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**THE INFLUENCE OF PREPREGNANCY WEIGHT STATUS ON THE
BIOPSYCHOSOICAL DETERMINANTS OF BODY IMAGE
SATISFACTION IN PREGNANCY**

A Thesis in
Kinesiology
by
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ABSTRACT

Background. Pregnancy is a unique time in a woman's life that is accompanied by substantial changes in body shape and weight that are likely to impact her body image satisfaction. However, there is a paucity of research examining body image satisfaction in pregnancy with a scant understanding of the biological, psychological, and social influences that may impact women's body image throughout pregnancy. **Study Purpose.** The primary purpose of this thesis was to prospectively examine the moderating influence of prepregnancy weight status on the biopsychosocial determinants of body image satisfaction in pregnancy. The secondary purpose was to assess if first trimester body image satisfaction mediated the relationship between first trimester depressive symptoms, gestational weight gain, and exercise behavior and its motivational determinants and second trimester body image satisfaction. **Hypotheses.** It was hypothesized that group differences would be observed in both the first and second trimesters such that normal weight women would have better body image satisfaction, less depressive symptoms, less gestational weight gain, higher exercise behavior and motivational determinants for exercise than overweight/obese women. It was also hypothesized that first trimester body image satisfaction would mediate the relationship between first trimester depressive symptoms, gestational weight gain, and exercise behavior and second trimester body image satisfaction. **Methods.** A prospective study design was conducted in which 209 pregnant women completed measures of their body image satisfaction, depressive symptoms, gestational weight gain, exercise behavior and its motivational determinants, and demographics in the first and second trimesters. Women were classified as normal, overweight, and obese weight categories based on

their prepregnancy weight status. **Results.** Normal weight women had significantly higher first trimester body image satisfaction compared to overweight and obese women and significantly higher second trimester body image satisfaction compared to obese women. Compared to overweight women, women of normal weight status also had a significantly greater increase in body image satisfaction from first to second trimester. Also, first trimester body image satisfaction was found to mediate the relationship between first trimester depression and second trimester body image satisfaction. First trimester body image satisfaction was also found to partially mediate the relationship between first trimester gestational weight gain and second trimester body image satisfaction. **Conclusions.** The preliminary findings demonstrate that body image satisfaction is experienced differently based on a woman's prepregnancy weight status. They also illustrate that explaining body image satisfaction in pregnancy may be better understood by examining trimester specific changes in body image satisfaction as well as the influences of depressive symptoms and gestational weight gain in pregnancy. Finally, a biopsychosocial approach may provide a conceptual framework for understanding and explaining body image satisfaction and its related biological, psychological, and social correlates.

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CHAPTER 1 INTRODUCTION

Limited research has prospectively examined body image satisfaction during pregnancy with a majority of these studies finding inconclusive results about the impact that pregnancy may have on women's body image satisfaction. Although pregnancy is a temporary state during which women experience rapid physical changes in their body, women's prepregnancy weight status may impact the way that they view their bodies during pregnancy. Also, body image satisfaction or dissatisfaction experienced during pregnancy may have a long lasting impact on women's body image satisfaction after pregnancy. Thus, understanding the determinants and possible moderating influence of prepregnancy weight status on body image satisfaction is necessary in order to enable women to embrace the changes they experience during pregnancy and maintain a healthy, positive body image satisfaction throughout pregnancy and their lifespan.

Defining Body Image

According to Borzekowski and Bayer (2005), the words "body" and "image" conflict one another. That is, they define *body* as a definite and more objective, physical structure of an organism with predictable reactions such as to cold, pain, pleasure, and hunger. In contrast, *image*, is subjective, comprising mental representations, ideas, or conceptions. They posit that images are derived from perceptions, which in turn, are influenced by personal and cultural factors. Therefore, the collective term of "body image" can be defined as the internal representation of one's own outer appearance which reflects physical and perceptual dimensions (Sands, 2000; Thompson, Heinber, Altabe, & Tantleff-Dunn, 1999). Early researchers conceptualized body image to be unidimensional; however, the currently accepted position is that body image is a multidimensional

construct that is influenced by biological, psychological, and social factors (Cash & Pruzinsky, 1990; Geller & Sands, 2000; Usmiania & Daniluk, 1997; Srikameswaran, Cockell, & Zaitsoff, 2000). Researchers have proposed a number of body image dimensions, but the following four dimensions have emerged as the primary means of conceptualizing the construct of body image: perceptual, cognitive, affective, and behavioral (Banfield & McCabe, 2002).

Importance of Studying Body Image Satisfaction in Pregnancy

Pregnancy is a unique time in women's life during which they experience substantial changes in their body shape and weight. These changes have the potential to have a significant impact on women's body image satisfaction (Boscaglia, Skouteris, & Wertheim, 2003; Clark, Skouteris, Wertheim, & Paxton, 2009; Skouteris, Carr, Wertheim, Paxton, & Duncome, 2005). Therefore, pregnancy serves as an important time to study body image satisfaction prospectively to better understand how women evaluate their bodies, especially since body image dissatisfaction in pregnancy has been found to be associated with increased risk for depressive symptoms and psychological distress (Clark et al., 2009; Symons Downs, DiNallo, & Kirner, 2008). Women that experience poor psychological health during pregnancy are also at increased risk for complications (e.g. inadequate or excessive gestational weight gain, adverse infant outcomes; Zuckerman, Amaro, & Cabral, 1989). In addition, women are more likely to continue having psychological health issues after pregnancy and they are more likely to experience depressive symptoms during the postpartum period (Qiao, Wang, Li & Ablat, 2009). Depression and poor psychological health in pregnant women is also associated with delayed mental development in children at the ages of eight months and two years (Qiao

et al., 2009). As a result, there is a need to understand what factors may impact women's body image satisfaction during pregnancy to decrease the risk for comorbid complications in pregnancy as well as poor psychological health in the postpartum period and thereafter.

Dimensions of Body Image

The perceptual dimension refers to the picture individuals create in their mind of how they believe their body looks (Gardner, 1996). When individuals look in the mirror, they believe they look a certain way such as "thin," "fat," "short," "tall," "muscular," "lean," and so forth. The perceptual dimension plays a key role in determining how individuals assess their body size and how satisfied people are with their appearance. Inaccuracies with the perceptual dimension are mostly linked with clinical disorders, particularly eating disorders (Cash & Pruzinsky, 2002). For example, individuals with disordered eating symptoms often overestimate their body size compared to individuals without eating disorder pathology (Cash & Pruzinsky, 2002).

The cognitive dimension of body image reflects how people think or evaluate their body in terms of both their appearance and function (Cash & Green, 1986), and it includes people's beliefs regarding their body attractiveness, strength, and fitness related to specific body parts (e.g. arms, torso, legs). The cognitive dimension also includes individuals' internal self-talk about their body (e.g. "My thighs are too big" or "My stomach is too flabby"). The affective or emotional dimension includes the feelings people experience as a result of their body's appearance and function (Cash & Green, 1986). Individuals may experience positive feelings about their bodies (e.g. comfort, pride) or negative feelings (e.g. anxiety, shame, and disgust). These emotions are linked

to specific representations that serve as triggers for whether or not individuals will experience a positive or negative body image satisfaction (Cash & Pruzinsky, 2002).

Finally, the behavioral dimension represents the actions an individual does to reflect a positive or negative perception, thoughts, and feelings about their body (Gleaves, Williamson, Eberenz, Sebastian, & Barker, 1995; Stice, Nemeroff, & Shaw, 1996). To manage or cope with distressing body image thoughts and emotions individuals engage in a range of actions to accommodate or adjust to environmental events (Cash & Pruzinsky, 2002). Actions to adjust to social environments include behaviors such as concealing the body with loose fit clothing, appearance correcting rituals, and constantly seeking social reassurance. These behaviors serve to maintain body image attitudes through negative reinforcement because they enable people to temporarily escape, reduce, or regulate body image discomfort in the presence of others (Cash & Pruzinsky, 2002). However, people with a positive body image satisfaction often feel more confident wearing clothing that shows off their figure and they enjoy social settings because these situations do not produce the same type or intensity of anxiety as it does for individuals who have a negative body image satisfaction.

Body Reality vs. Body Ideal

Body image is also a reflection of the interaction between people's *body reality* and their *body ideal*. Body reality refers to the actual physical characteristics of the body such as people's height, weight, body fat, lean body mass, bone structure, and strength (Brownell, 1991). Body ideal is how an individual thinks their body should look and function. Body ideal is derived from a number of sources including genetics, cultural and environmental influences, and the media. Due to genetic predispositions for individuals

to have a certain body shape or size there are limits in how much a person can change or reshape their body aside from diet and exercise (Brownell, 1991). As a result, each person has their own body ideal specific to their environmental and genetic background. A healthy body ideal is attained when people's body ideals are similar to their body reality within the context of normal weight (Brownell, 1991). For example, having normal weight status and standards for body ideal that are consistent with normal weight status would be considered a healthy body ideal. Also, individuals with a healthy body ideal are able to recognize that human bodies come in a variety of shapes and sizes and that their body shape and size is largely determined by their genetics (Brownell, 1991). People with a healthy body image also have positive thoughts and feelings towards their body, and in turn, they behave in ways that reflect their positive evaluations. However, when individuals perceive their body reality to be worse than their body ideal, this judgment often results in negative thoughts, feelings, perceptions, and behaviors that would indicate body image disturbance and in particular, body dissatisfaction. Body image disturbance occurs when individuals have negative self-evaluations along any or all four of the main dimensions of body image mentioned above. In addition to a discrepancy between one's body reality and body ideal, body image disturbance is characterized by negative thoughts, feelings, and actions taken to hide or change one's appearance without regard for health implications (Brownell, 1991).

The construct of body image has been clearly defined in the literature; however, for a more comprehensive understanding of body image satisfaction and its influence on individuals' health and psychological well being, it is necessary to be able to accurately measure body image satisfaction. There are a number of valid and reliable measures of

body image satisfaction that have been developed to assess the four main dimensions of body image (i.e. perceptual, cognitive, affective, and behavioral). These are described in more detail in the section below.

Measuring Body Image Satisfaction

Perceptual Measures. Perceptual measures of body image satisfaction assess the level of accuracy of judgments about the size of a person's body or specific parts of their body (Cash, Wood, Phelps, & Boyd, 1991; Slade, 1994). Two types of measures for assessing size accuracy have been used: whole-body image and body-site adjustment methods (Cafri & Thompson, 2004a). In whole-body image adjustment methods, an image of the body is distorted (e.g. by photograph or video) and size accuracy is determined on the basis of individuals' ability to choose the body that most closely resembles their own among the distorted images. Whole-body assessment procedures have included techniques such as the distorting mirror (Traub & Orbach, 1964), video distortion technique (Allebeck, Hallberg, & Spamark, 1976; Fernández-Aranda, Dahme, & Meerman, 1999; Freeman, Thomas, Solyom, & Hunter, 1984; Meermann & Vandereycken, 1988; Probst, Van Coppenolle, Vandereycken, & Goris, 1992; Smeets, Ingleby, Hoeck & Panhuisen, 1999), and the life size screen distortion (Gardner & Bokenkamp, 1996; Probst, Van Coppenolle, Vandereycken, Kampman, & Goris, 1991; Probst, Vandereycken, & Van Coppenolle, 1997; Probst, Vandereycken, Van Coppenolle, & Vanderlinden, 1995; Shafran & Fairburn, 2002).

Body-site adjustment procedures ask participants to determine the size of specific body parts, with accuracy assessed based on the degree to which one overestimates a group of body sites. Body-site adjustment procedures have been used more frequently

than whole-image techniques because they do not induce distress among participants and are more cost-effective (Thompson, 1996). The first body-site adjustment procedure was the movable caliper technique (Slade & Russell, 1973). The movable caliper technique consists of a horizontal bar with two lights mounted on a track and requires participants to modify the lights so that they reflect the perceived size of the body part. Another body-site adjustment procedure is image marking in which participants mark their estimated body widths on a sheet of paper attached to a wall (Askevold, 1975). Advancements were made in body-site assessment by Ruff and Barriers (1986) when they developed the Body Image Detection Device. This device consists of an overhead projector that displays a horizontal band of light onto a wall in a darkened room and participants adjust the width of the projected light band to estimate the width of body sites. Thompson and Thompson (1986) altered the Body Image Detection Device by developing the Adjustable Light Beam Apparatus in which four light beams are simultaneously projected so that each corresponds with a particular body part (i.e. cheeks, waist, hips, and thighs). The few studies that have used body-site adjustment methods have used projected light beam apparatuses. Researchers found that in general, men overestimate their body parts and women without clinical eating disorder pathology overestimate their body parts even more than men (Keeton, Cash, & Brown, 1990; Thompson & Thompson, 1986).

Recent computer technology and digital photography have allowed for the development of computer graphic techniques for assessing perceptual body image satisfaction. Most of these instruments allow distortions of different body parts as well as overall vision of body image satisfaction. Examples of programs that have been developed include Body Build (Dickson-Parnell, Jones, Braddy, & Parnell, 1987), Body

Image Testing System (Schlundt & Bell, 1993), computer morphing software (Benson, Emery, Cohen-Tovee, & Tovee, 1999), the Body Virtual Image Reality Scale (Riva, 1997, 1998), the Virtual Body (Perpiña, 1999), and the Body Image Assessment Software (Letosa-Porta, Ferrer-García, & Gutiérrez-Maldonado, 2005). This newer technique typically provides participants with a real image (digital photo) and allows them to manipulate their image in the way that they think they are (perception) and in the way they would like to be (satisfaction). This software has been validated in athletes (Stewart, Benson, Michanikou, Tsiota, & Narli, 2003) and disordered eating patients (Tovée, Benson, Emery, Mason, & Cohen-Tovée, 2003).

For example, Stewart et al. (2003) used software programs to digitally alter photographic images of 36 adult men and women. Computer algorithms were applied to a photographic image of participants to distort nine body regions (e.g. arms, legs, and torso) so that they appear larger or smaller than the actual size. Participants were shown the distorted photograph and were asked to adjust the photograph to match their perceived body shape and size. A ratio was calculated comparing participants' actual dimensions of their body parts to their perceived dimensions, representing the degree to which they either overestimated or underestimated their body size. The ratio also showed how accurate or inaccurate participants' perception of their body was. There were no differences in perception accuracy between men and women. Therefore, the researchers pooled the data of the men and women, revealing no differences for chest, rib, hip, and thigh areas but differences were observed for the arms and calves. The ideal-actual differences were influenced by sex with men desiring larger features and women desiring

smaller features. These differences were significant for the chest, thighs, arms, and calves.

Cognitive Measures. Measures to assess the cognitive dimension of body image satisfaction are typically obtained through questionnaires that examine the degree of satisfaction people have with their body as well as attitudes, beliefs, and thoughts about their body shape, size, and function (Cash & Green, 1986). There are more measures available to assess the cognitive dimension than any of the other three dimensions. Some of the more common cognitive measures include the Body Esteem Scale (Franzoi & Shields, 1984), the Body Shape Questionnaire (Cooper, Taylor, Cooper, & Fairburn, 1987), the Body Dissatisfaction Scale of the Eating Disorders Inventory-2 (Garner, Olmstead, & Polivy, 2006), the Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991), the Contour Drawing Rating Scale (Thompson & Gray, 1995), the Body Cathexis Scale (Secord & Jourard, 1953) and the Multidimensional Body Self-Relations Questionnaire (Cash, Winstead, & Janda, 1986).

The Body Esteem Scale (Franzoi & Shields, 1984) assesses 35 components of the body such as waist, weight, and physical stamina as well as behavioral body aspects such as sexual activities and appetite. Participants respond to the scale using a 5-point Likert scale ranging from 1 (have strong negative feelings) to 5 (have strong positive feelings). Out of the total 35 components, men are instructed to respond to 31 items comprising three subscales that include: Physical Attractiveness (11 items; e.g. *nose, lips*), Upper Body Strength (9 items; e.g. *muscular strength, body build*), and Physical Condition (13 items; e.g. *agility, health*; two items are also included under upper body strength subscale: *physical coordination, figure or physique*). Women respond to 30 items that

also make up three subscales including: Sexual Attractiveness (12 items; e.g. *body scent, sex drive*), Weight Concern (10 items; e.g. *appetite, figure or physique*), and Physical Condition (8 items; e.g. *energy level, reflexes*). There is cross-sex overlap of items, some items are asked of both sexes, and some items fall under more than one subscale. A total Body Esteem Score is summed with higher scores indicating higher body-esteem. The internal consistency scores for the Body Esteem Scale have ranged from $\alpha = 0.78$ to 0.91 in women (Franzoi & Shields, 1984; McKinley, 1998) and $\alpha = 0.81$ to 0.95 in men (Franzoi & Shields, 1984; McKinley, 1998). Evidence from Franzoi and Herzog (1986) showed that the Body Esteem Scale was a valid multidimensional measure of body satisfaction. Also, good convergent and discriminant validity were established for the male Upper Body Strength and Physical Condition subscales, and by the female Weight Concern, and Physical Condition subscales (Franzoi & Herzog, 1986). Also, the test-retest reliability was reported to be $r = 0.83$; however this was in a sample of children in Great Britain (Duncan, Al-Nakeeb, & Nevill, 2004). Test-retest reliability three months after completing the questionnaire initially was reported to be high ($r = 0.83$ to 0.92) for the subscales in a sample of men and women ranging in age from 12 to 25 years.

The Body Shape Questionnaire (Cooper, Taylor, Cooper, & Fairburn, 1987) is a unidimensional 34-item self report measure of concern with body shape and weight often experienced by persons with eating disorders or related body image concerns. Participants respond to the scale using a 6-point Likert scale ranging from 1 (never experiencing) to 6 (always experiencing). Example items include “*Have you avoided situations where people could see your body?*” and “*Has seeing your reflection made you*

feel bad about your shape?” The psychometric properties of the Body Shape Questionnaire are good. The internal consistency score for the Body Shape Questionnaire has been reported to be excellent ($\alpha = 0.97$; Pook, Tuschen-Caffier, Braehler, 2008). Also, the scale’s construct, concurrent, and discriminant validity have been established through several studies (Cooper et al., 1987; Ghaderi & Scott, 2004; Pook, Tuschen-Caffier, & Stitch, 2002; Pook & Tuschen-Caffier; Rosen, Jones, Ramirez, & Waxman., 1996). Test-retest reliability for the Body Shape Questionnaire has been reported to be $r = 0.88$ in a sample of 466 women and men from four study samples (body image therapy patients, obese dieters, university undergraduates, and university staff; Rosen et al., 1996).

The Eating Disorder Inventory-2 (Garner, 1991) is a multidimensional, 91-item inventory that assesses the behavioral and psychological traits common in individuals with disordered eating symptoms such as anorexia nervosa and bulimia. Participants respond using a 6-point Likert scale with responses ranging from 1 (never) to 6 (always). The Eating Disorder Inventory-2 consists of 11 subscales measuring: 1) Drive for Thinness, 2) Bulimia, 3) Body Dissatisfaction, 4) Ineffectiveness, 5) Perfectionism, 6) Interpersonal Distrust, 7) Interoceptive Awareness, 8) Maturity Fears, 9) Asceticism, 10) Impulse Regulation, and 11) Social Insecurity. The Body Dissatisfaction subscale contains nine items that examines displeasure with the size and shape of body regions (e.g. hips, thighs, buttocks). Example items on the Body Dissatisfaction subscale include *“I think my thighs are too large,”* and *“I think my hips are too big.”* The Drive for Thinness subscale includes seven items that assess excessive concern with dieting, preoccupation with weight, and fear of gaining weight. Example items include *“I am*

preoccupied with the desire to be thinner,” and *“I exaggerate or magnify the importance of my weight.”* Internal consistency scores for the subscales has been reported to be adequate, ranging from alpha = 0.73 to 0.93 for all participants (Ebernez & Gleaves, 1994; Thiel & Paul, 2006). Specifically, the Drive for Thinness and Body Dissatisfaction subscales internal consistency scores have been reported to be good (alpha = 0.88; Thiel & Paul, 2006). The Eating Disorders Inventory-2 has established content, convergent, and discriminant validity showing that the scale has sound psychometric properties and its subscales properly measure the symptom domains they were developed to measure (Garner, 1991). Test-retest reliability for the entire scale has been reported to be $r = 0.89$ (disordered eating population) and $r = 0.94$ (non-clinical population; Thiel & Paul, 2006). The Drive for Thinness subscale has reported test-retest reliability of $r = 0.86$ (disordered eating population) and $r = 0.91$ (non-clinical population). Finally, the Body Dissatisfaction subscale has reported test-retest reliability of $r = 0.89$ (disordered eating population) and $r = 0.94$ (non-clinical population; Thiel & Paul, 2006).

The Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) is a multidimensional, 44-item self administered questionnaire designed to assess a broad range of attitudes that individuals have towards their bodies. Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Body Attitudes Questionnaire consists of the following subscales: Feeling Fat, Strength and Fitness, Salience of Weight and Shape, Attractiveness, Lower Body Fatness, and Body Disparagement. Example questions include *“I feel fat when I can’t get clothes over my hips,”* *“People avoid me because of my looks,”* and *“I try to keep fit.”* High internal consistency has been established in women and men ranging from 0.84 to 0.87 (Ben-

Tovim & Walker, 1991; Kagawa, Uchida, Uenishi, Binns, & Hills, 2007). The convergent validity for each subscale was also established with existing instruments and the test-retest reliability for the entire scale has been reported to be good ($r = 0.83$; Ben-Tovim & Walker, 1991).

The Contour Drawing Rating Scale (Thompson & Gray, 1995) is a unidimensional measure that presents participants with 9 schematic drawings of female figures ranging from 1 (extremely underweight) to 9 (extremely overweight). Participants rate their current body size and their ideal or preferred body size by circling the figure that is most representative of their current size and the figure that is representative of the ideal size they would like. Each person's current perceived body size minus their ideal body size is calculated to determine an index of body dissatisfaction. A larger discrepancy in scores indicates higher levels of body dissatisfaction and ideally wanting to be thinner than one's current size. Current-ideal discrepancy scores have demonstrated good construct validity with measures of body and weight dissatisfaction (Wertheim, Paxton, & Tilgner, 2004). Current figure ratings have correlated well with self-reported BMI in university students ($r = 0.59$; Thompson & Gray, 1995) and with measured BMI in adolescents (Wertheim et al., 2004). This scale has shown test-retest reliabilities between $r = 0.71$ and $r = 0.84$ over periods of one, two, and six weeks, respectively (Thompson & Gray, 1995; Wertheim et al., 2004).

