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Exercise is a safe and efficacious way to gain many physical and mental health benefits (Fell, Joseph, Armson, & Dodds, 2008). However, the majority of women stay sedentary during pregnancy (Evenson & Well, 2010). In order to promote exercise among pregnant women, Hausenblas, Symons Downs, and their colleagues conducted a series of studies to explore psychosocial determinants that impact middle-to-upper class women's physical activity during pregnancy (Hausenblas & Symons Downs, 2004; Hausenblas, Symons Downs, Giacobbi, & Cook, 2008; Symons Downs & Hausenblas, 2003, 2007). However, research indicates socio-economic status (SES) as a significant predictor of different physical activity levels during pregnancy (Domingues & Barros, 2007; Cheng et al., 2011). Thus low SES pregnant women may have different psychosocial determinants of exercise. This study is designed to replicate the previous study of Hausenblas and Symons Downs (2004) to examine low SES pregnant women's exercise intention and behavior.

Participants were 50 low-socioeconomic status women who were in their first trimester of pregnancy. They were recruited from a local social program which provides financial assistance for obstetric check-ups during pregnancy. All participants completed a questionnaire packet which was designed to measure psychosocial determinants of exercise (TPB) and physical activity. Demographic information was also collected.

Results from multiple regression analysis indicated that the TPB constructs; attitude, subjective norm, and perceived behavioral control, did not predict exercise intention. Discriminant analysis results revealed that exercise intention and perceived behavioral control significantly discriminated the exercise and non-exercise group. A follow-up (step-wise discriminant analysis) indicated that only perceived behavioral control, but not intention, significantly discriminated the two groups. The results only partially supported the previous study of Hausenblas and Symons Downs (2004), and suggest that different variables may have moderated the relationship between the TPB measure and exercise behavior.

EXAMINATION OF LOW SOCIO-ECONOMIC STATUS PREGNANT  
WOMEN'S FIRST TRIMESTER EXERCISE  
INTENTION AND BEHAVIOR

by

Hyondo Chung

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Committee Chair

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To my parents.  
Without their guidance, sacrifice, and infinite love,  
I would not have achieved any significant milestone in my life.  
To Jinsun.  
For her inspirational spirit and unwavering love.  
And, to Swan.  
For the bundle of joy she brought into my life.

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of  
The Graduate School at The University of North Carolina at Greensboro.

Committee Chair \_\_\_\_\_

Committee Members \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Date of Acceptance by Committee

\_\_\_\_\_  
Date of Final Oral Examination

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## CHAPTER I

### INTRODUCTION

Pregnancy is an event with many physiological and psychological changes for women (Symons Downs & Hausenblas, 2003). For example, pregnant women experience weight gain, increased cardiac output and thyroid volume, depression, and increased anxiety (Koniak-Griffin, 1994). Pregnancy also affects women's exercise behavior, and many women choose to discontinue or spend less time in regular exercise during this period (Bungum, Peaslee, Jackson, & Perez, 2000).

The health benefits of regular exercise are well established. According to the United States Department of Health and Human Services (USDHHS, 2000), physical activity participation on a regular basis makes a positive contribution to people's physical and mental health. Pregnant women who engage in regular exercise can also obtain positive health outcomes (Lokey, Tran, Wells, Myers, & Tran, 1991; Symons Downs & Hausenblas, 2003). Exercise during pregnancy is associated with improved physical fitness (Clapp, Rokey, Treadway, Carpenter, Artal, & Warrens, 1992; Marquez-Sterling, Perry, Kaplan, Halberstein, & Signorile, 2000), less excessive weight gain (Polley, Wing, & Sims, 2002), lower cardiovascular risk (Clapp, 2008), better placental and fetoplacental development (Jackson, Gott, Lye, Knox-Ritchie, & Clapp, 1995; Clapp, Kim, Burciu, & Lopez, 2000), decreased depression symptoms and increased self-esteem (Koniak-Griffin, 1994), and improved body image (Marquez-Sterling et al., 2000).

Exercise guidelines for pregnant women delineate the safety and effectiveness of regular physical activity, and encourage women to exercise regularly during pregnancy. The American Congress of Obstetricians and Gynecologists (ACOG, 2002) recommends pregnant women follow the exercise guidelines of the American College of Sport Medicine (ACSM, 2006), that is, 30 minutes or more of moderate to vigorous exercise a day on most days of the week. The USDHHS (2008) guidelines advise 150 minutes or more of moderate aerobic exercise per week for pregnant women who were not frequently engaging in physical activity before pregnancy. Women who were already highly active or had been exercising regularly before pregnancy may continue to do so with some adjustments made upon the recommendations of a health-care provider.

Despite the health benefits and guidelines for exercise, a large number of women stay sedentary during pregnancy. Approximately two-thirds of pregnant women stay sedentary (Zhang & Savitz, 1996) and only a small number meet the ACOG (2002) exercise guideline (Evenson, Savitz, & Huston, 2004; Evenson & Wen, 2010).

In order to promote exercise among pregnant women, Hausenblas, Symons Downs, and their colleagues conducted a series of studies to explore the factors that impact women's physical activity during pregnancy (Hausenblas & Symons Downs, 2004; Hausenblas, Symons Downs, Giacobbi, & Cook, 2008; Symons Downs & Hausenblas, 2003, 2007). All studies used the Theory of Planned Behavior ([TPB], Ajzen, 1991) to examine pregnant women's exercise behavior. The TPB is a social cognitive theory proposed by Ajzen (1991) to guide research on understanding and predicting human behavior. The TPB has been widely applied in sport and exercise psychology to explain exercise

behavior (Biddle & Nigg, 2000). The TPB postulates that a person's intention and perceived behavioral control of performing a behavior is the key determinants of their behavior, and intention is determined by three components: attitude, subjective norm, and perceived behavioral control. Attitude reflects personal evaluation toward a certain behavior. For example, pregnant women may not exercise because they believe it may hurt the fetus. Subjective norm is the perceived social pressure to perform or not to perform a behavior. For example, a woman may exercise because she perceives that her spouse wishes her to control excessive weight gain during pregnancy. Perceived behavioral control is a person's perceived capability of performing the behavior. Perceived behavioral control may affect behavior directly by itself or indirectly via its influence on intention. For example, pregnant women's perceived capability of exercise will influence their exercise intention and behavior. Generally, research in the exercise domain indicates that intention and perceived behavioral control significantly predict exercise behavior, and attitude is the most powerful determinant of intention followed by perceived behavioral control, and subjective norm (Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, Mack, 1997).

Past research using the TPB framework found pregnant women's exercise intention and perceived behavioral control predicts exercise behavior, and that the influence of attitude, subjective norm, and perceived behavioral control on exercise intention varies across the first, second, and third trimester of pregnancy (Hausenblas & Symons Downs, 2004; Symons Downs & Hausenblas, 2003, 2007). Particularly, during the first trimester of pregnancy, perceived behavioral control was the strongest predictor

of exercise behavior, and attitude and subjective norm predicted exercise intention better than perceived behavioral control. During the second trimester, only intention predicted exercise behavior, and attitude was the strongest predictor of exercise intention. Lastly, during the third trimester, intention predicted exercise behavior and subjective norm predicted exercise intention. However, the majority of participants represented the middle-to-upper class population (family income between \$40,000 and \$100,000); thus, to date, pregnant women's exercise behavior and intention in low socio-economic status (SES) is unknown and requires further research. The purpose of this study is to replicate the previous study of Hausenblas and Symons Downs (2004) with low SES pregnant women to examine their exercise behavior and intention during the first trimester within the framework of the TPB.

### **Research Questions**

Research questions are related to the TPB as applied to exercise behavior of pregnant women. According to the TPB model, attitude, subjective norm, and perceived behavioral control predict exercise intention. Also, exercise intention and perceived behavioral control both predict exercise behavior. So, research questions are: 1) do pregnant women's first trimester exercise attitude, subjective norm, and perceived behavioral control predict their exercise intention; and 2) do pregnant women's first trimester exercise intention and perceived behavioral control predict their exercise behavior. It is hypothesized that, based on past literature; 1) attitude, subjective norm, and perceived behavioral control predict women's exercise intention during the first trimester of pregnancy with attitude and subjective norm as the strongest predictors, and 2)

exercise intention and perceived behavioral control predict women's first trimester exercise behavior with perceived behavioral control as the strongest predictor.

