Evaluating sensitivity to change in the Simple Lifestyle Indicator Questionnaire (SLIQ)

by

© Bradley Norman

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Abstract

The Simple Lifestyle Indicator Questionnaire (SLIQ) was developed to measure five aspects of lifestyle that are shown to impact cardiovascular health. The present study addresses a gap in the literature on the SLIQ by evaluating its sensitivity to change. We recruited forty-one adult participants from a Weight Watchers' location and a university gym. At enrollment, participants were weighed and asked to complete the SLIQ. Three months later, they were weighed a second time and completed the SLIQ again. Additionally, participants provided self-reports regarding how they felt various health-related aspects of their lifestyle had changed during the study period. Self-reports and weight change were compared with the change in SLIQ scores over the study period. We found that changes in the overall SLIQ scores had a statistically significant correlation with weight change and with participants' self-reported change in lifestyle. SLIQ sub-scores, specifically those relating to diet and exercise, were found to correlate significantly with self-reports.

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List of Abbreviations and Symbols

BMI	Body Mass Index
CVD	Cardiovascular disease
DSI	Daily Stress Inventory
DQI-R	Diet Quality Index Revised
HEI	Healthy Eating Index
r	Pearson correlation coefficient
PSS	Perceived Stress Scale
PSS-14	Perceived Stress Scale with 14 questions
7D-PAR	Seven-Day Physical Activity Recall Test
SLIQ	Simple Lifestyle Indicator Questionnaire
ρ	Spearmen correlation coefficient
SD	Standard deviation
VAS	Visual Analog Scale

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Chapter 1: Introduction

1.1 Background

Validated health measurement scales are used by clinicians and researchers to assess aspects of a person's health[1,2]. Different aspects of a person's lifestyle can affect current health or be a risk factor for future health[3]. From the perspective of cardiovascular disease (CVD), five lifestyle factors have been identified as having an impact on future disease occurrence[4-6]. These factors are diet, physical activity, smoking, alcohol ingestion, and stress.

There are health measurement scales that measure these five factors individually, but only one with published psychometrics that attempts to combine the five factors into a single health measurement scale to produce a 'lifestyle score' for an individual. This instrument is called the Simple Lifestyle Indicator Questionnaire or SLIQ[7,8]. The SLIQ is a 12-question instrument that measures all five of the above mentioned lifestyle factors and provides an overall lifestyle score as well as a score for each of the lifestyle components. The briefness of the instrument makes it more usable in a clinical situation and significantly decreases participant burden in research studies where it can be used to replace separate, often long, instruments used to individually measure each of diet, physical activity, smoking, alcohol ingestion, and stress.

1.2   Brief Summary of Literature on Measurement Tools for the Individual Lifestyle

Factors

Stress

A person experiencing a high level of stress for extended periods of time can become susceptible to a host of health complications, including hypertension, decreased immune response, and a variety of mental conditions[9,10]. Research suggests that stress is also capable of triggering maladaptive behaviours such as smoking or smoking relapse, which further increases the person's risk for a range of medical conditions, particularly those relating to cardiovascular health[9]. One common scale for measuring stress is the Perceived Stress Scale (PSS)[10,11]. There are several versions of the PSS but the longest version, with 14 questions, has the best psychometrics. The PSS has been shown to be reliable, with test-retest correlation ranging from 0.77 to 0.86 for the PSS-14.

An older measure used to evaluate stress level is the Daily Stress Inventory (DSI)[12]. Whereas the PSS focuses on how one feels during a particular period of time, the DSI attempts to measure stress level based on the presence of a number of potential stressors in their life. Early versions of the DSI included 71 items that were identified as stressful, but the inventory was eventually reduced to 58 items.

Unlike the PSS, the DSI is poorly generalizable across age and culture, due to the varying nature of stressors in different populations. Another concern with the DSI is that it assumes that only the 58 items on the list will cause significant stress in the respondent's life and that no new prevalent stressors will emerge in society as a result of world events or technological changes, such as terrorism or cyber bullying.

Diet

The Healthy Eating Index (HEI)[13] presents respondents with a total of 12 questions to determine the amounts of various components in one's diet, such as fruits, vegetables, whole grains, milk, meat, alcohol, sodium and saturated fats. Certain dietary components are weighted more heavily than others to account for the varying degrees that these components are believed to affect one's overall health. An overall evaluation of the respondent's diet is made by adding the weighted scores of their responses.

Another scale that is often used to evaluate diet is called the Diet Quality Index Revised (DQI-R)[14,15]. This test takes into consideration 10 factors that contribute to the quality of one's diet: fats, carbohydrates, fruit, vegetables, grains, calcium, iron, sodium, and alcohol. Respondents recall their dietary intake for a defined period of time which is then converted into a score ranging from 0 to 100, where a higher score indicates a higher quality diet[15].

Physical activity

Regular physical activity has been shown to have a long-term positive effect on health[16]. One method used to quantify physical activity is the Seven-Day Physical Activity Recall test (7D-PAR)[17]. This test is conducted in the form of a structured interview between a researcher and the participant. The interview lasts between 15 and 20 minutes and seeks to determine how much time during the last seven days the person has spent taking part in physical activities. The participant is also asked to classify the intensity of those activities as "moderate", "hard", or "very hard". Finally, the interviewer asks how much time has been spent sleeping during the past week. Any remaining time that has not been accounted for by the previous questions is assumed to be "light activity". Based on the responses to these questions, the researcher can use a series of

formulas to calculate the person's total daily energy expenditure. A validation study on the 7D-PAR found the test to be accurate at predicting the total amount of energy expended by individuals[8]. However, the test was found to have a degree of variation in accuracy due to certain factors, including gender, cardiovascular fitness, and the amount of body fat of the participant, as all these factors influence metabolic rates.

Alcohol

The amount of alcohol that is consumed regularly by an individual has an impact on their cardiovascular health. While there are acute health issues may arise from intoxication, such as accidental trauma or alcohol poisoning, for the purposes of this study, we only considered the long-term health effects of alcohol. It is also generally accepted that the amount of alcohol that can be safely consumed varies between individuals due to factors such as age, weight, and gender[18-20]. Most research that involves measuring one's alcohol consumption generally uses a simple self-reporting tool. For people who drink only a low to moderate number of drinks per week, this method of measurement is fairly accurate, but as the number of weekly drinks increases to more than 14 the accuracy of self-reports declines[19].

Smoking

The final lifestyle factor considered is cigarette smoking. The most commonly used means of quantifying smoking is a process called pack-years[21]. So an individual who has smoked a pack of cigarettes per day for 10 years would have a pack-years score of 10. A person smoking ½ a pack per day for twenty years would also have a pack-year score of 10. It involves collecting information of an individual's smoking history, number of years, and amount smoked, and doing the calculation.

1.3 Composite Lifestyle Measurement Tools

The SLIQ is a composite lifestyle measurement tool. It combines five different known lifestyle risk factors for cardiovascular disease. Apart from the SLIQ, there is very little in the literature related to measuring lifestyle as a construct that combines multiple lifestyle factors. There are examples of a composite score developed as the outcome for an intervention study, but these are generally scores based on administration of multiple validated measurement tools, each measuring a component of lifestyle, rather than an integrated instrument[22]. As well, these composite scores often include weight[23]; but weight itself is not a lifestyle, though it can be a consequence of lifestyle. There are examples of composite scores in other disciplines such as rheumatology[25,26]. Our search did not find another composite index that was developed from scratch rather than being a combination of existing measurement scales, that measured only lifestyle factors related to cardiovascular diseases. There are global risk scores such as the Framingham Score but these include biochemical and clinical risk factors; generally the only lifestyle factor utilized in the global CVD risk scores is smoking status[27,28].

1.4 Psychometrics

Psychometrics[29-32] is the field of study that deals with measurement of knowledge, abilities, attitudes, behaviours and traits in individuals. The field is primarily concerned with the study of measurement instruments such as questionnaires and tests. It involves the construction and testing of instruments to determine its validity and reliability, which are key to determining how accurately the instrument measures what it is supposed to be measuring.

1.4.1 Validity

Validity is a term used to describe how well a particular instrument reflects the real-world quantity it attempts to measure. Validity is a broad concept and there are a number of ways to assess it. Three types of validity testing are: content validity, criterion validity, and construct validity.

Content validity assesses whether the questions on a particular instrument are appropriate for the construct and population it is intending to measure; and whether the questions cover the full range of possible concepts the instrument should cover. Typically, this is accomplished by asking for input from those who are experts in the field of interest and from members of the particular population to be measured.

Construct validity refers to the degree to which an instrument designed to measure a specific construct (eg happiness) correlates positively with other constructs similar to happiness (eg satisfaction, contentment); and the degree to which it correlates negatively with constructs that would be considered the opposite such as sadness, or depression. Respectively these are called convergent validity and discriminate validity and constitute the two subtypes of validity that make up construct validity

Criterion validity also has two subtypes. Concurrent validity is the degree to which an instrument correlates with other measurement instruments designed to measure the same construct. For instance, the concurrent validity of a newly developed instrument designed to measure well-being would be compared to an instrument known to accurately measure well-being. The two measures would be completed at the same time or 'concurrently'. Predictive validity is a measure of the degree to which an instrument would predict future outcomes. For

instance, a well designed aptitude test would successfully predict how well an individual would perform in a future occupation.

