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**The Reliability and Validity of a New Measure of Lifetime Stress:  
The Concordia Lifetime Stress Graph.**

**Lucie Bonneville**

**A Thesis  
in  
The Department  
of  
Psychology**

**Presented in Partial Fulfilment of the Requirements**

**for the Degree of Masters of Arts at**

**Concordia University**

**Montreal, Quebec, Canada**

**April 1995**

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## Abstract

### The Reliability and Validity of a New Measure of Lifetime Stress: The Concordia Lifetime Stress Graph

Lucie Bonneville

Two major types of stress measurement, derived from the stimulus-oriented perspective on stress, are commonly used in the evaluation of an individual's level of stress. One assesses stress using major life events while the other uses minor daily hassles as an indication of the presence of stress. The present study sought to assess the reliability and validity of a new measure of lifetime stress: The Concordia Lifetime Stress Graph (CLSG). The CLSG employs both past events and present daily hassles. Two studies were performed for the assessment. The first study looked at the CLSG in relation to various psychosocial variables in a sample of 191 older women. Forty-nine of these women were retested 12 to 18 months later on the CLSG. Test-retest reliability for Time 1 and Time 2 testing has been shown to be adequate. Support was also established for various types of validity. Relationships were found between lifetime stress and adult unhappiness, child unhappiness, degree of upset with past loss and general intellectual ability. The CLSG accounted for a substantial amount of the variance in adult unhappiness and this was over and above measures of current stress. As well, concurrent validity was established between three alternate measures of stress and the CLSG administered at Time 1 and Time 2 with respect to a one year period. In the second study,

prospective data on stress were compared to retrospective reports on the CLSG in a group of women who had recently given birth. Concurrent validity was not found between these two measures. Further research implications were addressed.

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Classically, the stress construct has been defined from three distinct theoretical viewpoints: the response-oriented perspective (Selye, 1950), the interactional perspective (Lazarus & Folkman, 1984), and the stimulus-oriented perspective (e.g., Elliot & Eisdorfer, 1982). Because measurement is usually based on the operational definitions of the construct under study, approaches to the measurement of stress differ as a result of these divergent perspectives.

From a response-oriented perspective stress is defined as the response of the body or mind to any demand made on the individual. The response itself may be physiological, neurobiological or psychological in nature (Selye, 1993). Current psychological response-based measurement strategies focus primarily on psychological symptoms and indices of mood and affect to reflect the presence of stress (Derogatis & Coons, 1993).

The interactional perspective emphasizes the role of the individual as a mediator between an environmental stressor and the chosen response (e.g., Lazarus & Folkman, 1984). For example, coping mechanisms, personality traits, and primary and secondary appraisal processes are all interconnected with the experience of stress. As a result of the emphasis on the individual, the environment and the response, measurement strategies focus on several areas. For example, the Derogatis Stress Profile (Derogatis, 1987) utilizes a multiple scale which encompasses ways of coping, environmental stressors and

emotional responses in an attempt to reflect the interaction between person and environment

According to the stimulus-oriented view on stress, stress is seen as the result of stimuli in the environment. Various facets of an individual's environment which increase demands upon him or her will result in the experience of stress for that individual (Lazarus, 1966; Derogatis & Coons, 1993). Instruments used in the measurement of stress which are based on stimulus-oriented theories attempt to reflect some of the aspects in the environment which increase demands upon an individual. A common measurement strategy relies on the self-reporting of recent life events

Life events are considered by many to be stress evoking stimuli. Elliot and Eisdorfer (1982) have proposed four classes of stimulus stressors: acute or time-limited (e.g., waiting for test results); stressor sequences (e.g., death in the family with the associated processes one experiences); chronic-intermittent (e.g., test taking or final exams for students); and chronic (e.g., chronic illness, hostile supervisor at place of work). These types of environmental stressors are employed as items in many life event scales.

One of the first life event scales was developed by Holmes and Rahe in 1967. After several attempts at a comprehensive life events scale Holmes and Rahe developed the Schedule of Recent Experiences (SRE) in order to look at

the relationship between stress and health. The development and uses of the SRE, as well as other more recently developed life event scales, are based on the assumption that life events are inducers of stress which may lead to an increased risk of physical illness (Derogatis & Coons, 1993, Miller, 1993, Cleary, 1980). The original SRE contains items concerning various aspects of one's environment and stimulus stressor classes. The 42 items, including both positive and negative events, relate to family life, personal activities, financial status and work. Subjects report which items occurred in their life during a specified period of time. Each item checked off is given a weight according to the amount of readjustment required. All weights are added to yield a total score or Life Change Unit (LCU). This weighting system is based on the assumption that every person will experience the same amount of readjustment for any given event and this will be the case whether the event is positive or negative (Chiriboga, 1989).

Although inconsistent results have been found in terms of the reliability (Neugebauer, 1984; Miller, 1993) and validity of the SRE (Miller, 1993, Chiriboga, 1989), there appears to be some degree of relationship between the life events and health outcome. For example, Theorell and Rahe (1971), using the SRE, asked subjects to indicate which life events had occurred within the last three years. Subjects were divided into three groups, those who had just

survived a myocardial infarction but had no previous history of coronary heart disease (CHD), those who had just survived a myocardial infarction and had a history of CHD, and a matched control group who had been in good health for at least the past four years. When the life events were divided by year of occurrence, it was found that subjects who had just experienced a myocardial infarction and had no previous history of CHD also had a larger LCU score during the most recent two years. There was no difference in number of events per year for either of the other groups. These findings suggest that for those whose infarction occurred without previous warning, the increase in life events may have increased the stress upon the individual which may, in turn, have lead to the infarction.

A slightly different approach was used by Rahe and Lind (1971) in that they used informants to acquire information about the life events which had occurred within the past three years in the lives of subjects who had recently died of sudden cardiac arrest. They found that, according to the informants, a greater number of LCUs were attributed to the six months prior to death versus any of the other time periods within the three years examined.

Looking at a younger population, Marx, Garrity and Bowers (1975) found that in a group of college students there was a significant difference between life event groups (divided into high, medium and low LCU groups) on

the number of reported health problems. Health problems increased as a function of increased life event scores.

Although not related to illness per se, Gorsuch and Key (1974) looked at the relationship between life events over a two year period prior to the birth of a child and pregnancy complications. These researchers used the sum of life events rather than the weighted LCUs. They found that the sum of life events was positively correlated with pregnancy complications when they had occurred six months prior to delivery, but not if they had occurred prior to this period

Despite the successes of the above mentioned studies, the life events strategy has produced only weak correlations with health outcomes. The average relationship has been found to be approximately .12 (Rabkin & Streuning, 1976). Confounding due to the inclusion of health related events as items on life event inventories renders this already weak relationship difficult to interpret (Cleary, 1980). It may be that the relationship between health and life events is largely due to these confounding items.

Since the mid 1970's several measures using life events as indicators of stress have been developed in an attempt to combat some of the inherent problems caused by using both a predetermined set of life events and a predetermined set of weights to measure what is essentially a subjective experience. There have been several criticisms put forward of the SRE

approach to life events inventories. First is the notion that one type of event may be more stressful than another. For example, negative or undesirable events may be more stressful than positive or desirable events (Derogatis & Coons, 1993, Dohrenwend & Dohrenwend, 1978; Sarason, Johnson & Siegal, 1979). Second, life event inventories which yield one score are unidimensional and so may be obliterating distinct and useful domains of life events (Derogatis & Coons, 1993). Third, some events are more pertinent for some age groups than others (Derogatis & Coons, 1993; Lazarus & DeLongis, 1983). And, finally, the subjective impact of any given event may differ depending on the individual (Sarason et al., 1978).

In response to the numerous criticisms of the original SRE, Sarason et al. (1978) developed the Life Experiences Survey (LES). The LES was designed for use with different age groups and includes a rating scale for each item. Subjects rate each event which has occurred as to how positive or negative the impact of the event was for them. As well, there are blank spaces for events which may have occurred but are not included in the item list.

Another scale which was developed was the Psychiatric Epidemiological Research Interview-Life Events Scale (Dohrenwend & Dohrenwend, 1978). This scale was generated using life events which were known to correlate with psychiatric illness such as divorce and job loss. As a result, the intended uses

for this scale are more narrow and specific in terms of the populations between which it attempts to differentiate (i.e., psychiatric vs non-psychiatric populations).