## CHAPTER II

### REVIEW OF LITERATURE

In this chapter, research on exercise during pregnancy is reviewed. This literature review begins with a review of both physiological and psychological benefits of exercise during pregnancy, followed by current guidelines of exercise for pregnant women, and literature about exercise prevalence among pregnant women. The review continues with describing the Theory of Planned Behavior ([TPB], Ajzen, 1991) as a theoretical model of predicting exercise behavior. Then, recent research using the TPB to examine pregnant women's exercise behavior is reviewed, followed by the limitation of the study.

#### **Physiological Benefits of Exercise during Pregnancy**

The majority of empirical studies indicate that exercise during pregnancy has a positive physiological influence on the pregnant mother, the fetus, and ultimately the newborn child (Clapp et al., 1992). Pregnant women's aerobic fitness was significantly improved as a function of participation in regular exercise program (Marquez-Sterling et al., 2000). A total of 15 sedentary primigravidae, which is defined as a woman who is pregnant for the first time, were randomly assigned to an exercise group (n=9) and a control group (n=6). The exercise group trained with a target heart rate 150-160 beats/min, three times a week for fifteen weeks. The exercise program included rowing, cycling, walk-jogging, rhythmic calisthenics, and brisk walk sessions. Fitness was

measured pre and post using a graded exercise test on a treadmill, which led to 150 beats/min. The results from the study suggested that vigorous-intensity exercise significantly improved women's aerobic fitness during pregnancy without any negative health effects occurring to the mother or the fetus.

Research suggests that exercise helps to control women's excessive weight gain during pregnancy (Polley et al., 2002). A total of 120 normal-weight pregnant women, who were in less than 20 weeks of gestation, were randomly assigned to either a behavioral intervention or a control group. The behavioral intervention was designed for promoting appropriate weight gain during pregnancy and postpartum by healthy eating and exercise. Researchers followed participants' weight gain through pregnancy to postpartum, and found that the intervention significantly reduced the number of participants with an excessive weight gain.

Research also suggests that exercise during pregnancy is positively related to pregnant women's long-term exercise adherence and fitness. In a longitudinal study, Clapp (2008) followed up a cohort of women's (n=39) exercise patterns, fitness indicators (BMI, flexibility, & VO2 Max) cardiovascular risk factors (blood pressure, cholesterol level) and exercise patterns after 18-20 years after their pregnancy. At baseline, the majority of participants (> 75%) followed the ACSM exercise recommendation, and all participants voluntarily choose whether or not to exercise during pregnancy. As a result, women who exercised during pregnancy were more likely to engage in regular exercise at a higher intensity, and significantly better in most of fitness and cardiovascular health parameters.



Yeo (2009) conducted a randomized controlled trial to see the effect of stretching and walking exercise during pregnancy on preventing preeclampsia risk factors. With 124 pregnant women who had oxygen consumption level below 50<sup>th</sup> percentile in their age group and sedentary lifestyle of expending less than 840 kcal/week on leisure time physical activity measured by the Minnesota Leisure Time Physical Activity Questionnaire (Pereira et al., 1997). All subjects participated in either stretching with no elements of aerobic and muscular resistance or moderate-intensity walking program. Preeclampsia risk factors (HR, BP, & weight gain) were measured weekly. Both exercise programs were found beneficial in alleviating the risk of preeclampsia. However, women showed better adherence to stretching than the walking exercise program, as pregnancy advanced.

Exercise also has a positive effect on the growth of an unborn child. Jackson et al. (1995) examined the effect of aerobic exercise during pregnancy on the placental development by examining the placentae obtained from 60 women after the delivery. Pregnant women who exercised at least 30 minutes, three or more times a week at moderate to high intensity, throughout or in the early stage of the index pregnancy were defined as the exercise group. The control group did not exercise regularly at moderate to high intensity, but maintained an active lifestyle such as working, gardening, camping, etc., throughout the pregnancy. Compared to the group of 20 women in the control group, the 40 women who engaged in regular exercise either in the early pregnancy (before 20 weeks) or throughout the pregnancy had healthier and well developed placentae. Similarly, weight-bearing exercise during pregnancy significantly improved the birth

outcome (Clapp et al., 2000). Women (n=46) who were at 8 weeks of pregnancy and did not engage in regular exercise were randomly assigned into no exercise control group and weight-bearing exercise experimental group. The experimental group exercised for 20 minutes 3-5 times a week at a moderate intensity of 55-60% of their maximum aerobic capacity. The exercise program included treadmill runs, step aerobics, and stair stepper exercises, and lasted throughout the pregnancy. As compared to the control group, the weight-bearing exercise intervention group had significantly healthier (i.e., heavier and longer) offspring and more finely developed fetoplacentae.

### **Psychological Benefits of Exercise during Pregnancy**

The majority of empirical studies also indicate that exercise during pregnancy is associated with many psychological benefits (Symons Downs & Hausenblas, 2003). In Koniak-Griffin's quasi-experimental study (1994), 35 of 58 pregnant adolescents voluntarily completed the aerobic exercise program (AEP) intervention, and the rest were a non-exercise control group. A single session of AEP consisted of 10 minutes of warm up, 30 minutes low intensity (< 140 bpm) walking and marching, 15 minutes of calisthenics, and 10 minutes of cool down. Participants in the AEP group exercised twice a week for six weeks. Participants who regularly engaged in the AEP showed a significant decrease in depressive symptoms as measured by The Center for Epidemiological Studies Depression Scale (CES-D). In addition, the AEP group participants' self-esteem measured by Coopersmith's Self-Esteem Inventory (SEI) also significantly increased over time. In Marquez-Sterling et al.'s (2000) study of body image, 20 pregnant women were randomly assigned either to an exercise intervention or

control group, and participated in the 15-week study during the second trimester of pregnancy. The exercise intervention group showed a significant improvement in the Body Cathexis Score (Secord & Secord, 1953), which represents participant's attitude toward the physical self and the perception of body image.

More recently, Guskowska (2011) conducted a study examining the relationship between regular exercise program participation during pregnancy and perceived level of labor anxiety. In the study, pregnant women in the exercise group (n=135) participated in a 60-minute, low-intensity yoga, pilates, and ball exercise program at least twice a week, while the sedentary non-exercising group (n=64) did not attend any exercise classes or exercised at home. All participants were in the second or third trimester of their first pregnancy and did not have any medical complications to exercise. After 12 weeks, participants were asked to visualize their labor and respond to the State-Trait Anxiety Inventory ([STAI], Spielberger, 1966) and Profile of Mood States ([POMS], McNair, Lorr, & Droppleman, 1971) to assess the perceived anxiety and emotional state of an actual labor. As compared to the sedentary group, pregnant women who engaged in a regular exercise program had significantly better emotional state and lower levels of anxiety as they visualized their own labor.

### **Guidelines for Exercise during Pregnancy**

Government institutions and research associations have been interested in exercise promotion among pregnant women. Specific guidelines have been presented to promote pregnant women's exercise behavior and health benefits.

The American Congress of Obstetricians and Gynecologists (ACOG, 2002) and the American College of Sports Medicine (ACSM, 2006) recommend 30 minutes or more of moderate to vigorous exercise a day on most of the week during pregnancy. More recently, the USDHHS (2008) released exercise guidelines for pregnant women. According to the guidelines, at least 150 minutes of moderate-intensity aerobic activity per week is advised for those who have not been engaged in regular exercise before pregnancy. Further, under a health-care provider's recommendations and adjustments, healthy women who have been engaged in regular exercise may continue to do so throughout the pregnancy and postpartum.

In addition to the health benefits and guidelines of exercise for pregnant women, recent empirical studies also provide sufficient evidence supporting the safety of exercising during pregnancy. After conducting a meta-analysis of 18 pregnancy exercise intervention studies, Lokey et al. (1991) concluded that a variety of exercise interventions following the ACOG (2002) recommendation were safe for the mother and the fetus. Engaging in regular exercise for 43 minutes three times a week at a moderate intensity did not show any adverse effect on gestation length, maternal weight gain, length of labor, infant birth weight, or Appearance, Pulse, Grimace, Activity, and Respiration ([APGAR], Apgar, 1953; Finster & Wood, 2005) scores which were examined immediately after birth.

