

Body Satisfaction During Pregnancy: The Role of Health-Related Habit Strength

by

Rachelle Rose Ferera Pullmer

B.A. (Hons), McGill University, 2012

Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts

in the

Department of Psychology

Faculty of Arts and Social Sciences

© **Rachelle Rose Ferera Pullmer 2015**

SIMON FRASER UNIVERSITY

Summer 2015

All rights reserved.

However, in accordance with the *Copyright Act of Canada*, this work may be reproduced, without authorization, under the conditions for "Fair Dealing." Therefore, limited reproduction of this work for the purposes of private study, research, criticism, review and news reporting is likely to be in accordance with the law, particularly if cited appropriately.

Approval

Name: Rachelle Rose Ferera Pullmer
Degree: Master of Arts (Psychology)
Title: Body Satisfaction During Pregnancy: The Role of Health-Related Habit Strength
Examining Committee: **Chair:** Dr. Robert Ley
Associate Professor

Dr. Shannon Zaitsoff
Senior Supervisor
Assistant Professor

Dr. Rebecca Cobb
Supervisor
Associate Professor

Dr. Brent McFerran
Assistant Professor
Beedie School of Business

Date Defended/Approved: July 16, 2015

Ethics Statement



The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

- a. human research ethics approval from the Simon Fraser University Office of Research Ethics,

or

- b. advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University;

or has conducted the research

- c. as a co-investigator, collaborator or research assistant in a research project approved in advance,

or

- d. as a member of a course approved in advance for minimal risk human research, by the Office of Research Ethics.

A copy of the approval letter has been filed at the Theses Office of the University Library at the time of submission of this thesis or project.

The original application for approval and letter of approval are filed with the relevant offices. Inquiries may be directed to those authorities.

Simon Fraser University Library
Burnaby, British Columbia, Canada

update Spring 2010

Abstract

Body satisfaction during pregnancy is an important determinant of maternal and fetal health outcomes. It is therefore critical to investigate factors related to changes in body satisfaction and to elucidate how body satisfaction changes over time in pregnant women. I examined the relation between two novel factors (i.e., healthy eating and physical activity habit strength) and body satisfaction in 67 pregnant North American women from the beginning of their second trimester (T1) until the end of pregnancy. Strength of healthy eating and physical activity habits remained stable over time, body satisfaction decreased over time, and healthy eating habit strength at T1 predicted increases in body satisfaction from the second trimester to the end of pregnancy, even when controlling for gestational weight gain. Results highlight how increasing health-related habit strength in women of reproductive age may offer protection against low levels of body satisfaction during pregnancy.

Keywords: body satisfaction, habit strength, gestational weight gain, pregnancy, longitudinal

Acknowledgements

I would like to take the time to sincerely thank my senior supervisor Dr. Shannon Zaitsoff. Without your ongoing guidance, encouragement and support, this research project would not have been possible. I feel privileged to have you as my supervisor, and am so appreciative for all that you do. A special thank you to my secondary supervisor, Dr. Rebecca Cobb for your thoughtful advice and feedback. I would also like to thank the other members of my committee, Dr. Brent McFerran and Dr. Robert Ley. Thank you to MacKenzie Robertson, Shivani Seth, and Sophie Mohamed for your significant contributions to this project. Finally, thank you to the women who participated in this study for volunteering your time. Funding for this study was provided by the Canadian Institutes of Health Research through a Frederick Banting and Charles Best Canada Graduate Scholarship Master Award as well as Dr. Shannon Zaitsoff's President's Research Start-up Grant from Simon Fraser University.

Table of Contents

Approval.....	ii
Ethics Statement.....	iii
Abstract.....	iv
Acknowledgements.....	v
Table of Contents.....	vi
List of Tables.....	vii
1. Introduction	1
1.1. Changes in Body Satisfaction in Pregnant Women.....	2
1.2. The Role of Weight Gain, Eating Disorder Behaviours, and Psychological Variables	2
1.3. Physical Activity and Healthy Eating Habits.....	3
1.4. The Present Study.....	4
2. Method	5
2.1. Participants	5
2.2. Procedure.....	5
2.3. Measures	7
2.3.1. Maternal characteristics.....	7
2.3.2. Eating disorder symptoms.....	8
2.3.3. Gestational weight gain.....	8
2.3.4. Psychological Distress.....	9
2.3.5. Self-Esteem.....	9
2.3.6. Relationship Satisfaction.....	9
2.3.7. Body satisfaction.....	10
2.3.8. Habit strength.....	10
2.4. Data Analyses	10
3. Results	13
3.1. Descriptive Analyses	13
3.2. Change in Health-Related Habit Strength and Body Satisfaction Over Time	14
3.3. Relationship of Physical Activity and Healthy Eating Habit Strength to Body Satisfaction.....	14
4. Discussion.....	18
4.1. Strengths, Limitations, and Future Directions	21
4.2. Clinical Implications and Conclusions	22
References	24
Appendix A. Recruitment Materials.....	29
Appendix B. Informed Consent Form.....	31
Appendix C. Measures	36

List of Tables

Table 1.	Means and Standard Deviations of Pre-Pregnancy Body Mass Index (BMI), Psychological Variables, Weight Gain, Healthy Eating and Physical Activity Habit Strength, and Body Satisfaction.....	14
Table 2.	Correlations among Pre-Pregnancy Body Mass Index, Psychological Variables, Weight Gain, Healthy Eating and Physical Activity Habit Strength, and Body Satisfaction.....	16
Table 3.	Regression Analysis Predicting Body Satisfaction at the End of Pregnancy.....	17

1. Introduction

Throughout pregnancy, women experience substantial changes in their body shape and weight within a relatively short period of time (Skouteris, 2011). These physical changes are associated with women's body satisfaction during pregnancy, which is an important determinant of maternal psychological and physical wellbeing (Fuller-Tyskiewicz, Skouteris, Watson, & Hill, 2012; Symons Downs, DiNallo, & Kirner, 2008; Skouteris, 2011). Specifically, low levels of body satisfaction are associated with depressive symptoms during and after pregnancy, smoking during pregnancy, excessive gestational weight gain, and disordered eating behaviours that negatively impact maternal and fetal health (Duncombe, Wertheim, Skouteris, Paxton, & Kelly, 2008; Mehta, Siega-Riz, & Herring, 2011; Rauff & Symons Downs, 2011; Skouteris, 2011).

Despite accumulating evidence indicating that low body satisfaction is linked with a range of adverse health outcomes, little research exists on predictors of body satisfaction during pregnancy. Furthermore, the majority of studies employ cross-sectional designs, which limits an understanding of correlates of body satisfaction and how it changes over time in pregnant women (Fuller-Tyszkiewicz et al., 2012). To ultimately improve the health of mothers and their offspring, it is critical to longitudinally investigate factors that are linked to body satisfaction, and elucidate how body satisfaction changes during pregnancy (Fuller-Tyszkiewicz et al., 2012; Symons-Downs et al., 2008).

Several studies indicate that regular exercise and positive dietary behaviours are related to body satisfaction in pregnant women (Boscaglia, Skouteris, & Wertheim, 2003; Crow, Agras, Crosby, Halmi & Mitchell, 2008; Goodwin, Astbury, & McKeeken, 2000; Prather, Spitznagle, & Hunt, 2012). Repetition of health behaviours is particularly important, as it forms the basis of habits, which can be defined as "learned sequences of acts that have become automatic" (Verplanken & Aarts, 1999, p. 104). Whereas less frequent behaviours require the use of conscious mental resources, repeated and frequent

behaviour becomes habitual, which requires less mental effort and may be less influenced by conscious attitudes and intentions (Ji & Wood, 2007; Ouellette & Wood, 1998). The extent to which women automatically engage in physical activity and healthy eating behaviours during pregnancy may be particularly important to assess given that the numerous changes women experience affect cognition and behaviour, which in turn can affect frequency of health behaviours and adversely impact body satisfaction (Fuller-Tyskiewicz et al., 2012; Prather et al., 2012; Skouteris, 2011). However, no study to date has investigated the potentially pertinent relationship between healthy eating or physical activity habits and body satisfaction.

1.1. Changes in Body Satisfaction in Pregnant Women

Body satisfaction increases during pregnancy in comparison to pre-pregnancy baseline levels, and decreases during the postpartum period in comparison to during pregnancy (Clark, Skouteris, Wertheim, Paxton, & Milgrom, 2009; Coker & Abraham, 2015; Gjerdingen, Fontaine, Crow, McGovern, Center, & Miner, 2009). There is limited and conflicting research on how body satisfaction changes during pregnancy, with some research indicating declines (Coker & Abraham, 2015), some indicating increases (Clark et al., 2009; Skouteris, Carr, & Wertheim, 2005), and some indicating stability of body satisfaction over time (Duncombe et al., 2008). One study demonstrated that maximum body dissatisfaction occurs during the latter part of the third trimester (Coker & Abraham, 2015), as size and body shape increase, and physical symptoms related to pregnancy become more prominent. However, conclusions about the nature of changes in body satisfaction during pregnancy are difficult to make given limited research, and further prospective research is needed.