Responsiveness: Responsiveness is the degree to which the score on an instrument changes in direction and intensity when the actual construct being measured changes: also referred to as sensitivity to change. And the degree to which the score on an instrument remains stable when the construct being measured does not change: also referred to as specificity to change. It is a form of validity that has features of both construct and criterion validity. It is the SLIQ's responsiveness that is the primary focus of this thesis. As an example of the concept of responsiveness, if an instrument was designed to measure the degree of depression in an individual then a change in the degree to which a person was depressed based on professional clinical assessment should be reflected in both the intensity and direction of the person's score on the instrument. Similarly if a person's depression had not changed based on professional clinical assessment since the person's score on the instrument was last assessed, then the current score on the instrument should remain the same.

1.4.2   Reliability

Reliability refers to the consistency of a measure. It can be determined in three main ways: inter-rater reliability, test-retest reliability, and internal consistency reliability.

Inter-rater reliability is applied to measurement situations where the subjects are being observed or rated by someone and have to make judgements and give scores. The degree to which different raters agree on a score or a judgement is the inter-rater reliability. It is not appropriate when the subjects are rating their own behavior or attitudes on a questionnaire.

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Hence it does not apply to the SLIQ instrument which is a series of written questions to which the subject responds.

Test-retest reliability is the degree to which the responses on a measurement instrument, and the score obtained, remain the same over time, providing there has been no reason for it to have changed. The process is to have a group of people complete the questionnaire (measurement instrument) at time zero and then complete it again later at a time when it is unlikely the respondent would remember how they responded the first time, but not so long that their circumstances might have changed resulting in real changes in their score. This is often 1 - 4 weeks later depending on the instrument and the construct being measured. A reliable instrument should have a high correlation between the responses and scores at time zero and the subsequent responses and scores.

Internal consistency reliability is measured using a statistics called Cronbach's alpha and is essentially the correlation between responses to questions on a measurement instrument that are measuring the same concept or construct within the instrument. For instance, the Cronbach's alpha for the three diet questions on the SLIQ is 0.58 which is good but not excellent, suggesting that while the questions are all measuring aspects of a person's diet they are probably individually tapping into different aspects of that diet.

1.4.3   Correlation

Correlation, in most basic terms, describes whether two variables are related. Two strongly correlated variables will vary in a predictable pattern in relation to one another, whereas variables that are not correlated will show no such pattern. Perhaps the most frequently used measures of correlation is Pearson's correlation. This statistic is used when analyzing continuous

data (interval or ratio) that comes from a parametric distribution. When data is non-parametric, the Spearman correlation technique is more appropriate [17]. Regardless of which correlation technique is employed, it is interpreted in a similar fashion. The correlation coefficient—either r for Pearson correlation or ρ for Spearman correlation—will range from -1 to +1. A negative coefficient indicates that as one variable increases, the other will decrease, whereas a positive coefficient indicates that both variables will increase or decrease together. The closer the coefficient value is to either extreme, the stronger the correlation between the variables, with a value of zero indicating no relationship exists.

1.5   Simple Lifestyle Indicator Questionnaire (SLIQ)

The Simple Life Indicator Questionnaire (SLIQ)[7,8] is a short measurement scale that assesses five aspects of lifestyle and provides a score for each component as well as an overall lifestyle. Diet, physical activity, alcohol consumption, smoking, and stress have all been shown to be risk factors for development of cardiovascular disease. The motivation behind the development of the scale was to provide researchers and clinicians a single, short, easily applied, and reasonably valid and reliable instrument that measured cardiovascular lifestyle. Prior to its development, each of the five risk factors had to be measured individually using lengthy measurement scales for each risk factor.

1.5.1   Content/Components of the SLIQ

The SLIQ has 12 questions that evaluate the five lifestyle factors of interest.

Diet

There are three diet questions in the SLIQ (see figure 1.1). The questions ask about good dietary habits: ingestion of vegetables, fruit, and grains. In the initial versions of the SLIQ, there were also questions related to unhealthy eating habits such as highly fatty foods, processed foods, etc. However the developers determined through factor analysis that there was a high correlation between eating 'good' foods and not eating unhealthy foods. They decided that only one group was needed to measure a person's overall diet[7].

Figure 1.1: Diet related Questions on the SLIQ

Simple Lifestyle Indicator Questionnaire

Diet: To answer these questions, think about your eating habits in the past year. Indicate how often you eat the following foods. Please include all meals, snacks and eating out

1. Lettuce or green leafy salad, with or without other vegetables

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

2. Fruit: include fresh, canned or frozen, but do not include juices

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

3. High fiber cereals or whole grain breads: this includes cereal such as Raisin bran, Fruit and Fiber, cooked oatmeal, and breads which are whole wheat, multigrain, rye or pumpernickel

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

Physical Activity

Three questions ask about the frequency and type of exercise that is typically engaged in by the individual. (see figure 1.2). A formula is used to assign value to the three different levels of activity. See the scoring template in Appendix 1.

Figure 1.2: Physical Activity related questions on the SLIQ

Physical Activity: To answer the following questions, think about your physical activity over the past year, please indicate on average how many times per week you take part in the following activities for a duration of at least 30 minutes or more at a time:

I. Light physical activity, such as:
- light gardening and light housework (dusting, sweeping, vacuuming)
- leisurely walking (walking your dog)
- bowling, fishing, carpentry, playing a musical instrument
- volunteer work

0/week   1-3x/week   4-7x/week   8 and more/week

II. Moderate physical activity, for example:
- brisk walk
- bicycling, skating, swimming, curling
- gardening (raking, weeding, spading)
- dancing, Tai Chi or moderate exercise classes

0/week   1-3x/week   4-7x/week   8 and more/week

III. Vigorous physical activity, for example:
- running, bicycling, x-country skiing, lap swimming, aerobics
- heavy yard work
- weight training
- soccer, basketball or other league sports

0/week   1-3x/week   4-7x/week   8 and more/week

Alcohol Consumption

Alcohol consumption is evaluated by asking the respondent to identify the number of drinks they consume on a weekly basis from three categories: wine, beer, or spirits. (see figure 1.3). The three numbers are added to determine the number of weekly drinks.

Figure 1.3: Alcohol related questions on the SLIQ

Alcohol: Please indicate how many drinks of the following types of alcohol you consume in an average week:

- ✓ Wine: _____ drinks (3-5 oz.)

- ✓ Beer: _____ drinks (10-12 oz or 1 bottle)

- ✓ Spirits: ____ drinks (1-1 ½ oz.)

Smoking

Smoking status is scored as to whether the person is a current smoker, a past smoker, or never smoked (see figure 1.4).

Figure 1.4: Smoking related questions on the SLIQ

Smoking: Please indicate your smoking habits below:

Are you a smoker?	Yes	No
If yes, how long have you been smoking?	_____ years	
If no, did you ever smoke?	Yes	No
If yes, how many years ago did you quit?	_____ years	

Stress

Stress is measured as self-perceived stress using a single 6-point Likert Scale question (see Figure 1.5).

Figure 1.5: Stress related question on the SLIQ

Life Stress: To answer this question please circle the number which you feel best corresponds to the level of stress in your everyday life

1   2   3   4   5   6

Not at all stressful   Very stressful

1.5.2   Scoring the SLIQ

An overall SLIQ Lifestyle score and the five component lifestyle scores are calculated from the responses. First the raw component scores are calculated. (see appendix 1 for the scoring template).

For diet, the responses are given a value as indicated in the scoring template and the value for each of the three questions are added to give a diet raw score of between 0 and 15. A diet category score is assigned such that a raw score of 0-5 is assigned a value of zero indicating a poor diet; 6-10 is assigned a value of 1 indicating an intermediate diet; and 11-15 is given a value of 2 indicating healthy diet.

For physical activity, the respondents indicate the number of times per week they do light, moderate, and vigorous physical activity, with examples given for each. The frequency of each type of activity is given a weight (score). The physical activity raw score is a sum of these three scores. The physical activity category score is the highest level in which they do any activity. So if they only do light activity they score 0 indicating unhealthy level of physical activity; if they do any moderate activity they score 1 indicating an intermediately lifestyle for physical activity; and if they do any vigorous activity they are given a category score of 2 indicating a health level of physical activity.

For alcohol consumption, the respondent indicates the number of each type of alcohol (wine, beer, liquor) they drink in an average week. The numbers are added to give an alcohol raw score. The alcohol category score is calculated using the following formula: 14 or more drinks per week, the category score is zero for unhealthy; 8-13 drinks per week, the category score is 1 for intermediately health; and 0-7 drinks per week, the category score is 2 for healthy.

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For smoking, the raw score and category score are the same: 0 if current smoker; 1 if past smoker; 2 if never smoked.

For stress, the respondents indicate self-perceived level of stress on a scale of 1 to 6 with 1 being low stress and 6 being high stress. For scoring, the numbers are reversed in order to be consistent with the other factors where a high raw score indicates a healthy lifestyle and a low raw score indicates an unhealthy lifestyle. The stress raw score has a range of 1 to 6 with 6 being the lowest stress level. The stress category score is assessed by dividing the 6 point scale into tertiles: 1 and 2 indicate unhealthy stress lifestyle; 3 and 4 are intermediate; and 5 and 6 indicate a healthy lifestyle.

The overall SLIQ score is determined by adding the 5 category raw scores (each category score is 0, 1, or 2), hence the range for the SLIQ score is from 0 -10. The overall SLIQ lifestyle category score is zero for unhealthy if the overall SLIQ score is 0-4; 1 for intermediate if the overall SLIQ score is 5-7; and 2 for healthy if the overall SLIQ score is 8-10.