Sternfeld, Quesenberry, Eskenazi, and Newman (1995) also found that exercise is a safe means to gain the health benefits during pregnancy. In their cross-sectional survey study, the researchers followed pregnant women (n=388) from an average of 16.5 weeks of gestation to delivery to examine the effect of exercise on birth outcomes. The large

survey data indicated that participation in moderate to vigorous regular aerobic exercise during pregnancy was not associated with any adverse effect on birth weight or other maternal and infant outcomes.

Recently, O'Connor, Poudevigne, Cress, Motl, and Clappstrength (2011) found that strength training is safe and efficacious for pregnant women. A total number of 32 pregnant women participated in a supervised low-to-moderate intensity resistance training, twice a week for 12 weeks. They reported that no negative physical or physiological changes (i.e., injuries, adverse symptoms, blood pressures) occurred as a result of the exercise intervention, while still gaining the positive effects of strength training.

### **Prevalence of Exercise among Pregnant Women**

Despite the health benefits and safety of exercise during pregnancy, many pregnant women still remain sedentary. Zhang and Savitz (1996) first examined the prevalence of exercise during pregnancy in the United States. Women who had a successful delivery and participated in the National Maternal and Infant Health Survey in 1988 were randomly recruited from 48 states, the District of Columbia, and New York City, and completed a cross-sectional survey. The result from the survey showed that 58% of women are sedentary during pregnancy.

Women seem to be less active during pregnancy. Fell, Joseph, Armson, and Dodds (2008) recruited 1,737 Canadian pregnant women and compared the physical activity level during pregnancy to the year before pregnancy. Physical activity level was assessed by the Kaiser Physical Activity Survey (Sternfeld, Ainsworth, & Quesenberry,

1999). The results indicated that all physical activity items (i.e., household and family care, active living, sports and exercise) from the survey significantly decreased during pregnancy, with sports and exercise decreasing the most.

Results from recent research also found that only a small proportion of pregnant women engage in exercise which meets the current ACOG (2002) guideline (Evenson et al., 2004; Evenson & Wen, 2010). In the earlier study among 1,979 participants who were representative of the US population of pregnant women, only 15.8% met recommended leisure-time activity. Similarly, in the later study, which analyzed the data from the 1999-2006 National Health and Nutrition Examination Survey (n=1280), approximately 20% of pregnant women met the current ACOG (2002) physical activity guideline.

#### *Socio-demographic Features and Exercise during Pregnancy*

Socio-demographic factors such as education, income, and ethnicity, play a significant role in physical activity level during pregnancy. A positive relationship between the level of education and exercise during pregnancy was consistent across different populations from South America (Domingues & Barros, 2007), North America (Hinton & Olson, 2001), and Europe (Owe, Nystad, & Bo, 2009). Women with higher education and level tend to engage in regular exercise more frequently as compared to those with lower education level. Ethnicity also plays a significant role in exercise during pregnancy. Research shows that whites exercise more than the non-white population (Evenson, Savitz, & Huston, 2004) while Asians seem to be the most sedentary ethnic group during pregnancy (Zhang & Savitz, 1996).

Higher income or socioeconomic status (SES) is a strong predictor of regular exercise in the general population, and this relationship is also significant among pregnant women. In their study of 386 normotensive pregnant women, Ning, Williams, Dempsey, Sorensen, and Fredrick (2003) found that income was positively related to exercise during pregnancy. Domingues and Barros (2007) interviewed 4,471 mothers in southern Brazil, and reported that physical activity during pregnancy is strongly associated with total family income. More recently, a consistent relationship between income or SES and exercise during pregnancy was also reported in a cross-sectional study of 762 pregnant women in Taiwan (Cheng et al., 2011)

### **Pregnant Women's Exercise Behavior and Intention**

Considering the health benefits and safety of exercise and prevalence of inactivity during pregnancy, designing an effective intervention that can increase the activity level and its adherence is necessary. As the first step, exploring psychosocial determinants of pregnant women's exercise behavior is a promising approach to designing effective research interventions (Hausenblas & Symons Downs, 2004). For example, finding barriers or facilitators of exercise during pregnancy may help future intervention studies to bring higher physical activity level and adherence. Hausenblas, Symons Downs, and their colleagues have conducted a series of studies using the Theory of Planned Behavior (TPB) as a theoretical framework to explore the psychosocial determinants of exercise behavior during pregnancy.

### *The Theory of Planned Behavior*

The TPB is social cognitive theory proposed by Ajzen (1991) that provides a conceptual framework for predicting human behavior. According to the theory, an individual's intention to perform a behavior and perceived behavioral control are the key predictors of his or her actual behavior. Intention reflects the motivational factors of conducting a certain behavior; and it indicates a person's degree of willingness to perform a behavior. However, an individual's motivation may not be the only appropriate predictor of a behavior. For example, a group of people may have the same motivation to maintain a healthy diet, but may end up with different diets because each person has different opportunities and resources (e.g. money, availability, time). In other words, people may have different control factors for performing a behavior, and those control factors are represented by *perceived behavioral control* in the TPB framework. Perceived behavioral control explains an individual's perceived obstacles or confidence of performing a behavior derived from both past experience and future anticipation.

According to the TPB, a person's motivational factor (*intention*) is predicted by three independent psychosocial determinants; *attitude*, *subjective norm*, and *perceived behavioral control*. *Attitude* represents an individual's beliefs about a specific behavior. For example, people may have different beliefs or evaluations (e.g., favorable-unfavorable, beneficial-harmful, and happy-unhappy) toward a behavior, and in the TPB, *attitude* explains these beliefs and evaluations. *Subjective norm* explains the normative factors of a person's behavior. An individual's perception about what significant others (e.g., family members, friends) think about performing a certain behavior is explained



through this construct. *Perceived behavioral control* also influences people's intention towards the behavior. As mentioned earlier, *perceived behavioral control* reflects an individual's perceived capability of performing a behavior, and predicts both intention and behavior directly, according to the TPB framework.

#### *TPB Research on Predicting Exercise Intention and Behavior*

The TPB has been applied in many areas of research and shown to predict human behavior. The TPB has provided an excellent theoretical framework for predicting exercise behavior in research studies with many different populations (Biddle & Nigg, 2000). Blanchard (2008) used the TPB in his study of 76 Canadian cardiac- rehabilitation participants to examine their exercise behavior during a 6-month home-based rehabilitation program, and reported the potential effectiveness of the TPB. In their study of 112 overweight women in the southern region of the US, Gardner and Hausenblas (2004) applied the TPB to examine overweight women's exercise and diet program participation. In their study, the TPB successfully predicted overweight women's 4-week exercise and diet behavior, indicating that the TPB may be an effective framework to design a weight control intervention.

Symons Downs (2006) examined the predictive utility of the TPB with 63 low-income and ethnically diverse postpartum women's exercise intention. The study found that participants' *attitude* and *subjective norm* predicted 66% of the variance in their exercise *intention*, and ethnicity did not moderate the TPB constructs in explaining women's exercise intention during the postpartum period. The results suggested that the TPB effectively predicts exercise behavior of ethnically diverse postpartum women.

More recently, Karvinen et al. (2009) used the TPB to examine 397 Canadian cancer survivors' determinants of exercise. They found that some medical, social, and demographical variables may moderate bladder cancer survivors' exercise behavior and intention, but these relationships were clearly mediated by the TPB constructs, indicating that the TPB is potentially useful theoretical model for designing exercise project in the bladder cancer survivor population. The TPB model successfully predicted exercise intention and behavior among the cancer survivors, suggesting that the TPB may be a good theoretical framework to design an effective intervention.

Symons Downs and Hausenblas (2005) conducted a meta-analysis of 111 exercise studies which used the TPB as a theoretical framework, and found that the TPB is an effective theoretical framework to examine and understand exercise behavior. According to the review, a strong association was found between attitude and intention, and also between perceived behavioral control, intention, and exercise behavior. The review also found intention as a predictor of exercise behavior, and attitude and perceived behavioral control as predictors of intention.