1.2. The Role of Weight Gain, Eating Disorder Behaviours, and Psychological Variables

One factor related to body satisfaction and how it changes during pregnancy is adequacy of gestational weight gain, as defined by guidelines provided by the Institute of Medicine (2009) based on pre-gravid body mass index (BMI). Despite years of research

demonstrating that adherence to these guidelines results in improved pregnancy outcomes, nearly half of all pregnant women in North America experience excessive weight gain during pregnancy (Chu, Callaghan, Bish & D'Angelo, 2009; Kowal, Kuk, & Tamim, 2012). The relationship between body satisfaction and weight-related concerns in non-pregnant women suggests that body satisfaction is pertinently related to weight gain in pregnant women (Millstein et al., 2008). This notion is supported by a growing body of research, which indicates a negative association between pre-pregnancy BMI and weight gain in comparison to body satisfaction during pregnancy (Bagheri, Dorosty, Sadrzadeh-Yeganeh, Eshraghian, Amiri, & Khamoush-Chesm, 2013; Hill, Skouteris, McCabe, & Fuller-Tyskewicz, 2013; Mehta, Siega-Riz, & Herring, 2011). Thus, to ensure that changes in body satisfaction are not due to pre-pregnancy BMI or inadequate or excessive weight gain, it is prudent to control for adequacy of gestational weight gain when examining the relation between novel factors (i.e., physical activity and healthy eating habit strength) and body satisfaction in pregnant women.

With respect to dietary behaviours, higher levels of body satisfaction are associated with decreased eating disorder behaviours during pregnancy (e.g., binge eating and purging; Crow et al., 2008). Furthermore, restrained eating at six months postpartum predicted body satisfaction at 12 months postpartum (Rallis, Skouteris, Wertheim, & Paxton, 2008). Regarding psychological variables, research indicates that higher levels of psychological distress (e.g., depression) are associated with lower levels of body satisfaction in pregnant women, and highlights that self-esteem and relationship satisfaction may also be important constructs to consider (Fuller-Tyskewicz et al., 2012). Therefore, it is pertinent to collect data on the presence and frequency of eating disorder behaviours as well as various psychological variables when investigating body satisfaction during pregnancy.

1.3. Physical Activity and Healthy Eating Habits

Although exercise and dietary behaviours are positively associated with body satisfaction, no research exists on the potentially crucial protective role of health-related habit strength. Healthy eating and physical activity habit strength have been studied in a health psychology framework with respect to weight management and the prevention of

Type 2 diabetes (Knauper et al., 2014), and are empirically distinguished from behavioural frequency in the literature (Verplanken & Melkevik, 2008). The formation of strong health-related habits leads to lasting behaviour change because once a response to a specific context or cue becomes automatic, which is a key characteristic of habits, people are able to carry out the response in an effortless manner without any planning or external reinforcement. Given that stronger habits indicate higher levels of automaticity and stability of behaviours (Verplanken & Aarts, 1999; Verplanken & Orbell, 2003), physical activity and healthy eating habit strength may be pertinently related to body satisfaction during pregnancy; a time when unique physical changes can affect cognition and behaviour in numerous ways (Skouteris, 2011). However, no research has examined whether healthy eating and physical activity habit strength remain stable during pregnancy, and whether health-related habit strength is associated with changes in body satisfaction.

1.4. The Present Study

The primary purpose of this study was to longitudinally investigate the association between health-related habit strength and body satisfaction in pregnant women. I also assessed the presence and frequency of eating disorder behaviours before and during pregnancy for descriptive purposes to adequately characterize the sample with respect to current and past eating disorder behaviours. My hypotheses are as follows:

1. Healthy eating and physical activity habit strength will remain stable from the second to third trimester.
2. Body satisfaction will decrease from the second to third trimester.
3. Healthy eating and physical activity habit strength will be positively associated with and predict declines in body satisfaction when controlling for adequacy of gestational weight gain and any relevant psychological covariates (i.e., psychological distress, self-esteem, and relationship satisfaction).

2. Method

2.1. Participants

Participants were 67 pregnant women who averaged 28.39 years of age ($SD = 4.70$) and were living in Canada ($n = 34, 50.7\%$) or the United States ($n = 33, 49.3\%$); the majority of Canadian participants were living in British Columbia ($n = 20$). Of the sample, 62.7% ($n = 42$) were married, 52.2% ($n = 35$) had a familial income of \$65,000 CAD or less, and 64.2% ($n = 43$) reported having completed a university degree or greater. With respect to ethnicity, 77.6% ($n = 52$) of women were Caucasian, 7.5% ($n = 5$) were Hispanic, 6.0% ($n = 4$) were Asian, 3.0% ($n = 2$) were African American, and 6.0% ($n = 4$) identified as “other.” All women were in the beginning of their second trimester (i.e., between gestational weeks 16-20; Cunningham, Leveno, Bloom, Hauth, Rouse, & Spong, 2009), with a mean gestational age of 17.86 weeks ($SD = 1.58$). Of the sample, 37.3% ($n = 25$) were primiparous.

2.2. Procedure

The Simon Fraser University Research Ethics Board approved all procedures. Participants were recruited through (a) Facebook advertisements, (b) a maternity care provider listserv, and (c) community notice boards. Eligibility criteria included being between 16 and 20 weeks pregnant, 19 years and older, and living in North America. To recruit participants from Facebook, an advertisement and Facebook page containing information about the study was created and monitored in collaboration with a hired Facebook account manager (see Appendix A for recruitment materials). The advertisements were displayed on the Facebook newsfeed of the target sample: women from North America who were age 19 years and above, and exhibited an interest in pregnancy on their Facebook page. Participants voluntarily clicked on the study advertisement, which directed them to the secure study web page.

To recruit participants from a listserv of over 2000 maternity care providers throughout Canada (i.e., the Maternity Care Discussion Group), an e-mail was sent

describing the study and asking care providers to place a poster advertising the study in their office. The poster contained eligibility criteria, and directed interested individuals to the Facebook page or laboratory e-mail. Posters were also placed in local coffee shops and hospitals. Individuals who contacted the laboratory e-mail were provided with further information about the study and a link to the secure study webpage.

All web pages and questionnaires were created using Remark Web Survey Software and were hosted on a secure university server. The initial webpage outlined study details and informed consent procedures. Participants selected a box indicating their consent and responded to four questions to ensure they had read and understood the consent form (see Appendix B for informed consent form). Participants were then asked to provide contact information and to create a unique identification number. Afterwards, participants were directed to a new questionnaire survey, where they used their identification numbers to log in and complete Time one (T1) questionnaires. Approximately one month before their delivery date, participants received an e-mail with their identification number, password, and link to the Time two (T2) questionnaires (see Appendix C for measures). Participants were sent a maximum of six weekly reminder e-mails if they did not complete questionnaires, and they received one phone call reminder after the first two e-mails. Approximately 30% of women completed T2 after giving birth ($n = 16$), but they did not differ on any study or demographic variables compared to those who completed T2 before giving birth ($n = 51$).

All women completed measures of psychological distress, self-esteem, and relationship satisfaction at T1, and measures of eating disorder symptoms, body satisfaction and physical activity and healthy eating habit strength at both time points. Participants were entered in draws to win pregnancy-related prizes and gift cards upon completion of T1 and T2 questionnaires. All identifying information was stored in a separate data file from participant responses and data was stored on a secure server to protect confidentiality.

Of the 234 participants who completed informed consent procedures, 141 participants completed T1 questionnaires (125 accessed directly from Facebook and 16 contacted the laboratory), and 136 participants met eligibility criteria and were included in

the study. Of those, 70 women (51.5%) completed the T2 questionnaires; 65 women (47.8%) did not respond to follow-up, and one woman (1.5%) experienced a miscarriage. All data were examined to check for duplicate response sets and improbable weight changes. One participant was excluded from the study for completing the T2 questionnaires twice with different values, and one participant was excluded for reporting a weight loss of > 40 pounds from T1 to T2. Thus, 67 participants were included in study analyses.

There were no significant differences between participants who completed T2 ($n = 67$) versus those who did not ($n = 67$) on ethnicity, income, health conditions, weeks pregnant, parity, pre-pregnancy BMI, gestational weight gain, psychological distress, self-esteem, or relationship satisfaction ($ps > .08$). However, women who completed the study were older ($M = 28.39$, $SD = 4.70$; $t(131) = -3.62$, $p < .001$), had a higher income ($M = 77,353$, $SD = 104,449$; $t(116) = -2.32$, $p = .02$), were more likely to be married ($\chi^2(4) = 13.40$, $p < .001$), and had higher education (i.e., university degree or greater; $\chi^2(5) = 24.5$, $p < .001$) than women who did not complete T2 ($M_{age} = 25.44$, $SD = 4.70$; $M_{income} = 42,881$, $SD = 36,791$). Completers also had stronger healthy eating habit strength ($M = 4.94$, $SD = 1.29$; $t(127) = -3.37$, $p = .001$) than non-completers ($M = 4.04$; $SD = 1.72$).

2.3. Measures

2.3.1. Maternal characteristics.

Participants completed a questionnaire developed for this study to obtain socio-demographic data (i.e., age, ethnicity, relationship status, household income, and education level), physical and mental health conditions (“Have you ever been diagnosed with an eating disorder (i.e., anorexia nervosa, bulimia nervosa, binge eating disorder)?” and “Have you ever been diagnosed with any other medical or mental health conditions?”), treatment received, gestational age, parity, and anthropometric measurements (i.e., pre-pregnancy weight and height, and current weight). Pre-pregnancy weight and height were used to calculate body mass index (BMI; kg/m^2) as a measure of pre-gravid adiposity. All participants were classified using the World Health Organization (WHO, 2000) cut points:

BMI < 18.5 kg/m² (underweight); 18.5-24.99 kg/m² (normal weight); 25.0-29.99 kg/m² (overweight); and > 30 kg/m² (obese).