1.5.3   Published SLIQ Psychometrics

In the development of the SLIQ, a family physician, a nutritionist, and a nurse practitioner were consulted to help draft questions and ensure that the content covered by the questionnaire was relevant to cardiovascular health. Once drafted, the proposed questions for the SLIQ were shown to a different panel consisting of two physicians, a nutritionist and a nurse practitioner. This panel of experts evaluated how well they felt the questions related to the area of interest based on their expertise. The questions were adjusted based on their input. This constituted the content validity assessment of the SLIQ[7]. Factor analysis was then conducted and the original 30 questions were decreased to 12. The validity and reliability testing which was

completed and published in two peer reviewed articles[7,8], was conducted on this 12-question version of the SLIQ.

Test-retest reliability ranged from 0.74 to 0.97 for the 12 questions[7]. Internal consistency reliability was 0.58 for the three diet questions and 0.6 for the three physical activity questions[7]. Criterion validity (concurrent) was 0.77 for the overall SLIQ score[7] and for the components[8] it was 0.68 for diet, 0.46 for physical activity, 0.67 for alcohol consumption, and -0.264 for stress. Smoking was not assessed. These are good but not excellent scores.

Predictive validity has not been tested and neither has responsiveness. Responsiveness testing (sensitivity to change) for the SLIQ is the subject of this thesis.

1.6   Purpose of study

The overall SLIQ score and the categorization of a person as having a healthy, intermediate, or unhealthy lifestyle is reasonably robust as described in Chapter 1, although not excellent. One aspect of the SLIQ not previously studied is its ability to detect change in lifestyle of an individual over time. The purpose of this study is to determine if the SLIQ score changes appropriately as a person's lifestyle changes. If a person improves their lifestyle, will their SLIQ score increase, and conversely, if their lifestyle worsens will their SLIQ score decrease? <u>We will measure the correlation between change in SLIQ scores with two indicators of lifestyle change: change in weight and self-assessment of lifestyle change</u>.

Specifically, we will address the following research questions:

1.	Does the degree and direction of the overall SLIQ score change appropriately with the degree and direction of weight change in a population of people who set out to improve their lifestyle?

2.	Does the degree and direction of the overall SLIQ score change appropriately with the degree and direction of self-reported lifestyle change in a population of people who set out to improve their lifestyle?

3.	Does the degree and direction of the diet component raw score of the SLIQ change appropriately with the degree and direction of weight change and self-assessed diet change in a population of people who set out to improve their lifestyle?

4.	Does the degree and direction of physical activity component raw score of the SLIQ change appropriately with the degree and direction of weight change and self-assessed physical activity change in a population of people who set out to improve their lifestyle?

As described in the Methods section, people just starting out in a Weight-Watchers program and people starting to attend a gym (the Memorial University Works Gym) for the purpose of improving their health were assessed at the beginning of their programs and again after 3 months. The emphasis of these programs is on weight loss and on physical activity. Both programs will often have a goal of achieving weight loss as well as increasing fitness.

It should be noted that the change in overall SLIQ score was compared to/correlated with change in weight and self-assessment of overall change in lifestyle. As well, the raw scores on the diet and physical activity components of the SLIQ were compared to change in weight and self-assessed change in diet and physical activity over the three month period. Only the diet and physical activity components of the SLIQ are individually assessed in this project. While the participants may have also hoped to make changes in smoking, alcohol consumption, and stress

as part of their overall attempt to improve themselves, the programs we enrolled participants from did not focus on these components and hence we have not specifically assessed them. The overall SLIQ score includes these other lifestyle components (smoking, alcohol, stress) and any changes in these would have contributed to any overall SLIQ score change.

1.7   Significance of Study

The validity and reliability of the SLIQ have already been assessed. The developer of the instrument, who is the supervisor on this thesis project, plans to continue to make refinements which will hopefully improve the psychometrics. The SLIQ measures a person's lifestyle at a single point in time. The studies to-date have focused on this one point in time assessment and comparing it to other instruments applied at the same time. Whether it can be used to track changes in lifestyle over time is not known. This study was designed to test the ability of the SLIQ to measure such lifestyle changes over time.   A tool that can objectively measure lifestyle change over different periods of time would be useful to clinicians who care for patients who are trying to improve their lifestyle, or who are at risk for or already have lifestyle related illnesses. Lifestyle researchers hoping to determine which interventions are best at effecting lifestyle change can use the SLIQ to assess lifestyle without having to resort to long assessment tools that measure individual components of lifestyle.

Chapter 2: Methods

2.1 Participants

To be eligible for the study, participants were required to be in the process of attempting positive lifestyle change. We were working from the premise that there would be a range of success such that some participants would have made important lifestyle changes after three months, while others would not. In order to identify people who were about to initiate and attempt a lifestyle change, participants were recruited from two sources: Weight Watchers and The Memorial University Works Gym. We contacted local Weight Watchers programs to seek permission to speak with their members regarding enrolment in this study. It was assumed that an individual who is newly registered for a Weight Watchers program feels that their current lifestyle is less healthy than they desire and are hoping to make lifestyle changes. Participants were enrolled from two Weight Watchers locations in St. John's, Newfoundland, Canada. Participants were also recruited from The Works, a campus gym located at Memorial University of Newfoundland in St. John's. Participants at this location were enrolled if they considered themselves to be a new member of the gym, or had recently returned after a substantial length of time away from the gym. For the purposes of this study, a lengthy absence from the gym was considered to be six months. Participants from these two sources were considered to be near the beginning of a lifestyle change and would have varying degrees of success. Both male and female participants were enrolled in the study, ranging in age from 20 to 65 years. Prior to collection of data, permission to recruit participants was obtained from the Weight Watchers' program director and The Works' manager. Ethical approval was granted from the Human Investigation Committee of Memorial University of Newfoundland.

2.2 Procedure

Weight Watchers initial measurements

A trained researcher was present in the waiting room of a Weight Watchers location from half an hour prior to the beginning of their weekly meeting until the meeting ended. A poster was placed on the wall to provide basic information regarding the study and to invite individuals to participate. A postcard sized version of the poster was also given to each individual, as they arrived; they were asked to review it at their leisure in the waiting room.

If a participant expressed interest in the study, they were given a clipboard containing consent information and a more detailed overview of the study (Appendix II). After the document was reviewed by the participant, the researcher offered to address any questions or concerns the participant might have. If consent was obtained, the participant was given a paper copy of the SLIQ to complete (Appendix III).

Another data sheet collected basic demographic information, such as height, weight, age and gender (Appendix IV). Weight was measured either with a digital scale provided by the researcher, or the weight value given to the participant by Weight Watchers staff when they checked in for the meeting. For some participants, both values were obtained. Initially, it was preferred that all participants be measured by the researcher's scale, so that measurements were consistently obtained on the same device, however when comparing the two weight values in participants for which both were obtained, it was found that the Weight Watchers' scale and the researcher's scale agreed within 0.2 of a pound or better in each case. For the purposes of this study, a weight difference of this magnitude is considered negligible and thus either weight value was acceptable.

When the participant completed the questionnaire and additional information form, their responses were stored anonymously in an envelope, identified only by a unique participant ID number. Contact information was collected and stored separately from the data, so that a follow-up evaluation could be arranged after 3 months. The contact information sheet also contained the participant ID so that the follow-up data could later be paired with the corresponding baseline data.

The Works initial measurements

The procedure followed at The Works was similar to that described for Weight Watchers with a few minor differences. The researcher was located in a seating area near the front check-in desk. The same poster and postcard handouts were used. In contrast to Weight Watchers, participants were not weighed by staff during check-in, thus all weight measurements were obtained by the researcher using the digital scale.

Follow-up measurements

Follow-up was conducted after approximately 3 months. This time frame was chosen as it would allow sufficient time to detect lifestyle change while accommodating the time limitations relating to this thesis. Participants from both recruitment sites were contacted to arrange for a follow-up meeting. At the follow-up meeting, the participants were asked to again complete the SLIQ and also to complete a follow-up questionnaire. The follow-up questionnaire asked the participants to report whether they felt their lifestyle had changed since the initial assessment 3 months earlier. The degree and direction of change was assessed using a scale ranging from -10 (indicating a strong change in lifestyle for the worse) through zero (indicating no change) to +10 (indicating a strong change for the better). Next, they were asked to score changes in two sub-

groups of their lifestyle (diet and physical activity) on a similar -10 to +10 scale. A final weight

measurement was obtained using the researcher's scale.

2.3 Sample Size Estimations

In order to detect a Pearson correlation coefficient of 0.45 or greater, assuming an alpha

of 0.05 and a beta of 0.2 (Power 0.8) the estimated sample size was 29 participants. Since our

study required a follow-up assessment after 3 months, there was a possibility some would be lost

to follow-up. To account for this, an additional 20% more participants were included, resulting in

a minimum of 35 participants.

The sample size calculations were completed using StatTools.net developed by Allan

Chang and freely available online. The site for sample size calculations for correlation is at

http://www.stattools.net/SSizcorr_Pgm.php.

2.4 Planned Analysis

Summary descriptive statistics were calculated for the sample population, including mean

age, gender, height, weight, and body mass index.