#### *Relationship between TPB Constructs and Pregnancy*

Research indicates that the three constructs of TPB which predict *intention* are closely related to the characteristics of exercising during pregnancy. First, exercise during pregnancy is determined by several belief factors (*attitude*). For example, the safety issue is an important belief factor for exercising during pregnancy. In a study of 57 British pregnant women (Clarke & Gross, 2004), one third of the participants chose the risk of health to an unborn baby as a primary reason for not being active during pregnancy. Also,

Duncombe Wertheim, Skouteris, Paxton, & Kelly (2007) conducted a survey study examining pregnant women's belief about the safety of exercise during pregnancy. A majority of pregnant women had safety concerns about their own and baby's health, regardless of the intensity and frequency of exercise. Second, *subjective norm* seems to be a prominent determinant of women's exercise participation during pregnancy. Although findings are not uniform, research suggests that many different significant others may have a significant influence on pregnant women's exercise behavior.

Symons Downs and Hausenblas (2004) conducted a survey study to examine exercise beliefs during pregnancy and postpartum. With 74 participants who answered a questionnaire designed to assess their behavioral, normative, and control beliefs about exercise during pregnancy. They picked their husbands or fiancés (36.5%), children (17.6%), other family members (14.9%), friends (12.2%), health care professionals (2.7%), and gym instructors (2.7%) as significant others who have the most influence on exercising during pregnancy. In their study of 57 pregnant women, Clarke and Gross (2004) used a structured interview and the Fetal Health Locus of Control Scale (Labs & Wurtele 1986) to assess women's physical activity participation and the most influential person regarding exercising during pregnancy. The result indicates that the majority of women are influenced by their friends and family members in choosing to exercise during pregnancy. Krans et al. (2005) conducted a survey study among 211 pregnant women to find pregnancy exercise beliefs and influences. Most of the participants (41%) replied that their physicians had the most influence on their maternal exercise behavior and belief. In their study of a large number of Norwegian pregnant women (n=34,508),

Owe, Nystad, and Bo (2009) found that women who had pregnancy-related health issues were more likely to be sedentary during pregnancy. Not surprisingly, women who self-reported their general health as good or excellent were more likely to participate in regular physical activity than those who reported their health as fair or poor (Evenson, Savitz, & Huston, 2004). Third, research suggests that control factors (*perceived behavioral control*) may influence pregnant women's exercise intention. In their narrative review, Schoenfeld and Tiriyaqi-Sonmez (2011) found that a number of studies indicate health related issues, maternal time constraint, and child care may affect women's perceived behavioral control on exercising during pregnancy.

#### *TPB Research on Exercise during Pregnancy*

Hausenblas and Symons Downs (2004) examined pregnant women's exercise behavior and intention during the first trimester of pregnancy. A total of 104 participants who were in the first trimester of pregnancy completed a questionnaire that assessed their exercise behavior and intention within the TPB constructs. A substantial number (58.7%) of the participants had a relatively medium-to-high annual income of \$40,000 to \$100,000, and were Caucasian (87.5%). Exercise behavior was assessed by the Leisure-Time Exercise Questionnaire ([LTEQ], Godin & Shephard, 1985). Hierarchical regression analysis (HRA) showed that, while both being a significant predictor, perceived behavioral was a stronger predictor of exercise behavior, as compared to intention. And, attitude and subjective norm significantly predicted exercise intention during the first trimester of pregnancy.

Symons Downs and Hausenblas (2003) also used the TPB to explore pregnant women's exercise behavior and intention during the second trimester of pregnancy. The majority of the 89 participants was Caucasian (89%) and had an annual family income between \$40,000 and \$100,000. According to the HRA, only exercise intention significantly predicted exercise behavior, and attitude was the strongest predictor of exercise intention during the second trimester of pregnancy.

Symons Downs and Hausenblas (2007) examined pregnant women's exercise behavior and intention during the third trimester by using similar methods to previous studies. Among 62 participants, 91.9% were Caucasian and 75.8% had an annual family income between \$40,000 and \$100,000. Statistical analyses indicated that intention predicted exercise behavior and subjective norm predicted exercise intention of pregnant women during the third trimester.

Despite the contributions made so far, there is still some room for furthering our knowledge about pregnant women's exercise behavior and intention. We know about exercise behavior and intention among pregnant women from middle-to-upper classes. However, we do not know about low SES pregnant women's psychosocial determinants of exercise based on the TPB constructs.

## **Summary**

Exercise during pregnancy is a safe activity that results in both physiological and psychological benefits. However, a substantial number of pregnant women remain sedentary (Fell et al., 2008; Zhang & Savitz, 1996) and only a small number of them meet the current exercise guidelines (Evenson et al., 2004; Evenson & Wen, 2010).

Recently, researchers applied the TPB to explore pregnant women's exercise behavior and intention. They have provided a better understanding of pregnant women's exercise behavior and a conceptual framework to design further interventions and research during pregnancy (Hausenblas & Symons Downs, 2004). However, the majority of the participants represent the middle-to-upper class population, and the researchers failed to look at low SES pregnant women's exercise behavior and intention. Thus, the purpose of this study is to examine the exercise behaviors of low SES pregnant women within the TPB framework.

## CHAPTER III

### METHODS

The purpose of this study was to examine factors related to pregnant women's exercise behavior with the TPB. Survey methods were used with low SES women who are in the first trimester of pregnancy to address the purpose and research questions of this study.

#### **Participants**

Participants were women in their first trimester of pregnancy, recruited from a community health program, *Adopt-A-Mom*, in Guilford County, North Carolina. The program provides prenatal care to pregnant women who have low family income, do not have a health insurance, and are not eligible for Medicaid. The program mainly focuses on infant mortality prevention, which is defined as the death of a child born alive before their first birthday. The Adopt-A-Mom program has an annual enrollment of 300 pregnant women who usually visit the Guilford County social services office and meet the program director during their first trimester of pregnancy. Based on the  $R^2$  value of previous research of Hausenblas and Symons Downs (2004), sample size of 40 was needed to obtain a power of .81 with moderate effect size of .26 for predicting exercise behavior with all constructs of the TPB. However, the Adopt-A-Mom program director only allowed to access 50 participants for the study, and the sample showed relatively low

effect size of .10. Achieved power was .41, and it would have been .83 if 120 participants were recruited.

## **Measures**

Several different measures were included in the survey: a demographic questionnaire and several items that have been used in previous studies with pregnant women to examine the TPB constructs. An item was added in the demographic questionnaire to assess physical activity level. Further information regarding this physical activity item is provided in later part of this section.

According to the Adopt-A-Mom program director, approximately 90% of the program participants indicated their primary language as either English or Spanish. Thus, all questionnaires were provided both in English and Spanish. Initial translation of the questionnaires were conducted by Fluent Language Solutions Inc., a professional translation service company located in Charlotte, NC. The Adopt-A-Mom program coordinator who is Spanish-English bilingual did a back translation to check the accuracy of the initial translation. Copies of all measures including both English and Spanish versions are provided in the Appendix.

### *Demographic questionnaire*

The demographic questionnaire assessed age, education, employment, marital status, number of children, and ethnicity. Family income was not asked because all prospective participants were expected to meet the Adopt-A-Mom program eligibility criteria. According to the Adopt-A-Mom and North Carolina Medicaid eligibility, all participants would have an annual family income less than \$40,000



### *Physical Activity Measure*

The researcher originally planned to use the LTEQ (Godin & Shephard 1985) which was used in the previous study of Hausenblas and Symons Downs (2004) to assess physical activity level among low SES pregnant women. However, the measure was accidentally omitted from the questionnaire. No data was available to assess physical activity as a continuous variable. Thus, the researcher chose to use a leisure-time physical activity item that was included in the demographic questionnaire to assess physical activity as a categorical variable. This question, which was used in Centers for Disease Control and Prevention's (CDC) Morbidity and Mortality Weekly Report (MMWR, 2011) was added in the demographic questionnaire to assess the prevalence of leisure-time physical activity among the participants; "During the past month, other than your regular job, did you participate in any physical activities or exercise such as running, calisthenics, golf, gardening, or walking for exercise?"

### *The TPB Constructs: Intention, Attitude, Subjective Norm, and Perceived Behavioral Control*

The TPB constructs (i.e., intention, attitude, subjective norm, and perceived behavioral control) predicting pregnant women's exercise behavior were assessed with the TPB global items which was used by Hausenblas and Symons Downs (2004). Pregnant women's intention to exercise during the first trimester was measured by the statements: 'It is my intention to exercise during my first trimester of pregnancy', 'I intend to exercise with the following regularity during my first semester' or 'I intend to exercise at least three times per week during my first semester' with a seven-point scale

anchored from 1 (strongly disagree) to 7 (strongly agree). Hausenblas and Symons Downs (2004) did not report the internal consistency reliability of this scale. However, result from reliability analysis indicated that items assessing exercise intention was sufficient for the present study. Cronbach alpha value for these items is reported in the result section.

