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Personal, Social, and Environmental Influences on Physical Activity Behavior in Reproductive Age Mothers

Author
Quinonez, Andrea

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Personal, Social and Environmental Influences on Physical Activity Behavior in Reproductive Age Mothers

by

Andrea V. Quiñonez

DISSERTATION

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[redacted]

DEDICATION

This is for my husband Luis, who believes in me, encourages me to dream, and supports me through the journeys to make them realities.

This is for my kids, who teach me more than I ever realized I never knew about what it is to be a mother. I hope this teaches them to dream and not be afraid to follow their hearts, wherever their paths may lead.

This is for my own mom, who shows me how to live life on one's own terms, taught me to give my best, and recognize the value in caring for others.

And I am thankful to God, for the many blessings throughout this journey and the journeys to come. Through Him all things are possible.

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ABSTRACT

Personal, Social and Environmental Influences on Physical Activity Behavior in Reproductive Age Mothers

Andrea V. Quiñonez

Regular physical activity has many important health benefits. However, reproductive age mothers are at higher risk for physical inactivity and lower levels of moderate-vigorous physical activity. Personal, social, and environmental correlates of housework/caregiving, occupation, active living, and sports/exercise physical activity were examined among reproductive age mothers. Factors situated on three socioenvironmental levels were theorized to influence physical activity. The individual/intrapersonal level included sociodemographic characteristics and self-efficacy for physical activity. The social/interpersonal level included social norms and social support. The community level included neighborhood environment.

Influence of the different correlates varied among the types of physical activity. Population and income were associated with occupational and sports/exercise physical activity. Relevance of self-efficacy and social support to reproductive age mothers' physical activity were somewhat supported, particularly for sports/exercise physical activity. Social norms navigation, but not social norms, was associated with mothers' sports/exercise physical activity. Aspects of the neighborhood environment were influential in housework/caregiving, occupation, and sports/exercise physical activity.

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CHAPTER I

INTRODUCTION

Statement of the Problem

Participation in regular physical activity has many important health benefits, including longer life span, as well as lower risk for heart disease, stroke, type 2 diabetes, depression, and some cancers (Centers for Disease Control and Prevention [CDC], 2017b). In order to receive the health benefits of physical activity, the CDC recommends that adults, ages 18 to 64 years, engage either in 150 minutes per week of moderate-intensity aerobic activity (such as brisk walking) and two days per week of strength training, 75 minutes of vigorous-intensity aerobic activity (such as jogging) and two days of strength training per week, or an equivalent combination of moderate- and vigorous-intensity aerobic activity and two days per week of strength training. Only 21% of adults, however, in the United States (US) meet recommended physical activity levels (CDC, 2017b). In addition, certain groups, such as women, racial and ethnic minorities, and those with lower incomes or lower education levels are at greater risk for inactivity.

Parents are another important group at-risk for inactivity. Parents with dependent children are significantly less physically active than non-parents; and among parents, mothers are at greatest risk for being physically inactive (Bellows-Riecken & Rhodes, 2008; Berge, Larson, Bauer, & Neumark-Sztainer, 2011). Motherhood has been associated with a decrease in moderate to vigorous physical activity as well as a concurrent increase in time spent doing more low-intensity activities such as household chores (Bellows-Riecken & Rhodes, 2008); however, low-intensity activity levels are thought to be insufficient to produce the health benefits associated with more moderate to vigorous intensity physical activity (Murphy, Donnelly,

Breslin, Shibli, & Nevill, 2013). Fifty-eight percent of women, 15 to 50 years, in the US are mothers and 85% of women between 40 and 44 years are mothers (US Census Bureau, 2014). Given that the majority of women in the US become mothers by the age of 44, reproductive age mothers' physical activity may be an important aspect to consider for targeting physical activity interventions in this population (US Census Bureau, 2014). Physically active parents are believed to model this behavior to their children, who then become physically active, too; this effect may even last into middle age (Gustafson & Rhodes, 2006; Hinkley, Crawford, Salmon, Okely, & Hesketh, 2008; Kaseva et al., 2017; Oliver, Schofield, & Schluter, 2010).

Recent years have seen a shift from consideration of individual-level determinants of physical activity, such as self-efficacy, to include more social- and environmental-level sources of influence, such as social norms, social support and built/physical environment (McNeill, Kreuter, & Subramanian, 2006). Aspects of the built environment have been recognized as a potentially important determinant of mothers' engagement in physical activity (Cleland, Ball, Hume, Timperio, King, & Crawford, 2010; Hamilton, Cuddihy, & White, 2013). Key aspects of the built environment that have been shown to be associated with physical activity include safety (such as sidewalks, street lighting, crime, and dogs in the neighborhood) and availability and convenience of places to be physically active (Addy, Wilson, Kirtland, Ainsworth, Sharpe, & Kimsey, 2004; Hamilton et al., 2013; Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007). Among women, one study with a majority of mothers in the sample found weak to moderate associations between physical activity and neighborhood qualities, such as neighborhood cohesion, personal safety, neighborhood aesthetics and neighborhood walking (Cleland et al., 2010).

Self-efficacy, a cognitive process, is widely recognized as a mediator of women's physical activity behavior. Among mothers, self-efficacy has been shown to be moderately to strongly associated with meeting the moderate-intensity physical activity recommendation of 150 or more minutes per week (Cleland et al., 2010; Miller, Trost, & Brown, 2002). Social support also has been widely studied and consistently determined to be a positive correlate of women's physical activity (Vrazel, Saunders, & Wilcox, 2008). Among mothers, social support has been shown to have a moderate association with intention to engage in physical activity (Hamilton & White, 2012) and actual physical activity behavior (Cleland et al., 2010). In addition, social support has been shown to act as a mediator of physical activity behavior among mothers; those who reported higher levels of partner support were twice as likely to meet physical activity recommendations than mothers who reported lower levels of partner support (Miller, Trost, & Brown, 2002). Given that social support and social norms may be theoretically related concepts, it is important to note that both social support and social norms have been shown to uniquely contribute to physical activity (Ball, Jeffery, Abbott, McNaughton, & Crawford, 2010; Okun, Ruehlman, Karoly, Lutz, Fairlholme, & Schaub, 2003).

While social support is often recognized as an important source of influence in theories of behavior change, social normative influences among mothers has not been fully explored. Social normative influences on mothers' physical activity behaviors is present through cultural standards, gender-specific expectations and social roles as well as through the opinions and physical activity levels of people who are important to mothers (Ball et al., 2010; Hamilton & White, 2010a, 2010c; Hoebeke, 2008; Lewis & Ridge, 2005; Mansfield, Ducharme, & Koski, 2012; McGannon & Schinke, 2013; McIntyre & Rhodes, 2009; Miller & Brown, 2005; O'Dougherty et al., 2008). Most studies exploring the influence of social norms among

reproductive age mothers originate from other countries, using primarily qualitative methodology. Few studies in the US have focused on social normative influences of physical activity in reproductive age mothers, taking into consideration their personal background, self-efficacy, social support and built environment.

Purpose of the Study

The purposes of this study were to examine (a) the influences of social norms, social support, self-efficacy and neighborhood environment on physical activity behavior, and (b) the sociodemographic differences in physical activity behavior in reproductive age mothers within the context of three levels of socioenvironmental influences: individual/personal, interpersonal/ social and community. Sociodemographic characteristics and self-efficacy for physical activity represented the individual level of influence. Social norms and social support represented the interpersonal/social level of influence. Neighborhood environment represented the community level of influence.

In the long-term, findings may provide information to develop evidence-based programs that focus on promoting and engaging young mothers in regular physical activity behavior at the individual level as well as in the social context where they live and interact with others. Mothers constitute a unique group, which has multiple roles and responsibilities that often receive priority over self-care health behaviors, such as leisure-time physical activity. An examination of social norms, the least studied of social influences related to physical activity, may offer insight into cultural and gender-role expectations associated with physical activity behavior among mothers, as social norms underlie what attitudes, beliefs and behaviors are perceived to be appropriate among a particular group (Hogg & Reid, 2006).

Definition of Terms

The following conceptual definitions of the study variables were utilized for the purpose of this study.

Reproductive Age

Reproductive age was defined as 18 to 45 years, similar to the CDC definition of 18 to 44 years (CDC, 2017c).

Physical Activity

Physical activity was defined as "any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level." (CDC, 2017b)

Social Norms

Social norms was defined as collective beliefs about what attitudes, beliefs, or behaviors are appropriate, or ought to be, for members of a particular group (Hogg & Reid, 2006).

Social Support

Social support was defined as the functional content of relationships that can be categorized into supportive behaviors or acts (Heaney & Isreal, 2008).

Self-Efficacy

Self-efficacy was defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1997, p. 193).

Neighborhood Environment

Built environment was defined as "the buildings, roads, utilities, homes, fixtures, parks, and all other man-made entities that form the physical characteristics of a community" (CDC, 2017a). Neighborhood environment was considered the built and social environment,

operationalized as approximately one mile around a participant's home (Mujahid, Roux, Morenoff, & Raghunathan, 2007).

Organization of the Dissertation Chapters

The dissertation is divided into six chapters: (I) introduction, (II) literature review, (III) theory, (IV) methodology, (V) results, and (VI) discussion. Following this introductory chapter is Chapter II, which is a description of the literature related to physical activity and social norms in reproductive age mothers. The theoretical perspectives that provided context for the study is presented in Chapter III. Chapter IV is a description of the methodology used to conduct the study. Presented in Chapter V are the findings of the study. Chapter VI consists of a discussion of the findings, conclusions, limitations, implications for health and nursing, and recommendations for further research. Following Chapter VI are a list of the references and the appendices that include the approval letter from the University of California, San Francisco Institutional Review Board to conduct the study and the measurement tools.

CHAPTER II

LITERATURE REVIEW

In this chapter, literature related to social norms and physical activity is presented. The focus of the integrative review was on mothers between 18 and 45 years and how they navigate physical activity needs in the context of prevailing social norms. The chapter ends with directions for future research in order to understand the influences of social norms on reproductive age mothers' physical activity behavior.

Background and Significance

Although the benefits of being physically active have been well documented, the majority of the U.S. population does not meet recommended physical activity levels (CDC, 2017b). Parents, in particular mothers, are an important group at risk for sedentary behavior (Bellows-Riecken & Rhodes, 2008; Berge et al., 2011). Furthermore, physically active parents are believed to model this behavior to their children, who then become physically active (Gustafson & Rhodes, 2006; Hinkley et al., 2008; Oliver et al., 2010). Social norms may play a role in understanding the cultural and gender-role expectations associated with physical activity among mothers, as social norms underlie what attitudes, beliefs and behaviors are perceived to be appropriate among a particular group (Hogg & Reid, 2006). A synthesis of normative influences on mothers' physical activity has yet to be explored.

The purpose of this integrative review was to analyze current, relevant literature to identify the role of social norms in mothers' physical activity, with the goal of reaching a better understanding of how social normative influences are embedded within cultural mores and gender roles; and subsequently, provide evidence-based guidance for developing public health programs aimed at increasing physical activity among women, in particular mothers. The two

questions that guided the integrative review were (a) What social norms influence mothers' physical activity? And (b) How do mothers navigate physical activity needs in the context of prevailing social norms?

Methodology

Data Sources and Search Strategies

A systematic search of existing English-language, peer-reviewed articles examining the association between social norms and either (a) physical activity or (b) motivation to engage in physical activity among mothers ages 18 to 45 years was conducted between January and February 2017. For the purposes of this review, social norms was defined as collective beliefs about what actions, attitudes, or behaviors are appropriate, or ought to be, for members of a particular group (Hogg & Reid, 2006). A two-step process was used. In Step 1, relevant citations were searched using PubMed, PsycInfo, PyscArticles, and Sociological Abstracts databases. Various combinations of keywords, MeSH terms, and headings for social norms, motivation, and physical activity included: a) social norms, social environment, social influence, social perception, social conformity, culture, group norms, and sociocultural factors; b) motivation and intention; and c) physical activity, exercise, and motor activity. In Step 2, relevant articles identified in Step 1 were individually entered into the Web of Science database. Reference lists and cited articles were reviewed to identify any additional relevant articles that were not captured in Step 1.

Eligibility Criteria

Articles published from 2004 to 2017 originating from the US, Canada, Great Britain, or Australia were included in the review. The assumption was that findings from other countries might be applicable to mothers in the US, as Canada, Great Britain, and Australia are also

industrialized and English-speaking countries. Moreover, physical activity was assumed to be a lifestyle behavior that is not dependent on healthcare access and healthcare insurance, which vary by country. Other inclusion criteria were the study included at least a majority (> 50%) of mothers in the sample and participants were between 18 and 45 years old. Studies with samples consisting of both mothers and fathers were also included if statistical analysis was stratified and reported by gender. Exclusion criteria included studies of pregnant or postpartum women, women with mental or physical disabilities hindering a person's ability to engage in physical activity, women with a chronic illness using physical activity to manage their conditions, athletes engaging in competitive physical activity, and unpublished manuscripts or theses.

Selection Process

An initial search of PubMed, PsycInfo, PyscArticles, and SocAbstracts databases yielded 1,974 citations, which were screened by title and/or abstract (see Figure 1). A total of 1,944 citations were excluded, yielding 30 articles for full-text review. After screening the 30 articles for the aforementioned eligibility criteria, 23 articles were excluded due to mother status was unspecified (n = 9); key variables (social norms, physical activity and/or physical activity motivation) were not assessed (n = 4); sample was not specific to women or analysis was not stratified by gender (n = 3); sample was not specific to, or outside of, the target age range (n = 3); sample was comprised of less than 50% mothers (n = 1); study was conducted outside of the targeted geographical areas (n = 1); study focused on theory/model testing with duplicate sample already included in the review (n = 1); and study tested an intervention (n = 1).

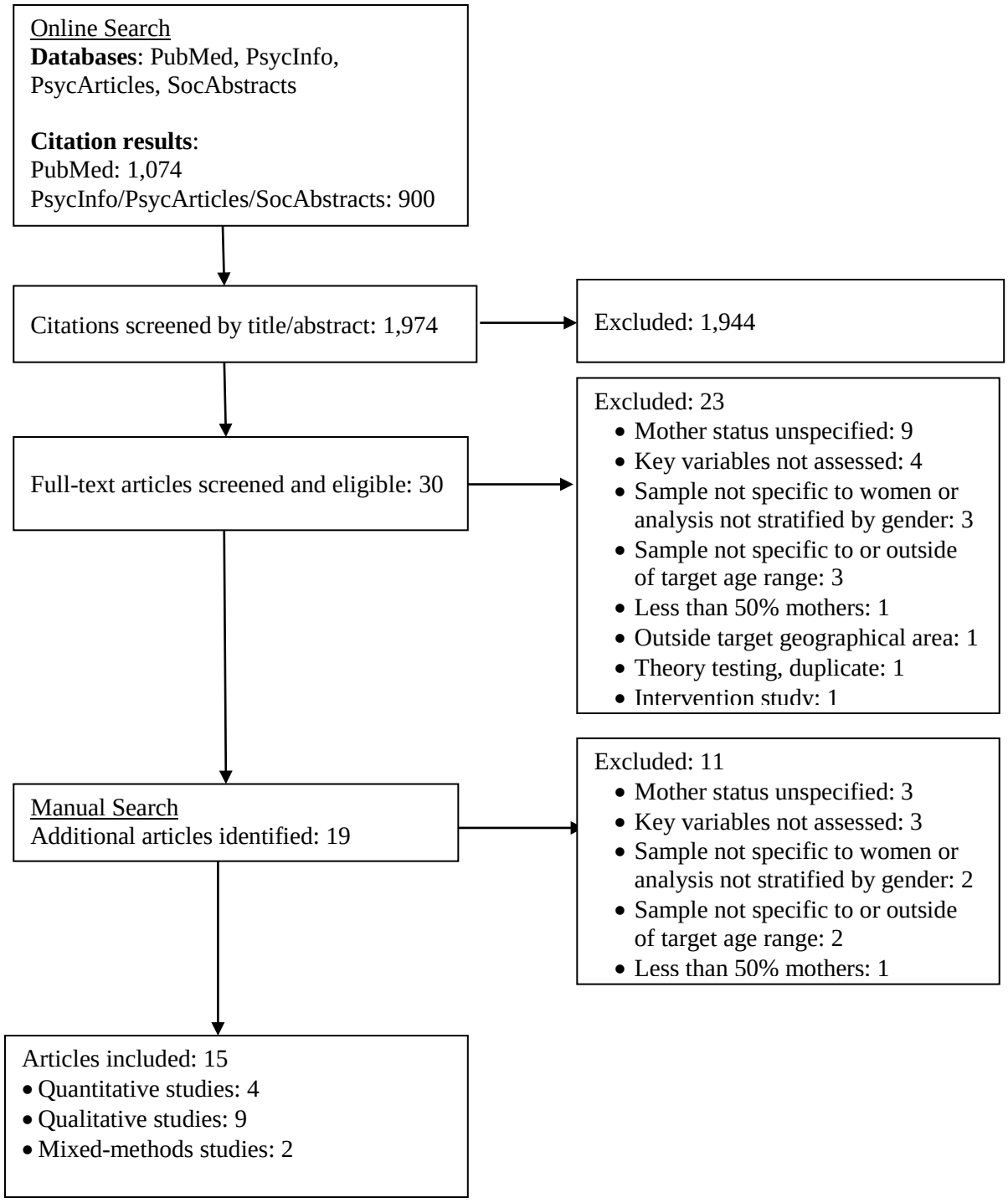

Figure 1. Flow diagram of the study selection process

Of the seven articles selected for inclusion, a Web of Science search was conducted based on the reference lists and other cited work. This process produced an additional 19 articles for full-text review. After applying the eligibility criteria, 11 articles were excluded due to mother status was unspecified (n = 3); key variables (social norms, physical activity and/or physical activity motivation) were not assessed (n = 3); sample was not specific to women or analysis was not stratified by gender (n = 2); sample was not specific to, or outside of, the target age range (n = 2); sample was comprised of less than 50% mothers (n = 1). This process yielded eight relevant articles.