2.3.2. Eating disorder symptoms.

The Eating Disorder Diagnostic Scale (EDDS; Stice, Telch & Rizvi, 2000) is a psychometrically valid 22-item self-report diagnostic tool based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria for eating disorders (American Psychiatric Association, 2000). Two questions were slightly adapted to assess eating disorder symptoms in accordance with the most recent DSM-5 criteria (American Psychiatric Association, 2013) and eight items were omitted because they did not inquire about eating behaviours. The 14 retained items assessed participants' binge eating, purging, and compensatory behaviours. These behaviours were assessed retrospectively for the three months before pregnancy and the last three months and last week from the time of measurement (cf. Knoph Berg, Torgersen, Von Holle, Hamer, Bulik, & Reichborn-Kjennerud, 2011; Nunes, Pinheiro, Camey, & Schmidt, 2012; Soares et al., 2009).

2.3.3. Gestational weight gain.

Consistent with previous research, the absolute amount of weight (kg) gained at T1 and T2 was calculated by subtracting participants' pre-gravid weight from their self-reported weight at each time point. As indicated above, data were examined for improbable weight changes (i.e., weight loss \geq 40 pounds or gain \geq 100 pounds; cf. Bodnar, Hutcheon, Platt, Himes, Simhan, & Adams, 2011; Hunt, Alanis, Johnson, Mayorga, & Korte, 2013). Adequacy of gestational weight gain was calculated as the ratio of total weight gain over expected weight gain using the Institute of Medicine guidelines (Bodnar, Siega-Riz, Arab, Chantala, & McDonald, 2004; IOM, 2009). This ratio helps to account for differences in gestational age at delivery, since weight is seldom documented at this time. Adequacy of gestational weight gain was also evaluated categorically. To characterize participants as gaining an inadequate, adequate, or excessive amount of weight, the lower and upper limits of the IOM pre-pregnancy BMI weight recommendations were divided by expected weight gain at 40 weeks gestation, and then multiplied by 100 to calculate an expected range of weight gain for each group (cf. Bodnar et al., 2004;

Deierlein, Siega-Riz, & Herring, 2008). Participants who gained within the expected range were categorized as gaining an adequate amount of weight, whereas participants who gained below or above the expected range were categorized as gaining an inadequate or excessive amount of weight respectively.

2.3.4. Psychological Distress.

The Hopkins Symptom Checklist (SCL-5; Aasheim et al., 2012) is a 5-item self-report questionnaire that assesses level of psychological distress. Each item is rated on a 4-point Likert scale ranging from 0 (*not bothered*) to 4 (*very bothered*). Items were averaged to produce a mean score (ranging from 0-4), with higher scores indicating higher levels of psychological distress. The SCL-5 demonstrated excellent internal consistency in the current sample ($\alpha = .82$).

2.3.5. Self-Esteem.

The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965) is a 10-item self-report questionnaire that was used to assess global feelings of self-esteem. Responses were made on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Total scores range from 0 to 30, with higher scores denoting higher levels of self-esteem. The RSE has been widely used in eating-related research (Knoph Berg et al., 2011). The internal consistency of the RSE in the current sample was excellent ($\alpha = .92$).

2.3.6. Relationship Satisfaction.

The 4-item version of the Couples Satisfaction Index (CSI-4; Funk & Rogge, 2007) was used to assess relationship satisfaction. Responses to each question are made on a 5 and 6-point Likert scale, with total scores ranging from 0-21. Higher scores indicate higher levels of relationship satisfaction. The CSI-4 demonstrated excellent internal consistency in the current sample ($\alpha = .90$).

2.3.7. Body satisfaction.

Perceived body satisfaction was assessed with the 9-item subscale of the Multidimensional Body Self Relations Questionnaire (i.e., the Body Areas Satisfaction Scale; BASS; Brown, Cash, & Mikulka, 1990). Participants rated their degree of body satisfaction with specific body parts, weight, height, muscle tone, and appearance on a 5-point Likert scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). Items were averaged to yield a mean score, with higher scores indicating higher body satisfaction. The BASS internal consistency (Chronbach's alpha) in the current sample was .88 at T1 and .85 at T2.

2.3.8. Habit strength.

The Self-Report Habit Index (SRHI; Verplanken & Orbell, 2003) is a 12-item self-report measure that assesses empirically derived features of habits. Participants filled out one SRHI to assess physical activity habit strength and one SRHI to assess healthy eating habit strength. Sample items include “[Engaging in physical activity] is something that belongs to my (daily, weekly, monthly) routine” and “[Eating healthily (e.g., eating a variety of vegetables, fruits, and whole grains)] is something I do automatically.” Responses are made on a 7-point Likert scale ranging from 1 (*disagree*) to 7 (*agree*). Items were averaged to yield a mean score, with higher scores indicating stronger habits. The SRHI effectively measures physical activity habit strength (Verplanken & Melkevik, 2008) and has been used extensively in research examining the influence of habit strength on dietary behaviours (Gardner, de Bruijn, & Lally, 2011). In this sample, the SRHI demonstrated excellent internal consistency for healthy eating habit strength ($\alpha = .95$ at both time points), and physical activity habit strength at T1 ($\alpha = .95$) and T2 ($\alpha = .97$).

2.4. Data Analyses

Decisions regarding missing data were based on the proportion of missing data and guidelines provided for the measures (i.e., individual mean substitution to replace missing values if only one item is missing, and pairwise deletion if >1 item is missing). Given the low proportion of missing data in the current sample across all participants and

measures at both time points (.55%), mean substitution is considered an adequate method (Harrell, 2001). Mean substitution was conducted for 11 participants and 13 items. One participant was missing more than one item on the T2 physical activity SRHI, one participant was missing more than one item on the T2 healthy eating SRHI, and one participant was missing more than one item on the RSE. As a result, these participants were excluded from relevant analyses, and their data on all other measures were checked and deemed appropriate to include in other analyses.

Following individual mean substitution, the data were examined for the presence of outliers and normality. Univariate outliers were assessed on predictor and outcome variables through inspection of Z-scores for each variable (Tabachnik & Fidell, 2013). All cases were deemed appropriate and were retained in analyses. Normality assumptions were satisfied for all variables.

Descriptive statistics (means, standard deviations, and frequencies) were calculated for maternal characteristics, weight gain variables, and main study variables. Pearson correlations for the total sample were computed to investigate associations among weight gain and main study variables. Paired samples t-tests were conducted to determine whether physical activity and healthy eating habit strength, and body satisfaction changed from T1 to T2.

A regression analysis was conducted to examine whether physical activity and healthy eating habit strength predicted changes in body satisfaction when controlling for adequacy of gestational weight gain and any relevant psychological covariates (i.e., psychological distress, self-esteem and relationship satisfaction). Adequacy of gestational weight gain was dummy coded, with women gaining an adequate amount of weight representing the referent group in all models. Body satisfaction at T1, adequacy of gestational weight gain, and relevant covariates were entered in the first step, and physical activity and healthy eating habit strength were entered in the second step. Multivariate outliers were screened in the regression analysis by examining the summary table of the residual statistics. One multivariate outlier was identified, and as recommended by Tabachnik and Fidell (2013), after checking to ensure that data was correctly transferred from Remark, analyses were run with and without the identified

outlier. The outlier significantly influenced the results and thus it was excluded from analyses. Normality assumptions were satisfied and residual diagnostics were conducted to check for validity of model fit, which was adequate. Examination of the variance inflation factor and the tolerance statistic revealed no multicollinearity.

3. Results

3.1. Descriptive Analyses

According to the WHO (2000) guidelines for pre-gravid weight status, 3.0% ($n = 2$) of women were classified as underweight, 56.7% ($n = 38$) as normal weight, 26.9% ($n = 18$) as overweight, and 13.4% ($n = 9$) as obese. With respect to gestational weight changes, participants gained an average of 13.31 kg ($SD = 5.39$). Only 32.8% ($n = 22$) of women gained within the recommended ranges, 56.7% ($n = 38$) gained in excess of clinical guidelines, and 10.5% ($n = 7$) gained an inadequate amount of weight. Of the sample, 65.1% ($n = 44$) denied any health conditions (e.g., endometriosis, epilepsy, depression, or anxiety), and 95.5% ($n = 64$) denied ever receiving a formal eating disorder diagnosis. One participant (1.5%) reported a diagnosis of anorexia nervosa, and two participants (3.0%) reported a diagnosis of bulimia nervosa. All participants who reported a mental or physical health condition also reported receiving treatment.

Based on EDDS data for the three months prior to pregnancy, 3.0% ($n = 2$) of women met diagnostic criteria for BED, 7.5% ($n = 5$) reported engaging in binge eating behaviours, and 19.4% ($n = 13$) reported engaging in compensatory behaviours (i.e., self-induced vomiting, use of laxatives/diuretics, fasting, and excessive exercise). During pregnancy (based on EDDS data), 4.5% ($n = 3$) of women were classified as having BED, 13.4% ($n = 9$) reported engaging in binge eating behaviours, and 10.4% ($n = 7$) reported engaging in compensatory behaviours. Frequency of binge eating episodes ranged from 0-5 times per week before pregnancy, 0-6 times per week at T1, and 0-2 times per week at T2. Frequency of compensatory behaviours ranged from 0-42 times per week before pregnancy, 0-14 times per week at T1, and 0-2 times per week at T2.