Pregnant women's attitude toward exercise during the first trimester was assessed by the item: ' Exercising during my first trimester of pregnancy is/will be...'. This item is followed by a set of bipolar adjectives representing positive and negative attitude toward exercise behavior: useless-useful, harmful-beneficial, bad-good, foolish-wise, unenjoyable-enjoyable, boring (or uninteresting)-interesting, and unpleasant-pleasant. Each item is rated on a 7-point scale and the sum of the scores from each item was used for statistical analyses. In the previous study (Hausenblas & Symons Downs 2004), the Cronbach alpha was 0.92 for this item.

Women's subjective norm of exercise during the first trimester of pregnancy was assessed by adding up the scores from the following two questions each with a seven-point scale. The questions were: 'Most people who are important to me think that I should (or want me to) exercise regularly during my first trimester of pregnancy' (strongly disagree-strongly agree), and 'Most people who are important to me approve of me exercising regularly during my first trimester' (strongly disagree-strongly agree). The cronbach alpha was 0.70 for this scale in the previous study (Hausenblas & Symons Downs 2004).

Perceived exercise behavior control was measured by three items with each on a seven-point scale: ‘How much control do you have over exercising during your first trimester of pregnancy?’ (very little control-complete control), ‘For me to exercise during my first trimester of pregnancy is/will be...’ (extremely difficult-extremely easy), and ‘If I want to, I can easily exercise during my first trimester of pregnancy’ (strongly agree-strongly disagree). The scores from each item will be added up for statistical analyses. Hausenblas and Symons Downs (2004) reported an internal consistency reliability of 0.90 for this scale.

## **Procedures**

Prospective participants, on their first visit to the Adopt-A-Mom program office, were asked whether or not they were willing to participate in the study examining their exercise behaviors during the first trimester of pregnancy. Once they agreed to take part in the research, they were given a study packet which consisted of a detailed cover letter, an informed consent form, and research questionnaires (i.e. CDC’s leisure-time physical activity item, TPB items, and demographic questionnaire). The packet was included in the Adopt-A-Mom application and participants were asked to return the packet with the application. Those participants who decided to participate in the study and completed the questionnaire were given a complementary gift certificate of \$5. All participants completed the questionnaire in a private room at the Adopt-A-Mom office, and the researcher provided the gift certificate in person.

## **Statistical Analysis**

Two separate statistical analyses were conducted to test the TPB variables within the study hypotheses. In the first statistical analysis, multiple regression was used. Pregnant women's first trimester exercise intention was regressed on the three constructs of the TPB predicting the intention; attitude, subjective norm, and perceived behavioral control. In the second analysis, discriminant analysis was used to determine if the two constructs of the TPB construct predicting the behavior; intention and perceived behavioral control, could discriminate between the exercise and no-exercise groups.

## CHAPTER IV

### RESULTS

The purpose of this study was to examine psychosocial determinants of exercise among low-socioeconomic status pregnant women during their first trimester of pregnancy by replicating the previous study of Hausenblas and Symons Downs (2004). Multiple regression and discriminant analyses were used to find the relationship between the TPB constructs and exercise behavior. TPB Global Items from the previous study and CDC leisure time physical activity item were the primary measures used to address the research questions.

#### **Descriptive Information on the Sample**

A total of 56 women in the first trimester of pregnancy participated in the study. However, 6 questionnaire packets had missing data and were excluded for analyses. Thus data from 50 participants were included in the analyses. Most of the pregnant women participated in the study through the Adpot-A-Mom program were Hispanic (86%), married (82%), part-time employed (32%) or unemployed (52%), had one (32%), two (30%), three or more children (8%), and had a high school or associate degree (84%). The average age of the participants was 29.06 (SD=5.40) years old. Descriptive statistics for the sample are provided in Table 1.

**Table 1. Demographic characteristics of sample.**

Characteristic	N	%
<i>Age</i>		
≥35 years	10	20
25-34 years	25	50
≤25 years	15	30
<i>Ethnicity</i>		
White/Caucasian	2	4
African-American	2	4
Asian-Pacific Islander	3	6
Hispanic/Latino	43	86
<i>Marital Status</i>		
Married	41	82
Single	4	8
Living with partner	5	10
<i>Employment</i>		
Full-time	8	16
Part-time	16	32
Unemployed	26	52
<i>Number of children</i>		
0	15	30
1	16	32
2	15	30
3	3	6
5	1	2
<i>Education</i>		
Less than high school	3	6
High school	17	34
Associate degree	25	50
Bachelor's degree	2	4
Graduate/Professional	3	6

### **Descriptive Analysis of the TPB and Physical Activity Measure**

The TPB constructs and physical activity were the primary variables that address the research questions of this study. The TPB constructs were measured by the TPB Global Items used in the previous study of Hausenblas and Symons Downs (2004).

Reliability analysis was conducted and revealed that the measures were reliable for each

TPB construct; intention ( $\alpha=.800$ ), attitude ( $\alpha=.896$ ), subjective norm ( $\alpha=.910$ ), and perceived behavioral control ( $\alpha=.858$ ). All items for each TPB constructs contributed to the total reliability and had positive item-total correlations. Hence, all items were used to calculate the mean score of each TPB constructs and conduct statistical analyses.

An item from Centers for Disease Control and Prevention's Morbidity and Mortality Weekly Report (2011) was used to assess physical activity. Participants responded Yes or No to this question. Therefore, physical activity outcome was used as a categorical variable. The 50 participants were divided fairly equal regarding their leisure time physical activity; 24 participants answered 'Yes' to the item while the other 26 answered 'No'.

### **The TPB Model and Exercise Behavior**

Predicting pregnant women's first trimester exercise intention and behavior within the TPB constructs was the main purpose of this study. According to the TPB model, attitude, subjective norm and perceived behavioral control predict exercise intention, and intention and perceived behavioral control predict exercise behavior. Results from preliminary correlation analysis showed that only subjective norm, but not attitude and perceived behavioral control, was significantly correlated to exercise intention. Only perceived behavioral control, but not exercise intention, was significantly correlated to exercise behavior. Correlations between exercise behavior and the TPB constructs are presented in Table 2.

**Table 2. Correlations, means, and standard deviations of the TPB constructs.**

Variable	2	3	4	5	M	SD
1 Exercise	-.169	-.163	.037	-.430*	-	-
2 Intention		.087	.282*	-.013	4.42	1.42
3 Attitude			.077	.167	4.92	1.28
4 Sub. Norm				-.188	4.28	1.46
5 PBC					3.89	1.82

\*Significant at the .05 level

### *Prediction of Exercise Intention*

To address the first research question, a multiple regression analysis was used with exercise intention regressed on attitude, subjective norm and perceived behavioral control. According to the theoretical structure of the TPB (Ajzen, 1991), the three constructs that predict intention were divided into two blocks for multiple regression analyses. In the first block, exercise intention was regressed on attitude and subjective norm, and perceived behavioral control was added in the second block. The analyses indicated that attitude and subjective norm (*block1*) explained 9.1% of the variance of intention. Although the beta weight of subjective norm was significant at  $p < .05$ , the multiple regression was not significant,  $F(2,47) = 2.366, p = .105$ . The regression was also not significant,  $F(3,46) = 1.616, p = .199$ , when perceived behavioral control was added on *block2*. Perceived behavioral control explained only additional 0.4% of the variance of exercise intention. Results from the multiple regression analyses are presented in Table 3.



**Table 3. Multiple regression analysis results for prediction of exercise intention.**

Variable	$F_{change}$	$\beta$	$P$
<i>Block 1</i>			.105
Attitude		-.110	.433
Sub. Norm		.290	.043
<i>Block 2</i>	.198		.199
Attitude		-.122	.400
Sub. Norm		.303	.040
PBC		.065	.659

*Block 1:  $R^2 = .091$ ,  $R = .302$ ,  $F = 2.366$  / *Block 2:  $R^2 = .095$ ,  $R = .309$ ,  $F = 1.616$**

Thus, both preliminary correlation and multiple regression analysis failed to support the TPB model for predicting exercise intention. Among three predictors; attitude, subjective norm, and perceived behavioral control, only subjective norm was significantly correlated to exercise intention. However, results from multiple regression analysis indicated that the TPB model did not work in predicting exercise intention with the study sample.