A total of 15 articles, representing 14 unique studies, were selected for the review as a result of the aforementioned selection process. This review included eight qualitative studies, four quantitative studies, and two mixed methods studies. One qualitative study produced two papers (Hamilton & White, 2010a, 2010c). Five studies were conducted in the US, five studies were conducted in Australia, and four studies were conducted in Canada.

Data Abstraction, Analysis and Synthesis

Data were analyzed using a constant comparative method described by Whittemore and Knafl (2005). Qualitative articles were read and analyzed before quantitative articles. Data analysis included data reduction, display, comparison, conclusion-drawing, and verification. In the first step, primary resources were carefully examined and divided into three groups (quantitative, qualitative, and mixed-methods). Next, data from the selected studies were extracted and synthesized according to the purpose, methods, and findings, which allowed for comparisons across studies and served as a starting point for analysis and interpretation. Results from this process were then evaluated for whether they best addressed Research Question 1 or Research Question 2. The steps were repeated until consensus about clarity of the categorizations

of the results was reached. The studies sample characteristics and findings are summarized in Tables 1 and 2, respectively, located at the end of the chapter.

Results

Findings of the integrative review revealed that social norms' influence on the physical activity behavior of mothers of reproductive age may occur on an intrapersonal level and three socioecological levels (society, community and interpersonal). Discussion of the results revolves around the two research questions: (a) what social norms influence mothers' physical activity, and (b) how do mothers navigate physical activity needs in the context of prevailing social norms. The answer to these questions resulted in a socioecological categorization of the findings of the selected studies for understanding the complex dynamics among the levels of social normative influences (interpersonal, community, and society) on mothers' physical activity behavior (intrapersonal). See Figure 2.

Socioecological Influences of Social Norms on Mothers' Physical Activity Behavior

Society. Norms situated at a society level refer to gender roles in leisure or free time, expectations of mothers' self-sacrifice, and body image. Gender role differences in free time were found to be a salient theme. Women were seen as naturally suited to household duties and childcare, meaning that women were largely expected to assume responsibility for primary care of the children as well as domestic chores (Lewis & Ridge, 2005; Mansfield et al., 2012; McGannon & Schinke, 2013; Miller & Brown, 2005). In doing so, women were thought to find fulfillment in the domestic arena through accomplishment of their duties as mother and homemaker (McGannon & Schinke, 2013). In contrast, men were seen as better suited to provide for the family by working and pursuing interests outside the home (McGannon & Schinke, 2013; Miller & Brown, 2005).

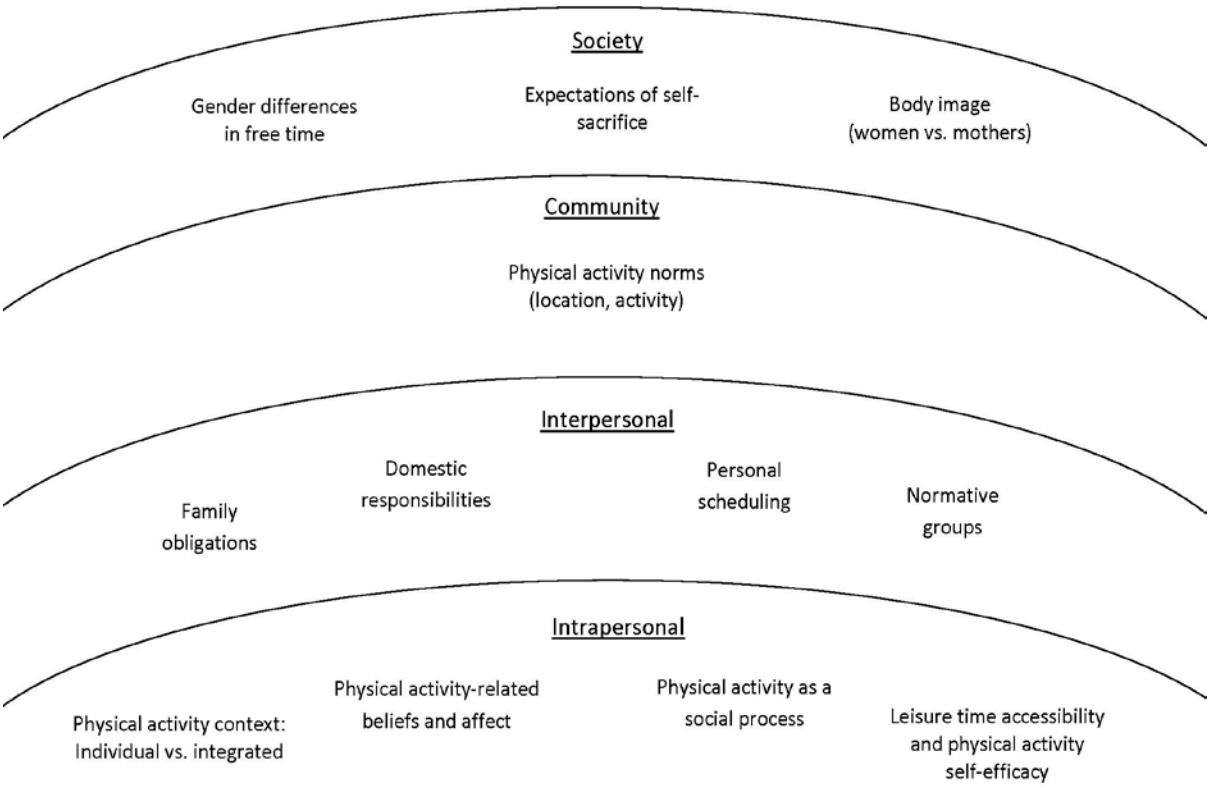

Figure 2. Socioecological categorization of the findings of selected studies for understanding levels of social norms influences on mothers' physical activity behavior

Additionally, men were either considered ill-suited to childcare or were simply not expected to engage in childcare; men were also not expected to help with domestic responsibilities (Lewis & Ridge, 2005; Mansfield et al., 2012; McGannon & Schinke, 2013; Miller & Brown, 2005). While not in the majority, a contrasting perspective on gender role responsibilities was noted in two studies. A feminist perspective was presented by McGannon and Schinke (2013) in their case-study of a working mother finding time to exercise: equality among genders was acceptable, in that women could "do it all" and choose to pursue interests outside the home and still fulfill their

role as a mother, and men could find fulfillment through performance of domestic duties and pursuits. Similarly, Lewis and Ridge (2005) also reported fathers with looser role expectations were more involved in care at home.

Self-sacrifice was another norm expressed by mothers. Mothers put their partners' and children's needs ahead of their own; this was both an expectation by mothers of themselves and by others toward mothers (Hamilton & White, 2010c; Lewis & Ridge, 2005; Mansfield et al., 2012; Miller & Brown, 2005). Mothers reported relegating their own needs and preferences in favor of others, and feeling expectations to put themselves last (Lewis & Ridge, 2005; Mansfield et al., 2012). In addition, a selfless attitude was considered part of being a good mother (McGannon & Schinke, 2013). Two studies also reported mothers experiencing a loss of self-identity as a result of commonly being identified primarily as through their role as mother to their children as opposed to being recognized as an individual in their own right (Hamilton & White, 2010c; Lewis & Ridge, 2005).

Body image norms also influenced physical activity among mothers. Two types of body image norms emerged from the literature: that of the "ideal" female body, and that of the "mother" body. Some mothers expressed feeling marginalized by social expectations for women to have slim, toned bodies, stating that the ideal was unrealistic and unachievable given the continuous demands of pregnancy, breastfeeding, and childrearing (Lewis & Ridge, 2005). Given that mothers felt their bodies were not ideal, and that they may even have been excluded from reaching an ideal condition, this norm undermined mothers' confidence and satisfaction in being active (Lewis & Ridge, 2005; Mansfield et al., 2012). In contrast, others felt that body size and shape standards were different for mothers, and that increased weight was acceptable for women with children due to the demands of motherhood (Lewis & Ridge, 2005; Mansfield et al.,

2012; Skowron, Stodolska, & Shinew, 2008), and no association was found between physical fitness nor physical appearance and physical activity (McIntyre & Rhodes, 2009).

Community. Physical activity social norms were also situated at a community level, as commonly performed types of physical activity and settings of physical activity may vary from neighborhood to neighborhood. In particular, norms for type and location of activity were important contributors to how comfortable mothers felt in engaging in physical activity. Gyms and group classes were not seen as welcoming to mothers, and oftentimes mothers reported feeling like they did not belong, making them feel uncomfortable to exercise in such a setting (Hoebeke, 2008; Lewis & Ridge, 2005). Similarly, mothers in a mixed-methods study by Mansfield, Ducharme, and Koski (2012) expressed that a lack of appropriate sport or exercise programs in their community prevented them from participating in regular physical activity, which also led to feelings of marginalization. In addition, other activities such as strength training or riding bicycles were not seen as appropriate activities for women in their particular communities. Some participants (15%) in a study by Skowron et al (2008) also reported that exercise in general was not considered to be part of their dominant culture, and this lack of physical activity within prevailing cultural norms was viewed as a constraint to leisure-time physical activity. In contrast, physical activity that was considered as appropriate in a given community was not viewed with any negative connotations. For example, mothers who walked in their neighborhood did not report feeling self-conscious (Hoebeke, 2008), and more traditional forms of physical activity, such as traditional dance, were seen as an important source of exercise for both mothers and children (Mansfield et al., 2012).

Interpersonal. Norms surrounding negotiation of family dynamics, specifically obligations surrounding childcare, performance of household duties, and personal scheduling,

were situated at an interpersonal level. The influence of social normative groups was situated at an interpersonal level as well. Norms regarding mothers' obligations in caring for their families were noted. Mothers commonly reported assuming the role of primary caregiver for their families, and this responsibility included the expectation to prioritize others' needs over their own. In particular, children's activities were seen as more important than mothers' activities (Dlugonski & Motl, 2016; Hamilton & White, 2010c; Hoebeke, 2008; Lewis & Ridge, 2005; Mailey, Huberty, Dinkel, & McAuley, 2014; Mansfield et al., 2012; Miller & Brown, 2005; O'Dougherty et al., 2008; Skowron et al., 2008), and taking time for others was more important to mothers than taking time for themselves as attending to others before oneself was considered part of being a good mother (Hoebeke, 2008; Mailey et al., 2014; McGannon & Schinke, 2013; Miller & Brown, 2005; Skowron et al., 2008).

Norms regarding responsibilities within the family also included fulfillment of household duties: mothers reported assuming primary responsibility for domestic chores. Mothers were expected to attend to cooking, cleaning, and maintenance of domestic order, regardless of employment status outside the home (Hamilton & White, 2010a, 2010c; Hoebeke, 2008; Lewis & Ridge, 2005; Miller & Brown, 2005). This distribution of labor was accepted, seen as a typical consequence of being a woman (Miller & Brown, 2005), and hard work both at a job and at home was simply a way of life (Hoebeke, 2008). Lastly, norms in family dynamics included personal scheduling. Mothers reported they were expected to structure schedules around the family, making accommodations for the activities of their husbands and children (Mailey et al., 2014; Miller & Brown, 2005; O'Dougherty et al., 2008). In doing so, mothers expressed a loss of personal control over their time, shaping their own activities to fit the situation of their partners, and making concessions when trying to fit in their own physical activity time (McGannon &

Schinke, 2013; Miller & Brown, 2005). Women also expressed being faced with a dilemma in trying to manage their time: either striving to be a 'supermom' by attempting 'do it all' for their families and themselves, or being a 'self-sacrificing' mom by letting their time be ruled by an 'all for others' approach, prioritizing their families' schedules and downplaying time for themselves (Lewis & Ridge, 2005).

Social normative groups were also situated at an interpersonal level. Social normative groups included individuals, or groups of individuals, whose beliefs and behaviors are thought to have an influence on mothers' physical activity. In a qualitative study based on a theory of planned behavior, Hamilton and White (2010a) found that normative groups for mothers included significant others, other parents with small children, mothers' own children, friends, other family members, and people with whom they exercised. In addition, being around other active parents helped mothers feel that taking time out for physical activity was acceptable. African-American and Latina women in a qualitative study by Hoebeke (2008) also expressed that engagement in physical activity was influenced by what they saw other family members and women in their community doing: staying inside the home and not exercising outside of the home. Participants stated this norm had been passed on to them, stating "we basically teach our kids the same thing we've been taught" (Hoebeke, 2008, p. 63). Similarly, 18% of Latina women in a mixed-methods study by Skowron et al. (2008) reported rarely seeing other Latinas exercising, which constrained their physical activity behavior, and one participant said she would exercise more if she saw more Latinas exercising.

The statistical association between normative groups and either physical activity or intent to engage in physical activity among mothers was also explored. McIntyre and Rhodes (2009) found that friends' approval of mothers' engagement in regular physical activity was moderately

associated with physical activity intention as well as engagement, and family approval was weakly associated with physical activity intention, but was not significantly associated with physical activity engagement. McIntyre and Rhodes (2009) also found that when taking other important concepts, such as attitudes and perceived behavioral control, into consideration, perceived norms regarding important others' approval of physical activity was not significantly associated with mothers' physical activity engagement, but it was moderately associated with their physical activity intention. Hamilton and White (2012) found that important others' approval of mothers' physical activity and perceived physical activity levels of friends with small children also showed weak to moderate associations with mothers' intention to engage in physical activity. Of note, the relationship between perceived physical activity of important others and mothers' physical activity intention was not significant. A longitudinal study by Rhodes et al. (2014) also did not find statistically significant association between important others' approval of physical activity and physical activity engagement and physical activity intention. In contrast, Ball et al (2010) found that women who see people in their neighborhood exercising or know people who exercise were 1.22 to 1.69 times more likely to engage in multiple types of leisure-time physical activity, including moderate to vigorous leisure-time physical activity, such as participation in sports and walking. Associations for transport cycling, and not knowing anyone who exercises were not significant.

Intrapersonal: Navigating Physical Activity in the Context of Prevailing Social Norms

Mothers' processes regarding physical activity in relation to prevalent social norms were situated at an intrapersonal level. Salient categories within the intrapersonal level of influence included physical activity context, physical activity-related beliefs and affect, physical activity as a social process, and leisure-time accessibility and physical activity self-efficacy.

Physical activity context. Mothers tended to contextualize physical activity either as an individual activity or as an activity integrated into the family. For those who considered physical activity from an individual perspective, physical activity was seen as a mother's personal responsibility or chore, to be managed alongside other obligations, such as childcare and household duties (Lewis & Ridge, 2005; Miller & Brown, 2005). As such, engaging in physical activity was only acceptable as long as it worked around family responsibilities. That is, the family's needs should be met before time could be taken for exercise, and individual physical activity should not add responsibility to significant others (Hamilton & White, 2010a; McGannon & Schinke, 2013). Making time for physical activity was often viewed as taking away from other more important responsibilities, such as spending time with children and fulfilling household duties (Hamilton & White, 2010a, 2010c; Lewis & Ridge, 2005; Miller & Brown, 2005). McIntyre and Rhodes (2009) found that mothers' belief that physical activity would take too much free time was associated with decreased physical activity intention and engagement.

On the other hand, mothers who considered physical activity from an integrated perspective incorporated being physically active into their role within the family. Physical activity was seen as beneficial to the family, rather than taking away from the family, thus making being physically active part of being a good mother (Miller & Brown, 2005). Mothers' perspectives varied as to how time for physical activity within the family could be managed. Making time for exercise was acceptable if it was integrated into family activities, such as actively playing with children, or while children were engaged in activities (Hamilton & White, 2010a, 2010c; Lewis & Ridge, 2005; Mailey et al., 2014; Mansfield et al., 2012). Mothers also

saw physical activity as a shared responsibility within the family, and were willing to let go of some household duties or expectations (Lewis & Ridge, 2005; Miller & Brown, 2005).

Physical activity-related beliefs and affect. Mothers expressed negative and positive beliefs and affect in regards to physical activity. Negative associations with physical activity among mothers included perceiving time engaged in physical activity as 'selfish' time (Hamilton & White, 2010c; Lewis & Ridge, 2005; Mansfield et al., 2012; Miller & Brown, 2005), and feeling guilty about taking time to exercise, especially if this involved time away from caring for children (Dlugonski & Motl, 2016; Mailey et al., 2014; Mansfield et al., 2012; McGannon & Schinke, 2013; Miller & Brown, 2005; O'Dougherty et al., 2008; Skowron et al., 2008). Some mothers not only felt personally guilty about taking time to exercise, but also negatively judged other mothers who took time to exercise (Miller & Brown, 2005). Mothers also expressed concern over being judged negatively for taking time to exercise (Mailey et al., 2014).

