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Cumulative Lifetime Stress Variables as Predictors of Depression and Chronic Illness in Women

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A Thesis

in

The Department

of

Psychology

Presented in Partial Fulfilment of the Requirements
For the Degree of Master of Arts at
Concordia University
Montreal, Quebec, Canada

July 1998

Abstract

Cumulative Lifetime Stress Variables as Predictors
of Depression and Chronic Illness in Women

Maria Mireault

Further progress in understanding the relationship between psychological stress and health may require examination of the cumulative effects of stress experienced across the lifespan. The main objectives of the present research were to learn more about the nature of stress experienced by women during the life course and to examine the relative contribution of cumulative lifetime stress to the prediction of depression and chronic illness. Data acquired from a sample of three hundred and eight women who volunteered for an earlier study examining the impact of changing lifestyles on health were analyzed for this study. Subjects completed a wide variety of psychosocial measures including a retrospective measure of lifetime stress, the Concordia Lifetime Stress Graph (CLSG). A qualitative analysis of the CLSG identified several differences in lifetime stress experienced by the younger and older women. Work-related stress was the most frequently reported stressor by women aged 30-59. In addition, work-related stress, separation and divorce were perceived as being the most stressful events by this age group. Women aged 60 and over reported death of a family member most frequently and also rated it as being the most stressful event experienced. Younger and older women also differed in the variability of lifetime stress experienced, however, they did not differ on mean lifetime stress. Results of the quantitative analyses indicated that cumulative lifetime stress, as measured by the CLSG is not related to depression or chronic physical

illness in women. However, methodological problems may have influenced these findings and further research should be conducted before concluding that lifetime stress does not affect women's health.

Acknowledgements

I would like to thank my supervisor, Dr. June Chaikelson, for her advice and unlimited patience throughout the completion of this thesis. I would also like to express my appreciation to my committee members, Dr. Dolores Pushkar and Dr. David Andres, for their valuable suggestions and comments. My thanks to Dr.Urs Maag for providing his statistical expertise during the early stages of this research. A special thank you is extended to Steven Lapidus for his generous help with this project.

I am especially grateful to my former professors, Dr. Anton de Man, and Dr. Andrea Drumheller for their continuous support. Their belief in my abilities has been instrumental to achieving this goal. To my friends, Michelle O'neill, Julie Eichstedt and Cindy Potechin, who have encouraged me along the way, my gratitude. To Trisha, my devoted companion, thank you for spending so many late nights at my side.

Above all, I would like to thank my family for their role in the completion of this thesis. To my husband, Robert, who made many personal sacrifices during recent years so that I could pursue this degree, my heartfelt thanks. I would not have succeeded without your support. To my children, Luke, Andrew and Nicole, thank you for keeping me in touch with the truly important things in life.

This research was made possible by financial support provided by Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR) and Conseil québécois de la Recherche sociale (CQRS).

To my children,

Luke, Andrew and Nicole

With unconditional love

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An extensive body of literature has shown that stress has adverse effects on physical and mental health. Stress contributes to a variety of physical illnesses including coronary heart disease (Tennant, 1996) and diabetes mellitus (Bradley, 1988). Advances in the field of psychoneuroimmunology have shown that stress is associated with immunosuppression (Kiecolt-Glaser & Glaser, 1986; McNaughton, Smith, Patterson, & Grant, 1990; Snyder, Roghmann, & Sigal, 1993) and increased susceptibility to infectious diseases, autoimmune diseases and cancer (Vollhardt, 1991). Studies examining the relationship between stress and mental health have linked life stress to depression (e.g., Ensel & Lin, 1991) and anxiety disorders (Paykel & Dowlatshahi, 1988). Recently, investigators studying the effects of stress on the brain have discovered that exposure to acute stress results in hypersecretion of the stress hormone cortisol, which, if sustained over several months, causes atrophy of the hippocampus and leads to memory loss in rodents (Sapolsky, 1996). The latest research shows a relationship between prolonged cortisol elevation, reduced hippocampal volume and memory decline in humans (Lupien et al., 1998; Seeman, McEwen, Singer, Albert & Rowe, 1997).

Despite consistent evidence that life stress plays a role in the development of physical illness and psychological problems, the magnitude of the observed relationship is rather modest (Rabkin & Streuning, 1976). Furthermore, researchers have been unable to determine why some individuals who experience high levels of stress do not become ill, while others succumb to illness following exposure to relatively minor stressors (Helzer, 1984). It is has been suggested that existing limitations in the assessment of stressful experiences has hampered progress toward understanding the relationship

between stress and subsequent health problems (Turner & Avison, 1992).

Concept of Stress

Various theories as to how the body responds to stressors have been documented for hundreds of years, however, systematic research of the stress process did not begin until the early twentieth century. During the 1920's, Walter Cannon began a series of classic experiments that established the existence of regulatory feedback mechanisms which help the body maintain a steady state (i.e., homeostasis) when deviations from normal occur. His research demonstrated that when subjected to physical danger, animals experienced physiological changes such as increased heart rate, elevated blood pressure, and heightened production of blood sugar to prepare them for conflict or for escape to safety. Once the threat of danger passed, their bodily functioning returned to normal levels. Cannon postulated that prolonged stress and continued physiological arousal could lead to future health problems (Cannon, 1963).

Investigation into the effects of prolonged stress on bodily functioning was begun by Hans Selye (1950). During his medical training, Selye became intrigued by the observation that patients suffering from different illnesses displayed common symptoms of weight loss, decreased energy, and reduced muscular strength. His subsequent research with laboratory animals showed that exposure to a stressor invoked both a specific bodily response (e.g., shivering in response to cold) as well as a generalized response common to a wide variety of laboratory stressors. This generalized, or "nonspecific," reaction pattern initiates increased output of adrenal corticoid steroids and results in a succession of bodily changes including enlargement of the adrenal glands, gastrointestinal ulcers,

and shrinkage of the thymus and lymph nodes. The realization that these changes are similar to those observed when an organism attempts to ward off disease led Selye to conclude that this nonspecific response is the body's mechanism of defense against any stressor. He named this process the General Adaptation Syndrome (GAS).

According to Selye, the GAS consists of three sequential phases. The initial stage, the "alarm reaction," occurs when the organism is exposed to a stressor to which it has not adapted, and the body struggles to maintain stability. Common symptoms such as loss of appetite, fatigue, sleeplessness, and headaches coincide with this stage. Under extreme stress, death may occur during the alarm reaction, however, in most cases adaptation to the stressful stimuli is achieved and the organism reaches the "stage of resistance." During this phase, the capacity to withstand the stressor rises above normal levels. Symptoms associated with the original stressor improve or disappear, but resistance to other stressors may be lessened. If exposure to stressful stimuli is severe or prolonged, the organism will not be able to maintain its resistance indefinitely, adaptation energy will be depleted, and the "stage of exhaustion" will follow. At this time, the effects of the stressor are irreversible, symptoms reappear, and destruction of bodily tissue ensues (Selye, 1982, 1983).

An important aspect of Selye's concept of stress is the notion that the human organism has finite amounts of adaptation energy. Selye proposed that the wear and tear on the organism caused by repeated exposure and adaptation to stressors accumulates over time and leads to disease or degeneration of the body. Thus, the physiological changes activated by stress serve protective and restorative functions, but are also

damaging to the organism.

Because early work on stress focused on physical stressors and their effect on the physiological functioning of animals, stress was initially viewed as a reaction to external threat. As researchers began to investigate the stress process in humans, it became evident that thoughts and emotions can cause psychological arousal and are frequently responsible for activating and maintaining the physiological stress response. Under such conditions, the normal physiological response is not adaptive because there is no required physical activity to utilize the extra energy and strength produced by the body. This realization led researchers to try to determine whether psychological stress could lead to disease.

Assessment of Psychological Stress

One of the first methods used to assess the effects of psychological stress on health was the "life chart" developed by Adolf Meyer during the 1930's. Completion of the life chart involved obtaining a medical history for each patient as well as details about life experiences and the individual's reactions to these events. Through his work, Meyer showed that experiencing common life events such as births or deaths of family members, residential moves, or occupational changes, and how one adjusts to these events can contribute to the development of a pathological condition. It was hypothesized that life events requiring greater adjustment would be more likely to result in subsequent illness (Dohrenwend & Dohrenwend, 1974). Meyer's life history approach identified the number and types of life events occurring prior to onset of illness, but did not provide a quantitative measure of the amount of adjustment involved.

Efforts to overcome this limitation led to the development of a systematic set of procedures to assess the magnitude of life change associated with specific life events. Using Meyer's life chart method as a model, Holmes and his colleagues began the process by constructing the Schedule of Recent Experiences (SRE). In its original format, the SRE listed 43 desirable or undesirable life events considered to be potentially disruptive to an individual's usual activities. The questionnaire included events related to employment, finances, health, family and social situations. Each of the selected events had been reported as preceding onset of illness by a large sample of medical patients (Rahe, Meyer, Smith, Kjaer, & Holmes, 1964).

Numerical estimates of the magnitude of life change were obtained by asking subjects to assign a value to each event, relative to the amount of readjustment associated with "marriage," which had arbitrarily been assigned a value of 500. For example, if a subject decided an event entailed twice the readjustment experienced by marriage, a value of 1000 was assigned to that event. In contrast, an event thought to require half the readjustment of marriage would be given a value of 250, and so forth. The values for each event were then totaled across subjects, and an average readjustment score was calculated. The average was divided by 10 and represented the number of life change units (LCU) assigned to the event (Holmes & Rahe, 1967).

This weighting scheme was subsequently integrated into a revised version of the SRE thereby allowing researchers to investigate the degree of life change one might experience before adverse health effects were observed. Subjects completing the SRE were asked to indicate, by year of occurrence, which of the listed events they had

experienced over the previous decade. Each event indicated was given its appropriate weighting and a total LCU score was calculated for each subject.

Validation studies of the SRE showed that any clustering of life events totaling 150 LCU or more in one year constituted a life crisis and placed an individual at increased risk for a variety of health problems within the following 2-year period (Holmes & Masuda, 1974). Similarly, Theorell and Rahe (1971) observed that myocardial infarction patients reported an increase in life events during the 6 months preceding hospitalization. In yet another study, Rahe, Floistad, and Bergan (1974) found significant correlations between subjects' 6-month life change scores and physicians' illness reports among American and Norwegian Navy personnel.

Although this research provided support for the hypothesis that significant life changes may increase susceptibility to illness and disease, use of the SRE as an adequate measure of life events or as an acceptable representation of the stressor construct has been severely criticized. One aspect of the SRE that has been disputed involves the domain of events sampled by the measure. It is evident that no single measure could include all possible life events, however, the SRE tends to emphasize incidents typically experienced by young or middle aged adults while excluding events related to late adulthood. Items related to victimization (e.g., robbery, sexual assault) and controversial events (e.g., infidelity, abortion) are also omitted. The failure to include these types of items may obscure the relationship between life events and health (Thoits, 1983).

In addition to the lack of inclusiveness, several of the life events listed on the SRE are considered to be vague and ambiguous (Brown, 1974). For instance, in reading

the item, "change in health of a family member," one person may report the occurrence of this event because his or her spouse was recently diagnosed with cancer, whereas another may recall a child being ill with the flu. The variation in the severity of the event for the two cases is evident, yet, according to the weightings of life events on the SRE, the amount of readjustment necessary would be identical for both subjects. Even in situations where different subjects undergo an identical event such as divorce, the impact of the event is likely to vary between individuals depending on the situation of the person before its occurrence. For example, although a person facing the dissolution of what was believed to be a reasonably stable marriage is likely to experience a great deal of stress, someone who had suffered years of physical abuse in a marital relationship would probably perceive divorce as being less stressful.

An individual's perception of the degree of stress induced by a life event often depends on whether or not the event has been experienced personally. Theorell (1974) found that subjects who had themselves experienced stressful life events assigned lower LCU values to the events than subjects who had not experienced them. Similar findings were reported by Rahe (1974) who demonstrated that when subjects were asked to rate life events as to degree of upset and amount of readjustment necessary, those having no prior personal experience with the events rated them as being more upsetting and requiring greater readjustment. Apparently people have preconceived ideas about how stressful an event will be before it occurs, but tend to modify these assumptions once they have personally been confronted by the event.

In developing the scaling system for the SRE, subjects were asked to estimate the

amount of readjustment required for all listed events regardless of whether or not they had actually experienced them. Holmes and Rahe became aware of considerable variation in subjects' ratings, however, they chose to deal with these differences by assigning average weights to each event (Holmes & Masuda, 1974). Considering the aforementioned unique reactions to life events, it would seem that applying average readjustment weights to events experienced by different individuals would limit the ability to predict health problems.

The decision to include both desirable and undesirable events on the SRE has also been strongly debated. According to Holmes and Rahe (1967), adjustment to life events, regardless of their degree of desirability, could be taken as an indicator of stress induced. Both positive and negative life events were believed to tax the individual's resources and increase susceptibility to illness. In their view, the meaning of the events to the individual and the social desirability of the events were considered to be inconsequential. Other researchers have postulated that the severity of an undesirable event, or a greater number of undesirable events, would be more likely to overwhelm a person and result in illness (Brown, 1974; Paykel, Prusoff, & Uhlenhuth, 1971). Later research showed that undesirable events are highly correlated with psychological disturbance (Paykel, 1974) but readjustment to both positive and negative events is associated with physical illness (Thoits, 1983).

Several critiques have questioned the psychometric properties of the SRE (Brown, 1974; Cleary, 1980; Raphael, Cloitre, & Dohrenwend, 1991). In general, test-retest reliability studies comparing LCU scores for events that occurred during the

same calendar period have reported reliability coefficients in the low to moderate range. Paired-subjects reliability studies, which have also been used as an indicator of validity, have obtained similar results (Neugebauer, 1984).

It has been suggested that the modest test-retest correlations of the SRE are due to forgetting of life events over time. Jenkins, Hurst, and Rose (1979) demonstrated that subjects' LCU scores for the same calendar period were 40 to 50 points lower at the retest administration of the SRE than those reported 6 months earlier. Uhlenhuth, Haberman, Balter, and Lipman (1977) also found a recency effect for reporting of life events. They estimated that reporting of events declined at a rate of 5% per month over an 18-month period. These findings have cast doubt on the accuracy of recall for events that occur more than 6 months prior to assessment. However, Casey, Masuda, and Holmes (1967) found that events with the highest LCU weightings were reported consistently over a 3-year period. This would seem to indicate that recall for highly salient events is quite reliable.

Perhaps the most severe criticism of the SRE is that many items on the scale are actually symptoms of physical illness or psychological distress. Some of the more obvious health-related items include, "major personal injury or illness, change in sleeping habits, change in eating habits, and sexual difficulties." According to Hudgens (1974), as many as 29 of the 43 events on the SRE could be considered as symptoms or consequences of illness. The overlap between the SRE and outcome measures may have artificially inflated the reported associations between life events and illness (Tausig, 1986).

Notwithstanding these limitations, the SRE has served as a model of measuring life events since 1967 and currently used checklist inventories of life events continue to include items from this scale. The more recently developed life event measures have been altered in some way to address the previously mentioned shortcomings. Paykel, Prusoff, and Uhlenhuth (1971) attempted to minimize ambiguity of the items by providing more detailed descriptions of the life events. Some researchers have modified the scale to study the stress-illness relationship for specific populations by including items that are pertinent to the group involved (e.g. Aldwin, 1990). Others have excluded health related items from their analyses in order to control for confounding with outcome measures of illness (Tausig, 1982).

The observation that the effect of stressful life events on illness episodes begins to decline after 6 months (Depue & Monroe, 1986) as well as concerns about accuracy of recall for past events (Raphael, Cloitre, & Dohrenwend, 1991) led investigators to assess only those events that occur during the year preceding the study. Structured interviews (Brown, 1974) and combinations of interviews and checklist methods (Dohrenwend, Raphael, Schwartz, Stueve, & Skodol, 1993) have been developed to assist recall of events and to obtain more detailed information about the antecedents and consequences of life experiences.

There is now considerable agreement among stress researchers that the impact of life events and subsequent effect on health are highly dependent on the perception of the event to the individual involved (Thoits, 1983). As a result, life stress inventories now integrate various ways of assessing the subjective impact of life events (e.g., Sarason,

Johnson, & Siegel, 1978) rather than relying on predetermined group weights to assess the amount of readjustment required.

In spite of the modifications to life event measures, investigators typically find that life events are only moderately related to current physical and mental health. Studies examining the association between life events and depressive symptoms generally report correlations ranging between .25 and .40 (e.g., Tausig,1986). The relationship between life events and physical illness is somewhat less with reported correlations of .20 to .30 (Dohrenwend & Dohrenwend, 1974). This indicates that, at best, life events account for 16% of the variance on outcome measures. Yet, Hughes, Pearson, and Reinhart (1984) have estimated that 75% of all medical disorders are directly attributable to stress. In addition, Paykel (1974) found that depressives report experiencing three times as many stressful events as the general population during the 6 months before the onset of a first depressive episode.