*Prediction of Exercise Behavior*

To address the second research question, discriminant analysis was conducted to determine the relationship between the TPB constructs and exercise behavior. Results from the analysis indicated that exercise intention and perceived behavioral control, together, significantly, Wilks' Lambda = .784,  $\chi^2=11.422$ ,  $p=.003$ , discriminated between the two groups (exercise and non-exercise), explaining 46.4% of the variance of the behavior. Results from the discriminant analyses are presented in Table 4.

**Table 4. Discriminant analyses results for predicting exercise behavior.**

Variable	Wilks' Lambda	$\chi^2$	Canonical correlation	<i>p</i>	Discriminant Func. Coefficient
<i>Disc. Func.</i>	.784	11.422	.464	.003*	
Intention					.419
PBC					.949

\*Significant at the .05 level

A step-wise discriminant analysis was also conducted and only perceived behavioral was entered, and had a significant, Wilks' Lambda = .815,  $\chi^2 = 9.731$ ,  $p = .002$ , canonical correlation to exercise behavior. Exercise intention did not significantly contribute to the variance of exercise behavior. As the result shows, perceived behavioral control was the stronger contributor to the discriminant function. Thus, the TPB model predictions of exercise behavior were partially supported, as perceived behavioral control predicted exercise behavior. However, exercise intention did not discriminate between exercise and non-exercise groups.

## CHAPTER V

### DISCUSSION

The primary research questions examined in this study are 1) Do pregnant women's first trimester exercise attitude, subjective norm, and perceived behavioral control predict their exercise intention; and 2) do pregnant women's first trimester exercise intention and perceived behavioral control predict their exercise behavior. The results did not support the first hypothesis predicting exercise intention, and partially supported the second hypothesis predicting exercise behavior. Among the three constructs predicting exercise intention within the TPB model, only subjective norm was significantly correlated to exercise intention, and multiple regression analysis indicated that the TPB model did not work for predicting exercise intention of this sample. For predicting exercise behavior, only perceived behavioral control, but not exercise intention, was significantly related to exercise behavior, and discriminated the exercise and non-exercise group. These results partially support the second research hypothesis with perceived behavioral control being the only significant predictor of exercise behavior. In the following section, study results are discussed in detail, followed by future research directions.

In contrast to the previous research of Hausenblas and Symons Downs (2004), attitude, subjective norm, and perceived behavioral control did not predict exercise

intention in the first trimester of pregnancy. This result indicates that the theoretical framework of the TPB does not work in this sample, and may suggest that other variables are affecting their exercise intention. Some characteristics of the sample may be possible underlying variables. Demographic data of the sample showed that the majority of participants (70%) already had one or more children and generally had very low income according to the Adopt-A-Mom program admission criteria. It is plausible that barriers such as maternal time constraint (Schoenfeld & Tiriyaqi-Sonmez, 2011) or burdens of everyday life made it difficult to measure exercise intention, which is in the leisure-time domain. A comment from the Adopt-A-Mom program coordinator (V. Santolim, personal communication, Apr. 30, 2012) supports this point:

It is very difficult to figure out what each of them is actually thinking about health related issues. For example, when I talk about healthy food and nutrition, one's response may vary even within a minute. Many participants would easily agree about choosing healthy foods, but in the next couple of minutes the same person may suddenly change to an advocate of fast foods. Some participants even say choosing fast food is a bad choice for health but it is also a privilege to go to McDonald's considering the past life in Mexico. I don't know exactly why these are happening, but I can clearly notice while talking to them that life issues such as financial or immigration status problems are affecting their thoughts and behavior.

Only perceived behavioral control, but not intention predicted exercise behavior in this study. This result partially supports the previous study finding that perceived behavioral control and intention both significantly predicted exercise behavior, with perceived behavioral control being a stronger predictor (Hausenblas & Symons Downs, 2004). This may indicate that pregnant women's perceived efficacy (i.e., perceived behavioral control) plays a critical role during the first trimester for exercise behavior.

This result may allow researchers and health care providers to target pregnant women's perceived capability of exercise when designing an exercise intervention program for a low-socioeconomic sample. Because perceived behavioral control was the only significant predictor of exercise behavior, and its prediction was strong, it is plausible to consider using self-efficacy (Bandura, 1997) theory as a theoretical framework in predicting exercise behavior among similar samples. Self-efficacy is a model that focuses on a person's belief or confidence in a specific situation, and it has shown strong prediction ability in exercise behavior research (Feltz & Lrigg, 2001). Self-efficacy theory may provide ample information regarding pregnant women's perceived control of exercise that can help designing an effective exercise intervention program for low-socioeconomic women in the first trimester of pregnancy.

Notwithstanding the findings from this study, there are number of limitations that should be considered. First, the majority of participants were Hispanic (n=43, 86%) with Spanish as a primary language. People from different ethnic background may have diverse cultural aspects, social relationships, or beliefs and culture may influence the efficacy of the TPB in predicting exercise behavior. Results from recent studies are relatively inconsistent on the moderating effect of ethnicity in explaining exercise behavior with the TPB framework. For example, ethnicity did moderate the relationship between the TPB constructs and exercise behavior among the US college students (Blanchard, 2007), while no moderating effect was found among postpartum women (Symons Downs, 2006). However, no study so far has examined the utility of the TPB in predicting exercise behavior among an Hispanic pregnant sample, or tested the

moderating effect of ethnicity within the TPB framework with an ethnically diverse pregnant sample. Future studies might investigate these areas for further elucidating exercise intention and behavior during pregnancy.

Second, methodological limitations exist with measure of the exercise behavior. First, the item employed in this study measured physical activity as a dichotomous variable. Participants were divided into two groups; exercise and non-exercise group, by answering yes or no to the physical activity item. Thus, information regarding the frequency and intensity of exercise was limited. Second, the physical activity measure was logically inappropriate for the model and predicting future behavior. The item asked about the past (one month) leisure-time exercise behavior, and there was no further measure or attempt to actually predict exercise behavior after completing the questionnaire. Thus, predicting past behavior with present TPB constructs was not a logically sound method for examining . Future research may consider adding follow up physical activity measures after completing the initial survey for predicting exercise behavior.

Third, the unique environment of the study procedure may have influenced the participants' response to the questionnaire. The research questionnaire packet was included in the Adopt-A-Mom application, and during the initial visit, participants were basically applying for financial assistance. Therefore, despite the information provided in the consent form regarding participant's right and confidentiality, participants might have felt some pressure for completing the questionnaire. Future studies should try to recruit

low-socioeconomic status participants separate from such settings and any form of social or personal pressure.

Despite the limitations, this study is one of the first to examine low-socioeconomic status women's exercise intention and behavior during the first trimester of pregnancy. Some methodological limitations must be overcome in following research to further our knowledge regarding pregnant women's exercise behavior. Exploring the moderating effect of ethnicity and employing logically sound physical activity measures for behavioral prediction may be promising direction for future research. Our goal is to continue this endeavor to promote regular exercise during pregnancy for healthier moms and babies.

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APPENDIX A

MEASURES

Demographic Questionnaire (English Version)

1. **Age:** \_\_\_\_\_
  
2. **Race/Ethnicity (circle):**  
White/Caucasian      African-American/Black      Native American  
Asian/Pacific Islander      Hispanic/Latina/o      Other/Mixed \_\_\_\_\_
  
3. **Marital status (circle):**  
Married      Single (never married)      Divorced      Living with partner
  
4. **Employment (circle):**      Full-time      Part-time      Not employed
  
5. **When is your due date? (mm/dd/yyyy)** \_\_\_\_\_
  
6. **Is this your first pregnancy (circle)?**      Yes      No
  
7. **How many children do you have (circle)?**    1      2      3      4      5+
  
8. **Please indicate the highest level of education completed (circle):**  
  
Less than high school      High school  
  
Associate degree (Community college)  
  
Bachelor's degree      Graduate or professional degree
  
9. **What is your primary language (circle)?**    English      Spanish      Other
  
10. **During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise (circle)?**  
  
Yes      No



Theory of Planned Behavior Global Items (English Version)

**Instructions:** The following questions pertain to DURING YOUR FIRST TRIMESTER of pregnancy. Choose your answer by circling the number that most appropriately answers the statement for you.

