-day minor illnesses and life change units

Relationships between life change and illness onset have further been supported on a day-to-day life change modality. Holmes & Holmes (1970) presented data concerning the association of life change and minor health change. Minor health changes were defined as the signs and symptoms of everyday life, such as cuts, bruises, headaches, stomach aches, backaches and colds, that do not cause time lost from work nor require a visit to the doctor.

A Schedule of Daily Experience (SDE) was devised, based on the SRE. The 42 life change items were recorded on a daily basis. The 80 subjects were fairly homogenous in age and peer status and were comprised of graduate students, laboratory technicians, secretaries and medical students.
The findings indicated that the subjects were much more likely to experience the signs and symptoms of everyday life on days of greater-than-average life changes, as reflected by their LCU totals. Life changes tended to cluster significantly around health changes. The opposite was also confirmed: subjects were much less likely to experience signs and symptoms on days of less-than-average life change; and low amounts of life changes tended to cluster significantly around symptom-free days.

These results are in accord with Rahe & Arthur's (1968) findings, which involved long time intervals and major health changes. Those investigators found a clustering of greater-than-average life change before and after major health changes. Furthermore, Holmes & Holmes (1970) found that a relatively small number of life change events account for most of the day-to-day life change, and that a few systems within the body account for the majority of the signs and symptoms of everyday life. Hinkle et al., (1958) found that a small number of people account for the majority of illness and that a small number account for the majority of health. Hence, the results of the Holmes & Holmes (1970) study support several long-term studies of life and health change and suggests that minor health changes may be causally related to events requiring adaptive behavior.

Holmes & Holmes (1970) felt that by their method they had produced a brief qualitative and quantitative medical
history which spanned a limited length of time. By this method, they minimized the problems of recall and experimenter bias, since the survey was filled out daily by the subjects. Thus, the advantages and validity of such a method may be intimated.

In relation to this day-to-day study, Cline (1973) constructed a Schedule of Daily Experience (SDE) and a Stress Value Scale (SVS), such that stressful events encountered in the training of military officers could be qualitatively and quantitatively measured. The SDE lists 24 events that empirically were proven to be stressful during the training exercise and was filled out daily by each of the 191 trainees. A total daily stress score was calculated by multiplying the number of times the trainee experienced a given stressful event by the stress value listed on the SVS. The SVS was developed by a similar method used for the SRRQ.

Results showed significant high agreement concerning the relative order and magnitude of psychosocially stressful events between subgroups of the sample. The subgroups consisted of trainees in various phases of training. Furthermore, highly significant agreement existed between total daily stress scores calculated from the SVS and the stress scores calculated from subjects' own value judgement of stressful items. Thus, the SDE and SVS were considered by the authors to be useful tools in describing the nature and magnitude of stressful daily experience. However, due to the recent
development of these scales, further research is needed in order to establish not only the usefulness of these scales but more importantly to ascertain their reliability and validity more fully.

The Boston University Personality Inventory (BUPI)

Two major concerns of the present study: (1) relating life changes and illness onset, and (2) associating magnitude of life change with seriousness of illness, have been supported by the retrospective data. The third major concern is relating these factors to the coping mechanisms used by subjects under stressful situations.

Vulnerability or susceptibility to illness is an organismic factor which encompasses both inherited patterns and acquired techniques for coping with stress (e.g., Canter et al., 1966; Dohrenwend & Dohrenwend, 1969; Hinkle et al., 1958; Selye, 1974). The way in which a person perceives a situation of crisis, the way in which he attempts to adapt to it, or cope with it, or attempts to resolve it may be determinants of disease resistance.

Jacobs et al. (1969) hypothesized that the development of a serious upper respiratory infection (URI) for which treatment is sought is antedated by a maladaptive reaction to distressing life conflicts. The two psychosocial factors the authors defined as being predisposing were: (1) the
perception of a life event as personally threatening or distressing, and (2) failure to deal with this situation in an adaptive fashion.

To test the relationship of life change, maladaptive aggression and URI, four measures were used. The first was the Life Change Inventory (LCI- suggested by the work of Rahe et al.,1964) which listed 47 items relevant to college students. This scale measured the incidence of distressing life changes and the dates of occurrence. Secondly, the Boston University Personality Inventory (BUPI- devised by Jacobs et al.,1965), which is a measure to check styles of adaptation to challenging life situations, consisted of 62 items. Within the scale, two distinct forms of faulty coping mechanisms were identified. The first is characterized by passive, compliant traits (equalling 8 of the items). When faced with pressure or frustration the individual submits to, or accepts the unpleasant circumstances, regardless of the self-defeating consequences. The second is characterized by active defiant traits (equalling 12 of the items). When faced with a distressing situation the individual rebels or strikes back angrily. This patterns is associated with hostile, impulsive and danger-seeking behavior. (See Appendix C for a list of the various items constituting the two forms of faulty coping mechanisms).

Thirdly, a projective test for styles of coping was used. The Adolescent Conflict Test (ACT) consists of 20
conflict situations depicting problems occurring between parents and children, among peers, and between authority figures and students or subordinates. The subject is asked to imagine himself in the situation which is described and to report in writing what he would say or do if he were so involved. Fourthly, to measure unpleasant affect, the Manifest Affect Rating Scale (MARS) was implemented. It is a self-rating scale consisting of 87 items, reflecting pleasant, depressive, hostile and anxious affect.

The subject population consisted of male college students, 29 who sought relief from sore throats at the college health service and 29 who were symptom-free, that is, never had psychiatric or psychosomatic illnesses. Results indicated that there was significantly more disappointment, failure and role crisis in subjects who became ill and sought help than the "normals". The reaction pattern associated with the URI group was significantly one of defiance. No difference appeared between the groups with respect to the submissiveness dimension.

With the projective test (ACT) the majority of responses evoked by the stimuli were either assertive or compliant. However, no significant difference resulted between the "normal" and URI subjects. On all measures of unpleasant affect, however, the URI group reported a significantly greater number of distress signs than did the "normals". Feelings of helplessness, failure or social isolation were
seen by the authors as most likely to antedate serious URI in male college students and, in this light, illness was considered to be a temporary escape from unpleasant life circumstances (Jacobs et al., 1969).

Jacobs et al., (1970) studied life stress and respiratory illness in a manner similar to the Jacobs et al., (1969) study. One difference was the categorization of the dysfunction, in order of severity. One hundred and six (106) male college students with URI who sought medical attention, and seventy-three (73) symptom-free students, made up the subject population. The LCI, BUPI, MARS and ACT were administered to all subjects. The results of the LCI statistically supported those of Jacobs et al., (1969), for the more incapacitating the disorder, the more likely situations of life stress were reported as having occurred during the year preceding seeking treatment.

Furthermore, when treatment was sought the degree of incapacitation was positively associated with the frequency of reported previous life stresses and manifest unpleasant affect. Also, the majority of distressing situations (from the LCI) occurred within two months prior to the visit for treatment. This supports findings of Jacobs et al., (1969) and Rahe & Arthur (1968), both of whom reported that life changes increased with proximity to the time of illness onset. Similar results were reported for measures of manifest distress (BUPI and ACT), for the group with the highest
incidence of unpleasant affect were the neurotic subjects and the group with the lowest incidence were the control subjects.

In support of the Jacobs et al., (1969) study, Jacobs et al., (1970) found that life situations of failure, social isolation and role crisis in male college subjects were associated with seeking treatment for respiratory symptoms. Changes in family structure and relationships were not related to illness behavior in either study. Thus, a positive relationship between severity of illness and unresolved life conflict existed, for the subjects could not cope efficiently (as defined by the BUPI) with their problems. This relationship is supported by Wyler et al., (1971). The results of these two studies are further supported by the findings of Jacobs et al., (1971) and Spilken & Jacobs (1971).

A major concern that arises from the Jacobs et al., (1969, 1970 & 1971) studies is that at no time is mention made of the standardization of the various measures employed. In addition, none of the available research by the senior author indicates how the scales originated. Indeed, this is perplexing to anyone wishing to utilize these scales.

In accordance with the numerous studies concerning life change, illness onset, coping mechanisms and severity of illness, it may be appropriate to cite the statement made by Dohrenwend (1973). She concluded that change, rather than undesirability is the characteristic of life events that
should be measured for the accurate assessment of their stressfulness. The background research was taken into account in devising the present study.

The Present Study

The purpose of the present study was to investigate:

1. the relationship between life change and illness onset,
2. magnitude of life change with seriousness of illness, and
3. the influence of coping mechanisms on subjects' responses to the life change and illness measures.

The scales implemented to test these relationships were: (1) the Schedule of Recent Experience (SRE), devised by Holmes & Rahe (1967) (see Appendix A); (2) the Boston University Personality Inventory (BUPI), devised by Jacobs et al., (1965) (see Appendix C) and, (3) the Medical History Check-List (MHCL), devised by the current author (see Appendix D). Appendix E lists the various MHCL items and the Seriousness of Illness Rating Scale (SIRS) weights applied to them.

Subjects consisted of three levels of health care: (1) symptom-free or 'normal' subjects who were university students at Wilfrid Laurier University; (2) students who visited the university health service centers for minor ailments and, (3) hospital patients.
Considering the studies on life change, illness onset and coping ability that have been reviewed here, and the aims of the present document, the following hypotheses were formulated, which may be categorized as follows:

**Life change vs illness:**

1. A relationship was expected between subjects' amount of life change (LCU) and the frequency of their MHCL illnesses;

2. A relationship was expected between the subjects' amount of life change and the severity of their self-reported Medical History Check-List (MHCL) illnesses;

3. It was expected that the health service and hospital subjects' 0-6 month LCU scores would be proportional to the level of severity of their physician diagnosed illnesses;

4. Life events were expected to cluster around the 0-6 month period prior to the onset of the physician diagnosed illnesses of the health service and hospital subjects;

5. The LCU scores of the symptom-free subjects were expected to be lower than those of either the health service visitors, who exhibited minor illnesses, or the hospital patients;
(6) The life change scores (LCU) of the hospital patients were expected to be higher than those of either the symptom-free or health service subjects;

Group differences:
(7) It was postulated that responses (in terms of mean scores) on the Schedule of Recent Experience (SRE), the Boston University Personality Inventory (BUPI), and the Medical History Check-List (MHCL), would be significantly different between the three subject-groups. As well, the SIRS means (the values or weights given to the physician diagnosed illnesses) were expected to be significantly different between the health service and hospital subjects;

Demographic factors and life change:
(8) The demographic variables of the SRE, which describe the subjects (i.e., age, sex, marital status) were expected to exert little influence on subjects' responses to Parts A and B of the SRE (measuring: a) the occurrence of life events and, b) the occurrence and frequency of life events, respectively);

Life change, coping ability and illness:
(9) An association was expected between the subjects' level of submissiveness and defiance (defined by the BUPI scores) and the severity of the self-reported illnesses (defined by
the MHCL scores);

(10) Subjects who exhibited a great deal of life change (high LCU scores) and good coping ability (low BUPI scores) were expected to have less MHCL illness than subjects who exhibited little life change (low LCU scores) and poor coping ability (high BUPI scores);

(11) Subjects who exhibited little change (low LCU scores) and good coping ability (low BUPI scores) were expected to have the least amount of self-reported MHCL illness (in terms of number and severity).

The current author attempted to support the above hypotheses in a paradigm which made comparisons between "normal", symptom-free subjects (students), university health service visitors and hospital patients, in terms of subjects' responses to the SRE, BUPI and MHCL. In addition, the health service and hospital subjects were compared on the severity of their physician diagnosed illnesses.

The present study was deemed to have relevance for recent demonstrations have drawn increasing attention to the role of stressful life events in the onset, severity and frequency of disease. Indeed, further confirmation of such associations would greatly assist in public health research.
Subjects

A total of 260 subjects was included in the final analysis of the data. The population consisted of three subject-groups:

(1) Eighty-eight (88) university students, male and female, enrolled in summer session courses at Wilfrid Laurier University, Waterloo, Ont., during May and June, 1974;

(2) Seventy-two (72) university students, male and female, who visited the university health service centers at either Wilfrid Laurier University or the University of Waterloo, Waterloo, Ont., during the summer of 1974;

(3) One hundred (100) hospital patients, male and female, from the medical wards of a local hospital in Kitchener, Ont., during October, 1974. A patient's stay in the hospital averaged 10 days.