With respect to age and the pertinence of some events which are included in various inventories, there is increasing evidence that there is a relationship between the age of the cohort and the number of life events reported. It appears that older age groups are less likely to report life events as having occurred. Indeed, studies have found an inverse relationship between life events and age which suggests that the number of events in one's life decreases with age (Lazarus & DeLongis, 1983). Uhlenhuth, Lipman, Balter, and Stern (1974) looked at the intensity of psychiatric symptoms, medical health care status life events occurring over a 12-months period (for a total life stress score), and demographic variables including age in a large non-institutionalized sample. These researchers found an inverse relationship between life stress scores and age. As well, symptom intensity was also related positively with stress scores but negatively with age. However, when controlling for stress, age was no longer related to symptom intensity. Similarly, Dekker and Webb (1974) studied the relationship between psychiatric symptoms and stress measured by life events over a six-month period. It was found that life events were negatively correlated with the age of



the subject

Although an inverse relationship between life events and age has been found, we cannot assume that an older cohort is experiencing less stress than a younger population. Lazarus and DeLongis (1983) note that some events used in life event measurements may not be appropriate for an elderly population. More pertinent life events or life situations may be needed to address the life experiences of the elderly; for example, such instances may include limited energy and loneliness.

In contrast to the life events measurement strategy, the Hassles scale was developed to measure the minor stressors of life rather than major life events. The Hassles scale was developed by Kanner, Coyne, Schaefer and Lazarus (1981) because these researchers felt that the frequency of minor, more day-to-day stressors may be a better indication of how one's daily routine is affected by the environment and so may better predict health outcomes and psychological well-being. Hassles are defined as "the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment." (Kanner et al., 1981, pg 3). The Hassles scale includes such items as misplacing or losing objects, concerns about money for emergencies, trouble relaxing and being lonely. It is also believed that daily hassles may act as indicators of the effect that current or prior events have on the individual.

Indeed, Kanner et al. found Hassles to be a better predictor of psychological symptoms than life events. Although Hassles shared variance with life events as predictors of psychological symptoms, it remained a significant predictor after removing variance due to life events. DeLongis, Coyne, Dakof, Folkman, and Lazarus (1982) found that Hassles scores were also more strongly associated with a measure of present health than were life events

One of the difficulties in interpreting the Kanner et al. (1981) study is the possibility that measures of hassles and psychological symptoms are confounded with one another. Almost one third of the items contained in the Hassles scale are also considered by a large sample of clinical psychologists to be symptoms of psychological disorder ( Dohrenwend, Dohrenwend, Dodson & Shrout, 1984). Landreville and Vezina (1992) also compared the relative strength of hassles and life events as correlates of physical and psychological well-being in older adults. While these researchers did not control for the confounding of psychological items, they did control for potential confounding due to health-related items. Weak to moderate relationships among Hassles, self-rated health, limitations in daily activities and psychological well-being were found. Life events did not relate to these outcome variables

Because of the proliferation of stress measures, Chiriboga (1989) suggests that there may be too many new stress measures and that many are

continuously changing as new studies evince deficiencies in their reliability or validity. It may well be better to have a limited selection of stress measures with clearly established psychometric properties and uses.

One alternative to the short-term evaluations of stress, both in terms of life events inventories covering a period of only a few years, and the Hassles scale, is to look at stress over the life span. Chiriboga (1989) points out that the more traditional view of stress, from both a research and theoretical vantage point, is one which focuses on the short-term deterioration of physical, and psychological well-being and social functioning; that is, stress is traditionally assessed over a short time frame (evaluations of over a week to a few years). Although relationships have been found using the short-term approach, the long-term implications of stress and the effects of life events over a longer period of time are now seen as critical elements in the study of adult development.

In a longitudinal study looking at the long-term effects of divorce on women, Wallerstein (1986) found that some women were still suffering from divorce after ten years. Many women continued to express feelings of anger and loneliness. There was also an age effect in that women who had experienced a divorce and were over the age of 40 at the time of the event were more likely to experience prolonged suffering than the women who

divorced at a younger age. Another longitudinal study looked at the effects of life events over a 12-year period in a population of community-dwelling young and older adults. Chiriboga (1984) found that negative life events, for all ages, were related to levels of well being 11 to 12 years later, and this was the case particularly for women.

The purpose of the present study was to assess the reliability and validity of a new measure of lifetime stress. The Concordia Lifetime Stress Graph (CLSG) attempts to measure an overall level of stress over the life span using subjective self-reports and ratings of past stress. The CLSG is modeled on the Concordia Lifetime Drinking Questionnaire (CLDQ; Chaikelson, Arbuckle, Lapidus & Gold, 1994). The CLDQ is a retrospective measure of alcohol use and uses a time line approach. Subjects are asked to participate with the interviewer in the drawing of a graph which represents their prior drinking history. To help in the recall of drinking history subjects are asked to think about past life events and the levels of alcohol consumption associated with these events. As well, with the CLDQ the subject gives a detailed description of his or her present drinking levels through the use of a structured interview. Their present level of consumption is used as the starting point on the graph and helps orient subjects to the graph itself.

The CLSG is similar to the CLDQ with respect to its use of the lifetime

graph approach. The CLSG incorporates both the daily hassles and the life events approach in its measurement of lifetime stress. Because the Hassles scale seems to be a better predictor of both present health and psychological outcomes and because life events are inversely related to age, the Hassles scale is employed as the measure of current stress with which to launch the drawing of the graph. The recall of past stress is prompted by the recall of past events.

The assessment of the CLSG in this thesis is exploratory in nature and concerns the psychometric properties of the instrument. Thus, there are several questions which need to be addressed. First, is this retrospective measure of lifetime stress reliable? For a measure to be valid it must be reliable. The reliability of a measure is an index of its stability. There are several ways one can establish whether or not a measure is reliable. One such method is to use the test-retest technique. Test-retest requires that the same test, or measure, be administered to the same subjects on two separate occasions. The correlation between the first and second administration of the measure becomes the reliability coefficient and therefore its index of stability.

A second question in need of address, provided reliability is established, is whether or not the CLSG is a valid measure of stress. The validity of a measure is the extent to which it measures what it is designed to measure. There are several kinds of validity that should be established before a measure

is deemed to be valid. Content validity refers to whether or not the measure reflects the domain of interest, specifically does the administration of the CLSG appropriately reflect the domain of stress? Concurrent validity refers to the correlation between the measure of interest and currently available measures of the same construct. Does the CLSG correlate with other previously established measures of stress? Predictive validity is verified when a measure is able to predict an outcome variable which has been shown to be related to the construct under study. For example, does the CLSG predict indices of present psychological well-being and present health status? Construct validity refers to the extent to which a measure actually measures the construct of interest. In this case then the question becomes whether or not the CLSG is actually measuring stress and not some other psychological construct or trait. One way of establishing that the CLSG is not measuring another construct is to confirm discriminant validity, which specifically refers to low or non-significant correlations with unrelated measures.

In order to address the psychometric properties of the CLSG this thesis presents two separate studies. The first of these two studies was connected with a large sample of elderly women while the second study was connected with a smaller group of younger women.

## Experiment 1

### Method

#### Subjects

Older women who participated in a large study on alcohol consumption were also subjects for the present study. The sample consisted of 191 women, 60 years of age or older.

Mean age was 67.25 years ( $SD = 6.64$ ), and mean education level was 11.05 years ( $SD = 3.59$ ). Of the sample, 48.4 % were presently married, .5 % were cohabitating, 32.8 % were widows, 9.9 % were divorced or separated, and 8.3 % were single. As well, 40.6 % of this sample were Anglophone while the remaining 59.4 % were Francophone. Subjects were interviewed in their preferred language.

There were 49 subjects retested on the CLSG. These subjects were tested for the second time between 12 and 18 months after the initial testing. At the time of original testing these 49 participants had a mean age of 67.25 years ( $SD = 7.2$ ), and a mean education level of 11.5 ( $SD = 3.61$ ). Of the retest sample, 65.3 % were Anglophone and the remaining 34.7 % were Francophone. Again, subjects were tested in their preferred language.

#### Materials

All measures used in the study were initially developed for an English

population. All measures previously untranslated were translated into French, than back-translated. This procedure ensured that a suitable translation had been performed and that the French and English versions were comparable

Demographic Interview. A demographic interview was conducted to acquire demographic information and data on various lifestyle characteristics (e.g., financial comfort, work and educational history, number and ages of children, etc.). Embedded in the interview was a global four-point Likert scale asking the subjects how stressful the past year had been overall. The Global Stress Scale ranged from not at all stressful rated as 1 to very stressful rated as 4.