Means and standard deviations of weight gain and main study variables are in Table 1. Correlations among main study variables and weight gain are in Table 2. Weight gain at both time points was not significantly associated with any of the main study variables. Correlations between main study variables and body satisfaction are as follows: Self-esteem, relationship satisfaction, and physical activity and healthy eating habit strength were positively associated with body satisfaction at T1 and T2. Pre-pregnancy

BMI and psychological distress were negatively associated with body satisfaction at both time points.

3.2. Change in Health-Related Habit Strength and Body Satisfaction Over Time

Physical activity habit strength did not change from T1 ($M = 3.37$, $SD = 1.38$) to T2 ($M = 3.58$, $SD = 1.51$), $t(66) = 1.88$, $p = .09$, and there was no change in healthy eating habit strength from T1 ($M = 4.92$, $SD = 1.28$) to T2 ($M = 4.78$, $SD = 1.23$), $t(66) = -1.20$, $p = .29$. Body satisfaction declined from T1 ($M = 3.36$, $SD = .68$) to T2 ($M = 3.25$, $SD = .67$), $t(66) = 1.88$, $p = .02$.

3.3. Relationship of Physical Activity and Healthy Eating Habit Strength to Body Satisfaction

Self-esteem, psychological distress, and relationship satisfaction were not significantly related to changes in body satisfaction and did not significantly affect the study findings. As a result, these variables were not included as covariates in the final regression model. The regression model was significant, $F(5,60) = 22.17$, $p < .001$, with 65% of the variability in T2 body satisfaction being accounted for by T1 body satisfaction and adequacy of gestational weight gain (Step 1), and physical activity and healthy eating habit strength (Step 2). Together, physical activity and healthy eating habit strength accounted for 6% of variance in the model ($\Delta R^2 = .06$, $F(2,60) = 5.22$, $p < .01$). Independent predictors of T2 body satisfaction in the final model included T1 body satisfaction and healthy eating habit strength (See Table 3).

Table 1. Means and Standard Deviations of Pre-Pregnancy Body Mass Index (BMI), Psychological Variables, Weight Gain, Healthy Eating and Physical Activity Habit Strength, and Body Satisfaction

	Time 1 (<i>M</i> weeks pregnant = 17.86)	Time 2 (<i>M</i> weeks pregnant = 36.04)
Pre-Pregnancy BMI		
<i>M</i>	24.93	-
<i>SD</i>	5.37	-
Psychological Distress		
<i>M</i>	1.72	-
<i>SD</i>	.63	-
Self-Esteem		
<i>M</i>	22.27	-
<i>SD</i>	5.98	-
Relationship Satisfaction		
<i>M</i>	16.56	-
<i>SD</i>	3.66	-
Weight Gain (kg)		
<i>M</i>	3.37	13.23 ^a
<i>SD</i>	3.37	5.43
Healthy Eating Habit Strength		
<i>M</i>	4.95	4.80
<i>SD</i>	1.25	1.22
Physical Activity Habit Strength		
<i>M</i>	3.41	3.59
<i>SD</i>	1.36	1.52
Body Satisfaction		
<i>M</i>	3.36	3.24 ^a
<i>SD</i>	.68	.67

Note. *n* = 67 for Time 1 (T1) and Time 2 (T2)

^a Values changed from T1 to T2.

Table 2. Correlations among Pre-Pregnancy Body Mass Index, Psychological Variables, Weight Gain, Healthy Eating and Physical Activity Habit Strength, and Body Satisfaction

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Time One											
1. Pre-Pregnancy Body Mass Index	.28*	-.13	-.17	-.14	-.07	-.31**	-.34**	-.21	-.07	-.32*	-.2
2. Psychological Distress		-.32**	-.35**	.21	-.15	-.19	-.31*	.07	-.23	-.12	-.34**
3. Self-Esteem			.40**	.13	.42**	.29*	.46**	.09	.34**	.21	.46**
4. Relationship Satisfaction				-.22	.35**	.12	.34*	-.13	.26*	.19	.33**
5. Weight Gain					.02	-.01	.04	.63**	-.13	-.04	.05
6. Healthy Eating Habit Strength						.03	.28*	-.07	.71**	.15	.41**
7. Physical Activity Habit Strength							.40**	-.01	.09	.80**	.41**
8. Body Satisfaction								-.04	.26*	.37**	.76**
Time Two											
9. Weight Gain									-.20	-.11	-.07
10. Healthy Eating Habit Strength										.21	.41**
11. Physical Activity Habit Strength											.44**
12. Body Satisfaction											

Note. * $p < .05$. ** $p < .01$.

Table 3. Regression Analysis Predicting Body Satisfaction at the End of Pregnancy

Variable	R^2	df	F	p	B	S.E	β
Step 1	.59	3,62	29.47	<.001			
Time One Body Satisfaction					.63	.09	.64**
Adequacy of Gestational Weight Gain							
Inadequate Gestational Weight Gain					-.22	.18	-.10
Excessive Gestational Weight Gain					-.06	.11	-.05
Step 2	.65	2,60	22.17	<.01			
Time One Physical Activity Habit Strength					.07	.04	.14
Time One Healthy Eating Habit Strength					.12	.04	.23*

Note. * $p < .01$. ** $p < .001$.

4. Discussion

This is the first study to investigate health-related habit strength in pregnant women. The purpose of this study was to determine whether women with stronger physical activity and healthy eating habits would be more resilient to declines in body satisfaction during pregnancy, and to examine how health-related habit strength and body satisfaction changes from the beginning of the second trimester to the end of pregnancy. As hypothesized, healthy eating and physical activity habit strength remained stable, whereas body satisfaction declined. Additionally, women who had stronger physical activity and healthy eating habits were also more satisfied with their bodies. Notably, stronger healthy eating habits protected women against declines in body satisfaction over their final six months of pregnancy. Contrary to my third hypothesis, physical activity habit strength did not predict changes in body satisfaction.

Healthy eating habit strength may be especially protective against declines in body satisfaction for several reasons. Research indicates that body satisfaction is associated with positive health behaviours in a large sample of adults across weight status groups (Blake et al., 2013). This relationship is stronger in women than in men, especially with respect to eating behaviours, highlighting that people who engage in positive dietary behaviours are more satisfied with their bodies (Blake et al., 2013). Of course, there are instances when healthy eating behaviours are associated with extreme body dissatisfaction, but as research indicates, this is not the case in the general population. Although no studies have examined the mechanism through which healthy eating behaviours are positively associated with body satisfaction, a potential explanation for the study findings is that stronger healthy eating habits may help women maintain good psychological health, which in turn may increase body satisfaction and reduce adverse outcomes. Alternatively, good psychological health may protect women against declines in body satisfaction despite low health-related habit strength. However, these explanations were not evident in the current sample. Body satisfaction before pregnancy

may play an important role in that it engenders stronger healthy eating habits before pregnancy, which are then maintained during pregnancy and ultimately protect women against declines in body satisfaction. To test the viability of these tentative hypotheses, it would be beneficial for future research to examine potential mediators and moderators of health-related habit strength and body satisfaction over a more extended period of time. Another potential explanation for the influential role of healthy eating habits is that pregnant women with stronger healthy eating habits, regardless of actual weight category, may place less of an emphasis on their body during pregnancy, and more of an emphasis on nurturing themselves and their fetus.

Given past research indicating that exercise is positively associated with body satisfaction during pregnancy (Boscaglia et al., 2003; Goodwin et al., 2000; Prather et al., 2012; Symons Downs et al., 2008), it is somewhat surprising that physical activity habit strength did not protect women against declines in body satisfaction. This may be because the current sample exhibited a restricted range of physical activity habit strength, which may have decreased the chances of detecting an association between physical activity habit strength and body satisfaction. To elaborate, physical activity habit strength was significantly lower than healthy eating habit strength, and lower than the mean reported in a previous longitudinal study conducted in an adult population (Verplanken & Melkevik, 2008). Alternatively, it may be that physical activity habits are indeed less influential than healthy eating habits because they are difficult to maintain during pregnancy, as indicated by a study demonstrating that physical activity levels decrease, and the majority of pregnant women do not engage in the recommended level of physical activity (Borodulin, Evenson, Wen, Herring, & Benson, 2008).

As hypothesized, habit strength did not change over time, which highlights the stable nature of habits, even during pregnancy where unique physical and physiological changes occur throughout the three trimesters (Skouteris et al., 2011). In contrast and as expected, body satisfaction declined from the second to third trimester, which is consistent with findings from a study of pregnant women with and without eating disorders (Coker & Abraham, 2015), but contrary to studies of healthy pregnant women (Duncombe et al., 2008; Skouteris et al., 2005). One reason that may help account for discrepant findings is that the pregnancy time points examined at each trimester have differed between

studies. For example, while one study measured body satisfaction between 24-31 weeks pregnant at T2 and 32-39 weeks pregnant at time three (T3; Skouteris et al., 2005), another study measured body satisfaction between 24-26 weeks pregnant at T2 and 34-36 weeks pregnant at T3 (Coker & Abraham, 2015). Given the numerous biological changes that occur at a relatively rapid pace during pregnancy, measurements at various time points may produce different results with respect to body satisfaction.