Measures

The independent variables in the study were the Schedule of Recent experience (SRE), the Boston University Personality Inventory (BUPI) and the three experimental conditions, which were the subjects' level of health care
(i.e., symptom-free = 'no', health service = 'low' and hospitalization = 'high'). The dependent variables included the Medical History Check-List (MHCL), devised by the current author, and the physician diagnosed illnesses, which were given severity weights from the Seriousness of Illness Rating Scale (SIRS).

The independent or antecedent variables assessed the effects of the subjects' responses to the life events items (defined by the SRE) and the modes of coping (defined by the BUPI) on the dependent variables, which included the subjects' self-reported responses to illness occurrence (defined by the MHCL) as well as the illness diagnoses made by the physicians. Thus, the independent variables (life change and coping ability) were expected to effect the dependent variables (subjects' self-reported illness history and the physicians' illness diagnoses).

The Schedule of Recent Experience (SRE)

The first measure employed was the SRE, a self-administered paper and pencil questionnaire which was modified in format and wording but retained the items of Part A and B intact. The front sheet of the SRE, which contains demographic information was slightly altered by omitting one item deemed irrelevant since the population being tested was Canadian ('area of U.S. where most of life was spent') and by adding instructions for the method
of responding to these items. The instructions and items for Part A and B were simplified to enable subjects to answer the questions with greater ease, since the original format was somewhat complex. See Appendix A for the SRE format that was implemented.

The items in Part A of the SRE asked subjects to check 'if' and 'when' an item had occurred over the past two years (divided into 0-6, 6-12 and 12-24 month time periods). The items of Part B of the SRE asked subjects to respond with a number (i.e., to list the "number of times" that an item had occurred, ranging from 0 to 4+ times) again, within the three identified time periods.

If the response to an item was positive, a subject placed the appropriate check mark, for Part A, under the time period(s) that the event occurred. In Part B, the subject placed the appropriate number, in terms of frequency, under the time period(s) that the event occurred. If the item did not apply, in either Part A or B, the subject was asked to leave that particular time period column(s) blank.

The questionnaire was scored in the following manner. The number of check marks, for Part A, or the numbers, in terms of frequency, for Part B, for each item were tabulated, multiplied by the weighted value for that item (item LCU, see Appendix B) and then summed to obtain the subject's total life change units (total LCU) per time period. Then, the LCU weights of Part A and B were summed to give an
overall total for each time period. Lastly, a grand LCU total was obtained by summing all three time period scores.

Boston University Personality Inventory (BUPI)

The second measure employed was the BUPI (Jacobs et al., 1965) a self-rating scale which was modified by implementing only the items purportedly measuring the two faulty coping dimensions, that of passive-compliant and active-defiant traits. (See Appendix C for the BUPI format implemented). These two dimensions (derived by Jacobs et al., 1965) were chosen for the purpose of relating coping ability with subjects' illness frequency. It was expected that subjects who exhibited good coping ability would warrant less frequent illness.

Examples of passive-compliant items are: "I frequently take other people's advice." "In this world you often have to depend on others to take care of you." And, "I work under the principle that the boss is usually right." Examples of defiant-impetuous items are: "I often have had to take orders from someone who did not know as much as I did." "I often go out of my way to win a point with someone who has opposed me." "When I was a child I would always accept a dare." And, "I like to take risks and chances."

Of the 62 items constituting the BUPI, the 8 items measuring the passive-compliant or submissive traits and the 12 items measuring the defiant, danger-seeking traits, were
used. Responses to the items ranged from 0-5, reflecting choice from 'entirely false' to 'entirely true'. (See Appendix C for more detail). Subjects selected the number that best suited their opinion about an item, in terms of their own general attitudes and experiences.

The scores for submissiveness ranged from 0 to 40 (mean of 20) and the higher the score, the more submissiveness a subject exhibited and the more likely was a subject expected to seek treatment for illness. Items measuring active-defiant traits included those of defiance, impetuousness and danger-seeking. The range of scores measuring this trait characterizing faulty coping ability, was from 0 to 60 (mean of 30). Again, the higher the score, the more defiance a subject exhibited.

Thus, two scores per subject were calculated. The first one concerned the intropunitive mode (submissiveness) which characterized the reaction to frustration in which an individual would blame himself and experience feelings of shame and guilt. The second score concerned the extropunitive mode (defiance) which characterized the reaction to frustration in which the individual would show aggression towards the source of frustration. These two scores were used both independently, as separate factor scores and collectively, as pooled factor scores in the analysis of the data to see what implications could be drawn through comparison with the results of the other measures, the SRE and MHCL.
The third measure employed in the present study was the MHCL, devised by the present author (see Appendix D). The purpose of the instrument was to receive an estimate of potential illnesses a subject may have encountered in the past two years thus, suggesting a general state of health for an individual.

The MHCL consists of 15 randomly chosen disease states which range in severity from mild (common cold) to severe (cancer). A subject was asked to state the "number of times", if applicable, that he had experienced any of these illnesses over the past two years (divided into 0-6, 6-12 and 12-24 month time periods). All items were chosen from the Seriousness of Illness Rating Scale (SIRS)(Wyler et al., 1968 and 1970) such that a severity weight could be assigned for each illness (see Appendix E).

The scale was scored by assigning the appropriate weight (from the SIRS) to an item and multiplying this weight by the number of times (0 to 4+) it occurred, for each time period. Thus, a total score of 'illness severity' was tabulated for each time period. A grand total for each subject was reached by summing all weights of the three time periods to receive an estimate representing a subject's illness history over the past two years. The time periods and method of responding were similar to that of the SRE. With this similar breakdown of time periods, a direct comparison
could be made between a subject's LCU score and his MHCL illness report within each time period.

Furthermore, for the health service and hospital subjects, an SIRS weight was assigned to the present diagnosed illness of each subject. Through this method, comparisons were made between the seriousness of a subject's diagnosed illness and a subject's life change score on the SRE. The SIRS weights were not used with the symptom-free subjects in terms of a diagnosed illness since these subjects were the "healthy" or control subjects and they had no present illness at the time of testing. However, the SIRS weights were used for all subjects in scoring the MHCL.

Response forms and Procedure

The SRE, MHCL and BUPI were attached, respectively, as one series of questionnaires with face sheets describing the basic 'requirements' for respondent choices (i.e., if they "qualified" to be respondents in terms of the definition of illness used in this study, which was, illness precipitated on a psychological and/or physiological basis). The section regarding 'requirements' was omitted for the symptom-free subjects since they supposedly constituted healthy control subjects. Thus, all symptom-free subjects "qualified" to answer the questionnaires.

Of the health service visitors, the eliminated
subjects were those who visited the health centers for the following reasons: (1) physical injury (e.g., broken leg, cuts), (2) birth control and (3) routine medical check-up. Hospital patients excluded were those hospitalized for the following reasons: (1) physical injury, and (2) obstetrics. Patients on the surgical and pediatric wards were not included.

The face sheets (see Appendix F) for the health service and hospital patients incorporated a brief description of the outline of the study, but concealed the actual purpose so as not to bias subjects' responses. The face sheets read as follows:

"The following is a survey being conducted by the Department of Psychology at Wilfrid Laurier University. All response forms are totally anonymous (your name is not required) so please answer the questions as accurately as possible. Please check carefully that you have answered all items of the survey. Your co-operation in this matter will be greatly appreciated."

Regarding the health service subjects, the face sheet incorporated instruction in addition to the above description:

"..." When you have completed this form hand it to the doctor or nurse that you see him/her for your appointment."
The procedures utilized for the three subject-groups under the three experimental conditions were as follows:

(1) The symptom-free, control subjects completed the SRE, MHCL and BUPI questionnaires during class time and the present author gave verbal instructions to this group at the time of testing, similar to the written instructions given to the health service and hospital subjects. The author collected the questionnaires upon completion. The symptom-free subjects were chosen on the basis of their presently "healthy" medical condition, in terms of not having visited the health service centers or hospitals immediately prior to the test period.

Subjects were debriefed on the details of the study after the questionnaires were collected in order to alleviate any bias in reporting during the experiment. It was felt that if the subjects were aware of the purpose of the study beforehand, they might have been wary to reveal personal details. Eighty-eight forms were successfully completed.

(2) The health service group were visitors at either Wilfrid Laurier University or the University of Waterloo. The study was approved by the administrators at both centers and the questionnaires were left with the respective receptionists. They asked students to fill out the scales while they waited for their appointments with their respective doctors or
nurses. Again, certain students were requested not to complete the scales if they were visiting for the reasons previously outlined (i.e., pregnancy, etc.). Upon completion of the scales, the subjects were asked to give the forms to the doctor or nurse with whom they had the appointment. The doctor or nurse was asked to diagnose the illness or reason for visitation of the individual and to write a brief diagnosis on the response form.

The questionnaires were later collected by the author after a certain number had been completed. Because of the length of time taken for the scales to be completed, less than the desired number were collected. Seventy-two forms were successfully completed. Furthermore, since many questionnaires did not reach the doctors or nurses for diagnosis, or the diagnoses could not be assigned SIRS weights, only 23 out of 72 were included in the analysis concerning a "present" illness state. The anonymity of the respondents and their occasional visits to the centers made it impossible to debrief the involved students regarding the nature of the study.

(3) The hospital patients were recruited by the submission of a formal proposal to the hospital administration, St. Mary's Hospital, Kitchner, Ont. Permission was requested to visit the medical patients and to ask the patients if they would object to filling in the questionnaires. Upon approval,
the author visited the medical wards daily, over a span of 3 to 4 weeks, and asked each new patient to fill out the scales. Most patients were quite co-operative and one hundred questionnaires were successfully completed.

Upon completion of the scales, the author asked either the subject or nurse involved if they would object to revealing the nature of their (subject's) incapacitation such that a present state of health or "present" disease state could be diagnosed. Co-operation was received to the extent that assignment of a Seriousness of Illness Rating Scale (SIRS) weight was attempted for each physician diagnosed illness. Of the 100 illnesses diagnosed, 81 could be assigned an SIRS weight for use in the analysis of a "present" disease state. Subjects were debriefed by the author after the response forms were collected.
Results

The data from the Schedule of Recent Experience (SRE), the Medical History Check-List (MHCL) and the Boston University Personality Inventory (BUPI) were analysed for each subject-group by means of various statistical measures in order to test the hypotheses outlined.

Hospital group

The results for the hospital group will be discussed first, inasmuch as these subjects exhibited illness serious enough to require hospitalization.

The main concern of this document was in examining whether a relationship existed between life change and illness onset. One of the hypotheses (H1) involved in the above association concerned the relationship between the frequency of the self-reported MHCL illnesses and the life change scores (LCU), derived from the SRE. In order to test this and other hypotheses concerning life change and illness, two types of Spearman and partial correlations were carried out. These analyses were labelled for convenience as follows: (A) those which included all of the self-reported illnesses of each subject, and (M) those which included only the major or most serious self-reported illness of each subject. A description of the variable codes used in these analyses may be seen in Table 1.

Results of the Spearman "A" analysis, seen in Table 2,
TABLE 1

DESCRIPTION OF VARIABLE CODES WITHIN THE CORRELATION ANALYSES
Tables 2, 3, 5 and 9

<table>
<thead>
<tr>
<th>NO.</th>
<th>VARIABLE</th>
<th>DESCRIPTION OF CODES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIRS*</td>
<td>Seriousness of Illness Rating Scale (SIRS) mean value (weight) of subjects' MHCL illnesses</td>
</tr>
<tr>
<td>2</td>
<td>A06</td>
<td>Average frequency of subjects' 0-6 month MHCL illnesses</td>
</tr>
<tr>
<td>3</td>
<td>A112</td>
<td>Average frequency of subjects' 6-12 month MHCL illnesses</td>
</tr>
<tr>
<td>4</td>
<td>A24</td>
<td>Average frequency of subjects' 12-24 month MHCL illnesses</td>
</tr>
<tr>
<td>5</td>
<td>L06</td>
<td>Subjects' average 0-6 month LCU scores</td>
</tr>
<tr>
<td>6</td>
<td>L012</td>
<td>Subjects' average 6-12 month LCU scores</td>
</tr>
<tr>
<td>7</td>
<td>L024</td>
<td>Subjects' average 12-24 month LCU scores</td>
</tr>
</tbody>
</table>

* In the analyses involving the physician diagnosed illnesses, this variable refers to the SIRS mean value weight of these illnesses.