These discrepant findings may have arisen because the life event approach does not adequately assess the stress process (Raphael et al., 1991). Kanner, Coyne, Schaefer, and Lazarus (1981) developed the Hassles Scale on the premise that ongoing stresses and strains of daily living may be more detrimental to health than major life events. The original Hassles Scale consists of 117 items pertaining to minor but often disturbing daily stressors (e.g., concerns about not having enough money for necessities, problems with relatives or friends). Respondents completing this measure are asked to report the occurrence of hassles experienced during the preceding month and then judge the severity of these hassles. Implicit to this approach is the assumption that it is the

individual's appraisal of a demand as threatening, rather than the demand per se, which induces stress.

Investigators who have examined the effects of major life events and hassles simultaneously have found that both types of stressors are correlated with outcome measures of health, but hassles are a better predictor of somatic and psychological symptoms (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Holahan & Holahan, 1987; Weinberger, Hiner, & Tierney, 1987). Although it is conceivable that being confronted with life events could influence the pattern of daily hassles and produce a joint effect on current health over and above the effects of either type of stressor alone, this hypothesis has not been supported by research. Studies that have included analyses of the interaction between life events and hassles have shown that each type of stressor acts independently and thus plays a distinct role in the stress process (Chamberlain & Zika, 1990).

Despite the support these findings provide for the recommendation of including daily stressors as a supplement to the life events approach of assessment (DeLongis et al., 1982), some reviewers have suggested that the importance of hassles and their effect on health has been overstated due to confounding with outcome measures (e.g., Dohrenwend & Shrout, 1985). One such confound involves the instructions and the response alternatives on the original Hassles Scale. Respondents are asked to "rate the intensity of each hassle experienced as either somewhat severe, moderately severe, or extremely severe." According to Dohrenwend and Shrout (1985), the failure to include a response category for daily stressors perceived as less than "somewhat severe" (i.e., not

at all severe) may lead to the assumption that such stressors should not be reported as hassles. Should this occur, the intensity ratings would be an indication of maladaptive coping or possible psychological distress and therefore be confounded with outcome measures of psychological disorders. Alternatively, the omission of a neutral response category for intensity scores could cause subjects to incorrectly rate stressors as "somewhat severe" when in fact they were not perceived as such. This situation would result in higher intensity scores, thereby inflating correlations between the Hassles Scale and outcome measures.

An additional source of confounding stems from the symptom-like content of the items on the original Hassles Scale. In a study conducted by Dohrenwend, Dohrenwend, Dodson, and Shrout (1984), clinical psychologists rated 37 of the 117 items as probable symptoms of psychopathology, and an additional 53 items were rated as possible symptoms. Such symptom-like content results in redundancy between the independent and dependent measures and could explain the strength of the observed relationship between daily hassles and mental health. Similar concerns have been expressed regarding confounding with somatic symptoms.

In response to these criticisms, some researchers have made alterations to the original Hassles Scale by modifying the instructions, adding a neutral response category, and by eliminating or rephrasing symptom-related items on the questionnaire (e.g., Delongis, Folkman, & Lazarus, 1988). Studies using revised versions of the Hassles Scale show that daily stressors remain significantly correlated with outcome measures (DeLongis et al., 1988) and continue to be superior to life events in the prediction of

physical and psychological well-being (Landreville & Vezina, 1992). It would therefore seem reasonable to conclude that the assessment of daily stressors in combination with the life events approach is essential to furthering understanding of the stress process.

Demographic Characteristics, Psychosocial Factors and the Stress-Illness Relationship

Thus far the accumulation of research pertaining to methodological issues has resulted in more comprehensive assessment of life stress, yet the ability to predict stress-related health problems has not improved appreciably. It has become increasingly evident that the relationship between stress and illness is more complex than once assumed. Consequently, demographic characteristics and other psychosocial factors that could affect vulnerability or resistance to stress have come under examination.

One of the demographic variables stress researchers frequently include in their studies is age. Investigators who have examined age-related differences in reporting of stressful events have found that, in general, younger adults tend to indicate more major life events (Kasl, 1983) and more hassles on stress measures than older adults (Folkman, Lazarus, Pimley, & Novacek, 1987). With regard to stress and future health problems, life events seem to be more detrimental to the health of younger adults. In a study examining the association between life events and subsequent hospitalization, Holmes and Masuda (1974) found that patients between the ages of 20 and 30 reported 50% more life events than those aged 45 to 60 and twice the number of life events as patients age 65 or older. More recently, Lin, Ensel, and Dean (1986) demonstrated that the frequency of life events has a greater effect on the manifestation of depressive symptoms among adults between the ages of 25 and 49 than among older adults. These findings have led some

researchers to conclude that there is an inverse relationship between stress and aging, however, this conclusion may be unfounded.

Some of the age differences observed may be due to limitations of existing assessment measures. A significant proportion of the items listed on conventional stress inventories reflect stressors of young and middle-aged adults (Aldwin, 1995). Experiences associated with late adulthood (e.g., increasing dependency on others, loneliness, chronic disability) are usually not listed, despite the fact the they can be stress inducing for the older person. This shortcoming may explain why older adults obtain relatively low stress scores compared to younger adults (Lazarus & Delongis, 1983).

A further point to consider before deciding that older adults have relatively stress free lives compared to younger age groups is that a reduction in the frequency of stressors does not necessarily imply that less distress is experienced. The types of life events primarily experienced by older adults (e.g., death of spouse) are those that were assigned the highest readjustment weightings on traditional life event inventories (Holmes & Masuda, 1974). Other studies have shown that older adults report a higher degree of unhappiness and upset when disrupting life events occur (George, 1989), and the amount of negative preoccupation with stressors does not differ between age groups (Chirboga & Dean, 1978).

Lazarus and DeLongis (1983) have observed that the cognitive appraisal of a demand may change with age because of prior experience with a similar stressor or because of changing expectations. For example, a demand such as obtaining a mortgage for a new home may be appraised as less stressful by a middle-aged adult purchasing a

second home than by a younger, first time buyer. On the other hand, an elderly adult in declining physical health may become highly stressed when demands that were once easily met (e.g., purchasing groceries) become increasingly difficult and are perceived as overwhelming (Eisdorfer & Wilkie, 1977). There is some indication that compared to young adults, the elderly are less likely to perceive undesirable experiences as changeable, and this perception may create additional distress (Holahan, Holahan, & Belk, 1984).

Regardless of age, people of lower socioeconomic status experience more chronic stress (e.g., financial hardship, undesirable living conditions) than those of higher socioeconomic status (Turner, Wheaton, & Lloyd, 1995). The relationship between recent negative life events and social class is less consistent. Whereas some studies have shown that lower status individuals experience more recent negative life events than those of higher status groups (e.g., Brown & Harris, 1978), others have not observed this relationship (e.g., Lin, Dean & Ensel,1986). These contradictory findings may be due to methodological differences in the assessment of negative life events across studies. For example, results of a recent, large scale investigation into the social distribution of stress showed significant differences between low and high socioeconomic status groups on negative life events directly experienced by the respondents. However, when negative life events occurring to members of the respondents' social network were included in the life event scores, no significant social class differences were found (Turner et al., 1995).

Despite discrepancies concerning differential exposure to negative life events, research has consistently shown that under comparable levels of stress, those of lower

socioeconomic status experience greater psychological distress than their higher status counterparts (e.g., Cronkite & Moos, 1984). This finding led to the assumption that members of disadvantaged socioeconomic groups were especially vulnerable to the effects of stress and was presumed to account for the higher rate of mental health problems among these individuals. Researchers have since learned that the combined effects of social class differences in environmental experiences and individual circumstances, as well as differences in personal and social resources are largely responsible for the observed relationship between socioeconomic status and mental health (Aneshensel, 1992). The relationship between these factors and physical health has yet to be determined.

Efforts to identify the factors that influence vulnerability or resilience to stress have also included the examination of gender differences. These studies have shown that men and women report approximately the same number of life events, but women tend to rate events as being more stressful (Holmes & Masuda, 1974) and react to life events with greater emotional distress than men (Belle, 1987). Closer investigation of gender differences in responsiveness to stress indicates that although women are more vulnerable to certain types of stressors, men are more vulnerable to others. Specifically, the research shows that men are more likely than women to manifest depressive symptoms as a result of financial or work-related stressors. In contrast, women tend to become depressed by marital problems (Aneshensel & Pearlin, 1987), demands of parenting (Barnett & Baruch, 1987), or by events occurring to people outside of the immediate family (Wethington, McLeod, & Kessler, 1987). Women frequently occupy

roles that expose them to the problems of others such as providing care to aging parents (Schlesinger, 1989) or offering assistance to friends or extended family members during crisis situations (Wethington et al., 1987). Gore and Colten (1991) have proposed that it is the supportive demands encountered within these roles that increase stress and lead to higher rates of depressive symptomatology in women.

For both men and women, stressors encountered in one social role may create or exacerbate stress in another role, however, women experience more inter-role conflict and overload than men. It seems this type of strain is predominant among women because of disproportionate family responsibilities. Although there has been a dramatic increase in the number of women working outside the home in recent decades, women are still primarily responsible for household tasks and child care. Employed mothers frequently report that stressors such as children's illnesses and concerns about daycare have a negative effect on their job performance (Aneshensel & Pearlin, 1987). Nonetheless, despite additional strains, working mothers have better psychological and physical health than nonemployed mothers (Rodin & Ikovics, 1990). Apparently the benefits of involvement in multiple roles outweigh the negative effects of inter-role conflict.

In addition to age, socioeconomic factors and gender differences, it is now known that individual variation in personality, social support and coping can influence the stress-illness process. With regard to personality characteristics, studies have shown that individuals with high scores on measures of neuroticism tend to endorse more illness-related items on conventional life event checklists. These individuals also report a

greater number of somatic complaints than those with lower scores on this personality dimension (Schroeder & Costa, 1984). On the other hand, personality characteristics such as perceived self-efficacy and a sense of mastery over life seem to buffer the negative effects of stress and are associated with better physical and psychological health (Holahan, Holahan, & Belk, 1984). High self-esteem is known to serve a protective function against depressive symptomatology, however, its importance as a mediator between stress and physical health has not been widely studied (Thoits, 1995).

Considerable interest has been directed toward understanding the link between stress, social support, and health. It seems that social support serves a dual purpose in mediating the stress-illness process. First, individuals with social support are exposed to fewer situations that tax their resources and therefore experience less stress (Russell & Cutrona, 1991). For instance, older adults who receive emotional or instrumental support from family, friends, or social services can live autonomously for longer periods of time and thus postpone the stress associated with leaving their homes and moving to seniors' residences. Second, when stress does occur, social support seems to protect the individual from its negative effects on health (Cutrona, Russell, & Rose, 1986; Russell & Cutrona, 1991) particularly when stress arises in a social role that is highly valued by the individual (Krause, 1995). It has been suggested that social support mediates the negative effects of stress on psychological well-being by helping the individual maintain self-esteem and a sense of competence (Thoits, 1995). Although the mechanisms through which social support influences physical health are not completely understood, social integration is related to lower rates of disease (Matthews et al., 1997). There is also some

evidence that perceived emotional support has a moderating effect on cardiovascular reactivity under high stress conditions (Gerin, Milner, Chawla, Pickering, & Pihl, 1995).

Together, personal attributes and characteristics of one's social support network constitute a pool of resources that are drawn upon by the individual during times of stress. The individual's appraisal of the stressor and the perceived adequacy of available resources to meet the demand determines how successful coping will be. The two predominant types of coping strategies individuals use are problem-focused coping, which involves taking direct action to eliminate the problem, and emotion-focused coping, where the individual attempts to change an emotional reaction to a stressor without confronting it directly. In general, people employ some degree of both strategies to cope with major life events and ongoing strains (Lazarus & DeLongis, 1983), but as the perceived uncontrollability of a stressor increases, so to does the likelihood of using emotion-focused coping strategies. Although no single coping strategy is effective in dealing with all stressful situations, problem-focused coping is presumed to be more beneficial than emotion-focused coping (Thoits, 1995). The latter approach, which includes escapism and avoidance behavior, has been shown to have an adverse effect on mental health among younger and older adults (Aldwin & Revenson, 1987; Smith, Patterson, & Grant, 1990).

Long-term Effects of Stress on Health

Attempts to identify factors that increase susceptibility to stress-related disorders have also generated interest in learning whether stress experienced at one stage of the life span can "carry over" to affect health at later life stages. In the past, investigators

studying the impact of life events on adult health have typically ignored the role of childhood adversities (Dohrenwend & Dohrenwend, 1984). It is now known that early life stressors such as parental alcoholism, loss of a parent through death or divorce and sexual abuse are predictors of depression in adulthood (Barnes & Prosen, 1985; Kessler & McGee, 1993; Roesler & McKenzie, 1994). Additional support for the hypothesis that life events can have long-term negative effects on health was found by Lehman, Wortman, and Williams (1987). They observed that adults who had experienced traumatic life events such as the unexpected death of a child or spouse remained depressed 4 to 7 years after their loss and had higher mortality rates than non-bereaved adults. Of further interest is the finding of a significant association between recent stress and lifetime trauma scores among Holocaust survivors diagnosed with post-traumatic stress disorder (Yehuda et al., 1995). Regarding physical health, stress of combat exposure in young adulthood has been linked to heightened physiological reactivity and increased risk of cardiovascular disease in older veterans suffering from post-traumatic stress disorder (Blanchard, 1990). There is also some indication that certain types of diabetes are caused by stress that occurred years before onset of symptoms (Bradley, 1988).

Combined, these studies indicate that prior stress can have lasting negative effects on subsequent health, yet when carry-over effects of stress are studied, researchers typically focus on a single traumatic event. Relatively little is known about the relationship between depression and cumulative effects of stressful experiences which occur during the course of the lifespan. In addition, although the relationship between

recent stress and near-future physical illness episodes has been clearly established, it remains to be determined whether there is an association between cumulative lifetime stress and chronic physical illnesses such as diabetes, coronary heart disease or cancer (Singer & Davidson, 1991). Renewed interest in Selye's theory of the cumulative effect of stress and recent findings in physiological research suggest that lifetime stress may be an important factor in the development of such health problems in adulthood.

The manner in which cumulative stress is assumed to affect health may be explained by allostasis and allostatic load. In contrast to the principle of homeostasis which emphasizes the importance of maintaining constancy of the organism's internal environment, allostasis refers to the ability of the organism to maintain stability through change. According to Sterling and Eyer (1988), "to maintain stability an organism must vary all the parameters of its internal milieu and match them appropriately to environmental demands" (p. 636). Therefore, the ability of allostatic systems (i.e., autonomic nervous system, hypothalamic-pituitary-adrenal axis, cardiovascular, immune and metabolic systems) to adapt to internal or external stressors is viewed as essential to survival. However, when the stress response is maintained over long periods of time (either because of frequent stress or due to a failure to return to normal levels once a stressor has terminated), the resulting allostatic load is believed to be damaging to the organism.

If the concept of allostatic load is accurate, one would expect that individuals who had experienced more frequent or higher levels of stress during the course of their lives would have sustained greater allostatic load on their bodily systems and would be

more likely to develop stress-related psychological problems or chronic illness than those with comparatively less stressful lives. At present, the measurement of allostatic load is limited to physiological tests (e.g., elevated systolic blood pressure). If a relationship between lifetime stress and the occurrence of depression or chronic illness exists, then assessment of stress experienced over the life span could be used as a psychosocial measure of allostatic load.

Although it is apparent that these issues should be addressed, the ability to study the cumulative effects of stress has been hampered by conventional assessment methods that restrict reporting of stressful experiences to time periods of one year or less. The recently developed Concordia Lifetime Stress Graph (CLSG; Bonneville, 1995) assesses stress experienced over the life span and provides a means of pursuing this line of research. Several other features distinguish the CLSG from currently used stress measures. Unlike checklist inventories that instruct respondents to identify which of the listed events they have experienced, the CLSG encourages subjects to report any strain or stressor of importance to them. Also, in contrast to traditional stress measures that used controversial group weightings to assess stressful events, the graphing technique of the CLSG permits subjects to convey their perceived stress in response to each event reported. The ability to assess subjective stress over the life span makes the CLSG highly suited to investigating the association between the effects of cumulative stress and health.

Present study: Objectives and Hypotheses

The purpose of the present research was to determine whether the assessment of cumulative lifetime stress would advance understanding of the stress-illness process

among adult women while at the same time, allow an evaluation of the CLSG as a measure of allostatic load. More specifically, a qualitative analysis of the data obtained from the CLSG was conducted in order to shed more light on the nature of stress experienced by adult women of different ages. In addition, the interrelations between lifetime stress, recent stress, demographic variables and other psychosocial correlates of depression and chronic illness were examined. The relative contribution of these variables to the prediction of depression and chronic health problems was also assessed.

Four main hypotheses were formulated in relation to these objectives. The qualitative analysis of the CLSG was expected to reveal both similarities and differences between the younger and older women as to the types of stressors reported, the frequency of stressors reported and the severity of stress experienced in response to different stressors. Based on the life events literature which suggests that stress decreases with age, it was hypothesized that the lifetime stress graphs of the younger and older women would show comparable levels of stress at the early stages of adulthood but lower stress levels would be reported by the older cohort in later years.