Additionally, although the current study examined the subjective experience of satisfaction with shape and weight, some studies assessed other dimensions of body satisfaction, which may change in different ways as pregnancy progresses (Coker & Abraham, 2015; Duncombe et al., 2008; Skouteris et al., 2005). As is evident in the literature, body image is a multi-dimensional construct that consists of various aspects (i.e., salience of weight and shape, perception of being strong and fit, perceptions regarding what size and shape is 'ideal', and perceptions about one's current weight and shape; Cash, 2002). While research demonstrating stability of body satisfaction during pregnancy assessed various dimensions of body satisfaction (e.g., perceptions of strength and fitness; Duncombe et al., 2008), research demonstrating changes in body satisfaction assessed current versus desired BMI (Coker & Abraham, 2015) in addition to other dimensions (including perceptions of strength and fitness; Skouteris et al., 2005). These results indicate that body satisfaction may change in relation to different dimensions during pregnancy. Therefore, the modification and systematic evaluation of an existing psychometrically valid measure to assess body satisfaction specifically in pregnant women would likely help avoid discrepancies between findings, and would assist with future research (Fuller-Tyskiewicz et al., 2012).

Finally, it is possible that participants in this study experienced greater or more severe changes in their body as a result of pregnancy than those in studies that did not find a decrease in body satisfaction (Duncombe et al., 2008; Skouteris et al., 2005). However, neither study used the BASS or measured actual body changes during pregnancy (e.g., stretch marks, skin pigmentation), and could therefore not be compared. It may be important for future studies to assess, perhaps even objectively, actual body changes during pregnancy and how they impact body satisfaction.

4.1. Strengths, Limitations, and Future Directions

This study contributes to the limited research on body satisfaction during pregnancy by investigating changes in health-related habit strength and body satisfaction, and relevant and novel predictors of body satisfaction in pregnant women throughout North America over their final six months of pregnancy. Despite these strengths, several limitations warrant discussion.

First, participants who completed the follow-up were older, more educated, more likely to be married, and had higher incomes and stronger healthy eating habit strength. Although body concerns are prevalent in groups from a diverse range of socioeconomic and cultural backgrounds, research indicates that body satisfaction varies across different ethnic-racial groups, with one study demonstrating that African American women from lower socioeconomic backgrounds have higher body satisfaction than Caucasian women in the post-partum period (Carter-Edwards et al., 2010). Therefore, it may be beneficial for future research to examine how body satisfaction changes over time in diverse groups of pregnant women.

Another potential limitation is that all measures were self-report, which is subject to biases. Regarding total weight gain, although self-reported weight and height provides an accurate representation of BMI in women of reproductive age (Brunner Huber, 2007), there is a tendency for overweight and obese pregnant women to underestimate their weights (Stevens-Simon, Roghmann, & McAnarney, 1992). However, underestimation of pre-gravid weight, weight during the second trimester, and weight at the end of pregnancy would not have resulted in overestimation of gestational weight gain.

It was beyond the scope of this study to assess psychological variables, habit strength and body satisfaction before pregnancy and during the postpartum period. However, this may be an important topic for future research to elucidate associations between these variables, particularly in the post-partum period when body satisfaction significantly decreases (Clark et al., 2009; Coker & Abraham, 2015). Furthermore, although few eating disorder behaviours were reported in this study, future research would benefit from systematically examining how the relationships between the main study variables may differ when comparing pregnant women with and without eating disorders.

4.2. Clinical Implications and Conclusions

Given that pregnancy is a unique period involving profound biopsychosocial changes, appropriate and effective perinatal interventions to improve physical and mental health are particularly important (Crow et al., 2008). Body satisfaction during pregnancy is associated with poor maternal and fetal health outcomes (Fuller-Tyskiewicz et al., 2012), and maintaining a healthy body image over time is a non-pharmacologic strategy that could offer protective effects against a range of adverse outcomes during pregnancy and in the postpartum period (Rauff & Symons Downs, 2011). However, no evidence-based interventions have been developed to increase body satisfaction in pregnant women.

Increasing our understanding of factors that protect women from declines in body satisfaction during pregnancy has important implications for developing interventions to ultimately improve maternal and fetal health outcomes. Health-related habit strength may be a key construct to consider in the eventual development and implementation of interventions to increase body satisfaction in pregnant women. Findings from this study suggest that teaching women techniques to increase health-related habit strength before and during pregnancy may have a significant impact on body satisfaction. A strong evidence base indicates that if-then plans and mental practice are efficacious techniques for increasing habit strength and producing lasting behaviour change (cf. Belanger-Gravel, Godin & Amireault, 2013; Knauper et al., 2014). Recently published protocol from an ongoing randomized controlled trial in pre-diabetic patients indicates that these techniques can be incorporated into interventions in a simple and cost-effective manner (Knauper et al., 2014). However, prior to testing the efficacy of these techniques in pregnant women, further research is needed to elucidate factors related to body satisfaction, and to identify the ideal window within which to target health-related habit strength in women of reproductive age.

To conclude, this study contributes to the understanding of novel correlates and predictors of body satisfaction in pregnant women, demonstrates the stability of health-related habit strength over time, and helps to clarify how body satisfaction changes from the beginning of the second trimester to the end of pregnancy. Notably, this study suggests that healthy eating habit strength may be an important behavioural determinant

of body satisfaction that can offer women protective effects against declining body satisfaction during pregnancy. Given that the prominent features of habits include automaticity and stability over time, and the numerous biological changes during pregnancy, health-related habit strength warrants attention in future research. By continuing to systematically identify correlates of body satisfaction in pregnant women, we can ultimately provide guidance and increased awareness for the development and maintenance of maternal and fetal health, and effectively improve short and long-term outcomes for pregnant women and their offspring.

References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Aasheim, V., Waldenstrom, U., Hjelmstedt, A., Rasmussen, S., Pettersson, H., & Schytt, E. (2012). Associations between advanced maternal age and psychological distress in primiparous women, from early pregnancy to 18 months postpartum. *An International Journal of Obstetrics and Gynaecology*, *119*, 1108-1116.
- Bagheri, M., Dorosty, A., Sadrzadeh-Yeganeh, H., Eshraghian, M., Amiri, E., & Khamoush-Cheshm, N. (2013). Pre-pregnancy Body Size Dissatisfaction and Excessive Gestational Weight Gain. *Maternal and Child Health Journal*, *17*, 699-707.
- Belanger-Gravel, A., Godin, G., & Amireault, S. (2013). A meta-analytic review of the effect of implementation intentions on physical activity. *Health Psychology Review*, *7*, 23–54.
- Blake, C. E., Hebert, J. R., Lee, D., Adams, S. A., Steck, S. E., Sui, X., . . . Blair, S. N. (2013). Adults with Greater Weight Satisfaction Report More Positive Health Behaviors and Have Better Health Status Regardless of BMI. *Journal of Obesity*, 1-13.
- Bodnar, L. M., Hutcheon, J. A., Platt, R. W., Himes, K. P., Simhan, H. N., & Abrams, B. (2011). Should gestational weight gain recommendations be tailored by maternal characteristics? *American Journal of Epidemiology*, *174*, 136–146.
- Bodnar, L. M., Siega-Riz, A. M., Arab, L., Chantala, K., & McDonald, T. (2004). Predictors of pregnancy and postpartum haemoglobin concentrations in low-income women. *Public Health Nutrition*, *7*, 701–711.
- Borodulin, K., Evenson, K. R., & Herring, A. H. (2009). Physical activity patterns during pregnancy through postpartum. *BioMed Central Women's Health*, *9*, 32.
- Boscaglia, N., Skouteris, H., & Wertheim, E. H. (2003). Changes in body image satisfaction during pregnancy: A comparison of high exercising and low exercising women. *The Australian & New Zealand Journal of Obstetrics & Gynaecology*, *43*, 41–45.
- Brown, T. A., Cash, T. F., & Mikulka, P. J. (1990). Attitudinal body-image assessment: factor analysis of the Body-Self Relations Questionnaire. *Journal of Personality Assessment*, *55*, 135-144.