The Body Cathexis Scale (Secord & Jourard, 1953) is a self administered multidimensional measure of body image satisfaction consisting of two subscales: Body Cathexis (i.e. strength and direction of feeling about various parts and functions of the body) and Self Cathexis (i.e. conceptual aspects of the self). The Body Cathexis Subscale

asks participants to rate 46 body parts and functions on a 5-point Likert Scale, ranging from: 1 = Have strong feelings and wish change could somehow be made; 2 = Don't like, but can put up with; 3 = Have no particular feelings one way or the other; 4 = Am satisfied; and 5 = Consider myself fortunate. Example items include *hair, waist, back, ears, and teeth*. The Self Cathexis Subscale lists 55 conceptual aspects of the self, which are rated on the same Likert Scale, ranging from 1 (Have strong feelings and wish change could somehow be made) to 5 (Consider myself fortunate). Example items *include neatness, self confidence, self-respect, emotional control, and popularity*. Three scores are obtained: Total Body Cathexis, Total Self Cathexis, and an Anxiety Indicator score. A Total Body Cathexis score is obtained by summing the ratings for each of the 46 items and dividing by 46. Total Self Cathexis scores are obtained by summing the ratings for all 55 items and dividing by 55. Finally, the Anxiety-Indicator score is obtained by summing the ratings for the 11 most negatively rated Body Cathexis items across all males in the study. An anxiety-indicator for females would be obtained in the same way, choosing the 11 most negatively rated Body Cathexis items and summing them for each individual female. The Body Cathexis Scale has been shown to be a stable measure, correlating with other measures of self-concept (Secord & Jourard, 1953).

Intercorrelations between the Body Cathexis Subscale and the Self Cathexis Scale have been shown to be $r = 0.58$ for men and $r = 0.66$ for women (Secord & Jourard, 1953). Reliability on the Body Cathexis Subscale for men has been reported at $r = 0.78$ and $r = 0.83$ for women (Secord & Jourard, 1953). The test-retest reliability of the Self Cathexis Subscale has been reported to be good for men ($r = 0.88$) and excellent for women ($r =$

0.92; Secord & Jourard, 1953). Finally, the Anxiety Indicator has reported reliabilities of $r = 0.72$ for men and $r = 0.73$ for women (Secord & Jourard, 1953).

The Multidimensional Body-Self Relations Questionnaire (Cash, Winstead, & Janda, 1986) is one of the most comprehensive cognitive measures of body image satisfaction that assesses body image cognitions related to the body's appearance, health, and physical functioning. Two forms of the scale are available for use with adults and adolescents (15 years or older). The full version consists of 69 items with 10 subscales, including: 1) Appearance Evaluation, 2) Appearance Orientation, 3) Fitness Orientation, 4) Health Evaluation, 5) Health Orientation, 6) Illness Orientation, 7) Overweight Preoccupation, 8) Fitness Evaluation, 9) Self Classified Weight, and 10) Body Areas Satisfaction. Participants respond using a 5-point Likert scale from 1 (definitely disagree) to 5 (definitely agree). The convergent, discriminant, and construct validity of this scale have been established with clinical and nonclinical populations (Brown, Cash, & Lewis, 1989; Cash & Green, 1986; Cash & Hicks, 1990; Jackson, Sullivan & Rostker, 1988; Keeton, Cash, & Brown, 1990; Noles, Cash, & Winstead, 1985; Thompson & Psaltis, 1988). Each of the subscales has good to excellent internal consistency scores ranging from $\alpha = 0.70$ to 0.90 (Cash, 1994). The Multidimensional Body Self-Relations Questionnaire has good test-retest reliability, ranging from $r = 0.70$ to $r = 0.90$ over a one month period (Cash, 1994). A shortened version, the Multidimensional Body Self-Relations Questionnaire-Appearance Scales is a 34-item measure that consists of 5 subscales including Appearance Evaluation, Appearance Orientation, Overweight Preoccupation, Self-Classified Weight, and the Body Areas Satisfaction. Internal consistency scores for the subscales have ranged from $r = 0.73$ to $r = 0.88$ for both men

and women (Cash, 2000; Hart et al., 2008). One month test-retest reliabilities have also ranged from $r = 0.79$ for men to $r = 0.91$ for women (Cash, 2000; Hart et al., 2008). The Body Areas Satisfaction Subscale consists of nine items that assesses satisfaction with discrete aspects of appearance. Higher scores on the Body Areas Satisfaction Subscale indicate contentment with more areas of the body. Since the Multidimensional Body Self Relations Questionnaire is the most frequently used measure of body image satisfaction, the Body Areas Satisfaction Subscale was chosen for the current study to assess body satisfaction.

Affective Measures. There are relatively few measures available to assess the affective dimension of body image satisfaction, such as feelings of worry, shame, anxiety, comfort, embarrassment, and pride in relation to the body (Cash & Green, 1986). Two affective measures include the Objectified Body Consciousness Scale (McKinley & Hyde, 1996) and the Social Physique Anxiety Scale (Hart, Leary, & Rejeski, 1989). The Objectified Body Consciousness scale is a multidimensional measure that assesses people's feelings of shame about their outward appearance and weight. The scale contains three subscales consisting of Body Surveillance (8 items; e.g. "*I often worry about whether the clothes I am wearing makes me look good.*"); Body Shame (8 items; e.g., "*I feel like I must be a bad person when I don't look as good as I could.*"); and Control Beliefs (8 items; e.g., "*I think a person can look pretty much how they want to if they are willing to work at it.*"). The questionnaire asks respondents to indicate their level of agreement with each of the statements using a Likert Scale ranging from 1 (strongly disagree) to 7 (strongly agree). Participants can also circle a "Not Applicable" option if the statement does not apply to them. The Objectified Body Consciousness Scale has

been shown to be internally consistent in young and middle-aged women (McKinley & Hyde, 1996). Test-retest reliabilities of the three subscales has been reported to be: Body Surveillance: $r = 0.88$ (young women) and $r = 0.73$ (middle aged women); Body Shame: $r = 0.84$ (young women) and $r = 0.69$ (middle aged women); Control Beliefs: $r = 0.73$ (young women) and $r = 0.75$ (middle aged women; McKinley, 2006).

The Social Physique Anxiety Scale (Hart et al., 1989) is a multidimensional self report scale that assesses the level of anxiety that people experience when other people evaluate their body. The Social Physique Anxiety Scale consists of 12 items in which participants indicate their degree of anxiety by using a 5-point Likert-scale ranging from 1 (not at all characteristic of me) to 5 (extremely characteristic of me). Two items are reverse scored and then all items are summed. The scale was initially thought to be unidimensional, but recent confirmatory analysis research suggests that it is a multidimensional scale, with two subscales (Hurst, Hale, Smith, & Collins, 2000). The first subscale consists of five items that represent feelings about comfort of presenting one's physique and the second subscale has seven items that represent the negative evaluation of one's physique by others. Higher scores on the Social Physique Anxiety Scale indicate greater social physique anxiety. Internal consistency for the Social Physique Anxiety Scale has been reported to range from $\alpha = 0.90$ to 0.93 with university students (Diehl, Johnson, Rogers, & Petrie, 1998; Hart et al., 1989). Extensive support for the scale's construct validity in men and women was provided by Hart et al. (1989) in their initial investigation showing that the scale correlated moderately with the Interaction Anxiousness Scale ($r = 0.33$) and the Fear of Negative Evaluation Scale ($r = 0.35$). The Social Physique Anxiety Scale was also correlated with the Body Cathexis Scale ($r =$

0.51) and the subscales of the Body Esteem scale ($r = 0.26$ to 0.82). Eight week test-retest reliability has been reported to be $r = 0.82$ in a sample of men and women (Hart et al., 1989).

Behavioral Measures. Behavioral measures assess the frequency with which one engages in activities that are indicative of body image disturbance. Such behavioral disturbances can be placed in two categories: avoidance behaviors and lifestyle behaviors (Rosen, Srebnik, Saltzberg, & Wendt, 1991). Avoidance behaviors include actions performed to divert attention away from the body or to prevent other people from seeing one's body. Examples of avoidance behaviors would be things like wearing baggy clothes, shunning social events, and avoiding physical or sexual intimacy. Lifestyle behaviors are actions performed with the goal of altering the body or that reflect extensive body image concern. Examples of lifestyle behaviors include restrained eating or dieting, excessive exercising, exercising for only the purpose of weight loss, steroid use, repeatedly weighing oneself, or seeking out cosmetic surgery to alter one's appearance.

To measure both categories of behaviors, questionnaires are typically utilized in which participants indicate the frequency with which they engage in these behaviors. For instance, the Drive for Muscularity Scale (McCreary, Sasse, Saucier, & Dorsch, 2004) assesses behaviors that men typically perform to become bigger and more muscular. Respondents rate their use of muscularity-oriented behaviors (i.e., "*I use protein or energy supplements*" and "*I lift weights to build up muscle*") using a 6-point Likert Scale ranging from 1 (always) to 6 (never). The scale also contains seven questions to assess the cognitive dimension of muscular orientations (i.e., "*I wish that I were more*

muscular” and “*I think that my chest is not muscular enough*”). The scale is scored by calculating separate sums for the cognition items and the behavior items. Higher scores indicate greater muscularity satisfaction and less use of behaviors to increase muscularity. The drive for muscularity scale has shown good internal consistency, with a Cronbach's alpha of 0.87, and good construct validity (McCreary, et al., 2004). Test-retest reliability estimates have ranged from $r = 0.85$ to $r = 0.91$ (men) and $r = 0.80$ (women; McCreary et al., 2004). High seven to ten day test-retest correlations have been reported in a sample of men ($r = 0.93$ for the entire scale; Cafri & Thompson, 2004b). In some cases, it is also possible to obtain direct measures rather than self-reported measures. For example, observations can be made of the type of clothing a person wears to an aerobics class as a direct behavioral index of each person's body image satisfaction. However, direct observational methods are used less frequently because it would require an observer to rate participants' behaviors such as avoidance of mirrors or scales which would be difficult to capture in a laboratory setting and too time consuming to determine in a more naturalistic setting. Also, because body image satisfaction is a psychological construct specific to each individual, a more direct way to determine behaviors individuals might perform would be to have them complete questionnaires rather than depending on observer ratings (Cash & Pruzinsky, 2002)

Measuring Body Image Satisfaction in Subpopulations. There are a number of ways to assess body image satisfaction across different populations; however, none of these body image satisfaction measures are designed to examine body image satisfaction in special populations such as children, elderly, disabled individuals, and particularly pregnant women. Specifically for pregnant women, only one located self-report measure

has been developed to assess body image satisfaction during pregnancy. Skouteris and colleagues examined satisfaction with specific body parts in pregnancy using their author-developed Pregnancy Figure Rating Scale (Duncome, Wertheim, Skouteris, Paxton, & Kelly, 2008; Skouteris, et al., 2005). The Pregnancy Figure Rating Scale consists of three rows of five schematic drawings with each row representing a different body part. Women rated the current size of their bust, stomach, and buttocks on a scale from 1 (very thin) to 10 (very large). Using the same scale, women rated their ideal size of these body parts. Discrepancy scores between the current size and ideal size for each body part were then calculated. A total score was then determined by summing the three body part ratings. Given the small number of items in the scale, inter-item correlations were performed to assess internal consistency, ranging from $\alpha = 0.27$ to 0.46 for current size and $\alpha = 0.27$ to 0.44 for ideal size (Skouteris et al., 2005). Construct validity for the Pregnancy Figure Rating Scale was established between the discrepancy scores on the scale and the Feeling Fat Subscale of the Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) with correlations ranging from $r = 0.19$ to 0.51 . Test-retest reliability for the Pregnancy Figure Rating Scale ranged from $r = 0.86$ to 0.92 for current ratings and $r = 0.81$ to 0.91 for ideal ratings. Due to the fact that this scale has only been utilized by the authors who developed it, there is a need for more widespread examination of this scale and/or for the development of a more comprehensive multidimensional scale to assess body image satisfaction specific to pregnancy.

Sociocultural Impact on Body Image Satisfaction

Multiple factors impact the development of body image satisfaction, but the underlying mechanisms that contribute to body image disturbance are still not completely

understood. Four primary approaches have been offered to explain the development and maintenance of body dissatisfaction including Social Comparison Theory, Sociocultural Theory, Negative Verbal Commentary approach, and Maturational Status approach (Thompson, 1992). Social Comparison Theory (Heinberg & Thompson, 1992) emphasizes that individuals who frequently compare their appearance to that of other persons, especially individuals who are more attractive (i.e. an upward comparison) are at a greater risk of body dissatisfaction. The Negative Verbal Commentary approach (Brown, Cash, & Lewis, 1989) argues that early exposure to negative verbal commentary in the form of teasing comments directed towards appearance or weight is associated with body dissatisfaction, eating disturbance, and general psychological functioning. The Maturational Status approach (Thompson, 1990) focuses on early physical maturation in which the experience of puberty prior to one's peer group is associated with elevated body dissatisfaction. Out of all the approaches, the Sociocultural Theory has received the most widespread support for explaining body dissatisfaction. The Sociocultural Theory is based on the belief that societal factors, particularly those involving the media (e.g. television, magazines, internet) convey powerful messages regarding what is acceptable in terms of one's physical appearance (Heinberg, Thompson, & Stormer, 1995). The media strongly influences women with respect to how their bodies should look, suggesting that the ideal body is extremely thin and fit (Cortese, 1999).

For at least the past 40 to 50 years, pictures of thin women have been portrayed in the media with images such as Twiggy becoming popular in the 1960's. These images began the trend of very thin women being shown on magazine covers, television shows, in movies, and now on the internet. However, most young women cannot obtain the thin

body that is favored in the media. The disparity between Western society's definition of the ideal female shape and the actual size of women's bodies is increasing (Morrison, Kalin, & Morrison, 2004). The conceptualized ideal figure portrayed in the media has changed such that in 1985 models weighed 8% less than the average woman and as of 2005, models weighed 23% less than the average woman (Borzekowski & Bayer, 2005). Additionally, 90% of female models are reported to be below average weight for their height (Vaughan & Fouts, 2003). The models consistently seen in the media represent an unrealistic standard of beauty: tall with narrow hips, long legs, and thin thighs (Katzmarzyk & Davis, 2001; Seifert, 2005). While media images of women have become progressively thinner, the average American woman under the age of 30 has become progressively heavier (Wiseman, Gray, Moismann, & Ahrens, 1992). Women are constantly comparing their appearance with the idealized women seen in the media, and as a result, more women are experiencing anxiety over their personal body image satisfaction (Thompson, 1990). The internalization of such a stringent and unobtainable body is likely to lead to negative feelings and cognitions about one's body which could furthermore lead to negative behaviors such as disordered eating (Andrist, 2003).

According to the National Eating Disorders Association (NEDA), 42% of first through third grade girls wanted to be thinner and 81% of 10 year old girls were afraid of being fat (NEDA, 2002). Even more disturbing is the research by Davison and colleagues demonstrating body image anxiety in girls as young as 5 years old (Davison, Markey, & Birch, 2002). There has been speculation as to why girls of such a young age are experiencing dissatisfaction with their bodies, but many attribute this dissatisfaction to the influence of the media. Individuals of all ages - children, adolescents, young adults,

and older adults - are exposed to media images on a daily basis. It has been estimated that Americans are exposed to between 500 and 3,000 advertising images each day (Cortese, 1999). Children and young women are exposed to advertising in television, magazines, and movies every day of their life and this exposure has a powerful influence on how they formulate their ideals of a perfect body (Andrist, 2003).

Evidence on the effects of exposure to thin media images and body dissatisfaction has been inconsistent. Some studies found that after exposure to slender media images, women reported higher levels of body dissatisfaction (Hawkins, Richards, Granley, & Stein, 2004; Thornton & Maurice, 1997) while other studies have had inconsistent evidence on the effect of thin media images on body satisfaction (Cash, Cash, & Butters, 1983; Champion & Furnham, 1999; Hamilton & Waller, 1993; Myers & Biocca, 1992). These conflicting findings could be a result of methodological problems such as non-random assignment, participant's awareness of the aim of the research, questionable assessment measures, and the absence of pre-exposure measurements of self-evaluation (Hawkins, Richards, Granley, & Stein, 2004). Despite the inconsistent findings of exposure to media images, there is no doubt that the media plays a large role in the development of body dissatisfaction.

Celebrities are the main focus of the media today, and of particular interest is their weight. Celebrities are criticized if they gain too much weight and considered to be unattractive. At the other extreme, celebrities are deemed to have an eating disorder or excessive exercise behaviors if they suddenly become too thin. Pregnant celebrities have become the latest trend for media coverage. In the past when celebrities became pregnant they were expected to hide their pregnancy because their inevitable weight gain caused

them to deviate from the cultural ideal of beauty. Any signs of a pregnancy were typically hidden under loose fitting maternity clothing to disguise the pregnant belly. However, this is no longer the case and in fact, the media has begun to glamorize pregnancy. Constant media coverage of pregnant television and movie stars has created an unrealistic view of the pregnant body. Hollywood stars have access to stylists and expensive outfits that no longer hide their pregnant body, but instead show off their “perfect” pregnant body. As a result of pregnant celebrities becoming the latest target of the media, it has become the norm to see pregnant celebrities on the cover of many popular magazines. Due to society’s continual obsession with thinness, this view has taught women that even during pregnancy they should strive to achieve a “cute” but fit pregnant body because this is what they see when pregnant stars are featured on the magazine covers. Even worse, celebrities are criticized negatively for gaining too much weight in their pregnancy. Clearly there are limitations to the amount of weight a woman should gain in pregnancy (Institute of Medicine [IOM], 2009), but women who are unaware of the weight gain guidelines may be greatly influenced by the critical views of gestational weight gain they see in the media. This could possibly lead to dieting behaviors as well as attempts to lose weight during pregnancy, which in turn, can lead to negative consequences for both the mother and her infant. In spite of the media’s current interest in pregnancy, there is a paucity of research examining body image satisfaction during pregnancy.

A Biopsychosocial Explanation of Body Image Satisfaction

It is clear that sociocultural influences have a large impact on the development of individuals’ body image satisfaction. In addition to the media and cultural influences, there may also be biological and psychological factors that contribute to the development

of body image satisfaction or dissatisfaction. The biological, psychological, and social factors must all be considered to better understand the development of body image concerns among women, particularly during pregnancy. These factors have not all been examined collectively, and as a result, the influence of each of these factors as well as their combined influence on body image satisfaction is not known. There is some research examining body image satisfaction within the framework of the Biopsychosocial Model, and some studies that have used the Theory of Planned Behavior, but no located studies have examined body image satisfaction in pregnancy using an integrated framework. For this reason, a conceptual model that considers the Biopsychosocial Model (Engel, 1977) and the Theory of Planned Behavior (Ajzen, 1991) may provide a more comprehensive understanding of body image satisfaction during pregnancy (See Figure 1). As illustrated in Figure 1, the current thesis assessed the potential biopsychosocial determinants of body image satisfaction during pregnancy. Based on previous research that examined the impact of gestational weight gain and prepregnancy weight status (Abraham, King, & Llewellyn-Jones, 1994; Copper, DuBard, Goldenberg, Oweis, 1995; DiPietro, Millet, Costigan, Gurewitsch, & Caulfield, 2003; Fox & Yamaguchi, 1997) it was thought that these biological factors would be important determinants of the way women felt about their bodies during pregnancy. The psychological variables that were examined in the current study included depressive symptoms, exercise behavior, and the motivational determinants of exercise. Depressive symptoms have been shown to be negatively associated with body image satisfaction and exercise behavior has been shown to have both positive and negative influences on body image satisfaction (Boscaglia, Skouteris, & Wertheim, 2003; Clark et al., 2009;

Goodwin, Astbury, & McMeeken, 2000; Symons Downs et al., 2008). Based on the findings from prior research, it was speculated that these psychological constructs would also be important determinants of women’s body image satisfaction in pregnancy. Finally, the Subjective Norm construct from the Theory of Planned behavior was included in the current study as the social aspect of the model. The conceptual framework used in the current thesis as well as evidence for this framework among non-pregnant and pregnant populations is presented below.

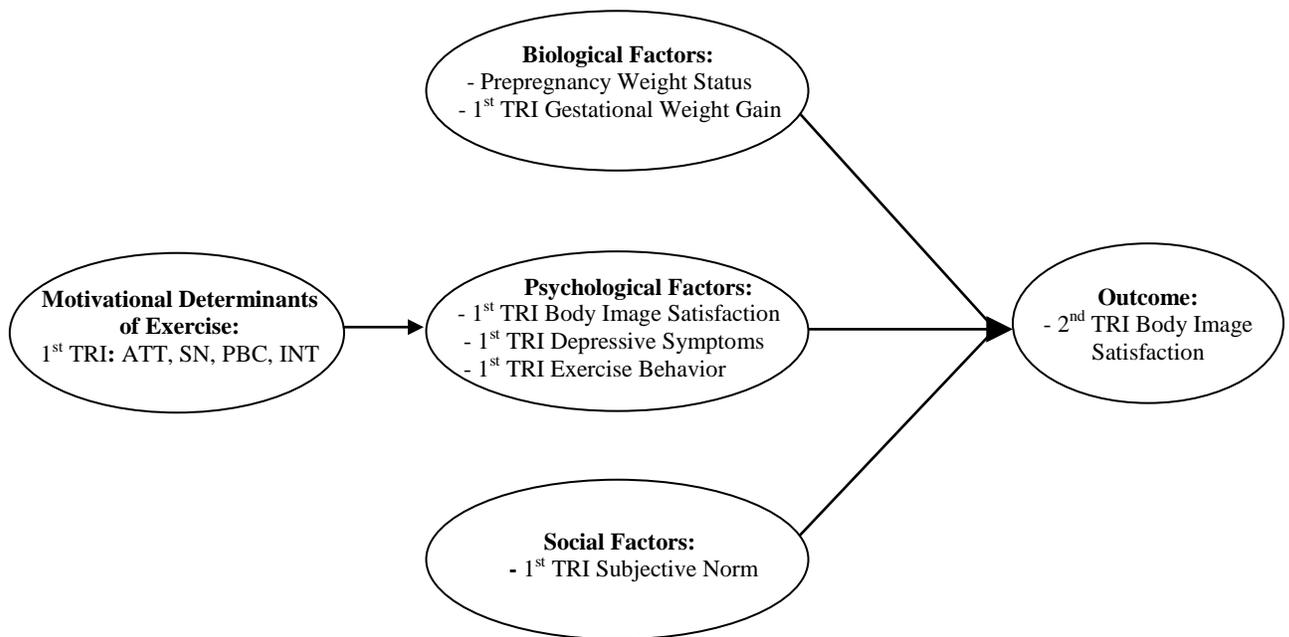


Figure 1. Biopsychosocial Model of Body Image Satisfaction depicting the potential variables that are contributing to women’s body image satisfaction at the second trimester of pregnancy. *Note.* ATT = attitude; SN = subjective norm; PBC = perceived behavioral control; INT = intention.