The second hypothesis of this study was that if negative life events, hassles, mean lifetime stress and variability in lifetime stress all measure different aspects of the stress construct, then positive, low order correlations would be found between these variables. Based on the stress literature which consistently reports a relationship between measures of recent stress and health, mean lifetime stress and variability in lifetime stress were expected to be positively correlated with depressive symptoms and chronic physical illness. Further, the correlations between the lifetime stress variables and depression were

expected to be of greater magnitude than those found between lifetime stress and chronic physical illness.

Given the research showing that the reporting of life events may be influenced by individual characteristics (Schroeder & Costa, 1984), it was hypothesized that personal, social or economic factors would also have an impact upon the reporting of the lifetime stress variables derived from the CLSG. Age and neuroticism were expected to emerge as significant predictors of mean lifetime stress and variability in lifetime stress because of their previously established relationship with negative life events and hassles (Lazarus & Delongis, 1983; Aldwin, Levenson, Spiro III & Bossé, 1989).

The final hypothesis of this study was that the assessment of lifetime stress variables, in addition to negative life events and hassles, would significantly improve upon the ability to predict depression and chronic illness. Moreover, it was expected that this effect would remain when the effects due to negative life events and hassles were controlled. Because stressful experiences in and by themselves do not determine health outcome (Weiner, 1992), it was also important to determine whether any relationship observed between the lifetime stress variables, depression and chronic illness would be attenuated when demographic and psychosocial factors other than stress were taken into consideration.

Method

Subjects

The present study analyzed data acquired for previous research at the Center for Research in Human Development of Concordia University. Three hundred and eight

community-dwelling women participated in two earlier studies investigating the relationship between psychosocial factors and alcohol consumption among adult women. Data for the first study was obtained in 1991 from a sample of 126 older women who ranged between 60 and 90 years of age (M = 68.5, SD = 6.0). The second study was conducted in 1993 and 1994 with a group of 182 younger women who ranged in age from 30 to 59 years of age (M = 44.5, SD = 8.5).

Subjects were recruited through various announcements seeking volunteers to participate in a project investigating the impact of changing lifestyles on women's health and well-being. The cohort of older women was recruited through notices published in local English language newspapers (The Montreal Suburban, The Verdun Messenger, The Gazette) and through posters displayed in various stores, apartment buildings and bus stops in Montreal area. Requests for participation were also made at various French and English community organizations that provide services for seniors. The sample of younger women was recruited through newspaper articles published in the university's campus newspaper and in the women's section of two Montreal newspapers (La Presse, The Gazette). Women who expressed an interest in participating in the study were invited to call the university laboratory. An honorarium of $25.00 was given to the older women for their participation. The younger women received $30.00.

Demographic data for the two age cohorts and for the combined sample is shown in Table 1. Ethnicity of the subjects was comparable across age groups. On average, the younger women had attained higher levels of education, had fewer children, were more likely to have worked or be working outside of the home, and had a higher average

Table 1

Demographic Characteristics of Younger and Older Cohorts and the Combined Sample

Demographic Characteristic	Younger Women aged 30-59 n = 182	Older Women aged 60-90 n = 126	Combined Sample aged 30-90 n = 308
	%	%	%
Ethnic group			
Francophone	57.1	58.7	57.8
Anglophone	34.6	31.0	33.1
Allophone	8.3	10.3	9.1
Current marital status			
Single - never married	9.9	6.3	8.4
Married / cohabitating	55.3	54.0	54.4
Separated / divorced [a]	32.6	8.7	23.1
Widowed	2.2	31.0	14.1
Current employment status			
Full-time (20 hours or more per week)	45.1	5.6	29.0
Part-time	14.3	1.6	9.1
Not presently employed	37.4	72.8	51.8
Never employed	3.2	20.0	10.1
Annual household income			
< $10,000	10.1	12.1	10.8
$10,000-$20,000	24.6	29.3	26.4
$20,000-$30,000	26.3	19.8	23.7
$30,000-$40,000	19.6	25.0	21.7
$40,000-$50,000	12.3	8.6	10.8
> $50,000	7.1	5.2	6.6
	M +/- SD	M +/- SD	M +/- SD
Years of education	12.6 2.6	9.7 2.6	11.4 3.0
Number of children	1.6 1.3	2.9 2.1	2.1 1.8

[a] Includes separation or divorce from common-law marriages

household income than the older women. The percentage of women who were married or cohabitating at the time of the study was similar for both cohorts, however, divorce was more common among the younger cohort and widowhood was more likely for the older cohort. The differences in educational level, employment status, income levels and current marital status between the younger and older women is characteristic of what would be expected for these two age groups.

Measures

The measures used in this study were originally developed for use with an English population but were adapted for French speaking subjects by translating them into French, then back-translating to ensure adequacy of translation. Participants completed a wide variety of psychosocial and cognitive measures, however, only those of relevance to this thesis will be mentioned here.

A demographic interview (Appendix A) was conducted to obtain information regarding age, income, marital status, and ethnicity. Subjects were also asked about their family history, educational background, employment history, leisure activities, and current lifestyle.

The Self-Esteem Scale (Rosenberg, 1965) was administered to assess feelings of self-worth and self-acceptance. Subjects indicated the extent to which they agreed or disagreed with each of 10 statements according to a four-point response format ranging from strongly disagree (1) to strongly agree (4). Total scores can range from 10 to 40 with higher scores representing higher self-esteem. Internal consistency of the Self-Esteem Scale has been reported as .86 and test-retest reliability studies have

reported correlation coefficients of .82 and .85 over a 2-week period (Robinson, Shaver & Wrightsman, 1991).

The Sense of Mastery Scale (Pearlin & Schooler, 1978) was administered as an 8-item self-report inventory to measure the degree to which individuals feel in control of outcomes in their lives. Subjects indicated their level of agreement with each statement according to a 4-point response format ranging from strongly disagree (1) to strongly agree (4). Total scores can range from 8 to 32 with higher scores indicating a greater sense of mastery. The test-retest reliability coefficient over a four-year interval was found to be .33. Convergent validity of the scale has been demonstrated through the finding of consistent relationships with other scales and variables (Robinson et al., 1991).

The Eysenck Personality Inventory (Eysenck & Eysenck, 1968) was used to assess the personality dimensions of introversion-extraversion (24 items) and neuroticism (24 items). The inventory also includes a "lie" scale (9 items) to identify subjects who tend to give socially desirable responses. Respondents were asked to reply yes or no to each of the 57 questions listed on the inventory. Higher scores on any of the three subscales indicated a greater likelihood of the particular personality trait. Test-retest reliability coefficients range from .84 to .94 for the complete inventory and between .80 and .97 for the separate subscales (Drummond, 1985).

The Coping Response Questionnaire (CRQ: Tobin, Holyroyd & Reynolds, 1982) provided an indication of the coping strategy(ies) an individual typically uses when under stress. The original 76-item version of the CRQ was shortened to 19 items that reflect emotion-focused coping and problem-focused coping. In addition, avoidance coping was

assessed because of its known relevance to psychological disturbance (Smith et al., 1990). Subjects were asked to recall a particularly stressful situation that occurred during the previous year and then indicate the degree to which each of the coping strategies was used to deal with the stress at that time. Responses for each item ranged from I did not use this at all (1) to this was the main thing that I did (5). On the original version of the scale test-retest reliability coefficients over a two-week period ranged from .54 to .81 with a mean coefficient of .70.

The Social Support Questionnaire (SSQ: Sarason, Levine, Basham & Sarason, 1983) provided a measure of two dimensions of social support; availability of support and perceived satisfaction with support. Subjects completing the 27-item questionnaire are asked to list the individuals (maximum of nine) they can rely on for support in each of the situations described and then rate their satisfaction with the support provided. Ratings of satisfaction with social support are based on a 6-point scale ranging from very dissatisfied (1) to very satisfied (6). Scores reflect the mean availability of support and mean satisfaction with support. Test-retest correlations over a 4-week interval for network size and satisfaction with support have been reported as .90 and .83 respectively.

The Childhood and Adult Experiences Questionnaire (Arbuckle, Chaikelson & Pushkar Gold, 1992; Appendix B) was used to obtain information pertaining to personal life experiences and family relationships in childhood. Two different versions of the questionnaire were completed by the younger and older women. Childhood stressors common to both cohorts were used in the present analyses. This included self-ratings of happiness in childhood, closeness to mother, closeness to father, frequency of

punishment, perceived emotional neglect and happiness of parents during childhood. Respondents rated each item on a 7-point scale, with higher values indicating less happiness and greater upset.[1] Due to the sensitivity of the information obtained, a computerized coding procedure was devised to ensure confidentiality of the data.

The Life Experiences Survey (LES: Sarason et al., 1978) measured the amount of stress associated with recent negative life events. The original version of the LES presents 57 items in a checklist format and provides three additional spaces for subjects to report other recent negative life events they may have experienced. Several changes were made to the original format in order to maximize the face validity of this measure with the population of women under study. With the exception of two items related to education (which were only included on the scale for the younger women) all items pertinent to the student population were dropped from the scale. Items relevant only to males were also deleted. In addition, three items pertaining to pregnancy were omitted on the scale administered to the older women. These modifications resulted in a 43-item version of the scale for the younger women and a 38-item version for the older women. The revised versions of the scale also included four blank spaces where subjects could indicate any unlisted recent major life events which had an impact on their lives. Respondents were asked to indicate which of the listed events they had experienced during the previous year as well as the impact each event had on their lives at the time of occurrence. Ratings of events ranged from extremely positive (1) to extremely negative

[1] In order to facilitate reporting and interpretation of results, scores on these variables were subsequently recoded so that lower scores indicate a poorer quality of life during childhood.

(7). The LES yields a positive, negative and total stress score, however, because adjustment to undesirable events is reportedly more detrimental to psychological health, and overall readjustment is presumed to be a better predictor of physical health (Thoits, 1983), only the negative and total stress scores were considered for the analyses in this study. Test-retest reliability studies conducted on the original version of the LES reported reliability coefficients of .56 and .88 for the negative change score over a 5- to 6-week interval. Reliability coefficients for the total change score were .63 and .64 for the same period.

The Hassles Scale (Kanner et al., 1981) assessed the frequency of strains and stressors of everyday life which had been experienced during the preceding 30-day period.[2] The measure includes items related to employment, interpersonal relations and chance occurrences. A 35-item version of the scale which included only items of relevance to an older population was completed by the older women. The younger women completed a 53-item version of the scale. Subjects were asked to indicate the frequency of occurrence of each hassle on a 5-point scale ranging from did not occur (1) to extremely often (5). Fourteen of the items were comparable across the two versions of the scale and were selected for the analyses of the present study. The reduced scale appears to be a good representation of the Hassles Scales completed by the subjects. The correlation between the selected items and the 53-item measure was found to be .90 whereas their correlation with the 35-item measure was .89.

[2] The original Hassles Scale also provides an index of the severity of stress experienced, however, there is some evidence that this index is confounded with measures of psychological distress (Dohrenwend & Shrout, 1985). For this reason, only frequency of hassles was examined in the present study.

The Concordia Lifetime Stress Graph (CLSG: Bonneville,1995; Appendix C) is a retrospective measure of lifetime stress that was administered in a semi-interview format. The CLSG is printed horizontally on legal size paper with background shading ranging from light pink at the abscissa, to dark red at the top of the page. Respondents are told that darker shading denotes higher stress. The ordinate is separated into six, equal, unlabelled intervals. Numbers have been deliberately omitted from the scale in order to encourage subjects to use the gradient of colour to represent perceived stress. The abscissa represents a time line from 1930 to 1995 and is labeled in 5-year intervals.

The CLSG is designed to provide both a qualitative and quantitative representation of stress experienced over the lifespan. The subject's average Hassles score is used to indicate the current level of stress, however, the subject is permitted to change this point if it is felt to be inaccurate. Once the present stress level is established and indicated as the end point on the graph, subjects are asked to think about the stressful times during their lives. The starting point on the graph is at the respondent's discretion.[3] For each stressful period or event recalled, the subject plots the year of occurrence and the degree of stress experienced. Each point is then labeled with a brief description of what was happening in the subject's life at that time. When this step is completed, subjects are instructed to draw a line connecting the points to show whether the stress levels between events remained elevated or whether stress abated quickly or gradually.

The CLSG yields three quantitative scores for each subject; total lifetime stress,

[3] The majority of younger women began their graphs with stress in childhood or adolescence. Most older women indicated "marriage" as the starting point on their graphs.

mean stress and variability in lifetime stress. Total lifetime stress is determined by computing the area under the curve. Mean lifetime stress represents the average amount of stress experienced and is computed by dividing total lifetime stress by the number of years covered by the graph. Variability in lifetime stress is an indicator of the amount of readjustment a person has undergone in response to various stressors across the lifespan. This score is derived by dividing the length of the line graphed by the number of years covered during that period.[4] Because the total lifetime stress score is highly correlated with age, which is a variable of interest in this study, only mean stress and variability in lifetime stress will be included in the analyses. The CLSG has a test-retest reliability of .68 over a 15-month interval. The measure has been shown to have good convergent and discriminant validity (Bonneville,1995).

The Centre for Epidemiological Studies Depression Scale (CES-D: Radloff, 1977) is a 20-item, self-report inventory designed to measure current depressive symptomatology. Respondents rate each item for frequency of occurrence during the previous week. Responses are rated on a 4-point scale ranging from none of the time or rarely (0), to most or all of the time (3). Accordingly, total scores range from 0 to 60 with higher scores indicating a greater frequency of depressive symptoms. The CES-D has been shown to have high internal consistency and good convergent validity with other standardized measures of depression (Ensel,1986).

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[4] In order to avoid confounding with the quantitative measure of childhood and family experiences used in this study, the data pertaining to stress experienced prior to age 16 was not included in the computation of mean lifetime stress or variability in lifetime stress.

Physical health of the participants was determined by several measures. A modified version of the Seriousness of Illness Rating Scale (SIRS: Wyler, Masuda & Holmes, 1971) was completed by the older women. The adapted version lists 67 health problems relevant to older females. Subjects were asked to indicate which symptoms or illnesses they had experienced during the past five years. The illness score was based on the total number of illnesses checked by the respondent.

A standard medical questionnaire (Arbuckle, Chaikelson & Maag, 1995; Appendix D) was administered to the younger women. This self-report inventory consists of 35 health problems relevant to the general population and two pertinent only to women (i.e., menstruation and menopause). Respondents indicated which of the listed health problems they had experienced during their lives as well as the year of occurrence, however, for comparability with the older women, illness scores were restricted to illnesses and symptoms experienced during the previous 5-year period.

For the purposes of this study, only stress-related health problems that develop over long periods of time and which appear on both questionnaires were selected for analysis. The chronic health problems included were rheumatism, arthritis, diabetes, peptic ulcers / stomach or bowel disorders, high blood pressure, stroke and cancer. These illnesses are representative of the chronic illnesses most prevalent in an adult population (Landreville & Vezina, 1992).

As a complement to these health inventories, subjects were also asked to provide self-ratings of health at the time of the study. Ratings were assigned on a 3-point scale, ranging from very good (1) to poor (3). Self-ratings of health have been found to

correlate with physicians' ratings of health (LaRue, Bank, Jarvik & Hetland, 1979).

Procedure

Individuals who expressed an interest in participating in the project were contacted by telephone to schedule an appointment. All participants were seen individually, either at their homes or at the laboratory, as the subject desired. Participants were also given the choice of being tested in English or in French. Testing was conducted by one of three interviewers who had been fully trained to administer the measures used. Completion of the interviews, tests and questionnaires usually required two, 2-hour sessions, however, a third session was scheduled if necessary. The initial session began by informing the subject of the purpose of the study and by providing an explanation of the testing procedure. Subjects were assured of the confidentiality of the information they provided and advised they could withdraw from the study at any time. Once the subject's written consent had been obtained, the demographic interview was conducted. This was followed by the administration of physical health questionnaires and measures related to the initial studies on alcohol use in adult women. The psychosocial measures were completed during the second session.

Results

Qualitative Analysis of the Concordia Lifetime Stress Graphs

Among the sample of 182 younger women, two subjects refused to complete the CLSG and two graphed their life stress but failed to indicate which stressors were represented by the points on the graph. An additional 8 graphs were missing, leaving 170 graphs available for the qualitative analysis for this cohort. In the sample of 126 older

women, the CLSG was administered to 109 subjects. Of these, 10 graphs were missing and one was incomplete. Consequently, the qualitative analysis for the older cohort was based on information obtained from 98 lifetime stress graphs.

The subjective nature of the perception of stress became readily apparent through visual examination of the individual lifetime stress graphs completed by this sample of adult women. Some of the graphs showed frequent periods of chronic stress, others showed moderate levels of stress with a great deal of variability across time and a few isolated cases showed stable, low levels of stress. In general, there were more frequent and greater fluctuations in stress levels on the graphs drawn by the younger women. There was no consistent decrease in stress levels reported by the older women as they aged. For both younger and older women, periods of high stress were dispersed throughout the life course.