In contrast, physical activity was also associated with positive beliefs, particularly when mothers considered their role and needs within the greater context of the family. Mothers saw themselves as an individual component with a central role contributing to the well-being of the family, and therefore believed self-care to be as important not only for themselves but also for ensuring that they would be better parents and able to meet and support the needs of the family (Dlugonski & Motl, 2016; Hamilton & White, 2010c; Lewis & Ridge, 2005; Miller & Brown, 2005). As part of self-care, physical activity was recognized as a source of energy, well-being, and confidence (McGannon & Schinke, 2013). Taking time to engage in physical activity was not viewed as selfish, but rather as time to nurture their roles as a good parent, spouse, and employee (Lewis & Ridge, 2005; Mailey et al., 2014; Miller & Brown, 2005). Being a physically active mother was also thought to set a good example and role model for creating a physically

active family culture (Dlugonski & Motl, 2016; Hamilton & White, 2010c; Lewis & Ridge, 2005; Mailey et al., 2014; Miller & Brown, 2005). Identifying as a physically active parent was also associated with intention to engage in physical activity (Hamilton & White, 2012).

Physical activity as a social process. Motivation for mothers to engage in physical activity was more social rather than individually-based. Mothers deemphasized physical activity for weight management or physical health reasons, and instead endorsed being physically active for pleasure, social, and mental health benefits (Lewis & Ridge, 2005; Mailey et al., 2014; Miller & Brown, 2005). Motivation for being physically active included social interaction, improved mood, stress reduction, and feeling better overall (Mailey et al., 2014; Miller & Brown, 2005). In contrast, some mothers felt that although physical activity would theoretically help them feel better, the actual act of finding time to exercise created more anxiety rather than alleviating stress (Lewis & Ridge, 2005). McIntyre and Rhodes (2009) explored this theme in a cross-sectional study. The belief that physical activity 'makes me feel good' was moderately associated with physical activity intention but not physical activity engagement. Beliefs that physical activity would reduce disease and stress were not significantly associated with physical activity intention or engagement.

Leisure-time accessibility and physical activity self-efficacy. The theme of accessibility of leisure-time physical activity and associated self-efficacy was noted in eight studies. Mothers lacked a sense of entitlement to leisure-time physical activity (Dlugonski & Motl, 2016; Hamilton & White, 2010a; McGannon & Schinke, 2013; McIntyre & Rhodes, 2009; Miller & Brown, 2005; Skowron et al., 2008). Lack of engagement in leisure-time physical activity was accepted as a part of being a good mother; being too tired for physical activity or temporarily "ineligible" for physical activity were considered natural consequences of a mother's

role (McGannon & Schinke, 2013; Miller & Brown, 2005; Skowron et al., 2008). Entitlement to leisure-time physical activity also had economic ties. Mothers believed they were not entitled to prioritize their interests if they were not working at a job outside the home (Miller & Brown, 2005). In observing their partners' perceived greater ability to take advantage of leisure-time physical activity and pursuit of other interests, mothers did express resentment or envy, but ultimately accepted the circumstances (Hamilton & White, 2010c; McGannon & Schinke, 2013; Miller & Brown, 2005).

Interestingly, physically active mothers overcame a lack of entitlement to leisure-time physical activity by consciously making time for physical activity, rather than waiting for circumstances in which time would eventually be more accessible. Women who exercised regularly created time for exercise during the day, through scheduling and prioritizing physical activity as an important responsibility or commitment (Mailey et al., 2014; Miller & Brown, 2005; O'Dougherty et al., 2008). In doing so, physically active mothers expressed a sense of empowerment and control over their leisure time (Miller & Brown, 2005). Mothers in one study also reported negotiating times for physical activity in advance as a successful time management strategy; they also felt this was a healthy example of negotiation and cooperation for their children (Mailey et al., 2014). Greater perceived control over ability to engage in physical activity was also associated with physical activity intention and engagement (Hamilton & White, 2012; McIntyre & Rhodes, 2009; Rhodes et al., 2014).

Discussion and Conclusions

An analysis of current peer-reviewed literature revealed that social normative influences on mothers' physical activity intention and engagement occurred on multiple levels within a socioecological context (Stokols, 1992, 1996). Findings revealed that mothers' physical activity

intention and behavior were situated on and across multiple levels of social normative influences: intrapersonal, interpersonal, community and societal. There were differences in how mothers perceived that others viewed them and how they viewed themselves in regards to making time to engage in leisure-time physical activity. Traditional social normative views engender women as more suited for domesticity. Mothers are expected to assume primary responsibility for childcare and household chores, to have a self-sacrificial attitude that prioritizes family needs ahead of their needs, and to schedule leisure-time activities around others at the expense of their personal control and time. The literature was consistent and revealed that mothers' lack of time and barrier to physical activity was due to fulfillment of domestic obligations (Abbasi, 2014; Bellows-Riecken & Rhodes, 2008; Vrazel et al., 2008). Furthermore, mothers did not want to be judged by others for fear of being perceived as neglecting family and household responsibilities in favor of using frivolous personal time to engage in physical activity.

Social norms around women's bodies also influenced mothers' physical activity intention and engagement. In this context, physical activity is viewed as a social process instead of as an individual benefit. Conflicting expectations for women to have slim, toned bodies while also navigating the acceptance of increased weight for mothers often led to issues of feeling marginalized in common locations for physical activity, such as gyms or exercise classes. In these locations, mothers often felt judged because of their post-baby excess weight, felt they did not belong in the setting, and were expected to engage in lower-intensity physical activity, such as walking. In some studies, mothers reported feeling marginalized and unwelcomed to vigorous-intensity types of physical activity, such as team sports or other types of structured or organized activities (Ball et al., 2010). Other studies showed that the availability of culturally-sensitive

physical activity facilities and appropriateness of certain types of physical activity for mothers were factors in predicting physical activity intention and engagement (Abbasi, 2014; Vrazel et al., 2008).

Mothers who were able to contextualize intrapersonally physical activity into prevailing social norms were more successful at incorporating physical activity into their schedules as compared to mothers who were not able to contextualize physical activity into prevailing social norms. In addition, mothers who were able to be physically active with their children viewed childcare as a facilitator of physical activity in contrast to mothers who viewed physical activity to be separate from the needs of the family (Abbasi, 2014). These mothers also expressed feelings of selfishness and guilt as a barrier to physical activity and believed that leisure time was earned rather than deserved and luxury rather than necessity. Even when mothers were able to contextualize physical activity into prevailing norms, the results were not always positive. Although intention to engage in physical activity was associated with the belief that exercise would 'make me feel good,' physical activity was not significantly associated with stress reduction (McIntyre & Rhodes, 2009). It is likely that mothers contextualize physical activity as an additional chore rather than self-care.

The socioecological categorization of the literature related to social norms' contributions to physical activity intention and engagement among mothers, ages 18 to 45 years, demonstrates how social normative influences are potentially embedded within cultural standards and gender roles, and may provide guidance for target areas in individual and public health programs aimed at increasing physical activity among women and mothers in particular.

Limitations

Limitations of this review were a sparse literature about social norms' relation to physical activity in mothers and lack of a uniform tool used to assess social norms. Furthermore, meta-analyses of the systematic comparison of effect sizes across studies could not be located, primarily due to a lack of clinical studies and randomized-controlled trials. All relevant studies were likely not retrieved and included in this review, although a systematic process and methodology were used to maximize the inclusion of relevant studies. There was inconsistent agreement about the conceptual definition of social norms, physical activity and young or reproductive age mothers across studies. Most studies assumed physical activity was something that most mothers should want to engage in, even if opportunities were not readily accessible. While implied, the perspective of whether mothers would find physical activity to be desirable or necessary was not explicitly explored in many of the studies. In addition, social norms were explored from mothers' perspectives within heterosexual two-partner families; while single mothers were included, the experiences and effects of single motherhood or alternate family structures were not examined within this review. This review specifically focuses on mothers. Another perspective that should be explored is the influence of social norms on fathers' physical activity behavior.

Directions for Future Research

A paucity of research specifically exploring social norms and physical activity among reproductive age mothers was noted; alternatively, physical activity-related social support and self-efficacy were more commonly studied psychosocial variables. Social support is a related, but different concept to social norms and has been shown to influence women's physical activity behavior (Vrazel et al., 2008). Findings of this review revealed that physical activity is a socially

motivated process; thus, social support, along with social norms, is also important to measure. The limited social norms literature on physical activity in mothers was of good quality. The majority of studies were qualitative and based on a grounded theory or modified grounded theory design. The limited number of quantitative studies were mostly cross-sectional, with one longitudinal design. The mixed-methods studies employed a combination of grounded theory and cross-sectional methods. A greater depth of normative data was found in qualitative studies. Exploration of social norms in quantitative studies typically focused on normative groups and did not reflect the greater range and variability of normative influences reported in the qualitative literature. For future research, attempts to include additional normative influences reflected should be considered when measuring social norms.

In terms of study characteristics, the majority of the studies in the review originated from countries outside the US. In addition, none of the quantitative studies were from the US. While all studies focused on women, ages 18 to 45 years old, most participants were Caucasian or unspecified in ethnicity. Women of color were included in studies from the US; however, some of these studies did not focus on mothers specifically. More research focusing on mothers and physical activity is needed from within the US, as well greater exploration of social normative influences on physical activity among multicultural populations. Overall, varying degrees of socioeconomic status were evident across studies, suggesting that prevailing norms may be experienced by all mothers regardless of neighborhood, income, or education levels. No specific analyses were performed to test for effects of socioeconomic status on social normative influences, although emerging differences were noted in one study (Lewis & Ridge, 2005). Further research should continue to explore the potential influences of socioeconomic status on social norms and mothers' engagement in physical activity.

Additional explanatory models may be useful in translating qualitative findings into quantitative research. While qualitative studies were frequently underpinned by perspectives of feminism and social constructionism, the most commonly used theoretical frameworks in quantitative and mixed-methods studies included the Theory of Planned Behavior and Social Cognitive Theory. This review supports the existing call for increased use of socioecological modeling within research in the physical activity behavior of women and parents in particular (Bellows-Riecken & Rhodes, 2008; Vrazel et al., 2008). In addition, alternate explanatory frameworks, such as Pender's Health Promotion Model, might allow for greater exploration of variability both within and between social normative influences as well as other proven influential factors, such as social support, self-efficacy, and environmental variables such as socioeconomic status and neighborhood characteristics.

Table 1. *Sample Characteristics of Studies* ($n = 15$)

Study	Design	Theory	Location	Sample			
				Proportion of Mothers	Age (Years)	Race/Ethnicity	Socioeconomic Status (SES)
QUALITATIVE STUDIES							
Lewis & Ridge (2005)	Grounded theory	Feminist; sociology and cultural studies	Australia	100%	30-39	Unspecified	~50% low SES
Miller & Brown (2005)	Grounded theory	Feminist and structuralist perspectives	Australia	100%	26-37	Unspecified	~33% low SES
Hoebeke (2008)	Grounded theory	Transtheoretical model	United States	Exact number unspecified ("majority")	20-38	African American, Latina, and Caucasian	100% low SES
O'Dougherty, Dallman, Turcotte, Patterson, Napolitano & Schmitz (2008)	Grounded theory	Social cognitive theory; self-determination theory	United States	61.2%	Range: 25-44 Mean: 34.9 36.8	Women of color and Caucasian	60%-79.1% college degrees or postgraduate education
Hamilton & White (2010a)	Grounded theory	Theory of planned behavior	Australia	100% (subsample)	Range: 23-49 Mean: 35	Caucasian	Unable to determine; education level varied
Hamilton & White (2010b)	Grounded theory	Social constructionism; structural symbolic interactionism	Australia	100% (subsample)	Range: 23-49 Mean: 35	Caucasian	Unable to determine; education level varied
McGannon & Schinke (2013)	Critical discourse (single case)	Discursive psychology; social constructionism	Canada	100% ($n = 1$)	35	Unspecified	Unspecified

Study	Design	Theory	Location	Sample			
				Proportion of Mothers	Age (Years)	Race/Ethnicity	Socioeconomic Status (SES)
Mailey, Huberty, Dinkel, and McAuley (2014)	Grounded theory	Unspecified	United States	100% (subsample)	Mean: 38.5	Caucasian and African American	92% college degree
Dlugonski & Motl (2016)	Grounded theory	Social cognitive theory	United States	100%	Mean: 41.4	Caucasian, African American, and other	78.6% college degree
QUANTITATIVE STUDIES							
McIntyre & Rhodes (2009)	Retrospective, cross-sectional	Theory of planned behavior	Canada	100%	25-34yo	Caucasian (~90%) "Visible minority" Aboriginal	40.2% college degree
Ball, Jeffery, Abbott, McNaughton & Crawford (2010)	Cross-sectional	Theory of planned behavior; social cognitive theory	Australia	60.7%	Range: 18-46 Mean: 34.5	Unspecified	21.9% <HS; 51.7% HS Mostly low SES 1/3 suburbs
Hamilton & White (2012)	Cross-sectional	Theory of planned behavior	Australia	100% (subsample)	Mean: 34.1	77.1% Australian; 21.5% not Australian	53.8% college degree
Rhodes, Blanchard, Benoit, Levy-Milne, Naylor & Symons Downs (2014)	Longitudinal	Theory of planned behavior	Canada	100% (subsample)	Mean: 31.1-32.3	8%-10% visible minority; Majority presumably Caucasian	82%-83% college degree

Study	Design	Theory	Location	Sample			
				Proportion of Mothers	Age (Years)	Race/Ethnicity	Socioeconomic Status (SES)
MIXED-METHODS STUDIES							
Skowron, Stodolska & Shinew (2008)	Mixed methods: grounded theory and cross-sectional	Health ecological model	United States	94% with children under mother's supervision	20-50	Latina	"Majority" low SES
Mansfield, Ducharme & Koski (2012)	Mixed methods: grounded theory and cross-sectional	Social cognitive theory	Canada	100%	Mean: 35.7	Multi-ethno English speakers; Multi-ethno French speakers; Aboriginal	100% low SES

Table 2. *Summary of Study Findings* ($n = 15$)

Study	Ball, Jeffery, Abbott, McNaughton & Crawford (2010)
Purpose	Investigate relationship between clearly defined social norms and physical activity and dietary behavior
Theory	Theory of Planned Behavior, Social Cognitive Theory
Sample & Setting	$n = 3,610$; women 18-46 years; 60.7% mothers; ethnicity unspecified. Random selection from electoral voting roll in three economically disadvantaged neighborhoods of Melbourne, Australia
Design	Cross-sectional survey between 2007 and 2008; 45% response rate
Variables	DV: physical activity. IV: social norms. Covariates: social support, education, marital status, # of children, weight goal, neighborhood
Main Findings	After controlling for all covariates, social norms were associated with: • Leisure-time exercise: Agree OR: 1.22 (CI: 1.04, 1.43); Strongly Agree OR: 1.49 (CI: 1.20, 1.83) vs. Not Agree • Exercise/sport: Agree/Strongly Agree OR: 1.69 (CI: 1.47,1.94) vs. Not Agree • Volitional walking: Agree OR: 1.36 (CI: 1.14, 1.63); Strongly Agree OR: 1.68 (CI: 1.35, 2.10) vs. Not Agree • Volitional walking/cycling: Agree/Strongly Agree OR: 1.50 (CI: 1.33, 1.69) vs. Not Agree • Non-significant for transport cycling, not knowing anyone who exercises
Study	Dlugonski & Motl (2016)
Purpose	Explore physical activity among single mothers with varied physical activity levels using social cognitive theory constructs
Theory	Social cognitive theory
Sample & Setting	$n = 14$. Single mothers (not living with a partner); mean age: 41.4 years; 78.6% college degree; 50% Caucasian, 29% African American, and 21% other. Recruited from a database of 25 single mothers who were part of another study
Design	Qualitative, grounded theory using semi-structured interviews and constant comparative analysis of transcribed interviews; data collection years unspecified; locale unspecified
Variables	Self-efficacy, outcome expectations, barriers/facilitators, and self-regulatory strategies for physical activity behavior
Main Findings	Barriers to physical activity: lack of time due to employment and household responsibilities; limited opportunities. Preference was to spend leisure-time with children, putting children's needs and other responsibilities before own needs; time for self was considered selfish; had guilt about spending free time away from kids. Reframed thoughts about taking time for self-care and being physically active; expressed that prioritizing physical activity

	enabled to be a better mother and role model; was good for children and family; wanted to be around for children; children were the motivation for physical activity. Mothers who had moderate/high physical activity, scheduled physical activity into daily routine/part of schedule
Study	Hamilton & White (2010a)
Purpose	Identify the commonly held behavioral, normative and control beliefs related to regular, moderate physical activity performance among parents of young children
Theory	Theory of Planned Behavior
Sample & Setting	*n* = 21 mothers (40 parents total) in Australia; had at least one child younger than 5 years; 100% Caucasian; 23-49 years; mean age: 35 years; maximum variation sampling for age, gender, # dependents, marital status, education level, employment status, and physical activity levels; recruited via snowball sampling; sample size determined by theoretical saturation
Design	Grounded theory; focus group and individual interviews using semi-structured interview guide developed according to the Theory of Planned Behavior. Data collected 2008-2009. Iterative coding and thematic analysis until data saturation. Addressed credibility (confirming summaries in focus groups), transferability (community sample), and confirmability (disinterested peers reviewed data reduction)
Variables	Physical activity behavioral beliefs, normative beliefs (normative pressures), and control beliefs
Main Findings	Beliefs consistent across individual/group interviews and between men and women. **Behavioral beliefs**: parents' perceived time pressures; physical activity would take away from other responsibilities, such as family/work/chores; viewed physical activity as a sense of entitlement. **Normative beliefs**: okay with others as long as it does not add responsibility to significant others or take away from time with kids; physical activity acceptable if integrated within the family. **Normative groups** included significant others, other parents with small children, their children, friends, other family members, people they exercise with; being around other active parents lessened the guilt for engaging in regular PA
Study	Hamilton & White (2010c)
Purpose	Explore parents' understanding of physical activity, patterns of physical activity-related behavior, and how construction of social role expectations might influence PA behavior
Theory	Social constructionism; structural symbolic interactionism
Sample & Setting	*n* = 21 mothers (40 parents total) in Australia; had at least one child younger than 5 years; 100% Caucasian; 23-49 years; mean age: 35 years; maximum variation sampling for age, gender, # dependents, marital status, education level, employment status, and physical activity levels; recruited via snowball sampling; sample size determined by theoretical saturation