The Eysenck Personality Inventory (EPI) consists of 57 yes-no items and provides a measure of two personality traits: extraversion and neuroticism (Eysenck & Eysenck, 1968). The EPI also includes a Lie Scale which assesses the tendency of individuals to give responses that are socially desirable but unlikely to be true (e.g., "I never get angry"). Out of the 57 items 24 pertain to the extraversion trait, 24 to the neuroticism trait and the remaining 9 items concern the Lie Scale. Higher scores on each of the three measures denotes a greater degree of that particular construct. Test-retest coefficients range from .84 to .94. Concurrent validity coefficients have been found to range from .79 to .92.



The Hassles Scale. This study used a modified Hassles scale consisting of 35 items drawn from the original scale (Kanner et al., 1981). The scale was modified by us in order to reflect the concerns of an elderly population. Each item pertains to potential daily hassles or irritants (e.g., concerns about money for emergencies). Subjects are asked to rate how often each item occurred in the past month on a five point Likert-type scale with end points from did not occur (1) to occurred extremely often (5). Higher scores indicate a greater amount of stress. The test-retest correlation for frequency and intensity of hassles was found to be .79 and .48 respectively (Kanner et al., 1981). For the purpose of this study only the frequency scores were used in analyses, with possible scores ranging from 35 to 175.

The Life Experiences Survey (LES). A shortened 42 item version of the LES was administered. Eight items from the original LES (Sarason, et al., 1978) were not used because of their relevance to male or younger respondents. Each item relates to a major life event (e.g., death of a spouse). Subjects are asked to rate, on a 7-point scale, how negatively or positively they experienced any event(s) which occurred during the past year from extremely negative (-3) to extremely positive (3). The LES yields two scores. The first score represents total negative life events whereby all scores rated in the negative direction are added. For the purpose of this study, negative scores are changed to a positive

sign so that higher scores represent more stress related to events perceived as negative. The second score represents total positive life events whereby all positively rated events are added together. Higher scores denote more stress related to events perceived as positive. Test-retest correlations for positive and negative experiences were found to be .53 and .88 respectively.

The Family Experiences Questionnaire was a questionnaire developed for the purposes of the larger study of which this study was a part. Items consist of how the subject perceives global concepts. The concepts that were relevant to this study were overall adult and childhood unhappiness, parental unhappiness, and amount of upset experienced about major losses in the past (Table 1). Subjects rate each item on a 7-point Likert type scale with higher scores indicating a greater amount of unhappiness and upset. Because of the delicate nature of some of the personal information asked in this questionnaire a computer derived coding system was employed. Each of these questionnaires was coded differently from all others and placed in a separate folder. The matching of the information to the subject was performed by the computer so as to ensure confidentiality.

The Centre for Epidemiological Studies Depression Scale (CES-D).

This self-report scale consists of 20 items which represent depressive symptomatology (Radloff, 1977). Each item is rated as to how frequently it has

Table 1

Questions from the Family Experiences Questionnaire which are relevant to the present study

---

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

7) 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

14) Prior to the age of 16, did you experience a death of a very close friend or family member?

Yes \_\_\_ / No \_\_\_.

How upsetting was this death?

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

19) Overall how happy has your adult life been?

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

---

occurred in the past week from rarely to none of the time, rated 0, to most or all of the time rated 3. Thus, higher scores reflect a greater degree of depression. Concurrent validity coefficients range from .69 to .75. The reliability coefficient for depressed mood has been found to be .85 (Gatz & Hurwitz, 1990).

The Vocabulary subtest (from the Revised Examination M of Intelligence and Aptitude). This subtest is a 30 item vocabulary test. Subjects are required to underline one of four possible words or phrases that best defines each target word. Higher scores on this measure represent a greater number of correctly defined words. Subjects are given five minutes to complete the test. This measure has been found to be stable into older adulthood (Schwartzman, Gold, Andres, Arbuckle & Chaikelson, 1987). The verbal measures have a test-retest reliability coefficient of .91 and the overall M test correlates with other well-standardized tests of intelligence ( $r = .80$  with the American Army Alpha Test and .72 with the Penrose-Raven Matrices), (W.R.N. Blair, July 1959; cited by Schwartzman et al., 1987). This subtest is used in the present study as a measure of general intellectual ability.

The Seriousness of Illness Rating Scale asks subjects to check off all of the illnesses or symptoms which they have experienced in the past five years (Wyler, Masuda & Holmes, 1971). The present study used as abbreviated

version of the original checklist, containing 67 illnesses or symptoms that would apply to older women. Scores reflect the total number of items indicated by the subject and range from 0 to 67. A concurrent validity coefficient has been found by Wyler et al. to be .95 for the original scale.

The Concordia Lifetime Stress Graph (CLSG) (see Appendix A). The graph is constructed by the subject on a reddish pink colour graded legal size paper (Letraset, Copy FX, Process Red, #300 GH). The colour is graded vertically with a lifetime graph (from 1930 to 1995) superimposed onto the coloured paper. The abscissa represents years and the ordinate represents degree of stress. The ordinate has 6 equally spaced dashes to represent increasing degrees of stress. Numbers have been omitted on the ordinate to enhance the use of the gradient of colour rather than a numerical representation of stress. As well, there was no grid on the graph paper. The only "scale" that covered the graph was the intensity of colour.

Prior to constructing the graph, subjects complete the Hassles Scale. The interviewer then computes an average Hassles score by adding the frequency ratings for each item reported and dividing by 35. Averages can range from 1 to 5. After the interviewer has completed the computation, subjects are told what their average was, and it is explained that this scale is believed to be a measure of one's daily stress level. The CLSG is then presented. Subjects are

told that the gradient of colour is significant in terms of its representation of levels of stress, (i.e., dark red signifies extreme levels of stress whereas the lighter pink signifies lower stress levels). The average Hassles score is charted with an "X" along the ordinate, based on the small dashes, each one representing one "unit" of Hassles measure. Subjects are then asked whether or not they agree with where the point has been placed. Subjects are allowed to move this reference point if they feel that a different position (higher or lower) would provide a better representation of their current stress level. The initial placement is left on the graph and the new mark is recorded as an X with a circle around it. The new mark is used as the subject's present stress level, and hence the initial point on the graph.

Each subject is then asked to recall various times in their life which may have been more or less stressful for them. The subject can start at any time in their life. Once a time period is chosen, subjects are asked where they would place their stress level at that time, relative to their present level of stress. They are also asked what was occurring in their life at that time. This information is written down on the graph directly above their stress level. All spontaneous recollections are noted on the graph. When subject are no longer able to spontaneously generate events in their life, they are asked what was occurring between each point that has already been placed. For example, if a

subject had noted that the year 1980 was stressful and that the year 1985 was less stressful, she is asked how things were over the intervening time period (e.g., did her stress rapidly decrease after 1980, or did it gradually decrease, and in either case, where their stress level would be relative to how stressful things were in 1980, etc.). Subjects are guided in this manner in completing the graph. In the present study all subjects were asked to go back at least to 1940. This decision was made so that individuals could be compared to each other over approximately the past 50 years regardless of their age differences. Several scores can be derived from the CLSG. First, the area under the curve is computed to yield a total stress score. Second, stress levels for the year of testing and each five-year period (i.e., the years 1990, 1985, 1980, 1975, etc.) are recorded so that current stress and any five-year interval can be assessed. And, finally, a mean stress level can be obtained by dividing total stress experienced over the period graphed by the number of years in that period.

#### Procedure

Recruitment for the study was accomplished in several ways. First, wives of men who had participated in a study concerned with WWII veterans were contacted by mail asking if they would be willing to participate in a study similar to the one in which their husbands had participated. These women were then contacted by phone. If the person was willing to participate an

appointment was made by one of three interviewers (one Anglophone, one Francophone, and one bilingual). Second, advertisements were placed in several local papers and one major paper in and around the Montreal area. Third, bilingual posters advertising the need for subjects for this study were posted in local food and drug stores, bingo halls, legion halls, church basements, Golden Age clubs, and apartment complexes housing the elderly. Finally, subjects were recruited through a large synagogue, a Protestant church and a Golden Age club following a talk on aging given by the principal investigator.

Initial interviewing for this study required two to three sessions per subject. Subjects were allowed to proceed at their own pace. Each session took approximately two hours to complete. In the first session, after receiving a detailed explanation of the study and signing the consent form (Appendix B), subjects completed the initial demographic interview, questionnaires pertaining to alcohol consumption, a health questionnaire and several measures of psychosocial functioning. As well, subjects completed the CLDQ and a similar graph on lifetime tobacco use. Completing similar graphs helped to ensure that subjects were familiar with the retrospective graphing procedure used in the CLSG.