We calculated each individual's Body Mass Index (BMI) using the following formula:

$$BMI = \frac{Weight\ (lbs)}{Height\ (inches)^2} \times 0.703$$

The change in SLIQ score was calculated by subtracting baseline SLIQ score from the

follow-up SLIQ score. This provides a positive value if their SLIQ score improved during

follow-up and a negative value if their SLIQ score declined. Participants' body weight change was calculated by subtracting their 3 month follow-up body weight from their baseline body weight. This allows a positive value to represent a decrease in weight. This was done so that a "desirable" outcome (ie: losing weight) would correlate in the positive direction with a "desirable" SLIQ score change (ie: an increased SLIQ score).

We calculated correlation coefficients for change in overall SLIQ score vs change in weight, and change in overall SLIQ score vs self-assessed change in overall lifestyle. The change in raw scores on the SLIQ for the diet and physical activity components were each correlated with weight change and self-assessed change in diet and physical activity.

Chapter 3: Results

3.1 Descriptive Statistics

Forty-one participants, ranging in age from 20 to 67 years, were enrolled in the study. Twenty-nine of these participants were female (70.7%). Eight individuals (19.5%) were lost to follow-up, so our results are drawn from the remaining 33 study participants. Of the eight that were lost to follow-up, six were female (75%) and two were male (25%).

The mean age for all participants was 38.56 years (SD=15.46). The mean age of participants recruited through Weight Watchers was 45.92 years (SD=13.16) and those recruited from The Works gym mean age was 27.06 years (SD=11.37).

The height of participants ranged from 58 to 75 inches (Mean=65.88, SD=4.08). Participant weight ranged from 108 to 297 lbs (Mean=188.51, SD=47.39) at enrolment. At the 3 month follow-up, the weight ranged from 110 to 310 lbs (Mean=182.42, SD=49.31).

The upper and lower BMI values for our participants were 19.3 and 49.7 (Mean=30.54, SD=7.28) at enrolment. Since height was assumed to remain constant over the three month interval, the BMI values at the follow-up assessment varied in relation to the participant's weight range. Follow-up BMI range was 20.4 to 45.8 (Mean=29.41, SD=6.69).

Table 3.1 Mean values for participants' height, weight, and BMI at enrolment and 3-month follow-up.

Metric	At Enrolment		Follow-up	
	Mean	Standard Deviation	Mean	Standard Deviation
Height	65.88	4.08	NA*	NA*
Weight	188.51	47.39	182.42	49.31
BMI	30.54	7.28	29.41	6.69

*Height was assumed to have remained constant over the three month interval and thus was not measured at follow-up.

3.2   Research Question # 1: Does the degree and direction of the overall SLIQ score change appropriately with the degree and direction of weight change in a population of people who set out to improve their lifestyle?

For the 33 participants who remained through to follow-up, the mean weight change was 2.48 lbs (SD=10.78), an overall loss in weight. The mean SLIQ score change for these individuals was -0.09 (SD=1.73). Figure 3.1 shows the distribution of SLIQ score change for the participants in the study, ranging from -5 to 4 points.

Figure 3.1 Distribution of SLIQ score changes in participants.

Histogram

Mean = -.09
Std. Dev. = 1.739
N = 33
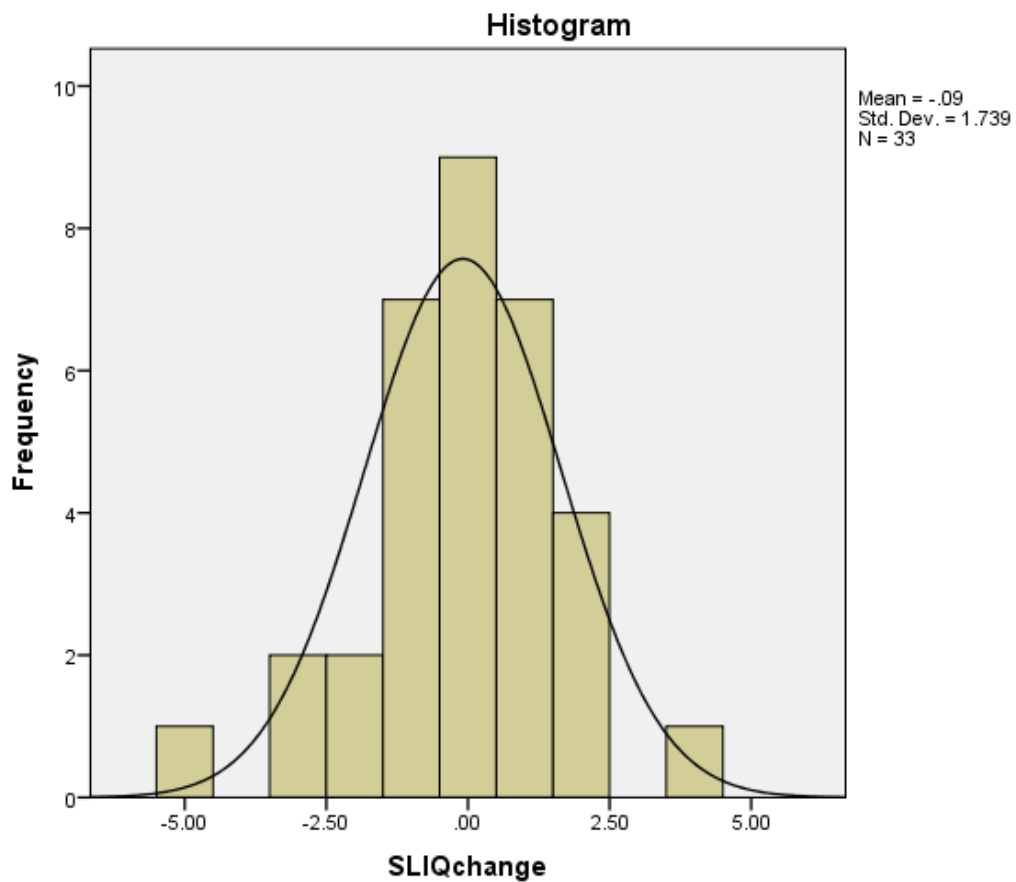
To determine the degree and direction of weight change in relation to the SLIQ score change, a Pearson correlation coefficient (r) was calculated. The result, r=0.499 with P=0.003, indicates a statistically significant positive correlation between weight loss and increased SLIQ score. Figure 3.2 below shows a scatter plot of this relationship with 95% confidence intervals. As the amount of weight loss increased the SLIQ score increased.

Figure 3.2 Relationship between SLIQ score change and weight change.
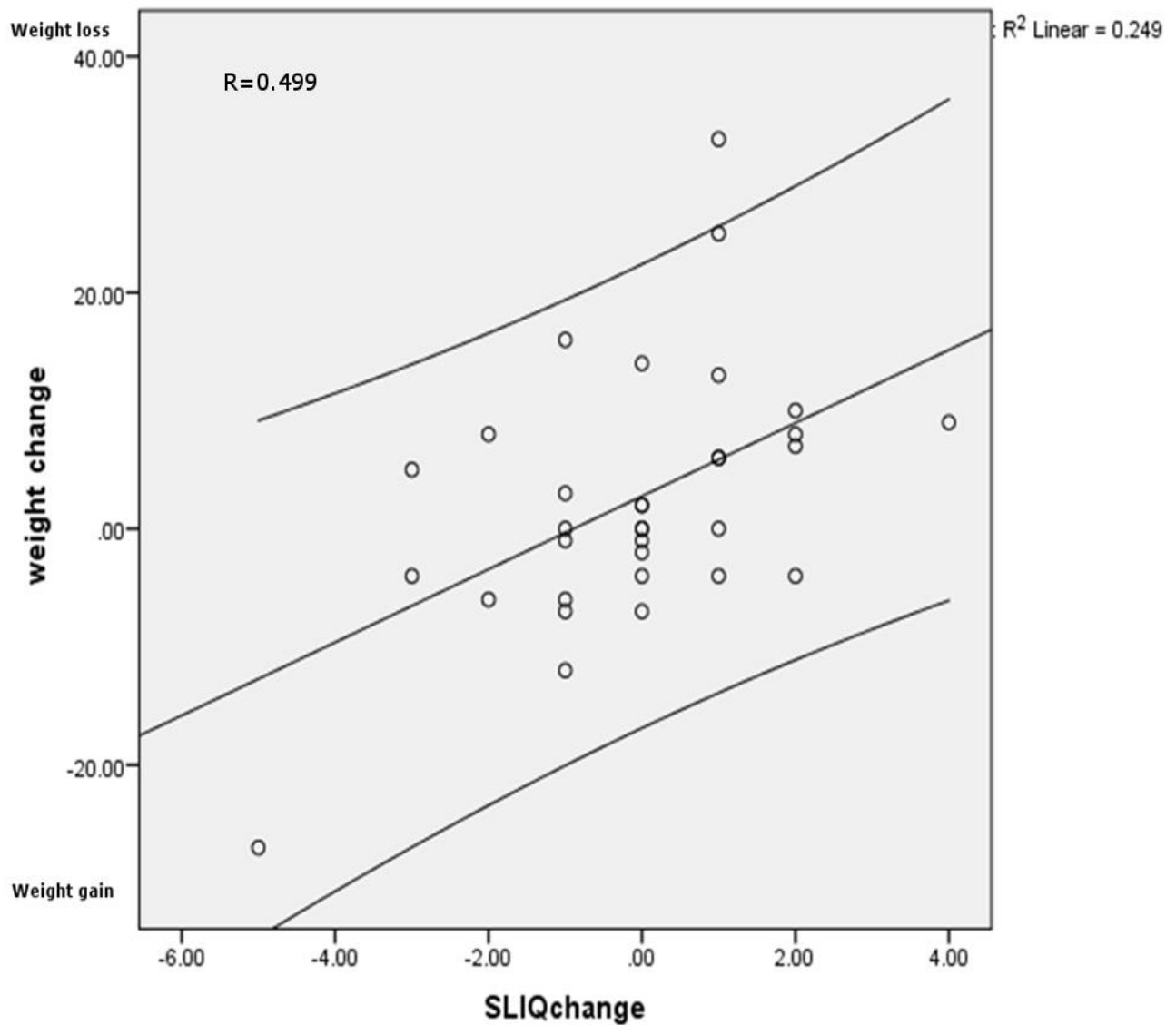
3.3 Research Question # 2: Does the degree and direction of the overall SLIQ score change appropriately with the degree and direction of self-reported lifestyle change in a population of people who set out to improve their lifestyle?