Design	Grounded theory; focus group and individual interviews using semi-structured interview guide developed according to the Theory of Planned Behavior. Data collected 2008-2009. Iterative coding and thematic analysis until data saturation. Addressed credibility (confirming summaries in focus groups), transferability (community sample), and confirmability (disinterested peers reviewed data reduction)
Variables	Physical activity patterns and social roles
Main Findings	Similar findings across individual and group interviews; integrating physical activity with children's activities is acceptable. **Parenting roles**: parents' activities given less value than kids; time for self is harder to achieve; self-sacrifice (have to put others' before self); loss of self-identity; spending time engaged in physical activity is selfish, takes away from other duties/ spending time with kids; physical activity can serve as role model that it's important for family and that it contributes to well-being, which supports family well-being; create active family culture. **Partner role**: staying fit/attractive for significant other; fulfilling household duties (cooking/cleaning) more important than physical activity (own needs to be active); fathers more able to take leisure time, but integrate into family to avoid resentment; take time for self = "selfish" **Conflict resolution**: need to be more assertive in asking for help; reframe beliefs about household chores (re-evaluate standards or incorporate physical activity into chores; acceptance/deserving of own needs; prioritization of physical activity vs. other roles
Study	Hamilton & White (2012)
Purpose	Investigate social influences thought to impact parents' intentions to be physically active
Theory	Theory of Planned Behavior
Sample & Setting	n = 288 mothers (580 parents total) living in Australia with at least one child younger than 5 years; 53.8% college degree. Recruited from various family/parenting networks (parents' groups, baby/toddler swim schools, child play centers, day care/play, group associations, University Alumni association)
Design	Cross-sectional survey between 2009 and 2010 in Australia
Variables	DV: physical activity intention. IV: attitude, subjective norms; perceived behavioral control; descriptive norms; group norms; family and friend social support; active parent identity. Covariates: age, marital status, education level, ethnic background, work status, # of children
Main Findings	Adjusted R^2 = .57 for physical activity intention. *** = most influential variables (subjective norms) ** = 2nd most influential variables (attitude, perceived behavioral control, and active parent identity) Not significant: descriptive norms, group norms, family social support, friend general support, and friend instrumental support

Study	Hoebeke (2008)
Purpose	Explore low-income women's perceived barriers to physical activity
Theory	Transtheoretical Model
Sample & Setting	*n* = 14; women 18 years or older; low-income; included African American, Latina, and Caucasian women; majority single parents of young children (exact # unspecified). Recruitment occurred through a community health center and the nearby Habitat for Humanity neighborhood and a Women, Infant and Children support group
Design	Grounded theory with focus group interviews in 2001 in the United States. Focus groups homogenous by ethnicity, translator available at Latina focus group. Childcare provided during focus groups. At final stage of analysis, outside expert reviewed data; interrater reliability = 90%; discrepancies reviewed and categories revised with feedback
Variables	Barriers to physical activity: "What gets in the way of fitting physical activity into your daily life?"
Main Findings	Important for African American and Latina women, but not for Caucasian women, to see others and significant others. Many mothers had no prior experience with physical activity being a part of the cultural norm: "Women are just in their homes. They don't go out and exercise. We basically teach our kids the same thing we've been taught." Women do not exercise. Domestic duties (work, child care, house chores) prioritized over time for self, such as physical activity. **African American mothers**: hard work at job and keeping house; no time for self to pursue physical activity for sake of exercise; priority is childcare; physical activity means less time for family/friends (taking time for important others takes precedence over time for self) **Body image and physical activity norms**: Self-conscious about looks when exercising in class, but others who walked in neighborhood did not feel self-conscious; focus was on weight loss vs. pleasure **Environmental factors**: cost, transportation, and neighborhood safety
Study	Lewis & Ridge (2005)
Purpose	Develop a deeper understanding of the different ways in which women make sense of physical activity within the contexts of their everyday lives as mothers of young children, especially understanding the tensions, dilemmas, and trade-offs which women experience around physical activity.
Theory	Feminist sociology and cultural studies
Sample & Setting	*n* = 40; mothers of at least one child <5 years. Purposive sampling strategy with 'maximum variation sampling' included a range of income levels, marital status, employment, age, number/age of children, level of physical activity. Snowball and opportunistic sampling strategies were also used to recruit from maternal/child centers, playgroups, childcare centers, fitness centers, community health centers and community support services
Design	Grounded theory using individual interviews at participants' homes. Data were collected between 1998 and 2000 in

	Melbourne, Australia. Interviews recorded and professionally transcribed. Analysis developed as cyclical and reflexive process as data collection progressed. All transcriptions double coded by colleagues, codes checked, compared and refined in final stage of analysis.
Variables	Physical activity, own health, health of the family, role as mother, meanings around physical activity
Main Findings	Maternal 'ethic of care'; physical activity take into consideration social factors rather than focusing on individual aspects; emerging differences between low SES and more socially advantaged mothers; mothers less focused on self ==> use ecological model to encompass social and family-oriented influences of PA (mental well-being, social connections) **'New' good mother**: physical activity viewed as an opportunity to be active with family; not considered selfish; constructed time around needs of others; strengthened relationships and contributed to wellbeing of family; need to take care of self to be good mother and role model; create healthy family culture; more relaxed stance towards domestic role, let go of some duties/expectations; mother's physical activity should be a shared responsibility. **'Traditional' good mother**: physical activity is selfish time; prioritized kids, others and duties; more internalized stance towards domestic role, responsibilities first; mother's physical activity is own responsibility; relegate one's needs; expectations to 'do it all' and be a 'supermom.' **Role expectation norms**: responsibilities for routine, domestic order, PA; responsibility for chores; self vs. others; supermom vs. self-sacrificing mom **Body image norms**: social expectations of 'ideal' body marginalize mothers, undermine confidence and satisfaction in being active; healthy body size/shape standards different for mothers **Physical activity norms**: conventional locations/types for physical activity; participants in group classes not welcoming to mothers; settings marginalize mothers; physical activity for weight management vs. pleasure, social &mental health benefits **Beliefs**: parenting young children undervalued social role, complexities under-recognized at social, economic, and political levels; mixed results about physical activity being beneficial for mental health vs. causing more anxiety **Gender role expectations**: women = caregivers and responsible for domestic duties; men = not necessarily involved in care (although some less strict role expectations show fathers more involved in care)
Study	Mailey, E.L, Huberty, J., Dinkel, D., & McAuley, E. (2014)
Purpose	Determine whether parenthood impacts physical activity participation similarly for working mothers and fathers, and to explore barriers and facilitators of physical activity within these populations
Theory	None specified
Sample & Setting	*n* =13; mean age: 38.5 years; all employed full time; 92.3% married, 92.3% White, and 92.3% college degree. Convenience sample recruited via email lists from two universities
Design	Grounded theory with 1.5 hour focus group sessions; period of data collection unspecified; Midwestern United States. Mothers and fathers participated in separate focus groups. Sessions were audiorecorded and transcribed. Constant

	comparative analysis.
Variables	Physical activity benefits, motives, barriers, and facilitators among parents; how physical activity behavior had changed since becoming a parent
Main Findings	**Barriers**: children/family responsibilities, lack of childcare, guilt, caring for others, difficulty prioritizing physical activity over children; too much to balance; put others' needs and schedules first **Facilitators**: being active with children during their activities; setting good example/role model; physical activity important for creating active family culture; important to send message to kids that physical activity is important **Negotiation**: negotiating time to carve out time to be active while kids sleeping, or during work day; negotiations with spouse/plan ahead of time; negotiate schedules with each other **Meaning of physical activity**: being more present and alert in roles of parent, spouse, employee; feeling better; stress; positive impact on parent role

Study	Mansfield, Ducharme, & Koski (2012)
Purpose	Identify the individual, social and environmental factors that influence utilitarian (activities of daily living, including occupation) and leisure-time physical activity among multiethnic socioeconomically disadvantaged mothers
Theory	Social cognitive theory
Sample & Setting	$n = 42$ in focus groups; $n = 59$ completed physical activity survey; multiethnic mothers, urban dwelling with at least one child ≤14 years living at home; purposive sampling drawn from prenatal nutrition program and community action plan for children in Canada. Bilingual (English/French) moderators facilitated each of the focus groups
Design	Mixed methods: grounded theory and cross-sectional physical activity survey in 2008
Variables	Qualitative: determinants of physical activity Quantitative: DV: physical activity level; IV: age, BMI and ethnicity
Main Findings	**Intrapersonal barriers**: lack of motivation and fatigue **Interpersonal barriers**: nonsupportive cultural norms; acceptance vs. not of women to ride bikes; lack of appropriate sport/exercise programs for women; feeling marginalized; family obligations and expectations (caring for children; husbands rarely assist with childcare; prioritize kids over self; expectation to put self last; guilt about taking time to exercise; physical activity appropriate when with kids playing, but inappropriate when kids not involved **Motivation**: weight loss vs. increased weight acceptable for mothers **Social environment**: negative experiences related to body size/shape **Environmental factors**: safety of neighborhood, places to exercise, weather, street lighting, childcare, accessibility of places to exercise, financial barriers, clothing cost, and transportation

Study	McGannon & Schinke (2013)
Purpose	Theorize and study mother identities as subject positions constructed within discourse(s), and explore the implications for one woman's physical activity participation

Theory	Discursive psychology; social constructionism
Sample & Setting	*n* = 3; 35 year; employed full time; mother of 2 kids under 6 years; primary caregiver; in the process of incorporating physical activity into lifestyle after being sedentary. Husband: 38 years, employed full time. Male co-worker: exercise buddy; 35 years, married with 2 kids under 6 years; equal distribution of childcare in home, also reintroducing physical activity into lifestyle. Recruited via advertisement at wellness fair
Design	Single-case study, critical discourse analysis. Nine in-depth, semi-structured interviews, 60-120 minutes each interview: - 5 for case over 16 weeks (4 interviews over 12 weeks, then 1 follow-up 4 weeks later) - 2 for husband and 2 for co-worker (1 at beginning, and 1 at 12th week) Year conducted and locale unspecified; participants given pseudonyms to maintain anonymity
Variable	How is motherhood identity constructed by one's self and others within discourse(s) and what are the associated meanings? What are the implications of a discursively produced mother identity for one woman's PA participation?
Main Findings	**Patriarchal discourse**: 'good mother'; women naturally suited to household duties and childcare; personally fulfilled through being good mothers (less need and encouragement to pursuits outside home); guilt if physical activity took time away from caring for kids; prioritize family over personal physical activity; women responsible for domestic duties/ behaviors in free time; care for emotional needs of others, sacrifice to maintain family harmony; too tired for physical activity = natural result of being good mother; selfless attitude = good mother; men = providers, fulfilled through pursuits outside of home; ill-suited to childcare, not expected to assist with domestic duties **Liberal feminist discourse**: 'Super mother'; equality and opportunity for men and women; women can 'do it all'; pursue career, fulfillment outside home while balancing demands of motherhood; men can seek fulfillment through domestic pursuits/behaviors; physical activity = source of energy and well-being, better allow to care for kids; also source of confidence in other areas of life; 'super mother' = myth; doing it all ==> over-tiredness and frustration with persistent unequal distribution of labor
Study	McIntyre & Rhodes (2009)
Purpose	Evaluate physical activity behaviors of urban women changed during transition to motherhood; determine theory of planned behavior correlates of physical activity; and evaluate current social cognitive correlates of physical activity during motherhood
Theory	Theory of Planned Behavior
Sample & Setting	*n* = 139; urban mothers; 25-34 years with at least one child 0-4 years old; 40.2% college degree; 59.8% high school; 88.7% Caucasian. Recruited from parenting programs/groups, preschool associations, online parenting forum in Canada (Greater Victoria region)
Design	Retrospective, cross-sectional

Variables	DV: physical activity. IV: attitude, behavioral beliefs, subjective norm, normative beliefs, perceived behavioral control, control beliefs, and intention
Controlled for / potential confounders	None specified. Analysis done by hierarchical regression. PA=DV, Block 1 -Intention, Block 2- PBC, Block 3 - Attitude, Subjective Norm Intent = DV: only 1 block (PBC, attitude, subjective norm)
Main Findings	**Physical activity intention model**: $R^2 = .47$. No significant relationship between physical activity intention and instrumental attitude. Statistically significant relationship between physical activity intention and perceived behavioral control ($\beta = .40, p < .01$), affective attitude ($\beta = .39, p < .01$), and subjective norms ($\beta = .25, p < .01$) **Normative beliefs**: Friends' approval was associated with physical activity behavior ($r = .23, p < .01$) and intention ($r = .24, p < .01$). Family approval was associated with physical activity intention ($r = .17, p < .05$), but not for physical activity behavior. **Behavioral beliefs**: makes me feel good was significantly associated with physical activity intention ($r = .22, p < .01$), but not with physical activity behavior; takes up too much free time was significantly associated with physical activity intention ($r = -.47, p < .01$) and behavior ($r = -.22, p < .01$), but not with physical fitness, physical appearance, reduce disease, or relieves stress.
Study	Miller & Brown (2005)
Purpose	Explore ideologies and negotiation strategies for active leisure participation among heterosexual women with young children
Theory	Feminist and structuralist perspectives
Sample & Setting	$n = 12$; mothers 26-37 years with heterogeneous socioeconomic status, physical activity level, and partner support. Purposive sampling was used by contacting participants who had participated in a large randomized controlled trial to test the effect of print and community-based interventions to increase physical activity in Queensland, Australia. Data collection period was not specified.
Design	Qualitative approach using one-on-one interviews. Constant comparative method used for data analysis.
Variables	Current leisure-time physical activities; strategies for accessing leisure-time physical activity; role of partner in supporting independent leisure-time physical activity; and perceptions of community and social influences on leisure-time physical activity behavior
Main Findings	Chores/needs of others prioritized before time for self; it's a part of being a mother. Prioritizing others = 'good mother'. Guilt was associated with leaving kids with others to take time out for self, some expression of negative judgment about others who do so; taking time to exercise created stress by taking away time from other duties/ responsibilities (as opposed to a sense of entitlement to leisure); physical activity = selfish time, takes away from family unit, and was considered a chore, an additional responsibility.

	Inactive women expressed acceptance of inactivity due to choice to be a mother; active women *made* time rather than *had* time for PA; created sense of empowerment and control over leisure time. Taking care of self and finding balance was evidence of good mothering skills, letting chores go was okay. Mother is central to family's well-being, therefore physical activity = better able to fulfill roles as mother and wife. Motivation to exercise were perceived benefits, social interaction, feel better, improved mood and stress reduction. There was some resentment/envy of partners' greater sense of entitlement to leisure-time physical activity and distribution of household duties. Women adapt to others; shape own activities to fit situation of partner. Breadwinners in home = preferences, interests take precedence; if not earning outside home ==> not entitled to leisure without economic contribution
Study	O'Dougherty, Dallman, Turcotte, Patterson, Napolitano, & Schmitz (2008)
Purpose Theory	Understand factors associated with adhering to a gym-based strength training intervention among diverse women in their mid-life years and compare motivators and barriers across race/ethnicity
Theory	Social Cognitive Theory and Self-Determination Theory
Sample & Setting	*n* = 49 (25 women of color, 24 Caucasian women). Participants were a part of a randomized controlled physical activity intervention trial for premenopausal women (25-44 years). Women were African-American, Asian-American, Native American, multiracial, and Caucasian living in Minneapolis-St. Paul, Minnesota. 61.2% mothers (80.0% women of color, 41.7% Caucasian); highly educated and working full-time.
Design	Grounded theory using 75-minute audiotaped focus groups between Summer 2004 and Winter 2005. Data were analyzed using content analysis.
Variables	Individual, social and study-related factors that facilitated or undermined adherence to twice-weekly strength training
Main Findings	Competing obligations of family and work: personal schedules structured around activities of others; feelings of guilt if personal physical activity time is taken after work; childcare prioritized above physical activity; many women expected to work around family schedule (husband, kids). High adherence to physical activity were related to responsibility/commitment and scheduled into day. Strength training not appropriate for women ==> should "lose weight, not bulk up" so will not look like a "dude." Mixed important others' support for physical activity expressed; accountability and manageable scheduling into day made adherence easier
Study	Rhodes, Blanchard, Benoit, Levy-Milne, Naylor, & Symons Downs (2014)
Purpose	Examine the social cognitive correlates of physical activity across cohorts of young adult couples over 12 months; assess whether attitudes, subjective norm, perceived behavioral control, and intention changed from baseline to 12 months, and whether any of the relationships were moderated by sex and/or parental status; and evaluate the longitudinal prediction utility of the overall Theory of Planned Behavior model.