During the second session, after subjects had filled out several questionnaires and completed several cognitive tests, the Hassles Scale was



administered. Following the Hassles Scale, subjects received the LES. While the subject was filling out this survey the interviewer computed the average of all scores on the Hassles Scale. The LES was deliberately placed after the Hassles scale, and prior to the CLSG, both to give the interviewer adequate time to compute the average and to get the subject thinking about different kinds of major life events prior to administration of the CLSG. After completing the CLSG, each subject was then administered several additional psychosocial questionnaires and cognitive tests. Subjects received thirty dollars (\$30.00) as an honorarium for their participation.

Several women who had participated in the original study were later telephoned and invited to participate in a second study. They were told that the second study would entail being retested on several measures which they had previously completed. As well, approximately 18 months after participating in the initial study several women were invited to participate in an unrelated study on the acquisition of computer knowledge. These subjects were also retested on the CLSG. The retest interviewers were not involved in the initial testing and so were unaware of what the subjects had previously reported.

### Results

In all analyses performed, missing data are not replaced. Therefore, sample sizes for each analysis are subject to change and are presented in each

table. Data from all the measures used in this study, with the exception of the Vocabulary test, were found to be normally distributed and so remained in their original format for each analysis. The Vocabulary test was found to be positively skewed. A reflexive square root transformation was performed on the data which yields negative scores for a greater number of correctly defined words. However, in order to maintain ease of interpretation, all results which include this variable are presented using a positive sign.

Out of the total sample, 23.4 percent of subjects disagreed and 76.6 percent agreed with the Hassles score as their first point on the CLSG. Most of the subjects supplied stress levels as far back as 1940. Correlations between the first test and the retest were performed for stress levels at five-year intervals. Test-retest correlation coefficients ranged from .36 to .69 depending on the time period being assessed. Total lifetime stress measures at Time 1 and Time 2 were significantly correlated ( $r = .68$ ), with mean stress levels at the two times not being significantly different (Time 1--  $M = 2.67$ ,  $SD = 1.10$ , Time 2--  $M = 2.61$ ,  $SD = 1.16$ ;  $t(48) = .44$ , ns.). As can be seen in Table 2, with the exception of the significant difference between the two administrations for the stress levels for 1991 ( $t(47) = -4.10$ ,  $p < .001$ ), no significant differences occurred between the two administrations. The correlations between each five-year period were all significant. Prior to 1985, the coefficients ranged from .69

Table 2

Test-Retest Correlations for the Lifetime Stress Graph

Stress Level						
<u>Year</u>	<u>n</u>	<u>Time Rated</u>	<u>M</u>	<u>SD</u>	<u>r</u>	<u>t</u>
1991	49	1	1.85	1.31	.36 *	- 4.10**
		2	2.74	1.38		
1990	49	1	2.60	1.52	.36*	- 1.07
		2	2.86	1.45		
1985	49	1	2.98	1.68	.44*	.75
		2	2.79	1.52		
1980	49	1	2.89	1.74	.65**	- .24
		2	2.94	1.52		
1975	49	1	2.57	1.52	.51**	- .89
		2	2.76	1.59		
1970	49	1	2.84	1.67	.69**	- .16
		2	2.87	1.67		
1965	49	1	2.72	1.71	.51**	.75
		2	2.54	1.53		
1960	49	1	2.86	1.74	.58**	.85
		2	2.67	1.66		
1955	49	1	2.39	1.56	.54**	-1.05
		2	2.61	1.50		
1950	48	1	2.44	1.63	.69**	-1.24
		2	2.67	1.64		
1945	48	1	2.21	1.61	.62**	.18
		2	2.17	1.65		
1940	48	1	1.90	1.47	.57**	-1.00
		2	2.11	1.67		
marriage	43	1	2.17	1.58	.53**	.55
		2	2.04	1.52		

\* p &lt; .01 \*\* p &lt; .001

to .51. In the three most recent five-year periods, however, (1985, 1990 and 1991), the correlation coefficients were slightly lower ( $r = .44, .36$  and  $.36$  respectively). Stress levels read from the graph at Times 1 and 2 for the year of marriage yielded a correlation of  $.53$  ( $p < .001$ ).

Table 3 shows a Pearson correlation matrix using five different measures of the amount of stress experienced in 1991. These include the current measures of 1991 stress from the Hassles Scale, the LES negative life events measure, the Global Stress scale and the stress level for 1991 reported on the CLSG administered in 1991. As well they include the retrospective measure of 1991 stress reported on the CLSG administered in 1992-3. As can be seen, all correlations were significant. Correlations ranged from  $r = .63, p < .001$  for that of the Global Stress scale and the CLSG taken at Time 2 to  $r = .22, p < .001$  for that of the Global Stress scale and the Hassles scale

A hierarchical regression was performed using psychosocial variables and life stress to predict adult unhappiness. Among the psychosocial variables were level of depression, rated childhood and parental unhappiness, and two measures of present stress. daily hassles and negative life events As can be seen in Table 4, variables entered at each stage contributed significantly to explained variance. After accounting for the variance due to depression, and childhood and parental unhappiness, the measures of present stress added .04 to

Table 3

Pearson Intercorrelation Matrix for Five Measures of Stress Concerning the Same Time Period (the year 1991).

Variables	Hassles scale	Global Stress scale	Negative Events scale	Lifetime Stress Graph 1991
Global Stress scale	.25 ** (191)	---		
Negative Life Events scale	.25 ** (190)	.27 ** (190)	---	
Lifetime Stress Graph (administered in 1991)	.45 ** (191)	.39 ** (191)	.27 ** (190)	---
Lifetime Stress Graph (administered in 1992-3)	.35 * (49)	.63 ** (49)	.46 ** (49)	.36 * (49)

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\*  $p < .01$

\*\*  $p < .001$

n for each cell in parentheses

Note. For all scales, large numbers correspond to more stress.

Table 4

Hierarchical Regression of Psychosocial Variables and Life Stress on Adult Unhappiness (N = 182)

	$\beta$	r	$sr^2$	t	Total $R^2$
<b>Stage 1</b>					
Depression	.08	.16	.01	1.04	.03 *
<b>Stage 2</b>					
Childhood Unhappiness	.15	.31	.02	1.95	.13 **
Parental Unhappiness	.04	.23	.00	.53	
<b>Stage 3</b>					
Hassles	.15	.28	.02	1.82	.17 **
Negative Life Events	.07	.02	.01	.97	
<b>Stage 4</b>					
Total Lifetime Stress	.35	.45	.12	4.82**	.27 **

---

\*  $p < .05$

\*\*  $p < .001$

the total ( $R^2 = .17$ ,  $p < .001$ ), whereas, total lifetime stress contributed 10 to the total variance accounted for in the last stage of the regression ( $R^2 = .27$ ,  $p < .001$ ).

A second hierarchical regression was performed using several psychosocial variables in the prediction of mean life-time stress (Table 5). All variables entered with the exception of depression and neuroticism were significant predictors of total life-time stress. These variables included childhood and adult unhappiness, degree of being upset with major loss in the past, and vocabulary ( $F(6,180) = 12.25$ ,  $p < .001$ ).

Finally, a multiple regression was performed using three measures of stress in the prediction of illness (Table 6). While total life-time stress and negative life events were entered into the equation, only Hassles significantly predicted illness ( $F(3,185) = 6.54$ ,  $p < .001$ ).

Table 5

Hierarchical Regression of Psychosocial Variables on Mean Lifetime Stress (N = 182)

	$\beta$	r	$sr^2$	t	Total $R^2$
Stage 1					
Depression	.00	.07	.00	.03	.02
Neuroticism	.02	.15	.00	.26	
Stage 2					
Vocabulary	.16	.23	.03	2.43*	.07*
Stage 3					
Childhood Unhappiness	.17	.32	.04	2.61*	.29 **
Adult Unhappiness	.30	.44	.10	4.34**	
Upset About Loss	.19	.32	.04	2.89*	

\* p &lt; .05

\*\* p &lt; .001



Table 6

Multiple Regression on Illness (N = 189)

Predictors	$\beta$	r	$sr^2$	t
Negative Life Events	-.04	-.02	.002	-.55
Hassles	.32	.30	.10	4.42**
Total Lifetime Stress	-.07	.02	.00	-.91

$\underline{R} = .31$        $\underline{R}^2 = .10$

$\underline{F} ( 3, 185 ) = 6.54 \quad p < .001$

---

\*\*       $p < .001$

## Discussion

Several questions concerning the psychometric properties of the CLSG have been posed and many of these have been addressed by this first study. Reliability and each type of validity will be discussed in turn.