### TABLE 2

**SIGNIFICANT SPEARMAN RHO CORRELATIONS—HOSPITAL SUBJECTS**

<table>
<thead>
<tr>
<th>1-SIRS</th>
<th>2-AP6</th>
<th>3-AP12</th>
<th>4-AP24</th>
<th>5-LCU6</th>
<th>6-LCU12</th>
<th>7-LCU24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*0.27^* (S)*

*0.59* (A)

*0.54* (M)

---

*p* < 0.05.

**p** < 0.005.

**Note.**

A= analysis of all MHCL illnesses of subjects.

M= analysis of the major MHCL illness of each subject.

S= analysis of SIRS mean value scores of physician diagnosed illnesses and the LCU scores of the involved subjects.

For explanation of variable codes, see Table 1.
revealed that the frequency of the subjects' MHCL illnesses (AF12) and their 6-12 month LCU scores (LCU12) were positively correlated \( (r=0.59, df=13, p.<.01) \), thus, supporting the hypothesis. However, in the partial "A" analysis of these data (which is a more refined test since it may pull out relationships hidden by a Spearman analysis) insignificant associations were found (see Table 3).

Hypothesis # 1 was again tested for the hospital group but instead of incorporating all of the self-reported MHCL illnesses of each subject, only the major or most serious illness of each subject was analysed. Spearman "M" correlations, seen in Table 2, revealed a significant positive relationship between the frequency of the subjects' major MHCL illness (AF12) and their 6-12 month LCU scores (LCU12), \( (r=0.54, df=11, p.<.05) \). In addition, this relationship was found in the partial "M" analysis of these data, seen in Table 3 \( (r=0.67, df=7, p.<.05) \) thus, lending support to the hypothesis. Therefore, this relationship was found to be significant in both the Spearman and partial analyses. It may be suggested that the more frequently illness occurs, for the hospital patients, the higher their life change scores will be, particularly at the 6-12 month time period.

Contrary to prediction (Hypothesis # 2) a relationship was not found between the severity of the self-reported illnesses (SIRS) and the life change scores (LCU).

Partial "M" correlations, seen in Table 3, revealed
**TABLE 3**

**SIGNIFICANT PARTIAL CORRELATIONS - ALL SUBJECT GROUPS**

<table>
<thead>
<tr>
<th>1-SIRS</th>
<th>2-AP6</th>
<th>3-AP12</th>
<th>4</th>
<th>5-LGU6</th>
<th>6-LGU12</th>
<th>7-LGU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

-0.67* (M-G3)
-0.6?* (M-G3)
0.67* (M-G3)
0.67* (M-G3)

* p. < 0.05.

**Note.**
For explanation of categories (A and M), see Table 2, footnote.
For explanation of variable codes, see Table 1.

G1 = Symptom-free group.
G2 = Health service group.
G3 = Hospital group.
a significant negative relationship between the severity of a major self-reported illness (SIRS) and the frequency of its occurrence at the 12-24 month interval (AF24), \( r = 0.67, \)\( df=7, p < 0.05 \). Thus, at this time period, the more serious a subject's major illness, the less frequently it occurred. Although this finding was not predicted, the results are indeed understandable and will be reviewed in the Discussion.

Spearman "S" correlations, seen in Table 2, revealed that the severity of the hospital subjects' physician diagnosed illnesses (SIRS) and their 0-6 month LCU scores (LCU6) were directly related \( (r = 0.27, df=80, p < 0.01) \) thus, supporting the hypothesis (4) that this relationship would exist. Since this hypothesis was supported, further computations were carried out. The SIRS illness means and standard errors of the mean, at the 0-6 month period, were calculated for the hospital patients and are shown in Table 4. The SIRS illness mean represents the degree of severity (taken from the Seriousness of Illness Rating Scale) of the physician diagnosed illnesses. Table 4 and Figure 1 show that the highest SIRS illness mean was noted at the highest LCU range (for these subjects, 400-799). Thus, as predicted, a relationship between severity of the physician diagnosed illnesses and life change scores, was further supported.
<table>
<thead>
<tr>
<th>LCU RANGE (0-6 MONTHS)</th>
<th>NO. OF Ss</th>
<th>SIRS VALUE TOTAL</th>
<th>SIRS ILLNESS MEAN</th>
<th>STANDARD DEVIATION</th>
<th>STANDARD ERROR OF THE MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>18</td>
<td>9024</td>
<td>501.33</td>
<td>171.5</td>
<td>13.1</td>
</tr>
<tr>
<td>100-199</td>
<td>22</td>
<td>11867</td>
<td>539.40</td>
<td>244.6</td>
<td>15.6</td>
</tr>
<tr>
<td>200-299</td>
<td>17</td>
<td>8757</td>
<td>515.11</td>
<td>209.6</td>
<td>14.5</td>
</tr>
<tr>
<td>300-399</td>
<td>20</td>
<td>12501</td>
<td>625.05</td>
<td>208.3</td>
<td>14.4</td>
</tr>
<tr>
<td>400-799</td>
<td>4</td>
<td>3420</td>
<td>855.00</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Figure 1. SIRS illness means and standard errors of the mean for equal divisions of the range of 0-6 month LCU scores. Hospital subjects (N=81).
Health service group

At this time, it is necessary to discuss the relationship between life change and illness onset for the health service visitors. These subjects exhibited relatively minor illnesses (e.g., sore throats, colds). Spearman "M" correlations, shown in Table 5, revealed a direct relationship between the frequency of the major MHCL illness (AF6) and the 0-6 month LCU scores (LCU6), (r= 0.60, df= 10, p. < .05). Thus, it appears that Hypothesis # 1, which stated that this relationship would exist, was supported. However, partial "M" correlations, seen in Table 3, revealed insignificant results.

When Spearman and partial "A" analyses were carried out on these data (which included all self-reported illnesses of each subject) no significant associations were found between the frequency of illness and the subjects' LCU scores.

It was expected that a relationship would exist between the severity of the self-reported illnesses and the LCU scores (Hypothesis # 2). Spearman "A" correlations, seen in Table 5, revealed that the more severe the subjects' MHCL illnesses (SIRS), the higher were their 0-6 month LCU scores (LCU6), (r= 0.63, df= 12, p. < .01). However, the partial "A" analysis did not support these findings.

A significant negative relationship that was not predicted, was found between subjects' illness severity scores
<table>
<thead>
<tr>
<th></th>
<th>SIRS</th>
<th>AP6</th>
<th>X12</th>
<th>X13</th>
<th>ICU6</th>
<th>ICU7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>0.37 (S)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>0.60 (M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>0.60 (M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p. < 0.05.

Note.

For explanation of categories (A, M and S), see Table 2, footnote.

For explanation of variable codes, see Table 1.
(SIRS) and the frequency of these illnesses at the 12-24 month period \( r = -0.78, \, \text{df}=3, \, p. < .01 \), in the partial "A" correlations (see Table 3). Thus, it seems that at this time frame, the more serious the subjects' illnesses, the less frequently they occurred.

Spearman "S" correlations, shown in Table 5, revealed a significant positive relationship between the 0-6 month LCU scores (LCU6) and the severity of the physician diagnosed illnesses (SIRS), \( r = 0.37, \, \text{df}= 22, \, p. < .05 \). Thus, it appears this finding supports the hypothesis (#3) that such a relationship would exist.

Since Hypothesis #3 was supported, further computations were carried out to investigate this relationship. In Table 6, the SIRS illness means (again, the SIRS illness mean value was assigned to a subject's physician diagnosed illness to give it a severity rating) and standard errors of the mean, at the 0-6 month period, were calculated for the health service group. Table 6 and Figure 2 reveal that the highest SIRS illness mean was found at the highest LCU range (for these subjects, 300-399) thus, lending support to the hypothesis that a relationship would exist between the seriousness of a subject's diagnosed illness and the subject's 0-6 month LCU score.

Considering that the frequency of the self-reported MHCL illnesses and the LCU scores exhibited some degree of correlation, additional computations were carried out and
### TABLE 6

SIRS ILLNESS MEANS AND STANDARD ERRORS OF THE MEAN FOR
EQUAL DIVISIONS OF THE RANGE OF LCU
(0-6 MONTH PERIOD)

<table>
<thead>
<tr>
<th>LCU RANGE</th>
<th>N</th>
<th>SIRS VALUE TOTAL</th>
<th>SIRS ILLNESS MEAN</th>
<th>STANDARD DEVIATION</th>
<th>STANDARD ERROR OF THE MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>8</td>
<td>1230.00</td>
<td>153.75</td>
<td>85.42</td>
<td>9.24</td>
</tr>
<tr>
<td>100-199</td>
<td>10</td>
<td>1006.00</td>
<td>100.60</td>
<td>59.27</td>
<td>7.70</td>
</tr>
<tr>
<td>200-299</td>
<td>3</td>
<td>624.00</td>
<td>208.00</td>
<td>6.92</td>
<td>2.64</td>
</tr>
<tr>
<td>300-399</td>
<td>2</td>
<td>422.00</td>
<td>211.00</td>
<td>193.70</td>
<td>13.92</td>
</tr>
</tbody>
</table>
Figure 2. SIRS illness means and standard errors of the mean for equal divisions of the range of 0-6 month LCU scores. Health service subjects (N=23).
Table 7 demonstrates these findings. The 0-6 month MHCL illness means and standard errors of the mean, for equal divisions of the range of 0-6 month LCU scores, were calculated for the health service and hospital groups. It may be noted that the mean number of illnesses rose in accordance with the range of total LCU scores, with the exception of the highest LCU range (400-799). Figure 3 illustrates these data, in which a linear correlation appeared to exist between all points, with the exception of the highest LCU range.

It was hypothesized (#4) that life events would cluster around the 0-6 month period before illness onset, for the health service and hospital subjects who had diagnosed illnesses. As may be seen in Table 8 and Figure 4, the highest mean LCU score was seen at the 0-6 month period, for both groups. When the average LCU scores/time period were combined for both subject-groups, the cluster of life events was again seen at the 0-6 month time interval, thus, supporting the hypothesis.