Biopsychosocial Model. A biopsychosocial framework has been proposed as a comprehensive theoretical framework for understanding body image satisfaction among children and men (Bardone-Cone, Cass, & Ford, 2007; Ricciardelli, McCabe, Holt, & Finemore, 2003). Poor body image satisfaction, dieting, and related behaviors during

childhood have been considered to be major risk factors associated with chronic body image satisfaction problems, weight cycling (e.g. repeated loss and regain of body weight), obesity, eating disorders, and exercise dependence in adolescence and adulthood (Birch & Fisher, 1998; Kotler, Cohen, Davies, Pine, & Walsh, 2001; Shisslak et al., 1999). Ricciardelli et al. (2003) examined the Biopsychosocial Model in understanding body image satisfaction concerns, cognitions, and behaviors related to body image satisfaction in preadolescent children. One of the main biological determinants of body dissatisfaction was proposed to be Body Mass Index (BMI). Research has shown that both boys and girls who have a larger BMI desire to be thinner (Candy & Fee, 1998; Gardner, Sorter, & Friedman, 1997; Oliver & Thelen, 1996; Rolland, Farnill, & Griffiths, 1997). In the study by Ricciardelli and colleagues (2003), they found that BMI was a strong predictor of body dissatisfaction for both boys and girls. Also, other psychological factors such as self-esteem and negative affect have been found to be related to body dissatisfaction (McCreary & Sasse, 2000; Neumark-Sztainer, & Hannan, 2000; Ricciardelli & McCabe, 2001; Stice, 2001); however, Ricciardelli et al. (2003) found that self esteem and negative affect were poor predictors of body image satisfaction. They also examined sociocultural factors such as perceived pressure to lose weight from parents, peers, and the media, all of which were found to be important and significant predictors of body dissatisfaction on girls and boys.

Previous research with the Biopsychosocial Model has attempted to explain the link between eating disorder pathology and body image disturbances (Gupta, 1995; Ricciardelli & McCabe, 2004). More specifically, body image dissatisfaction in young girls at the onset of puberty has been thought to predict disordered eating behaviors in

adulthood for these women (Graber, Brooks-Gunn, Paikoff, & Warren, 1994). Girls who perceive their timing of development to be early tend to feel less positive about their bodies, while girls who perceive their development to be on time feel more attractive and have more positive body image satisfaction (Mendelson, McLaren, Gauvin, & Steiger, 2002; Striegel-Moore, 2001).

The psychological environment has also been associated with eating disorder pathology and poorer body image satisfaction (Lester & Petrie, 1998). Families of women with disordered eating tend to be high achieving, competitive, overprotective, and characterized by intense interactions and poor conflict resolution (Pate, Pumareiga, Hester, & Garner, 1992). Also, the role of mothers has also been proposed for explaining disordered eating symptoms. There is evidence that mothers of daughters with eating pathology symptoms are often controlling, demanding, and critical of the weight and appearance of their daughters (Pike & Rodin, 1991).

Even though a Biopsychosocial approach has not been used during pregnancy, many of the mechanisms proposed by a Biopsychosocial Model for body dissatisfaction are also likely to occur in pregnancy. The current study included the biological factors of women's prepregnancy weight status as well as the amount of gestational weight women gained in early pregnancy. It was thought that women with a higher prepregnancy BMI would be more likely to experience greater body dissatisfaction when compared to women with a lower prepregnancy BMI. Also, the amount of weight women gain in pregnancy would be likely to have an impact on women's body image satisfaction throughout the course of their pregnancy. Women who understand the functionality of their gestational weight gain and evaluate it positively would be more likely to

experience greater body image satisfaction when compared to women who may experience negative attitudes about the weight they are gaining throughout pregnancy. Additional biological factors such as abnormal levels of norepinephrine and other neurotransmitters may promote depressive symptoms which are often linked with poorer body image satisfaction and eating disturbances (Fava, Copeland, Schweiger, & Herzog, 1989). The psychological variables assessed in the current study included depressive symptoms, exercise behavior and the motivational determinants of exercise.

Depressive symptoms are particularly common in pregnancy, and as a result, depression during pregnancy has been linked to poorer body image satisfaction (Cunningham & Zayas, 2002; Marcus & Flynn, 2008; Paxton, Neumark-Stzainer, Hannan, & Eisenberg, 2006; Symons Downs, et al., 2008; Wildes, Simons, & Marcus, 2005). It was thought that women who reported higher exercise behavior would experience greater body image satisfaction when compared to women who reported lower exercise behavior (Boscaglia et al., 2003). Also, women with greater motivational determinants of exercise (i.e. positive attitude towards exercise, high social support for exercise, control over their exercise behavior, and high intention towards exercise) would be more likely to exercise in pregnancy and as a result may have better body image satisfaction than women with low motivational determinants of exercise who furthermore may be less likely to exercise. As mentioned previously, societal pressure to attain a thin shape also plays an important role in the development of body image satisfaction or dissatisfaction which is likely to be exacerbated by gestational weight gain throughout pregnancy. Finally, women who have been raised in highly controlled and demanding environments may be more likely to have poorer body image satisfaction, particularly

during pregnancy when they are unable to have less control over their gestational weight gain. They may also feel unable to please others, particularly their spouse since many women may worry that their spouse might view them as less attractive due to their gestational weight gain and body changes they experience in pregnancy. Societal and spousal pressures on body image satisfaction in pregnancy were not assessed in the current study but are likely to also impact the way women view their bodies in pregnancy.

Theory of Planned Behavior. The Theory of Planned Behavior (Ajzen, 1991) is a social-cognitive framework that suggests people's beliefs about a behavior influence their way of thinking (i.e. Attitude), motivation to comply with others wishes and desires (i.e. Subjective Norm), and how they evaluate the difficulty of adopting the behavior (i.e. Perceived Behavioral Control). The Theory of Planned Behavior integrates three beliefs: behavioral, normative, and control beliefs that furthermore determine the main constructs of the theory. Behavioral Beliefs are determined by an individual's perceived positive and negative consequences of a behavior. For example, women may believe that exercise will help to control their gestational weight gain, but they may also think that exercise causes fatigue. As a result, the Behavioral Beliefs form people's Attitude. Normative Beliefs are formed by a person's perception that important people in their life think they should engage in a behavior. For instance, if a woman believes her spouse wants her to exercise and she values her spouse's opinion, her subjective norm for exercise will be higher. These Normative Beliefs furthermore form the construct of Subjective Norm. Finally, Control Beliefs are formed from an individual's perception that she has the necessary resources, skills, and power to engage in a behavior. The more resources and

skills a woman has for exercise (i.e. self motivation, supportive family and friends) and the fewer obstacles she anticipates (i.e. lack of time), the greater her perceived control for exercising will be. The Control Beliefs form people's Perceived Behavioral Control. The Theory of Planned Behavior exercise beliefs are the driving force in understanding the determinants of exercise behavior. Therefore, if people evaluate their behavior positively (attitude), believe that important people want them to participate in the behavior, and they perceive it to be under their control, they will be more likely to engage in that behavior.

Previous research has shown the Theory of Planned Behavior to be the most validated theory for predicting, explaining, and understanding exercise behavior (Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997; Symons Downs & Hausenblas, 2005a, 2005b). For instance, Symons Downs and Hausenblas (2005a) conducted a comprehensive meta-analytic review of exercise studies and the Theory of Planned Behavior. Large effect sizes were found for Intention and exercise behavior ($d = 1.01$) and Intention and Perceived Behavioral Control ($d = 0.90$). A moderate association were found for Perceived Behavioral Control and exercise behavior ($d = 0.51$). Also, Intention and Perceived Behavioral Control were found to account for 21% of the variance in exercise behavior. Finally, Attitude, Subjective Norm, and Perceived Behavioral Control accounted for 34% of the variance in Intention. Thus, the Theory of Planned Behavior may provide some context to understanding the motivational determinants of exercise behavior as they relate to body image satisfaction in pregnancy.

Limited research; however, has applied the Theory of Planned Behavior to understand body image satisfaction correlates in pregnancy. There is some evidence that the Theory of Planned Behavior is an effective framework for understanding and

explaining women's exercise intention and behavior during pregnancy (Hausenblas & Symons Downs, 2004; Hausenblas, Symons Downs, Giacobbi, Tuccitto, & Cook, 2008; Symons Downs & Hausenblas, 2003, 2004a, 2004b, 2005). Because exercise behavior is an important correlate of body image satisfaction and because the motivational determinants of exercise and exercise behavior may impact body satisfaction, examining the Theory of Planned Behavior components along with other relevant body image satisfaction correlates is warranted. Thus, the framework of the Theory of Planned Behavior was chosen to better understand how women's motivational determinants of exercise behavior furthermore influence body image satisfaction throughout pregnancy.

Linking a Biopsychosocial Model with the Theory of Planned Behavior. There has been research examining the Biopsychosocial Model and body image satisfaction as well as the Theory of Planned Behavior with exercise behavior; however, no studies have been located linking the two in order to predict body image satisfaction, particularly during pregnancy. Due to the fact that body image satisfaction is a multidimensional construct in which multiple factors contribute to body image satisfaction or dissatisfaction, the Biopsychosocial approach is beneficial to capture these influences. As mentioned previously, the Biopsychosocial approach examines the interaction among the biological, psychological, and social influences that are likely to impact body image satisfaction in pregnancy. It is possible that women who are more active also have greater body image satisfaction. Thus, the Theory of Planned Behavior constructs were included in the proposed research to better understand the motivational determinants of exercise as they relate to women's body image satisfaction in pregnancy. More specifically, it is possible that women's Attitude, Intention, and Perceived Behavioral Control for exercise

behavior may mediate body image satisfaction such that women with greater motivational determinants for exercise may be more likely to engage in exercise, and in turn, have greater body image satisfaction. The current literature on body image satisfaction during pregnancy has demonstrated equivocal findings, indicating that the relationships between the biopsychosocial correlates of body image satisfaction and body image satisfaction in pregnancy are complex. Utilizing the Biopsychosocial Model and the Theory of Planned Behavior may be beneficial to clarify how the correlates influence body image satisfaction during pregnancy.

Conceptual Understanding of Body Image Satisfaction and Pregnancy

Due to the limited research examining body image satisfaction in pregnancy, the literature is still unclear about the influence that pregnancy has on women's body image satisfaction. For example, 14 studies were located in which body image satisfaction was measured during pregnancy or the postpartum period, with each of these studies having discrepant findings for the influence of pregnancy on body image satisfaction (See Table 1, pg. 92). For clarity of presenting these findings, the following sections are grouped by the overall study outcome (i.e. positive, negative, and equivocal associations between body image satisfaction and the related correlates of depressive symptoms, gestational weight gain, and exercise behavior and its motivational determinants).

Positive Associations Between Body Image Satisfaction and Pregnancy. There is some evidence that body image satisfaction standards may be more relaxed during pregnancy since women see the changes they are experiencing as a necessary part of the childbearing process (Davies & Wardle, 1994; Fairburn, Stein, & Jones, 1992; Richardson, 1990). As result, many women feel that it is socially acceptable to gain

weight as a natural part of their pregnancy, thus making them larger than their typical body size. Women who view this gestational weight gain positively have been shown to experience positive changes in their body image satisfaction (Wiles, 1993). For instance, Rocco et al. (2005) administered questionnaires and interviewed 109 pregnant women during their first, second, third trimesters and in the postpartum period. The women completed both the Body Attitudes Test (Ben-Tovim & Walker, 1991) and the Eating Disorders Inventory-2 (Garner, 1991) to assess their body image satisfaction during each of these time points. Women were categorized into three groups: 1) pregnant women with a positive history of dieting ($n = 37$); 2) pregnant women with a positive history of dieting with a complete diagnosis of a current eating disorder ($n = 11$); 3) pregnant women with a negative history of dieting or eating disorders ($n = 49$). They found that women with diagnosed eating disorders as well as those with subclinical eating disturbances had improved eating behaviors and body image satisfaction during the middle of pregnancy when compared to women with no history of dieting or eating disorders. The authors speculated that women had improved body image satisfaction and eating attitudes because they were placing less emphasis and worry about their shape and body and more emphasis on their baby and the function of the transition to motherhood. The improvements in body image satisfaction and eating attitudes were thought to have been also related to an increased perceived quality of life since pregnant women tend to take care better care of themselves during this time, have more available social support, and lowered social demands. However, interestingly, despite the improvement in body image satisfaction during pregnancy, the authors also found that women's body image satisfaction returned to previous levels after delivery. Rocco and colleagues (2005)

suggested that this phenomenon could be related to an interaction between sociopsychological issues, and endocrinological imbalance, or simply a perceived increase in women's sense of well-being for a new attainment in their biological course that furthermore caused the amelioration to only last the duration of pregnancy. They suggested the need for more research in this area and perhaps intervention to prevent women from returning to their previous body image satisfaction levels prior to pregnancy.

Matushashi and Felice (1991) interviewed pregnant adolescents ($N = 86$) and had them complete the Tennessee Self Concept Scale (Fitts, 1965) to assess their body image satisfaction. They found that third trimester pregnant adolescents had a more positive body image satisfaction than their never pregnant peers (Matsuhashi & Felice, 1991). The pregnant teens also had lower scores in self-criticism and higher self-identity scores at a time when they were developing their own sexual identity. The authors thought that pregnancy may have been a way for them to develop this sexual identity and feel good about themselves thus leading to higher body image satisfaction. Despite the fact that this study examined body image satisfaction in pregnant adolescents, this study provides further support for the positive changes women experience during their pregnancy.

Davies and Wardle (1994) compared body image satisfaction in 76 pregnant women to 97 non-pregnant controls. The women completed the Drive for Thinness and Body Dissatisfaction subscales of the Eating Disorder Inventory-2 (Garner, 1991), The Figure Rating Scale (Stunkard, Sorensen, & Schulsinger, 1983), and The Restraint Scale of the Dutch Eating Behavior Questionnaire (Van Strien, Frijters, Bergers, & Defares, 1986). Women also rated the perceived size of their body and body parts, and were asked

to express their attitudes towards gestational weight gain in their pregnancy. These authors found that pregnant women were more accepting of their body size and made fewer attempts to control their weight compared to the non-pregnant controls. Pregnant women had slightly better body image satisfaction and less drive for thinness than their non-pregnant counterparts. Figure ratings for pregnant women were shifted away from “overweight” or “too big” and more towards “about right.” Overall, the authors found evidence for reduced weight concern and dieting in pregnancy despite the increase in body size experienced by pregnant women. If women accept the functionality of their weight gain during pregnancy and can attribute the changes in their body as a part of a healthy pregnancy, then they are more likely to experience positive changes in their body image satisfaction.

Negative Associations between Body Image Dissatisfaction and Pregnancy.

Pregnancy is often seen by many as a time when women are falling further from the cultural ideal of “thinness” and as a result they may experience a decline in their body image satisfaction. Rallis et al. (2007) examined changes in body image satisfaction as women progressed through their first year of postpartum. Women completed questionnaires that included the Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) and the Contour Drawing Rating Scale (Thompson & Gray, 1995) at 16 to 23 weeks gestation and reporting retrospectively to the 3-month period prior to pregnancy, at 32-39-weeks gestation, 6-weeks postpartum, 6-months postpartum, and 1-year postpartum. Findings revealed changes in all but one subscale of the Body Attitudes Questionnaire. In the first year of postpartum, women felt “fatter” and less “strong and fit” and reported a greater discrepancy between their perceived current size and ideal size

than they reported prior to pregnancy. Women also reported being more aware of their weight and shape in the year after birth than they did in late pregnancy. Women reported feeling “most fat” at six months postpartum which may be a result of women no longer seeing themselves as being within the pregnancy phase when it is acceptable to have a larger figure. Based on these findings, it seems that some women may appear to adapt to body changes in pregnancy and shift to a more realistic ideal as their body grows larger, but by the postpartum period, women’s perceptions of their ideal figure and body image satisfaction are relatively similar to what they were at prepregnancy (Rallis et al., 2007).

In contrast to the findings from Rallis et al. (2007), Strang and Sullivan (1984) examined body image satisfaction in 63 pregnant women. Women completed the Attitude to Body Image Scale (Jourard & Secord, 1955), which is a modified version of the Body Cathexis Scale (Secord & Jourard, 1953). They found that pregnant women felt more negatively about their bodies during pregnancy than they did prior to pregnancy and that the majority of the women felt positively about their bodies during the postpartum period. Women felt more negatively about their bodies in pregnancy which the researchers contributed to a discrepancy between the actual pregnant body and the ideal female body expressed by many of the women. The enlarged size of their bodies, particularly their abdomens, made the women feel physically uncomfortable which also contributed to negative body image satisfaction in the third trimester. However, by six weeks postpartum, 70 % of the women indicated a positive feeling toward their bodies, particularly multiparous women (i.e. women who had children previously and had experienced the postpartum period before). Previously pregnant women knew what to

expect and therefore, they did not feel so disturbed by the lack of or slow progress in changes to their body.

Also, Chang et al. (2006) interviewed 18 Taiwanese pregnant women in their third trimester of pregnancy to discuss the physical and emotional changes they experienced during pregnancy. From the interviews, they discovered that 61% of the women perceived themselves as less attractive by others during pregnancy. Many women felt that their pregnant body interfered with their views of beauty, which was reflected by their desire to stay thin. These women felt that by gaining weight during pregnancy, they were no longer measuring up to the ideal thin shape that had been socially prescribed for them. Almost half of the women viewed the changes positively and saw the increase in their belly size as indication of successful mothering and their baby's health and development, but more women reported feeling unattractive in pregnancy and wanting to attain their prepregnant body after delivery.

Equivocal Associations between Body Image Satisfaction and Dissatisfaction and Pregnancy. Several studies of body image satisfaction during pregnancy have found that women experienced both positive and negative changes in their body image satisfaction across pregnancy. Duncome et al. (2008) assessed body image satisfaction in 158 pregnant women by having them complete four subscales of the Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991), the Contour Drawing Rating Scale (Thompson & Gray, 1995), and the Pregnancy Figure Rating Scale (Skouteris, et al. 2005) retrospectively to the three months prior to pregnancy and in all three pregnancy trimesters. Findings from this study indicated that body image satisfaction of women remained relatively stable across pregnancy suggesting that women who felt good about

their body at the start continued to do so during pregnancy and those who did not, tended to maintain their concerns about their bodies during pregnancy. Therefore, some women reported positive body image satisfaction while others reported negative body image satisfaction. Women indicated that even though they would prefer a smaller belly in late pregnancy, they actually felt “less fat” in late pregnancy than they felt prior to pregnancy and significantly “fatter” in early pregnancy than they felt in middle or late pregnancy. Women may compare their body changes in early pregnancy to those of a woman who has gained weight and as a result report greater body image dissatisfaction. In contrast to the negative views women had in the early part of pregnancy, women reported more positive body image satisfaction during the latter half of their pregnancy. At this time, their pregnant belly was more apparent and women may have adjusted to these physical changes because they may have understood that the body changes they were experiencing were necessary for a successful pregnancy. Additionally, women may associate the larger belly as a sign of a full pregnancy rather than unnecessary weight gain.

Also, Skouteris and colleagues (2005) examined body image satisfaction in 128 pregnant women. Women completed the same measures as the women in Duncome’s (2008) study (four subscales of the Body Attitudes Questionnaire, the Contour Drawing Rating Scale, and the Pregnancy Figure Rating Scale). They found similar findings with women feeling “less fat” at late pregnancy than they did at any other time point in pregnancy and prior to pregnancy. Women felt more attractive prior to pregnancy than they did during early to middle and late pregnancy. As mentioned above, it was proposed that women associated their weight gain in early pregnancy with general weight gain rather than that of a woman who was pregnant. Once women developed more of a

“pregnant form,” they tended to adapt to the physical changes, understanding that such changes were necessary for the health of their child. These findings suggest that many women experience both negative and positive body image satisfaction across pregnancy with a majority of the women adapting to the body changes over the course of their pregnancy and shifting to a more realistic ideal as their body is growing larger.

Clark et al. (2009) had 116 pregnant women complete four subscales (Feeling Fat, Strength and Fitness, Salience of Weight and Shape, and Attractiveness) of the Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) retrospectively on the period three months prior to their pregnancy, at 17-21 weeks gestation, 32-35 weeks gestation, six weeks postpartum, and 12 months postpartum. They reported that weight and shape body dissatisfaction remained stable or was reduced temporarily at some points in pregnancy. Despite the fact that women were gaining weight and moving away from the societal ideal, women were able to recognize and appreciate the functionality of their bodies. However, the decreased feelings of fat and salience of weight and shape during pregnancy were not carried into the postpartum period. Clark and colleagues felt that this pattern was due to women in the postpartum believing they no longer had an “excuse” to be large, resulting in greater body image dissatisfaction at this time point.

Body Image Satisfaction and Depressive Symptoms

Negative Findings: Body Image Dissatisfaction and Depressive Symptoms.

Depressive symptoms have been associated with body image satisfaction; however, it is unknown as to which variable predicts the other. Two models have been used to explain the relationship between depressive symptoms and body image satisfaction. The first proposed model is that of body image dissatisfaction leading to depressive symptoms.