One of the metrics we used to determine lifestyle change was a self-assessment of whether the participant felt their lifestyle had changed since they enrolled in the study. Participants rated their perceived change in overall lifestyle on a scale from -10 to +10.

To determine the degree and direction of self-assessed change in lifestyle in relation to the SLIQ score change, a Pearson correlation coefficient (r) was calculated. The result, r=0.599 with P=0.001, indicates a statistically significant positive correlation between self-assessment of lifestyle change and change in SLIQ score. Figure 3.3 below shows a scatter plot of this relationship with 95% confidence intervals. As the self-assessment of improved lifestyle increased, the SLIQ score increased.

Figure 3.3 Correlation of change in overall SLIQ score and self-reported change in overall lifestyle.
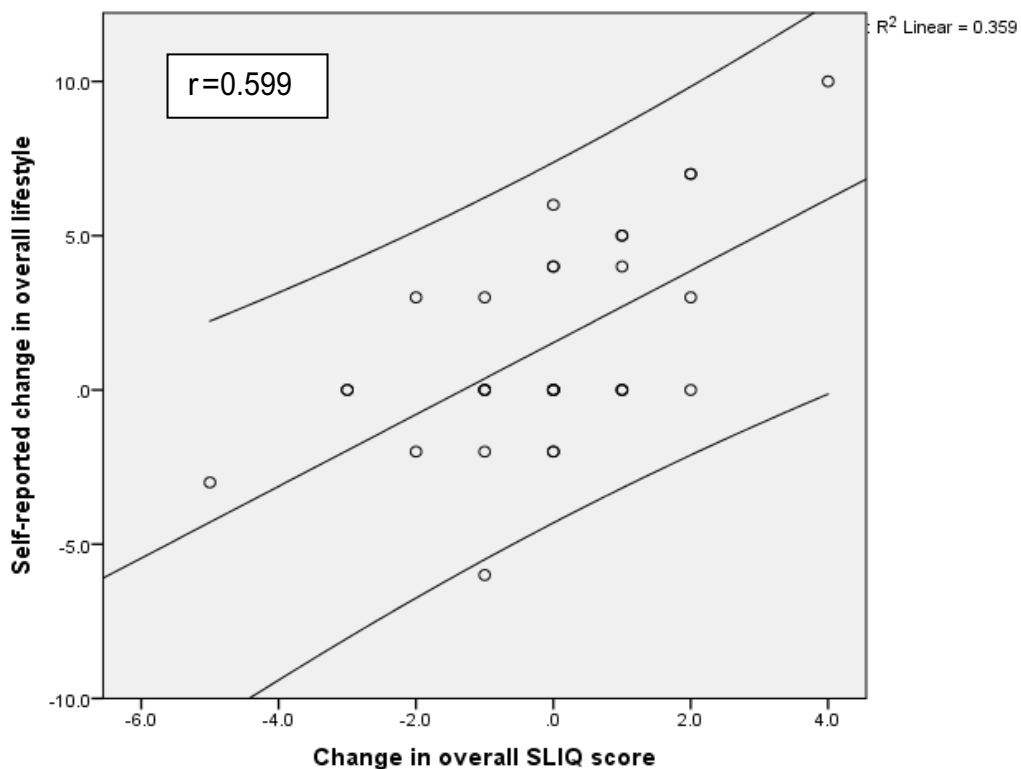
3.4   Research Question # 3: Does the degree and direction of the diet component raw score of the SLIQ change appropriately with the degree and direction of weight change and self-assessed diet change in a population of people who set out to improve their lifestyle?

   The change in the raw scores of the diet sub-component scores of the SLIQ was calculated by subtracting the diet raw score as measured at baseline from the diet raw score measured at follow-up. Correlations were then calculated for the diet raw score sub-component score vs weight change and diet raw score vs self-reported change in diet. As with the overall assessment of lifestyle change, the participants' self-reported change for the diet sub-component was recorded as a value ranging from -10 to +10, with a higher number indicating a desirable lifestyle change. The Pearson r for diet raw score vs self-report change in diet was 0.718 ($P < 0.001$) see figure 3.4

Figure 3.4 Correlation of self-reported change in diet with changes in raw diet scores.
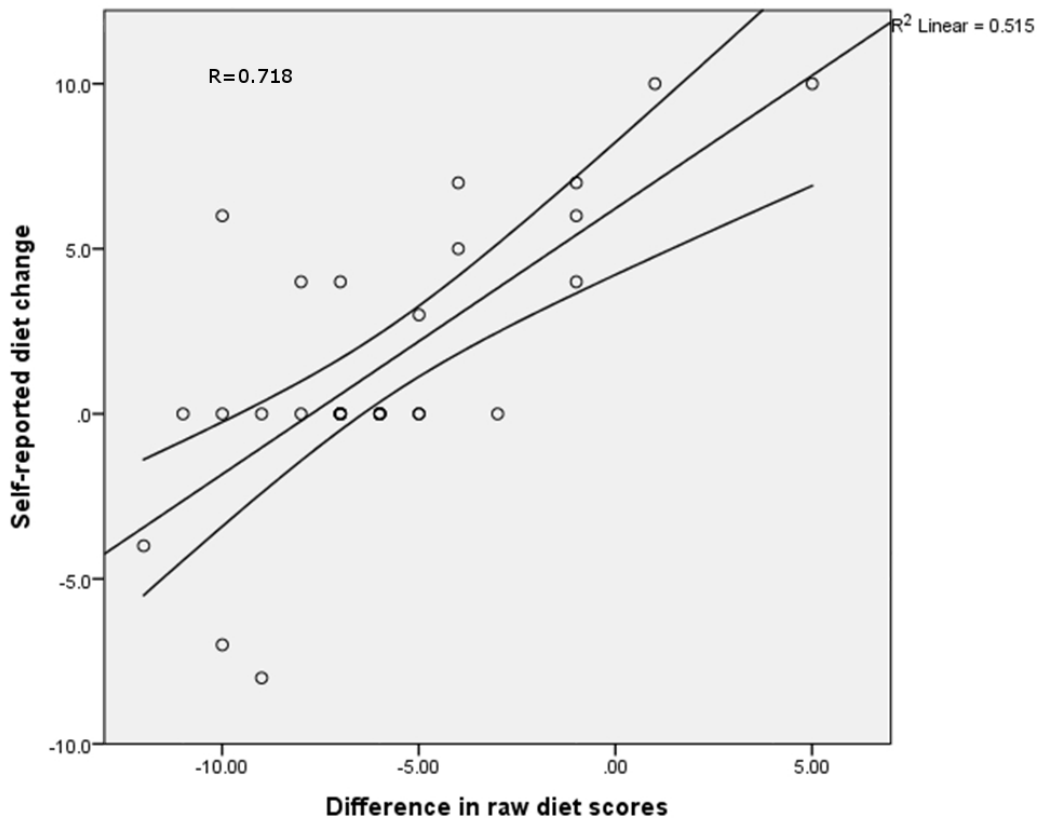
The Pearson r for the raw diet sub-score vs weight change from baseline to follow-up was

0.58 The correlation between weight change and change in diet was not statistically significant

(P=0.105).