**Symptom-free group**

At this point, discussion of life change and illness onset for the relatively symptom-free subjects will be addressed. Spearman "A" correlations, seen in Table 9, revealed a significant positive relationship between frequency of the self-reported illnesses (AF24) and the 12-24 month LCU scores (LCU24), \( r = 0.52, df = 11, p < .05 \). This finding was
TABLE 7

MHCL MEAN ILLNESS RATES AND STANDARD ERRORS OF THE MEAN
FOR EQUAL DIVISIONS OF THE RANGE OF LCU
(0-6 MONTH PERIOD)
HEALTH SERVICE AND HOSPITAL GROUPS

<table>
<thead>
<tr>
<th>LCU RANGE (0-6 MONTH)</th>
<th>N</th>
<th>ILLNESS FREQUENCY</th>
<th>MEAN NO. OF ILLNESSES</th>
<th>STANDARD DEVIATION</th>
<th>STANDARD ERROR OF THE MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>53</td>
<td>139</td>
<td>2.62</td>
<td>2.80</td>
<td>0.38</td>
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<tr>
<td>100-199</td>
<td>53</td>
<td>203</td>
<td>3.83</td>
<td>27.90</td>
<td>1.20</td>
</tr>
<tr>
<td>200-299</td>
<td>32</td>
<td>165</td>
<td>5.15</td>
<td>3.90</td>
<td>0.69</td>
</tr>
<tr>
<td>300-399</td>
<td>30</td>
<td>198</td>
<td>6.60</td>
<td>5.90</td>
<td>1.07</td>
</tr>
<tr>
<td>400-799</td>
<td>4</td>
<td>13</td>
<td>3.25</td>
<td>2.80</td>
<td>1.43</td>
</tr>
</tbody>
</table>
Figure 3. Mean illness rates and standard errors of the mean for equal divisions of the total range of LCU scores. Health service and hospital subjects (N=104).
**TABLE 8**

**MEAN LCU SCORES AND STANDARD ERRORS OF THE MEAN FOR EQUAL DIVISIONS OF THE TIME PERIODS BEFORE ILLNESS ONSET**

**HEALTH SERVICE AND HOSPITAL GROUPS**

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>TOTAL LCU</th>
<th>N</th>
<th>MEAN LCU SCORE</th>
<th>STANDARD DEVIATION</th>
<th>STANDARD ERROR OF THE MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEALTH SERVICE</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>9911</td>
<td></td>
<td>137.65</td>
<td>93.98</td>
<td>9.69</td>
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<td>6-12</td>
<td>5460</td>
<td>72</td>
<td>75.83</td>
<td>90.52</td>
<td>9.51</td>
</tr>
<tr>
<td>12-24</td>
<td>5986</td>
<td></td>
<td>83.13</td>
<td>118.91</td>
<td>10.90</td>
</tr>
<tr>
<td><strong>HOSPITAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>20697</td>
<td></td>
<td>206.97</td>
<td>233.09</td>
<td>15.26</td>
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<td>6-12</td>
<td>14184</td>
<td>100</td>
<td>141.84</td>
<td>120.14</td>
<td>10.95</td>
</tr>
<tr>
<td>12-24</td>
<td>16329</td>
<td></td>
<td>163.29</td>
<td>154.84</td>
<td>12.44</td>
</tr>
<tr>
<td><strong>HEALTH SERVICE AND HOSPITAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>30608</td>
<td></td>
<td>177.95</td>
<td>117.41</td>
<td>10.84</td>
</tr>
<tr>
<td>6-12</td>
<td>19644</td>
<td>172</td>
<td>114.20</td>
<td>156.94</td>
<td>12.52</td>
</tr>
<tr>
<td>12-24</td>
<td>22315</td>
<td></td>
<td>129.73</td>
<td>191.24</td>
<td>13.83</td>
</tr>
</tbody>
</table>
Figure 4. Mean LCU scores and standard errors of the mean for each time period before illness onset.

Health service and hospital groups (N=172).
**TABLE 9**

**SIGNIFICANT SPEARMAN RHO CORRELATIONS—SYMPTOM-FREE SUBJECTS**

<table>
<thead>
<tr>
<th>1 - STK5</th>
<th>2</th>
<th>3 - APL</th>
<th>4 -</th>
<th>5 - IGH6</th>
<th>6 - IGU1?</th>
<th>7 - IGH5?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.52 (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.82 (K)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p. < 0.05.
** p. < 0.005.

**Note.**

For explanation of categories (A and M), see Table 2, footnote.
For explanation of variable codes, see Table 1.
further supported by partial "A" correlations of these data, seen in Table 3 (r = 0.74, df = 7, p. < .05). Thus, as predicted (Hypothesis # 1), the more frequently the subjects' MHCL illnesses occurred, the higher were the subjects' LCU scores, at a particular time period.

Spearman "M" analyses of these data, seen in Table 9, revealed a significant positive relationship between the frequency of a subject's major illness (AF24) and the subject's 12-24 month LCU score (LCU24) (r = 0.82, df = 4, p. < .005). This finding supports the results of the previous analyses as well as the hypothesis (H1) that such an association would exist. Thus, it may be stated that a definite relationship exists between the frequency of illness and LCU scores, for the symptom-free subjects, particularly at the 12-24 month time interval. However, partial "M" analyses of these data, seen in Table 3, yielded insignificant findings.

Spearman "A" correlations, seen in Table 9, revealed that the more serious the subjects' MHCL illnesses (SIRS), the less frequently the illnesses occurred at the 6-12 month period (AF12) (r = -0.52, df = 11, p. < .05). In the partial "A" analysis of these data, seen in Table 3, this association was not significant. This unexpected relationship however, was seen for the health service and hospital subjects in the partial "A" and "M" analyses, respectively, at the 12-24 month periods.

Hypothesis # 2, which stated that an association
would exist between the severity of the self-reported illnesses (SIRS) and the LCU scores of the symptom-free subjects, was not supported in either the Spearman, nor in the partial analyses.

All subject-groups

The hypotheses which concerned all three subject-groups will now be considered. One such supposition (Hypothesis # 5) stated that the life change scores (LCU) of the symptom-free subjects would be lower than those of either the health service visitors, or the hospital patients. As seen in Table 10, the symptom-free subjects had a lower mean LCU score than the hospital subjects, which is in accord with the hypothesis. However, contrary to prediction, the symptom-free subjects had a higher mean LCU score than the health service visitors who exhibited minor illnesses.

It was further postulated that the mean LCU scores of the hospital patients would be higher than those of either the symptom-free or the health service subjects (Hypothesis # 6). As seen in Table 10, the hypothesis was supported. Analysis of variance further indicated that the LCU means of the groups were significantly different. This analysis will be discussed in greater detail at a later date. Graphic illustrations of the magnitude of LCU score differences between subjects, in each of the groups, may be seen in Appendix G.
TABLE 10

LIFE CHANGE UNIT (LCU) TOTAL SCORES/ SUBJECT-GROUP

<table>
<thead>
<tr>
<th></th>
<th>SYMPTOM-FREE</th>
<th>HEALTH SERVICE</th>
<th>HOSPITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCU TOTAL</td>
<td>33409</td>
<td>21357</td>
<td>51210</td>
</tr>
<tr>
<td>NO. OF SUBJECTS</td>
<td>88</td>
<td>72</td>
<td>100</td>
</tr>
<tr>
<td>AVERAGE LCU/GROUP</td>
<td>379.6</td>
<td>296.6</td>
<td>512.1</td>
</tr>
</tbody>
</table>
Additional analyses were carried out to test Hypothesis # 7, which stated that variable differences would exist between the three subject-groups. A one-way analysis of variance was employed to compare the Seriousness of Illness Rating Scale (SIRS) means— the values or weights given to the subjects' physician diagnosed illnesses. In the comparison of the SIRS means, it should be noted that the symptom-free subjects had an "N" of 0, since none of these subjects had a present illness diagnosed. For the health service and hospital subjects, 23 and 81 subjects were involved, respectively. A significant difference was found between the means of these two groups on the SIRS variable (F= 40.12, df= 1/102, p. < .001).

A further breakdown of the one-way analysis of variance resulted in usage of one-way pairwise analysis of variance. Comparison of the means of pairs of groups were tested. Between the health service and hospital subjects, a significant difference was found on the SIRS variable, (F= 81.04, df= 1/102, p. < .001). As predicted, the level of severity or seriousness of the physician diagnosed illnesses was significantly different between the health service and hospital groups. This finding is understandable since the hospital group, by definition, had illnesses severe enough to require hospitalization.

To further test Hypothesis # 7 that variable differences would exist between subject-groups, two-way Lindquist
Type I analyses of variance (Lindquist, 1956) were implemented to compare the LCU scores, as well as the Medical History Check-List scores. In support of the hypothesis, as seen in Table 11, significant differences on the LCU scores were found between groups, \( F = 15.64, \text{df} = 2/520, p < .01 \) between time periods, \( F = 9.81, \text{df} = 2/514, p < .01 \) and between groups \( \times \) time periods, \( F = 4.47, \text{df} = 4/514, p < .01 \).

In view of these findings, multiple comparisons were performed using Duncan's Multiple Range Tests for main effects and for simple main effects. As seen in Table 12, results of the main effects test revealed that the symptom-free and hospital subjects, the symptom-free and health service subjects, and the health service and hospital subjects differed significantly from each other in terms of overall performance on the life change dimension. Thus, in support of Hypothesis #7, all subject-groups differed significantly in their responses to the Schedule of Recent Experience (SRE), which measured the amount of life change or stress these subjects encountered over the two years prior to the test period.

Results of the simple main effects test revealed differences found between groups on their LCU scores at each of the three time periods. At the 0-6 month LCU interval, the symptom-free and hospital subjects, as well as the health service and hospital subjects, differed significantly from each other in terms of their overall performance at the 0-6
TABLE 11
ANALYSIS OF VARIANCE OF THE LCU SCORES OF ALL SUBJECT-GROUPS

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SUM OF SQUARES</th>
<th>MEAN SQUARES</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJECTS</td>
<td>259</td>
<td>6,172,262.83</td>
<td>23,831.12</td>
<td></td>
</tr>
<tr>
<td>GROUP</td>
<td>2</td>
<td>669,747.63</td>
<td>334,873.81</td>
<td>15.64*</td>
</tr>
<tr>
<td>BETWEEN ERROR</td>
<td>257</td>
<td>5,502,515.19</td>
<td>21,410.56</td>
<td></td>
</tr>
<tr>
<td>WITHIN SUBJECTS</td>
<td>520</td>
<td>5,525,806.00</td>
<td>10,626.55</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>2</td>
<td>196,621.16</td>
<td>98,310.56</td>
<td>9.81*</td>
</tr>
<tr>
<td>GROUPS x TIME</td>
<td>4</td>
<td>179,225.15</td>
<td>44,806.28</td>
<td>4.47*</td>
</tr>
<tr>
<td>WITHIN ERROR</td>
<td>514</td>
<td>5,149,959.68</td>
<td>10,019.37</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>779</td>
<td>11,698,068.83</td>
<td>15,016.77</td>
<td></td>
</tr>
</tbody>
</table>

*p. < 0.01.
TABLE 12
DUNCAN'S MULTIPLE RANGE TESTS ON MAIN EFFECTS

<table>
<thead>
<tr>
<th></th>
<th>MEANS</th>
<th>df = 2/520; 3/520.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIFE CHANGE (LCU)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom-Free vs. Hospital</td>
<td>( R_3 = 32.38 )</td>
<td>512.00 - 296.62 = 215.38 *</td>
</tr>
<tr>
<td>Symptom-Free vs. Health Service</td>
<td>( R_2 = 30.76 )</td>
<td>379.64 - 296.62 = 83.02 *</td>
</tr>
<tr>
<td>Health Service vs. Hospital</td>
<td>( R_2 = 30.76 )</td>
<td>512 - 379.64 = 132.36 *</td>
</tr>
</tbody>
</table>

| **MEDICAL HISTORY (MHC)** |                                |                    |
|---------------------------|                                |                    |
| Symptom-Free vs. Hospital | \( R_3 = 191.42 \)            | 6889.53 - 797.61 = 6091.92 * |
| Symptom-Free vs. Health Service | \( R_2 = 181.84 \)          | 1210.05 - 797.61 = 412.44 * |
| Health Service vs. Hospital | \( R_2 = 181.84 \)     | 6889.53 - 1210.05 = 5679.48 * |

* p. < 0.05.
month LCU time period. At the 6-12 month LCU interval, the symptom-free and health service subjects, as well as the health service and hospital subjects, differed significantly from each other in terms of their responses. At the 12-24 month period, the health service and hospital subjects differed significantly in their responses to the LCU items. Table 14 lists the various LCU group means found at each of the time periods which may assist in comprehending these findings.

Comparison of the MHCL means between groups, using two-way analysis of variance (see Table 13), revealed significant differences between groups ($F = 33.29, df = 2/520, p < .01$) between time periods, ($F = 3.63, df = 2/514, p < .05$) and between groups x time periods ($F = 3.04, df = 4/514, p < 0.05$). Apparently, the subject-groups did respond in a significantly different manner to the MHCL questionnaire, which supports the hypothesis.