This model asserts that current societal standards for beauty place excessive emphasis on the importance of thinness and other often unattainable standards of beauty (Thompson et al., 1999). As women deviate from this ideal standard of beauty due to weight gain and body changes experienced in pregnancy, the result is body image dissatisfaction (Stice, Hayward, Cameron, Killen, & Barr Taylor, 2000). This body image dissatisfaction contributes to depressive symptoms because appearance is a central dimension of evaluation in females. This model may also hold true during the postpartum period when women often retain weight from pregnancy and thus experience body image dissatisfaction, leading to depressive symptoms (Stein & Fairburn, 1996). Support for this model has come from longitudinal research with adolescent girls and postpartum women at two time points (Holsen, Kraft, & Roysamb, 2001; Paxton et al., 2006; Stice & Bearman, 2001; Walker et al., 2002).

The second model suggests that depressive symptoms may predict body image dissatisfaction (Cohen-Tovee, 1993; Keel, Mitchell, Davis, & Crow, 2001; Striegel-Moore, McAvay, & Rodin, 1986). Depression consists of a cognitive dimension that is formed based on attitudes from an individual's previous experiences (Beck, Rush, Shaw, & Emery, 1979). Some of these cognitions may be maladaptive, particularly when an individual has negative self appraisals. As a result of such negative appraisals, body image dissatisfaction may follow (Thompson et al., 1999). Support for this model has come from longitudinal and cross sectional research with adolescent girls and non-pregnant adult women, pregnant women, and postpartum women (Cohen-Tovee, 1993; Keel et al., 2001; Rallis, Skouteris, Wertheim, & Paxton, 2007; Skouteris et al., 2005; Striegel-Moore et al., 1996).

The proposed models for body image dissatisfaction leading to depressive symptoms or depressive symptoms leading to body image dissatisfaction still remains a question in the literature with a majority of the studies in this area being conducted with adolescents. Therefore, the results of these studies cannot be translated to pregnant adult women since both groups are at different developmental stages of life and have different societal expectations placed upon them (Clark et al., 2009). Due to the lack of research in this area, pregnancy is an ideal time to further explore the relationship between body image dissatisfaction and depressive symptoms.

Depressive symptoms are common in pregnancy and are often linked with body image dissatisfaction as well as other poor health outcomes for the mother (i.e. postpartum depression) and her offspring (i.e. preterm delivery) (Cunningham & Zayas, 2002; Marcus & Flynn, 2008; Paxton et al., 2006; Wildes, Simons, & Marcus, 2005). The prevalence of prenatal depression has been reported to be approximately 11% with rates during the first, second, and third trimesters being 7%, 13%, and 12% (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; Dennis, Ross, Grigoriadis, 2007). Despite the prevalence of depressive symptoms in pregnancy and its association with body image dissatisfaction, there has been scant research examining the relationship between body image dissatisfaction and depressive symptoms during pregnancy and the postpartum period. A cross sectional study (DiPietro, Millet, Costigan, Gurewitsch, & Caufield, 2003), a correlational study between two postpartum time points (Walker, Timmermann, Kim, & Sterling, 2002), and two prospective studies (Clark, et al., 2009; Symons Downs et al., 2008) have examined depression and its relationship with body image satisfaction.

As mentioned previously, Clark et al. (2009) also examined the relationship between depression and body image satisfaction in their sample of 116 pregnant women by having them complete the short form of the Beck Depression Inventory (Beck & Steer, 1993). They found positive relationships between depression scores and two subscales of the Body Attitudes Questionnaire (Feeling Fat and Salience subscales) and a negative relationship between depression scores and the other two subscales (Attractiveness and Strength and Fitness). The association between depressive symptoms and body image dissatisfaction was stronger during the postpartum period than during pregnancy, possibly due to women describing the most body image dissatisfaction (on all four subscales) at six weeks and six months postpartum. They also found that late depressive symptoms predicted body image dissatisfaction such that women felt fatter, less attractive, less strong and fit, and worried more about their weight and shape (Clark et al., 2009).

An additional study by Symons Downs et al. (2008) examined depressive symptoms and body image satisfaction in 230 pregnant women. Women were categorized into two groups based on their prepregnancy exercise behavior: 1) somewhat active, reporting less than 120 min and greater than 30 min of PA a week ($n = 113$); 2) active, reporting greater than 120 min of PA a week ($n = 96$). Participants completed the Center for Epidemiological Studies-Depression Scale (Radloff, 1977) and the Body Areas Satisfaction of the Multidimensional Body Relations Questionnaire (Cash, 1990) in the first, second, and third pregnancy trimesters, and in the postpartum period. Symons Downs et al. (2008) found that women who experienced more depressive symptoms also experienced more body image dissatisfaction across all three pregnancy trimesters.

Women who experienced less depressive symptoms reported better body image satisfaction throughout pregnancy suggesting that body image satisfaction is an important psychological factor when considering determinants of depressive symptoms in pregnant women. Depressive symptoms and body image satisfaction were found to be important determinants of later depressive symptoms during the postpartum period.

Body Image Satisfaction and Gestational Weight Gain

Positive Findings: Body Image Satisfaction and Gestational Weight Gain. Weight changes experienced in pregnancy may be distressing for many women; however at the same time it may be liberating for other women. If women regard their gestational weight gain as a positive consequence of pregnancy, they are more likely to have lower levels of psychological distress and better body image satisfaction (DiPietro et al., 2003). The difference in how women respond to gestational weight gain in pregnancy may be a function of a woman's prepregnancy weight, attitudes towards gestational weight gain, and prior dieting behavior. As mentioned previously, women with a history of dieting and weight concern may have improved body image satisfaction in pregnancy (Rocco et al., 2005). Two studies found that normal weight (pregnancy BMI of 18.5 to 24.9) women prior to pregnancy had more positive attitudes towards gestational weight gain than did overweight (pregnancy BMI of 25 to 29.9) women (Copper, et al.,1995; Stevens-Simons, Nakashima, Andrews, 1993).

Steven-Simons et al. (1993) examined attitudes towards gestational weight gain in 99 pregnant adolescents. The participants completed the Pregnancy and Weight Gain Attitude Scale (Palmer, Jennings, & Massey, 1985) when they entered prenatal care at around 15 weeks gestation. Adolescent women were also weighed at each prenatal visit

to determine the amount of gestational weight gain each woman had throughout her pregnancy. They found that a majority of the adolescents (84%) had a positive attitude toward gestational weight gain in their pregnancy. Participants with a higher prepregnancy weight status had less positive attitudes towards gestational weight gain when compared to adolescents of normal weight status prior to pregnancy.

In a large prospective study conducted by Copper et al. (1995), 1,000 pregnant women completed the Pregnancy and Weight Gain Attitude Scale (Palmer, Jennings, & Massey, 1985) at approximately 20-weeks gestation and again at 32-weeks gestation. Results of the study indicated that obese women tend not to want to gain weight, and that thin women tend to have positive attitudes towards gestational weight gain. In the heaviest women, poor attitudes were associated with a decreased gestational weight gain in pregnancy. Although the thinnest women had more positive attitudes towards gestational weight gain and higher mean gains, the attitude alone was not significantly associated with increased gestational weight gain. Due to the small number of studies that have examined the effects of prepregnancy weight status and gestational weight gain on body image satisfaction, research is warranted in this area to determine the impact of both factors on body image satisfaction in pregnancy.

Negative Findings: Body Image Dissatisfaction and Gestational Weight Gain.

Recently, the IOM (2009) established new guidelines for the appropriate amount of gestational weight women are to be gaining in pregnancy. One of the most important modifiers of gestational weight gain and the impact it has on the mother and her baby's health is a woman's prepregnancy weight. As a result, the new guidelines provide gestational weight gain ranges for women based on their prepregnancy BMI. It is

expected that women who gain within the recommended ranges of her prepregnancy BMI category will experience better pregnancy outcomes than women who gain outside of the recommended ranges. As of 2000, only 30% to 40% of women in the United States gained within the previous 1990 IOM weight recommendations (Abrams, Altman, & Pickett, 2000; Cogswell, Scanlon, Fein, & Schieve. 1999). High gestational weight has been associated with adverse pregnancy outcomes such as preeclampsia, increased risk of gestational diabetes, preterm delivery, increased risk of cesarean section, and macrosomia (Cedergren, 2006; Dietz et al., 2006; Johnson, Longmate, & Frentzen, 1992; Stotland, Hopkins, & Caughey, 2004; Stotland, Cheng, Hopkins, & Caughey, 2006; Thorsdottir, Torfadottir, Birgisdottir, & Geirsson, 2002). High gestational weight gain may also contribute to poor psychological health in pregnancy.

There are few existing studies that have examined gestational weight gain in pregnancy and its association with body image satisfaction. In one study, DiPietro et al. (2003) found that women who gained more gestational weight were significantly more likely to express negative body image satisfaction attitudes regardless of their prepregnancy BMI. In their study, 14% of their sample did not gain enough gestational weight, 40% of the women had adequate gestational weight gain, and 46% gained too much gestational weight. Poor body image satisfaction was reported by women who gained too much gestational weight, but women who gained within the recommended ranges and not enough gestational weight, also reported negative body image satisfaction attitudes. For instance, 37% of those who gained within the guidelines worried about getting fat at the end of pregnancy and 14% felt their weight gain made them unattractive (DiPietro et al., 2003). Of the women who did not gain enough gestational weight, 11%

thought the gestational weight they gained made them unattractive (DiPietro et al., 2003). Garner (1997) found that the gestational weight gain associated with pregnancy is increasingly seen as a problem for body image satisfaction and that some women are not having children for this reason. These results suggest that gestational weight gain, regardless of the amount, may be an important factor in predicting body image satisfaction during pregnancy.

Equivocal Findings: Both Body Image Satisfaction and Dissatisfaction and Gestational Weight Gain. The pressure to be thin can result in negative attitudes towards gestational weight gain in pregnancy and as a result, women worry constantly about the amount of gestational weight they are gaining. Some women have a more relaxed attitude about their gestational weight gain in pregnancy and see pregnancy as a time when they are “allowed” to be large because their size and shape is indicative of a successful pregnancy. Several studies have found women reporting both attitudes towards their gestational weight gain throughout pregnancy with each of these attitudes impacting body image satisfaction differently.

Fox and Yamaguchi (1997) categorized 76 pregnant women into normal weight ($n = 42$) and overweight ($n = 42$) groups based on their prepregnancy BMI to evaluate group differences in body image satisfaction during pregnancy. Women provided qualitative data through an open-ended question on how they generally felt about their current appearance and body shape and if, how, and why these feelings differed from their prepregnancy feelings about their body. Current body shape concern was also assessed through a modified version of the Body Shape Questionnaire. Of the normal weight women, 19% had a positive change in body image satisfaction, 19% had no

change in their body image satisfaction, and 62% experienced a negative body image satisfaction change. In the overweight group, 62% experienced a positive change, 15% had no body image satisfaction change, and 23% had a negative change in their body image satisfaction. Women who experienced no body image satisfaction change had positive body image satisfaction and accepted the physical changes of their body as a natural part of pregnancy. A majority of these women also reported a lack of concern with weight prior to pregnancy. However, both normal weight and overweight women who experienced negative body image satisfaction change gave explanations that were focused on issues of increased self-consciousness, decreased physical attractiveness, and concern with body weight. Lack of control over their body weight was a key concern for women experiencing negative changes in their body image satisfaction. Normal weight women reported feeling less attractive because they were “fat” and as a result they reported self-imposed restrictions in social and physical activities. Women who experienced positive changes were primarily in the overweight group. These women reported feeling less self-conscious and felt free from the stigma of being overweight. Some normal weight women also felt free from dieting and had less concern about their gestational weight gain. In general, women who were normal weight prior to pregnancy had more negative body image satisfaction at more than 30 weeks gestation with normal weight women being more concerned about their gestational weight gain and overweight women having less concern about their body shape. As stated previously, some normal weight women perceived pregnancy as a time of freedom from pressure to be thin, but many more overweight women felt that being pregnant allowed them to be overweight rather than struggling to attain the ideal thin body.

Abraham et al. (1994) examined the attitudes women had towards their gestational weight gain. One hundred women completed questionnaires three to five days after giving birth that assessed their eating behaviors, body image satisfaction, and body concern about weight before and during pregnancy. The authors found that 82% of women indicated they had used techniques (i.e. dieting, avoiding eating between meals, self-induced vomiting, laxatives) to control their body weight before pregnancy and 73% continued to do so in pregnancy while only 9% of women stopped using weight control measures. Fifty-nine percent of the women would have preferred a smaller gestational weight gain, 34% were happy with their gestational weight gain, and 7% wanted a larger gestational weight gain. Women had ambivalent attitudes about being weighed at their prenatal visits. Most women felt that being weighed had a positive effect (94%) with 85% of women describing a “normal” gestational weight gain between prenatal visits as reassurance that their pregnancy was progressing normally. However, 41% of the women worried about the amount of weight they gained with 30% of these women fearing they would not be able to lose the weight they gained after birth. Other negative impacts of being weighed at prenatal visits included thinking more about food and weight, putting on more weight, eating more in response to knowing about the amount of weight they had gained, and modifying weight before a prenatal visit (e.g. water loading or starving before a prenatal visit). These data suggest that a woman’s history of weight control methods along with the amount of information women have about their gestational weight gain may have both positive and negative impacts on how women view their gestational weight gain in pregnancy.

Body Image Satisfaction and Exercise Behavior

Positive Findings: Body Image Satisfaction and Exercise Behavior. Regular PA contributes positively to both physical and psychological health. PA can help to reduce the risk of many illnesses such as heart disease, obesity, breast cancer, diabetes mellitus, osteoporosis, and depression (United States Department of Health and Human Services [USDHHS], 2000). There is considerable evidence that exercising during pregnancy also has many health benefits for the mother and her infant (American College of Obstetricians & Gynecologists [ACOG], 2002; Brown, 2002; Ning et al., 2003). The ACOG (2002) recommended that pregnant women without obstetrical or medical complications should meet exercise guidelines (30 min of moderate intensity exercise on most, if not all, days of the week). More recently, the USDHHS (2008) recommended that healthy pregnant women should get at least two and a half hours of moderate-intensity aerobic activity performed in episodes of at least 10 min a week during pregnancy and the time after delivery. These exercise recommendations have been established for women to achieve health benefits and reduce pregnancy complications (e.g. pre-eclampsia, high gestational weight gain, gestational diabetes; ACOG, 2002). Fetal health benefits of maternal exercise include lower birth weight and appropriate weight for gestational age (ACOG, 2002; IOM, 2009).

Exercise behavior during pregnancy is also likely to have significant benefits for psychological well being, with some evidence showing that higher exercise levels during pregnancy may be associated with less depressive symptoms, anxiety, and stress (Poudevigne & O'Connor, 2006). It is clear that staying active during pregnancy is important for women's physical and psychological health as well as the health of their infant (IOM, 2009). However, pregnancy appears to be a time during which overall

exercise levels decline. For example, nearly 70% of pregnant women are inactive (Evenson et al., 2004). Also, Evenson et al. (2004) documented the prevalence of meeting exercise recommendations has been shown to be much lower among pregnant women (15.8%) when compared to non-pregnant women (26.1%). Psychological health and body changes associated with pregnancy may contribute to the declines observed in exercise during pregnancy. For example, increased levels of depression and anxiety are also associated with pregnancy which could make engaging in regular exercise behavior during this time difficult at best (Poudevigne & O'Connor, 2006). However, if women are able to overcome barriers and continue a regular exercise routine, the exercise may help to improve women's psychological well being during pregnancy.

For instance, Boscaglia and colleagues (2003) examined exercise behavior during pregnancy and the impact exercise had on psychological well being, and specifically on body image satisfaction. Seventy-one pregnant women were classified into two groups: high exercisers ($n = 40$) and low exercisers ($n = 31$). High exercisers were classified as women who exercised for at least 90 min per week at moderate intensity while the low exercisers reported no or minimal amounts of exercise. Participants completed the Body Cathexis Scale (Secord & Jourard, 1953) at 15-22 weeks gestation as well as at 23-30 weeks gestation. They completed two assessments of the Body Cathexis Scale at the first time point (15-22 weeks), one retrospectively about the period 6 months prior to pregnancy and the other asking about their current body image satisfaction. At 23-30 weeks they completed the Body Cathexis Scale again and an additional version projecting ratings of body image satisfaction for 6-weeks postpartum. They found that high exercising pregnant women were significantly more satisfied with their bodies at 15-22

weeks gestation compared to their low exercising counterparts. Relative to their prepregnancy body image satisfaction, high exercising women were significantly more satisfied with their bodies at 15-22 weeks gestation and tended to be more satisfied at 23-30 weeks gestation. While the high exercise group experienced significant improvements in their body image satisfaction, the low exercise group's body image satisfaction remained relatively stable. Findings from this study may suggest that exercising regularly throughout pregnancy may be a way for women to retain positive attitudes towards their bodies as they are increasing in size.

As discussed previously, a prospective study by Symons Downs et al. (2008) examined the influence of prepregnancy exercise behavior on depressive symptoms and body image satisfaction throughout pregnancy and the postpartum period. They found that women who were classified as active prior to pregnancy reported lower levels of depression in the first trimester of pregnancy compared to somewhat active women prior to pregnancy. Women who experienced less depressive symptoms also reported better body image satisfaction. It was speculated that the positive psychological effects of regular exercise experienced by the active prepregnancy group carried over into the first trimester and "protected" them from experiencing depressive symptoms. The active prepregnancy group also reported less depressive symptoms in the second trimester and higher body image satisfaction in the third trimester compared to the somewhat active group. Therefore, it is possible that women who are active prior to pregnancy may have better psychological well being and in particular, improved body image satisfaction throughout their pregnancy.

Equivocal Findings: Both Body Image Satisfaction and Body Image

Dissatisfaction and Exercise Behavior. Most studies have found that exercise behavior has a positive impact on psychological well being and overall physical health. However, Goodwin et al. (2000) found that exercisers did not have a more positive body image satisfaction than non-exercisers, but overall their body image satisfaction was still better than non-exercisers. A prospective longitudinal study was conducted with 65 nulliparous women in which women self-reported their exercise behavior and completed the Body Cathexis Scale (Secord & Jourard, 1953) at approximately 17 weeks gestation and again at 30 weeks gestation. Possible reasons given for this finding were due to a sample size and differences in mean Body Cathexis Scale between exercisers and non-exercisers was too small to be statistically significant. Although not significant, exercising women's attitudes towards body image satisfaction moved in a positive direction from 17 weeks to 30 weeks and the non-exercisers moved in a negative direction from 17 to 30 weeks. Significant differences were observed between the two groups at 30 weeks gestation for some items on the Body Cathexis Scale (e.g. bust and waist/abdomen), but not for the entire scale. Even though, the exercisers did not experience significantly greater body image satisfaction when compared to the non-exercisers, the research team still suggested that regular participation in exercise is associated with a positive attitude towards particular body parts.

Body Image Satisfaction and the Motivational Determinants of Exercise

No studies were located that examined the motivational determinants of exercise using the framework of the Theory of Planned Behavior (Ajzen, 1991) and their relationship with body image satisfaction during pregnancy. Thus, there is an important

need for research in this area to better clarify how the motivational determinants of exercise influence exercise behavior, and in turn, influence body image satisfaction in pregnancy.

In summary, evidence from the literature has demonstrated that the influence of depressive symptoms, gestational weight gain, and exercise behavior on body image satisfaction have been equivocal. Therefore, the relationships between the correlates of body image satisfaction in the current study and their influence on body image satisfaction seem to be quite complex. As a result, it is possible that the relationships between first trimester depressive symptoms, gestational weight gain, and exercise behavior with second trimester body image satisfaction may be mediated through women's first trimester body image satisfaction.

Mediated Relationships Among the Correlates of Body Image Satisfaction in Pregnancy.

The use of mediated models may provide a better overall understanding of the complex interrelationships that underlie the relationships between the correlates (i.e. depressive symptoms, gestational weight gain, and exercise behavior and its motivational determinants) and women's body image satisfaction during pregnancy. A mediation model requires the inclusion of a third variable that serves as a mediator between the predictor variable and the outcome variable. Rather than there being a direct causal relationship between the predictor variable (i.e. correlates of body image satisfaction), a mediational model posits that the predictor variable causes the mediator variable (i.e. first trimester body image satisfaction) which in turn causes the outcome (i.e. second trimester body image satisfaction). The mediator serves to clarify the nature of the association

between the predictor and outcome variables by explaining why the independent variable predicts the outcome variable (MacKinnon, 2008).

Because of the complex interrelationships among the variables and the rapid physical and psychological change of pregnancy, it is possible that first trimester depressive symptoms, gestational weight gain, exercise behavior, and its motivational determinants may influence and predict women's body image satisfaction in the first trimester. Furthermore, based on previous researchers' suggestions (Clark et al., 2009; Duncome et al., 2008; Skouteris et al., 2005; Symons Downs et al., 2008), first trimester body image satisfaction may serve as the mediator that then predicts women's body image satisfaction in their second trimester. That is, if women feel dissatisfied about their bodies in the first trimester, they will be likely to also feel dissatisfied as the pregnancy progresses through the second and third trimesters when gestational weight gain and other characteristics of the pregnancy are exacerbated. In contrast, if women have a healthy body image satisfaction at the start of pregnancy, they are more likely to continue feeling positively about their bodies throughout pregnancy regardless of the physical changes and gestational weight gain they are experiencing. Also, women who experience greater levels of depressive symptoms in the first trimester may be at an increased risk for body image dissatisfaction in the first trimester. As a result, body image dissatisfaction in the first trimester may be likely to lead to body image dissatisfaction in the second trimester (Clark et al., 2009; Symons Downs et al., 2008). Alternatively, women who experience less depressive symptoms in the first trimester may also have greater body image satisfaction at this time. This body image satisfaction in the first trimester may lead to better body image satisfaction in the second trimester. Women who experience

excessive or greater levels of gestational weight gain in their first trimester may feel negatively about their bodies in the first trimester which may lead to body image dissatisfaction in the second trimester (DiPietro et al., 2003). However, women that gain the appropriate amount of gestational weight in their first trimester may feel more positive about their bodies and consequently have better body image satisfaction in the second trimester. Women who engage in little to no exercise behavior in the first trimester may experience greater body image dissatisfaction in the first trimester, which in turn, may make them more likely to also report dissatisfaction with their bodies in the second trimester. Conversely, women who are active in their first trimester may be more likely to be much more satisfied with their bodies and as a result these women may continue feeling positively toward their bodies into their second trimester (Boscaglia et al., 2003; Symons Downs 2008). Finally, women with low motivational determinants of exercise (i.e., low Attitude, Subjective Norm, Perceived Behavioral Control, and Intention) in the first trimester may be less likely to exercise and experience low body image satisfaction in the first trimester. Low first trimester body image satisfaction may furthermore lead to lower body image satisfaction in the second trimester. Alternatively, women with greater motivational determinants of exercise (i.e., high Attitude, Subjective Norm, Perceived Behavioral Control, and Intention) in the first trimester may be more likely to engage in exercise behavior and consequently experience higher body image satisfaction in their first trimester. These women may also be more likely to report higher body image satisfaction into their second trimester. The possible mediated relationships between the correlates of first trimester body image satisfaction and second trimester body image satisfaction have not been previously examined. This information can help

researchers and practitioners to better understand the factors related to body image dissatisfaction during pregnancy to further help women avoid negative health implications associated with body image dissatisfaction in pregnancy. Therefore, there is a need to determine the extent to which second trimester body image satisfaction is mediated through the relationships between the correlates of body image satisfaction and first trimester body image satisfaction.