In addition to differences in the general shape of the graphs, variations in the perceived stress associated with individual stressors were also evident. For example, an event such as retirement was reported as being a major stressor by some women but a relatively minor stressor by others. It was also noted that some stressors (e.g. university studies) were viewed as moderately stressful when they occurred in isolation, but were rated as highly stressful when other stressors occurred simultaneously. Furthermore, certain types of stressors such as pregnancy and childbirth were perceived as being more stressful when experienced the first time than on subsequent occasions.

Despite widespread individual differences, some clear patterns concerning the nature of stressors experienced by women of different ages were observed. The findings

as to the types, frequency and severity of stressors experienced will be reviewed separately. It should be noted that due to non-independence of observations on these variables, chi-square analyses to compare the younger and older cohorts could not be performed. As a result, differences between the two age cohorts are expressed in percentages.

Table 2 provides a list of the variety of stressors reported by the younger and older women. Eighteen types of stressors pertaining to family, employment, health, education, social activities, and financial matters were reported by the younger and older women. Both age groups also mentioned a variety of stressful experiences which occurred in childhood and adolescence, however, a greater proportion of younger women (79.4%) than older women (14.2%) reported these events. In addition to the stressors specified by both groups, the younger women reported stress related to illness or death of friends, isolation, spouses' education, mid-life crises and travel. Stressors mentioned only by older women were loss of a home by fire, community work and war. Work-related problems were reported by more young women (59.4%) than any other type of stressor. This was followed by relationship problems with spouse (38.8%), separation and divorce (35.9%), stress associated with education (35.3%) and personal illness (31.8%). Among the older age cohort, death of a family member was reported by the majority of women (61.2%). Stress experienced due to illness of a family member was also reported by many of the older subjects (43.9%), as was adjustment to marriage (39.8%) and personal illness (34.7%). As can be seen by examining Table 2, many of the stressors reported by this sample of adult women are associated with normative

Table 2
Comparison of the Types of Stressors Reported on the CLSG by Younger and Older Cohorts

	Younger Women (n = 170)		Older Women (n = 98)	
Type of Stressor	# reporting	% of sample	# reporting	% of sample
Stress in Childhood / Adolescence				
Difficult family relationships	42	24.7	2	2.0
Adolescent development	18	10.5	0	0.0
Death of parent / family member	14	8.2	8	8.2
School	12	7.0	0	0.0
Alcoholic parent(s)	10	5.9	1	1.0
Separation / divorce parents	8	4.7	0	0.0
Parent's financial problems	7	4.1	2	2.0
Physical abuse / rape	7	4.1	0	0.0
Personal illness / accident	6	3.5	1	1.0
Parent's illness	5	2.9	0	0.0
Teen pregnancy	4	2.4	0	0.0
War	0	0.0	5	5.1
Stress in Adulthood				
Adjustment to marriage	42	24.7	39	39.8
Relationship with spouse/partner	66	38.8	14	14.3
Separation / divorce	61	35.9	14	14.3
Pregnancy / childbirth	43	25.3	23	23.5
Adoption	4	2.3	2	2.0
Problems raising children	47	27.6	22	22.4
Other family problems[a]	29	17.1	22	22.4
Personal health / illness	54	31.8	34	34.7
Illness family member	39	22.9	43	43.9
Illness friend	1	0.6	0	0.0
Death family member	48	28.2	60	61.2
Death friend	5	2.9	0	0.0
Work-related problems (personal)	101	59.4	20	20.5
Community work	0	0.0	1	1.0
Work (spouse / partner)	14	8.2	12	12.2
Retirement	3	1.8	4	4.1
Financial difficulties	26	15.3	7	7.1
Moving / buying / selling home	50	29.4	26	26.5
Loss of home by fire	0	0.0	2	2.0
Studies (personal)	60	35.3	4	4.1
Studies (spouse / partner)	2	1.2	0	0.0
Robbery	1	0.6	1	1.0
Developmental crisis / therapy	13	7.6	0	0.0
Substance abuse	8	4.7	1	1.0
Isolation	5	2.9	0	0.0
Travel	2	1.2	0	0.0

[a] Includes concerns for aging parents and adult children (e.g., caregiving, abusive relationships, divorce)

transitions that occur during the life course. Relatively few women reported traumatic events.

Once the types of stressors reported on the CLSG had been identified, the frequency of occurrence of each type of stressor was examined. The frequency count was based on the number of times a particular type of stressor was indicated on the graphs. In cases where subjects reported experiencing the same type of stressor at different times during their lives (e.g., recurrent marital problems), the stressor was counted each time it was mentioned. Women of the younger cohort reported a total of 1072 stressful experiences; an average of 6.3 stressors per subject. Of these, work-related problems (16.2%), problems with spouse (8.8%), and personal illness (7.6%) ranked as the top three most frequently occurring stressors.

The older cohort reported a total of 537 stressful experiences or an average of 5.5 stressors per subject. Among the older women, the most frequently occurring stressors were death of a family member (20.1%) personal illness (10.8%), adjustment to marriage (9.9%) and illness of a family member (9.5%). The ten most frequently occurring stressors reported by the two age cohorts are presented in Table 3.

In order to determine whether certain lifetime stressors are perceived as more stressful than others, each graph was examined to identify the situation associated with the highest level of stress reported. Some subjects indicated that multiple stressors contributed to their peak stress level. When this occurred it was not possible to determine whether a particular stressor caused more distress than any of the others. In these cases, each stressor associated with the highest stress point was included in the analysis. The

Table 3

Lifetime Stressors Most Frequently Reported by Younger and Older Women

Stressors Most Frequently Reported by Women Aged 30-59	Number Reported	Percentage of Stressors (n =1072)
Work-related problems	174	16.2
Relationship with spouse / partner	94	8.8
Personal illness	81	7.6
Separation / divorce	70	6.5
Death of a family member	66	6.2
Pregnancy / childbirth	64	6.0
Studies (personal)	60	5.6
Problems raising children	56	5.2
Illness of a family member	56	5.2
Adjustment to marriage	42	3.9

Stressors Most Frequently Reported by Women Aged 60-90	Number Reported	Percentage of Stressors (n = 537)
Death of a family member	108	20.1
Personal illness	58	10.8
Adjustment to marriage	53	9.9
Illness of a family member	51	9.5
Pregnancy / childbirth	47	8.8
Other family problems [a]	37	7.0
Work-related problems	31	5.8
Problems raising children	28	5.2
Moving	27	5.0
Separation / Divorce	16	3.0

[a] Includes concerns for aging parents, adult children (e.g., caregiving, abusive relationships, divorce)

indication that various stressors at different times in a subject's life produced identical levels of extreme stress was handled in the same manner. Table 4 shows the events and situations that were reported as being most stressful for the younger and older women. As can be seen in Table 4, the greatest proportion of most stressful events reported by the younger cohort were work-related problems (14.7%), separation or divorce (13.6%) and death of a family member (12.9%). In contrast, death of a family member accounted for 30.2% of the events perceived as most stressful by the older cohort. This was followed by problems with personal health (13.8%) and illness of a family member (11.8%).

Overview of Statistical Analyses

To examine cohort differences on measures of recent and lifetime stress, depression and chronic illness, t-tests were conducted on the data collected from the separate samples of younger and older women. In addition, one-way Analysis of Variance (ANOVA) procedures were used to compare mean stress levels of age cohorts at different ages across the lifespan.

Hierarchical and standard regression analyses were used to test the main hypotheses of this study. All regression analyses were conducted on the combined data of younger and older women. This decision was made in order to have an adequate sample size for the proposed analyses.

Preliminary Data Analyses

The data were examined to identify any extreme scores and for violations of statistical assumptions. No outliers or non-normal distributions were found in the data to be analyzed by univariate analyses. All assumptions of Analysis of Variance and t-test

Table 4

Lifetime Stressors Perceived as Most Stressful by Younger and Older Women

Stressors Perceived as Most Stressful by Women Aged 30-59	Times Reported	% of Most Stressful Events (n=279)
Work related problems	41	14.7
Separation / Divorce	38	13.6
Death of a family member	36	12.9
Personal health	28	10.0
Problems during childhood / adolescence	23	8.2
Other family problems [a]	22	7.9
Relationship with spouse / partner	20	7.2
Illness of family member	16	5.7
Moving	10	3.4
Studies (personal)	10	3.4
Financial difficulties	7	2.5
Problems raising children	5	1.8

Stressors Perceived as Most Stressful by Women Aged 60-90	Times Reported	% of Most Stressful Events (n=152)
Death of a family member	46	30.2
Personal health	21	13.8
Illness of family member	18	11.8
Separation / Divorce	11	7.2
Other family problems [a]	8	5.2
Work related problems	7	4.6
Problems during childhood / adolescence	7	4.6
Problems raising children	7	4.6
Relationship with spouse / partner	5	3.2
Moving	5	3.2

[a] Includes concerns for aging parents, adult children (e.g., caregiving, abusive relationships, divorce)

were met.

Several univariate outliers were found among the variables in the data that would be analyzed using multiple regression techniques. Following the procedure recommended by Tabachnick and Fidell (1996), each case identified as a univariate outlier was recoded to a score exactly three standard deviations above or below the mean of its respective distribution. This procedure reduces the impact of the outliers on the statistical analyses yet maintains their position as the highest or lowest scores in the distribution. The data were also screened for multivariate outliers. Using Cook's distance as a criterion, no multivariate outliers were found.

Data obtained for three variables, negative life events during the past year, variability in lifetime stress and depression were found to be positively skewed and were transformed using a square-root transformation. A fourth variable, total stress during the past year, was also positively skewed, however, because transformation of the data caused this distribution to became negatively skewed, the original scores were used in the analyses. Satisfaction with social support was substantially negatively skewed and required reflexive logarithmic transformation to reduce skewness. After recoding of outliers and transformation of skewed variables, the assumptions of multiple regression analysis were met.

Preliminary correlational and factor analyses were used to reduce the set of predictor variables for this study. Education and income were factor analyzed to produce a socioeconomic status factor score. A second factor, quality of life during childhood, was composed of the variables childhood happiness, closeness to mother, closeness to

father, frequency of punishment, emotional neglect and happiness of parents during childhood.

The data were also examined for multicollinearity and singularity among the variables. Emotion-focused and avoidance coping were highly correlated (r = .83) indicating multicollinearity between these two measures. Because the measure of emotion-focused coping includes items related to avoidance coping, it was decided to eliminate the latter from subsequent analyses.[5] In addition, although the correlation between negative life events and total life events (r = .64) did not reach the criterion for multicollinearity, it did indicate substantial overlap between these variables. Of the two variables, negative life events was retained for further analyses. This decision was based on the observation that negative life events were more reliably correlated with the outcome measures than total life events.

The original means and standard deviations for all variables for the combined sample and details regarding any alterations or transformations applied to them are presented in Table 5. Although all statistical analyses were performed on revised scores, for ease of interpretation, the results reported are in terms of the original variables. Missing data were not replaced and resulted in varying sample sizes across analyses.

Descriptive statistics on stress and health measures

Stress

An average of 5.48 life events during the previous year and 1.92 hassles during

[5] According to Tabachnick and Fidell (1996), two variables with bivariate correlations of .70 or greater should not be included in the same analysis. Deletion of one of the two variables is recommended.

Table 5

Descriptive Statistics of Quantitative Measures for the Combined Sample

Measure	Mean	SD	Range Min	Range Max	Transformation
Age	54.36	14.05	30.00	90.00	
Socioeconomic status factor					
Education	11.41	2.95	2.00	21.00	
Total household income[a]	3.14	1.38	1.00	6.00	
Quality of life during childhood factor					
Childhood happiness	4.84	1.56	1.00	7.00	
Closeness to mother	4.90	1.94	1.00	7.00	
Closeness to father	4.30	2.13	1.00	7.00	
Parent happiness	4.36	1.88	1.00	7.00	
Frequency of punishment	2.63	1.48	1.00	7.00	
Emotional neglect	3.44	2.14	1.00	7.00	
Neuroticism	10.00	4.95	0.00	22.00	
Introversion-extraversion	11.72	3.91	1.00	21.00	
Social desirability	4.24	2.00	0.00	9.00	
Self-esteem	26.35	2.03	18.00	33.33	Recode outliers
Mastery	24.02	3.52	15.00	32.00	
Size of support network	3.65	1.72	0.30	8.90	
Satisfaction with support	5.30	0.72	1.50	6.00	Reflexive log
Problem-focused coping	25.07	6.07	10.00	40.00	
Emotion-focused coping	25.56	5.93	13.00	36.00	Recode outliers
Negative life events (past year)	4.18	4.94	0.00	36.00	Square root
Daily hassles (past month)	1.92	0.60	1.00	4.27	
Mean lifetime stress	2.57	1.01	0.22	5.58	
Variability in lifetime stress	4.01	2.26	0.92	13.67	Square root
Depression (past week)	11.64	9.95	0.00	53.00	Square root
Chronic physical illness (past 5 years)	0.79	0.87	0.00	4.00	Recode outliers

[a] Total annual household income was scored on the following 6-point scale:
(1) < $10,000
(2) $10,000 - $20,000
(3) $20,000 - $30,000
(4) $30,000 - $40,000
(5) $40,000 - $50,000
(6) > $50,000

the previous month were reported by this sample of adult women. On average, their mean lifetime stress score was 2.57 and ranged between .22 and 5.58. Variability in lifetime stress averaged at 4.01 in a range of .92 to 13.67.

Some notable age-related differences were found between the younger and older women on the stress variables used in this study. Women between the ages of 30 and 59 reported significantly more negative life events ($M = 1.83$, $SD = 1.22$) during the past year than the women aged 60 and over ($M = 1.22$, $SD = 1.22$; $t(262) = 4.31$, $p < .001$). As for daily strains during the past month, the younger cohort reported significantly more hassles than the older cohort: Younger $M = 2.15$, $SD = .57$; Older $M = 1.57$, $SD = .45$; $t(293) = 9.87$, $p < .001$.

On the measures of lifetime stress derived from the CLSG, the two age cohorts differed only with respect to variability in lifetime stress. Women aged 30-59 reported significantly greater variability in lifetime stress ($M = 2.07$, $SD = .55$) than the women aged 60 and over ($M = 1.71$, $SD = .38$; $t(282) = 6.61$, $p < .001$). The differences between younger and older women on mean lifetime stress were not significant: Younger - $M = 2.64$, $SD = 1.04$; Older - $M = 2.46$, $SD = .96$; $t(242) = 1.48$, $p = .14$, ns.

Cohort differences in mean lifetime stress were also examined by graphing mean stress levels of participants at the same age. Because cohort differences may exist between narrowly defined age ranges, the sample was divided into five, 10-year age groups. As shown in Figure 1, the mean stress levels of all age cohorts increased sharply between the ages of 25 and 30, and for those cohorts with data beyond age 30, mean stress remained above their 25-year levels. The graph also shows that the amount of

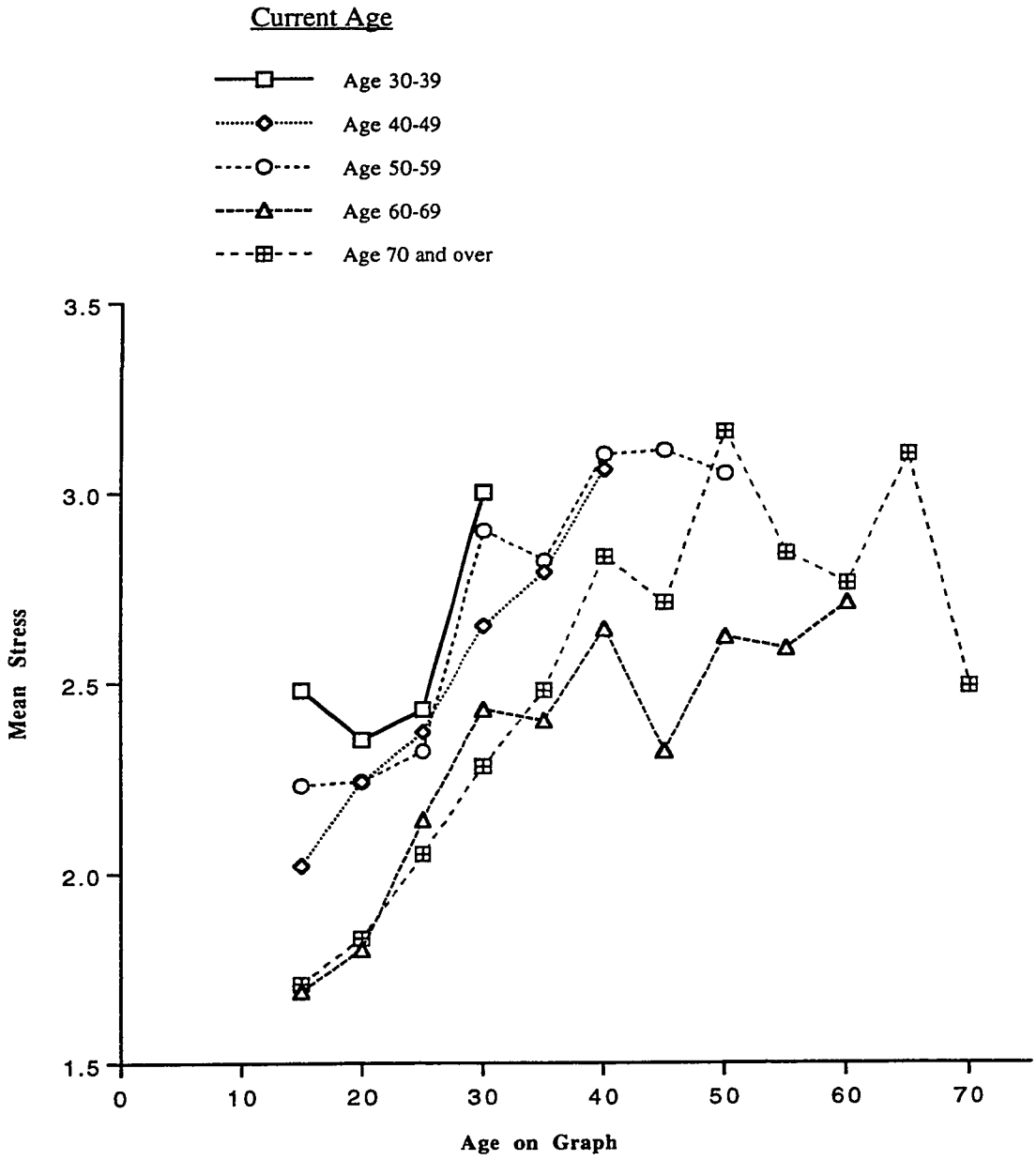

Figure 1. Cohort differences in mean stress reported over the lifespan. Points represent mean stress levels for each age cohort at 5 year intervals.

stress reported changed across the life span, but no particular period of life was consistently reported as being more stressful than another.