Duncan's Multiple Range comparisons were carried out to further test these differences between groups on the MHCL measure. As seen in Table 12, the results of the main effects test revealed that the symptom-free and hospital subjects; the symptom-free and health service subjects; and the health service and hospital subjects, differed significantly from each other in terms of overall performance on the medical history (MHCL) dimension. In support of Hypothesis # 7, all subject-groups differed significantly in their responses to the MHCL, which measured the amount of illness subjects
TABLE 13
ANALYSIS OF VARIANCE OF THE MHCL SCORES OF ALL SUBJECT-GROUPS

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SUM OF SQUARES</th>
<th>MEAN SQUARES</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJECTS</td>
<td>259</td>
<td>994,137,627.64</td>
<td>3,838,369.00</td>
<td></td>
</tr>
<tr>
<td>GROUP</td>
<td>2</td>
<td>204,565,656.18</td>
<td>102,282,832.00</td>
<td>33.29*</td>
</tr>
<tr>
<td>BETWEEN ERROR</td>
<td>257</td>
<td>789,571,971.46</td>
<td>3,072,264.00</td>
<td></td>
</tr>
<tr>
<td>WITHIN SUBJECTS</td>
<td>520</td>
<td>192,915,640.00</td>
<td>370,991.62</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>2</td>
<td>2,630,665.43</td>
<td>1,315,333.00</td>
<td>3.63*</td>
</tr>
<tr>
<td>GROUPS x TIME</td>
<td>4</td>
<td>4,408,795.40</td>
<td>1,102,199.00</td>
<td>3.01*</td>
</tr>
<tr>
<td>WITHIN ERROR</td>
<td>514</td>
<td>185,876,179.16</td>
<td>361,626.81</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>779</td>
<td>1,187,053,267.64</td>
<td>1,523,817.00</td>
<td></td>
</tr>
</tbody>
</table>

* p. < 0.05.
** p. < 0.01.
<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>TIME PERIODS (MONTHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-6</td>
</tr>
<tr>
<td><strong>LCU</strong></td>
<td></td>
</tr>
<tr>
<td>Symptom-Free</td>
<td>121.09</td>
</tr>
<tr>
<td>Health Service</td>
<td>136.91</td>
</tr>
<tr>
<td>Hospital</td>
<td>207.07</td>
</tr>
<tr>
<td><strong>MHCL</strong></td>
<td></td>
</tr>
<tr>
<td>Symptom-Free</td>
<td>242.80</td>
</tr>
<tr>
<td>Health Service</td>
<td>424.79</td>
</tr>
<tr>
<td>Hospital</td>
<td>1574.03</td>
</tr>
</tbody>
</table>
encountered in the two year period prior to testing.

Results of the simple main effects test indicated differences found between groups at each of the three time periods on the MHCL. At each of the time periods (0-6, 6-12 and 12-24) it was found that the symptom-free and hospital subjects, as well as the health service and hospital subjects, differed significantly from each other in terms of their responses to the MHCL. Table 14 lists the various MHCL group means found at each of the time periods which may assist in revealing the reasons for these findings. As may be noted in Table 14, the differences between the MHCL means are visibly dissonant.

Demographic factors

In this area of research, relationships between the demographic variables of the Schedule of Recent Experience (SRE), (i.e., age, sex, marital status) and the two other parts of the scale (Parts A and B) are often explored. In this study, Hypothesis # 8 predicted that no significant associations would exist between the 21 demographic variables of the SRE and Part A (measuring the occurrence, either 'yes' or 'no' of a life event) nor Part B (measuring the occurrence and/or frequency of other life events). As predicted, Chi-square analyses, performed independently on each of the subject-groups, yielded inconsistent relationships between the demographic variables and Parts A and B of the SRE.
At this stage, it was deemed of interest to obtain some idea of the sample make-up. Marginal analysis (Hie et al., 1974), a descriptive statistic, was implemented for the purpose of describing the subject population. The 21 demographic variables of the SRE were independently compared for each subject-group to see if differences and/or similarities existed between groups on these factors. Appendix H lists the major differences found in this analysis. Of the 21 demographic variables, 10 were found to show major differences, either between two or all three subject-groups. These variables were: age; sex; present marital status; times married; education; time at present residence; population of birthplace; subject's age when mother died; subject's age when father died; and, times moved in the past five years.

Overall, the hospital subjects were much older and less educated than either the symptom-free or health service subjects. The majority of the hospital patients had not moved in the past five years and were married, which is contrary to the make-up of the symptom-free and health service groups. In addition, the majority of the hospital subjects were born in small towns or rural areas, whereas, most of the symptom-free and health service subjects were from large towns or cities. Also, the majority of the hospital group had deceased parents, contrary to the other two groups. Since this analysis was conducted to derive an idea of the sample, no implications were made from the results of these data to those of the
other analyses. The results, however, are worth discussion and will be reviewed at a later time.

Coping Mechanisms

The onset, severity and frequency of illness, as related to life changes, has been discussed in terms of the hypotheses laid out in this study. The measures employed to test these relationships consisted of: (1) the Schedule of Recent Experience (SRE) which measures the amount and frequency of life change (LCU) that subjects encounter; (2) the Medical History Check-List (MHCL) which measures the amount and frequency of subjects' self-reported illnesses, and (3) the Seriousness of Illness Rating Scale (SIRS) mean values, which were used to assign a weight, in terms of severity, to a subject's physician diagnosed illness.

It was thought of value to test the effect of coping mechanisms on illness onset, severity and frequency. However, considering the limitations of the measure employed to test this relationship, as previously mentioned, it was felt appropriate to discuss the results of the Boston University Personality Inventory (BUPI).

Hypothesis #9, which involved the BUPI, stated that a relationship would exist between subjects' BUPI scores, on the submissiveness and defiance dimensions (which are referred to as "faulty coping mechanisms") and the severity of the subjects' self-reported MHCL illnesses. As noted in
Table 15, the results for all subject groups revealed inconsistent relationships between these variables. As was previously noted, two Spearman and two partial analyses were performed on these data in terms of: (1) all self-reported MHCL illnesses of each subject ("A"), and (2) the major self-reported MHCL illness of each subject ("M").

Results of the Spearman "A" analysis revealed that only the health service subjects showed relationships between submissiveness and MHCL illness severity ($r = -0.64$, df = 12, $p < .01$) and between defiance and illness severity ($r = 0.53$, df = 12, $p < .05$). In the Spearman "M" analysis, only the hospital subjects showed significant correlations between defiance and MHCL illness severity ($r = -0.87$, df = 11, $p < .005$). In both partial analyses, none of the subject-groups showed any significant relationships between illness severity and submissiveness, nor between illness severity and defiance. In view of these findings, the hypothesis failed to be supported.

Numerous significant correlations, that were not predicted, were found between life change scores (LCU) and submissiveness and between LCU and defiance. As seen in Tables 16 and 17, the results proved to be quite inconsistent and at times, contradictory and thus, will not be discussed for sake of clarity.

In addition to relations between submissiveness and defiance as separate factors on life change and illness onset,
## TABLE 15

RELATIONSHIPS BETWEEN SUBMISSIVENESS, DEFIANCE AND SELF-REPORTED MHCL ILLNESS SEVERITY

ALL SUBJECT-GROUPS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>MHCL ILLNESS SEVERITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBMISSIVENESS</td>
<td>SPEARMAN RHO ANALYSIS &quot;A&quot;</td>
</tr>
<tr>
<td>DEFIANCE</td>
<td>SPEARMAN RHO ANALYSIS &quot;M&quot;</td>
</tr>
</tbody>
</table>

* p. < 0.05.

** p. < 0.005.

Note.

A = Spearman analysis involving all self-reported MHCL illnesses.

M = Spearman analysis involving the major self-reported MHCL illness of each subject.
TABLE 16

VARIABLES RELATING TO SUBMISSIVENESS AND DEFIANCE
ALL SUBJECT GROUPS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>SUBMISSIVENESS</th>
<th>DEFIANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 MONTH LCU SCORE</td>
<td>-0.46 *(HS-A)</td>
<td>0.67 *(HS-A)</td>
</tr>
<tr>
<td>6-12 MONTH LCU SCORE</td>
<td>-0.71 **(HS)</td>
<td>0.47 *(HS-A)</td>
</tr>
<tr>
<td>12-24 MONTH LCU SCORE</td>
<td>0.59 *(HP-A)</td>
<td>0.58 *(HP-A)</td>
</tr>
<tr>
<td>FREQUENCY OF SELF-REPORTED</td>
<td>-0.57 *(SF-A)</td>
<td>-0.77 **(HS-A)</td>
</tr>
<tr>
<td>MHCL ILLNESSES AT THE 12-24 MONTH PERIOD</td>
<td>-0.53 *(HS-A)</td>
<td>-0.54 *(HS-M)</td>
</tr>
<tr>
<td>SUBMISSIVENESS</td>
<td></td>
<td>-0.52 *(HS-A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.77 *(SF-A)</td>
</tr>
</tbody>
</table>

* p < 0.05.
** p < 0.005.

Note.
For explanation of categories (A and M), see Table 15.
SF = symptom-free; HS = health service; HP = hospital subjects.
TABLE 17

VARIABLES RELATING TO SUBMISSIVENESS AND DEFIANCE
SIGNIFICANT PARTIAL CORRELATIONS
ALL SUBJECT GROUPS

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>SUBMISSIVENESS</th>
<th>DEFIANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-24 MONTH LCU SCORE</td>
<td>-0.81 * (SF-A)</td>
<td></td>
</tr>
<tr>
<td>SUBMISSIVENESS</td>
<td></td>
<td>0.80 * (SF-A)</td>
</tr>
</tbody>
</table>
coping, as a pooled factor on the BUPI was tested. Hypothesis # 10 predicted that subjects with a lot of life change (high LCU's) and good coping ability (low BUPI scores) would have less MHCL illness than subjects who had experienced little life change (low LCU scores) and had poor coping ability (high BUPI scores).

The mean score for submissiveness on the BUPI was 20, while the mean score for defiance was 30; thus, a high BUPI score was defined as one with a total score of 51+. Since a subject's total BUPI score was a combination of the submissiveness and defiance scores, the actual amount of either trait was unknown. For this reason, the two scores were analysed independently in previous statistical tests. Appendix I shows graphic illustrations of the magnitude of BUPI score differences between subjects in each subject-group. On the Schedule of Recent Experience (SRE), an LCU total of 300+ constituted a major life crisis, thus, 300+ was selected as being a high LCU score.

As seen in Table 18, the symptom-free and health service subjects who had low BUPI and high LCU scores, possessed lower MHCL average scores than did subjects from these two groups who had high BUPI and low LCU scores. The opposite, however, was found for the hospital subjects. When the average self-reported MHCL illness score, for all subject-groups was tabulated under the two conditions (MHCL/condition), the results indicated rejection of the hypothesis.

In support of Hypothesis # 11, subjects with good
TABLE 18

AMOUNT OF SELF-REPORTED ILLNESS (MHCL) IN TERMS OF BUPI AND LCU SCORES

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>N</th>
<th>SYMPTOM-FREE N</th>
<th>HEALTH SERVICE</th>
<th>N</th>
<th>HOSPITAL TOTAL N</th>
<th>TOTAL MHCL</th>
<th>TOTAL N</th>
<th>MHCL/CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH BUPI AND LOW LCU SCORES</td>
<td>10</td>
<td>738.2</td>
<td>15</td>
<td>16</td>
<td>1690.2</td>
<td>41</td>
<td>3962.2</td>
<td>1320.7</td>
</tr>
<tr>
<td>LOW BUPI AND HIGH LCU SCORES</td>
<td>30</td>
<td>732.3</td>
<td>14</td>
<td>26</td>
<td>5230</td>
<td>70</td>
<td>6982.9</td>
<td>2327.6</td>
</tr>
</tbody>
</table>
coping ability (low BUPI scores) and little life change (low LCU scores) had the least amount of MHCL illness. In this case illness was defined as that recorded in number and severity on the MHCL. As noted in Table 19, subjects with good coping ability and little life change, from the symptom-free and health service groups, had the least amount of illness. In the hospital group, subjects with good coping ability (low BUPI scores) and little life change (low LCU's) had more illness than subjects with poor coping ability (high BUPI scores) and little life change (low LCU's). When the three subject-groups were combined under each of the four conditions, the subjects with good coping (low BUPI) and little life change (low LCU's) did exhibit the least amount and severity of self-reported MHCL illness.