1. For me to exercise regularly during the first trimester of pregnancy will be:  
Useless Useful  
1          2          3          4          5          6          7
  
2. I intend to exercise regularly during my first trimester.  
Strongly Disagree Strongly Agree  
1          2          3          4          5          6          7
  
3. Most people who are important to me would like me to exercise regularly during my first trimester  
Strongly Disagree Strongly Agree  
1          2          3          4          5          6          7
  
4. For me to exercise regularly during my first trimester will be:  
Harmful Beneficial  
1          2          3          4          5          6          7
  
5. For me to exercise regularly during my first trimester will be:  
Extremely Difficult Extremely Easy  
1          2          3          4          5          6          7
  
6. For me to exercise regularly during my first trimester will be:  
Bad Good  
1          2          3          4          5          6          7
  
7. Most people who are important to me think that I should exercise regularly during my first trimester.  
Strongly Disagree Strongly Agree  
1          2          3          4          5          6          7
  
8. For me to exercise regularly during my first trimester will be:  
Foolish Wise  
1          2          3          4          5          6          7

9. I intend to exercise with the following regularity during my first trimester:  
Not at all  
1            2            3            4            5            6            Everyday  
7
10. For me to exercise regularly during my first trimester will be:  
Unpleasant  
1            2            3            4            5            6            Pleasant  
7
11. For me to exercise regularly during my first trimester will be:  
Unenjoyable  
1            2            3            4            5            6            Enjoyable  
7
12. If I want to, I could easily exercise during my first trimester.  
Strongly  
Disagree  
1            2            3            4            5            6            Strongly  
Agree  
7
13. Most people who are important to me want me to exercise regularly during my first trimester.  
Strongly  
Disagree  
1            2            3            4            5            6            Strongly  
Agree  
7
14. For me to exercise regularly during my first trimester will be:  
Boring  
1            2            3            4            5            6            Interesting  
7
15. How much control do you have over exercising during your first trimester?  
Very Little  
Control  
1            2            3            4            5            6            Complete  
Control  
7
16. I intend to exercise at least three times per week during my first trimester.  
Definitely not  
1            2            3            4            5            6            Definitely  
7
17. Most people who are important to me approve of me exercising regularly during my first trimester.  
Strongly  
Disagree  
1            2            3            4            5            6            Strongly  
Agree  
7

18. For me to exercise regularly during my first trimester will be:

Uninteresting

1

2

3

4

5

6

Interesting

7

Demographic Questionnaire (Spanish Version)

1. **Edad:**\_\_\_\_\_
  
2. **Raza/etnia (circule):**  
Blanco/caucásico                      Negro/Afro Americano                      Nativos americanos  
Asia y el Pacífico isleños              Hispano/Latina/o                      otro/mixto\_\_\_\_\_
  
3. **Estado civil (circule):**  
Casada                      Soltera (nunca casada)                      Divorciada                      Vive con pareja
  
4. **Empleo (circule):**  
Empleados a tiempo completo                      A tiempo parcial                      Sin empleo
  
5. **¿ Cuando es la fecha de nacimiento de su bebe? (dd/mm/aaaa)**
  
6. **¿ Este es su primer embarazo (circule)?**    Sí    No
  
7. **¿Cuántos niños ya tiene (circule)?**    1    2    3    4    5+
  
8. **Por favor indicar su nivel más alto de educación:**  
Menos de la escuela secundaria                      Secundaria completa  
Graduación en el colegio de la comunidad                      Grado de Bachiller  
Graduado o profesional
  
9. **¿Cuál es su idioma principal?**    Inglés                      Español                      Otro
  
10. **. Durante el mes pasado, además de su trabajo regular, ¿participó usted en algunas actividades físicas o ejercicios tales como correr, calistenia, golf, jardinería o caminar (marque con un círculo la respuesta correcta)?**

Si

No

Theory of Planned Behavior Global Items (Spanish Version)

1. Para mí, hacer ejercicio regularmente durante el primer trimestre de embarazo será:  

	Inútil						Útil
1	2	3	4	5	6	7	
  
2. Yo tengo la intención de hacer ejercicio regularmente durante mi primer trimestre.  

1	2	3	4	5	6	7	
  
3. La mayoría de las personas que son importantes para mí quisieran que Yo hiciera ejercicios regularmente durante mi primer trimestre.  

1	2	3	4	5	6	7	
  
4. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:  

1	2	3	4	5	6	7	
  
5. Para mí hacer ejercicio regularmente durante mi primer trimestre será:  

1	2	3	4	5	6	7	
  
6. Para mí hacer ejercicios regularmente durante mi primer trimestre, será:  

1	2	3	4	5	6	7	
  
7. La mayoría de las personas que son importantes para mí creen que debo hacer ejercicio regularmente durante mi primer trimestre.  

1	2	3	4	5	6	7	
  
8. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:  

1	2	3	4	5	6	7	

9. Mi intención de ejercitarme es con la siguiente regularidad durante mi primer trimestre:
- |                     |   |   |   |   |   |                |
|---------------------|---|---|---|---|---|----------------|
| No hacer ejercicios |   |   |   |   |   | Hacer los días |
| 1                   | 2 | 3 | 4 | 5 | 6 | 7              |
10. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:
- |               |   |   |   |   |   |            |
|---------------|---|---|---|---|---|------------|
| No placentero |   |   |   |   |   | Placentero |
| 1             | 2 | 3 | 4 | 5 | 6 | 7          |
11. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:
- |              |   |   |   |   |   |           |
|--------------|---|---|---|---|---|-----------|
| Desagradable |   |   |   |   |   | Agradable |
| 1            | 2 | 3 | 4 | 5 | 6 | 7         |
12. Si quiero, pude hacer ejercicio fácilmente durante mi primer trimestre.
- |                        |   |   |   |   |   |                           |
|------------------------|---|---|---|---|---|---------------------------|
| Fuertemente de acuerdo |   |   |   |   |   | Fuertemente en desacuerdo |
| 1                      | 2 | 3 | 4 | 5 | 6 | 7                         |
13. La mayoría de las personas que son importantes para mí quieren que Yo haga ejercicios regularmente durante mi primer trimestre.
- |                        |   |   |   |   |   |                           |
|------------------------|---|---|---|---|---|---------------------------|
| Fuertemente de acuerdo |   |   |   |   |   | Fuertemente en desacuerdo |
| 1                      | 2 | 3 | 4 | 5 | 6 | 7                         |
14. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:
- |          |   |   |   |   |   |             |
|----------|---|---|---|---|---|-------------|
| Aburrido |   |   |   |   |   | Interesante |
| 1        | 2 | 3 | 4 | 5 | 6 | 7           |
15. ¿Cuánto control tienes sobre ejercicio durante su primer trimestre?
- |                  |   |   |   |   |   |                  |
|------------------|---|---|---|---|---|------------------|
| Muy poco control |   |   |   |   |   | Control completo |
| 1                | 2 | 3 | 4 | 5 | 6 | 7                |
16. La intención de hacer ejercicio por lo menos tres veces por semana durante mi primer trimestre:
- |                    |   |   |   |   |   |                 |
|--------------------|---|---|---|---|---|-----------------|
| Definitivamente no |   |   |   |   |   | Definitivamente |
| 1                  | 2 | 3 | 4 | 5 | 6 | 7               |
17. La mayoría de las personas que son importantes para mí aprueban mi ejercicio hecho regularmente durante mi primer trimestre.
- |                        |   |   |   |   |   |                           |
|------------------------|---|---|---|---|---|---------------------------|
| Fuertemente de acuerdo |   |   |   |   |   | Fuertemente en desacuerdo |
| 1                      | 2 | 3 | 4 | 5 | 6 | 7                         |

18. Para mí, hacer ejercicio regularmente durante mi primer trimestre será:

Desinteresante

Interesante

1

2

3

4

5

6

7

APPENDIX B

CONSENT FORMS

(ENGLISH VERSION)

**UNIVERSITY OF NORTH CAROLINA AT GREENSBORO**

***CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM***

Project Title: EXAMINATION OF LOW SOCIO-ECONOMIC STATUS PREGNANT WOMEN'S FIRST TRIMESTER EXERCISE BEHAVIOR AND INTENTION

Project Director: Diane L. Gill, Ph.D. & Hyondo Chung, B.S.