Although no overall statistical analyses comparing age cohorts across the lifespan could be conducted due to unavailability of data for younger cohorts in later life, separate analyses at certain ages were possible. Results of a one-way ANOVA comparing mean stress of all five cohorts at age 30 did not identify any significant cohort differences, $F(4, 247) = 1.76$, $p = .13$, ns. Two additional one-way ANOVAs were conducted on mean stress levels at age 40 and 50 for the cohorts with data available at these ages. No significant differences were found between the cohorts at age 40, $F(3, 192) = 1.04$, $p = .38$, or at age 50, $F(2, 134) = 1.74$, $p = .18$, ns. (Source tables for the three ANOVAs are presented in Appendix E, Tables E-1 to E-3). A t-test was conducted on mean stress levels at age 60 to compare the cohort of women aged between 60 and 69 at the time of testing ($M = 2.7$, $SD = 1.47$) with those aged 70 and over ($M = 2.75$, $SD = 1.57$). Their mean stress levels were not significantly different, $t(80) = -.15$, $p = .88$, ns.

Depression

On the CESD, these women reported an average depression score of 11.63. Using the traditional cutoff score of 16 and over as an indicator of probable caseness for depression in a community sample, 22.4% of the women sampled were probably depressed.[6] Women between the ages of 30 and 59 were significantly more depressed ($M = 3.35$, $SD = 1.46$) than the women aged 60 and over ($M = 2.70$, $SD = 1.23$; $t(285) =$

[6] On the CES-D, using a cutoff score of 16 as an indicator of depression in a community sample produces a false positive rate of 6.1% and a false negative rate of 36.4% (Ensel, 1986).

4.18, $p < .001$).

Chronic health problems

The women who participated in the study perceived themselves as having good physical health. On a scale ranging from 1 to 3, their mean health rating was 1.48. Of the women sampled, 45.8% did not report any chronic health problems during the past 5 years. One third of subjects had one chronic condition, 17.5% had two and 3.2% reported three. A single subject (0.3%) reported four chronic health problems. Older women had significantly more chronic health problems ($M = 1.04$, $SD = .85$) than the younger women ($M = .60$, $SD = .81$; $t\ (285) = -4.52$, $p < .001$).

Main Quantitative Analyses

Intercorrelations Among the Study Variables

Table 6 provides the intercorrelations between all variables included in this study. Examination of the correlation matrix reveals the multifactorial nature of the stress-illness relationship. Significant intercorrelations between demographic variables, childhood factors, personality characteristics, social support variables, coping strategies, stress, depression and chronic illness are identified. Significant positive correlations were found among all of the stress variables except negative life events and mean lifetime stress. Depression scores were significantly correlated with daily hassles ($r = .46$, $p < .001$) and negative life events ($r = .31$, $p < .001$). Measures of lifetime stress were also correlated with depression. The correlation between mean lifetime stress and depression was significant ($r = .13$, $p < .05$) as was the correlation between variability in lifetime stress and depression ($r = .16$, $p < .01$). With regard to physical health, a

Table 6

Correlation Matrix of the Study Variables (N = 308)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	-																
2. SES	-.21***																
3. Quality childhood [a]	.24***	.13*															
4. Neuroticism	-.16**	-.08	-.17**														
5. Introversion-extraversion	-.08	.03	-.04	-.15**													
6. Social desirability	.29***	-.14*	.07	-.26***	.00												
7. Mastery	-.12*	.04	-.02	-.49***	.27***	.16**											
8. Self-esteem	-.17**	.19***	.00	-.22***	.09	-.05	.22***										
9. Support network size	-.15**	.15**	.04	-.14*	.11	-.08	.27***	.19***									
10. Satisfaction support [b]	-.10	.09	-.18**	.28***	-.18**	-.11	-.34***	-.02	-.31***								
11. Emotion coping	.19***	-.18***	-.07	.03	.10	.10	.02	-.03	-.03	.02							
12. Problem coping	-.01	-.08	-.12	-.08	.07	.03	.18***	.06	.08	.01	.35***						
13. Negative life events	-.25***	.05	-.11	.24***	.00	-.11	-.18**	.01	.09	-.14*	.02	-.02					
14. Hassles	-.45***	.02	-.31***	.35***	.03	-.19***	-.24***	-.15**	-.08	-.25***	.04	.05	.38***				
15. Mean lifetime stress	-.05	-.11	-.32***	.24***	.03	-.26***	-.02	-.14*	-.01	-.08	-.10	.01	.03	.18**			
16. Variability lifetime stress	-.33***	.04	-.15**	.13*	.07	-.20***	-.02	-.04	.05	-.15*	-.03	.04	.31***	.26***	.22***		
17. Depression	-.25***	-.08	-.23***	.51***	-.19***	-.12*	-.40***	-.19***	-.19***	-.39***	-.03	.06	.31***	.46***	.13*	.17**	
18. Chronic illness	.31***	-.14*	.01	.14*	-.05	.14*	-.07	-.08	-.10	-.15*	.09	.09	.03	.00	.13*	-.04	.12*

[a] Scores on this factor were recoded so that lower scores indicate a poorer quality of life during childhood

[b] Satisfaction with support was transformed using a reflexive log transformation - direction of the correlations are presented in terms of the original scores

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

significant correlation was found between mean lifetime stress and chronic illness (r = .13, $p < .05$). The association between variability in lifetime stress and chronic illness was not significant. No significant correlations were found between hassles, negative life events and chronic illness.

Predictors of Lifetime Stress Variables

Two standard regression analyses were performed to identify the variables that account for significant proportions of the variance in mean lifetime stress and variability in lifetime stress. In the first regression, mean lifetime stress scores were regressed on age, socioeconomic status, quality of childhood, personality variables, social support variables and coping strategies. As shown in Table 7, this combination of variables accounted for 23.5% of the variance in mean lifetime stress scores, F (12, 262) = 6.74, $p < .0001$. Quality of childhood ($sr^2 = .08$), neuroticism ($sr^2 = .02$), and social desirability ($sr^2 = .05$) were the only variables to make significant, unique contributions to the prediction of mean lifetime stress. Based on the correlations shown in Table 6, women who reported greater mean lifetime stress are those who experienced a poorer quality of life during childhood, who have higher levels of neuroticism and who obtained lower scores on the measure of social desirability.

In the second regression, variability in lifetime stress was regressed on the same set of potential predictors used to predict mean stress. This combination of variables accounted for 16.8% of the variance in variability in lifetime stress scores, $F(12, 262)$ = 4.42, $p < .0001$). Age ($sr^2 = .07$) and satisfaction with social support ($sr^2 = .01$) were the only variables to make significant, unique contributions to variability in lifetime stress.

Table 7

Summary of Standard Multiple Regression of Predictors of Mean Lifetime Stress (N = 274)

Variable	ß	r	sr^2	t
Age	.10	-.04	.01	1.60
Socioeconomic status	-.04	-.13	.00	-.64
Quality of childhood	-.31	-.34	.08	-5.20****
Mastery	.12	-.02	.01	1.85
Self-esteem	-.10	-.14	.01	-1.72
Neuroticism	.16	.25	.02	2.36*
Introversion-extraversion	.02	.03	.00	.34
Social desirability	-.26	-.25	.05	-4.29****
Size of support network	-.01	-.03	.00	-.15
Satisfaction with support	.00	.09	.00	-.04
Emotion-focused coping	.11	.13	.01	1.82
Problem-focused coping	-.05	.01	.00	-.90

Note. Multiple R = .485 R^2 = .235 Adjusted R^2 = .200 F (12, 262) = 6.74****

* p < .05 **** p <.0001

By referring to Table 6, it can be seen that these two variables are negatively correlated with variability in lifetime stress. This indicates that younger women and those who are less satisfied with their social support report greater variability in lifetime stress. Results of this analysis are presented in Table 8.

Stress Variables as Predictors of Depression

Two hierarchical multiple regression analyses were performed to evaluate the utility of using measures of lifetime stress as predictors of depression. Results of the first regression, summarized in Table 9, showed that when the lifetime stress variables were entered into the regression at the first stage, mean lifetime stress and variability in lifetime stress together accounted for 3.8% of the variance in depression, $F_{inc}(2, 279) = 5.49$, $p < .01$. Of these two measures, only variability in lifetime stress made a significant contribution to the analysis. Hassles and negative life event stress were entered at the second stage of the regression analysis. Together, these measures of recent life stress accounted for an additional 18.4% of the variance in depression scores. This increase in variance explained was significant, $F_{inc}(2, 279) = 32.70$, $p < .0001$. Hassles ($sr^2 = .12$) made a greater contribution to the analysis than negative life events ($sr^2 = .02$). With all of the stress variables entered into the analysis, the overall variance accounted for was 22.2%, $F(4, 277) = 19.72$, $p < .0001$.

A second hierarchical multiple regression was conducted to determine whether the lifetime stress variables would account for a significant proportion of the variance in depression scores after controlling for the effects of negative life events and hassles. When hassles and negative life events were entered into the analysis at the first stage,

Table 8

Summary of Standard Multiple Regression of Predictors of Variability in Lifetime Stress (N = 274)

Variable	ß	r	sr^2	t
Age	-.30	-.34	.07	-4.53****
Socioeconomic status	-.06	.02	.00	-1.09
Quality of childhood	-.03	-.15	.00	-.53
Mastery	.00	.00	.00	-.07
Self-esteem	-.11	-.03	.01	-1.72
Neuroticism	.00	.12	.00	-.07
Introversion-extraversion	.09	.08	.01	1.47
Social desirability	-.11	-.22	.01	-1.81
Size of support network	.09	.07	.01	1.35
Satisfaction with support	.14	.15	.01	2.10*
Emotion-focused coping	-.02	-.04	.00	-.36
Problem-focused coping	.02	.04	.00	.38

Note. Multiple R = .410 R^2 = .168 Adjusted R^2 = .130 F (12, 262) = 4.42****

* $p < .05$ **** $p < .0001$

Table 9

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Depression with Lifetime Stress Measures Entered First

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Mean lifetime stress Variability in lifetime stress	.038	.038	5.49**
Step 2			
Negative life events Hassles	.222	.184	32.70****

Note. Multiple R = .471 R^2 = .222 Adjusted R^2 = .210 $F(4, 277) = 19.72$****

** $p < .01$ **** $p < .0001$

these two variables accounted for 21.8% of the variance in depression scores. This proportion of variance explained was significant, $F_{inc}(2, 279) = 38.90$, $p < .0001$. The entry of mean lifetime stress and variability in lifetime stress at the second stage of the regression accounted for an additional 0.4% of the variance in depression. This increase was not significant, $F_{inc}(2, 279) = .64$, $p > .10$, ns. Results of this regression analyses are summarized in Table 10. Details of the final stage of these two analyses are presented in Appendix F, Table F-1.

Demographic Variables, Childhood Factors, Personality, Social Support, Coping, Stress and Depression

Hierarchical regression analyses were performed to examine the relative importance of recent and lifetime stress as predictors of depression when demographic characteristics and other psychosocial variables were taken into consideration. Depression scores were regressed on age, socioeconomic status, quality of childhood, personality variables, social support variables, coping strategies, recent stress and lifetime stress. When entered as the first stage of the regression analysis, age and socioeconomic status together accounted for 8.9% of the variance in depression scores. This proportion of variance accounted for was significant, $F_{inc}(2, 268) = 13.12$, $p < .0001$. The entry of quality of life during childhood at stage two accounted for an additional 2.4% of the variance in depression. This increase in variance explained was also significant, $F_{inc}(1, 269) = 7.11$, $p < .01$. The personality variables neuroticism, social desirability, introversion-extraversion, mastery and self-esteem were entered at stage three. Combined, these variables increased R^2 by 27.0%. This increase in variance

Table 10

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Depression with Lifetime Stress Measures Entered Last

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Negative life events Hassles	.218	.218	38.90****
Step 2			
Mean lifetime stress Variability in lifetime stress	.222	.004	.64

Note. Multiple R = .471 R^2 = .222 Adjusted R^2 = .210 F (4, 277) = 19.72****

**** $p < .0001$

explained was significant, F_{inc} (5, 265) = 23.00, $p < .0001$. Of the personality variables, only neuroticism, mastery and self-esteem made a significant contribution at this stage. Once the personality variables were entered into the analysis, the contribution of socioeconomic status was no longer significant. When the variables size of social support network, satisfaction with social support, problem-focused coping and emotion-focused coping were entered at stage four, R^2 increased by 4.3%, F_{inc} (4, 266) = 4.78, $p < .001$. Of the four variables entered at this stage, only satisfaction with social support and problem-focused coping made a significant contribution to the regression. At this stage of the analysis the importance of the quality of childhood variable disappeared. The stress variables, negative life events and hassles were entered into the analysis at stage five. Together, these measures accounted for an additional 2.7% of the variance in depression. This increase was significant, F_{inc} (2, 268) = 6.26, $p < .01$. With these measures of recent stress included in the analysis the contribution of self-esteem was no longer significant. The measures of lifetime stress were entered into the analysis at the final stage. Together, mean lifetime stress and variability in lifetime stress accounted for .04% of the variance in depression scores. This increase in variance explained was not significant, F_{inc} (2, 268) = .09, $p > .10$, ns. Overall, this combination of variables explained 45.3% of the variance in depression, F (16, 254) = 13.16, $p < .0001$. The variables that made a significant, unique contribution at the final stage of this regression were age ($sr^2 = .01$), neuroticism ($sr^2 = .03$), mastery ($sr^2 = .02$), satisfaction with social support ($sr^2 = .02$), problem-focused coping ($sr^2 = .01$), negative life events ($sr^2 = .01$), and hassles ($sr^2 = .01$). Based on the correlations shown in Table 6, depression is more common among younger

women and is related to higher levels of neuroticism, a lower sense of mastery and less satisfaction with social support. Depression is also associated with more negative life events during the past year and a greater number of hassles during the past month. Problem-focused coping appears to have contributed to the analysis by suppressing irrelevant variance between emotion-focused coping and depression, however, this effect had little impact on the regression equation. The results of this analysis are summarized in Table 11. Details of the final stage of the analysis are shown in Appendix F, Table F-2.