In reference to Hypothesis # 7, differences were expected between subject-groups on the submissiveness and defiance variables of the BUPI. One-way analysis of variance was implemented. Comparison of the submissiveness means yielded a significant difference between groups (F = 15.98, df = 1, p < .001), while comparison of the defiance means yielded insignificant results.

One-way pairwise analyses of variance were performed to further test these findings. Comparison of the submissiveness means yielded a significant difference between the symptom-free and hospital groups (F = 32.72, df = 1, p < .001), and between the health service and hospital groups (F = 15.12, df = 1, p < .001). Comparison of the defiance means yielded
## TABLE 19
AMOUNT OF ILLNESS IN TERMS OF BUPI, LCU AND MHCL SCORES

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>N</th>
<th>SYMPTOM FREE</th>
<th>N</th>
<th>HEALTH SERVICES</th>
<th>N</th>
<th>HOSPITAL</th>
<th>TOTAL N</th>
<th>TOTAL MHCL</th>
<th>KH / CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW BUPI AND LOW LCU SCORES</td>
<td>23</td>
<td>376</td>
<td>30</td>
<td>688</td>
<td>13</td>
<td>2758</td>
<td>66</td>
<td>3822</td>
<td>1274</td>
</tr>
<tr>
<td>LOW BUPI AND HIGH LCU SCORES</td>
<td>30</td>
<td>732</td>
<td>14</td>
<td>921</td>
<td>26</td>
<td>5230</td>
<td>70</td>
<td>6883</td>
<td>2294</td>
</tr>
<tr>
<td>HIGH BUPI AND LOW LCU SCORES</td>
<td>10</td>
<td>738</td>
<td>15</td>
<td>1554</td>
<td>16</td>
<td>1690</td>
<td>41</td>
<td>3982</td>
<td>1327</td>
</tr>
<tr>
<td>HIGH BUPI AND HIGH LCU SCORES</td>
<td>25</td>
<td>1211</td>
<td>13</td>
<td>2000</td>
<td>45</td>
<td>4839</td>
<td>83</td>
<td>8050</td>
<td>2683</td>
</tr>
</tbody>
</table>
a significant difference between the symptom-free and health service groups ($F = 4.12, df = 1, p < .05$). It seems that the symptom-free and health service groups responded to submissiveness in a significantly different manner than the hospital group. In addition, the defiance scores of only the symptom-free and health service groups were significantly different. In view of these findings, the hypothesis failed to be supported.
Discussion

Consistent with previous studies (e.g., Holmes & Holmes, 1970; Masuda & Holmes, 1967; Rahe et al., 1964, 1967, 1968 & 1969) the results of this study established that the frequency of the self-reported MHCL illnesses was positively related to the life change scores (LCU) of the subjects, in each of the three subject-groups. Specifically, the more frequently these illnesses occurred, the higher were the LCU scores or the amount of life stress encountered by the subjects.

As seen in Table 7 (page 76) and Figure 3 (page 77), the mean number of self-reported illnesses rose in accordance with the range of total LCU scores, with the exception of the highest LCU range (400-799). This was seen for the health service and hospital subjects, at the 0-6 month time interval. A linear relationship is suggested between all points in Figure 3, with the exception of the 400-799 LCU range.

Similar results were seen in the Rahe et al., (1970) study in which a linear relationship was reported, but at the highest LCU range the mean illness rate was not the highest one recorded.

In the present study, the MHCL mean illness rate of the 400-799 LCU range was only higher than that of the 0-99 LCU range. The reason for such a result may lie in the fact that only four subjects constituted the highest LCU range, while 30 to 53 subjects were found in each of the other four
LCU ranges. Also, these four subjects had few illnesses. Consequently, the low mean illness rate seen at the highest LCU range may have well been the result of such a drastically small sample.

Furthermore, considering the results found in the present study as well as in Rahe et al., (1970), in which similar methods were employed to test the relationship between mean illness rate and life change, it may be feasible to suggest that a ceiling or threshold effect is evidenced at the higher LCU ranges, above which the predictive value of mean illness rates to life change is weakened. Thus, it may be assumed, albeit with some hesitance, that the more life events or stress these subjects experienced, the more likely they were to experience illness. Moreover, it may be the case that the amount of life change subjects experience are predictive, to some degree, of how frequently they will become ill, at a particular point in time.

The amount of life change experienced was less predictive of the severity of the self-reported illnesses. The more serious the illnesses were for the health service group, the higher were their life change scores, at the 0-6 month interval. Although this finding supports Hypothesis #2, the association was not seen in either the symptom-free or hospital groups.

The absence of a significant relationship between severity of the illnesses and life change scores for the symptom-free group may lie in the fact that the mean 0-6
month MHCL scores for this group, which represents the number and severity of these illnesses, was almost half that of the health service group. Little difference was seen between the two groups mean LCU scores, as well (see Table 14, page 90). Concerning this absence in the hospital group, the severity of the MHCL illnesses may have been relatively insignificant, in terms of life change or stress experienced, since their hospital ailments were of a more serious nature and duration. Thus, the present diagnosed ailments were more likely the products of increased stress or life change.

The unpredicted finding that the more serious the self-reported MHCL illness(es), the less frequently it occurred, for all subject-groups, is easily understood since illnesses that are severe usually persist for a greater length of time and thus, occur less frequently.

As previously stated, the 0-6 month LCU scores of the health service and hospital subjects were positively associated with the level of severity of their physician diagnosed illnesses, which supports Hypothesis #3. As seen in Table 4 (page 68) and Figure 1 (page 69), for the hospital group, and in Table 6 (page 73) and Figure 2 (page 74) for the health service group, the highest SIRS illness mean was noted at the highest LCU range. These findings are supported by several studies (e.g., Rahe et al., 1970, 1973, 1974; Rubin et al., 1972; Wyler et al., 1971), and suggest that the more life change or stress subjects encountered in the 0-6 month
period prior to onset, the more severe were their present illnesses. The amount of life change experienced may thus, be indicative of the degree of severity of illnesses that may result.

The finding that the hospital subjects had more severe physician diagnosed illnesses than the health service subjects (see Table 4 and 6) supported the hypothesis (#7) that a difference would exist. Since the hospital patients had higher LCU scores than the health service subjects, credence may be given to the supposition that the amount of life change experienced may be indicative of the severity of the resultant illnesses. Indeed, the fact that the hospital patients had illnesses severe enough to require hospitalization, while the health service visitors were younger subjects with minor ailments, makes this difference in severity discernable.

As previously observed (e.g., McKegney et al., 1970; Rahe et al., 1964, 1967, 1970, 1973, 1974; Rahe & Lind, 1971; Rahe & Paasikivi, 1971; Rubin et al., 1972; Wyler et al., 1971) life change scores (LCU) clustered around the 0-6 month period prior to the onset of physician diagnosed illnesses among the health service and hospital subjects. Table 8 (page 78) and Figure 4 (page 79) demonstrate that the highest mean LCU scores were found at the 0-6 month period, for both groups, which supports Hypothesis #4. It seems that an increase in the amount of life change is likely to be found
immediately prior to illness onset. This finding suggests that an increase in life stressors may precipitate the onset of disease. The data from this and previous studies indicate that the greater the significance of the life situations or life changes that cluster together the greater becomes the risk of ensuing major body breakdown of its resistance to general health change.

As seen in Table 10 (page 83), the hospital group had the highest mean life change score (LCU) of all subject-groups, which supports Hypothesis # 6. Appendix G further illustrates that the hospital group had more subjects in the highest LCU range than the other groups. This finding appears reliable since the hospital patients, by definition, were more seriously ill than either the health service visitors, who visited the centers for minor ailments, or the relatively symptom-free subjects, who had no present illness at the time of testing.

Together these data suggest that the amount of life change subjects encounter, at a particular point in time, may be indicative of the state of health that results. This finding is supported by Casey et al.,(1970) who found a significant difference between mean LCU scores of 'high care' subjects, requiring hospitalization, and mean LCU scores of the 'low' and 'no' care subjects. When considered together, these results indicate that the predictive validity of SRE scores to health care is reliable.
However, contrary to prediction (Hypothesis # 5), the symptom-free group had higher life change scores than the health service group. This finding may be explained by the fact that both these groups were university students, with the health service group experiencing relatively minor, short-term ailments. Perhaps the symptom-free group did not seek health care as readily when an ailment presented itself and this may have resulted in an increase in stress or life change since they would have chosen to deal with the illness themselves. By seeking medical attention, the health service subjects could have avoided heightened life change or stressors by having someone else take care of them.

As predicted, all subject-groups differed significantly from each other in their responses to the SRE, which supports Hypothesis # 7 (see Table 11, page 86). Therefore, the level of health care attained by these subjects appears indicative of the amount of life change or stress they had experienced. At the 0-6 month time interval, the symptom-free and health service subjects differed significantly from the hospital subjects in their LCU scores. This finding seems valid since the two former groups had either 'low' or 'no' health care, while the latter group had illness severe enough to require hospitalization. It seems plausible that this latter group would have experienced a greater amount of life changes or at least a varying amount from the other two groups.

At the 6-12 month period, the symptom-free and health
service, as well as the health service and hospital subjects, differed significantly from each other on the LCU responses. An explanation of the latter result has been stated above. Concerning the former finding, Table 14 (page 90) reveals that the health service subjects had their lowest mean life change, and self-reported illness scores at the 6-12 month period, while the opposite was seen for the symptom-free group. This fact alone appears to account for the significant difference in their LCU responses.

Finally, at the 12-24 month interval, the health service and hospital subjects differed significantly in their responses on the SRE. Thus, at each of the time periods, these two groups differed significantly. It is proposed that time has no effect on the differences between subject-group responses when the level of health care varies so drastically. In addition, the LCU scoring method appears to be a valid one in predicting the level of health care attained by subjects, at least up to two years prior to illness.

A rather pertinent finding confirmed that significant differences existed between the subject-groups in their responses to the Medical History Check-List (MHCL). The MHCL measured the amount of self-reported illness encountered over the two year period prior to testing. Thus, the amount of illness experienced varied between the levels of health care,
which supports Hypothesis # 7 (see Table 13, page 89). Concerning the time intervals at which these illnesses were reported (0-6, 6-12 and 12-24 months), the symptom-free and health service subjects differed significantly from the hospital subjects in their responses to the MHCL, at all time periods.

Such findings appear reliable since the symptom-free and health service subjects had 'low' to 'no' health care while the hospital subjects were incapacitated to a much greater degree. In addition, as seen in Table 14, the self-reported illness means of the symptom-free and health service subjects, at each of the time periods, are quite visibly dissonant from the means of the hospital subjects. It appears that the amount of illness subjects encounter prior to a present incapacitation may be indicative of the severity and duration of their present illness.

As previously reported, the Boston University Personality Inventory (BUPI) produced results that should be approached with caution. This inference in based on the fact that only through repeated communication with the senior author of the scale was the present author informed that the BUPI was based on theoretical assumptions and had not been empirically standardized. No mention was made in any of the research that this was the case, nor were the theoretical bases for the scale described. This information was not received until the present study had been completed.
Therefore, the validity and reliability of the BUPI is unknown and this fact should be taken into account when reviewing the literature and the results.

Contrary to the predictions of Hypothesis # 9, Table 15 (page 95) revealed that relationships between the BUPI variables of submissiveness and defiance with the MHCL illness severity scores, were inconsistent and contradictory. Numerous significant correlations that were not predicted were found between the life change scores (LCU) and defiance and between the LCU scores and submissiveness. Again, as seen in Tables 16 (page 96) and 17 (page 97) the results proved inconsistent and often contradictory. Due to the theoretical basis on which the BUPI was established, it appears that such results may be inherent in the make-up of the questionnaire. Attempts to explain such confusing results would be unjustified and therefore, no solid conclusions can be drawn about these results. It would indeed be of great benefit if the validity and reliability of the BUPI was established, in terms of standardization.