Public Health Implications of Studying Body Image Satisfaction and Correlates in Pregnancy.

Low body image satisfaction during pregnancy has been associated with poor psychological and physical health as well as excessive gestational weight gain that increases the risk for future obesity. Pregnancy may be a time in which women are more likely to experience dissatisfaction with their bodies and the negative health implications associated with body image dissatisfaction are a maternal and infant health priority that should be addressed. Low body image satisfaction in pregnancy is likely to be associated with poor psychological well being (i.e., depression, anxiety) which in turn, can have negative health implications for both the mother and her baby (Clark et al., 2009; Cunningham & Zayas, 2002; Marcus & Flynn, 2008; Paxton et al., 2006; Symons Downs et al., 2008; Wildes et al., 2005). Poor psychological well being could also persist into the postpartum period affecting the health and well being of a woman throughout her life span. Also, women may attempt to hide their low body image satisfaction by overeating. Eating too much during pregnancy could lead to excessive gestational weight gain which is associated with risks for additional health issues (e.g. preeclampsia, gestational diabetes mellitus; Cedergren, 2006; DeVader, Neeley, Myles, & Leet, 2007; Dietz et al.,

2006; Stotland, et al., 2004, 2006; Thorsdottir et al., 2002). Women with excessive gestational weight gain may be more likely to retain weight after their pregnancy which places these women at an increased risk for becoming overweight or developing obesity in the future, especially if women are overweight at the start of pregnancy (Gunderson & Abrams, 2000; Siega-Riz, Evenson, & Dole, 2004). Lastly, low body image satisfaction may lead to dietary restraint and other potentially damaging weight loss behaviors that would have negative consequences for both the mother and her baby (Franko et al., 2001; Micali, 2008). Because the negative health implications that may be associated with low body image satisfaction during pregnancy, there is an important need for studies that examine the factors precipitating low body image satisfaction.

There is also a need for the development of interventions aimed at promoting a healthy body image satisfaction during pregnancy. To date, there are no empirically and theoretically driven and efficacious interventions to promote body image satisfaction and prevent poor psychological well being in pregnancy. However, interventions have the potential to promote body image satisfaction, and as a result, women may have a decreased risk for poor psychological well being and excessive gestational weight gain during pregnancy. Furthermore, this may lead to better overall health for the mother and her baby not only during pregnancy but in the years following the pregnancy. Clearly, there is a need to better understand the factors that contribute to body image satisfaction in pregnancy and how women's body image satisfaction may change throughout pregnancy to develop efficacious interventions during this time.

The Current Study: Importance of Examining Correlates of Body Image Satisfaction and its Association to Depressive Symptoms, Gestational Weight Gain, Exercise Behavior and its Motivational Determinants.

Body image satisfaction appears to be associated with depressive symptoms, gestational weight gain, and exercise behavior; however there has been limited research examining how these constructs are specifically related to body image satisfaction. Therefore, research is needed examining the biological, psychological, and social correlates of body image satisfaction as well as the potential mediated relationships between body image satisfaction and its correlates to help researchers to better understand these complex interrelationships. Gaining a better understanding of these relationships will enable the development of efficacious interventions to not only improve body image satisfaction in pregnancy but to also potentially ameliorate poor psychological and negative health consequences associated with body image dissatisfaction. Due to the previously mentioned implications associated with poor body image satisfaction in pregnancy, such interventions would be of great value for women and their unborn fetus during pregnancy. Therefore, the primary purpose of this thesis was to prospectively examine the moderating influence of prepregnancy weight status on the biopsychosocial determinants of body image satisfaction. The secondary purpose was to assess if body image satisfaction in the first trimester mediated the relationship between first trimester depressive symptoms, gestational weight gain, exercise behavior, and its motivational determinants and second trimester body image satisfaction. Based on prior research (Boscaglia et al., 2003; Clark et al., 2009; DiPietro et al., 2003 Symons Downs et al., 2008) it was hypothesized that group differences would be observed in both

the first and second trimesters such that normal weight women would have better body image satisfaction, less depressive symptoms, less gestational weight gain, higher exercise behavior and motivational determinants for exercise than overweight/obese women. It was also hypothesized that first trimester body image satisfaction would mediate the relationship between first trimester depressive symptoms, gestational weight gain, and exercise behavior, and its motivational determinants and second trimester body image satisfaction (Duncome et al., 2008; Skouteris et al., 2005).

CHAPTER 2

METHODS

Participants

Participants were 209 pregnant women (M age = 30.3, SD = 4.0 years, age range 18 to 43 years). Most of the women were Caucasian (88.9%), married (88.0%), had a graduate or professional degree (49.3%), worked full time (65.5%), and were of middle to high income (50.3%). Women's mean pre-pregnancy body mass index (BMI) was 24.4 (SD = 5.2), which was within the normal range (CDC, 2009; see Table 2).

Study Design and Procedures

A prospective study design was used to conduct this research. Pregnant women were recruited for this study as part of a larger longitudinal study examining women's pregnancy and postpartum exercise beliefs and behaviors (Institutional Review Board [IRB] # 29315). The University's IRB approved this study and consent was obtained from a local obstetrics and gynecology office to recruit the participants from February, 2005 to June, 2009.

At their first prenatal visit, pregnant women received an informational packet containing the clinic forms and an informational flyer about the study. Women who were interested in volunteering for the study provided their contact information on the study flyer and returned it to a clinic nurse (N = 769). These study forms were collected on a weekly basis by a member of the research team. Participants were then sent a packet in the mail containing a cover letter explaining the study and the survey instruments. To improve the response rate, Ransdell's (1996) recommendations were followed, including: personalized cover letters, business-reply envelopes, and multiple phone call reminders. Participants were asked to return their survey within 1-week and the women who did not

comply with this request were given a reminder phone call. If a participant still did not send her survey back by the end of the second week, the research team sent the participant a second questionnaire packet. If an additional three weeks passed and a participant still did not return her surveys, she was removed from the study. Reasons for attrition were: no initial response ($n = 234$), lost to follow-up ($n = 123$), miscarriage ($n = 25$), no longer interested in study participation ($n = 8$), withdrew consent ($n = 4$), and pregnancy complications precluding study participation ($n = 3$). The response rate in the first trimester was 48.4% (372/769) and 82.8% in the second trimester (308/372). Of the 308 women that completed a first and second trimester survey, 32% ($n = 99$) had missing data for one or more of the primary study variables. Thus, the remaining sample of 209 (67.9% of the viable sample who completed both the first and second trimester surveys) was included in the study analyses.

Measures

The *Body Areas Satisfaction Scale (BASS; Cash, 1990)* is a 9-item subscale of the Multidimensional Body Self Relations Questionnaire that assesses perceived body satisfaction. Using a 5-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied), participants rate their degree of body satisfaction with specified body parts (e.g., thighs, face, stomach) as well as their height, weight, and overall muscle tone. The BASS has been used previously in pregnant women and the internal consistency scores of the BASS in prior studies was good (alpha = 0.84 at trimester 1, alpha = 0.84 at trimester 2; Symons Downs et al., 2003). The internal consistency reliability alpha for the BASS in the current study was good (alpha = 0.82 at trimester 1, alpha = 0.86 at trimester 2). The reliability and validity of the BASS has been previously established (Giovanelli, Cash,

Henson, & Engle, 2008; Cash, 1994). The BASS has a test-retest reliability of $r = 0.86$ (Cash, 1994).

The *Centers for Epidemiological Studies-Depression (CES-D)* scale was used to assess the amount of depressive symptoms experienced during pregnancy (Radloff, 1977). The CES-D consists of 20 questions in which participants rate their responses using a 5-point Likert scale ranging from 1 (rarely) to 4 (most days). The participants also had an option of scoring the item as “did not apply to me.” Some of the items were reverse scored so that overall, higher scores indicated more severe depressive symptoms. Participants who scored from 0 to 2 were identified as being undefined, those scoring between 3 to 12 were categorized as non-depressed, scores of 13-15 were considered to be borderline for depression and participants who scored greater than 16 were said to be depressed (Diego, Field, & Hernandez-Rief, 2001). Example items on the CES-D include “*I was bothered by things that don’t usually bother me*” and “*I had trouble keeping my mind on what I was doing.*” The internal consistency reliability of the CES-D has been good in previous studies of pregnant women, ranging from $\alpha = 0.85$ to 0.88 (Symons Downs et al., 2008). It has also been good ($\alpha = 0.84$) to excellent ($\alpha = 0.90$) in field studies (Locke & Putnam, 1971), and in the current study, the internal consistency reliability was good ($\alpha = 0.89$ at trimester 1, $\alpha = 0.89$ at trimester 2). The validity and reliability of the CES-D has been previously established (Locke & Putnam, 1971; Mercer & Fertich, 1988). Also, test-retest reliability has ranged from $r = 0.51$ to 0.67 over an 8-week time period (Locke & Putnam, 1971).

Gestational Weight Gain in the first trimester was determined through women’s self-reported current weight at the first trimester and subtracting this value from their

self-reported prepregnancy weight. To calculate weight gain from the first to second trimester, women's current weight in the second trimester was subtracted from their prepregnancy weight. The calculated weight gain from the first trimester was subtracted from this value (gestational weight gain from prepregnancy to second trimester) to determine the amount of weight women gained from the first to second trimester of pregnancy.

The *Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shepherd, 1985)* was used to determine the frequency of strenuous (e.g. running, aerobic dance), moderate (e.g. brisk walking), and mild (e.g. easy walking) physical activity (PA) that was done for at least 15 min during participants' leisure time during each pregnancy trimester). Participants were asked to report average weekly bouts of at least 15 min of strenuous, moderate, and mild PA for prepregnancy, first trimester, and second trimester. The number of bouts of PA participants reported was then multiplied by 15 since participants reported the number of 15 min bouts they did in a week. Total LTEQ min were determined by summing each participant's strenuous, moderate, and mild scores. LTEQ min were used instead of MET equivalent to control for prepregnancy exercise behavior and to assess group differences by weight status for min of exercise. Also, previous research using the LTEQ has modified the quantification of exercise to include average min rather than METS across a week to better examine whether or not participants were meeting exercise guidelines (Courneya, Friedenreich, Quinney, Fields, Jones, & Fairey, 2004; Courneya et al., 2007). The validity and reliability of the LTEQ has been previously established (Jacobs, Ainsworth, Hartman, & Leon, 1993) and it has been also used in prior research with pregnant women (Hausenblas & Symons Downs, 2005;

Hausenblas, Symons Downs, Giacobbi, Tuccitto, & Cook, 2008; Symons Downs & Hausenblas, 2004; Symons Downs, et al. 2008).

The Theory of Planned Behavior (TPB) constructs were examined based on Ajzen's recommendations and recommendations from previous researchers (Ajzen, 1991, 2006; Courneya, Friedenreich, Arthur, & Bobick, 1999). Participants were provided the following statement before completing any of the TPB questions: "*Regular exercise behavior = participating in 30 minutes of accumulated moderate exercise on most, if not all days of the week. This exercise can be done at one time (e.g. 30 min of continuous walking or jogging) or accumulated in the day (e.g. walking 10 min in the morning and 20 min in the evening).*" This statement was provided to participants to facilitate a standardized understanding of regular exercise behavior. *Attitude* was assessed with the following seven semantic differential pairs commonly used in the exercise literature: 1) useless-useful, 2) bad-good, 3) boring-interesting, 4) unpleasant-pleasant, 5) foolish-wise, 6) harmful-beneficial, and 7) unenjoyable-enjoyable (Ajzen, 1991, 2002; Symons Downs & Hausenblas, 2003, 2005). Participants were given the statement "*Exercising during my first/second trimester of pregnancy will be*" and were asked to complete the statement by rating each pair using a seven-point Likert scale ranging from 1 (useless, bad, boring, unpleasant, foolish, harmful, unenjoyable) to 7 (useful, good, interesting, pleasant, wise, beneficial, enjoyable). Internal consistency scores for Attitude in two prior studies examining Attitude in the second trimester only and then at first and second trimesters was reported to be excellent (alpha = 0.90 at trimester 2; alpha = 0.92 at trimester 1 and alpha = 0.90 at trimester 2; Symons Downs & Hausenblas, 2003; Hausenblas, et al.,

2008). The internal consistency scores for the seven Attitude items for the first and second trimesters were excellent ($\alpha = 0.89$, $\alpha = 0.89$ respectively).

Subjective Norm was assessed using the following three items: 1) “*Most people who are important to me think that I should exercise regularly in my first/second trimester,*” 2) “*Most people who are important to me want me to exercise regularly in my first/second trimester,*” and 3) “*Most people who are important to me approve of me exercising regularly in my first/second trimester.*” Participants responded to these three questions with a seven point Likert scale from 1 (strongly disagree) to 7 (strongly agree) for the first two items and from 1 (disagree) to 7 (agree) for the third item (Ajzen, 1991, 2006; Hausenblas & Symons Downs, 2005; Symons Downs & Hausenblas, 2003). Previously, one item was used to assess Subjective Norm, and as a result internal consistency for these items has not been reported in pregnancy. However, previous internal consistency for Subjective Norm with two items was reported to be good in undergraduate students ($\alpha = 0.73$; Rhodes, Courneya, & Jones, 2005). Studies using three items to measure Subjective Norm have demonstrated acceptable reliability among undergraduate students and cancer survivors (Courneya, Bobick, & Schinke, 1999; Courneya & Friedenreich, 1999; Rhodes & Courneya, 2003). Internal consistency scores for Subjective Norm across both trimesters were excellent ($\alpha = 0.95$ at trimester 1, $\alpha = 0.94$ at trimester 2).

Perceived Behavioral Control was assessed with the following three items: 1) “*How much control do you have over exercising at least 3 days per week in your first/second trimester?*” ranging from 1 (very little control) to 7 (complete control), 2) “*For me to exercise at least 3 days per week in my first/second trimester will be*” ranging

from 1 (extremely difficult) to 7 (extremely easy), and 3) “*If I wanted to, I could easily exercise regularly in my first/second trimester*” ranging from 1 (strongly disagree) to 7 (strongly agree) (Courneya et al., 1999; Hausenblas & Symons Downs, 2005; Symons Downs & Hausenblas, 2003). Internal consistency scores in previous studies with pregnant women were good (alpha = 0.84 in the first trimester) to excellent (alpha = 0.90 in the second trimester; Symons Downs & Hausenblas, 2003; Hausenblas et al., 2008). The internal consistency scores for Perceived Behavioral Control in the current study were good alpha = 0.87 at trimester 1, alpha = 0.89 at trimester 2.

Intention to exercise during each trimester of pregnancy was assessed with the following three questions: 1) “*I intend to exercise regularly in my first/second trimester*” ranging from 1 (strongly disagree) to 7 (strongly agree), b) “*I intend to exercise at least 3 days per week in my first/second trimester*” ranging from 1 (definitely not) to 7 (definitely), and 3) “*I intend to exercise with the following regularity in my first/second trimester*” ranging from 1 (not at all) to 7 (very much). Previously, one item was used to assess Intention, and as a result, internal consistency for these items has not been reported in pregnancy. However, Rhodes et al. (2005) used three items to assess Intention in undergraduate students reporting good internal consistency (alpha = 0.89). Three items were used in the current study to be able to better understand women’s exercise Intention. The internal consistency scores for Intention were excellent (alpha = 0.92 at trimester one, alpha = 0.91 at trimester two).

A *Personal History Questionnaire* was developed by the research team to obtain participant contact information, occupation, occupation status (full time, part time, stay at

home), marital status, race/ethnicity, highest level of education, and family income, parity, height, current weight, and weight prior to pregnancy.

CHAPTER 3

RESULTS

The study analyses were conducted using SPSS data software (version 17.0). Data were examined across the total sample ($N = 209$) and by prepregnancy weight status (PPWS) groups. Women's PPWS was determined by using the Institute of Medicine (IOM, 2009) recommendations for PPWS body mass index (BMI) classifications from the World Health Organization: (a) underweight = BMI of 18.5 or less ($n = 6$), normal weight = BMI of 18.6 to 24.9 ($n = 138$), overweight = BMI of 25.0 to 29.9 ($n = 35$), and obese = BMI of 30.0 or greater ($n = 29$). Due to insufficient data in the underweight group, subsequent analyses to examine the moderating influence of PPWS were conducted with normal weight, overweight, and obese groups.

Descriptive statistics were used to examine the participant characteristics of age, BMI, race/ethnicity, marital status, education, and family income (see Table 2). Chi square analyses were conducted to examine PPWS group differences across these demographic characteristics. Significant group differences were observed for education level and family income (p 's < 0.05). Seventy percent of women who completed college or graduate/professional school were in the normal weight category, while 16.3% of the women completing graduate/professional school were in the overweight category, and 13.7% were in the obese category. Also, 66% of women who were of middle to high family income (\$40,000 - \$100,000) were in the normal weight category. In comparison, only 20% of women of middle to high income were overweight and 13.2% were obese. As a result of these significant group differences, education and family income were included as covariates in the remaining study analyses.

PPWS Group Differences Across Study Constructs in the First Trimester. A multivariate analysis of variance (MANVOA), controlling for prepregnancy exercise behavior (i.e., total prepregnancy Leisure-Time Exercise Questionnaire [LTEQ] score), level of education, and family income was conducted for the first trimester constructs. The total scores for first trimester body image satisfaction (BASS), depressive symptoms (CES-D), gestational weight gain (measured from prepregnancy to first trimester), exercise behavior (LTEQ), Attitude (ATT), Subjective Norm (SN), Perceived Behavioral Control (PBC), Intention (INT) were the dependent variables (DV's) and PPWS was entered as the fixed factor. Table 3 displays the means and standard deviations for the total sample and by PPWS groups as well as the MANOVA findings for the first trimester.

A significant multivariate effect was found for the first trimester constructs, Wilks Lambda = 0.67, $F(2,166) = 4.4$, $p < .001$, $\eta^2 = 0.18$. Normal weight women reported significantly higher body satisfaction ($M = 28.6$) compared to overweight and obese women ($M = 26.3$ and 23.8 , respectively). Overweight women also reported significantly higher body satisfaction ($M = 26.3$) compared to obese women ($M = 23.8$). Differences in gestational weight gain from prepregnancy to the first trimester were also observed such that normal weight women gained significantly more weight ($M = 6.5$ lbs) than overweight women ($M = 3.5$ lbs). Normal weight women ($M = 6.5$ lbs) also gained more weight than obese women ($M = 3.6$ lbs) in the first trimester; however, these weight differences were not significant ($p = 0.10$). No significant differences were observed for gestational weight gain in the first trimester between overweight and obese women ($p = 1.0$).

Significant group differences were observed for exercise behavior in the first trimester. Obese women reported significantly higher exercise behavior ($M = 104.5$ min) than normal weight and overweight women ($M = 75.4$ min and 64.0 min, respectively). No significant group differences for exercise behavior were reported among normal weight and overweight women ($p > 0.05$). Also, no significant differences were observed across the groups for any of the other study variables (depressive symptoms, Attitude, Intention, Perceived Behavioral Control, and Subjective Norm; p 's > 05).

PPWS Group Differences Across Study Constructs in the Second Trimester. A MANVOA controlling for prepregnancy exercise behavior, level of education, and family income was conducted for the second trimester constructs. The total scores for second trimester BASS, CES-D, gestational weight gain (measured from prepregnancy to second trimester), LTEQ, ATT, SN, PBC, and INT were the DV's and PPWS was entered as the fixed factor. Table 3 displays the means and standard deviations for the total sample and by PPWS groups as well as the MANOVA findings for the second trimester.

A significant multivariate effect was found for the second trimester constructs, Wilks Lambda = 0.71, $F(2,172) = 3.6$, $p < 0.001$, $\eta^2 = 0.16$ (see Table 3), such that normal weight women had significantly higher body satisfaction scores ($M = 28.1$) compared to obese women ($M = 24.0$) but not compared to overweight women ($M = 27.9$). Similarly, overweight women ($M = 27.9$) had significantly higher body satisfaction scores compared to obese women ($M = 24.0$). Gestational weight gain differences from prepregnancy to the second trimester were also significantly different across the groups. Normal weight women gained significantly more weight ($M = 15.0$ lbs) than obese

women ($M = 8.3$ lbs). Normal weight women ($M = 15.0$ lbs) also gained more weight than overweight women ($M = 11.3$ lbs); however, these differences only approached significance ($p = 0.09$). There were no significant differences in weight gain between overweight and obese women ($p > 0.05$). Significant differences were observed across the PPWS groups for exercise Attitude in the second trimester. Normal weight ($M = 41.8$) and overweight women ($M = 42.7$) reported significantly higher exercise Attitude than obese women ($M = 37.8$). No significant differences were observed for exercise Attitude between normal weight and overweight women ($p > .05$). Also, overweight women reported higher second trimester exercise Intention ($M = 15.8$) compared to obese women ($M = 13.8$); however, these differences only approached significance ($p = 0.09$). No significant differences were observed between normal weight and overweight and obese women ($p > 0.05$). No significant group differences were observed for depressive symptoms, exercise behavior, Subjective Norm, and Perceived Behavioral Control.