Theory	Theory of Planned Behavior
Sample & Setting	*n* = 314 adults (157 couples) in Victoria metropolitan area, British Columbia, Canada; 25-40 years; 68 mothers expecting first child at baseline; 38 mothers expecting second child at baseline; ~8% "visible minority." A majority of the sample was college educated and employed with middle to high household income. Recruitment occurred via clinics, coffee shops, newspapers, online parenthood lists, purchase lists, physician/midwife offices, outreach parent groups, prenatal classes, baby retail outlets, etc.
Design	Prospective, longitudinal between January 2007 and December 2011. Hierarchical linear modeling analysis stratified by sex was computed.
Variables	DV: physical activity. IV: attitude, subjective norm, perceived behavioral control, and intention. Covariates: gender and parental status
Main Findings	No significant difference in mean subjective norms between groups non-parents, new parents and second-time parents, suggesting that parental status does not have effect on norms in this sample. Subjective norms did not significantly predict physical activity intention
Study	Skowron, Stodolska, & Shinew (2008)
Purpose	Examine participation rates in leisure-time physical activity among Latina women from two Chicago suburban communities and to explore factors affecting their leisure time physical activity levels
Theory	Ecological model of health
Sample & Setting	16 in-depth interviews; 269 completed questionnaires; women, aged 20-50 years. A majority were of low socioeconomic status with children under their supervision. Women approached while at the parks for questionnaire; interviews recruited from pool of women who completed questionnaire. Setting: Chicago suburbs.
Design	Cross-sectional, mixed methods: survey and in-depth interviews (grounded theory). Interviews, conducted in Spanish language, lasted 25-35 minutes from December 2005 to January 2006. Survey was conducted in Summer 2005. Transcripts mailed to participants for accuracy.
Variables	Physical activity; constraints of physical activity; social support; and attitudes towards physical activity
Principal Findings	32.8% reported lack of childcare as a physical activity constraint and 30.3% report lack of time as a physical activity constraint; 18% reported rarely seeing Latino people exercising as a physical activity constraint; 15% reported exercise not being a part of Latino culture as a physical activity constraint. Interviews revealed that the primary constraints to physical activity were family roles, necessity of child-care, and lack of energy. Moreover, Latino communities put pressure on role of mother and wife, and "this leaves very little, if any, time for

	exercise." Time caring for family takes priority; physique not that important; marriage takes a lot of liberty to exercise, instead time/expectations placed in family/household; feelings of guilt about having time for self instead of taking care of kids; one participant also said she would exercise more if she saw more Latinas exercising.

CHAPTER III

THEORETICAL PERSPECTIVES

Discussion of the integrated theoretical framework that underpinned this study about understanding the influences of social norms, social support, self-efficacy, and neighborhood environment on the physical activity behavior of reproductive age mothers, considering sociodemographic characteristics, is presented in this chapter. The integrated theoretical framework was based on two theories: socioecological and self-categorization. The socioecological theory explains environmental influences in health promotion (Stokols, 1992, 1996). The self-categorization theory explains self-identity within social groups and the emergence and influence of social norms (Hogg, 2006; Hornsey; 2008; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). An overview of each theoretical perspective is presented followed by a discussion of the integrated theoretical framework that was used to guide this study.

Socioecological Perspective

Although the field of social ecology has been in existence since the late 1960s, efforts to specifically conceptualize health promotion within the socioecological perspective did not crystallize until the late 1980s and early 1990s (McLeroy, Bibeau, Steckler, & Glanz, 1988; Stokols, 1992, 1996). Until then, health promotion focused on individually-oriented approaches. Alternatively, socioecological approaches to health promotion allow for a more comprehensive approach by examining not only individual factors, but also social and physical/built environmental factors in order to determine what a healthy environment is and how to create and sustain a healthy environment (Stokols, 1992, 1996). The levels of socioecological influence include the individual/intrapersonal, interpersonal/social, institutional/community, and society, which are nested and interrelated.

The underlying premise of the socioecological perspective is that human health is shaped by the dynamic interplay between personal/individual factors (e.g., genetics, gender, race/ethnicity, psychological disposition, etc.) and multilevel social determinants (e.g., education, economics, culture, social networks, built environment, policy, politics, etc.) (Stokols, 1992, 1996). Either singly or in combination, these multifaceted and multidimensional factors can have a cumulative effect on health over time, and not all of these factors affect all individuals equally. Stokols (1992) does not identify specific concepts to examine within the environment; rather, the situation (e.g., neighborhood characteristics) in which the behavior (e.g., physical activity) is situated is considered.

Self-categorization Theory

Self-categorization theory comes from the field of social psychology and encompasses social identity theory; it was in response to criticisms about the overly individualistic and simplistic conceptualization of group relations as an aggregate of interpersonal processes and failing to take into account contextual factors such as language, culture and history (Hornsey, 2008). In the 1970s, social identity theory focused on how social context affected relations between groups and presumed that intergroup relations were comprised of cognitive, motivational and sociohistorical influences (Tajfel & Turner, 1979). In the 1980s, social identity theory was refined and presented as self-categorization theory, a new and separate theory that focuses on social cognitive processes within groups, specifically individuals in a group context (Turner et al., 1987). In addition, self-categorization theory focuses on how in-group processes give rise to social norms, a central concept of this study.

According to the self-categorization theory, individuals are categorized into groups and groups emerge as a result of people creating shared cognitive representations of social categories,

called prototypes, in which a general set of attributes, such as attitudes and behaviors, serve to define a particular group and differentiate it from other groups (Hogg & Reid, 2006; Turner et al., 1987). In doing so, similarities within a group and differences between groups are accentuated, creating in-group prototypes (the group to which a person belongs and is similar) and out-group prototypes (groups to which a person compares and contrasts his or her group). Furthermore, individuals tend to view their in-group attributes more positively than attributes of out-groups. Group prototypes may vary in different contexts as different group comparisons become available. Social categorization occurs when representation of a person is reconfigured to conform to your group's prototype such that the person is depersonalized and his or her unique attributes are not considered. That is, the person is seen as an embodiment of your group's prototype or expected attributes of your group. Depersonalization creates stereotypical expectations of how people should act in accordance with your group categorization.

Not only do people categorize others, but they also categorize themselves into prototypes, including depersonalizing themselves, as they do others, in recognition of the in-group prototype (Hogg & Reid, 2006; Turner et al., 1987). This self-categorization not only creates a feeling of belonging and group identification, but also creates normative behavior as an individual's attitudes, emotions and behavior conform to the perceived in-group prototype. Prototypes are individual cognitive representations. In-group and out-group prototypes are generally shared among members of a particular group and result in social norms, which have been defined as "shared cognitive representations, that, within a particular context, characterize the behavior of members of relevant out-groups and describe and prescribe the behavior of in-group members including ourselves" (Hogg & Reid, 2006, p. 10). Because group prototypes are anchored in

social consensus, prototypes and associated normative beliefs can shift or change as information from others and perceptions of social consensus also shift.

Social categorization produces normative behavior when the individual perceives the categorization and its associated group prototypes as psychologically salient (Hogg & Reid, 2006; Turner et al., 1987; Terry & Hogg, 1996). The salience of available social categories to an individual depends on accessibility and fit; an individual must identify with an in-group in the particular context. Accessibility considers the readiness with which a person considers and adopts a particular self-category and is determined by whether a categorization is chronically and situationally relevant in an individual's self-concept, such as gender and/or race/ethnicity. Fit refers to how well reality reflects the criteria that define a social category and can be categorized as a comparative fit or a normative fit. A comparative fit refers to how well a categorization maximizes in-group similarities and out-group differences. A normative fit refers to how well a categorization reflects stereotypical expectations as defined by the prototype. When a category becomes salient, an individual is more likely to self-categorize himself or herself into that particular group prototype, thereby accessing the prototype's associated normative influences.

Integrated Theoretical Framework

As demonstrated in the literature presented in the previous chapter, mothers typically have multiple self-identities to consider when negotiating time to engage in physical activity, which was often motivated and determined by social norms rather than personal factors; findings that are consistent with the self-categorization theory (Hogg & Reid, 2006; Turner et al., 1987; Terry & Hogg, 1996). In addition to personal and social factors, the physical/built environment also can be influential in facilitating or impeding health promotion, such as physical activity behavior, as presumed in the socioecological perspective (Stokols, 1992, 1996). The

socioecological perspective, which is broad in scope, provided an overarching context for the study with the underlying assumption that a mother's health was influenced by dynamic, multiple interrelated and multifaceted levels of influence (individual, interpersonal, institutional, community and society). Using self-categorization theory, another assumption of the study was that a mother's self-identity was shaped by the normative influence of her social group. See Figure 3 for the integrated theoretical framework used to guide this study.

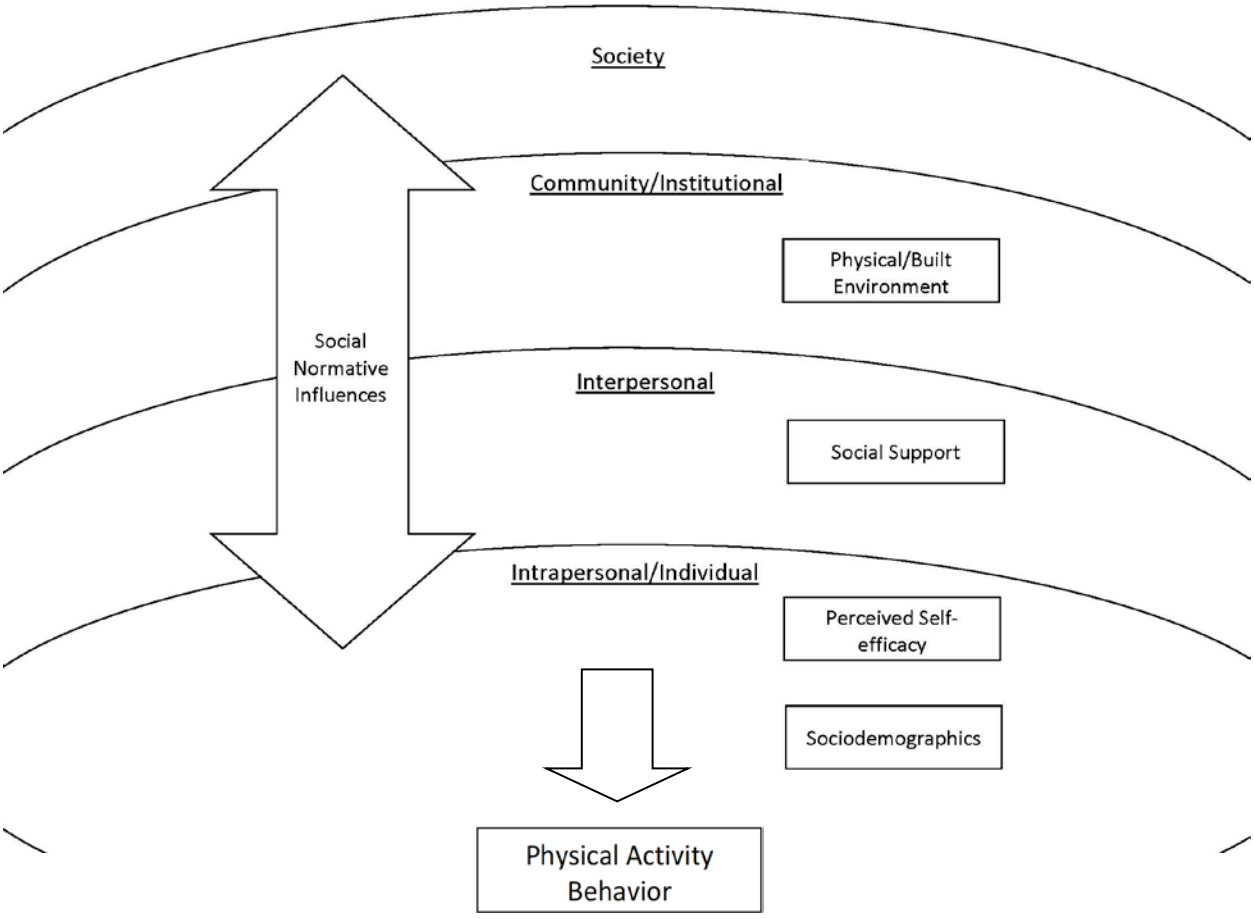

Figure 3. Integrated theoretical framework of individual, social and environmental factors on mothers' physical activity behavior

The integrated framework was used to examine the social normative influences on physical activity behavior in reproductive age mothers, 18 to 45 years, the relationship between physical activity behavior and the community or built/physical environment (neighborhood qualities), social/interpersonal environment (social support), and individual/intrapersonal factors (self-efficacy and sociodemographic characteristics). The framework includes the multiple socioecological levels of influence: individual/intrapersonal, interpersonal, institutional, community and societal, which allows for context-specific examination of phenomena and a collective social responsibility for individuals' health outcomes (Stokols, 1992, 1996). Such a perspective moves away from an individual, person-blaming focus of health to a perspective that incorporates health into a larger systems context.

Consistent with self-categorization theory (Hogg & Reid, 2006; Turner et al., 1987; Terry & Hogg, 1996), in the integrated framework, social normative influences are presumed to be present on all levels with interactions among the levels of influence. Not only is group membership presumed to have normative influence on the individual, but group norms are also presumed to be shaped by the individual. Self-categorization theory ascribes to a collective rather than an overly individualistic perspective (Hornsey, 2008). People are presumed to be situated in a larger social context and typically do not function in isolation. Each person is presumed to be inextricably part of, influenced by and even defined by his or her social surrounding. The emphasis on the individual as a part of the collective whole may be at odds with the Eurocentric tendency to favor individualism and autonomy over communitarianism.

Conclusions

The self-categorization theory presents a novel explanation of social norms, taking into account social environment, group dynamics and population-specific social leverage. Along with

the socioecological perspective, the self-categorization theory is compelling in making explicit the perceived acceptability of not only behaviors, but also the attitudes and beliefs of members of a particular group within a certain context. The integrated framework presents a unique and comprehensive view of the contribution of social norms to physical activity behavior among mothers while simultaneously taking other important factors into account. In the long-term, the integrated framework may offer insight into the social environmental context of mothers' physical activity behavior by identifying influential components. Finding key leverage points may allow for better tailoring of physical activity interventions as well as informing recommendations for policy solutions that target mothers' physical activity behavior; and in turn, ultimately affect community health changes within this population. Furthermore, the integrative framework could be useful in planning public health messaging to encourage physical activity within the built environment as well as in program planning by making underlying social normative dynamics explicit. Nurses are well-suited for supporting health promotion and behavioral change while taking social and environmental contexts into consideration and thus advocating for holism, while also respecting people's autonomy and individualism.

CHAPTER IV

METHODOLOGY

Chapter IV is a description of the methodology used to examine the influences of social norms, social support, self-efficacy and neighborhood environment on the physical activity behavior of reproductive age mothers, taking into consideration sociodemographic characteristics. The influences of physical activity were assessed on three levels: individual (sociodemographic characteristics and self-efficacy), interpersonal/social (social norms and social support) and community (neighborhood environment). The methodology described includes the study design, sample, setting, recruitment, eligibility screening, data collection procedure, variables and measures, and data analysis.

Study Design

The design of this non-experimental study was descriptive and correlational with data collected at one cross-section of time in Northern California between July 2016 and November 2016. The Institutional Review Board of the University of California, San Francisco approved the study (see Appendix A).

Sample and Setting

The target population was mothers of reproductive age living in Northern California, including the Sacramento and San Francisco metropolitan areas. Inclusion criteria were non-institutionalized women between 18 and 45 years old with at least one dependent child living at home and able to speak and read English. Exclusion criteria were pregnant women, women 6-months postnatal, women with physical limitations that might hinder ability to engage in physical activity, and female professional or semi-professional athletes who were more likely to be physically active irrespective of social normative influences. Pregnant women and women

within the first six months after delivery were excluded because they were more likely to be dealing with transitions, such as breastfeeding, childcare, post-pregnancy weight management concerns, among others factors, that may affect physical activity behavior (Cochrum, 2015; Ohlendorf, Weiss, & Oswald, 2015).

In order to examine the influences of social norms, social support, self-efficacy, neighborhood environment and sociodemographic characteristics on physical activity behavior in reproductive age mothers, a priori sample size calculations with power set at .80, medium effect (noted in parenthesis) and $p \leq .05$, two-tailed, were calculated (Cohen et al., 2003; Hulley, Cummings, Browner, Grady, & Newman, 2013). The recommended minimum sample size was 128 for Independent Student *t*-test analysis ($d = .5$) and 127 for multiple linear regression analysis with 12 predictors ($R^2 = .15$).