### Reliability

The test-retest correlation for the overall total stress score has been shown to be good, particularly given that there was an interval of 12 to 18 months between the two testing sessions. However, when the graph was divided by five-year intervals the correlations varied. The variation showed a clear pattern in that more recent years had lower correlations than did the years prior to 1985. This pattern may be due in part to what is known as the reminiscence phenomenon (Rubin, Wetzler & Nebes, 1986) whereby older adults tend to recall more events related to earlier periods in their life than more recent events (Fitzgerald, 1992). It may be that the events of earlier life are more readily retrievable and so may be remembered more frequently and with more certainty than more recent events.

### Content Validity

Based on the stimulus-oriented perspective, life events are considered to be stimuli in the environment which lead to increased demands and therefore inflict stress upon an individual. When the CLSG was administered, subjects

complied with instructions to think back to times which were more or less stressful and did so by naming significant life events as the precursor to the stress they reported (e g., death of spouse, divorce, raising children, etc.). The fact that there is a known relationship between stress and life events and that subjects spontaneously reported these types of events when completing the CLSG, supports the conclusion that the subjects were thinking about stress versus some unrelated construct. The prior administration of the LES may have facilitated the subjects ability to generate life events when drawing the graph.

Although the Hassles scale is considered to be a measure of current stress, approximately one quarter of the subjects disagreed with the first point on the graph designated by the Hassles scale. This finding suggests that the subjective interpretation of stress, at least in terms of how subjects viewed the CLSG with its coloured scaling system, may differ from that of the interpretation made by the Hassles scale. Another possible factor is that the first point on the graph relates to the year 1991 which is a whole year rather than the month that the Hassles scale covers. Subjects may have taken this into consideration when reporting their current level of stress. It is also possible that subjects who did agree with the Hassles score did so because they wanted to please the tester or because they did not want to disagree with an established measure. The Hassles scale may not be as useful as the starting point on the

CLSG as was first believed. A purely subjective decision may be more appropriate for determining the point with which to start the graph.

#### Predictive Validity

The CLSG has shown an ability to predict levels of adult unhappiness, and this is the case even after other measures of stress have been controlled. This finding suggests that those who have experienced several stressful life events, or fewer but prolonged stressful events (and thus have higher total lifetime stress scores) have also experienced an unhappier life. Other variables such as childhood unhappiness and how upset subjects were about past major losses also supports this interpretation. It is interesting to note that while studies show recent life events relate to current symptoms of depression (e.g., Uhlenhuth, et al., 1974) stress over the life span relates to general unhappiness in one's life. A limitation of this interpretation is that both the report of stress and the reports of adult and child unhappiness are retrospective in nature. It would be helpful if prospective data on levels of happiness were available.

Another interesting relationship was found between general intellectual ability as measured by the vocabulary subtest and the CLSG. Schaie (1983) postulates a relationship between intellectual abilities which are maintained in later life and having had a lifestyle which involved a high degree of engagement in social and intellectual activities (Gribbin, Schaie & Parham,

1980). It may be then that those subjects who have had a high degree of engagement in their lives also have had to deal with more stress than those leading a less active life. This hypothesis is consistent with our finding of a significant positive correlation between stress and vocabulary scores.

The CLSG did not predict number of illnesses as measured by the Seriousness of Illness Rating Scale. This finding is not surprising given that the CLSG covers the life span. As previously mentioned, studies have already shown that health relates more to life events occurring just prior to the onset of illness versus longer periods of time (Theorell & Rahe, 1971; Rahe & Lind, 1971). As well, the Seriousness of Illness Rating Scale covers a five year period. Because subjects may have had the illness five years prior to the administration of the Seriousness of Illness Rating Scale, all measures of stress were potentially administered after the illnesses occurred and the subject had recovered. An assessment of illness with respect to the years read off the CLSG just prior to the five-year period covered by the illness measure may help to illuminate whether or not the CLSG has a relationship with recent illness. While the Hassles scale was the only significant predictor of health, there is a problem associated with this finding. There are several items on the Hassles scale which are health-related thus confounding the correlation between Hassles and the Seriousness of Illness Rating Scale.

### Discriminant Validity

Measures of current depression did not relate to lifetime stress level on the CLSG. This point is especially important to establish given the literature on mood and memory. Research has shown that there is a relationship between negative mood and the types of memories recalled. That is, a current negative mood can result in less recall of positive events (e.g., Singer & Salovey, 1988). The fact that depression was not reliably related to the amount of stress subjects recalled on the CLSG suggests that current mood does not affect the subjects' memory for levels of stress. Specifically, subjects were not more likely to report more stress in their life if they were more depressed.

### Concurrent Validity

The nature of the CLSG is such that there is a limitation as to the time period that can be used to assess concurrent validity. Prospective stress measures taken at several time periods and starting from a relatively young age would be needed in order to perform correlations between prospective and retrospective stress measures over the life span. With this limitation in mind it is possible to examine the assessments taken a year earlier at the time of initial testing which were available for the recall subjects in examining concurrent validity.

The correlation between the Hassles and the CLSG cannot be construed

as an indication of concurrent validity as this correlation is a direct reflection of the number of subjects who rejected and accepted the Hassles score as the first point on the graph. However, significant results were found when both negative life events, taken from the LES, and the Global Stress scale were correlated with the CLSG.

A significant but low correlation between the CLSG measured in 1991 and negative life events was found. This relationship is not surprising as several of the subjects reported not having had any major life events in the past year yet provided a stress level on the CLSG for the same year. The lack of reported events on the LES is in keeping with the inverse relationship between age and the occurrence of life events found in several studies (e.g., Lazarus & DeLongis, 1983). It is interesting to note that the LES, which has a subjective component, is perhaps not picking up levels of stress as well as the CLSG. The CLSG may be more sensitive than the LES because the CLSG allows subjects to choose their own subjective level of stress without choosing from a set of predetermined events as well as allowing subjects to rate the intensity of a stressful period without specifying whether the stressor was uniquely positive or negative, but rather any combination of the two.

One of the more interesting findings was the relationship found between the year 1991 taken from the CLSG administered in 1992-3 and the Global

Stress scale. This relationship was the strongest found and suggests that subjective reports of stress are similar taken retrospectively and prospectively

## Experiment 2

To further illuminate the psychometric properties of the CLSG a second study was performed. One way to establish concurrent validity for a retrospective measure is to compare it to prospective data measuring the same construct taken over the same time period. In Study 1, because of the limitations due to non-available prospective data on stress, concurrent validity was limited in scope. Study 2 allowed the examination of several months from a prospective and retrospective vantage point. The Hassles scale was again used as the starting point on the CLSG for two reasons. First, the second study was begun prior to the completion of Study 1, and therefore, before it was realized that perhaps this scale should not be used with the CLSG. Second, the Hassles scale was the instrument used as the prospective measure of stress and so was used in this study to maintain consistency

## Method

### Subjects

A sample taken from a larger prospective study on the effects of stress, anxiety and depression on pregnant women (Da Costa, 1992) were used as subjects in the present study. The sample for the present study consisted of 42



female subjects.

The subjects had a mean age of 29.91 years ( $SD = 3.25$ ) and a mean education level of 15.07 years ( $SD = 3.13$ ). All subjects were either anglophone or at least had the ability to read and comprehend English.

During the initial study on pregnancy several questionnaires pertaining to psychosocial variables which may be related to pregnancy complications were administered. Included among these measures were measures of stress, depression, state anxiety, and a structured interview which elicited demographic information. Each subject filled out and mailed in their responses to items on all measures. These measures were mailed to the coordinator of the study on a monthly basis starting with the third month of pregnancy up until the birth of their child (i.e., approximately every month for six months).

### Materials

The Hassles Scale (Kanner et al., 1981). This modified version of the Hassles Scale requires subjects to rate each of 53 items on a four-point scale and was used in the pregnancy study. As with the Hassles Scale used in the previous study, each item pertains to potential daily hassles or irritants. Subjects are required to rate how often each item occurred in the past month (from did not occur to occurs extremely often) with higher scores denoting more stress. This revised version was used in the present study to ensure

comparability with the results from the pregnancy study.

The Lubin Depression Adjective Check-list - Form A and B (DACL).

This self-report measure consists of 32 adjectives (22 positive and 10 negative) which assess current levels of depression (Lubin, 1967). Subjects indicate all of the adjectives which best describes how they are currently feeling. A total depression score is obtained by adding the number of negative items indicated and the number of positive items which are not indicated. Score may range from 0 to 32 with higher scores indicating a greater degree of depression. Concurrent validity has been shown to have a coefficient of .68. Alternate form reliability ranges from .83 to .93 for females.