In the utilization of this measure, one outcome appeared to have some justification. Subjects who exhibited good coping ability (low BUPI scores) and a mild to moderate amount of life change (low LCU score) had the least amount of self-reported MHCL illness. This finding is understandable since the combination of 'good coping ability' and little life stress should result in fewer and less severe illnesses.
One may suggest that this combination is beneficial in sustaining good health. Furthermore, as may be noted in Table 19 (page 101), the "poor copers" (subjects with high BUPI scores) with a lot of life stressors (high LCU scores) had the highest mean illness score of all four combinations of subjects. Thus, the subjects who had experienced a lot of life change and had poor coping ability had the most illness, in terms of number and severity. These results are in agreement with those of Jacobs et al., (1970) and Wyler et al., (1971) who found that when treatment was sought, the degree of incapacitation was positively associated with the frequency of reported previous life stresses. However, due to the reservations stated, these present findings should be viewed as having limited validity in the field of illness research.

Age, sex, marital status, education, religion, race, social class, ethnic background, etcetera, appeared to exert little influence upon the subjects' responses to the SRE items. The life events items of the SRE are commonly experienced life changes, ranging from such things as change in residence to retirement from work. This finding was expected (Hypothesis # 8) and has been supported by many studies (e.g., Canter et al., 1966; McKegney et al., 1970; Mendels & Weinstein, 1972; Myers et al., 1972; Rahe et al., 1969; Selzer & Vinokur, 1974) in which the demographic variables proved unrelated to
the subjects' responses on the SRE items.

Furthermore, several cross-cultural studies (e.g., Coddington, 1972a, b; Harmon et al., 1970; Holmes & Rahe, 1967; Komaroff et al., 1968; Masuda & Holmes, 1967; Rahe, 1969; Ruch & Holmes, 1971) found no significant differences in subjects' ratings of the relative importance of the SRRS items (later given weights to produce the SRE) among various cultures. Thus, it appears that demographic factors exert little influence in the way people perceive stress, in terms of their responses to life events items.

As previously mentioned, the characteristics of the subject population, as seen in Appendix K, indicated that the hospital subjects were much older; less educated; had deceased parents; had seldom moved in the past five years; were born in rural areas or small towns; and were married, which is contrary to the make-up of the symptom-free and health service groups. Although specific conclusions cannot be drawn, these characteristics may have had some bearing on the fact that the hospital patients had the greatest amount of life changes or stress (LCU), the greatest amount of self-reported MHCL illness and the most severe physician diagnosed illnesses. Since the symptom-free and health service subjects were relatively young and "healthy" university students with their future ahead of them, may be pertinent to their exhibition of less life change and illness than the hospital patients.
The findings of the present study support, within the limitations mentioned above, numerous retrospective studies (e.g., Cantor et al., 1970; Holmes & Masuda, 1973; Holmes & Rahe, 1967; Rahe & Arthur, 1968; Rahe et al., 1973; Wyler et al., 1968) linking life changes or stressors to the onset, severity and frequency of illness. One contribution of this study was the finding that the subjects' present state of health appeared to indicate the amount of life change they had encountered, as well as the amount and severity of past and present illnesses. These results are indeed favorable in relating life change or stress to illness behavior, and should be further explored for the purpose of assisting in the psychological as well as medical treatment of illness.
Conclusions

The relationship between onset, severity and frequency of illness to life changes has been further substantiated. The effect of coping mechanisms on the illness process has not been ascertained. The most profound relationships found in the study, which support many of the hypotheses, were as follows:

(1) the frequency of the self-reported MHCL illnesses and the LCU scores of all subject-groups were positively related; that is, the more frequently illnesses occurred, the higher was the amount of life change or stress experienced;

(2) the severity of the self-reported MHCL illnesses and the life change scores (LCU) were positively related for the health service subjects. Thus, the more serious the illnesses, the higher was the amount of life change these subjects encountered;

(3) in each subject-group it was found that the more serious the self-reported MHCL illness(es) was, the less frequently it occurred, at a particular time period;

(4) subjects' 0-6 month life change scores (LCU) were positively related to the level of severity of their physician diagnosed illnesses; that is, the greater the amount of life change, the more severe were the illnesses;

(5) the health service subjects had physician diagnosed illnesses that were at a level of severity significantly differ-
ent from that of the hospital patients. As well, the hospital patients had the more severe illnesses;

(6) life change scores (LCU) clustered around the 0-6 month period prior to the onset of the physician diagnosed illnesses for the health service and hospital patients. Thus, the highest LCU scores were seen at the time period immediately prior to illness onset;

(7) the hospital patients had higher mean life change scores than either the health service or symptom-free subjects;

(8) the life change scores (LCU) differed significantly between subject-groups, time periods and groups x time periods. In addition, the minor illness or health service subjects differed significantly from the hospital subjects in their responses to the Schedule of Recent Experience (SRE), at each of the three time periods (0-6, 6-12 and 12-24 months). Thus, the passage of time had no effect on the differences between groups when their level of health care varied so greatly. Furthermore, the LCU scoring method appears to be a valid one in predicting the level of health care required by subjects, at least up to two years prior to their present illnesses;

(9) significant differences existed between subject-groups, time periods and groups x time periods on the Medical History Check-List (MHCL) responses. In addition, at each time period, the symptom-free and health service subjects differed significantly from the hospital patients in their responses. Thus, the passage of time did not effect these group
differences. It appears that the amount of illness subjects encounter prior to a present disease may be indicative of the severity and duration of their present illnesses; (10) subjects with low scores on the Boston University Personality Inventory (BUPI) (defined as "good copers") and low scores on the SRE (little life change) had the least amount of self-reported MHCL illness. The combination of "good coping ability" and little life change or stress (LCU) resulted in fewer and less severe self-reported illnesses; (11) many unpredicted and contradictory relationships were seen between subjects' LCU scores and their submissiveness and defiance scores. However, due to the unknown validity and reliability of the BUPI, no definite conclusions can be drawn about these relationships. Indeed, standardization procedures are definitely required before any relevant assumptions can be made about this measure; (12) no significant associations were found between the demographic variables of the SRE (i.e., age, sex, marital status) and Parts A and B of the SRE, which measured the occurrence and/or frequency of life events. Therefore, the way in which people perceive stress or respond to life events items is seemingly unrelated to demographic factors.

Considering the findings of the present study, as well as those of numerous retrospective studies, it seems plausible to suggest that life change or life stressors are
at least contributory in the onset, severity and frequency of illness. Also, the state of health of individuals tends to predict the amount of life change and illness encountered prior to a present disease. Certainly, additional research into the stress-illness relationship is necessary to further assist in the understanding, possible prevention, and subsequent cure of many diseases in man.
References


Mendels, J. & Weinstein, N. The Schedule of Recent Experiences: A reliability study. Psychosomatic Medicine, November-December 1972, 34, No. 6, 527-531.


Myers, J.K; Lindenthal, J.J; & Pepper, M.P. Life events and psychiatric impairment. Journal of Nervous and Mental Disease, March 1971, 152. (3, Serial No. 1060), 149-157.

Myers, J.K; Lindenthal, J.J; Pepper, M.P; & Ostrander, D.R. Life events and mental status: A longitudinal study. Journal of Health and Social Behavior, 1972, 13, 398-406.


Rahe, R.H.; Bennett, L; Romo, M; Siltanen, P; & Arthur, R.J. Subjects' recent life changes and coronary heart disease in Finland. *American Journal of Psychiatry*, November 1973, 130, No.11, 1222-1226.


Rubin, R.T; Gunderson, K.E.; & Arthur, R.J. Life stress and illness patterns in the U.S. Navy: Environmental, demographic and prior life change variables in relation to illness onset in naval aviators during a combat cruise. *Psychosomatic Medicine, November-December, 1972, 34*, No.6, 533-547.


APPENDIX A

SCHEDULE OF RECENT EXPERIENCE (SRE)
Please circle the appropriate response for each category listed below. Please check that you have answered all items.
**SCHEDULE OF RECENT EXPERIENCE (SRE)**

**PART A**

Please indicate if you have experienced any of the following events, within the past; 0-6 months; 6-12 months and/or 12-24 months. Do so by checking (✓) the appropriate column(s) after each question. If the event did not happen, leave the space(s) blank. If you are not certain of the time period, do not worry; just try to be as close as possible.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>0-6</th>
<th>6-12</th>
<th>12-24</th>
<th>ITEM NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A lot more or a lot less trouble with the boss.</td>
<td></td>
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<td>1</td>
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<tr>
<td>2. Major change in sleeping habits (more or less or time of day).</td>
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<td>2</td>
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<tr>
<td>3. Major change in eating habits (more or less or meal hours).</td>
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<td>3</td>
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<td>4. Revision in personal habits (dress, manner, associations, etc.).</td>
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<tr>
<td>5. Major change in your usual type and/or amount of recreation.</td>
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<tr>
<td>6. Major change in your social activities (clubs, dancing, movies, visiting, etc.).</td>
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<td>7. A lot more or a lot less church activities.</td>
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<td>7</td>
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<tr>
<td>8. A lot more or a lot less family get-togethers.</td>
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<td>8</td>
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<tr>
<td>9. Major change in financial state (a lot worse off or a lot better off, than usual).</td>
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<td>10. In-law trouble.</td>
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<td>11. Major change in arguments with spouse (lot more or lot less than usual regarding child-rearing, personal habits, etc.).</td>
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<tr>
<td>12. Sexual difficulties.</td>
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</table>
PART 3

Please indicate the number of times you have experienced the following events within the past 0-6 months, 6-12 months and/or 12-24 months. Please mark in the number of times of each event with 1, 2, 3, or 4+, under the appropriate months. If the event happened 4 or more times, mark 4+. If an event did not happen, leave the space(s) blank.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>0-6</th>
<th>6-12</th>
<th>12-24</th>
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<tbody>
<tr>
<td>13. Major personal injury or illness</td>
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<td>14. Death of a close family member</td>
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<td>15. Death of a spouse</td>
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<td>16. Death of a close friend</td>
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<td>17. Gain of a new family member (birth, adoption, relative, oldster moving in, etc.)</td>
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<td>18. Major change in health or behavior of a family member</td>
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<td>19. Change in residence</td>
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<td>20. Jail detention or other institution</td>
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<td>21. Found guilty of minor violations of the law, (eg; traffic tickets, jay walking, disturbing the peace, etc.)</td>
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<td>22. Major business adjustment</td>
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<td>23. Marriage</td>
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<td>24. Divorce</td>
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<td>25. Marital separation from spouse</td>
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<td>26. Outstanding personal achievement</td>
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<td>27. Son or daughter leaving home</td>
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<td>28. Retirement from work</td>
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<td>29. Major change in working hours or conditions</td>
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<td>ITEM NO.</td>
<td>0-6</td>
<td>6-12</td>
<td>12-24</td>
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<td>30. Major change in responsibilities at work, (promotion, demotion, transfer, etc.)</td>
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<td>31. Fired from work</td>
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<td>32. Major change in living conditions (building a new home, remodeling, deterioration of home or neighborhood)</td>
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<td>33. Wife began or ceased working outside of home</td>
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<td>34. Taken on a mortgage greater than $10,000.</td>
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<tr>
<td>35. Taken on a mortgage or loan less than $10,000.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>36. Foreclosure on a mortgage or loan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Taken a vacation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Changed to a new school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Changed to a different line of work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Begun or ceased formal schooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. Marital reconciliation with your mate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. Pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

SCHEDULE OF RECENT EXPERIENCE (SRE)