Figure 3.5 Correlation of change in diet score vs change in weight over three month interval
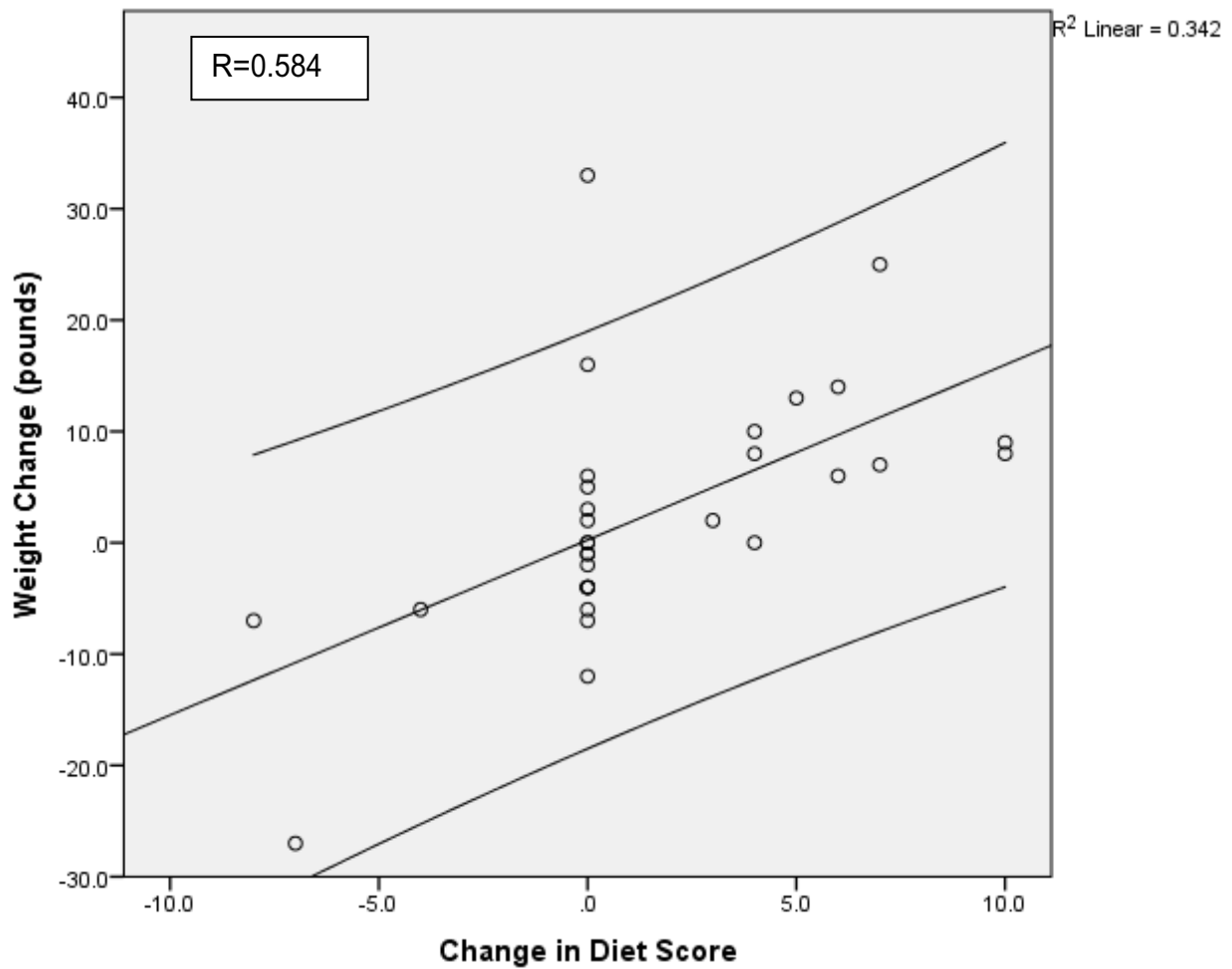
3.5 Research Question #4: Does the degree and direction of physical activity component raw score of the SLIQ change appropriately with the degree and direction of weight change and self-assessed physical activity change in a population of people who set out to improve their lifestyle?

The change in the raw scores of the physical activity sub-component scores of the SLIQ was calculated by subtracting the physical activity raw score as measured at baseline from the physical activity raw score as measured at three month follow-up. Correlations were then calculated for the physical activity raw score sub-component score vs weight change and physical activity raw score vs self-reported change in diet. As with the overall assessment of lifestyle change, the participants' self-reported change for the physical activity sub-component was recorded as a value ranging from -10 to +10, which a higher number indicating a desirable lifestyle change. The Pearson r for physical activity raw score vs self-report change in physical activity was 0.651 (P < 0.001). See figure 3.6)

The correlation for the raw score for physical activity level vs weight change was r=0.665, P=0.004) as shown in figure 3.7.

Table 3.2 summaries all of the correlation coefficients and their level of statistical significance.

Figure 3.6 Correlation of self-reported change in activity level with differences in raw activity scores obtained from initial and follow-up SLIQ assessments.
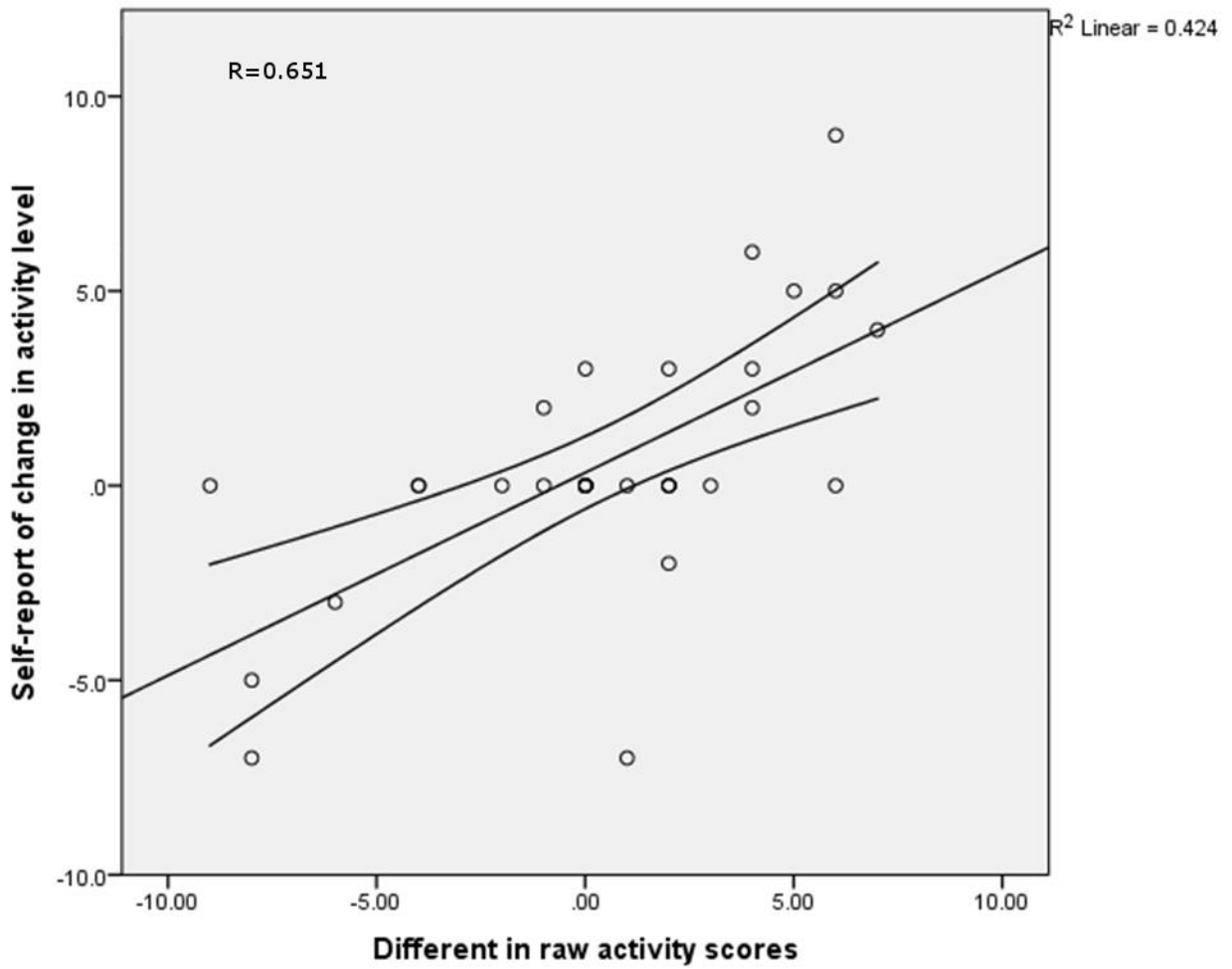
Figure 3.7 Correlation of change in physical activity raw score vs change in weight over a three month interval.
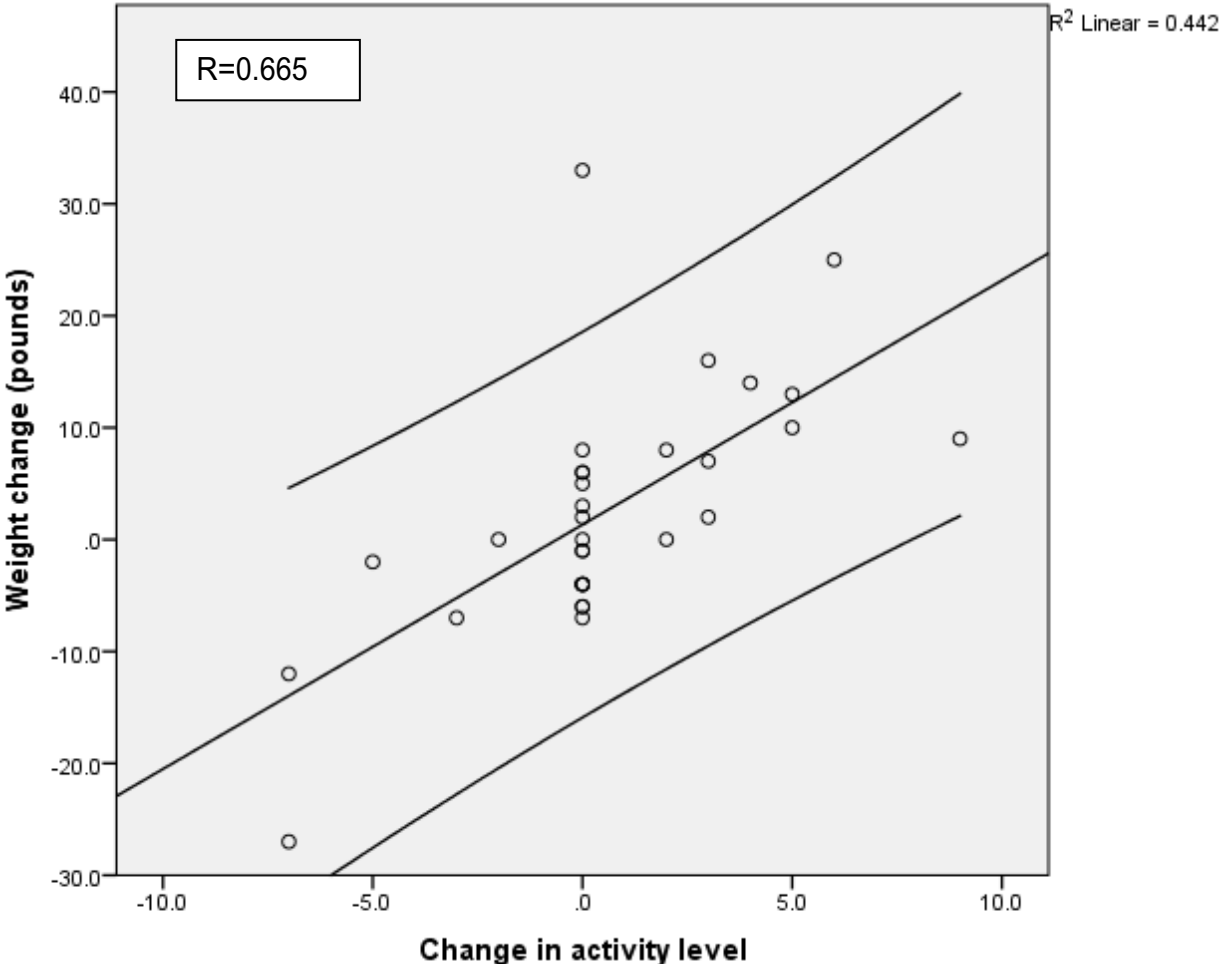
Table 3.2: Summary of Correlation Coefficients