- Brunner Huber, L. R. (2007). Validity of self-reported height and weight in women of reproductive. *Maternal and Child Health Journal, 11*, 137–144.
- Carter-Edwards, L., Bastian, L. A., Revels, J., Durham, H., Lokhnygina, Y., Ahinee Amamoo, M., & Ostbye, T. (2010). Body Image and Body Satisfaction Differ by Race in Overweight Postpartum Mothers. *Journal of Womens Health, 19*, 305-311.
- Cash, T. F. (2002). Cognitive-behavioural perspectives on body image. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 38–46). New York: Guilford Press.
- Chu, S. Y., Callaghan, W.M., Bish, C. L., & D'Angelo, D. (2009). Gestational weight gain bybody mass index among US women delivering live births, 2004–2005: fueling future obesity. *American Journal of Obstetrics & Gynecology, 200*, 88-89.
- Clark, A., Skouteris, H., Wertheim, E. H., Paxton, S. J., & Milgrom, J. (2009). The Relationship between Depression and Body Dissatisfaction across Pregnancy and the Postpartum: A Prospective Study. *Journal of Health Psychology, 14*, 27-35.
- Coker, E., & Abraham, S. (2015). Body weight dissatisfaction before, during and after pregnancy: a comparison of women with and without eating disorders. *Eating and Weight Disorders, 20*, 71-79.
- Crow, S. J., Agras, W. S., Crosby, R., Halmi, K., & Mitchell, J. E. (2008). Eating DisorderSymptoms in Pregnancy: A Prospective Study. *International Journal of Eating Disorders, 41*, 277-279.
- Cunningham, F., Leveno, K., Bloom, S., Hauth, J., Rouse, D., & Spong, C. (2009).Gestational Weight Gain in Pregnant Women. *Williams Obstetrics: 23rd Edition*. New York, NY: McGraw-Hill Publishing.
- Deierlein, A. L., Siega-Riz, A. M., & Herring, A. (2008). Dietary energy density but not glycemic load is associated with gestational weight gain. *American Journal of Clinical Nutrition, 88*, 693-699.
- Duncombe, D., Wertheim, E. H., Skouteris, H., Paxton, S. J., & Kelly, L. (2008). How well do women adapt to changes in their body size and shape across the course of pregnancy? *Journal of Health Psychology, 13*, 503–515.
- Fuller-Tyszkiewicz, M., Skouteris, H., Watson, B. E., & Hill, B. (2012). Body dissatisfaction during pregnancy: A systematic review of cross-sectional and prospective correlates. *Journal of Health Psychology, 11*, 1411-1421.

- Funk, J. L., & Rogge, R. D. (2007). Testing the Ruler With Item Response Theory: Increasing Precision of Measurement for Relationship Satisfaction With the Couples Satisfaction Index. *Journal of Family Psychology, 21*, 572-583.
- Gardner, B., de Bruujn, G. J., & Lally, P. (2011). A Systematic Review and Meta-analysis of Applications of the Self-Report Habit Index to Nutrition and Physical Activity Behaviours. *Annals of Behavioral Medicine, 42*, 174-187.
- Gjerdingen, D., Fontaine, P., Crow, S., McGovern, P., & Miner, M. (2009). Predictors of Mothers' Postpartum Body Dissatisfaction, *Women & Health, 49*, 491-504.
- Goodwin, A., Astbury, J., & McMeeken, J. (2000). Body image and psychological well-being in pregnancy. A comparison of exercisers and non-exercisers. *The Australian & New Zealand Journal of Obstetrics & Gynaecology, 40*, 442–447.
- Harrell, F. E. (2001). Regression modeling strategies: With applications to linear models, logistic regression, and survival analysis. Springer Series in Statistics. New York: Springer.
- Hill, B., Skouteris, H., McCabe, M., & Fuller-Tyskiewicz, M. (2013). Body Image and Gestational Weight Gain: A Prospective Study. *Journal of Midwifery & Women's Health, 58*, 189-194.
- Hunt, K. J., Alanis, M. C., Johnson, E. R., Mayorga, M. E., & Korte, J. E. (2013). Maternal pre-pregnancy weight and gestational weight gain and their association with birthweight with a focus on racial differences. *Maternal and Child Health Journal, 17*, 85–94.
- Institute of Medicine (2009). Weight gain during pregnancy: reexamining the guidelines. Washington, DC: The National Academies Press.
- Ji, M. F., & Wood, W. (2007). Purchase and Consumption Habits: Not Necessarily What You Intend. *Journal of Consumer Psychology, 17*, 261-276.
- Knauper, B., Ivanova, E., Xu, Z., Chamandy, M., Lowenstyn, I., Joseph, L., . . . Grover, S. (2014). Increasing the effectiveness of the Diabetes Prevention Program through if-then plans: study protocol for the randomized controlled trial of the McGill CHIP Healthy Weight Program. *Biomed Central Public Health, 14*, 470.
- Knoph Berg, C. K., Torgersen, L., Von Holle, A., Hamer, R. M., Bulik, C. M., & Reichborn-Kjennerud, T. (2011). Factors Associated with Binge Eating Disorder in Pregnancy. *International Journal of Eating Disorders, 44*, 124-133.
- Kowal, C., Kuk, J., & Tamim, H. (2012). Characteristics of Weight Gain in Pregnancy Among Canadian Women. *Maternal and Child Health Journal, 16*, 668-676.
- Mehta, U. J., Siega-Riz, A. M., & Herring, A. H. (2011). Effect of body image on pregnancy weight gain. *Maternal and Child Health Journal, 15*, 324–332.

- Millstein, R. A., Carlson, S. A., Fulton, J. E., Galuska, D. A., Zhang, J., Blanck, H. M., & Ainsworth, B. E. (2008). Relationships Between Body Size Satisfaction and Weight Control Practices Among US Adults. *The Medscape Journal of Medicine*, *10*, 119.
- Nunes, M. A., Pinheiro, A. P., Camey, S. A., & Schmidt, M. I. (2012). Binge Eating During Pregnancy and Birth Outcomes: A Cohort Study in a Disadvantaged Population in Brazil. *International Journal of Eating Disorders*, *45*, 827-831.
- Oullette, J., & Wood, W. (1998). Habit and intention in everyday life: the multiple processes by which past behaviour predicts future behaviour. *Psychological Bulletin*, *124*, 54-74.
- Prather, H., Spitznagle, T., & Hunt, D. (2012). Benefits of Exercise During Pregnancy. *Journal of the American Academy of Physical Medicine and Rehabilitation*, *4*, 845-850.
- Rallis, S., Skouteris, H., Wertheim, E. H., & Paxton, S. J. (2008). Predictors of Body Image During the First Year Postpartum: A Prospective Study. *Women & Health*, *45*, 87-104.
- Rauff, E. K., & Symons Downs, D. (2011). Mediating Effects of Body Image Satisfaction on Exercise Behavior, Depressive Symptoms, and Gestational Weight Gain in Pregnancy. *Annals of Behavioral Medicine*, *42*, 381-390.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Skouteris, H. (2011). Body image issues in obstetrics and gynecology (2nd ed.). In T. F. Cash & T. Pruzinsky (Eds.), *Body Image: A Handbook of Science, Practice, and Prevention* (pp. 342-349). New York: Guilford Press.
- Skouteris, H., Carr, R., & Wertheim, E. H. (2005). A prospective study of factors that lead to body dissatisfaction during pregnancy. *Body Image*, *2*, 347-361.
- Soares, R. M., Nunes, M. A., Schmidt, M. I., Giacomello, A., Manzolli, P., Camey, S., . . . Duncan, B. B. (2009). Inappropriate Eating Behaviors During Pregnancy: Prevalence and Associated Factors among Pregnant Women Attending Primary Care in Southern Brazil. *International Journal of Eating Disorders*, *42*, 387-393.
- Stevens-Simon, C., Roghmann, K. J., & McAnarney, E. R. (1992). Relationship of self-reported prepregnancy weight and weight gain during pregnancy to maternal body habitus and age. *Journal of the American Dietetic Association*, *92*, 85-87.
- Stice, E., Telch, C. F., & Rizvi, S. L. (2000). Development and validation of the Eating Disorder Diagnostic Scale: A brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychological Assessment*, *12*, 123-131.

- Symons Downs, D., DiNallo, J. M., & Kirner, T. L. (2008). Determinants of pregnancy and postpartum depression: Prospective influences of depressive symptoms, body image satisfaction, and exercise behavior. *Annals of Behavioral Medicine*, 36, 54–63.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston: Allyn and Bacon.
- World Health Organization (2000). *Obesity: Preventing and managing the global epidemic*. WHO Technical Report series 894). Geneva, Switzerland.
- Verplanken, B., & Aarts, H. (1999). Habit, Attitude, and Planned Behaviour: Is Habit an Empty Construct or an Interesting Case of Goal-directed Automaticity? *European Review of Social Psychology*, 10, 101-134.
- Verplanken, B., & Orbell, S. (2003). Reflections on Past Behavior: A Self-Report Index of Habit Strength. *Journal of Applied Social Psychology*, 33, 1313-1330.
- Verplanken, B., & Melkevik, O. (2008). Predicting habit: The case of physical exercise. *Psychology of Sport and Exercise*, 9, 15-26.

Appendix A.

Recruitment Materials

 **Pregnancy Study: Weight and Eating Laboratory, Simon Fraser University**
Sponsored ·  [Like Page](#)

We Want to Learn How People Cope with the Challenges of Pregnancy.



Pregnancy Research Study
We are conducting a research study at Simon Fraser University on the various challenges women at the beginning of their 2nd trimester (16-20 weeks) face during pregnancy.

[Learn More](#)

CGI.SFU.CA

 **Pregnancy Study: Weight and Eating Laboratory, Simon Fraser University**
Sponsored ·  [Like Page](#)

We Want to Learn How People Cope with the Challenges of Pregnancy.



Pregnancy Research Study
We are conducting a research study at Simon Fraser University on the various challenges women at the beginning of their 2nd trimester (16-20 weeks) face during pregnancy.

[Learn More](#)

CGI.SFU.CA

 **Pregnancy Study: Weight and Eating Laboratory, Simon Fraser University**
Sponsored ·  [Like Page](#)

We Want to Learn How People Cope with the Challenges of Pregnancy.



Pregnancy Research Study
We are conducting a research study at Simon Fraser University on the various challenges women at the beginning of their 2nd trimester (16-20 weeks) face during pregnancy.

[Learn More](#)

CGI.SFU.CA

 **Pregnancy Study: Weight and Eating Laboratory, Simon Fraser University**
Sponsored ·  [Like Page](#)

We Want to Learn How People Cope with the Challenges of Pregnancy.