A second hierarchical regression was conducted to determine whether the lifetime stress variables would account for a significant portion of the variance in depression if hassles and negative life events were excluded from the analysis. In this regression, the entry of mean lifetime stress and variability in lifetime stress at the final stage of the analysis did not account for any appreciable variance in depression scores, $\underline{R}^2$ change = .00007, $\underline{F}_{inc}$ (2, 271) = .02, $\underline{p}$ >.10, ns. Altogether this set of demographic and psychosocial variables accounted for 42.7% of the variance in depression, $\underline{F}$ (14, 259) = 13.77, $\underline{p}$ < .0001. In this analysis, the variables that made a significant, unique contribution at the final stage of the analysis were age ($\underline{sr}^2$ = .04), socioeconomic status ($\underline{sr}^2$ = .01), neuroticism ($\underline{sr}^2$ = .04), mastery ($\underline{sr}^2$ = .04), self-esteem ($\underline{sr}^2$ = .01) and satisfaction with social support ($\underline{sr}^2$ = .02). Apparently the exclusion of negative life events and daily hassles allowed the contribution of socioeconomic status and self-esteem to be revealed. It did not, however, have this effect for mean lifetime stress or variability in life time stress. As in the previous analysis, problem-focused coping contributed to the regression by suppressing irrelevant variance in emotion-focused

Table 11

Summary of Hierarchical Regression Analysis for Demographic and Psychosocial Variables Predicting Depression

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Age			
Socioeconomic status	.089	.089	13.12****
Step 2			
Quality of life during childhood	.113	.024	7.11**
Step 3			
Neuroticism			
Introversion-extraversion			
Social desirability			
Mastery			
Self-esteem	.383	.270	23.00****
Step 4			
Size of support network			
Satisfaction with social support			
Problem-focused coping			
Emotion-focused coping	.426	.043	4.78***
Step 5			
Negative life events			
Hassles	.453	.027	6.26**
Step 6			
Mean lifetime stress			
Variability in lifetime stress	.453	.000	.09

Note. Multiple R = .673 R^2 = .453 Adjusted R^2 = .419 $F(16, 254) = 13.16$****

** $p < .01$ *** $p < .001$ **** $p < .0001$

coping but this effect had little impact on the analysis. Table 12 shows a summary of this regression. Details of the final stage of this analysis are shown in Appendix F, Table F-3.

Stress Variables as Predictors of Chronic Illness

A standard regression analysis was conducted to determine whether the lifetime stress variables would account for a significant proportion of the variance in chronic illness scores. As can be seen in Table 13, the combination of mean lifetime stress and variability in lifetime stress accounted for 2.0% of the variance in chronic illness. The proportion of variance explained was significant, F (2, 285) = 3.14, $p < .05$, however, the size of the effect was small. Of the two lifetime stress measures, only mean lifetime stress made a significant, unique contribution to the analysis ($sr^2 = .02$).

A hierarchical multiple regression analysis was performed to determine whether the examination of recent stress would improve the prediction of chronic illness beyond that provided by assessing lifetime stress. In this analysis, the entry of mean lifetime stress and variability in lifetime stress together at the first stage of the regression again accounted 2.0% of the variance of chronic illness scores. Due to a slight decrease in sample size, this proportion of variance explained now only approached significance, F_{inc} (2, 281) = 2.90, $p = .056$. The entry of negative life events and daily hassles at the second stage of the regression accounted for an additional 0.2% of the variance. This increase in variance explained was not significant, $F_{inc}(2, 281) = .25$, $p > .10$, ns. After stage two, with all of the stress variables entered into the regression, only 2.2% of the variance in chronic illness was explained, F (4, 279) = 1.57, $p > .10$, ns. The results of this regression are summarized in Table 14.

Table 12

Summary of Hierarchical Regression Analysis for Demographic and Psychosocial Variables Predicting Depression with Negative Life Events and Hassles Excluded

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Age			
Socioeconomic status	.089	.089	13.16****
Step 2			
Quality of life during childhood	.113	.024	7.41**
Step 3			
Neuroticism			
Introversion-extraversion			
Social desirability			
Mastery			
Self-esteem	.384	.271	23.30****
Step 4			
Size of support network			
Satisfaction with social support			
Problem-focused coping			
Emotion-focused coping	.427	.043	4.89***
Step 5			
Mean lifetime stress			
Variability in lifetime stress	.427	.000	.02

Note. Multiple $R = .653$ $R^2 = .427$ Adjusted $R^2 = .396$ $F(14, 259) = 13.77$****

** $p < .01$ *** $p < .001$ **** $p < .0001$

Table 13

Summary of Standard Regression Analysis with Lifetime Stress Measures as Predictors of Chronic Illness (N = 287)

Variable	ß	r	sr^2	t
Mean lifetime stress	.15	.13	.02	2.42*
Variability in lifetime stress	-.07	-.04	.00	-1.17

Note. Multiple R = .146 R^2 = .022 Adjusted R^2 = .015 F (2, 285) = 3.14*

* $p < .05$

Table 14

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Chronic Illness with Lifetime Stress Measures Entered First

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Mean lifetime stress Variability in lifetime stress	.020	.020	2.90
Step 2			
Negative life events Hassles	.022	.002	.25

Note. Multiple R = .148 R^2 = .022 Adjusted R^2 = .008 F (4, 279) = 1.57 ns

When the analysis was rerun with measures of recent life stress entered at the first stage of the hierarchical regression, the combination of hassles and negative life events accounted for .04% of the variance in chronic illness scores, F_{inc} (2, 281) = .05, $p > .10$, ns. The entry of mean lifetime stress and variability in lifetime stress together at the second stage of the regression analysis accounted for 2.2% of the variance in chronic illness scores; a small but significant effect, F_{inc} = (2, 281) = 3.09, $p < .05$. Taken together, the results of the two preceding multiple regressions showed that the assessment of recent stress does not improve on the ability to predict chronic illness over and above that predicted by mean lifetime stress. The results of this regression are summarized in Table 15. Details of the final stage of these two regression analyses are presented in Appendix F, Table F-4.

Demographic Variables, Childhood Factors, Personality, Social Support, Coping, Stress and Chronic Illness

Hierarchical regression analyses were performed to examine the relative importance of recent and lifetime stress measures when demographic variables and other psychosocial factors were taken into account. Chronic illness scores were regressed on age, socioeconomic status, quality of childhood, personality variables, social support, coping strategies, recent stress and lifetime stress.

When entered at the first stage of the regression, age and socioeconomic status together accounted for a significant 12.4% of the variance in chronic illness scores, F_{inc} (2, 269) = 18.96, $p < .0001$. Of the two demographic variables, only age made a significant contribution to the analysis. The entry of quality of childhood at stage two

Table 15

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Chronic Illness with Lifetime Stress Measures Entered Last

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Negative life events Hassles	.0004	.0004	.05
Step 2			
Mean lifetime stress Variability in lifetime stress	.0216	.0216	3.09*

Note. Multiple R = .148 R^2 = .022 Adjusted R^2 = .008 F (4, 279) = 1.57 ns

* $p < .05$

increased R^2 by 1%. This increase in variance explained was not significant, $F_{inc}(1, 270) = 2.93$, $p > .05$, ns. The personality variables neuroticism, introversion-extraversion, self-esteem, social desirability and mastery were entered together at stage three. Together, this combination of variables explained an additional 3.6% of the variance in chronic illness. This increase was significant, $F_{inc}(5, 266) = 2.26$, $p < .05$. Of the variables entered at this stage, only neuroticism accounted for a significant proportion of the increase in variance explained. Satisfaction with social support, size of social support network, problem-focused coping and emotion-focused coping were entered into the analysis together at stage four. This group of variables accounted for an additional 2.0% of the variance in chronic illness, however, this increase was not significant, $F_{inc}(4, 267) = 1.56$, $p > .10$, ns. Negative life events and hassles were entered together at stage five. Together, these two variables increased R^2 by 1.9%. This increase in variance explained just reached significance, $F_{inc}(2, 269) = 3.01$, $p = .05$. Neither negative life events, nor hassles made a significant, independent contribution to the analysis. Mean lifetime stress and variability in lifetime stress were entered together at the final stage of the analysis. These measures of lifetime stress accounted for an additional 1.1% of the variance in chronic illness. This increase in variance explained was not significant, $F_{inc}(2, 269) = 1.75$, $p > .10$, ns. With all of the variables entered into the regression analysis predicting chronic illness, the overall proportion of variance explained was 21.8%, $F(16, 255) = 4.44$, $p < .0001$. At the final stage of the regression, age ($sr^2 = .12$) and neuroticism ($sr^2 = .02$) were the only variables that made a significant, unique contribution to the analysis. As can be seen by referring to the correlation matrix in Table 6, both of these variables

are positively associated with chronic illness. This indicates that chronic illness is more common among older women with higher levels of neuroticism. Results of this analysis are summarized in Table 16. Details of the final stage of the regression are presented in Appendix F, Table F-5.

A second hierarchical regression analysis was conducted to assess whether the measures of lifetime stress would make a significant contribution to the prediction of chronic illness if negative life events and hassles were excluded from the analysis. In this regression, the entry of mean lifetime stress and variability in lifetime stress at the final stage of the analysis accounted for 1.1% of the variance in chronic illness. This increase was not significant, $F_{inc}(2, 268) = 1.86$, $p > .10$, ns. Altogether, this set of variables accounted for 20.3% of the variance in chronic illness, $F(14, 260) = 4.73$, $p < .0001$. The exclusion of negative life events and hassles did not permit the lifetime stress measures to enter into the analysis. No suppressor variables were identified. Results of this analysis are summarized in Table 17. A summary of the final stage of this regression analysis is shown in Appendix F, Table F-6.

Discussion

The goal of this research was to determine whether the assessment of cumulative lifetime stress would advance understanding of the stress-illness process and to evaluate the feasibility of using the CLSG as a psychosocial measure of allostatic load. The present study examined the nature of stress experienced by women during the life course. The relative contribution of cumulative lifetime stress to the prediction of depression and chronic illness was also investigated.

Table 16

Summary of Hierarchical Regression Analysis for Demographic and Psychosocial Variables Predicting Chronic Illness

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Age			
Socioeconomic status	.124	.124	18.96****
Step 2			
Quality of life during childhood	.133	.009	2.93
Step 3			
Neuroticism			
Introversion-extraversion			
Social desirability			
Mastery			
Self-esteem	.169	.036	2.26*
Step 4			
Size of support network			
Satisfaction with social support			
Problem-focused coping			
Emotion-focused coping	.188	.020	1.56
Step 5			
Negative life events			
Hassles	.207	.019	3.01*
Step 6			
Mean lifetime stress			
Variability in lifetime stress	.218	.011	1.75

Note. Multiple R = .467 R^2 = .218 Adjusted R^2 = .169 F (16, 255) = 4.44****

* p < .05 **** p < .0001

Table 17

Summary of Hierarchical Regression Analysis for Demographic and Psychosocial Variables Predicting Chronic Illness with Negative Life Events and Hassles Excluded

Variable	R^2	R^2 Change	Incremental F Change
Step 1			
Age			
Socioeconomic status	.127	.127	19.77****
Step 2			
Quality of life during childhood	.137	.010	3.22
Step 3			
Neuroticism			
Introversion-extraversion			
Social desirability			
Mastery			
Self-esteem	.171	.034	2.18
Step 4			
Size of support network			
Satisfaction with social support			
Problem-focused coping			
Emotion-focused coping	.191	.020	1.65
Step 5			
Mean lifetime stress			
Variability in lifetime stress	.203	.011	1.86

Note. Multiple $R = .450$ $R^2 = .203$ Adjusted $R^2 = .160$ $F(14, 260) = 4.73$****

****$p < .0001$

The qualitative analysis of the CLSG offered some insight into various aspects of lifetime stress. As expected, both similarities and differences were noted with respect to the types of stressors, their frequency of occurrence and their impact on younger and older women. Of the variety of stressors reported, work-related problems and marital problems (including separation and divorce) were identified as major stressors in the lives of younger women. Death of a family member was the most important stressor reported by older women. Compared to the older women, a greater percentage of younger women reported experiencing stress during childhood and adolescence. Although this difference may indicate that women between the ages of 30 and 60 experienced more early life stress than women aged 60 and over, it could be due to the fact that subjects were given a choice as to where they wanted to begin their graphs. Perhaps older women were more reluctant to mention childhood stressors or felt they were irrelevant because of the amount of time that had passed since their occurrence.

Examination of the lifetime stress graphs showed that the effect a stressor has on a person cannot be determined prior to its occurrence. In this study, the reporting of a particular stressor as well as the individual's response to a stressor depended on the age of the respondent, whether the person had previous experience with a similar stressor and whether other stressful events or situations were occurring in that person's life at the same time. These findings provide support for the use of stress measures with subjective rather than objective weighting schemes.

Aside from demonstrating the subjective nature of the stress process, the qualitative analysis of the CLSG showed that checklist stress measures have overlooked

some important sources of women's stress. For example, although many of the women completing the CLSG reported stressors similar to those listed on conventional stress measures, some stressors were unique to the CLSG (e.g., stress associated with parenting, substance abuse and developmental crises in adulthood). Other items such as major changes in sleeping or eating habits, which do appear on life event scales, were not reported by any of the women who participated in this study. Most of the stressors reported on the CLSG are those that are recalled consistently over time (Casey et al, 1967). These observations suggest that the CLSG would be a reliable measure of global lifetime stress.

Closer examination of the stressors reported on the CLSG showed that although traumatic events were reported by some women, stress related to normal transitions during the life span were reported with greater frequency. These periods of adjustment were often reported as being highly stressful. In view of this observation, it would be important for health care professionals to provide resources to help women cope during transition periods in addition to offering assistance during times of trauma.

A rather surprising finding concerns stress reported in relation to upsets in the social support networks of adult women. According to the social support literature, women value close personal relationships and invest a great deal of energy in maintaining these relationships by providing support to family and friends (Belle, 1991). Women have also reported experiencing vicarious stress as a result of negative events involving relatives and friends (Eckenrode & Gore, 1981). In this study, few of the younger women and none of the older women reported stress related to illness or death of

friends. Furthermore, none of the women reported feeling stressed over any other problems their friends experienced. On the other hand, disruptions in the family network were reported frequently and were often perceived as being highly stressful. This discrepancy with the social support literature suggests that stress in relation to friendship is important in the short term but assumes less significance from a lifetime perspective.

The qualitative analysis also draws attention to the nature of stress experienced in relation to societal changes that have occurred in recent years. One such change concerns women's employment. In this study, work-related stress was the most frequently reported stressor among women aged 30-59. Moreover, employment stress was perceived as being extremely stressful more often than any other type of stressor by this age group. In contrast, the women aged sixty and over reported work-related stress much less frequently and those who did rarely reported it as being extremely stressful. This finding probably reflects a cohort effect in that the influx of women into the workplace has escalated over the past three decades. The high rate of reporting of work-related stress shows that employment has recently assumed a much more important role in women's lives.

It was expected that the individual stress graphs of the older cohort would show levels of stress comparable to the younger cohort for the early stages of adulthood and decreasing levels of stress in later years. This change across the life course was not seen. Instead, the graphs of the older women showed less variability in stress over the entire lifespan. Also noteworthy was the finding that compared to the younger women, who reported details about individual stressors, the older women were more likely to report

stressful periods of longer duration. Based on these observations, one could assume that the cohort of older women lived more stable lives and thus experienced fewer periods of readjustment than the younger cohort. However, the finding of less variability on the older women's graphs could also reflect differences in the way they perceive lifetime stress. Stressors that were once important to the older women may have lost emotional salience over the years, either because of the amount of time that had elapsed since their occurrence, or because the problems had been resolved.

The statistical comparison of younger and older women on lifetime stress showed that the younger cohort had greater variability in lifetime stress but did not differ from the older cohort on mean lifetime stress. Similarly, when the women were separated into 10-year age groups, comparisons of mean stress levels at various ages across the lifespan did not reveal any significant differences between the cohorts. It appears that the widely held assumption of women's lives being more stressful now than in the past may not be accurate.

Analyses examining the interrelations between the stress variables included in this study identified positive correlations in the low to moderate range and, with the exception of the correlation between mean lifetime stress and negative life events, all correlation coefficients were significant. This finding indicates that although the indices of stress derived from the CLSG are not entirely independent of measures of recent negative life events and hassles, different aspects of stress are being measured and provides evidence for the discriminant validity of the CLSG. It also suggests that reporting of mean lifetime stress is not influenced by negative life events experienced

during the previous year.

The hypothesis that positive, significant correlations would be found between measures of lifetime stress and health outcomes was partially supported. Mean lifetime stress was positively correlated with depression and chronic illness. Based on earlier studies investigating the relationship between recent life events and near future health problems (Avison & Turner, 1988; DeLongis et al., 1982), it was expected that the magnitude of the relationship between the lifetime stress variables and depression would be greater than that between lifetime stress and chronic illness. This difference in magnitude was not observed; the degree of association between mean lifetime stress and the two outcome measures of health were identical. Variability in lifetime stress was significantly correlated with depression but the degree of association was less than that observed with measures of recent life events and hassles. Variability in lifetime stress was not correlated with chronic illness. This finding is not consistent with the theory that readjustment necessitated by exposure to stressful life events can exhaust an individual physically and lead to disease (Thoits, 1983).

Analyses to identify the variables that account for significant proportions of the variance in lifetime stress measures showed that a poor quality of life during childhood and higher levels of neuroticism are associated with higher mean lifetime stress. This finding is consistent with the trauma literature which states that severe stress during childhood can result in enduring changes in personality and primes individuals to overreact to new stressors (Janoff-Bulman, 1992). This analysis also showed an inverse relationship between social desirability and mean lifetime stress. Apparently some

women believe reporting of high stress has negative connotations and therefore minimize the amount of stress they report. Although the relationship between social desirability and mean lifetime stress was significant, its impact on the analysis was small. Nevertheless, researchers should be aware of the tendency for some women to underreport the amount of stress they have experienced.