Variables Correlated	Pearson's Correlation Coefficient r	P value
Change in Overall SLIQ Score vs Weight Change	0.499	0.003
Change in Overall SLIQ Score vs Self-Assessed Change in Lifestyle	0.599	0.001
Change in raw diet scores on the SLIQ vs Weight Change	0.580	0.105
Change in raw diet scores on the SLIQ vs Self-assessed change in diet	0.718	0.001
Change in raw physical activity scores on the SLIQ vs Weight change	0.718	0.001
Change in raw physical activity scores on the SLIQ vs Self-assessed change in physical activity	00.665	0.004

Chapter 4: Discussion

4.1 Descriptive Statistics

Females constituted over 70% of our sample which may pose a problem in generalizing beyond the study sites. In particular, older males were very poorly represented in this study, as all of the males were recruited from a university gym and were younger in age than participants recruited from Weight Watchers. The Weight Watchers programs used to recruit participants for this study were overwhelmingly subscribed to by female clients. Future research in this area should consider recruiting participants from other locations in order to ensure more males are included. The age range of the sample population, 20 to 67 years, is appropriate given the target population of the SLIQ.

The mean initial BMI for our sample was 30.54, which is considered obese. This is appropriate for this study, since we were aiming to include participants who were attempting to improve aspects of their lifestyle that would lower their body mass index. It is more likely to achieve a measurable change in weight in individuals who are overweight compared to those who have a healthy body weight.

4.2 Sensitivity to Change of Overall SLIQ Score

On average, participants in this study experienced a loss of weight. This was expected, since all participants were actively involved in a weight loss program, either through a gym or Weight Watchers.

The change in overall SLIQ score was significantly correlated with both weight change and self-assessment of lifestyle change. Participants who improved their SLIQ score were more likely to have moved closer to a healthier body weight. In contrast, participants who achieved a

decrease in their SLIQ score were more likely to have gained weight. The SLIQ score is sensitive to changes in weight, or changes in lifestyle that impact weight. The correlations were considered good in the 0.5 to 0.6 range.

4.3 Sensitivity to Change of the SLIQ Diet and Physical Activity Raw Scores

The change in Diet Raw Score correlated well with change in weight and with change in the self-assessed change in diet (r = 0.58 and r= 0.72 respectively). Likewise, the Physical Activity Raw Score correlated well with change in weight and with change in the self-assessed change in physical activity (r =0.67 and 0.65 respectively). Both the diet and physical activity sub-scores are sensitive to change in weight and to change in self-assessment of the degree and direction of change.

4.4 Limitations

Several limitations of this study should be considered. Our sample size was small and taken from only two sites. For these reasons, we should be cautious when generalizing these results to the general population.

A second limitation deals with the very low number of males who enrolled in the study. There were no males recruited from the Weight Watchers site. The focus of the lifestyle change (diet vs physical activity) in participants from the two recruitment sites was different: For this reason, males would not have provided much information to the diet sub-score of the SLIQ and our results may not necessarily reflect males in the general population.

There is also a possibility of recall bias when completing the self-assessment of diet and physical activity in this study as well as when answering the SLIQ questions. Those participants

recruited from a Weight Watchers location would be carefully keeping track of their meals and consequently would be able to accurately recall any changes in their eating habits. Likewise, it is possible that participants from the gym are more likely to be able to recall changes in activity levels.

Finally, the issue of using a modified Visual Analog Scale (VAS) to have the participants assess change in diet and physical activity between baseline and follow-up should be discussed. In general, the literature would suggest that a VAS is as good as, or better than, a Likert Scale as a means of measuring symptoms, perceptions, health outcomes, or health status.[33,34] The VAS.is generally structured as a 10 centimetre line anchored on each end with an extreme description. It has been most often used for self-assessment of pain where the left end would have a statement saying 'No Pain' and the right end saying, 'The worst pain you can imagine'. Sometimes there are no numbers on the line except perhaps a zero on the left end and a 10 on the right end, and the participant is asked to place a mark on the line to indicate his/her assessment of the level of whatever is being measured. Sometimes a number or a mark is place at each centimeter point on the line. VAS is generally considered a valid measurement approach. However because we need to measure both degree and direction of change at the end of the study, the VAS we used was numbered from -10 through 0 to +10. This has not been used much in the literature and we did not test it prior to using it in the study. The fact that the results we obtained when correlating it with the SLIQ scores were similar to the results we obtained when correlating weight change with the SLIQ scores, we believe it was a valid means of assessing the participants' perception of change. However, this must be considered a limitation of this study.

4.5 Conclusion

The SLIQ is not a perfect health measurement scale. However, despite its brevity, it has been shown to be reasonably valid and reliable. This study contributes to this literature by assessing the SLIQ's sensitivity to change. We have shown that a SLIQ score which increases over time correlates with a healthier lifestyle, as measured by both a decrease in weight and a self-assessment of an improved lifestyle. Similarly, a SLIQ score which decreases over time correlates with a less healthy lifestyle. This is also true for the SLIQ raw scores for the sub-components of diet and physical activity. The size of these correlations fall in the 0.50 to 0.72 range which are similar to the correlations achieved in other studies assessing the validation of the SLIQ.

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Scoring the
Simple Lifestyle Indicator Questionnaire

Diet:

1. Lettuce or green leafy salad, with or without other vegetables					
☐less than 1/week	☐ 1/week	☐ 2-3x/week	☐ 4-6x/week	☐ once/day	☐2+/day
0	1	2	3	4	5

2. Fruit: include fresh, canned or frozen, but do not include juices					
☐less than 1/week	☐1/week	☐2-3x/week	☐ 4-6x/week	☐once/day	☐ 2+/day
0	1	2	3	4	5

3. High fiber cereals or whole grain breads: this includes cereal such as Raisin bran, Fruit and Fiber, cooked oatmeal and breads which are whole wheat, rye or pumpernickel					
☐less than 1/week	☐ 1/week	☐2-3x/week	☐ 4-6x/week	☐ once/day	☐2+/day
0	1	2	3	4	5

DietRawScore = _____
Q1+Q2+Q3

DietCategoryScore = _____
0 If DietScore 0-5
1 If DietScore 6-10
2 If DietScore 11-15

Exercise:

1. Light exercise, such as:
• light gardening and light housework (dusting, sweeping, vacuuming)
• leisurely walking (walking your dog)
• bowling, fishing, carpentry, playing a musical instrument
• volunteer work

☐0/week	☐1-3x/week	☐4-7x/week	☐8 and more/week
0	2	3	4

ActivityRawScore = _____
Q1+Q2+Q3

2. Moderate exercise, for example:
• brisk walk
• bicycling, skating, swimming, curling
• gardening (raking, weeding, spading)
• dancing, Tai Chi or moderate exercise classes

☐0/week	☐1-3x/week	☐4-7x/week	☐8 and more/week
0	4	6	8

ActivityCategoryScore = ____
0 If Light Exercise Only
1 If Any Moderate Activity
2 If Any Vigorous Activity

3. Vigorous exercise, for example:
• running, bicycling, x-country skiing, lap swimming, aerobics
• heavy yard work
• weight training
• soccer, basketball or other league sports

☐0/week	☐1-3x/week	☐4-7x/week	☐8 and more/week
0	6	9	12

Alcohol: (per week)

- ✓ Wine: _____ drinks (3-5 oz.)