The Concordia Lifetime Stress Graph (CLSG) - Two-Year version. This version of the CLSG was administered in the same way as in Study One except that the graph covered a two-year span. The two-year graph is superimposed onto the coloured paper with the abscissa representing 24 months and the ordinate again representing degree of stress. Subjects are first administered the revised version of the Hassles Scale and an average Hassles score is computed. As in Study 1, subjects are asked if they agree or disagree with the position on the graph designated by the Hassles score. If the subject disagrees with the score position, they are asked to specify on the graph where they feel their stress level is currently. Each subject is then asked to recall various times in

the past 24 months which may have been more or less stressful for them. Because subjects were tested six months after the birth of their child, their entire pregnancy was included in the 24 month period. In this study all subjects were required to go back over the entire two-year period.

#### Procedure

Subjects were contacted six months after they had given birth to their child and asked if they would be willing to volunteer as a participant in a follow-up study. If the subject was willing to participate an appointment was made by one of two interviewers. Both interviewers were different from the initial interviewers and so were unaware of the prospective reports.

Sessions took approximately one hour to complete and took place in the subject's home. After receiving a detailed description of the study and signing the consent form (Appendix B), each subject was asked to complete several psychosocial measures, some for the purpose of this study and some additional ones administered at the request of the coordinator of the initial study. These additional measures concerned child care and were presented in between those measures which pertained to the present study.

The Hassles scale was administered in two distinct ways. First, as in Study 1, the scale was used to determine the first point on the stress graph. That is, the Hassles scale was used as a measure of their current stress covering

the month just prior to testing. Second, subjects were asked to think back to one of the third, sixth, or ninth month of their pregnancy and to fill out the Hassles scale a second time based on their recall of the specified month (Retrospective Hassles). Assignment to recall group for the retrospective Hassles was counterbalanced based on the schedule of testing (i.e., the first person scheduled to be tested was asked to recall their third month, the second person recalled their sixth month, the third person recalled their ninth month, the fourth person their third month and so on until the last subject was scheduled and tested). After completing the CLSG, the retrospective Hassles, and the Lubin, each subject was then administered several additional psychosocial questionnaires. Subjects were thanked for their participation at the end of the session.

### Results

As in Study 1, because missing data are not replaced, subject sizes for each analysis are subject to change and are presented in each Table.

Out of the total sample, 40.5 percent of subjects disagreed and 59.5 percent agreed with the Hassles score as their first point on the CLSG.

As can be seen in Table 7, none of the correlations between the Hassles administered prospectively and the CLSG for each month of pregnancy were significant. Correlations ranged from .06 for the fifth month of pregnancy to

Table 7

Pearson Correlations Between the Retrospective CLSG Scores and Prospective Hassles Scores During Pregnancy

Retrospective CLSG Scores by Month of Pregnancy							
Variable	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth
Prospective Hassles	.12 (41)	.12 (41)	.06 (41)	.15 (41)	.28 (41)	.26 (38)	.09 (34)

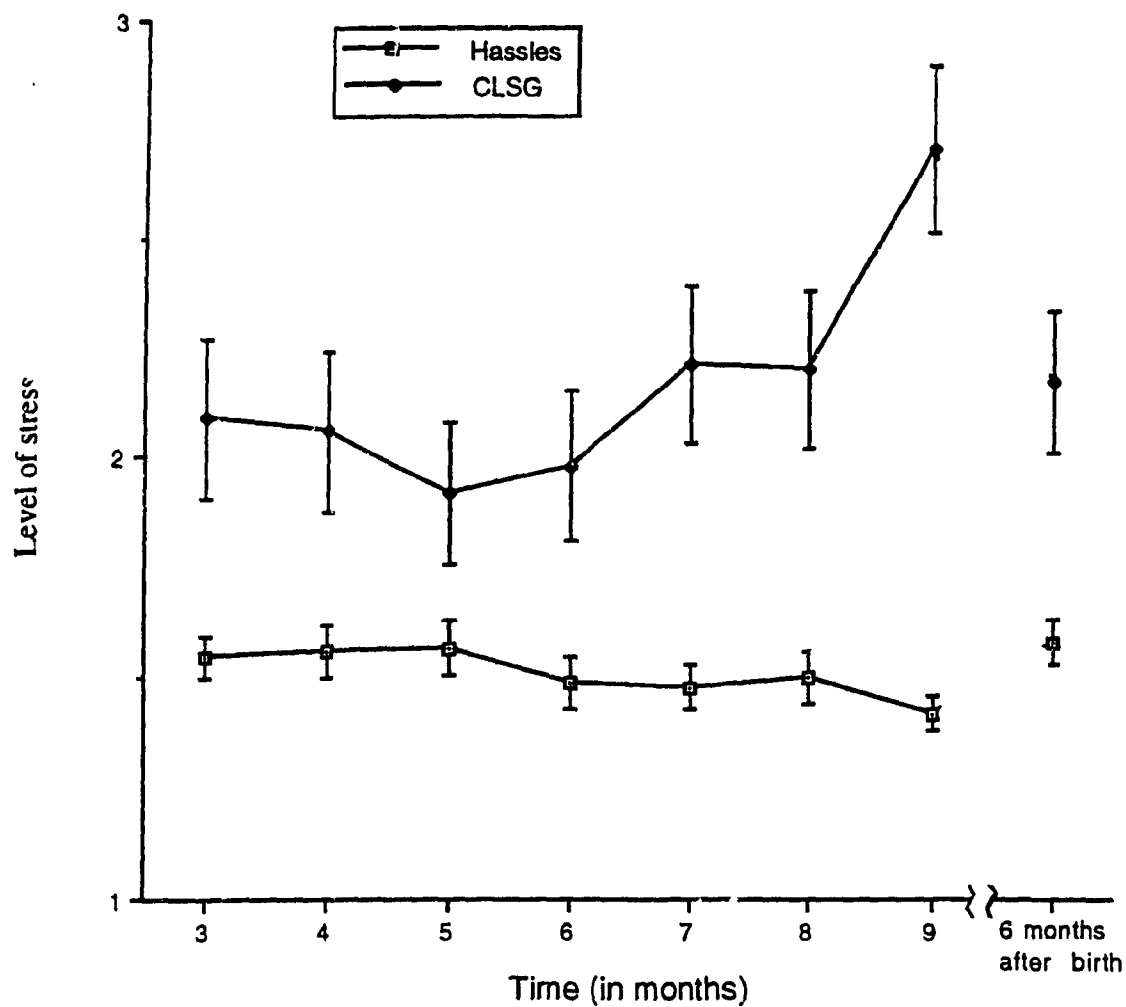
all correlations are ns ( $p > .05$ )

n for each cell in parentheses

.28 for the seventh month of pregnancy. However, correlation between the Hassles and CLSG for the concurrent administration at six months after birth also was not significant ( $r = .21$ ,  $p$ , ns).

Hassles scores taken prospectively were divided by 53 to allow comparison of means and standard errors from the Hassles and the CLSG during and after the months of pregnancy. Figure 1 shows that all CLSG retrospective reports for the nine months are higher in relation to the Hassles, but, with the exception of the ninth month, mean stress does not change appreciably across months, and it tends to be similar to mean stress reported on the two measures for the period 6 months after birth. The one exception is that, at the ninth month, subject reports on the CLSG show a marked increase in perceived stress as compared to all other time periods. A Pearson intercorrelation matrix for the CLSG scores reveals that subjects also changed their relative positions on the CLSG (re: higher or lower stress levels) at the ninth month and at six months after the birth of their child. The months prior to the ninth month are correlated significantly with one another with correlations ranging from .96 between months five and six and .45 between months three and eight (see Table 8).

A similar pattern of results emerged when subject's prospective reports on the Hassles were compared to their retrospective Hassles reports. Table 9



**Figure 1.** Means and standard errors for the prospective Hassles and the retrospective CLSG by month as a function of stress level.