Pregnancy Research Study
We are conducting a research study at Simon Fraser University on the various challenges women at the beginning of their 2nd trimester (16-20 weeks) face during pregnancy.

[Learn More](#)

CGI.SFU.CA

Are you 16-20 Weeks Pregnant?

The Weight and Eating Laboratory (Department of Psychology, Simon Fraser University) is interested in learning about how YOU cope with the challenges of pregnancy.



We are looking for women who are at least **19 yrs old and 16-20 weeks pregnant.**

We'll ask you to complete two short online questionnaires over the course of your pregnancy. You will be entered in a **draw to win pregnancy-related prizes!**

INTERESTED? Find our Facebook page (Pregnancy Study) or contact Rachelle (...@sfu.ca)

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Pregnancy Study

Appendix B.

Informed Consent Form

Informed Consent By Participants In a Research Study

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser University Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well-being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director, Office of Research Ethics via e-mail [...]@sfu.ca or telephone at [...].

Your electronic signature (indicated by selecting the "I agree and wish to participate in this study" button at the end of this form) will signify that you have read the following information which describes the procedures, possible risks, and benefits of this research study, that you have received an adequate opportunity to consider the information in the documents describing the study, and that you voluntarily agree to participate in the study.

All information you provide will be confidential. Information will only be accessible by the principal investigator and research assistants and volunteers working on this study. All computer-generated data will be kept in secure databases and password-protected file servers. Access to these databases is strictly limited to the people working on this research project. Your data will be coded with a unique subject identification number. Only coded research data is published in psychology journals, and is presented without identifying individuals. Data from this study may be used in combination with data from future studies. In all cases, data will be coded with a unique subject identification number, and no identifying information will be provided in any publication or presentation based on this research.

Title: Gestational Weight Gain in Pregnant Women

Principal Investigator: Rachelle Pullmer, Department of Psychology, [...]@sfu.ca, [...]

Investigator Department: Psychology

Funding sources: Canadian Institutes of Health Research and the President's Research Start-up Grant from Simon Fraser University

Purpose and goals of this study:

The purpose of this study is to examine a number of characteristics that may be associated with various amounts of weight gain in pregnant women. We are looking for pregnant women at the beginning of their second trimester (i.e., between 16-20 weeks pregnant) to participate in this study.

What you will be asked to do:

The total time and duration of this study depends on which questionnaire batteries you are willing to complete. Provision of all information is completely voluntary, and you can withdraw from the study at any time. After agreeing to participate in the study, you will be asked to create an identification number, and to complete the first questionnaire battery. This questionnaire battery will inquire about ethnicity, demographic information, physical measurements, and various perceptions and experiences before and during pregnancy to examine which characteristics are associated with various amounts of weight gain in pregnancy. The first questionnaire battery will take approximately 30 minutes to complete. Upon completion, your name will be entered into a draw to win one of several pregnancy-related prizes (i.e., Babies R Us gift cards, animal blocks, a set of four pre-washed swaddles, and an Aden & Anais gift set which includes two swaddles, one burpy bib, one musy mate and one swaddle book), which will be shipped to your mailing address free of charge. You will also be provided with the option to take an additional set of questionnaires, which will take approximately 5 minutes to complete.

A few months later, you will be contacted approximately 1 month before your expected due date (first via e-mail and then via telephone if no response is received via e-mail) and will be provided with a web URL and password to login to a secure website to complete the second questionnaire battery, which will inquire about your weight and various perceptions and experiences during pregnancy. This questionnaire battery will take approximately 15 minutes to complete. Upon completion, your name will be entered into another draw to win one of several pregnancy-related prizes (i.e., stroller, outdoor blanket & cooler bag, reusable shopper tote, Babies R Us gift cards and animal blocks), which will be shipped to your mailing address free of charge. You will be included in both draws regardless of whether or not you withdraw from the study. You will also be asked to indicate if you are willing to be contacted three months after your delivery date to fill out a third questionnaire battery. At this time point, you will also have the option to taken an additional set of questionnaires, which will take approximately 5 minutes to complete.

If you indicated at the end of the second questionnaire battery that you were willing to be contacted three months after your expected due date, you will be contacted (first via e-mail, and then via telephone if no response is received via e-mail) and provided with a web URL and password to login to a secure website to complete the third questionnaire battery which will inquire about your weight and various perceptions and experiences after pregnancy. The third questionnaire battery will take approximately 15 minutes to complete.

Is there any way being in this study could be bad for you?

There are no physical risks associated with participating in this study. There is a risk of emotional discomfort in filling out the questionnaires, some of which inquire about sensitive and personal information. In filling out the questionnaires, you may learn things about yourself to which you may have positive, negative, or neutral reactions. Your participation is completely voluntary and you are free to not answer any question(s) or complete any measurement(s) that you find uncomfortable. Your decision to refuse to complete particular questions or measurements will not affect your relationship with the researchers, or Simon Fraser University, either now or in the future.

The principal investigator will be available to assist any participant with any questions or concerns related to this study. Also, if you experience any lasting distress as a result of this study, two primary resources may be helpful to you: (1) Contact the principal investigator (Rachelle Pullmer, [...]; [...]@sfu.ca) or (2) Contact a local crisis centre (a directory of Canadian, American, and international crisis hotlines is available at www.befrienders.org/). If you are experiencing intimate

partner violence and live in Canada, the following resource may be helpful to you: Battered Women's Support Services: www.bwss.org, crisis line: 1-604-687-1867. If you are experiencing intimate partner violence and live in America, the following resource may be helpful to you: National Resource Center on Domestic Violence: www.nrcdv.org, violence hotline: 1-800-799-7233. Please write this information down now.

Benefits of the study to the development of new knowledge:

This study will provide important information on which factors influence the amount of weight women gain during pregnancy. Collectively, the information gathered in this study has important implications for research on ways to help women cope with the challenges of pregnancy.

How will your privacy be maintained?

Confidentiality of your name and the contributions you have made to this study will be maintained to the extent allowed by the law. Since the web survey software (Remark) used to collect your information is based in the United States (US), US authorities can require access to this information without disclosing that the information has been accessed. The study webpage will be stored on a secured and encrypted server and the online data will be kept in secure databases within password-protected file servers. As such, upon submission, during transmission, and upon receipt of data, responses are confidential. Your data will be coded with your unique subject identification number. Identifiable data will be kept separate from research data, and will only be accessible to the principal investigator, research assistants and graduate students working on this study. Only anonymous research data is published in psychology journals, and will be presented without identifying individuals.

Inclusion of names of participants in reports of the study:

Research findings may be presented at professional conferences, or reported in academic publications. However only group data will be presented, and your individual responses will never be examined.

Contact of participants at a future time or use of the data in other studies:

Data from this study may be used in combination with data from past and future studies. Specifically, there may be opportunities to participate in other studies examining weight gain in pregnant women. In all cases, data will be used in ways that are consistent with the aims and intent of this research.

Can I withdraw my participation?

I understand that I may withdraw my participation at any time. I also understand that I may register any complaint with the Director of the Office of Research Ethics.

Dr. Jeffrey Toward
Director
Office of Research Ethics
[...]@sfu.ca

I may obtain copies of the results of this study upon its completion by contacting the principal investigator (Rachelle Pullmer) via e-mail [...]@sfu.ca

The researchers may wish to contact you to provide you with the opportunity to hear about how you can participate in other studies in our lab in the future. Please indicate whether you would be willing to be contacted in the future (Yes/No)

In accordance with Canadian ethical guidelines for research participation, only individuals age sixteen and older are considered competent to consent in research. Unfortunately, for our particular study, individuals under the age of nineteen are not eligible for participation. As ethical guidelines and laws regarding research participation vary internationally, please be aware that the present study is governed by Canadian law. Therefore, we cannot guarantee that your participation in this study meets relevant laws and guidelines prescribed by your country of residence.

Clicking the "I agree and wish to participate in this study" button below and completing this survey will signify that you have read a document which described the procedures, whether there are possible risks, and benefits of this research study, that you have received adequate opportunity to consider the information in the documents describing the study, you are at least 19 years of age, and that you voluntarily agree to participate in the study.

If you do consent, any identifying information will be removed or disguised to protect your identity.

NOTE: THE FIRST PART OF THIS STUDY TAKES APPROXIMATELY 30 MINUTES AND HAS TO BE COMPLETED ALL AT ONCE. PLEASE MAKE SURE YOU ARE IN A COMFORTABLE AND PRIVATE ENVIRONMENT AND HAVE APPROXIMATELY 30 MINUTES OF FREE TIME BEFORE YOU BEGIN THIS STUDY AS YOU WILL NOT BE ABLE TO CLOSE IT AND RETURN TO IT LATER. You are encouraged to switch off your cellphone or messaging programs and to inform others that you are busy before you begin the study to minimize distractions.

Having been asked to participate in the research study named above, I certify that I have read the procedures specified above and understand the procedures to be used in this study. I understand the risks and contributions of my participation in this study and agree to participate.

By filling out this survey, you are consenting to participate.