The finding that less satisfaction with social support was a predictor of greater variability in lifetime stress was unexpected but is also in line with previous research. The perceived availability of supportive social relationships is believed to mediate the impact of stress (Singer & Davidson, 1991). Adequate social support reduces the risk for some negative life events and hassles (Gore, 1981). Presumably, women who are dissatisfied with available social support would be more likely to appraise various situations as threatening and as being beyond their ability to cope.

It was hypothesized that age would account for a significant proportion of the variance in both lifetime stress measures but this effect was only found for variability in lifetime stress. This finding substantiates the observation of the qualitative analysis which showed older women generally reported fewer fluctuations in lifetime stress.

Evaluation of the benefits derived by using lifetime stress variables as an adjunct to recent life events and hassles in predicting depression did not produce the expected results. Although the combination of mean lifetime stress and variability in lifetime stress explained a significant proportion of variance in depression scores when entered into the regression analysis first, their contribution was minimal and the effect was mainly due to variability in lifetime stress. When negative life events and hassles were controlled for by

entering them into the regression equation first, the effect of variability in lifetime stress was no longer significant. Of the stress variables, negative life events during the previous year and hassles both made significant contributions to the analyses but hassles were the better predictor of depression. Previous studies examining the relationship between recent negative life events, hassles and psychological well-being have reported similar results (Chamberlain & Zika, 1990).

It has been suggested that hassles are better predictors of psychological well-being because endorsement of a hassles item is more strongly influenced by subjective appraisal than objective measures of life events (Landreville & Vezina,1992). This may be an adequate explanation in studies where life event scores are based on a count of negative events and hassles scores represent the intensity of hassles experienced, however, this was not the case here. In this study, recent life event scores, mean lifetime stress and variability in lifetime stress were all based on the perceived stress associated with stressful events or situations and the hassles score represented a frequency of occurrence of hassles. An alternative explanation might be that hassles are more closely related to current depressive symptoms because they reflect a person's immediate perception of the environment and therefore have a greater impact on present mood than stressful events that occurred months or years before (Lazarus & Delongis, 1983).

The relative contribution of mean lifetime stress and variability in lifetime stress to the prediction of depression when demographic and psychosocial variables were taken into account was not significant. Of the set of potential predictors, age, neuroticism, mastery, satisfaction with social support, negative life events and hassles were identified

as predictors of depression. The possibility that the lifetime stress variables would emerge as predictors of depression if negative life events and hassles were excluded from the analysis was also examined but this effect was not found. Instead, socioeconomic status and self-esteem were added to the list of predictors mentioned above. The variables that were identified as predictors of depression are consistent with those previously reported in the depression literature.

Minimal support was found for the hypothesis that assessment of lifetime stress would be a useful adjunct to measures of recent stress in studies investigating the relationship between stress and chronic illness. When only lifetime stress variables were examined as possible predictors of chronic physical illness, a small, but significant contribution was made by mean lifetime stress. However, when the contribution of lifetime stress was examined in conjunction with negative life events and hassles, the combination of stress variables did not reliably predict chronic illness. Moreover, the relative contribution of lifetime stress variables to the prediction of chronic illness with demographic and psychosocial variables taken into account was not significant. Of the set of variables examined in this study, age and neuroticism were the only significant predictors of chronic illness.

Overall, the ability to predict health problems with the combination of variables examined in this study was substantially greater for depression than for chronic illness. This suggests that the variables examined play a lesser role in the development of physical illness or are indirectly related to physical health through other unmeasured variables. Genetic predisposition or constitutional factors are likely to be important

determinants of physical health, as are lifestyle factors such as diet, exercise, rest, smoking and alcohol use.

The small contribution of mean lifetime stress to the prediction of chronic illness and the failure of either of the lifetime stress variables to account for a significant proportion of the variance in depression suggests that cumulative lifetime stress has a minimal effect on the physical and mental health of adult women. Accordingly, there appears to be little benefit in using the CLSG as a measure of allostatic load in studies investigating the relationship between stress and health.

Although these may be reasonable conclusions based on the results reported here, other research linking cumulative stress, depression and physical health indicates these conclusions may be premature (Sapolsky, 1996; Lovallo, 1997). The possibility that methodological weaknesses affected the results of this study should be considered.

First, it should be reiterated that the participants in this study were women who responded to newspaper articles and notices advertising the research project on women's changing lifestyles. As evidenced from the subjects' self-ratings of health, most participants perceived themselves to be in good health. It is doubtful that individuals in poor physical health or those who were more severely depressed would have volunteered to participate in the research. Such self-selection would restrict the range of scores on outcome measures and limit the ability to find a significant relationship between stress and health.

Another subject-related issue concerns the age of the participants. The women who participated in this study ranged in age from 30-90. Because the chronic illness

variable was comprised of health problems that are known to develop over long periods of time and which tend to manifest themselves more frequently in an older population, it is possible that the younger women were affected by cumulative stress but had not yet developed symptoms of illness. This possibility was examined by repeating each of the quantitative analyses with the data obtained for subjects aged 45 and over. The results of the revised analyses were essentially the same as with the 30-90 age group. The measures of lifetime stress still did not account for significant proportions of the variance in depression or chronic illness. Perhaps a better way to test this hypothesis would be through the use of a longitudinal design which would assess subjects' health status at two points in time. A stronger association between lifetime stress scores at the first evaluation and health status at the second evaluation, as compared to the two measures at the first evaluation, would provide some support for the hypothesis that cumulative stress has long-term negative effects on health.

In addition to limitations of the sample, methodological weaknesses at the measurement level could also explain the present results. As in any study using retrospective methods to assess a psychological construct, the possibility exists that the reporting of stressful events on the CLSG has been affected by memory. In the stress literature, several researchers have reported significant fall-off in the reporting of stressful events over time (Jenkins et al., 1977; Uhlenhuth et al., 1979). Others, however, have shown that accuracy of recall is less affected when interview techniques such as those employed with the CLSG are used (Brown, 1974) or when stressors that are salient to the individual are assessed (Helzer, 1984). Based on the latter, it is unlikely that the

subjects made major omissions on their graphs. Nonetheless, if any major stressors were forgotten on the individual stress graphs, the lifetime stress scores would be an underestimate of the amount of stress experienced and would therefore have attenuated the correlations between lifetime stress, depression and health.

It is possible that the weakness of the observed relationship between cumulative stress and chronic illness is due to the way stress was measured. In this study, subjects were not consistent in the area of the scale they used to depict lifetime stress. Although most subjects covered the entire range of the scale (from light pink to dark red), a few restricted the range of their stress graphs to a lesser area (pink). While this does not create a problem in a qualitative analysis and even demonstrates individual differences in perceived stress, it does create difficulties with a quantitative measure that is averaged across subjects. Those who used the entire scale would have higher lifetime stress scores than those who used only part of the scale. The greatest stressors for those who drew their graphs within a smaller range will appear to be minor compared to those who used the entire graph. In these cases, correlations between lifetime stress and illness would be low even if the two variables were highly related for the individual. If the goal of the research is to predict illness, it would probably be beneficial to attend to within-subject variation. There is some evidence in support of this approach. In previous research investigating the effect of stress on mood, Rehm (1978) demonstrated that mood was not affected by the individual's average level of stress but rather by whether the individual was experiencing more or less stress than usual.

Another possible limitation of the CLSG concerns the reporting of extremely

stressful events. As mentioned earlier, it was not uncommon for participants to indicate that several stressors produced maximum levels of perceived stress. Although it is likely that the subjects perceived different events to be equally stressful, it may be that equivalent levels of stress were indicated because of a ceiling effect on the measure. This possibility could be verified in the future by asking subjects who place multiple stress points at the extreme upper edge of the graph whether they actually perceived the different events to be equally stressful.

A final methodological weakness that may have affected these results concerns the issue of confounding between stress inventories and measures of depression and physical health. In this study, health-related items were not excluded from any of the stress inventories. Although some researchers have reported that such overlap results in inflated correlations between measures of stress and health (Dohrenwend & Dohrenwend, 1974), others have shown that the deletion of health-related items on life event inventories and the Hassles Scale does not appreciably reduce correlations (Helzer, 1984; Delongis et al., 1988). As for the CLSG, the exclusion of health-related stress from the calculation of lifetime stress scores might further reduce the already modest correlations between lifetime stress, depression and chronic illness. This would be difficult to verify because some subjects reported health-related stress as co-occurring with another stressor and both stressors were represented by a single point on the lifetime stress graph.

Once the aforementioned methodological problems have been addressed, it would be interesting to conduct similar research using statistical procedures such as structural

equation modeling to examine the interrelations between lifetime stress measures and other variables. Such analyses may lead to better predictions of physical and psychological health.

In conclusion, the present study provides some insight into the nature of the stress process across the life span, however, the results reported here suggest that cumulative lifetime stress, as measured by the CLSG, is not related to current depressive symptomatology or chronic illness. As such, support for the use of the CLSG as a psychosocial measure of allostatic load is tenuous. Nonetheless, several methodological problems need to be addressed and modifications to the CLSG could substantially improve on its ability to assess cumulative lifetime stress.

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Appendix A

General Life History Review

Code Nbr. _____

INTERVIEW

1. Date of interview_____
   Tester _____
   Language of interview French ( ) English ( )

2. What is your first language? _____

3. What language did you attend school in? _____

4. If first language other than English / French, at what age did you first start speaking English / French? _____

5. What is your birthdate? _____ Present age _____

6. Were you born in Canada? Yes _____ No _____

7. If not, where were you born? _____

8. Where were your parents born? _____

9. Are your parents living?
   If yes, how old are they? Mother _____ Father _____
   If no, how old were they when they died? Mother _____ Father _____

10. What is / was your parent's occupations?
    Father _____ status _____
    Mother _____ status _____

11. Present marital status:
    (1) single - never married ____ (2) married ____
    (3) separated _____ (4) divorced ____
    (5) widowed _____ (6) common-law _____
    (7) cohabitating (< 1 year) _____ (8) "divorced" from common-law / cohabit____

If currently married:
12a. In what year were you married? _____
13a. How old was your spouse then?_____

If currently common-law:
12b. In what year did you move in together?_____
13b. How old was your partner then?_____

If currently cohabitating:
12c. How long have you been living together (months)?_____
13c. How old was your partner at that time?_____

Married, common-law or cohabitating:

You told me that you are currently married / in a relationship. Is this the only marriage / significant relationship, or have you been married / involved before? Yes____ No_____.
How many times? _____ (excluding the current one).
(N.B. Although it states "relationship", we are referring to having lived with someone before).

Previous Relationship #1:
Nature: Marriage_____ / Common-law_____ / Cohabitating _____
14a. In what yer were you married / moved in together?_____
15a. How old was your spouse / partner then?_____
16a. In what year did the marriage / relationship end?_____
17a. For what reason? Death _____ / Divorce _____ / Split-up (common-law)_____
If the spouse / partner died:
18a. If you don't mind telling me, what was the cause of death?_____

Previous Relationship #2:
Nature: Marriage_____ / Common-law_____ / Cohabitating _____
14b. In what yer were you married / moved in together?_____
15b. How old was your spouse / partner then?_____
16b. In what year did the marriage / relationship end?_____
17b. For what reason? Death _____ / Divorce _____ / Split-up (common-law)_____
If the spouse / partner died:
18b. If you don't mind telling me, what was the cause of death?_____

If divorced, separated, widowed, or "divorced" from a common-law spouse:

You've told me that you are currently divorced / separated / split-up. I would like to ask you some questions about this marriage / relationship.

Previous relationship #1

Nature: Marriage _____ / Common-law _____ / Cohabitating _____

14d. In what year were you married / moved in together? _____
15d. How old was your spouse / partner then?_____
16d. In what year did the marriage / relationship end?_____
17d. For what reason? Death _____ / Divorce _____ / Split-up (common-law) _____
If spouse / partner died:
If you don't mind telling me, what was the cause of death?_____

Was this your only marriage / significant relationship, or have you been married / involved before? Yes _____ / No _____.
How many times? _____ (excluding the current one).
(NB: Although it states " relationship", we are referring to having lived with someone before).

Previous Relationship #2:
Nature: Marriage_____ / Common-law_____ / Cohabitating _____
14e. In what yer were you married / moved in together?_____
15e. How old was your spouse / partner then?_____
16e. In what year did the marriage / relationship end?_____
17e. For what reason? Death _____ / Divorce _____ / Split-up (common-law)_____
If the spouse / partner died:
18e. If you don't mind telling me, what was the cause of death?_____

Previous Relationship #3:
Nature: Marriage_____ / Common-law_____ / Cohabitating _____
14f. In what yer were you married / moved in together?_____
15f. How old was your spouse / partner then?_____
16f. In what year did the marriage / relationship end?_____
17f. For what reason? Death _____ / Divorce _____ / Split-up (common-law)_____
If the spouse / partner died:
18f. If you don't mind telling me, what was the cause of death?_____

Children:

19.Do you have any children? Yes _____ No _____

If yes, how many sons?_____ How many daughters?_____

(Note: Write S in brackets if subject's child, or P if partner's).

20. What is / are the birthdate(s) of your son(s)?_____
_____ _____ _____
_____ _____ _____

21. What is / are the birthdate(s) of your daughter(s)? _____
_____ _____ _____
_____ _____ _____

22. How many of your children are living at home?
sons _____ daughters _____

23. How many people live with you at home? _____ (excluding subject)

24. Would you say your home is too small, too large, or just about right for your needs?

1. Too large
2. Too small
3. Just about right
4.N.A.

Education

25. How old were you when you left school (if went back to school later, record age at first school leaving) _____

26. How many years of education did you have at the time? (i.e., what was the highest level achieved?) _____

Based on answer, circle highest grade attained

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Elementary Secondary CEGEP-1er cycle Graduate - Professional

27. Many people go back for more education after leaving school. Since leaving school have you taken any of the following types of courses:

Type	When	Equivalence in years
Further academic work for credit	_____	_____
Vocational,secretarial or trade courses for credit	_____	_____
Correspondance courses	_____	_____
On the job training courses	_____	_____
"Adult education" courses (noncredit)	_____	

28. At the present , do you work (for pay) outside the home? Yes ____ No ____

If No, have you ever worked for pay outside the home? Yes ____ No ____

(Explain that on your next visit you will be asking them for more details about their experiences on the job or as a homemaker)

29. (If presently or previously married) How many years of education does (did) your spouse have (in total, before leaving school and subsequently)? _____

Based on answer, circle highest grade attained

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Elementary Secondary CEGEP-1er cycle Graduate - Professional

30. What is (or was) your spouse's occupation. Please give me as exact a description as possible.

_____

_____

31. How financially comfortable would you say you are currently?

____ (1) Very comfortable
____ (2) Comfortable
____ (3) Neither comfortable nor uncomfortable
____ (4) Uncomfortable
____ (5) Very uncomfortable

32. How financially comfortable would you say you are compared to other people you know of the same age?

____ (1) Much worst off then most.
____ (2) Worse off than most.
____ (3) Slightly worse off than most.
____ (4) About the same as most.
____ (5) Slightly better off than most.
____ (6) Better off than most.
____ (7) Much better off than most.

33. If you don't mind telling me, what was your household's total income from all sources before taxes and deductions for this past year?

____ 1) Less than $10,000
____ 2) Between $10,000 & $29,999.
____ 3) Between $30,000 & $49,999.
____ 4) Between $50,000 & $74,999.
____ 5) Between $75,000 & $99,999.
____ 6) Over $100,000.

34. How many people contributed to this income? _____

Miscellaneous

35. On average how many social functions do you attend per month (parties, get-togethers with friends or relatives, social club meetings, etc.)

____ 1) None
____ 2) Less than one a month
____ 3) About one a month
____ 4) Two or three a month
____ 5) About one a week
____ 6) Two or more a week

36. How important is your social life to you?

1	2	3	4	5	6	7
Not at all			Somewhat			Extremely

37. How often do you usually attend religious services?

_____ 1) Never
_____ 2) Less than once a month
_____ 3) About once a month
_____ 4) Two or three times a month
_____ 5) Once a week
_____ 6) More than once a week

38. How religious are you?

1	2	3	4	5	6	7
Not at all			Somewhat			Devoutly (very much so)

39. During the past 12 months, would you describe your life as:

____ 1) Very stressful
____ 2) Fairly stressful
____ 3) Not very stressful
____ 4) Not at all stressful

40. How many cigarettes on average do you smoke a day? _____

41. How many drinks (beer, wine or liquor) on the average do you have per week?
_____ drinks

42. On the average, how many books do you read per month?_____

43. On the average, how many magazines do you read per month?_____

44. Do you read newspapers regularly? Yes ____ No____

If YES, how many per day?_____

_____
_____
_____

Appendix B

Childhood and Adult Experiences Questionnaire

CHILDHOOD AND ADULT EXPERIENCES QUESTIONNAIRE

This questionnaire is about your personal life experiences, both positive and negative. Because many of the questions on it ask for very private and potentially sensitive information, we are taking additional measures to protect your privacy, as the interviewer will already have explained.