- ✓ Beer: _____ drinks (10-12 oz or 1 bottle)

- ✓ Spirits: ____ drinks (1-1 ½ oz.)

```
AlcoholRawScore _____
          Wine + Beer + Spirits

AlcoholCategoryScore _____

0 If Alcohol Score 14 or more
1 If Alcohol Score 8-13
2 If Alcohol Score 0-7
```

Smoking:

Are you a smoker?
☐ Yes   ☐ No
  0

If no, did you ever smoke?
☐ Yes   ☐ No
1   **2**

```
SmokingRawScore _____
              (0,1, or 2)
SmokingCategory Score_____
(Same as Smoking Score)
```

Life Stress:

| 6 | 5 | 4 | 3 | 2 | 1 |

Not at all stressful   Very stressful

```
StressRawScore = _____
          As indicated on Line

StressCategoryScore _____
O  If Life Stress 1 or 2
1  If Life Stress 3 or 4
2   If Life Stress 5  or 6
```

SLIQScore = DietCategory + ActivityCategory + AlcoholCategory + SmokingCategory + StressCategory

Appendix II

Consent to Take Part in Research

TITLE: Evaluating the ability of the Simple Life Indicator Questionnaire to detect change in lifestyle.

INVESTIGATOR(S): Dr. Marshall Godwin and Bradley Norman

You have been invited to take part in a research study. Taking part in this study is voluntary. It is up to you to decide whether to be in the study or not. You can decide not to take part in the study. If you decide to take part, you are free to leave at any time.

Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

Please read this carefully. Take as much time as you like. If you like, take it home to think about for a while. Mark anything you do not understand, or want explained better. After you have read it, please ask questions about anything that is not clear.

The researchers will:

∞ discuss the study with you
∞ answer your questions
∞ keep confidential any information which could identify you personally
∞ be available during the study to deal with problems and answer questions

1. **Introduction/Background:**
   The Simple Lifestyle Indicator Questionnaire was designed to measure the healthiness of a person's lifestyle. It asks questions about a person's diet, exercise routine, stress level, alcohol intake, and smoking habits.

2. **Purpose of study:**
   This study is intended to discover if the questionnaire is able to measure a change in lifestyle over time.

3. **Description of the study procedures:**
   At the beginning of the study, you will be asked to indicate your age and gender. You will then complete the full questionnaire, either on a paper or electronic version of the test. We will also measure your weight. We will ask you to provide contact information so we can follow-up with you.

-1-   Subject's Initials: _____

Evaluating the ability of the Simple Life Indicator Questionnaire to detect change in lifestyle. Version date: Nov 9, 2011

After three months, we will contact you and arrange to meet with you again. You will be asked to complete the same questionnaire again. During this follow-up, you will again have your weight measured. You will also be asked if you consider your lifestyle change to be successful or not.

4. **Length of time:**

You will be expected to participate in two assessments, taking place three months apart. Each assessment should last less than half an hour.

5. **Possible risks and discomforts:**

You will be asked to supply sensitive information such as your age and weight.

6. **Benefits:**

It is not known whether this study will benefit you.

7. **Liability statement:**

Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

8. **What about my privacy and confidentiality?**

Protecting your privacy is an important part of this study. Every effort to protect your privacy will be made. However it cannot be guaranteed. For example we may be required by law to allow access to research records.

When you sign this consent form you give us permission to
- ∞ Collect information from you
- ∞ Share information with the people conducting the study
- ∞ Share information with the people responsible for protecting your safety

Access to records
The members of the research team will study records that identify you by name.
Other people may need to look at the study records that identify you by name. This might include the research ethics board. You may ask to see the list of these people. They can look at your records only when supervised by a member of the research team.

Use of your study information
The research team will collect and use only the information they need for this research study.

-2-   Subject's Initials: _____

This information will include your

∞ age
∞ sex
∞ weight
∞ information from study interviews and questionnaires

Your name and contact information will be kept secure by the research team in Newfoundland and Labrador. It will not be shared with others without your permission. Your name will not appear in any report or article published as a result of this study.

Information collected for this study will kept for five years.

If you decide to withdraw from the study, the information collected up to that time will be destroyed.

Information collected and used by the research team will be on a secure server at the Primary Health Research Unit. Dr. Marshall Godwin is the person responsible for keeping it secure.

<u>Your access to records</u>
You may ask the researcher to see the information that has been collected about you.

9. **Questions or problems:**

If you have any questions about taking part in this study, you can meet with the investigator who is in charge of the study at this institution. That person is:

Brad Norman
364-9116
bnorman@mun.ca

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:
   Ethics Office
   Health Research Ethics Authority
709-777-6974 or by email at info@hrea.ca

<p align="center">**After signing this consent you will be given a copy.**</p>

<p style="text-align: center;">**Signature Page**</p>

Study title:

Name of principal investigator:

To be filled out and signed by the participant:

	Please check as appropriate:
I have read the consent and information sheet.	Yes { } No { }
I have had the opportunity to ask questions/to discuss this study.	Yes { } No { }
I have received satisfactory answers to all of my questions.	Yes { } No { }
I have received enough information about the study.	Yes { } No { }
I have spoken to Brad Norman and he/she has answered my questions	Yes { } No { }
I understand that I am free to withdraw from the study	Yes { } No { }

- ∞   at any time
- ∞   without having to give a reason

I understand that it is my choice to be in the study and that I may not benefit.	Yes { } No { }
I understand how my privacy is protected and my records kept confidential	Yes { } No { }
I agree to take part in this study.	Yes { } No { }

_____   _____   _____ _
Signature of participant   Name printed   Year Month Day

_____   _____   _____
Signature of person authorized as   *Name printed*   *Year Month Day*
*Substitute decision maker, if applicable*_____

To be signed by the investigator or person obtaining consent

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

_____   _____ _   _____
Signature of investigator   Name printed   Year Month Day

Telephone number: _____

Subject's Initials: _____

Simple Lifestyle Indicator Questionnaire

Diet: **To answer these questions, think about your eating habits in the past year. Indicate how often you eat the following foods. Please include all meals, snacks and eating out**

1. Lettuce or green leafy salad, with or without other vegetables

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

2. Fruit: include fresh, canned or frozen, but do not include juices

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

3. High fiber cereals or whole grain breads: this includes cereal such as Raisin bran, Fruit and Fiber, cooked oatmeal, and breads which are whole wheat, multigrain, rye or pumpernickel

   less than 1/week   1/week   2-3x/week   4-6x/week   once/day   2+/day

Physical Activity: **To answer the following questions, think about your physical activity over the past year, please indicate on average how many times per week you take part in the following activities for a duration of at least 30 minutes or more at a time:**

I. Light physical activity, such as:
   - light gardening and light housework (dusting, sweeping, vacuuming)
   - leisurely walking (walking your dog)
   - bowling, fishing, carpentry, playing a musical instrument
   - volunteer work

   0/week   1-3x/week   4-7x/week   8 and more/week

II. Moderate physical activity, for example:
   - brisk walk
   - bicycling, skating, swimming, curling
   - gardening (raking, weeding, spading)
   - dancing, Tai Chi or moderate exercise classes

   0/week   1-3x/week   4-7x/week   8 and more/week

III. Vigorous physical activity, for example:
   - running, bicycling, x-country skiing, lap swimming, aerobics
   - heavy yard work
   - weight training
   - soccer, basketball or other league sports

   0/week   1-3x/week   4-7x/week   8 and more/week

Alcohol: Please indicate how many drinks of the following types of alcohol you consume in an average week:

- ✓ Wine: _____ drinks (3-5 oz.)

- ✓ Beer: _____ drinks (10-12 oz or 1 bottle)

- ✓ Spirits: ____ drinks (1-1 ½ oz.)

Smoking: Please indicate your smoking habits below:

Are you a smoker?   Yes   No

If yes, how long have you been smoking?   _____ years

If no, did you ever smoke?   Yes   No

If yes, how many years ago did you quit?   _____ years

Life Stress: To answer this question please circle the number which you feel best corresponds to the level of stress in your everyday life

<u>1</u>_____<u>2</u>_____<u>3</u>_____<u>4</u>_____<u>5</u>_____<u>6</u>

Not at all stressful   Very stressful

This is the end of the questionnaire. Thank you for your cooperation!

Appendix IV
Additional Information Sheet

Age: _____

Gender: _____

Height: _____

Weight: _____

Appendix V
Lifestyle self-report forms

Do you think your overall lifestyle has changed since you enrolled in this study about three months ago?

[   ] YES   [   ] NO

     If YES, is it Better or Worse than it was when you enrolled?

          [   ] Better   [   ] Worse

If there has been a change in your Overall lifestyle (Better or Worse), please indicate on the scale below where you would rank your current overall lifestyle in relation to your lifestyle when you enrolled in the study about three months ago.

-10___-9___-8___-7___-6___-5___-4___-3___-2___-1___0___1___2___3___4___5___6___7___8___9___10

Worse   Same   Better

With respect to specific areas of lifestyle please indicate on the scales below where you would rank your current lifestyle

Diet

-10___-9___-8___-7___-6___-5___-4___-3___-2___-1___0___1___2___3___4___5___6___7___8___9___10

Worse   Same   Better

Physical Activity

-10___-9___-8___-7___-6___-5___-4___-3___-2___-1___0___1___2___3___4___5___6___7___8___9___10

Worse   Same   Better