Recruitment and Eligibility Screening

Recruitment strategies attempted to incorporate maximum heterogeneity in regards to race/ethnicity and income using word-of-mouth and snowball sampling techniques, which have been shown to be effective recruitment strategies for reaching hard-to-reach populations (Sadler, Lee, Lim, & Fullerton, 2010). The assumption was that people likely socialize with others who have similar characteristics, and thus, participants were encouraged to refer others to the study. Flyers were distributed and posted in organizations that provide services and outreach to mothers, such as Women, Infants and Children, Family Resource Centers, community health centers, and daycare centers. Flyers were also distributed in places mothers might visit, such as coffee shops, restaurants, shops, gyms, libraries, parks and pools. Online advertisements were distributed to daycare and employment listservs and posted in online mothers' groups on social media sites such as Meetup.com and Facebook.com.

The number of people who were reached as a result of recruitment is unknown; however, of the 245 women who contacted the researcher, 88 women heard about the study from online social media, 55 women were participant referrals, 55 women were from unspecified sources, 20 women were from daycare centers, 15 women were from employment listservs, 10 women responded to flyers, and 2 women were from workout group listservs (see Figure 4).

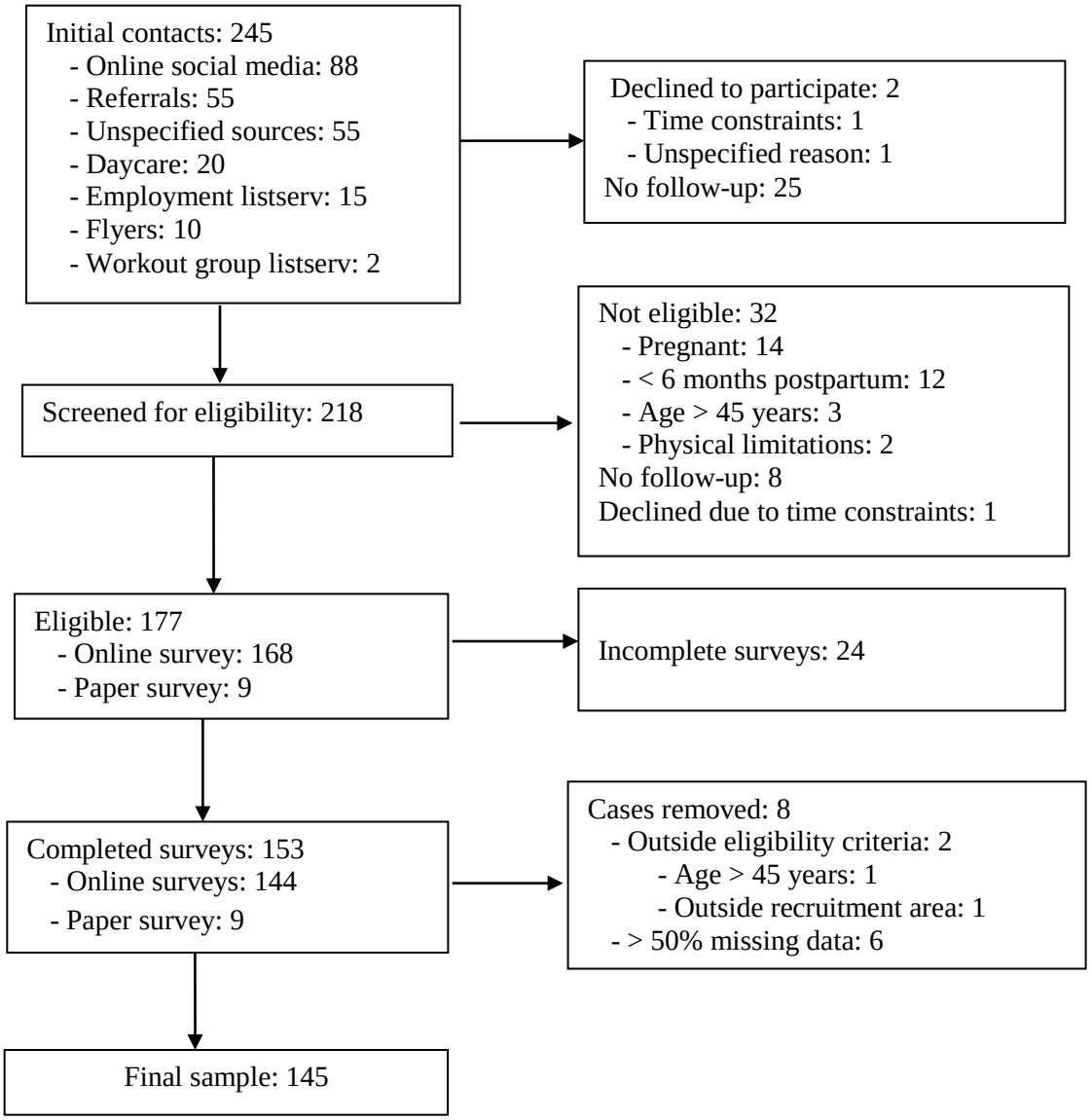

Figure 4. Recruitment and eligibility screening

Of the 245 women who contacted the researcher, 177 (72%) women met the study's eligibility criteria. Of the 177 participants who agreed to participate in the study, 153 participants (86%) completed the survey. Of the 153 participants who completed the survey, 144 participants completed the survey online and nine participants completed a mailed survey. Eight cases were removed due to greater than 50% missing data or later found to be outside the eligibility parameters during data entry and verification; yielding a community, non-probability convenience sample of 145 participants.

Potential participants contacted the researcher by telephone, text messaging, email or Facebook. Women who contacted the researcher by telephone were given the option of being screened for eligibility at that time or being screened for eligibility via email. Eligibility screening was conducted by email for women who contacted the researcher by email. Women who contacted the researcher by text messaging were screened either by telephone at her convenience or by email if she preferred. If a potential participant contacted the researcher via Facebook messenger, the researcher obtained a preferred email address and conducted eligibility screening via email. During these exchanges, the researcher answered potential participants' questions about the study either verbally and/or in writing.

Data Collection Procedure

Following the eligibility screening process, participants were able to choose whether to receive the survey in a paper version via mail or in an online version. Participants who elected to receive the survey package in a paper version via postal mail also received the consent document and a stamped, addressed envelope in which to return the survey packet. Participants who elected to receive the survey online were emailed the consent document with instructions on how to proceed to the survey, along with an individual-specific email link to access the survey. If a

survey had not been received two weeks after it had been sent to the participant, a reminder email was sent once for follow-up.

Data were collected and managed using the Research Electronic Data Capture (REDCap) system hosted online at the University of California, San Francisco. The REDCap system is a secure, web-based application designed to support data capture for research studies; it provides an intuitive interface for validated data entry; audit trails for tracking data manipulation and export procedures; automated export procedures for seamless data downloads to common statistical packages; and procedures for importing data from external sources (Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009). Upon receipt of paper surveys, the researcher manually entered the data into the REDCap data software.

All participants received a $5 gift card to either Safeway, CVS, Starbucks, or Jamba Juice once the survey was completed.

Variables and Measures

Participants were assessed on physical activity, social norms for physical activity, social support for physical activity, self-efficacy for physical activity, neighborhood environment, and sociodemographics. The outcome variable was physical activity. The predictor variables were social norms for physical activity, social support for physical activity, self-efficacy for physical activity, and neighborhood environment. The covariates were the sociodemographic characteristics (partnership status, age, race/ethnicity, education, number of children 5 years old or younger, and household monthly income).

Physical Activity

The Kaiser Physical Activity Survey (KPAS) was used to measure physical activity (see Appendix B). The KPAS was adapted from the Baecke Physical Activity Survey and was

designed to measure women's physical activity habits (Ainsworth, Sternfeld, Richardson, & Jackson, 2000; Lee, Im, & Chee, 2009). The KPAS is a 75-item, self-administered survey that assesses recalled physical activity in the past year and is comprised of four subscales (42 items): (a) housework/caregiving (11 items), (b) occupation (12 items), (c) active living habits (4 items), and (d) sports/exercise (15 items). The housework/caregiving subscale assesses time spent per week in domestic and caregiving activities. The occupation subscale assesses physical activity associated with occupation and type of work industry. The active living habits subscale assesses general levels of physical activity involved in daily routines over the past year. The sports/exercise subscale assesses intensity and duration of the three most frequent sports/exercise activities engaged in over the past year. The remaining 33 items assess personal feelings about exercise, contemplation about exercise, and personal characteristics.

Each subscale score can range from one to five and yields a separate summary activity index (Ainsworth et al., 2000). The overall score is computed as a four-item summary index that can range from four to 20. A higher score indicates higher physical activity level. The KPAS has demonstrated adequate one-month test-retest reliability (ICC = .83) and internal consistency reliability with Cronbach's alphas that have ranged from .72 to .80 among various ethnic/racial groups, with the exception of one sub-sample of non-Hispanic African Americans (α = .66) (Ainsworth et al., 2000; Lee et al., 2009). The KPAS also has demonstrated acceptable concurrent and construct validity among young adult and middle-aged adult women (Ainsworth et al., 2000; Lee et al., 2009).

In this study, the internal consistency reliability coefficients for the overall KPAS and its subscales were acceptable to good: .70 for housework/caregiving, .89 for occupation, .88 for sports/exercise, and .79 for the total scale. The exception was the active living habits subscale (α

= .44). In the literature, low internal consistency reliability coefficients for the active living habits subscale have been reported for various ethnically and racially diverse women and middle-aged women (Dombrowski, 2011; Lee et al., 2009).

Social Norms for Physical Activity

Although social norms constitute an essential construct in studying physical activity among mothers and are often included in theories explaining behavioral change, no single measure of social norms was identified in the literature. In addition, information on the psychometric properties of these measures was scarce; and thus, it was difficult to assess the appropriateness of these measures. An integrative review of the literature was conducted and revealed that social normative influences were influential, yet often overlooked, and considerably more variable than was operationalized and captured by current commonly used measurement tools. Moreover, qualitative studies showed considerably more range and ability to capture different aspects of social norms than did quantitative studies.

Alternative instruments considered for the current study included the Role of Wife, Husband, Father and Mother Scales (Scanzoni, 1990), Mother Role Questionnaire (Stephens, Franks, & Townsend, 1994), Social Issues/Social Roles Scales (Eyler et al. (2003), and Conformity to Feminine Norms Inventory-45 (Parent & Moradi, 2010). While all of these measures showed merit, no one tool was particularly appropriate to specifically address physical activity among reproductive age mothers with the breadth and depth of understanding social norms influence on physical activity that was sought. Thus, the Social Norms Questionnaire (SNQ) for physical activity was developed by the researcher.

The investigator-developed SNQ was designed to measure mothers' identification with and navigation of prevalent social norms in regards to physical activity behavior (see Appendix

C). The tool is comprised of 34 items within two subscales: social norms (18 items) and social norms navigation (16 items). Response options are based on a 5-point Likert-type scale, ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). A mean score is calculated for each subscale. A higher score on the social norms subscale indicates higher perceived levels of norms supportive of physical activity. A higher score on the social norms navigation subscale indicates a higher level of physical activity integration in the context of prevailing social norms.

Six questions commonly used in social norms research were modified slightly and included in the SNQ (see Appendix C). Two items (#5 and 6) were derived from the Walking Subscale of the Neighborhood Environment Scales (Mujahid, Roux, Morenoff, & Raghunathan, 2007) and four items (#1, 2, 3, and 4) were derived from a study by Hamilton and White (2012). An item (#23) exploring physical activity attitudes and beliefs was derived from a study by McIntyre and Rhodes (2009). The remainder of the SNQ items were developed from an integrative literature review presented in Chapter II and theoretical underpinnings presented in Chapter III. Items were categorized into two subscales: social norms and social norms navigation. Along with the aforementioned six social norm items derived from existing social norms measures, the social norms subscale also included three items about physical activity norms (#7, 8, and 9), four items about family obligations (#10, 14, 16, and 18), two items about domestic responsibilities (#11 and 15), and three items about personal scheduling (#12, 13, and 17). The social norms navigation subscale includes eight items about physical activity context (#19, 20, 22, 25, 26, 28, 30 and 31), three items about physical activity beliefs and affect (#21, 27, and 29), two items about physical activity as a social process (#23 and 24), one of which was a previously mentioned item derived from an existing tool (#23), and three items about leisure-time accessibility (#32, 33, and 34).

Content validity of the SNQ was established through expert review and focus groups conducted in June 2016. Three experts in the areas of women's physical activity reviewed the questionnaire and gave feedback on the clarity and relevance of the items. One focus group of four mothers and individual interviews with three additional mothers were conducted to review the items' content, clarity, and relevance. Feedback from the experts and mothers was used to improve clarity in wording items; no items were added or removed.

An exploratory factor analysis without prior specification about the nature and number of underlying factors was conducted using principal components with varimax rotation to explore the construct validity of the SNQ. The value of the Bartlett's test of sphericity was large (χ^2 = 2078.29) and the associated significance level was small ($p < .0005$), indicating that the correlation matrix was unlikely an identity matrix and thus the use of the factor analysis procedure was appropriate. The value of the overall Kaiser-Meyer-Olkin measure of sampling adequacy for all items was $r = .71$, indicating the use of the factor analysis procedure was acceptable. Principal components factor analysis with varimax rotation resulted in a three-factor solution as determined by eigenvalues greater than one and the scree plot. Variance accounted for by the three factors was 15.2%, 11.7%, and 11.6%, respectively. Together, the three factors accounted for 38.4% of the overall variance between items.

Factor loadings for each item of the rotated factor matrix is presented in Table 3. Two items (#4 and 30) did not load on any of the three factors. The remaining items had at minimum a moderate loading ($r > .30$) on at least one factor. The factors were interpreted and named by the researcher based on the factor analysis results, experts and mothers, an integrative literature review discussed in Chapter II, theoretical perspectives described in Chapter III, and conceptual clarity.

Table 3. *Factor Loadings for the Social Norms Questionnaire*

Factor Name		Item Number	Factor 1 Loading	Factor 2 Loading	Factor 3 Loading
Social Norms Navigation Subscale (Factor 1)		21	.74		
		12	.69		
		19	.64		
		20	.63	-.32	
		27	.61	.36	
		33	.58		.33
		31	.57		
		22	.57		.33
		29	.56		
		23	.49	-.30	.40
		28	.46		
		25	.41		
		24	.40		.38
		3	.39		
		32	.34		
Social Norms Subscale	Mother Role Pressures (Factor 2)	17		.74	
		14		.66	
		16		.64	
		13		.64	
		15	.32	.55	
		11		.53	
		18	.32	.51	
		34		.43	
		10		.39	
		26	.31	.37	.34
	Social and Environmental (Factor 3)	5			.70
		6			.70
		7			.69
		1			.65
		8			.62
		2			.59
		9			.43

Overall, the factor analysis results revealed a similar structure to the researcher's initial two-factor conceptualization of social norms for physical activity: (a) social norms and (b) social norms navigation. Factor 1 closely reflected the social norms navigation subscale and thus was named accordingly. Factors 2 and 3 closely reflected the social norms subscale and thus was

named accordingly. To give specificity to the social norms subscale based on the factor analysis results, Factor 2 was named *social norms – mother role pressures* and Factor 3 was named *social norms – social and environmental*. The items, as they were initially conceptualized, were retained in the two subscales of the SNQ without changes.

In this study, the social norms subscale showed fair to acceptable internal consistency reliability (α = .66) and the social norms navigation subscale showed good reliability (α = .78). Cronbach's alpha for the total SNQ was .81. Although there is a degree of subjectivity involved in identifying, grouping and naming factors (Munro, 2005), the preliminary, exploratory factor analysis was computed to provide additional information about the construct validity of the SNQ and the underlying construct, social norms for physical activity. The results are not conclusive measurements of the SNQ's validity and reliability.

Social Support for Physical Activity

Social support for physical activity was measured using three items adapted from the Social Support and Exercise Habits Survey (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). See Appendix D. Each item was rated twice (once for friends and once for family) on a 5-point Likert-type scale, ranging from 0 (*never*) to 4 (*very often*). A mean score was calculated for family social support and friend social support. A higher score indicates higher social support for physical activity from family and friends, respectively. Cronbach's alpha coefficients for internal consistency reliability have ranged from .80 to .91 and good construct and concurrent validity for the scale have been reported in the literature (Sallis et al., 1987). In this study, internal consistency reliability coefficients for the family and friends social support subscales were acceptable to good (α = .72 and .87, respectively). Cronbach's alpha for the total scale was .79.

Self-efficacy for Physical Activity

Four items, modified from the Exercise Confidence Survey, was used to measure confidence in one's ability to engage in exercise for at least 6 months (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). See Appendix E. The items were rated on a 5-point Likert-type scale and ranged from 0 (*I'm sure I cannot*) to 4 (*I'm sure I can*). A mean score was calculated across items. A higher score indicates higher self-confidence for physical activity. Cronbach's alpha coefficients for internal consistency reliability have ranged from .83 to .95 in other studies (Sallis et al., 1988). The Cronbach's alpha coefficient for the physical activity self-efficacy measure in this study was good (α = .86).

Neighborhood Environment

Neighborhood environment was assessed using the Neighborhood Environment Scales, which has five subscales (Mujahid et al., 2007). See Appendix F. The subscales are aesthetic quality (5 items), walking environment (5 items), safety (3 items), violence (4 items), and social cohesion (4 items). Items were rated on a 5-point Likert-type scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*), with the exception of the violence subscale items, which were rated on a 4-point Likert-type scale, ranging from 1 (*often*) to 4 (*never*). A mean score was calculated for each subscale.