CHILDHOOD EXPERIENCES

This first set of questions is about your experiences in childhood which is defined as the period from birth to age 16. For the questions that ask about your father and mother, should either parent not have been present in your home during your childhood, answer in terms of the people who acted as your father and/or your mother.

Circle the number on the scale that best represents your experience

1) Overall how happy was your childhood?

1	2	3	4	5	6	7
extremely happy			somewhat happy			not happy at all

2) How close was your relationship with your mother when you were a child?

1	2	3	4	5	6	7
extremely close			somewhat close			not close at all

3) How close was your relationship with you father when you were a child?

1	2	3	4	5	6	7
extremely close			somewhat close			not close at all

4) Over the course of your childhood how easy was it for you to make friends?

1	2	3	4	5	6	7
extremely easy			somewhat easy			not easy at all

5) Over the course of your childhood how satisfied were you with your friendships?

1	2	3	4	5	6	7
extremely satisfied			somewhat satisfied			not satisfied at all

6) In your estimation, how happy were your parents together when you were a child?

1	2	3	4	5	6	7
extremely happy			somewhat happy			not happy at all

7) In your estimation, how financially comfortable was your family when you were a child?

1	2	3	4	5	6	7
extremely comfortable			somewhat comfortable			not comfortable at all

8) During your childhood did either your father or mother die?
Father: Died: Yes _____ / No _____ Your age _____
Mother: Died: Yes _____ / No _____ Your age _____

9) What forms of physical punishment did your parents use when you misbehaved? Check the one used most often. If "other" state what is was.
None____ Spanking _____ Slapping _____ Strap _____ Beating _____ Other _____

10) How frequently were you punished physically as a child?

1	2	3	4	5	6	7
never			sometimes			almost every day

11) Were you ever physically abused as a child?
Never_____ Once _____ Twice _____ 3 to 5 times _____ More than 5 times ____

12) Did you feel emotionally neglected as a child?

1	2	3	4	5	6	7
very much			somewhat			not at all

13) Prior to the age of 16, was there a major upheaval between your parents (such as divorce, separation)?
Yes _____ No _____. If yes: How old were you? _____
How upsetting was this experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

How much did you confide in others about this upsetting experience?

1	2	3	4	5	6	7
not at all			somewhat			a great deal

14) Were you ever sexually abused as a child? (Note: Sexual abuse refers to any sexual advances made to a child by an older person, from showing or touching sexual parts of the body to sexual intercourse).
No, never _____ Yes: Once _____ Twice _____ 3 or more times

If yes: How upsetting was the experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

ADULT EXPERIENCES

The next set of questions pertain to your life as an adult, that is after age 16.

15) Overall how happy has your adult life been?

1	2	3	4	5	6	7
extremely happy			somewhat happy			not happy at all

16) If married or widowed, how close is/was your relationship with your husband?

1	2	3	4	5	6	7
extremely close			somewhat close			not close at all

17) How close is your relationship with your children?

1	2	3	4	5	6	7
extremely close			somewhat close			not close at all

Not applicable (have no children) _____

18) Over the course of adulthood how easy has it been for you to make friends?

1	2	3	4	5	6	7
extremely easy			somewhat easy			not easy at all

19) Over the course of adulthood how satisfied have you been with your friendships?

1	2	3	4	5	6	7
extremely satisfied			somewhat satisfied			not satisfied at all

20) During adulthood, how financially comfortable have you been on average?

1	2	3	4	5	6	7
extremely comfortable			somewhat comfortable			not at all comfortable

21) During adulthood, has there ever been a major upheaval between yourself and your spouse (such as divorce, separation)?

Yes _____ No _____ Not applicable (never married) _____

How upsetting was this experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

22) During adulthood, have you ever been physically abused by another person?
Yes _____ No _____

If yes, how upsetting was this experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

23) During adulthood, have you ever been sexually harassed?
Yes _____ No _____
Where did this harassment take place?
On the job _____ In an educational institution _____ Other _____
If yes, how upsetting was this experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

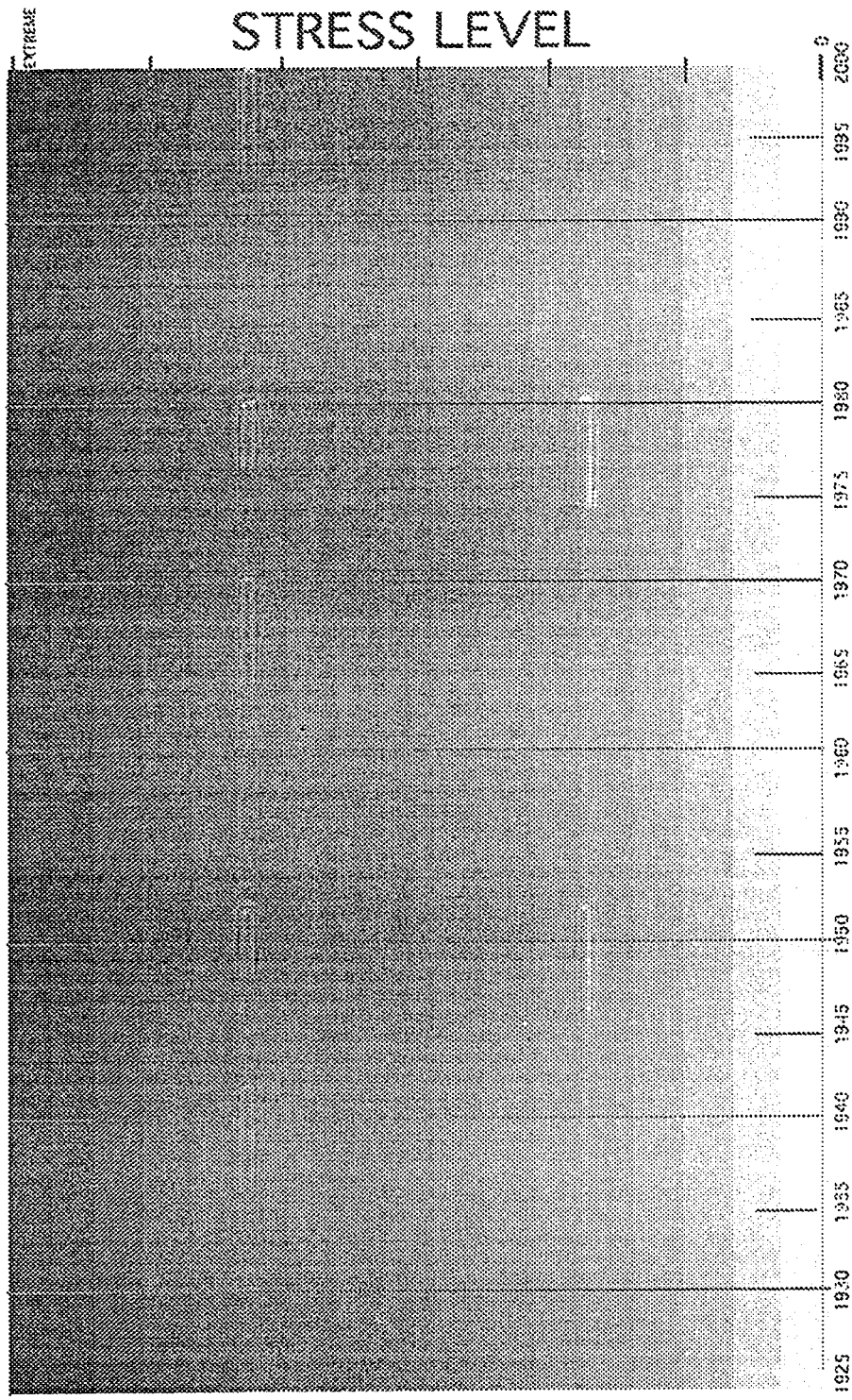
24) During adulthood, have you ever been sexually victimized? (Note: sexual victimization refers to someone trying to persuade or force you to have sexual relations when you do not want to).
No, never _____ Yes: Once _____ Twice 3 or more times _____
If yes, how upsetting was this experience?

1	2	3	4	5	6	7
not at all upsetting			somewhat upsetting			extremely upsetting

25) Do you think violence against women has increased over the past 25 years?
No _____ Yes _____
Comment: _____
_____
_____
_____

Appendix C

Concordia Lifetime Stress Graph


STRESS LEVEL
EXTREME
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
2000

Appendix D

Health Questionnaire

Code number_____

Health Questionnaire

This questionnaire deals with your health. Please indicate which of the following conditions you currently have or have suffered from in the past and the times when you suffered from them.

	Yes	No	When (Year)
1. Allergy to any medication? If yes, specify.			
2. Allergies, hay fever, hives.			
3. Problems sleeping or relaxing,			
4.Heart condition			
5. Eating disorders (e.g., anorexia, bulimia)			
6. Diabetes.			
7. Anemia.			
8. Back pain, spinal disorders.			
9. Are you seeing/ have seen a counselor, therapist, psychiatrist.			
10. Neurological disorders.			
11. Serious head injury ro concussion / stroke.			
12. Ear nose or throat problems.			
13. Frequent headaches.			
14. Arthritis, rheumatism, rheumatic fever.			
15. Eye trouble.			
16. Do you wear glasses or contact lenses?			
17. Lung disease - asthma, persistant cough, T.B., bronchitis.			
18. High blood pressure, shortness of breath.			
19. Chest pain.			

	Yes	No	When (year)
20. Stomach or bowel disorder.			
21. Disorder of kidney, bladder or genital organs.			
22. Hernia.			
23. Sexually transmitted diseases. e.g. chlamydia, herpes, genital warts, HIV.			
24. Liver disease, e.g. hepatitis, cirrhosis.			
25. Chronic skin condition.			
26. Thyroid problems.			
27. Cancer.			
28. Alcoholism.			
29. Drug addiction.			
30. Osteoporosis.			
31. Have you ever been admitted to hospital. If yes, why?			
32. Operations.			
33. Other health problems. If yes, please explain.			
34. Are you under treatment for any condition?			
35. Are you exposed to hazardous materials, e.g. chemicals. If yes, please specify.			
36. Any problems with menstruation?			
37. Any problems with menopause?			

Appendix E

Analysis of Variance Source Tables

Table E-1

Analysis of Variance for Cohort Differences in Mean Stress Levels at Age 30

Source	df	Sum of Squares	Mean Squares	F	p
Age cohort	4	16.42	4.1	1.76	0.14
Within-group error	247	575.16	2.33		
Total	251	591.57			

Note. Five age cohorts were compared in this analysis: Ages 30-39, 40-49, 50-59, 60-69, 70 and over

Table E-2

Analysis of Variance for Cohort Differences in Mean Stress Levels at Age 40

Source	df	Sum of Squares	Mean Squares	F	p
Age cohort	3	7.36	2.46	1.04	0.38
Within-group error	192	453.71	2.36		
Total	195	461.08			

Note. Four age cohorts were compared in this analysis: Ages 40-49, 50-59, 60-69, 70 and over

Table E-3

Analysis of Variance for Cohort Differences in Mean Stress Levels at Age 50

Source	df	Sum of Squares	Mean Squares	F	p
Age cohort	2	7.22	3.61	1.74	0.18
Within-group error	134	278.33	2.08		
Total	136	285.56			

Note. Three age cohorts were compared in this analysis: Ages 50-59, 60-69, 70 and over

Appendix F

Tables of the Final Stages of Hierarchical Regression Analyses

Table F-1

Variables in the Equation at the Final Stage of the Hierarchical Regressions of Stress Predicting Depression

Variable	ß	r	sr^2	t
Negative life events	.15	.29	.02	2.51*
Hassles	.38	.45	.12	6.47****
Mean lifetime stress	.06	.13	.00	1.00
Variability in lifetime stress	.02	.17	.00	0.32

Note. Multiple R = .47 R^2 = .22 Adjusted R^2 = .21 F (4, 277) = 19.72****

* p < .05 **** p < .0001

Table F-2

Variables in the Equation at the Final Stage of the Hierarchical Regression Predicting Depression with Negative Life Events and Hassles Included

Variable	ß	r	sr^2	t
Age	-.16	-.24	.01	-2.43*
Socioeconomic status	-.10	-.12	.01	-1.92
Quality of childhood	-.06	-.24	.00	-1.18
Neuroticism	.23	.49	.03	3.97***
Introversion-extraversion	-.08	-.20	.00	-1.62
Social desirability	.04	-.14	.00	0.67
Mastery	-.19	-.41	.02	-3.08**
Self-esteem	-.10	-.22	.01	-1.86
Size of social support network	-.03	-.19	.01	-0.60
Satisfaction with social support	.15	.37	.02	2.71**
Emotion-focused coping	-.90	-.03	.01	-1.72
Problem-focused coping	.13	.05	.01	2.62**
Negative life events	.12	.30	.01	2.13*
Hassles	.14	.44	.01	2.22*
Mean lifetime stress	.01	.13	.00	0.09
Variability in lifetime stress	-.02	.15	.00	-0.42

Note. Multiple $R = .67$ $R^2 = .45$ Adjusted $R^2 = .42$ $F(16, 254) = 13.16$****

*$p < .05$ **$p < .01$ ***$p < .001$

Table F-3

Variables in the Equation at the Final Stage of the Hierarchical Regression Predicting Depression with Negative Life Events and Hassles Excluded

Variable	ß	r	sr^2	t
Age	-.24	-.23	.04	-4.18****
Socioeconomic status	-.11	-.12	.01	-2.03*
Quality of childhood	-.09	-.24	.01	-1.63
Neuroticism	.25	.49	.04	4.22****
Introversion-extraversion	-.06	-.20	.00	-1.17
Social desirability	.04	-.14	.00	.82
Mastery	-.25	-.41	.04	-4.03***
Self-esteem	-.12	-.22	.01	-2.41*
Size of social support network	-.02	-.19	.00	-.31
Satisfaction with social support	.17	.38	.02	3.16**
Emotion-focused coping	-.07	-.03	.00	-1.38
Problem-focused coping	.14	.05	.01	2.73**
Mean lifetime stress	.00	.13	.00	.06
Variability in lifetime stress	.01	.15	.00	.15

Note. Multiple $R = .65$ $R^2 = .43$ Adjusted $R^2 = .40$ $F(14, 259) = 13.77$****

* $p < .05$ ** $p < .01$ *** $p < .001$ **** $p < .0001$

Table F-4

Variables in the Equation at the Final Stage of the Hierarchical Regressions of Stress Predicting Chronic Illness

Variable	ß	r	sr^2	t
Negative life events	.05	.02	.00	.69
Hassles	-.03	.00	.00	-.40
Mean lifetime stress	.15	.13	.02	2.37*
Variability in lifetime stress	-.08	-.04	.00	-1.20

Note. Multiple R = .15 R^2 = .02 Adusted R^2 = .01 F (4, 279) = 1.57 ns

* $p < .05$

Table F-5

Variables in the Equation at the Final Stage of the Hierarchical Regression Predicting Chronic Illness with Negative Life Events and Hassles Included

Variable	ß	r	sr^2	t
Age	.48	.35	.12	6.34****
Socioeconomic status	-.02	-.14	.00	-.35
Quality of childhood	.02	-.02	.00	.27
Neuroticism	.20	.13	.02	2.80**
Introversion-extraversion	.00	-.02	.00	-.04
Social desirability	.07	.10	.00	1.09
Mastery	.14	-.06	.01	1.89
Self-esteem	.07	-.07	.00	1.07
Size of social support network	.00	-.07	.00	.03
Satisfaction with social support	.10	.10	.01	1.53
Emotion-focused coping	-.08	.06	.00	-1.28
Problem-focused coping	.09	.07	.01	1.52
Hassles	.13	-.01	.01	1.69
Mean lifetime stress	.12	.14	.01	1.85
Variability in lifetime stress	.00	.06	.00	-.06

Note. Multiple $R = .467$ $R^2 = .218$ Adjusted $R^2 = .169$ $F(16, 255) = 4.44$****

** $p < .01$ **** $p < .0001$

Table F-6

Variables in the Equation at the Final Stage of the Multiple Regression Predicting Chronic Illness with Negative Life Events and Hassles Excluded

Variable	ß	r	sr^2	t
Age	.41	.35	.11	5.95****
Socioeconomic status	-.03	-.15	.00	-.53
Quality of childhood	-.01	-.02	.00	-.10
Neuroticism	.20	.13	.03	2.92**
Introversion-extraversion	.02	-.02	.00	.30
Social desirability	.08	.11	.00	1.20
Mastery	.10	-.06	.01	1.38
Self-esteem	.04	-.08	.00	.60
Size of social support network	.00	-.09	.00	.05
Satisfaction with social support	.13	.10	.01	1.92
Emotion-focused coping	.07	.06	.00	-1.09
Problem-focused coping	.10	.07	.01	1.61
Mean lifetime stress	.12	.14	.01	1.82
Variability in lifetime stress	.02	-.06	.00	.27

Note. Multiple $R = .45$ $R^2 = .20$ Adjusted $R^2 = .16$ $F(14, 260) = 4.73$****

**$p < .01$ ****$p < .0001$