PPWS Group Differences for the Change in Constructs from First to Second Trimester. A MANVOA controlling for prepregnancy exercise behavior, level of education, and family income was conducted for the change in constructs from the first to second trimester. The changes from first to second trimester for BASS, CES-D, gestational weight gain, LTEQ, ATT, SN, PBC, and INT were the DV's and PPWS was entered as the fixed factor. Change scores were calculated by taking the total score for each construct (BASS, CES-D, GWG, LTEQ, ATT, SN, PBC, and INT) in the second trimester and subtracting it from the total scores for the first trimester. Table 3 displays the means and standard deviations for the total sample and by PPWS groups as well as the MANOVA findings for the change in constructs from the first to second trimester.

A significant multivariate effect was found for the change in constructs from the first to second trimester, Wilks Lambda = 0.79, $F(2,148) = 2.8$, $p < 0.001$, $\eta^2 = 0.14$ (see Table 3). Overweight women reported a significant increase in body image satisfaction from first to second trimester ($M \Delta = 1.6$) when compared to normal weight women. Also, there were no significant differences in the change in body image satisfaction from the first to the second trimester between normal weight and obese women and between overweight and obese women (p 's > 0.05). Normal weight women gained significantly more weight from the first to the second trimester than obese women and overweight women ($M \Delta = 8.9$ lbs). There were no significant differences between gestational weight gain from the first to second trimester between normal weight and overweight women ($p > 0.05$).

Normal weight women had a significant increase in exercise behavior from the first to the second trimester when compared to overweight women ($M \Delta = 18.6$ min). No significant differences were observed in the change in exercise behavior from the first to second trimester between normal weight and overweight women and between overweight and obese women (p 's > 0.05). Normal weight women had a significant increase from the first to second trimester for Perceived Behavioral Control compared to obese women ($M \Delta = 1.5$). Also, overweight women had a significant increase in Perceived Behavioral Control when compared to obese women ($M \Delta = 2.5$). No significant differences were observed for the change in Perceived Behavioral Control between normal weight and overweight women ($p > 0.05$). Normal weight women had a significant increase in exercise Intention from first to second trimester when compared to obese women ($M \Delta = 1.1$). Also, overweight women had a significant increase from the first to second

trimester in exercise Intention compared to obese women ($M = \Delta 0.5$). There were no significant differences in the change in exercise Intention from the first to second trimester between normal weight and overweight women ($p > 0.05$). No significant differences were observed across the three groups for the change in depressive symptoms, Attitude, or Subjective Norm from the first to the second trimester.

Mediation Analyses for Depressive Symptoms, Gestational Weight Gain, and Exercise Behavior. Prior evidence of the correlates of body image satisfaction (depressive symptoms, gestational weight gain, and exercise behavior) has yielded equivocal findings for the way in which these correlates impact body image satisfaction (Fox & Yamaguchi, 1997; Goodwin et al., 200). Prior researchers have demonstrated that these correlates have been predictive of both body image satisfaction and dissatisfaction. It is likely that the relationships between these correlates and body image satisfaction are quite complex and therefore, three separate mediation analyses were used to better understand the relationships between first trimester depressive symptoms, gestational weight gain, and exercise behavior with second trimester body image satisfaction.

Figure 2 displays the three mediation models used in the current research. First trimester depressive symptoms, gestational weight gain, and exercise behavior were the predictor variables and second trimester body image satisfaction was the outcome variable. First trimester body image satisfaction was the mediator variable in all three models.

Three mediation models were tested using 4-step hierarchical regression analyses (HRA) controlling for PPWS, education, and family income (Baron & Kenny, 1986). Models one, two, and three examined the independent effects of first trimester depressive

symptoms, gestational weight gain, and exercise behavior respectively on second trimester body image satisfaction as mediated by first trimester body image satisfaction.

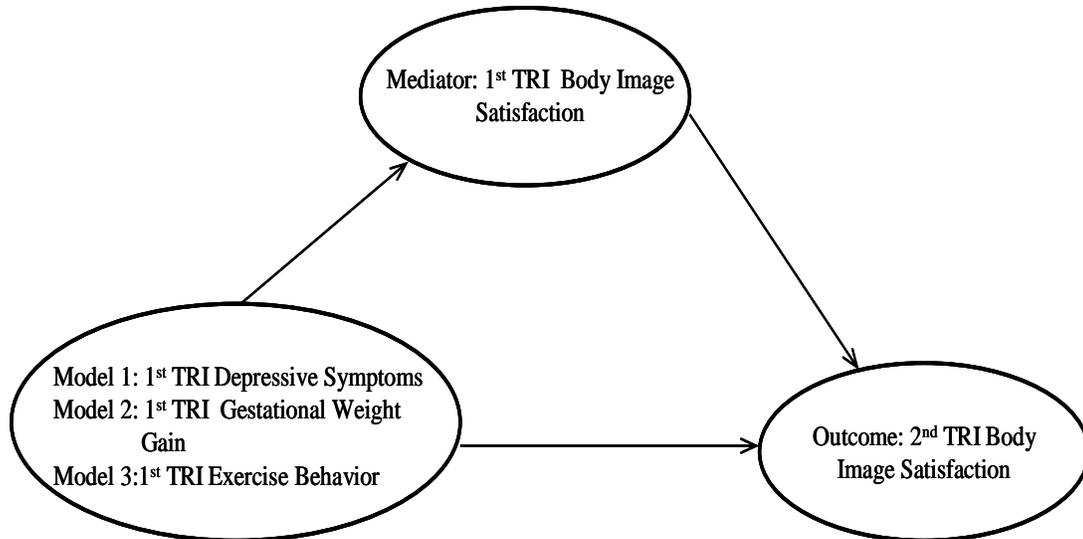


Figure 2. Mediation Analysis. Mediation is a hypothesized causal chain in which one variable affects a second variable that, in turn, affects a third variable (Baron & Kenny, 1986). The intervening variable, first trimester body image satisfaction is the hypothesized mediator. It “mediates” the relationship between a predictor (first trimester depressive symptoms, gestational weight gain, and exercise behavior) and an outcome (second trimester body image satisfaction).

To reduce the impact of multicollinearity among the independent variables, the means for the predictor variables were centered (i.e. the mean of each independent predictor variable – sample mean) before they were entered into each of the regression analyses (Aikens & West, 1991). To establish mediation the following four equations were tested for each model: 1) first trimester depressive symptoms, gestational weight gain, and exercise behavior predicting second trimester body image satisfaction; 2) first trimester depressive symptoms, gestational weight gain, and exercise behavior predicting first trimester body image satisfaction; 3) first trimester body image satisfaction predicting second trimester body image satisfaction; and 4) first trimester depressive

symptoms and body image satisfaction, first trimester gestational weight gain and body image satisfaction, and first trimester exercise behavior and body image satisfaction predicting second trimester body image satisfaction.

For the first model, the 4-step HRA testing mediation controlling for PPWS, education, and income revealed that first trimester body image satisfaction ($\beta = 0.64, p < 0.001$) mediated the relationship between first trimester depressive symptoms and second trimester body image satisfaction. In step 1, first trimester depressive symptoms significantly predicted second trimester body image satisfaction ($\beta = -0.27, p < 0.001$). In step 2, first trimester depressive symptoms significantly predicted first trimester body image satisfaction ($\beta = 0.30, p < 0.001$). In step 3, first trimester body image satisfaction significantly predicted second trimester body image satisfaction ($\beta = 0.68, p < 0.001$). Finally, according to Baron and Kenny (1986), full mediation was confirmed when a regression analysis was performed with first trimester body image satisfaction and first trimester depressive symptoms. First trimester body image satisfaction significantly predicted second trimester body image satisfaction ($\beta = 0.64, p < 0.001$). Importantly, when first trimester body image satisfaction was added to the regression, first trimester depressive symptoms were no longer significant ($p > 0.05$).

For the second model, the 4-step HRA testing mediation controlling for PPWS, education, and income revealed that first trimester body image satisfaction ($\beta = 0.64, p < 0.001$) partially mediated the relationship between first trimester gestational weight gain and second trimester body image satisfaction. In step 1, first trimester gestational weight gain significantly predicted second trimester body image satisfaction ($\beta = -0.24, p < 0.001$). In step 2, first trimester gestational weight gain significantly predicted first

trimester body image satisfaction ($\beta = -0.16, p < 0.05$). In step 3, first trimester body image satisfaction significantly predicted second trimester body image satisfaction ($\beta = 0.68, p < 0.001$). Finally, according to Baron and Kenny (1986), partial mediation was confirmed when the regression analysis was performed with first trimester body image satisfaction ($\beta = 0.64, p < 0.001$) and first trimester gestational weight gain ($\beta = -0.14, p < 0.05$) both significantly predicting second trimester body image satisfaction. When first trimester body image satisfaction was added to the regression, first trimester gestational weight gain did not lose its significance and therefore partial mediation was established.

In the third model, for step 1, exercise behavior in the first trimester did not significantly predict second trimester body image satisfaction ($\beta = 0.04, p > 0.05$). As a result, no further steps of the HRA were tested as it was clear that there was no mediation between first trimester exercise behavior, first trimester body image satisfaction, and second trimester body image satisfaction. Additionally, the motivational determinants of exercise were not examined since exercise behavior did not significantly predict second trimester body image satisfaction in the first regression of the mediation model.

CHAPTER 4

DISCUSSION

The primary purpose of this thesis was to prospectively examine the moderating influence of prepregnancy weight status on the biopsychosocial determinants of body image satisfaction. The secondary purpose was to assess if body image satisfaction in the first trimester mediated the relationship between first trimester depressive symptoms, gestational weight gain, exercise behavior, and its motivational determinants and second trimester body image satisfaction. In general, the study findings illustrate that group differences in prepregnancy weight status were observed for body satisfaction such that normal weight women had more positive body satisfaction than overweight or obese women. First trimester body image satisfaction mediated the relationship between depressive symptoms and second trimester body image satisfaction. Also, first trimester body image satisfaction partially mediated the relationship between first trimester gestational weight gain and second trimester body image satisfaction. Several findings warrant further discussion.

Partial support was found for the first study hypothesis of expected group differences across the study constructs. As predicted, women categorized as normal weight prior to pregnancy reported significantly higher first trimester body image satisfaction than overweight and obese women. Normal weight women also had significantly higher second trimester body image satisfaction than obese women, but no significant differences were observed between normal weight and overweight women in the second trimester. Findings from the current study are in line with those of Copper et al. (1995) in which normal weight women had positive attitudes towards gaining weight

while obese women had negative attitudes towards weight gain and did not want to gain weight. It is likely that normal weight women who had positive attitudes towards their weight gain may have had greater body image satisfaction compared to obese women who may have negatively evaluated their weight gain during pregnancy. Body image satisfaction differences in the current study suggest that normal weight women may feel more positive about their bodies prior to pregnancy since their body size was consistent with a socially prescribed “thin body.” They may continue feeling positive about their bodies throughout pregnancy, particularly if they accept the changes in their bodies during pregnancy and understand that these changes are a necessary part of the childbearing process. However, overweight and obese women may have lower body image satisfaction prior to pregnancy because they are potentially not meeting the social standard for “ideal” body image and thinness. It is possible that their lower level of body image satisfaction likely carried over into their pregnancy as they continued to gain weight, making these women potentially experience greater criticism for not being thin, and more pressure to achieve the “ideal” pregnancy physique. However, attitudes towards body image satisfaction were not explicitly studied in this thesis, so this is merely an assumption. Nevertheless, it appears that normal weight women have different levels of body image satisfaction than overweight and obese women in the first and second trimesters. This finding is important because it illustrates that prepregnancy weight status has some influence on body image satisfaction in pregnancy. This finding can inform future studies by encouraging researchers to consider prepregnancy weight status and body image satisfaction as targets of intervention, especially for overweight and obese

women, who may be at an increased risk of experiencing low body image satisfaction as well as other aspects of poor psychological health in pregnancy.

In addition, the change in body image satisfaction from the first to second trimester was relatively small (i.e., an overall mean change of 0.04 for the entire sample); however overweight women experienced a positive change in body image satisfaction that was significantly greater than normal weight women. However, it is important to note here that normal weight women already had a higher first trimester body image satisfaction score compared to the overweight women so there was less of a potential overall mean change score for the normal weight women. This finding is important as the current literature on body image satisfaction during pregnancy has been equivocal and only one other located study examined the influence of PPWS on body image satisfaction during pregnancy. Somewhat consistent with the findings from the current study, Fox and Yamaguchi (1997) found that 62% of the normal weight women experienced a negative change in their body image satisfaction while 62% of the overweight women experienced a positive change in their body image satisfaction. In their study, overweight women appeared to experience more positive changes in their body image satisfaction when compared to normal weight women. The authors suggested that the overweight women may have felt that being pregnant allowed them to be free from the stigma of being overweight and as a result they were less self-conscious of their weight and were able to experience a more positive body image satisfaction. Normal weight women may have felt a lack of control over their body during pregnancy and this may have resulted in the poor body image satisfaction these women experienced. In the current study, normal weight women experienced the greatest decline in body image satisfaction from the first to the

second trimester, but as previously mentioned, they also had higher body image satisfaction scores in the first and second trimesters when compared to overweight and obese women. The decrease in body image satisfaction experienced by normal weight women was small (i.e. mean change of -0.4 from first to second trimester) and may indicate that despite a slight decline in body image satisfaction, their body image satisfaction remained relatively stable from first to second trimester. This finding may furthermore show that the way women view their bodies in early pregnancy may be indicative of how women will feel about their bodies in late pregnancy. These findings are important for intervention development such that screening women for poor body image satisfaction in early pregnancy and intervening in these women to promote healthier body image satisfaction may consequently improve women's psychological well being and promote a healthier overall pregnancy experience.

No significant group differences for depressive symptoms were observed in the first or second trimester. Also, no significant differences were observed across the three groups for the change in depressive symptoms from the first to second trimester. However, scores on the depression measure were reported to be lower in normal weight women when compared to overweight and obese women in both the first and second trimesters, but these differences were not statistically significant. Although the differences in depressive symptoms among PPWS groups were not statistically significant, there was a trend in the current study such that women of normal weight status reported higher body image satisfaction and lower depressive symptoms when compared to overweight and obese women who reported lower body image satisfaction and greater depressive symptoms. These findings are consistent with prior researchers'

conclusions (Clark et al., 2009; Skouteris et al., 2005; Symons Downs et al., 2008) that body image satisfaction is associated with lower levels of depressive symptoms while body image dissatisfaction is associated with greater levels of depressive symptoms. These findings may suggest that depressive symptoms are an important psychological factor to consider when examining the determinants of body image satisfaction among pregnant women. These data are limited by their observational nature and future studies should further examine the possible causal pathways between body image satisfaction and depressive symptoms. Also, it may be beneficial for future interventions to target women at risk for depressive symptoms during pregnancy since reducing depressive symptoms may lead to a decreased risk of pregnancy complications, improved body image satisfaction, and potentially better overall health.

In contrast to the hypothesis, normal weight women reported significantly more gestational weight gain than overweight and obese women in the first trimester. In the first trimester, normal weight women reported gaining an average of 6.5 pounds while overweight women gained an average of 3.6 pounds and obese women gained an average of 3.5 pounds. Based on these gestational weight gain values, the overweight and obese women had reported gaining sufficient amount of weight for the first trimester according to the IOM (2009) recommendations of a 1 to 4.4 pound weight gain in the first trimester. Women categorized as overweight and obese are recommended to gain less weight during pregnancy (i.e. normal weight: 25-35 lbs; overweight: 15-25 lbs; obese: 11-20 lbs; IOM, 2009) and do not typically gain weight as rapidly in the first trimester of pregnancy which may have contributed to the lower gestational weight gain observed in overweight and obese women.

In the second trimester, normal weight women gained significantly more weight from prepregnancy to second trimester (15 lbs) than obese women (8.3 lbs). Comparison of trimester specific gestational weight gain across BMI groups has been previously shown to be higher in underweight and normal weight women than in overweight and obese women (Althuizen, vanPoppel, Seidell, & van Mechelen, 2009; Carmichael, Abrams, & Selvin, 1997). It is to be expected that normal weight women would gain more weight in each trimester since they generally have more gestational weight to gain than overweight or obese women across pregnancy. This finding is furthermore supported by the IOM (2009) recommendations for rate of weight gain per week in the second and third trimesters based on women's prepregnancy weight status. For instance, underweight women are recommended to gain 1-1.3 pounds a week, normal weight women are to gain 0.8-1 pounds a week, overweight women should gain 0.5-0.7 pounds a week, and obese women should only be gaining 0.4-0.6 pounds a week in both the second and third trimesters. It is clear that women of underweight and normal weight status should be gaining more weight in comparison to overweight and obese women.

Normal weight women also reported significantly more gestational weight gain from the first to the second trimester than obese women. Normal weight women reported gaining an average of 8.9 pounds from the first to second trimester while overweight women reported gaining an average of 7.7 pounds and obese women reported gaining an average of 4.4 pounds. Normal weight women had the largest gestational weight gain in both the first and second trimesters of pregnancy most likely due to the larger amount of weight these women are expected to gain across their entire pregnancy. Surprisingly, women in the current study in all three PPWS groups gained within the IOM (2009)

recommendations for weight gain up to the second trimester despite previous reports of a majority of women gaining excessive weight above the IOM recommendations during pregnancy (Althuizen et al., 2009; Caulfield, Witter, & Stoltzfus, 1996; Olson & Strawderman, 2003).

Another interesting finding was that obese women reported significantly higher first trimester exercise behavior than normal weight and overweight women. Normal weight women reported higher first trimester exercise behavior compared to overweight women, but these differences were not statistically significant. Obese women reporting significantly higher exercise behavior is in contrast to what has been observed previously in the general population. Being obese has been identified as a consistent negative influence on exercise behavior with these individuals reporting lower rates of exercise behavior when compared to normal weight individuals (Brownson, Eyster, King, Brown, Shy, & Sallis, 2000; Martinez-Gonzales, Martinez, Gibney, & Kearney, 1999; Ruchlin & Lachs, 1999; Salmon, Bauman, Crawford, Timperio, & Owens, 2000; Simonsick, Guralnik, & Fried, 1999; Sternfeld, Ainsworth, & Queensberry, 1999). There are several plausible explanations for this finding. It is possible that obese women may have over-reported their exercise behavior because when the change in exercise min from first to second trimester was calculated, obese women reported the greatest decline in exercise min (i.e. mean change of -33.6 min). Another explanation for higher levels of exercise in obese women in the first trimester could be that is common for obese women to have trouble getting pregnant due to complications experienced from their obesity (Gesink Law, Maclehorse, & Longnecker, 2007). Therefore, it is often recommended for obese women to become physically active if they have not been active previously to improve

their overall health, lose weight, and to increase the likelihood of becoming pregnant (Gesink Law et al., 2007). The obese women in the current study may have been physically active for this reason and once they had sustained the pregnancy through the first trimester they may have stopped exercising or decreased their exercise behavior in the second trimester. However, preconceptional complications and pregnancy planning status were not assessed in this study; thus, this assumption is speculative at best. Future research is needed to examine these assumptions.

No significant differences were observed across PPWS for exercise behavior in the second trimester. However, the change in exercise behavior from the first to second trimester did indicate that normal weight women reported significantly greater min of exercise from the first to second trimester compared to obese women. These differences were consistent with levels of exercise that have been previously observed in women of normal weight status when compared to obese women (Brownson, et al., 2000; Sternfeld, et al. 1999). This furthermore confirms prior findings that showed that normal weight women are more active than obese women. This finding is of particular importance during pregnancy when exercise behavior has been shown to decline greatly. Therefore, this finding provides evidence for the need for future exercise interventions designed to promote exercise behavior in pregnancy, particularly in obese women. It appears that exercise levels may be more likely to decline in this group of women and such low exercise behavior could increase their risk for poor psychological well being and body image dissatisfaction, and other associated complications (e.g. preeclampsia, GDM) throughout pregnancy.

In contrast to the hypothesis, no significant differences were observed in the first trimester for the motivational determinants of exercise (Attitude, Intention, Perceived Behavioral Control, or Subjective Norm) across PPWS groups. It is possible that weight status does not moderate women's motivational determinants for exercise. Also, there are other plausible factors that may be important in contributing to women's beliefs, Attitude, Intention, and Perceived Behavioral Control towards their exercise behavior. For instance, Ward et al. (2006) compared correlates of exercise in adolescent girls finding that no social-cognitive or environmental variables differed based on the girls' weight status. The results of this study suggested that factors such as Self-Efficacy, Perceived Behavioral Control, Attitude, and family support were all relevant to girls' exercise behavior regardless of the girls' weight status. Even though their study examined differences in the psychological correlates of exercise in adolescent girls as opposed to pregnant women, similar results were found in the current study. That is, there were no reported group differences for the motivational determinants of exercise in the first trimester of pregnancy.

However, in the second trimester, normal weight and overweight women reported significantly higher exercise Attitude than obese women. Normal weight women reported the highest average weekly exercise min in the second trimester and it is possible that these women evaluated exercise at this time much more positively than obese women. Interestingly, overweight women reported the lowest weekly average exercise min in the second trimester despite reporting significantly higher exercise Attitude than obese women. Also, overweight women reported higher Intention than normal weight and obese women, but these differences were not significant. Overweight women had higher

Intention for exercise, yet they were still the least active in the second trimester. It is possible that overweight women were not active for a variety of reasons such as pregnancy related fatigue, nausea, or difficulty exercising while pregnant. These potential factors were not examined in the current study, but these findings may indicate that even though women are evaluating exercise positively and have higher intention to exercise, there may be other factors (i.e. fatigue, nausea, time constraints due to jobs or other children) occurring during pregnancy that are inhibiting women from exercising.

When the change from first to second trimester for the motivational determinants was examined, normal weight women reported significantly higher Intention and Perceived Behavioral Control than obese women, and overweight women also reported significantly higher Perceived Behavioral Control than obese women. These significant differences may have been reported because obese women reported significantly lower exercise min from the first to the second trimester and they would be also likely to report lower Intention and Perceived Behavioral Control for exercise behavior. Due to the fact that normal weight and overweight women reported increases in exercise behavior from the first to second trimester, it would seem logical that these women would have a greater increase in Intention and Perceived Behavioral Control for exercise in comparison to the obese women. These findings can inform future studies and intervention development by highlighting the need to examine the underlying motivational determinants of exercise as well as exercise behavior to determine the specific cognitive structures that should be targeted in exercise interventions during pregnancy.