In the literature, the neighborhood environment scales have demonstrated acceptable internal consistency reliability (α = .73 to .83), test-retest reliability (r = .60 to .88), and good convergent validity (Mujahid et al., 2007). The neighborhood environment scales were also shown to have good internal consistency reliability (α = .76 to .85) in a sample of socioeconomically disadvantaged Australian women, 18 to 45 years (Cleland et al., 2010). In this study, the internal consistency reliability coefficients for the neighborhood environment scales

were acceptable to good: .70 for aesthetic quality, .82 for walking environment, .85 for safety, .86 for social cohesion, .78 for violence, and .82 for the total scale.

Sociodemographics

Sociodemographic data collected were age, marital/partnership status, education, race/ethnicity, number and age of children, employment, and income (see Appendix G). Age was assessed in years. Categorical responses for marital status were single, married/partnered, divorced, or widowed. For education, the options were less than high school, high school, college or undergraduate degree, or graduate degree. Race/ethnicity was an open-ended, self-identification item that was coded according to federal guidelines for race/ethnicity. Participants were asked to write in the number of children and ages of each child who lived in the same household and the number of hours per week worked. Household monthly income was assessed with 15 categories in $2,500 to $5,000 increments, ranging from under $5,000 to $75,000 or higher.

Data Analysis

All data were self-reported. There were no missing data. Data were entered, verified and analyzed using the Statistical Package for Social Sciences for Windows version 24 (IBM Corporation, 2016). Descriptive statistics were calculated to identify outliers and describe frequencies, percentages, medians, means and standard deviations of the study variables. Mean scores of the continuous variables were normally distributed. To maximize the count and increase the power of statistical analysis (Munro, 2005), years in age was categorized as 35 or younger or older than 35 years; race/ethnicity as non-Hispanic White or non-White; education as high school or less or college; marital or partnership status as married/partnered or not married/not partnered; employment as unemployed or employed; income as less than $75,000 or

greater than $75,000; and number of children under 5 years as none, one, or two or more. Social norms, social support, self-efficacy and neighborhood environment were categorized as low or high. Physical activity was categorized as routine or occasional.

Depending on the level of data, Independent Student's *t*-test or one-way analysis of variance with Scheffe's method for post hoc analysis was computed to determine sociodemographic differences in physical activity. Multiple linear regression was computed to determine the variance in physical activity related to social norms, social support, self-efficacy, neighborhood environment and specific sociodemographic characteristics (population and income), which represented levels of personal and socioenvironmental influences of physical activity behavior. Assumptions of normality, linearity and homoscedasticity were met for the multiple linear regression analyses. Univariate logistic regression was computed to examine the likelihood of engaging in routine physical activity relative to social norms, social support, self-efficacy, neighborhood environment and sociodemographic characteristics. Overall significance was set at $p \leq .05$ for the study.

Ethical Considerations

This study was reviewed and approved by the University of California, San Francisco Institutional Review Board (see Appendix A). Every effort was made to protect participant autonomy and privacy. Participants were able to refuse participation, stop participation at any time, or refrain from answering questions or providing information that they do not feel comfortable sharing. A modest remuneration without being coercive was given to acknowledge participants' time and effort. Participant names and contact information were kept separate from the data, which was kept in a locked area. Data entered onto computer files were kept on a password protected computer or on an encrypted portable drive.

The study focused solely on women with children, thereby excluding men and women without children. Gender roles and expectations have been shown to affect the prioritization of responsibilities and leisure-time activities, such as physical activity (Hamilton & White, 2010a, 2010c). Evidence also suggests that the physical activity behavior of women with children differs from women without children due primarily to childcare and domestic responsibilities (Collins, Miller, & Marshall, 2007; Mackay, Schofield, & Oliver, 2011). Thus, this study sought specifically to better understand the social normative influences underlying physical activity behavior among reproductive age women with children.

CHAPTER V

RESULTS

In this chapter, the sample and study variables are described. Results are presented about whether physical activity was influenced by social norms, social support, self-efficacy and neighborhood environment and whether there were sociodemographic differences in physical activity in a sample of 145 reproductive age mothers within the context of personal and socioenvironmental levels of influence. Sociodemographic characteristics and self-efficacy for physical activity represented the individual/personal level of influence. Social norms and social support represented the interpersonal/social level of influence. Neighborhood environment represented the community level of influence.

Participants

The sample was comprised of 145 mothers living in Northern California with at least one dependent child living in the home, among which the majority had at least one child 5 years old or younger (88.8%) (see Table 4). Mothers' ages ranged from 21 to 45 years with a mean age of 35.2 years. Almost half of the sample was 35 years and younger, and 51% of the sample was 35 years and older. Participants were from various racial/ethnic groups: non, Hispanic White (71.7%), Latina (11.7%), Asian American/Pacific Islander (6.9%), Multiracial/multiethnic (6.9%), and African American (2.8%). The majority of participants were married or partnered (92.4%), college graduates (91.7%), employed (84.7%), and had an annual household income of $75,000 or higher (74.3%). The mean hours per week worked was 28.3 with 56% of participants working full-time (32 or more hours per week).

Description of the Study Variables

Physical Activity

The sample had low physical activity mean scores across the four physical activity domains: 3.1 for housework/caregiving, 2.7 for occupation, 3.0 for active living habits, and 3.4 for sports/exercise (see Table 5). A mean score lower than 3.5 indicated occasional physical activity and a mean score of 3.5 and higher indicated routine or regularly engaged in physical activity. A majority of the sample engaged in occasional physical activity related to housework/caregiving (81.4%), occupational (79.3%), and active living habits (70.3%). Over half of the sample, however, engaged in routine physical activity for sports/exercise (58.6%).

Social Norms for Physical Activity

In general, the sample had an adequate mean score for social norms: 3.5 for the social norms subscale and 3.6 for the social norms navigation subscale (see Table 5). A mean score lower than 3.5 indicated low social norms and a mean score of 3.5 and higher indicated high social norms. Although 60% of the sample had high social norms navigation for physical activity, 52.4% of the sample had low social norms for physical activity.

Social Support for Physical Activity

The mean scores for family (1.8) and friend (1.5) social support were low, defined as a mean score of less than 2.0 (see Table 5). High social support was defined as a mean score of 2.0 and higher. Fifty-two percent of participants had low family social support for physical activity and 61.4% of participants had low friend social support for physical activity.

Self-efficacy for Physical Activity

The sample's mean score for physical activity self-efficacy was also low (2.1), defined as a mean score of less than 3.0. Whereas, a mean score of 3.0 and higher indicated high physical

activity self-efficacy. Seventy-two percent of participants had low physical activity self-efficacy (see Table 5).

Neighborhood Environment

A majority of the sample lived in a neighborhood that was described as highly aesthetic (98.6%), conducive to walking (91.7%), safe (86.9%), socially cohesive (97.9%), and low violence (91%). See Table 5. The neighborhood environment's mean scores were classified as low ($M \geq 3.0$) or high ($M < 3.0$). The mean score was 1.9 for aesthetic quality, 2.1 for walking conduciveness, 2.3 for safety, 2.1 for social cohesion, and 1.7 for violence.

Sociodemographic Differences in Physical Activity

Physical activity mean scores were statistically different for population and income, but not for age, marital status, education, employment, and children five years old or younger in the home (see Table 6). Mean scores for occupation and sports/exercise physical activities were significantly higher for non-Hispanic White participants compared to non-White participants. For occupation-related physical activity, the mean score was 2.8 for White, non-Hispanic participants and 2.4 for non-White participants ($t(143) = -2.68$, $p = .008$). For sports/exercise physical activity, the mean score was 3.5 for White, non-Hispanic participants and 3.0 for non-White participants ($t(143) = -2.48$, $p = .01$). Participants who had an annual household income of $75,000 or greater had a higher mean score for sports/exercise physical activity as compared to participants who had an annual household income below $75,000 (3.5 vs. 3.0, respectively; ($t(142) = -2.05$, $p = .04$).

When physical activity level was dichotomized into routine or occasional, non-Hispanic White participants were 4.4 times more likely to participate in routine occupation-related physical activity (*95% CI* [1.3, 15.6], $p = .02$) and 3.0 times more likely to participate in routine

sports/exercise physical activity (*95% CI* [1.5, 6.5], $p = .003$) as compared to non-White participants (see Table 7). As compared to non-White participants, White, non-Hispanic participants were still more likely to engage in routine occupation-related physical activity (AOR = 6.9, *95% CI* [1.7, 27.3], $p = .006$) and routine sports/exercise physical activity (AOR = 5.0, *95% CI* [1.6, 15.2], $p = .005$) after controlling for income, social norms, social support, self-efficacy and neighborhood environment.

Relationship between Physical Activity and Individual, Interpersonal and Community Level Characteristics

Housework/Caregiving Physical Activity

The hierarchical multiple linear regression analysis of the housework/caregiving physical activity model with 12 predictors, entered in five blocks, accounted for 8% of the explained variance ($F(12, 131 = 2.0, p = .03)$. Social norms for physical activity variables were entered in the first block and accounted for 3% of the variance in housework/caregiving physical activity and the difference between 0% and 3% was statistically significant (see Table 8). Adding social support for physical activity variables in the second block decreased R^2 from 3% to 2%. Adding the physical activity self-efficacy variable in the third block increased R^2 from 2% to 4%, which was not statistically significant. The neighborhood environment variables were added in the fourth block and increased R^2 significantly from 4% to 8%. In the final step, adding the sociodemographic variables did not change R^2. Only neighborhood aesthetic quality contributed significantly to the variance in the housework/caregiving physical activity model ($\beta = .23$, $p = .03$), indicating lower neighborhood aesthetic quality was associated with higher housework/caregiving activities.

Occupation-related Physical Activity

The hierarchical multiple linear regression analysis of the occupation-related physical activity model with 12 predictors, entered in five blocks, accounted for 12% of the explained variance ($F(12, 131 = 2.7, p = .003$). Social norms for physical activity variables were entered in the first block and accounted for 6% of the variance in occupation-related physical activity and the difference between 0% and 6% was statistically significant (see Table 8). Adding social support for physical activity variables in the second block did not change R^2. Adding the physical activity self-efficacy variable in the third block decreased R^2 from 6% to 5%. The neighborhood environment variables were added in the fourth block and increased R^2 from 5% to 6%, which was not statistically significant. In the final step, adding the sociodemographic variables R^2 from 6% to 12%, a statistically significant additional increase of 6%. Social norms ($\beta = -.37$, $p < .0005$), population ($\beta = .26$, $p = .002$), and income ($\beta = -.18$, $p = .04$) contributed significantly to the variance in the occupation-related physical activity model. The results suggest lower social norms for physical activity, non-Hispanic White participants, and lower annual household income were associated with higher occupation-related physical activity.

Active Living Habits Physical Activity

The hierarchical multiple linear regression analysis of the active living habits physical activity model with 12 predictors, entered in five blocks, accounted for 15% of the explained variance ($F(12, 131 = 3.0, p = .001$). Social norms for physical activity variables were entered in the first block and accounted for 3% of the variance in active living habits physical activity and the difference between 0% and 3% was statistically significant (see Table 8). Adding social support for physical activity variables in the second block decreased R^2 from 3% to 2%. Adding the physical activity self-efficacy variable in the third block further decreased R^2 from 2% to 1%.

The neighborhood environment variables were added in the fourth block and increased R^2 significantly from 1% to 13%. In the final step, adding the sociodemographic variables increased R^2 by 2%, but the change was not statistically significant. Specifically, neighborhood aesthetic quality (β = .29, p =.004), neighborhood walking conduciveness (β = -.30, p =.004), and neighborhood safety (β = -.27, p =.01) contributed significantly to the variance in the active living habits physical activity model. The results suggest lower neighborhood aesthetic quality, higher neighborhood walking conduciveness, and safer neighborhood were associated with higher active living habits physical activity.

Sports/Exercise Physical Activity

The hierarchical multiple linear regression analysis of the sports/exercise physical activity model with 12 predictors, entered in five blocks, accounted for 45% of the explained variance (F(12, 131 = 10.8, p < .0005). Social norms for physical activity variables were entered in the first block and accounted for 22% of the variance in sports/exercise physical activity and the difference between 0% and 22% was statistically significant (see Table 8). Adding social support for physical activity variables in the second block significantly increased R^2 from 22% to 29%. Adding the physical activity self-efficacy variable in the third block further increased R^2 from 29% to 38%, a statistically significant additional increase of 9%. The neighborhood environment variables were added in the fourth block and increased R^2 significantly from 38% to 41%. In the final step, adding the sociodemographic variables significantly increased R^2 by 4%. Specifically, friend social support (β = .17, p =.03), physical activity self-efficacy (β = .42, p < .0005), neighborhood safety (β = .17, p =.04), neighborhood violence (β = -.21, p =.003), population (β = .15, p =.03), and income (β = .15, p =.03) contributed significantly to the variance in the sports/exercise physical activity model. The results suggest higher friend social

support for physical activity, higher physical activity self-efficacy, lower neighborhood safety, lower neighborhood violence, non-Hispanic White participants, and higher annual household income were associated with higher sports/exercise physical activity.

Individual, Interpersonal and Community Level Characteristics Associated with Routine Physical Activity

Household/Caregiving Physical Activity

The two characteristics significantly associated with household/caregiving physical activity were self-efficacy and neighborhood violence (see Table 9). For every 1-point increase on the 5-point self-efficacy scale, 0 (I'm sure I cannot/low self-efficacy) to 4 (I'm sure I can/high self-efficacy), the odds of engaging in routine household/caregiving physical activity increased 1.6 times (p = .04). For every 1-point increase on the 4-point neighborhood violence scale, 1 (never/no violence) to 4 (often/high violence), the odds of engaging in routine household/ caregiving physical activity increased 1.8 times (p = .04).

Occupation-related Physical Activity

There was no statistically significant association between routine occupation-related physical activity and social norms, social support, self-efficacy and neighborhood environment (see Table 9).

Active Living Habits Physical Activity

The two characteristics associated with active living habits physical activity were neighborhood walking conduciveness and neighborhood safety (see Table 9). For every 1-point decrease on the 5-point neighborhood walking conduciveness scale, 1 (strongly agree/highly conducive) to 5 (strongly disagree/not conducive), the odds of engaging in routine active living habits physical activity increased 2.0 times (p = .005). For every 1-point decrease on the 5-point

neighborhood safety scale, 1 (strongly agree/safe) to 5 (strongly disagree/unsafe), the odds of engaging in routine active living habits physical activity increased 1.6 times ($p = .03$).

Sports/Exercise Physical Activity

Social norms navigation, family social support, friend social support, self-efficacy, neighborhood walking conduciveness, and neighborhood violence were significantly associated with routine sports/exercise physical activity (see Table 9). For every 1-point increase on the 5-point social norms navigation scale, 1 (strongly disagree/low ability to navigate social norms) to 5 (strongly agree/high ability to navigate social norms), the odds of engaging in routine sports/exercise physical activity increased 7.0 times ($p < .0005$).

For every 1-point increase on the 5-point family social support scale, 0 (never/no social support) to 4 (very often/high social support), the odds of engaging in routine sports/exercise physical activity increased 1.6 times ($p = .02$). For every 1-point increase on the 5-point friend social support scale, 0 (never/no social support) to 4 (very often/high social support), the odds of engaging in routine sports/exercise physical activity increased 2.2 times ($p < .0005$).

For every 1-point increase on the 5-point self-efficacy scale, 0 (I'm sure I cannot/low self-efficacy) to 4 (I'm sure I can/high self-efficacy), the odds of engaging in routine sports/exercise physical activity increased 3.6 times ($p < .0005$).

For every 1-point decrease on the 5-point neighborhood walking conduciveness scale, 1 (strongly agree/highly conducive) to 5 (strongly disagree/not conducive), the odds of engaging in routine sports/exercise physical activity increased 1.8 times ($p = .005$). For every 1-point decrease on the 4-point neighborhood violence scale, 1 (never/no violence) to 4 (often/high violence), the odds of engaging in routine sports/exercise physical activity increased 1.9 times ($p = .01$).