Participant's Name: \_\_\_\_\_

**What is the study about?**

This is a research project. This study is being completed to examine exercise behavior and intention among low socio-economic status pregnant women in Guilford County, NC during their first trimester of pregnancy.

**Why are you asking me?**

You are being asked to participate in this study because you fit the initial inclusion criteria of being a woman in the first trimester of pregnancy and a patron of Guilford County Coalition of Infant Mortality.

**What will you ask me to do if I agree to be in the study?**

If you choose to participate in this study, we will ask you to complete some questionnaires. It will take approximately 5-10 minutes to complete the questionnaires.

**Are there any audio/video recording?**

There will be no audio or video recording of any kind.

**What are the dangers to me?**

Risks are minimal for participating in this study. There is no risk involved with the pencil and paper questionnaires.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the Office of Research Compliance at UNCG at (336) 256-1482. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by [Hyondo Chung] who may be contacted at (336) 419-5819 ([h\\_chung4@uncg.edu](mailto:h_chung4@uncg.edu)) or [Dr. Diane Gill] who may be contacted at ([dlgill@uncg.edu](mailto:dlgill@uncg.edu)).



**Are there any benefits to me for taking part in this research study?**

There are no direct benefits for participating in this study.

**Are there any benefits to society as a result of me taking part in this research?**

Knowledge gained from this research may be an important contribution to society in furthering our understanding of pregnant women’s exercise behaviors in the United States. Additionally, knowledge gained from this research may help to promote exercise during pregnancy through local prenatal care program.

**Will I get paid for being in the study? Will cost me anything?**

There are no costs to you for participating in this study. You will receive a \$5 gift certificate for participating in this study. In order to receive the gift certificate, you must turn in completed questionnaire before you leave the Adopt-A-Mom office.

**How will you keep my information confidential?**

The researchers will keep any and all information confidential and data forms will not include your identity. All information obtained in this study is strictly confidential unless disclosure is required by law. All data collected during the study will be stored in a locked file cabinet in a locked office. By law, we are required to keep consent forms for at least 3 years following the study. After that time period has elapsed, consent forms will be shredded. Information collected in this study will be kept locked in the Sport Psychology lab on the UNCG campus, in a locked office, in a locked drawer.

**What if I want to leave the study?**

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not negatively affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

**What about new information/changes in the study?**

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

**Voluntary Consent by Participant:**

By signing this consent form you are agreeing that you have read it, or that it has been read to you and you fully understand the contents of this document and are openly willing to consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by \_\_\_\_\_.

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

## CONSENT FORMS

(SPANISH VERSION)

### UNIVERSIDAD DE CAROLINA DEL NORTE EN GREENSBORO

#### **CONSENTIMIENTO PARA ACTUAR EN CALIDAD DE PARTICIPANTE HUMANO: FORMULARIO EXTENSO**

Título del proyecto: ESTUDIO DEL COMPORTAMIENTO E INTENCIÓN EN CUANTO A REALIZAR EJERCICIOS DE MUJERES GESTANTES DE NIVEL SOCIOECONÓMICO BAJO QUE SE ENCUENTRAN EN EL PRIMER TRIMESTRE DE EMBARAZO

Directores del proyecto: Diane L. Gill, Ph.D. y Hyondo Chung, B.S.

Nombre de la participante: \_\_\_\_\_

#### **¿De qué trata este estudio?**

Este es un proyecto de investigación. Se lleva a cabo este estudio con el objetivo de examinar el comportamiento y la intención en cuanto a realizar ejercicios de las mujeres gestantes que se encuentran en el primer trimestre de embarazo y residen en el Condado de Guilford, Carolina del Norte.

#### **¿Por qué se me invita a participar?**

La invitamos a participar en este estudio debido a que cumple con los criterios iniciales de inclusión, ya que es una mujer que transita su primer trimestre del embarazo y patrocinadora de la coalición de mortalidad infantil del condado Guilford.

#### **¿Qué me van a pedir que haga si acepto participar en el estudio?**

Si usted decide participar en este estudio, se le pedirá que conteste algunos cuestionarios. Tendrá una duración aproximada de 5-10 minutos para que complete cuestionarios.

#### **¿Habrá alguna grabación de audio o video?**

No habrá ningún tipo de grabación de audio ni de video.

#### **¿Qué riesgos corro yo al participar?**

Los riesgos por participar en este estudio son mínimos. No existen riesgos relacionados con los cuestionarios en papel.

Si tiene alguna inquietud relacionada con sus derechos, sobre el trato que recibe o si tiene preguntas, desea recibir mayor información o tiene alguna sugerencia, por favor póngase en contacto con Eric Allen, de la Oficina de Cumplimiento de Investigaciones (Office of Research Compliance) de la Universidad de Carolina del Norte en Greensboro (UNCG) llamando al teléfono (336) 256-1482. Todas las preguntas, inquietudes o

quejas relacionadas con este proyecto o las consultas sobre los beneficios o riesgos asociados con su participación en este estudio pueden dirigirse a [Hyondo Chung], quien puede ser contactado en el teléfono (336) 419-5819 o el correo electrónico ([h\\_chung4@uncg.edu](mailto:h_chung4@uncg.edu)), o a [Dra. Diane Gill] quien puede ser contactada en el correo electrónico ([dlgill@uncg.edu](mailto:dlgill@uncg.edu)).

**¿Existe algún beneficio para mi persona por participar en este estudio de investigación?**

No hay ningunos beneficios directos por participar en este estudio.

**¿Existe algún beneficio para la sociedad como resultado de mi participación en esta investigación?**

Los conocimientos adquiridos a partir de esta investigación pueden constituir una importante contribución para la sociedad a fin de avanzar en nuestra comprensión de los comportamientos relacionados con la realización de ejercicios por parte de mujeres embarazadas en los Estados Unidos. Además, los conocimientos adquiridos a partir de esta investigación pueden ayudar a promover la realización de ejercicios durante el embarazo a través del programa local de atención prenatal.

**¿Me pagarán por participar en el estudio? ¿Participar me va a costar algo?**

Usted no abonará ningún costo por su participación. Recibirá un vale de regalo de USD 5 por participar en este estudio. Para poder recibir el vale de regalo, debe entregar su cuestionario completo antes de salir de la oficina de “Adopt-A-Mom”.

**¿Cómo se va a mantener la confidencialidad de la información que yo proporcione?**

Los investigadores mantendrán toda la información en confidencialidad y los formularios de datos no incluirán su identidad. Toda la información que se obtenga en este estudio es estrictamente confidencial a menos que su divulgación sea requerida por ley. Todos los datos que se recopilen durante el estudio se almacenarán en un estante de archivos debidamente cerrado en una oficina cerrada con llave. Por ley, estamos obligados a mantener los formularios de consentimiento por lo menos por tres años posteriores a la realización del estudio. Una vez transcurrido ese período, se destruirán los formularios de consentimiento. La información que se recopile en este estudio se guarda bajo llave en el laboratorio de Psicología del Deporte en el campus de la Universidad de Carolina del Norte en Greensboro (UNCG), en una oficina cerrada con llave, dentro de un cajón cerrado con llave.

**¿Qué sucede si quiero abandonar el estudio?**

Tiene derecho a indicar que no desea participar o a retirarse en cualquier momento, sin penalización alguna. Si se retira, ello no la perjudicará de ninguna manera. Si decide retirarse, puede solicitar que se destruyan cualquiera de los datos que se recogieron, a menos que estos no puedan identificarse para ser sometidos a dicho proceso.

**¿Qué sucede si se obtiene nueva información/ocurren cambios en el estudio?**

En caso de que se ponga a disposición información nueva y significativa concerniente al

estudio que tenga relación con su disposición a seguir participando, usted recibirá dicha información.

**Consentimiento voluntario otorgado por la participante:**

Al firmar este formulario de consentimiento, acepta que lo ha leído, o que el mismo le fue leído y que entiende por completo el contenido de este documento y que está completamente dispuesta a prestar su consentimiento para participar en este estudio. Se han contestado todas sus preguntas relacionadas con este estudio. Al firmar este formulario, declara que es mayor de 18 años y que está de acuerdo en participar, o que está de acuerdo en que la persona que se indica anteriormente como participante forme parte de este estudio, el cual fue descrito por \_\_\_\_\_.

Firma: \_\_\_\_\_ Fecha: \_\_\_\_\_