Table 8

Pearson Intercorrelation Matrix for Retrospective CLSG Scores During and After Pregnancy  
(N=42)

Month	Month of Pregnancy						
	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth
Fourth	.79**	---					
Fifth	.68**	.86**	---				
Sixth	.64**	.80**	.96**	---			
Seventh	.56**	.74**	.84**	.87**	---		
Eighth	.45*	.60**	.68**	.67**	.77**	---	
Ninth	.09	.27	.26	.29	.36*	.54**	---
Six months after birth	-.04	.03	-.11	-.07	-.01	.02	.17
* p < .05 ** p < .001							



Table 9

Pearson Correlations Between the Retrospective Hassles and Prospective Hassles for the Third, Sixth, and Ninth Month of Pregnancy

Variable	Retrospective Hassles Scores by Month of Pregnancy		
	Third	Sixth	Ninth
Prospective Hassles	.87** (13)	.83** (13)	.55 (11)

\*\*  $p < .001$

*n* for each cell in parentheses

shows the correlations for the three recall groups. High correlations were found for the third and sixth month groups whereas a moderate non-significant correlation was found for the ninth month group. A MANOVA on Hassles scores reported prospectively and retrospectively revealed a significant time by group interaction,  $F(2, 34) = 5.85, p < .01$ , depicted in Figure 2. The ninth month group recalled a significantly greater amount of stress on their retrospective reports ( $M = 96.18$ ) than they had reported prospectively ( $M = 85.36$ ),  $t(10) = -2.34, p < .05$ , the sixth month group recalled the same retrospectively ( $M = 91.56$ ) as they had reported prospectively ( $M = 90.92$ ),  $t(12) = -.15, p = ns$ , and the third month group recalled significantly less stress ( $M = 83.31$ ) than they had reported prospectively ( $M = 91.54$ ),  $t(12) = 3.09, p < .01$ . No main effect of time,  $F(1, 34) = .23, p = ns$ , or group  $F(2, 34) = .16, p = ns$ , was found.

A correlation between the Lubin administered at the time of testing (i.e., 6 months post natal) and the CLSG was found to be non-significant at the .05 level of significance ( $r = .03$ ).

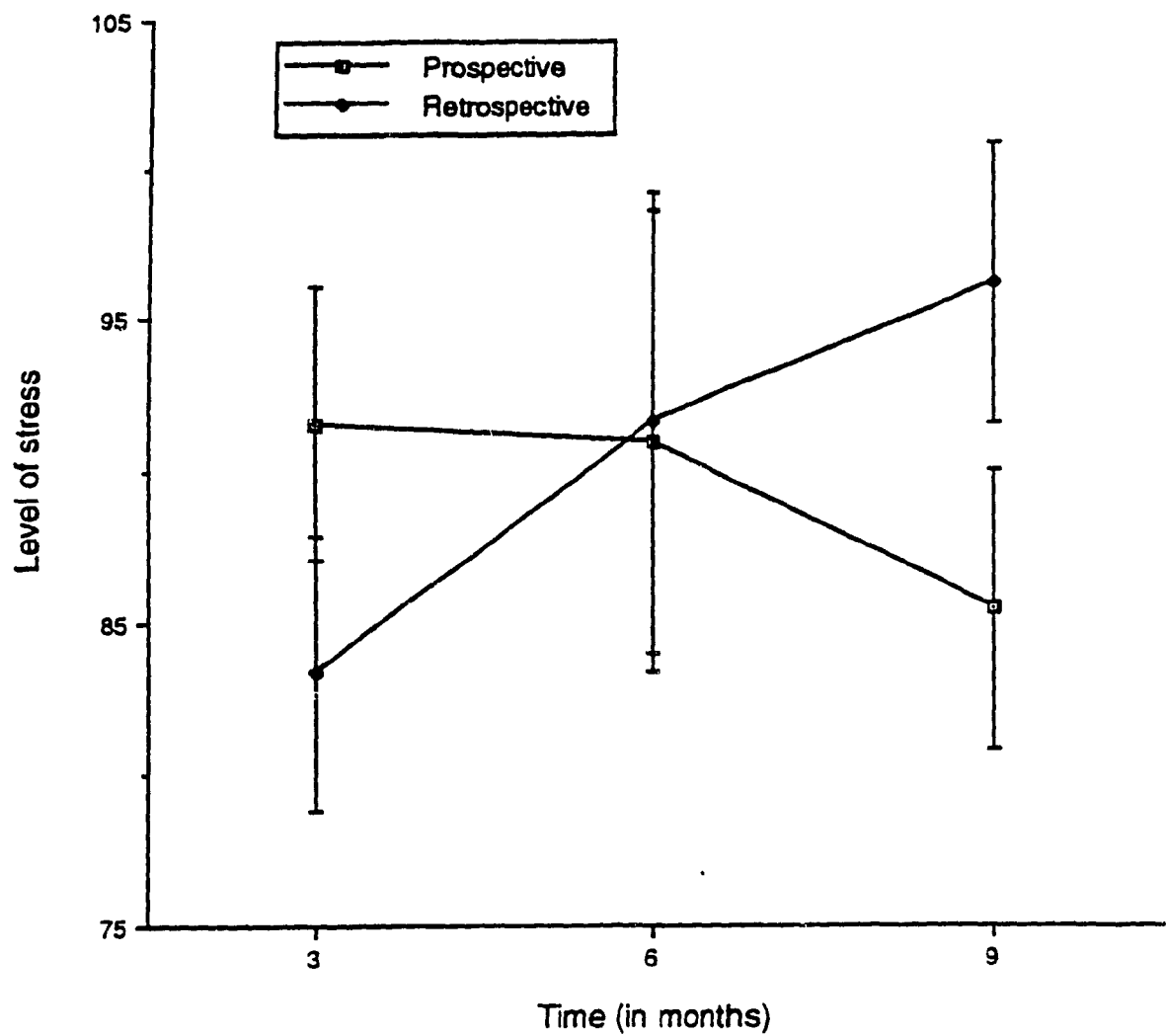


Figure 2. Means and standard errors for level of stress reported prospectively and retrospectively on the Hassles scale as a function of month of pregnancy.

## Discussion

In the present study concurrent validity was not found when the Hassles scale taken prospectively was correlated with the CLSG. However, an interesting pattern emerged when both the Hassles and the CLSG were compared. First, as in Study 1, subjects reported a higher subjective level of stress than that designated by the Hassle score. This increase remained similar relative to the prospective Hassles over the third to eighth month periods. Variation from the mean was far greater for the CLSG scores than for the Hassles. This suggests that the CLSG may be picking up more individual differences in perceived stress than the Hassles scale. Second, according to the retrospective reports, subjects perceived their ninth month (or the month of the birth of their child) as far more stressful than any other time period. Because the Hassles scale was filled out by subjects prior to the actual birth of their child and the CLSG referred to the ninth month as the month of the birth of their child, it is not surprising that these measures differed so greatly nor that this time period was rated differently from other time periods on the graph. It seems that subjects were perceiving the ninth month as a time associated with a major life event perhaps because, retrospectively, the salient episode of the ninth month was the delivery and birth of their child, which was not the case for the prospective (pre-delivery) Hassles. This interpretation is suggested.

further by the fact that subjects recalled their ninth month of pregnancy as being far more stressful when they rated the Hassles retrospectively for that same time period as compared to a less stressful rating on the prospective Hassles.

The intercorrelations among the CLSG scores for the third to eighth months during pregnancy have shown the measure to have good internal consistency. However, this seems to be the case only for the time period prior to the actual birth. The relationship among scores for the months prior to birth and those during and after the birth were very low in comparison to the other time periods. These findings suggest that subjects reacted differently to the actual birth with respect to perceived stress than they had previously. That is, some subjects who had higher stress relative to other subjects during the months prior to the birth did not necessarily remain in that relative position post-birth. This pattern was not reflected in the prospectively acquired Hassles scores. The CLSG appears to be more sensitive than the Hassles scale to the individual differences associated with the stress experienced by people as a result of the same event.

As in Study 1, current level of depression as measured in this study by the Lubin adjective checklist, did not relate to stress as measured by the CLSG. This finding again supports the notion that subjects are discriminating between

how depressed they are at the time of administration and their retrospective recall of stress.

### General Discussion and Conclusion

The CLSG appears to be a reliable instrument and several forms of validity have been assessed revealing the CLSG to be a valid measure. Because the CLSG is the first stress measure that has attempted to measure an individual's lifetime stress, there is no available information as to what should relate to the stress construct in this light. However, the results of the present studies lend support for the construct validity of the CLSG. For example, the CLSG relates to self-reports of global adult and child unhappiness, which is in keeping with studies showing a relationship between depression and recent stress.