The second hypothesis for mediation was partially supported by the current research. As predicted, the relationship between first trimester depressive symptoms and

second trimester body image satisfaction was mediated through first trimester body image satisfaction. This suggests that first trimester depressive symptoms influence second trimester body image satisfaction but only as it is mediated through first trimester body image satisfaction. As evidenced by the current study as well as previous research (Clark et al., 2009; Symons Downs et al., 2008), women who experienced greater depressive symptoms in the first trimester also had lower first trimester body image satisfaction. The current findings provide a greater understanding of the nature of the relationship between body image satisfaction and depressive symptoms. Women who reported less first trimester depressive symptoms were also more likely to report greater body image satisfaction in the first trimester. Their first trimester body image satisfaction was furthermore predictive of their second trimester body image satisfaction. This provides evidence that depressive symptoms impact second trimester body image satisfaction through the relationship that exists between first trimester depressive symptoms and body image satisfaction. These findings can be useful to inform future intervention development aimed at improving women's psychological health. More specifically, it may be useful to decrease the amount depressive symptoms women experience during early pregnancy. Decreased depressive symptoms may be likely to lead to better body image satisfaction not only in the early part of pregnancy but also throughout a woman's entire pregnancy. Therefore, future interventions should identify women at risk for experiencing depressive symptoms in early pregnancy and facilitating good psychological well being in these women may be likely to lead to improved body image satisfaction, which may in turn, lead to continued body image satisfaction

throughout pregnancy. A more positive body image throughout pregnancy can improve women's quality of life during this time.

Also, even though the relationship between first trimester depressive symptoms and second trimester body satisfaction was mediated through first trimester body satisfaction, this does not lessen the importance of targeting depressive symptoms early in pregnancy to prevent women from experiencing greater depressive symptoms later in pregnancy and thereafter in postpartum. There is a good body of literature that supports that prenatal depression increases the risk for postpartum depression (Varkukla, Viguera, & Gonsalves, 2009). Thus, due to the negative consequences of prenatal depression (e.g. increased risk of labor and delivery complications, postpartum depression, comorbid anxiety), interventions are also needed to target and alleviate these symptoms and enable women to have a healthier pregnancy, delivery, and postpartum.

In partial support of the second hypothesis, first trimester body image satisfaction partially mediated the relationship between first trimester gestational weight gain and second trimester body image satisfaction. According to Baron and Kenny (1986) models that indicate partial mediation are sometimes more realistic because it cannot be expected that a single mediator would completely explain the relationship between the predictor variable and outcome variable. Both first trimester body image satisfaction and gestational weight gain significantly predicted second trimester body image satisfaction. This indicates that less gestational weight gain in the first trimester is predictive of greater first trimester body image satisfaction. It is possible that there could be other factors contributing to the way women are evaluating their bodies in the second trimester. The relationship between first trimester gestational weight gain and body image

satisfaction may not be the only possible mediator of second trimester body image satisfaction. However, this finding does provide additional insight about how gestational weight gain is related to body image satisfaction in pregnancy. The findings illustrate that women who gain the appropriate amount of weight during pregnancy are more likely to have better body image satisfaction compared to women who gain more gestational weight who are more likely to have greater body image dissatisfaction. As mentioned previously, as of the year 2000, only 30% to 40% of women in the United States gained within the IOM gestational weight gain recommendations and this rate has continued to increase over the past 9 years (Abrams et al., 2000; Cogswell, et al., 1999). As a result, there is a need to better inform women of these guidelines and to develop interventions that prevent women from gaining excessive gestational weight. Due to the complications associated with excessive gestational weight gain for both mother and her infant, and the increased risk it creates for future obesity, it is imperative for interventions to help women gain within the recommendations. Women who experience appropriate gestational weight gain will not only have better health outcomes, but they may also be more likely to experience better body image satisfaction during their pregnancy. If women are aware of how much weight they are to be gaining in pregnancy and adhere to these guidelines, they may be more likely to feel positively towards their gestational weight gain. Positive attitudes towards gestational weight gain may be furthermore associated with better body image satisfaction in pregnancy.

In contrast to the second hypothesis, the third model including exercise behavior did not significantly predict second trimester body image satisfaction. That is, first trimester exercise behavior and second trimester body image satisfaction were not

mediated through first trimester body image satisfaction. The prior evidence of the relationship between exercise behavior and body image satisfaction has been equivocal (Goodwin et al., 2000) and there are several plausible reasons for why first trimester exercise behavior was not predictive of second trimester body image satisfaction. For example, the average weekly min of reported exercise behavior for the total sample in the first trimester was 77 min. This value is indicative of low levels of exercise behavior. More specifically, the majority of the women in this study were well below the recommended levels of 150 min/week of moderate intensity exercise (ACOG, 2002; USDHHS, 2008). This observed decline in exercise behavior has been shown to commonly occur during pregnancy (Evenson et al., 2004) as it is possible that other pregnancy related factors (i.e. nausea, fatigue, increased weight) may make exercise at this time difficult for women. As a result of such low levels of exercise behavior, exercise behavior in itself did not significantly predict second trimester body image satisfaction. It is possible that exercise behavior did not have any impact on body image satisfaction in the current study because of the low levels of exercise behavior reported. It is clear that more research in this area is needed to better understand the possible mediated relationship between exercise behavior and body image satisfaction during pregnancy. It may be beneficial to examine differences in low, middle, and high exercise groups to further clarify the impact that exercise behavior may have on body image satisfaction during pregnancy.

Finally, this thesis research suggests that the Biopsychosocial Model may be a good framework for understanding body image satisfaction and its correlates in pregnancy. However, including the Theory of Planned Behavior within this framework

did not provide additional context to better understand body image satisfaction in pregnancy. Having normal weight status prior to pregnancy may facilitate a more positive body image satisfaction in pregnancy since it can be assumed that women of normal weight status have attained a body image satisfaction more closely tied to the ideal “thin female shape” (Cortese, 1999). As a result, normal weight women reported having higher body image satisfaction than women of overweight and obese weight status prior to pregnancy. It is possible that overweight and obese women may feel stigmatized for not meeting the current societal standards for thinness. With the added weight experienced during pregnancy and societal pressures, these factors may have influenced overweight and obese women to report having lower body image satisfaction in the first and second trimesters of pregnancy. As mentioned previously, depressive symptoms are common in pregnancy and those women who reported having greater depressive symptoms also reported lower body image satisfaction while those women with less depressive symptoms experienced greater body image satisfaction.

It was also thought that motivational determinants for exercise from the Theory of Planned Behavior (Ajzen, 1991) would help explain body image satisfaction; however no differences were observed among PPWS groups for the motivational determinants of exercise behavior in the first trimester. The changes in Intention and Perceived Behavioral Control were found to differ by PPWS groups but none of the other determinants differed among the groups. Due to the finding that exercise behavior was not directly related to body image satisfaction, it can be assumed that the motivational determinants would also not directly impact body image satisfaction, and as a result, these variables did not provide additional context in explaining body image satisfaction.

Future research is needed to better understand the influence of these motivational determinants of exercise and body image satisfaction. For example, studies should examine how the motivational determinants of exercise differ among women who report low, middle, and high exercise behavior in pregnancy. Also, the influence of exercise behavior on body image satisfaction during pregnancy should be assessed as it is possible that the motivational determinants of exercise could mediate the relationship between exercise behavior and body image satisfaction despite the lack of evidence for this relationship in the current thesis.

This thesis research has provided additional information to the limited literature available on body image satisfaction during pregnancy; however, there are some study limitations worthy of mention. First, the participants in this study were mostly Caucasian, middle to upper class and highly educated. This sample is representative of the population in central Pennsylvania; however, generalizability of the findings to a more diverse population of pregnant women is limited. Additional research should be done with a more diverse population of women to determine the influence of the biological, psychological, and social factors on body image satisfaction during pregnancy. Second, only self-reported questionnaires were used to assess the main study measures (body image satisfaction, depressive symptoms, gestational weight gain, exercise behavior, Attitude, Subjective Norm, Perceived Behavioral Control, and Intention) which clearly have inherent social biases. Self-reported measures of body image satisfaction have been shown to be the most reliable method to assess this construct; however, objective measures of gestational weight gain (e.g. weight on electronic scale) and exercise behavior (e.g. activity monitors) are needed to generate a more accurate assessment of

both gestational weight gain and activity levels in pregnancy and how these are associated with body image satisfaction. Third, the current study did not assess eating behaviors or disordered eating pathology and these measures may play an important role in body image satisfaction during pregnancy. Future studies should include such measures to obtain a more comprehensive understanding of body image satisfaction in pregnancy.

Future research should examine additional risk factors for body image satisfaction concerns during pregnancy such as eating and dieting patterns at prepregnancy and throughout pregnancy, parity, ethnicity, and socioeconomic status. Women's previous dieting and eating pathology is likely to be closely related to their body image satisfaction prior to pregnancy. It would be beneficial to examine these constructs in pregnancy to better understand how they impact women's eating behaviors in pregnancy and their association with body image satisfaction. Research should examine ethnically diverse samples of women since other cultures may view women more negatively for gaining weight and developing a pregnant figure while other cultures may be much more accepting of the pregnant body. Such cultural differences should be examined to determine how they may impact women's body image satisfaction throughout pregnancy. Parity may also serve as an important predictor for body image satisfaction as women who have had previous children may experience more positive body image satisfaction since they are used to the changes they are experiencing and may have more confidence in returning to their prepregnancy body size than a woman who is experiencing her first pregnancy. Finally, women's body image satisfaction during the postpartum period is

important to examine in the future since weight retention is common during this period once pregnancy is over and may contribute to body image dissatisfaction.

In conclusion, this thesis has provided a better understanding of the influence of prepregnancy weight status on body image satisfaction as well as the relationships that exist between body image satisfaction and its correlates. Women of normal weight status prior to pregnancy are more likely to have better body image satisfaction throughout pregnancy compared to their overweight and obese counterparts. This thesis has indicated that depressive symptoms and gestational weight gain in early pregnancy may be important predictors of body image satisfaction at the subsequent trimester since first trimester body image satisfaction mediated the relationship between depressive symptoms and second trimester body image satisfaction. Also, first trimester body image satisfaction partially mediated the relationship between first trimester gestational weight gain and second trimester body image satisfaction. Finally, examining the correlates of body image satisfaction using the Biopsychosocial Model was useful since both biological and psychological correlates were important predictors of body image satisfaction in the second trimester. Due to the public health implications associated with body image dissatisfaction, depressive symptoms, and gestational weight gain during pregnancy, there is a need for the development of future interventions that also consider body image satisfaction and its correlates during pregnancy to improve overall maternal and infant health during this important time.

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Strang & Sullivan (1984)	Prospective study; women completed surveys at 2 and 6 weeks postpartum; prepregnancy survey data was collected retrospectively	$N = 63$ postpartum women; age range = 20 to 37; $N = 30$ primiparas (M age = 25.2); 33 multiparas (M age = 27.8)	Attitude to Body Image Scale (modified version of Jourard's Body Cathexis scale)	71.4% of participants had a positive feeling toward their body image at both 2 and 6 weeks postpartum; no significant difference was found between the women's score at 2 and 6 weeks postpartum; body image attitudes were significantly positive for multiparas when compared to primiparas
Boscaglia, Skouteris, & Wertheim (2002)	Prospective study; participants completed questionnaires at 15-22 weeks gestation and 23-30 weeks gestation	$N = 71$ pregnant women (M age = 32; M BMI = 23.8); $n = 40$ high exercisers (M age = 32.8; M prepregnancy BMI = 24.0; $n = 31$ low exercisers	10-item version of the Body Cathexis Scale	At 15-22 weeks, high exercisers had significantly higher levels of body image compared to low exercisers; no other significant differences between the 2 groups were observed
Skouteris, Carr, Wertheim, Paxton, & Duncombe (2005)	Prospective study; participants completed questionnaires in the early to mid second trimester (16-23 weeks), the late second/early third trimester (24-31 weeks), and late third trimester of pregnancy (32-39 weeks); they also completed retrospective information about the 3 month period prior to becoming pregnant	$N = 128$ pregnant women; (M age = 31.6; age range = 23-42; 82.8% married; 90.6% employed, M prepregnancy weight = 65.5 kg; M prepregnancy BMI = 24.0)	Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) including 4 subscales - feeling fat, strength and fitness, salience of weight and shape, attractiveness; Contour Drawing Rating Scale (Thompson & Gray, 1995); Physical Appearance Comparison Scale (revised version: Thompson et al., 1999)	Body image at pre-pregnancy was a strong predictor of body image in pregnancy; depressive symptoms at 16-23 weeks gestation found to predict decreases in feeling attractive, strong, and fit and to increases in feeling fat; women reported feeling more fit, strong, and attractive prior to pregnancy than during early to mid second trimester and late pregnancy; body image was relatively stable across pregnancy trimesters despite body changes

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Chang, Chao, & Kenney (2006)	Interview	<i>N</i> = 18 pregnant women (29-30 wk gestation); age range = 21-45; 100% Taiwanese; 83% primiparous; 16% multiparous; 73% university educated; 94% married	Author-Developed face-to-face interviews discussing the physical and emotional changes experienced during pregnancy	Major themes: 61% thought that they were viewed as less attractive by others during pregnancy, over 50% were concerned with returning to their prepregnant body after delivery; many felt their pregnant body interfered with their attainment of prepregnant standards of beauty and gracefulness while others saw changes as an indication of successful "mothering;" body concerns reflected women's desire to measure up to the ideal thin shape that is socially prescribed for women
Davies & Wardle (1994)	Observational and interview	<i>N</i> = 76 pregnant women (<i>M</i> age = 30.1, <i>M</i> BMI = 27.5; 72% Caucasian, 100% employed); <i>N</i> = 97 non-pregnant controls (<i>M</i> age = 29.2, <i>M</i> BMI = 23.5, 89% Caucasian, 99% employed)	Body Dissatisfaction Subscale of the Eating Disorder Inventory-2; Drive for Thinness subscale of the EDI-2 ; Figure Rating Scale; Author-developed Attitudes toward weight gain by interview; Author-developed scale to assess perceived size of body and body parts; Restraint Scale of the Dutch Eating Behaviour Questionnaire; Bulimia Scale of the EDI-2	Pregnant women had significantly lower EDI-DT scores; when BMI was controlled for, pregnant women had significantly lower EDI-BD scores than their non-pregnant counterparts; pregnant women accurately perceived themselves as heavier on the basis of figure rating than the non-pregnant women; pregnant women were more accepting of their body size and made fewer attempts to control their weight

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Clark, Skouteris, Wertheim, Paxton, & Milgrom (2009)	Prospective study; participants completed questionnaires at 17-21 weeks gestation, 32-35 weeks gestation, 6 weeks postpartum, 6 months postpartum, 12 months postpartum, and retrospectively about the 3 months prior to becoming pregnant	<i>N</i> = 116 pregnant women (<i>M</i> age = 31.8; age range = 21-41; <i>M</i> BMI = 25.7; 88.8% married; 50.9% primiparous)	Body Attitudes Questionnaire (Ben-Tovin & Walker, 1991) using 4 subscales – feeling fat, strength and fitness, salience of weight and shape, attractiveness	Women reported feeling significantly fatter and experiencing their weight and shape as more salient at all 3 postpartum time points compared to during pregnancy; body image remained relatively stable across pregnancy; women reported the least body dissatisfaction during late pregnancy but the most depressive symptoms at this time; depression in late pregnancy predicted body dissatisfaction in the postpartum with more depressive symptoms predicting feeling fatter, less attractive, less strong and fit, and weight and shape becoming more salient
Fox & Yamaguchi (1997)	Observational study; participants completed a questionnaire	<i>N</i> = 76 primiparous pregnant women at least 30 weeks gestation (57% Caucasian; 23% with intermediate skill job, <i>n</i> = 42 normal weight prior to pregnancy; <i>n</i> = 34 overweight women prior to pregnancy)	Two open-ended questions about how participants felt about their current appearance and body shape and if, how, and why these feelings differed from prepregnancy feelings; modified version of the Body Shape Questionnaire	19% of normal weight women experienced a positive change in body image and 62% experienced a negative change; 19% had no change; of the overweight women, 62% experienced a positive change, 23% a negative change, and 15% no change; normal weight women prior to pregnancy had a more negative body image at 30 weeks or more gestation

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Duncome, Wertheim, Skouteris, Paxton, & Kelly (2008)	Prospective study, participants completed questionnaires at 16-23 weeks gestation, 24-30 weeks, and 32-38 weeks, and retrospectively about the 3 months prior to becoming pregnant	$N = 158$ pregnant women (M age = 31.7 years; age range = 21-42; 85.8% married, 80.2% university educated; 40.1% worked full time M prepregnancy BMI = 24.0, 45.1% primiparous; 47.6% multiparous)	Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) using 4 subscales – feeling fat, strength and fitness, salience of weight and shape, attractiveness; Contour Drawing Rating Scale (Thompson & Gray, 1995); Pregnancy Figure Rating Scale (Sjouteris, et al., 2005)	Body image of women remained relatively stable across pregnancy; women who felt good about their body at the start continued to do so during pregnancy; those who did not tended to maintain that concern during pregnancy; women felt less fat in late pregnancy than they felt prior to pregnancy and significantly fatter in early pregnancy than they felt in middle to late pregnancy; no differences were reported in how women felt about their own attractiveness across pregnancy; poorer body image in early pregnancy was associated with greater depression scores in early/mid and late pregnancy
Goodwin, Astbury, McMeeken (2000)	Prospective longitudinal study	$N = 65$ nulliparous pregnant women (M age = 30.3; age range = 23-39; 86.2% married, 91% worked; 80% exercised prior to pregnancy); women were categorized into 2 groups: exercisers ($n = 25$) and non-exercisers ($n = 18$)	Body Cathexis Scale	Exercisers did not have a more positive body image than non-exercisers. Regardless of exercise status significant negative changes in attitude toward body image from prepregnancy to early pregnancy were observed. However, body attitude changes from early pregnancy to late pregnancy were observed to me in a positive direction

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Downs, DiNallo, & Kirner (2008)	Prospective study; participants completed questionnaires in their first, second, and third trimesters of pregnancy, and at 6 weeks postpartum	<i>N</i> = 230 pregnant women (<i>M</i> age = 30.1, 90% married, 92% Caucasian, 51.1% middle to upper income, <i>M</i> BMI = 25.5 at trimester 1, 26.5 at trimester 2, 28.5 at trimester 3, and 25.2 at 6 weeks postpartum; <i>n</i> = 113 somewhat active prepregnancy group (<i>M</i> age = 30.3; 91.1% married, 93.6% Caucasian); <i>n</i> = 96 active prepregnancy group (<i>M</i> age = 29.9; 89.4% married; 95.7% Caucasian)	Body Areas Satisfaction Scale (Cash, 1990)	Women experiencing higher levels of depressive symptoms across the pregnancy trimesters also experienced lower body image satisfaction and women with lower depressive symptoms reported better body image throughout pregnancy; body image satisfaction was a main determinant for later depression in pregnancy and postpartum
Abraham, King, & Llewellyn-Jones (1994)	Retrospective study; women completed a questionnaire 3 days postpartum about their eating behavior and attitudes to body weight prior to pregnancy and during their recent pregnancy	<i>N</i> = 100 primigravid pregnant women (<i>M</i> age = 27 years; age range = 17-42; 97% married; 94% completed school certificate; 25% completed university degree; 11% underweight; 74% normal weight; 11% overweight; 4% obese)	Eating Behavior 71 item self-report questionnaire that asked about women's eating behaviors, body image and concern, and weight before and during pregnancy	73% of women who used weight control measures prior to pregnancy continued these weight control measures during pregnancy; 59% of women would have preferred to have had a smaller or a much smaller weight gain during pregnancy; 34% were happy with their weight gain, and 7% wanted a larger weight gain
Matushashi & Felice (1991)	Observational study; pregnant adolescents were interviewed in their third trimester (28 weeks to 41 weeks) and never pregnant girls being seen for routine health care were interviewed during the same time period	<i>N</i> = 86 adolescents (<i>M</i> age = 16.1; 37% Hispanic, 32% African American, 26% Caucasian); <i>n</i> = 43 primiparous pregnant adolescents (<i>M</i> BMI = 21.5; 95.3% single; 69.8% full time students or high school graduate) <i>n</i> = 43 never pregnant adolescent girls (<i>M</i> BMI = 22.4; 100% single; 93.0% full time students or high school graduates)	Tennessee Self Concept Scale (TSCS) consisting of 100 self-descriptive statements divided into 9 subscales: self-identity, self-satisfaction, self-behavior, physical self, moral-ethical self, personal self, family self, social self, and self-criticism	Third trimester pregnant adolescents had a more positive body image, higher self-esteem, a surer self-identity than never pregnant peers; pregnant adolescents did appear limited in their capacity for self-criticism when compared to the non-pregnant adolescents

Author (year)	Study Characteristics	Participant Characteristics	Body Image Assessment	Primary Outcome
Rocco, Orbitello, Perini, Pera, Ciano, Balestrieri (2005)	Prospective study; pregnant women were interviewed at their first obstetrical ultrasound (approximately 12 weeks gestation), 22 weeks, 34 weeks, 2 days after delivery, and 4 months postpartum	<i>N</i> = 97 pregnant women (<i>M</i> age = 31.2 ; 100% Caucasian; 44.3% university degrees; 60.8% primiparas); <i>n</i> = 37 women with a positive history of dieting (<i>M</i> age = 32.1; <i>M</i> BMI = 23.2); <i>n</i> = 11 with a positive history of dieting and with a complete diagnosis of a current eating disorder (<i>M</i> age = 29.9; <i>M</i> BMI = 21.1); <i>n</i> = 49 with a negative history of either dieting or an eating disorder (<i>M</i> age = 30.8; <i>M</i> BMI = 21.9)	Body Attitude Test of the EDI Symptom Checklist and EDI-2	Women with eating disorders and subthreshold symptomatology prior to pregnancy, improve their eating attitudes and body satisfaction most likely due to a shift in roles to motherhood and the newborn as well as women taking better care of themselves more than usual, more available social support and lowered social demands; body image satisfaction in women with eating disorders is likely to return to previous levels after pregnancy
Rallis, Skouteris, Wertheim, & Paxton (2007)	Longitudinal study; followed women from early pregnancy (including retrospective reports for prepregnancy) to a year postpartum; questionnaires completed at 16-23 weeks gestation, 32 to 39 weeks gestation, 6 weeks postpartum, 6 months postpartum, and 1 year postpartum	<i>N</i> = 79 pregnant women (<i>M</i> age = 32.5; age range = 22-40; 86.1% married, 54% primiparous; <i>M</i> BMI= 23.9 at 3 months prepregnancy; 24.9 at 6 months postpartum, and 24.1 at 1 year postpartum; 78.2% middle income)	Body Attitudes Questionnaire (Ben-Tovim & Walker, 1991) using 4 subscales – feeling fat, strength and fitness, salience of weight and shape, attractiveness; Contour Drawing Rating Scale (Thompson & Gray, 1995); Weight and Shape subscale of the revised Physical Appearance Comparison Scale (Thompson et al., 1999)	Women experienced greater body dissatisfaction in the postpartum in comparison to prepregnancy and late pregnancy; 6 months postpartum was the time of most body concern; women's ideal body shape was relatively stable over postpartum, with the discrepancy between current and ideal figure ratings decreasing from 6 weeks to 6 months and then 1 year postpartum; depressive symptoms at 6 months postpartum predicted feeling less strong and fit at one year