MEAN VALUES
<table>
<thead>
<tr>
<th>No.</th>
<th>SRE Question</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trouble with boss</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>Change in sleeping habits</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>Change in eating habits</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>Revision of personal habits</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Change in recreation</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>Change in social activities</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>Change in church activities</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>Change in number of family get-togethers</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Change in financial state</td>
<td>38</td>
</tr>
<tr>
<td>10</td>
<td>Trouble with in-laws</td>
<td>29</td>
</tr>
<tr>
<td>11</td>
<td>Change in number of arguments with spouse</td>
<td>35</td>
</tr>
<tr>
<td>12</td>
<td>Sex difficulties</td>
<td>39</td>
</tr>
<tr>
<td>13</td>
<td>Personal injury or illness</td>
<td>53</td>
</tr>
<tr>
<td>14</td>
<td>Death of close family member</td>
<td>63</td>
</tr>
<tr>
<td>15</td>
<td>Death of spouse</td>
<td>100</td>
</tr>
<tr>
<td>16</td>
<td>Death of close friend</td>
<td>37</td>
</tr>
<tr>
<td>17</td>
<td>Gain of new family member</td>
<td>39</td>
</tr>
<tr>
<td>18</td>
<td>Change in health of family member</td>
<td>44</td>
</tr>
<tr>
<td>19</td>
<td>Change in residence</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>Jail term</td>
<td>63</td>
</tr>
<tr>
<td>21</td>
<td>Minor violations of the law</td>
<td>11</td>
</tr>
<tr>
<td>22</td>
<td>Business readjustment</td>
<td>39</td>
</tr>
<tr>
<td>23</td>
<td>Marriage</td>
<td>50</td>
</tr>
<tr>
<td>24</td>
<td>Divorce</td>
<td>73</td>
</tr>
<tr>
<td>25</td>
<td>Marital separation</td>
<td>65</td>
</tr>
<tr>
<td>26</td>
<td>Outstanding personal achievement</td>
<td>28</td>
</tr>
<tr>
<td>27</td>
<td>Son or daughter leaving home</td>
<td>29</td>
</tr>
<tr>
<td>28</td>
<td>Retirement</td>
<td>45</td>
</tr>
<tr>
<td>29</td>
<td>Change in work hours or conditions</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>Change in responsibilities at work</td>
<td>29</td>
</tr>
<tr>
<td>31</td>
<td>Fired at work</td>
<td>47</td>
</tr>
<tr>
<td>32</td>
<td>Change in living conditions</td>
<td>25</td>
</tr>
<tr>
<td>33</td>
<td>Wife begin or stop work</td>
<td>26</td>
</tr>
<tr>
<td>34</td>
<td>Mortgage over $10,000</td>
<td>31</td>
</tr>
<tr>
<td>35</td>
<td>Mortgage or loan less than $10,000</td>
<td>17</td>
</tr>
<tr>
<td>36</td>
<td>Foreclosure of mortgage or loan</td>
<td>30</td>
</tr>
<tr>
<td>37</td>
<td>Vacation</td>
<td>13</td>
</tr>
<tr>
<td>38</td>
<td>Change in schools</td>
<td>20</td>
</tr>
<tr>
<td>39</td>
<td>Change to different line of work</td>
<td>36</td>
</tr>
<tr>
<td>40</td>
<td>Begin or end school</td>
<td>26</td>
</tr>
<tr>
<td>41</td>
<td>Marital reconciliation</td>
<td>45</td>
</tr>
<tr>
<td>42</td>
<td>Pregnancy</td>
<td>40</td>
</tr>
</tbody>
</table>
APPENDIX C

BOSTON UNIVERSITY PERSONALITY INVENTORY (BUPI)
The following are 20 statements which describe opinion, feelings and attitudes that people commonly express. Read each statement quickly and decide whether, as applied to you, your interests, or opinions, it is:

5- entirely true (ET)
4- mostly true (MT)
3- sometimes true (ST)-tends to be true
2- sometimes false (SF)-tends to be false
1- mostly false (MF) or
0- entirely false (EF)

Circle the appropriate number to the right of each statement. Work quickly and record your first impressions, as they are usually the best ones. Be sure to circle one number for each and every statement.

1. I frequently take other people's advice. 5 4 3 2 1 0
2. I get impatient waiting in lines. 5 4 3 2 1 0
3. Most policemen in large cities are honest. 5 4 3 2 1 0
4. When I was a child, I often thought of running away from home. 5 4 3 2 1 0
5. When I'm ill I always seek immediate medical attention. 5 4 3 2 1 0
6. I like to drive fast. 5 4 3 2 1 0
7. When I was a child, I would always accept a dare. 5 4 3 2 1 0
8. I often have had to take orders from someone who did not know as much as I did. 5 4 3 2 1 0
9. In this world you often have to depend on others to take care of you. 5 4 3 2 1 0
10. I buy things in a hurry that later turn out to be 5 4 3 2 1 0
11. Most politicians are crooked. 5 4 3 2 1 0
12. When I get bored I like to stir up some excitement. 5 4 3 2 1 0
13. In the long run you're better off if you do as you're told by people in authority. 5 4 3 2 1 0
14. If you don't do things quickly you never get them done. 5 4 3 2 1 0
15. When I was a child I generally believed that what my parents said and did was in my best interests. 5 4 3 2 1 0
16. I often go out of my way to win a point with someone who has opposed me. 5 4 3 2 1 0
17. I like to take risks and chances. 5 4 3 2 1 0
18. I have never minded taking orders. 5 4 3 2 1 0
19. I often buy things which catch my eye that I don't really need. 5 4 3 2 1 0
20. I work under the principle that the boss is usually right. 5 4 3 2 1 0
APPENDIX D

MEDICAL HISTORY CHECK- LIST (MHCL)
MEDICAL HISTORY

Please indicate if you have experienced any of the following illnesses within the past 0-6 months, 6-12 months and/or 12-24 months. Fill in the number of times that you have experienced each illness, with 1, 2, 3 or 4+, under the appropriate months. If the illness has occurred 4 or more times, mark in 4+. If illness has not occurred, leave the space(s) blank.

| ITEM NO. | 0-6 | 6-12 | 12-24 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----------|-----|------|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 1. Peptic ulcer | | | | | | | | | | | | | | | | | | | |
| 2. Constipation | | | | | | | | | | | | | | | | | | | |
| 3. Diarrhea (mucous colitis) | | | | | | | | | | | | | | | | | | | |
| 4. High blood pressure (hypertension) | | | | | | | | | | | | | | | | | | | |
| 5. Asthma | | | | | | | | | | | | | | | | | | | |
| 6. Arthritis | | | | | | | | | | | | | | | | | | | |
| 7. Amenorrhea (cessation of menstruation) | | | | | | | | | | | | | | | | | | | |
| 8. Painful menstruation | | | | | | | | | | | | | | | | | | | |
| 9. Cancer | | | | | | | | | | | | | | | | | | | |
| 10. Common cold | | | | | | | | | | | | | | | | | | | |
| 11. Tuberculosis | | | | | | | | | | | | | | | | | | | |
| 12. Neurodermatitis (eczema, hives, rashes, etc.) | | | | | | | | | | | | | | | | | | | |
| 13. Heart attack | | | | | | | | | | | | | | | | | | | |
| 14. Infectious mononucleosis | | | | | | | | | | | | | | | | | | | |
| 15. Migraine headaches | | | | | | | | | | | | | | | | | | | |
APPENDIX E

MEDICAL HISTORY CHECK-LIST MEAN VALUES
(TAKEN FROM SIRS)
### VALUES OF ITEMS ON "MEDICAL HISTORY CHECK-LIST (M'CL)"

<table>
<thead>
<tr>
<th>No.</th>
<th>NHCL Item</th>
<th>SIRS Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peptic ulcer</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>Constipation</td>
<td>81</td>
</tr>
<tr>
<td>3</td>
<td>Diarrhea (mucous colitis)</td>
<td>118</td>
</tr>
<tr>
<td>4</td>
<td>High blood pressure</td>
<td>520</td>
</tr>
<tr>
<td>5</td>
<td>Asthma</td>
<td>413</td>
</tr>
<tr>
<td>6</td>
<td>Arthritis</td>
<td>468</td>
</tr>
<tr>
<td>7</td>
<td>Amenorrhea</td>
<td>175</td>
</tr>
<tr>
<td>8</td>
<td>Painful menstruation</td>
<td>163</td>
</tr>
<tr>
<td>9</td>
<td>Cancer</td>
<td>1020</td>
</tr>
<tr>
<td>10</td>
<td>Common cold</td>
<td>62</td>
</tr>
<tr>
<td>11</td>
<td>Tuberculosis</td>
<td>645</td>
</tr>
<tr>
<td>12</td>
<td>Neurodermatitis</td>
<td>204</td>
</tr>
<tr>
<td>13</td>
<td>Heart attack</td>
<td>855</td>
</tr>
<tr>
<td>14</td>
<td>Infectious mononucleosis</td>
<td>216</td>
</tr>
<tr>
<td>15</td>
<td>Migraine headaches</td>
<td>242</td>
</tr>
</tbody>
</table>
APPENDIX F

INSTRUCTION PAGE SHEETS
FOR
HEALTH SERVICE AND HOSPITAL
GROUPS
If you are seeing the doctor or nurse for any of the following reasons, please disregard this survey (don't fill it out):

1) physical injury (eg; broken leg, cuts, etc.)
2) birth control
3) routine physical check-up

The following is a psychological survey being conducted by the Dep't. of Psychology. All response forms are totally anonymous (ie: your name is not required) so please answer the questions as accurately as possible. When you have completed this form, hand it to the doctor or nurse when you see him/her for your appointment. Please check carefully that you have answered all items of the survey.
If you are hospitalized for any of the following reasons please disregard this survey, that is, don't fill it out:

1) physical injury
2) obstetrics

The following is a survey being conducted by the Department of Psychology at Wilfred Laurier University. All response forms are totally anonymous (your name is not required), so please answer the questions as accurately as possible. Please check carefully that you have answered all items of the survey. Your co-operation in this matter will be greatly appreciated.
APPENDIX G

SCHEDULE OF RECENT EXPERIENCE (SRE) SCORES
IN LIFE CHANGE UNITS (LCU)
TOTAL LCU SCORES

SYMPTOM-FREE GROUP

NO. OF SUBJECTS

(80)

0 1 2 3 4 5 6 7 8 9

40 120 200 280 360 440 520 600 680 760 840 920 1000
No. of Subjects (72)

Total LCU Scores

Health Service Group
APPENDIX H

MARGINALS ANALYSIS
MARGINALS ANALYSIS FOR THE DEMOGRAPHIC VARIABLES OF THE SRE
summary of major differences
(in %)

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>SUPERIOR</th>
<th>HEALF RVIC</th>
<th>HCS IML</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEX</td>
<td>(70) Males</td>
<td>(50)</td>
<td>(50)</td>
</tr>
<tr>
<td>AGE (68) 21-30</td>
<td>(67)</td>
<td>(65)</td>
<td>(65)</td>
</tr>
<tr>
<td>MARRIED STATUS (67) never mar</td>
<td>(67)</td>
<td>(65)</td>
<td>(65)</td>
</tr>
<tr>
<td>TIMES M' R'D</td>
<td>(63)</td>
<td>(65)</td>
<td>(65)</td>
</tr>
<tr>
<td>EDUCATION (65) college +</td>
<td>(66)</td>
<td>(70)</td>
<td>(70)</td>
</tr>
<tr>
<td>TIME AT PRESENT RESIDENCE (55)</td>
<td>1 YEAR OR LESS</td>
<td>(73) 1 YEAR OR LESS</td>
<td>(55) 1 YEAR OR LESS</td>
</tr>
<tr>
<td>POPULATION OF BIRTHPLACE (57)</td>
<td>50,000+</td>
<td>50,000+</td>
<td>50,000+</td>
</tr>
<tr>
<td>SUBJECT'S AGE WHEN MOTHER DIED</td>
<td>(85) living</td>
<td>(95) living</td>
<td>(30) living</td>
</tr>
<tr>
<td>SUBJECT'S AGE WHEN FATHER DIED</td>
<td>(92) living</td>
<td>(93) living</td>
<td>(22) living</td>
</tr>
<tr>
<td>TIMES MOVED IN PAST 5 YEARS</td>
<td>(72) once or more</td>
<td>(90) once or more</td>
<td>(62) not at all</td>
</tr>
</tbody>
</table>
APPENDIX I

BOSTON UNIVERSITY PERSONALITY INVENTORY (BUPI) SCORES
NO. OF SUBJECTS

TOTAL BPJ scores
SYMPOM-FREE GROUP

* 51 = "better" coping
TOTAL BUPI SCORES
HEALTH SERVICE GROUP

* 51+ = faulty coping
TOTAL BUPI SCORES
HOSPITAL GROUP

* 5* = faulty coping