Further validation of the CLSG is needed in order to understand better the psychometric properties of this retrospective measure. Similar studies could be performed to see if the same results are found. Comparable results would help to confirm the relationships which have already been established in these studies. As well, a longitudinal study which included the same colour graded scaling system of stress would help to verify the validity of the CLSG. For example, stress levels taken on a yearly basis over a five-to ten-year period with associated life events recorded could then be compared to an

administration of the CLSG covering the same time period

A qualitative analysis of the events reported by subjects may prove interesting. While measures of present depression did not relate to the amount of stress reported, it may be that the events reported are in fact more negative for those who are more depressed. A qualitative analysis would also help to understand better the nature of the stressors spontaneously generated by subjects. For example, it would be interesting to find out how the same event is perceived by different individuals. Such an analysis may help to clarify issues relating to the subjectivity of the stress response.

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## Appendix A

### The Concordia Lifetime Stress Graph

#### Instructions to the Interviewer

#### Lifetime Stress Graph (8.5 X 11 version)

### **INSTRUCTIONS FOR LIFETIME STRESS GRAPH**

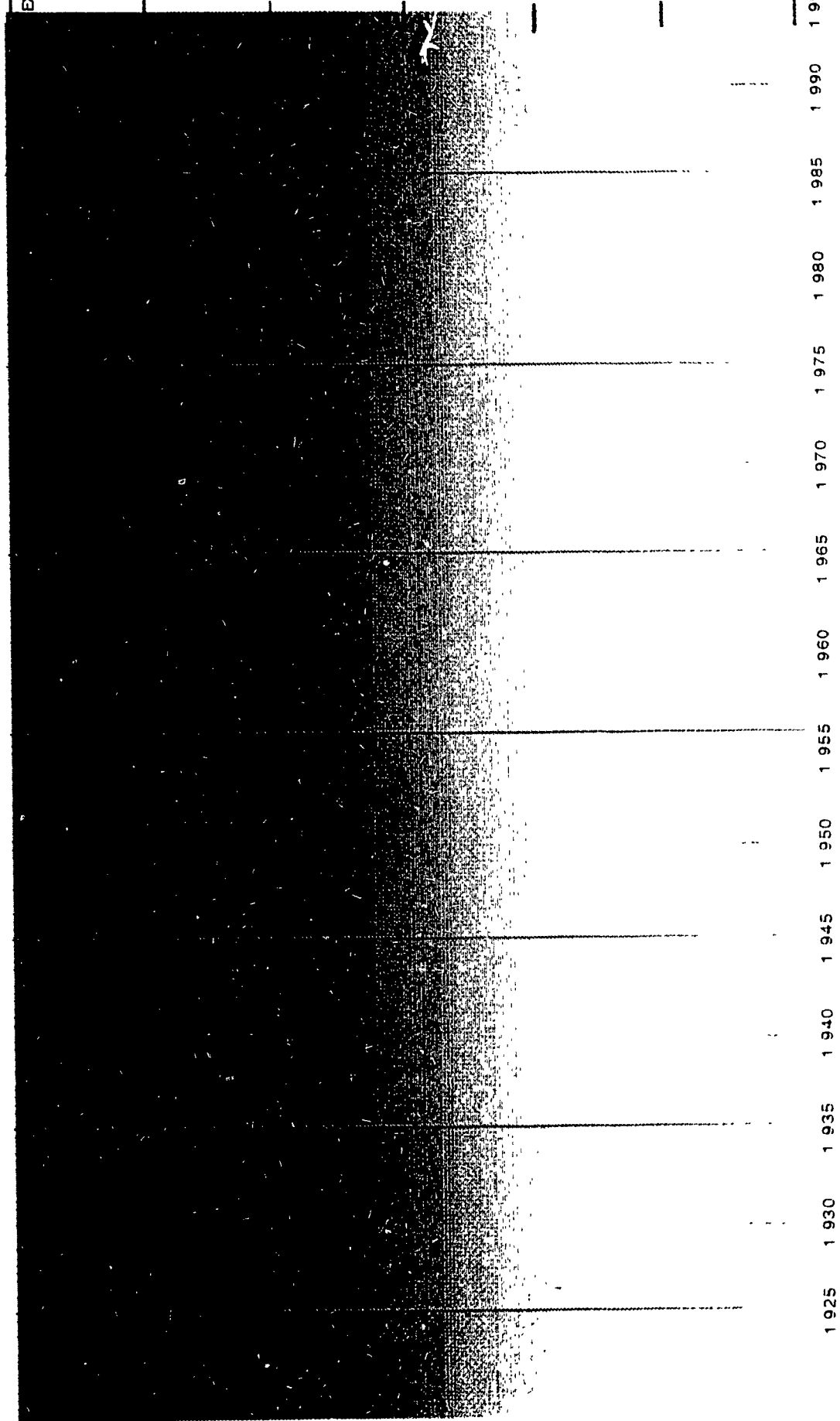
The last questionnaire that you filled out is thought to be associated with stress. For example, it is believed that things that are of concern to you or that just bug you on a daily or weekly basis can also add to ones stress level. If we take this questionnaire as possibly reflecting your stress level and place its interpretation on this stress graph, we find that you would be placed here. As you can see, the colour ranges from a deep reddish-pink to almost white. The deep coloured end signifies extreme stress and the white end denotes no stress. Now, stress is a subjective experience so would you agree with either of this point in terms of how stressful your life has been in the past year, or, would you place yourself somewhere else? **(LET SUBJECT PLACE HERSELF WHERE SHE FEELS SHE SHOULD GO)**

Can you think of any other times in your life which you recall as being either stressful or not stressful for you. **(FOR EACH TIME PERIOD SPONTANEOUSLY RECALLED, ASK THE SUBJECT TO PLACE HER STRESS LEVEL FOR THAT TIME PERIOD ON THE GRAPH OVER THE APPROPRIATE YEAR(S). IF THE SUBJECT CANNOT RECALL ANY TIME PERIOD USE PROMPTS BELOW. OTHERWISE, FROM TIME PERIODS OBTAINED, BE SURE TO GET AS MUCH OF LIFESPAN AS POSSIBLE (i.e., FROM CHILDHOOD TO PRESENT)).**

I'd like you to think of any other time which was either stressful or not stressful for you. For example, your childhood, leaving home for the first time, the first years of marriage, having a child, etc..

EXTREME

# STRESS LEVEL



0  
1995  
1990  
1985  
1980  
1975  
1970  
1965  
1960  
1955  
1950  
1945  
1940  
1935  
1930  
1925



## **Appendix B**

### **Consent Forms**

**Study 1**

**Study 2**

Code no. \_\_\_\_\_

### **CONSENT FORM**

I, \_\_\_\_\_, consent to participate in the study of how personality, social factors and lifestyle affect the activities and abilities of older adults, which is being conducted by Drs. Arbuckle, Chaikelson and Gold of the Centre for Research in Human Development of Concordia University.

A. With respect to the study itself, I understand that:

1. It will involve answering a number of questionnaires and tests, some of which will be new to me and others of which I have filled in previously
2. One aspect of the project will be the addition of questionnaires on marriage and family life and on tobacco and alcohol use. The reason for asking these questions is to add to knowledge about how various aspects of Canadian lifestyle relate to everyday functioning of individuals. The study will also include some new measures of abilities and activities

B. With respect to my participation in the study, I understand that

1. Any information learned about me or anyone else through my responses to the questionnaire will be confidential. The results of the study will be available only to the investigators, who may use the results for scientific purposes such as publication in a scientific journal or presentation at a scientific meeting as long as I am not identified as a participant in the study.
2. I will receive a full explanation of the findings of the study when they become available.
3. Participation is completely voluntary and I may withdraw from the study at any time.
4. My decision on whether or not to participate will in no way affect my eligibility to participate in any future studies.

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

### To Our Subjects

#### **PREGNANCY PROJECT UPDATE**

We are happy to inform you that there are presently 65 women participating in the pregnancy project. Of these, 27 have delivered. We are pleased with the good cooperation that we have received and with our virtually non-existent dropout rate. This enables us to collect information about life during pregnancy and once the baby is born. We believe that it is important to study women's health, especially during pregnancy. Consequently, the project is still in full operation. You will be receiving a summary of the findings once they are available. We wish to thank you for your valuable help and we hope that you and your new baby are well.

Deborah Da Costa, Julie Larouche  
William Brender Ph.D  
Department of Psychology  
Concordia University

#### **INFORMATION CONCERNING PRESENT PARTICIPATION**

With respect to this part of the study, I understand that:

It will involve answering a few questionnaires, some of which I have filled out previously.

One aspect of the project will be the addition of questionnaires on child care and my new baby, as well as how my feelings change over time.

All information learned about me or anyone else through my responses to the questionnaires, as always, will be confidential.

I will receive a full summary of the findings as soon as they become available. Participation is completely voluntary and I may withdraw from the study at any time.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_