QUESTIONS

Please answer the following questions to make sure you understand the above information:

- 1) Participation in this study **today** will take approximately
 - a. 30 minutes
 - b. 1 hour
 - c. 2 hours
 - d. 5 minutes
- 2) I have to respond to every question and cannot withdraw my participation during or after the study
 - a. True
 - b. False
- 3) If I have any concerns or complaints about this study I should contact
 - a. Nobody
 - b. Jeffrey Toward, the director of the research ethics board.
 - c. Neil Watson, the chair of the psychology department
 - d. Rachelle Pullmer, the principal investigator
- 4) I am 16, 17, 18, 19 or 20 weeks pregnant
 - a. Yes
 - b. No

I do not wish to participate in this study

I agree and wish to participate in this study

Appendix C.

Measures

Maternal Characteristics

Socio-demographic data:

1. What province/state do you currently live in?
2. What country were you born in?
3. What is your date of birth (mm/dd/yyyy)?
4. What is your ethnicity? (Hispanic/Caucasian/African American/Asian/Other*)
5. What is your relationship status? (Married/Cohabitation/In a relationship/Single/Other*)
6. What is your average annual household income (after taxes)?
7. What is your level of education? (Graduate school or professional degree/Graduated from college or university/Some college or university/Graduated from high school/Some high school/Some elementary school/Other*)

Anthropometric measurements:

1. What is your current weight? **Please indicate unit of measurement (i.e., lbs or kg)**
2. What date were you last weighed? (mm/dd/yyyy)
3. What is your current height? **Please indicate unit of measurement (i.e., ft or m)**

Obstetric History:

1. What was your weight before this pregnancy? **Please indicate unit of measurement (i.e., lbs or kg)**
2. What **date** was the *first day* of your last menstrual period? (mm/dd/yyyy)

3. How many weeks have you been pregnant for?
4. What is your expected delivery date? (mm/dd/yyyy)
5. Is this your first pregnancy? (Yes/No)

Physical and Mental Health Conditions

1. Have you ever been diagnosed with an eating disorder (i.e., anorexia nervosa, bulimia nervosa, binge eating disorder)? (Yes/No)

If yes, please list...

Diagnosis:

Treatment received (including therapy, medications, and/or hospitalization):

2. Have you ever been diagnosed with any other medical or mental health conditions?

(Yes/No)

If yes, please list...

Diagnosis:

Treatment received (including therapy, medications, and/or hospitalization):

Note. *text box included for description of 'Other'

Eating Disorder Symptoms

The questions below were listed sequentially in Remark according to the following time periods:

- During the **three month period before this pregnancy...**
- During the **last three months...**
- During the **last week...**

1. Have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances? (Yes/No)

2. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)? (Yes/No)

3. How many DAYS per week on average have you eaten an unusually large amount of food and experienced a loss of control? (0 1 2 3 4 5 6 7)

4. How many TIMES per week on average have you eaten an unusually large amount of food and experienced a loss of control? (0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 14+)

During these episodes of overeating and loss of control did you...

5. Eat much more rapidly than normal? (Yes/No)

6. Eat until you felt uncomfortably full? (Yes/No)

7. Eat large amounts of food when you didn't feel physically hungry? (Yes/No)

8. Eat alone because you were embarrassed by how much you were eating? (Yes/No)

9. Feel disgusted with yourself, depressed, or very guilty after overeating? (Yes/No)

10. Feel very upset about your uncontrollable overeating or resulting weight gain? (Yes/No)

11. Have you ever made yourself vomit to prevent weight gain or counteract the effects of eating? (Yes/No)

11a. How many **times per week** on average have you made yourself vomit to prevent weight gain or counteract the effects of eating? (0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 14+)

12. Have you ever used laxatives or diuretics to prevent weight gain or counteract the effects of eating? (Yes/No)

12a. How many **times per week** on average have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating? (0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 14+)

13. Have you ever fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? (Yes/No)

13a. How many **times per week** on average have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? (0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 14+)

14. Have you ever engaged in excessive exercise specifically to counteract the effects of overeating episodes? (Yes/No)

14a. How many **times per week** on average have you engaged in excessive exercise specifically to counteract the effects of overeating episodes? (0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 14+)

Gestational Weight Gain and Delivery Date

1. What was your last recorded weight before delivery? **Please indicate unit of measurement (i.e., lbs or kg)**
2. What date was this weight taken? (mm/dd/yyyy)
3. What date did you give birth? (mm/dd/yyyy)

Hopkins Symptom Checklist-5

Have you been bothered by any of the following during the last two weeks?

	Not bothered	A little bothered	Quite bothered	Very bothered
Feeling fearful	1	2	3	4
Nervousness or shakeiness inside	1	2	3	4
Feeling hopeless about the future	1	2	3	4
Feeling blue	1	2	3	4
Worrying too much about things	1	2	3	4

Rosenberg Self-Esteem Scale

Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle **SA**. If you agree with the statement, circle **A**. If you disagree, circle **D**. If you strongly disagree, circle **SD**.

- | | | | | | |
|-----|--|----|---|---|----|
| 1. | On the whole, I am satisfied with myself. | SA | A | D | SD |
| 2. | At times, I think I am no good at all. | SA | A | D | SD |
| 3. | I feel that I have a number of good qualities. | SA | A | D | SD |
| 4. | I am able to do things as well as most other people. | SA | A | D | SD |
| 5. | I feel I do not have much to be proud of. | SA | A | D | SD |
| 6. | I certainly feel useless at times. | SA | A | D | SD |
| 7. | I feel that I'm a person of worth, at least on an equal plane with others. | SA | A | D | SD |
| 8. | I wish I could have more respect for myself. | SA | A | D | SD |
| 9. | All in all, I am inclined to feel that I am a failure. | SA | A | D | SD |
| 10. | I take a positive attitude toward myself. | SA | A | D | SD |

Couples Satisfaction Index-4

1. Please indicate the degree of happiness, all things considered, of your relationship.

Extremely unhappy	= 0
Fairly Unhappy	= 1
A Little Unhappy	= 2
Happy	= 3
Very Happy	= 4
Extremely Happy	= 5
Perfect	= 6

2. I have a warm and comfortable relationship with my partner

Not at all True	= 0
A Little True	= 1
Somewhat True	= 2
Mostly True	= 3
Almost Completely True	= 4
Completely True	= 5

3. How rewarding is your relationship with your partner?

Not at all	= 0
A little	= 1
Somewhat	= 2
Mostly	= 3
Almost Completely	= 4
Completely	= 5

4. In general, how satisfied are you with your relationship?

Not at all	= 0
A little	= 1
Somewhat	= 2
Mostly	= 3
Almost Completely	= 4
Completely	= 5

Body Areas Satisfaction Scale

Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are with each of the following areas or aspects of your body:

Very Dissatisfied = 1

Mostly Dissatisfied = 2

Neither Satisfied Nor Dissatisfied = 3

Mostly Satisfied = 4

Very Satisfied = 5

1. Face (facial features, complexion) _____
2. Hair (colour, thickness, texture) _____
3. Lower torso (buttocks, hips, thighs, legs) _____
4. Mid torso (waist, stomach) _____
5. Upper torso (chest or breasts, shoulders, arms) _____
6. Muscle tone _____
7. Weight _____
8. Height _____
9. Overall appearance _____

Self-Report Habit Index

Engaging in physical activity is something...

1. I do frequently.

Disagree 1 2 3 4 5 6 7 Agree

2. I do automatically.

Disagree 1 2 3 4 5 6 7 Agree

3. I do without having to consciously remember.

Disagree 1 2 3 4 5 6 7 Agree

4. That makes me feel weird if I do not do it.

Disagree 1 2 3 4 5 6 7 Agree

5. I do without thinking.

Disagree 1 2 3 4 5 6 7 Agree

6. That would require effort not to do it.

Disagree 1 2 3 4 5 6 7 Agree

7. That belongs to my (daily, weekly, monthly) routine.

Disagree 1 2 3 4 5 6 7 Agree

8. I start doing before I realize I'm doing it.

Disagree 1 2 3 4 5 6 7 Agree

9. I would find hard not to do.

Disagree 1 2 3 4 5 6 7 Agree

10. I have no need to think about doing.

Disagree 1 2 3 4 5 6 7 Agree

11. That's typically "me."

Disagree 1 2 3 4 5 6 7 Agree

12. I have been doing for a long time.

Disagree 1 2 3 4 5 6 7 Agree

Eating healthily (e.g., eating a variety of vegetables, fruits, and whole grains) is something...

1. I do frequently.

Disagree 1 2 3 4 5 6 7 Agree

2. I do automatically.

Disagree 1 2 3 4 5 6 7 Agree

3. I do without having to consciously remember.

Disagree 1 2 3 4 5 6 7 Agree

4. That makes me feel weird if I do not do it.

Disagree 1 2 3 4 5 6 7 Agree

5. I do without thinking.

Disagree 1 2 3 4 5 6 7 Agree

6. That would require effort not to do it.

Disagree 1 2 3 4 5 6 7 Agree

7. That belongs to my (daily, weekly, monthly) routine.

Disagree 1 2 3 4 5 6 7 Agree

8. I start doing before I realize I'm doing it.

Disagree 1 2 3 4 5 6 7 Agree

9. I would find hard not to do.

Disagree 1 2 3 4 5 6 7 Agree

10. I have no need to think about doing.

Disagree 1 2 3 4 5 6 7 Agree

11. That's typically "me."

Disagree 1 2 3 4 5 6 7 Agree

12. I have been doing for a long time.

Disagree 1 2 3 4 5 6 7 Agree