Table 2a*Demographic Characteristics of the Study Sample (Means and Standard Deviations)*

Variable	Total Sample (<i>N</i> = 209)*		Pregpregnancy Normal Weight (<i>N</i> = 138)		Pregpregnancy Overweight (<i>N</i> = 35)		Pregpregnancy Obese (<i>N</i> = 29)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	30.3	4.0	30.0	4.0	29.9	3.5	31.6	4.5
Body Mass Index								
Pregpregnancy	24.4	5.2	21.8	1.7	27.1	1.5	34.6	4.8
1 st Trimester	25.3	5.2	22.9	2.0	27.7	1.8	35.4	4.8
2 nd Trimester	26.6	5.0	24.3	2.1	29.0	2.0	36.2	4.8
Average Weekly LTEQ PA Min								
Pregpregnancy	104.5	68.6	109.6	70.2	89.4	57.3	107.3	74.4
1 st Trimester	77.3	62.5	74.8	57.5	64.5	41.4	104.5	98.1
2 nd Trimester	82.6	60.9	89.0	63.3	69.5	41.9	73.7	70.1
Gestational Weight Gain (in pounds)								
Pregpregnancy-1 st Trimester	5.4	6.3	6.2	6.1	3.5	5.8	3.6	8.1
1 st Trimester-2 nd Trimester	8.0	5.0	8.6	5.5	7.6	4.2	4.6	5.3
Pregpregnancy-2 nd Trimester	13.2	8.3	14.6	7.8	11.4	7.6	8.5	10.0

*Note. Study sample includes all participants including underweight women (*n* = 6)

Table 2b
Demographic Characteristics of the Study Sample (Percentages)

Variable	Total Sample (<i>N</i> = 209)*	Prepregnancy Normal Weight (<i>N</i> = 138)	Prepregnancy Overweight (<i>N</i> = 35)	Prepregnancy Obese (<i>N</i> = 29)
Marital Status				
Married	88.0%	88.4%	85.7%	82.8%
Single	6.3%	5.8%	5.7%	10.3%
Divorced	1.4%	1.4%	2.9%	0.0%
Race/Ethnicity				
Caucasian	88.9%	89.1%	91.4%	89.7%
Asian	7.2%	7.3%	2.9%	6.9%
Hispanic	1.9%	2.2%	0.0%	3.4%
Education				
Graduate	49.3%	50.7%	45.7%	44.8%
College	45.4%	47.1%	42.9%	44.8%
High School	4.3%	2.2%	11.4%	3.4%
Family Income				
> \$100,000	24.1%	27.7%	18.2%	10.3%
\$40,000 – 100,000	50.3%	50.0%	60.6%	44.8%
\$20,000 – 39,999	19.1%	14.6%	21.2%	34.5%
\$10,000 – 19,999	6.5%	7.7%	0.0%	10.3%

**Note.* Study sample includes all participants including underweight women (*n* = 6)

Table 3

Means (M), Standard Deviations (SD), and Multivariate Analysis of Variance Scores for the Total Sample and by Prepregnancy Weight Status Groups

	Total Sample (N =202)		Prepregnancy Normal Weight (N = 112) ^a		Prepregnancy Overweight (N = 32) ^b		Prepregnancy Obese (N = 28) ^c		<i>df</i>	<i>F</i>	<i>p</i> value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1st Trimester									2, 166	4.4	
BASS	27.4	4.7	28.6	4.3	26.3	4.2	23.8	4.8		14.1	< 0.001***
CES-D	12.2	9.6	11.4	8.4	12.9	10.2	14.6	12.8		0.8	0.47
GWG	5.5	6.4	6.5	5.9	3.5	5.9	3.6	8.1		3.9	< 0.05*
LTEQ	78.0	64.1	75.4	56.4	64.0	41.2	104.5	99.9		7.4	< 0.001***
ATT	39.2	8.0	39.4	8.2	39.7	6.1	37.8	9.0		0.2	0.80
SN	16.8	3.8	16.6	3.6	17.8	3.5	16.2	4.5		2.0	0.14
PBC	13.4	4.9	13.5	5.1	12.8	3.9	13.7	5.1		0.4	0.66
INT	14.8	4.8	14.7	5.0	15.3	4.1	14.5	5.1		1.1	0.33
Sample size	(N =202)		(N = 111) ^a		(N = 31) ^b		(N = 24) ^c				
2 nd Trimester									2, 160	3.6	
BASS	27.5	5.0	28.1	4.7	27.9	5.1	24.0	5.1		7.7	<0.001***
CES-D	10.2	8.0	9.6	7.4	10.2	9.1	12.9	9.0		0.9	0.41
GWG	13.3	8.5	15.0	7.9	11.3	7.6	8.3	10.4		7.1	<0.001***
LTEQ	82.1	61.5	86.5	63.0	69.0	42.7	79.1	74.0		0.9	0.43
ATT	41.3	5.9	41.8	5.5	42.1	5.4	37.8	7.2		5.6	<0.01**
SN	17.5	3.6	17.3	3.4	18.6	3.3	17.1	4.5		2.6	0.08
PBC	14.7	4.1	14.7	4.3	15.3	3.4	13.9	4.3		1.4	0.24
INT	15.3	4.6	15.5	4.6	15.8	4.3	13.8	5.0		2.6	0.08
Sample size	(N =202)		(N = 100) ^d		(N = 31) ^e		(N = 23) ^f				
Change from 1 st to 2 nd Trimester									2, 148	2.8	
BASS	0.04	3.9	-0.4	3.9	1.6	3.3	-0.3	4.1		3.2	< 0.05*
CES-D	-1.8	8.5	-1.5	8.4	-2.6	6.6	-2.2	11.0		0.4	0.64

GWG	8.0	5.5	8.9	5.6	7.7	4.1	4.4	5.4	6.5	< 0.01**
LTEQ	8.2	73.5	18.6	64.5	5.8	42.1	-33.6	118.8	5.7	< 0.01**
ATT	2.2	6.3	2.6	6.8	2.4	5.3	0.3	4.6	1.5	0.22
SN	0.9	3.3	0.9	3.5	0.8	2.1	0.7	3.9	0.3	0.77
PBC	1.3	4.0	1.5	4.0	2.5	4.4	-0.7	2.4	4.2	< 0.01**
INT	0.6	4.0	1.1	4.1	0.5	3.3	-1.7	3.4	4.8	< 0.01**

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ^{a,b,c,d,e,f} = Change in N for PPWS at trimester one and two due to missing data. Df = degrees of freedom; BASS = Body Areas Satisfaction Scale; CES-D = Center for Epidemiological Studies Depression Scale; GWG = Gestational Weight Gain from prepregnancy to 1st trimester, weight gain from prepregnancy to 2nd trimester, and weight gain from 1st to 2nd trimester; LTEQ = Leisure Time Exercise Questionnaire; ATT = Attitude; SN = Subjective Norm; PBC = Perceived Behavioral Control; INT = Intention.

Table 4

Mediation Model using Hierarchical Regression Analyses to Predict Second Trimester Body Image Satisfaction in the Second Trimester with First Trimester Body Image Satisfaction and Depression

Variable	F Change	Df	R ² change	β^1	β^2
<i>Step 1: Predicting Second Trimester Body Image Satisfaction with First Trimester Depression</i>					
Block 1	5.7	3, 185	0.08		
PPWS	14.7			-0.28***	-0.25***
Education				0.03	0.01
Income				0.03	-0.01
Block 2	14.7	1, 184	0.07		
1 st Tri Depression					-0.27***
<i>Step 2: Predicting First Trimester Body Image Satisfaction with First Trimester Depression</i>					
Block 1	12.0	3, 184	0.16		
PPWS				-0.38***	-0.35***
Education				0.12	0.10
Income				0.02	-0.03
Block 2	20.7	1, 183	0.09		
1 st Tri Depression					0.30***
<i>Step 3: Predicting Second Trimester Body Image Satisfaction with First Trimester Body Image Satisfaction</i>					
Block 1	5.1	3, 187	0.08		
PPWS				-0.27***	-0.02
Education				0.01	-0.06
Income				0.02	0.01
Block 2	135.2	1, 186	0.39		
1 st Tri Body Image					0.68***
<i>Step 3: Predicting Second Trimester Body Image Satisfaction with First Trimester Depression and Body Image Satisfaction</i>					
Block 1	5.7	3, 184	0.09		
PPWS				-0.28***	-0.03
Education				0.03	-0.05
Income				0.03	0.01
Block 2	62.6	2, 182	0.37		
1 st Tri Body Image					0.64***
1 st Tri Depression					-0.08

Note. β^{1-2} = standardized regression coefficients; Df = degrees of freedom. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Abbreviations. PPWS = prepregnancy weight status.

Table 5

Mediation Model using Hierarchical Regression Analyses to Predict Second Trimester Body Image Satisfaction in the Second Trimester with First Trimester Body Image Satisfaction and Gestational Weight Gain

Variable	F Change	Df	R ² change	β^1	β^2
<i>Step 1: Predicting Second Trimester Body Image Satisfaction with First Trimester Gestational Weight Gain</i>					
Block 1	5.1	3, 184	0.08		
PPWS				-0.27***	-0.32***
Education				0.15	0.01
Income				0.41	0.03
Block 2	11.8	1, 183	0.06		
1 st Tri Weight Gain					-0.24***
<i>Step 2: Predicting First Trimester Body Image Satisfaction with First Trimester Gestational Weight Gain</i>					
Block 1	10.9	3, 183	0.15		
PPWS				-0.37***	-0.40***
Education				0.10	0.10
Income				0.02	0.01
Block 2	5.5	1, 182	0.03		
1 st Tri Weight Gain					-0.16*
<i>Step 3: Predicting Second Trimester Body Image Satisfaction with First Trimester Body Image Satisfaction</i>					
Block 1	5.1	3, 187	0.08		
PPWS				-0.27***	-0.02
Education				0.01	-0.06
Income				0.02	0.01
Block 2	135.2	1, 186	0.39		
1 st Tri Body Image					0.68***
<i>Step 3: Predicting Second Trimester Body Image Satisfaction with First Trimester Body Image Satisfaction and Gestational Weight Gain</i>					
Block 1	5.1	3, 183	0.08		
PPWS				-0.27***	-0.06
Education				0.01	-0.05
Income				0.03	0.02
Block 2	67.5	2, 181	0.39		
1 st Tri Body Image					0.64***
1 st Tri Weight Gain					-0.14*

Note. $\beta^{1,2}$ = standardized regression coefficients; Df = degrees of freedom. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

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APPENDIX A: PERSONAL HISTORY QUESTIONNAIRE

Instructions. Please complete the following health history questions even if you have already completed these items on a previous version of a survey.

Today's Date: ____ / ____ / ____

Date of Birth: ____ / ____ / ____

Age: ____ years

Contact phone # (home): _____ (cell): _____

Email address: _____

Occupation: _____ Part-time Full-time Self-Employed
Other _____

Marital Status: Single Married Divorced Widow Common
Law Other _____

Race/ethnicity: African American/Black American Indian Asian Caucasian
Hispanic Other _____

Highest level of education: < High school High school College Grad/Professional
Other _____

Family income: < \$10,000 \$10-20,000 \$20-40,000 \$40-100,000 > \$100,000
Other _____

Number of weeks currently pregnant? _____ Due date: ____/____/____

Height: ____ *feet* ____ *inches* Current weight: _____ *pounds*

Weight prior to pregnancy: _____ *pounds*

Are you currently on maternity leave? Yes _____ No _____

Are you currently breastfeeding? Yes _____ No _____

Do you plan to: Breastfeed _____ Use formula _____ Use a combination of both _____

APPENDIX B: LEISURE TIME EXERCISE QUESTIONNAIRE

Instructions. This is a scale that measures your leisure-time exercise (exercise in your free time, but not physical activity that is done at work or walking for travel). Considering a typical week, please indicate how often (on average) you have engaged in mild, moderate, and strenuous leisure-time exercise more than 15 minutes during your free time currently in your 1st/2nd trimester. *If your answer is "none" please write-in "0".* For example, if you did 60 minutes of moderate walking last week, you would write "4" (15 min x 4 = 60) in the space for moderate exercise.

Strenuous exercise: heart beats rapidly (e.g., running, basketball, roller skating, vigorous swimming, long distance bicycling, judo, aerobic dance weight training)

How many times per typical week do you perform strenuous exercise for 15 minutes or longer?

Currently _____ 1st trimester _____ 2nd trimester _____

Moderate exercise: not exhausting, light sweating (e.g., fast walking, tennis, baseball, easy bicycling, swimming, volleyball, badminton, easy dancing)

How many times per typical week do you perform moderate exercise for 15 minutes or longer?

Currently _____ 1st trimester _____ 2nd trimester _____

Mild exercise: minimal effort, no sweating (e.g., easy walking, yoga, golf, archery, fishing, bowling, lawn bowling)

How many times per typical week do you perform mild exercise for 15 minutes or longer?

Currently _____ 1st trimester _____ 2nd trimester _____

APPENDIX C: CENTERS FOR EPIDEMIOLOGICAL STUDIES-DEPRESSION

Instructions. The following questions ask about your feelings during the past week. Using the scale below, indicate your answer by placing it in the space provided after each statement.

1 rarely / not not at all (< 1 day)	2 some (1-2 days)	3 often (3-4 days)	4 most days (5-7 days)	5 does not apply to me
---	--	---	---	---

1. I was bothered by things that don't usually bother me. _____
2. I did not feel like eating, my appetite was poor. _____
3. I felt I could not shake the blues, even with the help of my family. _____
4. I felt that I was just as good as other people. _____
5. I felt depressed. _____
6. I had trouble keeping my mind on what I was doing. _____
7. I felt that everything I did was an effort. _____
8. I felt hopeful about the future. _____
9. I thought my life had been a failure. _____
10. I felt fearful. _____
11. My sleep was restless. _____
12. I was happy. _____
13. I talked less than normal. _____
14. I felt lonely. _____
15. People were unfriendly. _____
16. I had enjoyed life. _____
17. I had crying spells. _____
18. I felt that people disliked me. _____
19. I felt like I couldn't do what I needed to do. _____
20. I felt sad. _____

APPENDIX D: BODY AREAS SATISFACTION SCALE

Instructions. The following items pertain to how you may think, feel, or behave in your 1st /2nd trimester. Using the scale below, please indicate the extent to which the items best relate to you by placing it in the space provided after each statement.

1	2	3	4	5
very	mostly	neither	mostly	very
dissatisfied	satisfied	satisfied or dissatisfied	satisfied	satisfied

How satisfied are you with your ...

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

APPENDIX E: ATTITUDE ITEMS

Instructions. Answer the following questions by circling the number that best represents your answer. *Regular exercise behavior* = participating in 30 minutes of accumulated moderate exercise on most, if not all, days of the week. This exercise can be done at one time (e.g., 30 min of continuous walking or jogging) or accumulated in the day (e.g., walking 10 min in the morning, and 20 min in the evening).

For me to exercise regularly in my 1st /2nd trimester will be:

Useless Useful

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Harmful Beneficial

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Bad Good

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Foolish Wise

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Unpleasant Pleasant

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Unenjoyable Enjoyable

1 2 3 4 5 6 7

For me to exercise regularly in my 1st /2nd trimester will be:

Boring Interesting

1 2 3 4 5 6 7

APPENDIX H: INTENTION ITEMS

Instructions. Answer the following questions by circling the number that best represents your answer. *Regular exercise behavior* = participating in 30 minutes of accumulated moderate exercise on most, if not all, days of the week. This exercise can be done at one time (e.g., 30 min of continuous walking or jogging) or accumulated in the day (e.g., walking 10 min in the morning, and 20 min in the evening).

I intend to exercise regularly in my 1st /2nd trimester:

Strongly Disagree

Strongly Agree

1 2 3 4 5 6 7

I intend to exercise at least 3 days per week in my 1st trimester:

Definitely Not

Definitely

1 2 3 4 5 6 7

I intend to exercise with the following regularity in my 1st trimester:

Not at All

Very Much

1 2 3 4 5 6 7

Date: September 11, 2009
From: Dolores W. Maney, IRB Administrator
To: Danielle S. Downs
Subject: Results of Review of Continuing Progress Report - Expedited (**IRB #29315**)

Approval Expiration Date: September 10, 2010

"Exercise Beliefs and Behaviors During Pregnancy and Postpartum"

The Continuing Progress Report for your project was reviewed and approved by this office on behalf of the Social Science University's Institutional Review Board (IRB). By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

Attached is/are the dated, IRB-approved informed consent(s) to be used when enrolling participants for this research. Participants must receive a **copy** of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.

If your study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the committee and the University, thank you for your efforts to conduct research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

DWM/dwm
Attachment

APPENDIX J: INFORMED CONSENT

KEEP THIS FORM FOR YOUR RECORDS

INFORMED CONSENT FORM FOR SOCIAL SCIENCE RESEARCH The Pennsylvania State University

Title of Project: Exercise Beliefs and Behaviors during Pregnancy and Postpartum (**IRB # 29315**)
Principal Investigator: Dr. Danielle Downs, Associate Professor of Kinesiology and Obstetrics and Gynecology, 266 Recreation Bldg, University Park, PA 16802, (814) 863-0456, dsd11@psu.edu

1. *Purpose of the study:* The purpose of this research study is to examine women's beliefs and behaviors about exercising during their pregnancy and/or postpartum. You are not being asked to exercise as a part of this study, so even if you do not exercise, your participation is still needed.
2. *Procedures to be followed:* You will be asked to complete questions about your exercise habits and beliefs related to your pregnancy and/or postpartum period. The questions will be sent to you in the mail during each trimester and postpartum. You will be asked to complete the questionnaires and return them in the stamped addressed envelope provided for you.
3. *Discomforts and risks:* There are no risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort. If you find that any of the questions posed during the research started feelings of distress beyond normal daily living, please call 1-800-273-8255 or the Centre County Women's Resource Center at 814-234-5050 or go to the Community Health Center (<http://www.communityhelpcentre.com>). If you are living around the Hershey, PA area, you can also call 1-800-243-1455 or visit Penn State Women's Health at <http://www.hmc.psu.edu/womens/>.
4. *Benefits:* The anticipated benefits of your participation include: (a) you might learn more about yourself and your physical activity and health by participating in this study, and (b) you might have a better understanding of your exercise and health behaviors during your pregnancy and/or postpartum.
5. *Duration:* It will take approximately 20 minutes to complete the study questions at each time point.
6. *Statement of confidentiality:* Your participation in this research is confidential. The information about you on the questionnaire will be stored separately from responses and code numbers will be used instead. Penn State's Office for Research Protections, the Social Science Institutional Review Board, and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of any publication or presentation resulting from this research, no personally identifiable information will be shared because your name is in no way linked to your responses.

7. *Right to ask questions:* Please contact Dr. Danielle Downs at 814-863-0456 with questions, complaints, or concerns about this research. You can also call this number if you feel this study has harmed you. Questions about your rights as a research participant may be directed to Penn State's Office for Research Protections at (814) 865-1775.
8. *Compensation:* there is no compensation for participating in this study.
9. *Voluntary participation:* Participation in this study is voluntary. You can withdraw at any time and decline to answer any questions that you do not want to answer. You can end your participation at any time by telling the persons in charge. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to consent to participate in this research study. Completion and return of the questionnaire implies that you have read the information in this form and consent to participate in this follow-up research study.

Please keep this form for your records or for future reference.

ORP OFFICE USE ONLY: DO NOT REMOVE OR MODIFY IRB#29315 Doc. #1 The Pennsylvania State University Institutional Review Board Office for Research Protections Approval Date: 09-11-2009 DWM Expiration Date: 09-10-2010 DWM
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APPENDIX K: STUDY RECRUITMENT FLYER

Dear Study Participant,

My name is Danielle Downs and I am a researcher in the Department of Kinesiology and the director of the Exercise Psychology Laboratory at Penn State University Park campus. I am interested in learning more about your **exercise and health behaviors during your pregnancy and postpartum**. With the help of the staff at **Centre Medical and Surgical Associates**, my research team is able to ask women like yourself (e.g., ages 18 and older) if you would be willing to take 10-15 minutes to complete questionnaires that will be mailed to you about your feelings toward exercising during your pregnancy/postpartum.

Even if you do/are not currently exercising – you are still eligible to participate in this study!

Unfortunately, there is not a lot of research available regarding pregnant/postpartum women's exercise thoughts and habits, so this study's aim is to better understand how women feel about exercise and related health issues during this time.

In addition, you may be eligible for upcoming additional studies that include walking on a treadmill and wearing activity monitors (small beeper-like device measuring your movement and worn on the waist band of your pants) or participating in exercise programs in pregnancy and postpartum. **You may receive financial compensation for your participation in these studies.** If you are interested, please check the box below. *Your answers are confidential and at no time will you be personally identified for participating in this study.*

Yes, I will participate in your survey study. I also understand that I may be eligible for additional studies depending on the time of the study enrollment and my pregnancy/postpartum status. I understand that I may receive compensation for these additional studies. Please contact me:

Name: _____ Phone: _____ Email: _____

Address: _____

No, I am not interested in participating in your studies because:

If you have any questions or would like information regarding exercise during pregnancy/postpartum please contact me at: (814) 865-0840. I wish you all the best during your pregnancy/postpartum and congratulations!



Dr. Danielle Symons Down, The Pennsylvania State University

IRB# 23915&24174