Table 4

Sociodemographic Profile (n = 145)

Sociodemographic Characteristic	*n*	*%*	*M*	*SD*	*Md*
Age (years)			35.2	4.8	36.0
35 or younger	71	49.0			
Older than 35	74	51.0			
Marital Status					
Married/partner	134	92.4			
Single	11	7.6			
Education					
High school or less	12	8.3			
College degree	133	91.7			
Population					
White, non-Hispanic	104	71.7			
Non-White	41	28.3			
Latina	17	11.7			
Asian American/Pacific Islander	10	6.9			
Multiracial/ethnic	10	6.9			
African American	4	2.8			
Children ≤ 5 Years in Home			1.2	.65	1.0
0	16	11.2			
1	78	54.5			
2 or more	49	34.3			

Sociodemographic Characteristic	*n*	*%*	*M*	*SD*	*Md*
Employment (hours per week)			28.3	16.5	35.5
Unemployed	22	15.3			
Employed	122	84.7			
Part time (1 to 31)	42	29.2			
Full-time (32 or more)	80	55.6			
Annual Household Income					
Less than $75,000	37	25.7			
$75,000 or higher	107	74.3			

Table 5

Summary Descriptive Statistics for Physical Activity, Social Norms, Social Support, Self-efficacy and Neighborhood Environment Scales (n = 145)

Scale	*n*	*%*	Scale Range	*Range*	*M*	*SD*
[a]Physical Activity						
Housework/caregiving			1-5	1.7-5.0	3.1	.51
Occasional	118	81.4				
Routine	27	18.6				
Occupation			1-5	1.4-4.4	2.7	.77
Occasional	115	79.3				
Routine	30	20.7				
Active living habits			1-5	1.3-5.0	3.0	.72
Occasional	102	70.3				
Routine	43	29.7				
Sports/exercise			1-5	1.0-5.0	3.4	1.12
Occasional	60	41.4				
Routine	85	58.6				
[a]Social Norms for Physical Activity						
Social norms			1-5	2.4-4.6	3.5	.38
Low	76	52.4				
High	69	47.6				
Social norms navigation			1-5	2.5-4.8	3.6	.47
Low	58	40.0				
High	87	60.0				
[a]Social Support for Physical Activity						
Family			0-4	0.0-4.0	1.8	.89
Low	75	51.7				
High	70	48.3				

Scale	*n*	*%*	Scale Range	*Range*	*M*	*SD*
Friend			0-4	0.0-4.0	1.5	1.17
Low	89	61.4				
High	56	38.6				
[a]Self-efficacy for Physical Activity			0-4	0.0-4.0	2.1	.96
Low	104	71.7				
High	41	28.3				
Neighborhood Environment						
[b]Aesthetic quality			1-5	1.0-3.8	1.9	.57
Low	2	1.4				
High	143	98.6				
[b]Walking conduciveness			1-5	1.0-4.6	2.1	.87
Low	12	8.3				
High	133	91.7				
[b]Safety			1-5	1.0-4.3	2.3	.89
Low	19	13.1				
High	126	86.9				
[b]Social cohesion			1-5	1.0-4.5	2.1	.61
Low	3	2.1				
High	142	97.9				
[c]Violence			1-5	1.0-3.8	1.7	.68
Low	132	91.0				
High	13	9.0				

[a]Higher mean score indicates higher physical activity, supportive norms for and integration of physical activity, social support for physical activity, and self-efficacy for physical activity.

[b]Higher mean score indicates less neighborhood attractiveness, walking conduciveness, safety and social cohesion.

[c]Higher mean score indicates higher neighborhood violence.

Table 6

Sociodemographic Differences in Physical Activity Mean Scores (n = 145)

	Physical Activity Domain			
Sociodemographic Characteristic	Housework/ Caregiving *M (SD)*	Occupation *M (SD)*	Active Living Habits *M (SD)*	Sports/ Exercise *M (SD)*
Age				
35 or younger	3.1 (.43)	2.7 (.76)	3.0 (.74)	3.4 (1.05)
Older than 35	3.1 (.57)	2.7 (.78)	3.1 (.69)	3.4 (1.20)
Marital Status				
Married/partner	3.1 (.51)	2.7 (.77)	3.1 (.73)	3.48 (1.12)
Single	3.1 (.41)	2.9 (.74)	2.9 (.62)	3.3 (1.19)
Education				
High school or less	3.0 (.39)	2.9 (.87)	3.2 (.92)	3.5 (1.13)
College degree	3.1 (.51)	2.7 (.76)	3.0 (.70)	3.4 (1.13)
Population				
White, non-Hispanic	3.1 (.47)	2.8 (.77)	3.1 (.73)	3.5 (1.06)
Non-White	3.1 (.59)	2.4 (.70)**	2.9 (.67)	3.0 (1.22)**
Children ≤ 5 Years in Home				
0	2.9 (.52)	2.9 (.74)	3.1 (.49)	3.7 (.85)
1	3.1 (.51)	2.6 (.76)	3.1 (.78)	3.4 (1.15)
2 or more	3.1 (.49)	2.8 (.76)	2.9 (.68)	3.2 (1.15)
Employment				
Employed	3.1 (.50)	2.6 (.76)	3.0 (.72)	3.4 (1.13)
Unemployed	3.2 (.55)	n/a	3.0 (.74)	3.4 (1.06)
Annual Household Income				
Less than $75,000	3.2 (.63)	2.8 (.72)	2.9 (.66)	3.0 (1.10)
$75,000 or more	3.1 (.46)	2.6 (.78)	3.1 (.73)	3.5 (1.12)*

Note. Higher mean score indicates higher physical activity. n/a = not applicable.

*$p \leq .05$. **$p \leq .01$.

Table 7

Univariate Logistic Regression of Routine Physical Activity and Associated Sociodemographic Characteristics (n = 145)

	Physical Activity Domain			
	Housework/		Active Living	
Sociodemographic	Caregiving	Occupation	Habits	Sports/Exercise
Characteristic	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*
Age	.96 (.88, 1.0)	1.0 (.94, 1.1)	1.1 (.97, 1.1)	1.0 (.96, 1.1)
Marital Status				
Married/partner vs. single	2.4 (.30, 19.7)	.67 (.17, 2.7)	1.1 (.27, 4.5)	1.8 (.52, 6.1)
Education				
College vs. high school	2.7 (.33, 21.6)	.49 (.14, 1.7)	.56 (.17, 1.9)	.69 (.20, 2.4)
Population				
White, NH vs. non-White	.74 (.30, 1.8)	4.4 (1.3, 15.6)*	2.1 (.87, 5.0)	3.0 (1.5, 6.5)**
Children ≤ 5 Years in Home				
0	.26 (.03, 2.2)	1.0 (.28, 3.8)	1.4 (.40, 4.9)	3.1 (.88, 11.0)
1	1.0 (.42, 2.4)	.62 (.26, 1.5)	1.5 (.65, 3.3)	1.6 (.77, 3.2)
2 or more (referent)				
Employment				
Employed vs. unemployed	.55 (.19, 1.6)	n/a	1.2 (.42, 3.2)	1.0 (.40, 2.5)
Annual Household Income				
≥ $75,000 vs. <$75,000	.51 (.21, 1.2)	.94 (.38, 2.3)	2.1 (.83, 5.2)	1.7 (.80, 3.6)

Note. NH = non-Hispanic. n/a = not applicable.

*$p \leq .05$. **$p \leq .01$.

Table 8

Hierarchical Regression of Physical Activity Assessed in Social Norms, Social Support, Self-Efficacy, Neighborhood Environment and Sociodemographic Characteristics (n = 145)

Physical Activity Model and Step	R^2	ΔR^2	ΔF	*df*	*p*
Housework/Caregiving: R^2 = .08, F(12, 131) = 2.0, p = .03					
1. Social Norms for Physical Activity	.03	.04	3.23	2, 141	.04
a. Social norms (β = -.16, p =.11)					
b. Social norms navigation (β = .08, p =.54)					
2. Social Support for Physical Activity	.02	.01	.44	2, 139	.65
a. Family (β = .03, p =.71)					
b. Friend (β = .05, p =.64)					
3. Self-efficacy for Physical Activity (β = .12, p =.29)	.04	.02	3.23	1, 138	.08
4. Neighborhood Environment	.08	.08	2.36	5, 133	.04
a. Aesthetic quality (β = .23, p =.03)					
b. Walking conduciveness (β = -.10, p =.36)					
c. Safety (β = -.17, p =.13)					
d. Social cohesion (β = -.13, p =.16)					
e. Violence (β = .18, p =.06)					
5. Demographics	.08	.01	.70	2, 131	.50
a. Population (β = -.06, p =.47)					
b. Income (β = -.07, p =.44)					
Occupation: R^2 = .12, F(12, 131) = 2.7, p = .003					
1. Social Norms for Physical Activity	.06	.08	5.79	2, 141	.004
a. Social norms (β = -.37, p < .0005)					
b. Social norms navigation (β = .01, p =.93)					
2. Social Support for Physical Activity	.06	.01	.69	2, 139	.50
a. Family (β = -.01, p =.94)					
b. Friend (β = .11, p =.25)					
3. Self-efficacy for Physical Activity (β = .06, p =.62)	.05	.00	.31	1, 138	.58
4. Neighborhood Environment	.06	.04	1.07	5, 133	.38

Physical Activity Model and Step	R^2	ΔR^2	ΔF	*df*	*p*
a. Aesthetic quality (β = -.18, *p* =.09)					
b. Walking conduciveness (β = -.08, *p* =.45)					
c. Safety (β = -.11, *p* =.29)					
d. Social cohesion (β = .04, *p* =.66)					
e. Violence (β = .07, *p* =.46)					
5. Demographics	.12	.08	6.17	2, 131	.003
a. Population (β = .26, *p* =.002)					
b. Income (β = -.18, *p* =.04)					
Active Living Habits: R^2 = .15, $F(12, 131) = 3.0$, $p = .001$					
1. Social Norms	.03	.04	3.01	2, 141	.05
a. Social norms (β = -.08, *p* =.39)					
b. Social norms navigation (β = .10, *p* =.40)					
2. Social Support	.02	.00	.29	2, 139	.75
a. Family (β = .02, *p* =.83)					
b. Friend (β = .01, *p* =.93)					
3. Self-efficacy (β = .01, *p* =.92)	.01	.00	.43	1, 138	.52
4. Neighborhood Environment	.13	.15	4.80	5, 133	.0005
a. Aesthetic quality (β = .29, *p* =.004)					
b. Walking conduciveness (β = -.30, *p* =.004)					
c. Safety (β = -.27, *p* =.01)					
d. Social cohesion (β = -.05, *p* =.62)					
e. Violence (β = .08, *p* =.36)					
5. Demographics	.15	.02	1.97	2, 131	.14
a. Population (β = .13, *p* =.10)					
b. Income (β = .06, *p* =.47)					
Sports/Exercise: R^2 = .45, $F(12, 131) = 10.8$, $p < .0005$					
1. Social Norms	.22	.23	20.91	2, 141	.0005
a. Social norms (β = -.02, *p* =.82)					
b. Social norms navigation (β = .14, *p* =.17)					

Physical Activity Model and Step	R^2	ΔR^2	ΔF	*df*	*p*
2. Social Support	.29	.08	7.89	2, 139	.001
a. Family (β = .02, *p* =.77)					
b. Friend (β = .17, *p* =.03)					
3. Self-efficacy (β = .42, *p* < .0005)	.38	.09	21.07	1, 138	.0005
4. Neighborhood Environment	.41	.05	2.55	5, 133	.03
a. Aesthetic quality (β = .11, *p* =.18)					
b. Walking conduciveness (β = -.10, *p* =.22)					
c. Safety (β = .17, *p* =.04)					
d. Social cohesion (β = -.01, *p* =.85)					
e. Violence (β = -.21, *p* =.003)					
5. Demographics	.45	.05	6.05	2, 131	.003
a. Population (β = .15, *p* =.03)					
b. Income (β = .15, *p* =.03)					

Note. R^2 *i*s the adjusted R^2.

Table 9

Univariate Logistic Regression of Routine Physical Activity Associated with Social Norms, Social Support, Self-efficacy and Neighborhood Environment (n = 145)

	Physical Activity Domain			
	Housework/ Caregiving	Active Living		
		Occupation	Habits	Sports/Exercise
Characteristic	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*	*OR (95% CI)*
Social Norms	1.0 (.23, 3.0)	.43 (.14, 1.3)	1.9 (.73, 4.8)	2.1 (.86, 5.1)
Social Norms Navigation	1.9 (.76, 4.6)	.77 (.33, 1.8)	1.7 (.79, 3.7)	7.0 (2.9, 17.0)**
Family Social Support	.98 (.61, 1.6)	.86 (.54, 1.4)	1.3 (.89, 2.0)	1.6 (1.1, 2.4)*
Friend Social Support	1.2 (.83, 1.7)	.98 (.69, 1.4)	1.1 (.81, 1.5)	2.2 (1.6, 3.2)*
Self-efficacy	1.6 (1.0, 2.6)*	1.0 (.68, 1.6)	1.3 (.87, 1.9)	3.6 (2.2, 5.8)**
Neighborhood Aesthetics	1.7 (.84, 3.5)	.67 (.32, 1.4)	.94 (.50, 1.7)	1.1 (.64, 2.0)
Neighborhood Walking	1.1 (.70, 1.8)	.85 (.53, 1.4)	.51 (.31, .82)**	.56 (.38, .84)**
Neighborhood Safety	1.2 (.73, 1.8)	.88 (.55, 1.4)	.62 (.40, .96)*	.92 (.63, 1.3)
Neighborhood Cohesion	.66 (.33, 1.3)	1.2 (.64, 2.4)	.62 (.34, 1.1)	.64 (.37, 1.1)
Neighborhood Violence	1.8 (1.0, 3.3)*	1.1 (.60, 1.9)	.85 (.50, 1.5)	.52 (.31, .86)**

*$p \leq .05$. **$p \leq .01$.

CHAPTER VI

DISCUSSION

In this chapter, study findings, limitations, conclusions, implications for practice, and recommendations for future research are presented. This study explored factors associated with four types of physical activity in the context of personal and socioenvironmental levels of influence in a sample of 145 reproductive age mothers, 18 to 45 years, who were predominantly non-Hispanic White, married, educated, and of middle-to-high socioeconomic status. Personal factors included sociodemographic characteristics and self-efficacy for physical activity. Social factors included social norms and social support for physical activity. Environmental factors included neighborhood environment.

Summary of the Findings

In general, participants engaged in occasional, rather than routine housework/caregiving, occupational, and active living physical activity. About 59% of participants, however, engaged in routine sports/exercise physical activity, a study finding that was in contrast to the literature; which showed that motherhood was associated with decreased sports/exercise physical activity (Bellows-Riecken & Rhodes, 2008; Berge, Larson, Bauer, & Neumark-Sztainer, 2011; Candelaria et al., 2012). As a comparison, nationally, 57% of women ages 18 to 44 in the US engage in recommended levels of aerobic physical activity, and 27% engage in recommended levels of both aerobic and muscle-strengthening activity (CDC, 2014).

Social norms for physical activity was generally low, although social norms navigation for physical activity was generally high. Family and friend social support of mothers' physical activity was also low, although the literature indicates the importance of social support in women's physical activity (Cleland et al., 2010; Hamilton & White, 2012; Vrazel, Saunders, &

Wilcox, 2008; Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007). Consistent with this study's findings, Hamilton and White (2010b) found that mothers were hesitant to ask for help from family or friends in order to engage in physical activity due to concerns about overburdening them and selfishness, which might explain mothers' perceived low family and friend social support to engage in physical activity. Moreover, self-efficacy for physical activity was low and overall neighborhood environment quality was good. Hereafter, a discussion of each type of physical activity and associated personal and socioenvironmental factors is presented.

Housework/Caregiving Physical Activity

A majority of participants did not engage in routine housework/caregiving physical activity; which was an unexpected finding given that domestic-related physical activity has been shown to increase with motherhood, especially for mothers with children, 5 years old or younger (Bellows-Riecken & Rhodes, 2008; Candelaria et al., 2012; Gaston, Edwards, Doelman, & Tober, 2014). Domestic physical activities included low-to-moderate intensity routine childcare, cooking and cleaning as well as moderate-to-vigorous intensity domestic activities such as gardening or home improvement projects. Given that that the majority of the sample reported higher incomes, perhaps participants outsourced higher-intensity activities such as renovation projects and yard maintenance, which might have resulted in occasional as opposed to routine engagement in housework/caregiving physical activity.

Neighborhood aesthetic quality was the only significant personal and socioenvironmental factor that explained the variance in housework/caregiving physical activity. Mothers living in neighborhoods with less aesthetic quality were engaged in more housework/caregiving physical activity than those who lived in more aesthetic neighborhoods. When housework/caregiving

physical activity was categorized as routine or occasional, neighborhood aesthetics was no longer relevant, but neighborhood violence and self-efficacy were. Higher neighborhood violence and higher physical activity self-efficacy was associated with increased likelihood of engaging in routine housework/caregiving physical activity. Perhaps, mothers living in areas with lesser aesthetic quality and greater neighborhood violence were more inclined to spend time inside instead of outside the home. Greater ability to accommodate time for multiple tasks throughout the day, and planning out time for activities, is thought to be linked with greater self-efficacy for physical activity (Hamilton & White, 2014; Mailey & McAuley, 2014). It may be that mothers using these planning skills were also able to make more time for domestic activities as well.

Occupation-related Physical Activity

Lower social norms for physical activity, being non-Hispanic White, and lower annual household income were associated with higher occupation-related physical activity; none of these factors, however, were associated with routine, regular occupation-related physical activity. There was a subset of mothers who were stay-at-home mothers without pay that listed their caregiving and home maintenance activities as occupation-related physical activity, which may explain the relationship between lower social norms for physical activity and higher occupation-related physical activity. These stay-at-home mothers may have had stronger perceptions of normative responsibilities for childcare and domestic duties and thus lower social norms for physical activity. In the literature, lower annual income has been associated with higher levels of occupation-related physical activity (Beenackers et al., 2012). However, the relationship between population and occupation-related physical activity is unclear. One study of US adults found that non-White Hispanics and African-Americans have higher amounts of occupation-related

physical activity (He & Baker, 2005), while other studies have found no significant differences in occupational physical activity levels by population (Marquez, Neighbors, & Bustamante, 2010; Sternfeld, Ainsworth, & Quesenberry, 1999).

Active Living Habits Physical Activity

Active living habits activity involves active daily routines in and around one's home, such as walking, bicycling or running errands. Study findings suggest that the neighborhood environment played a role in mothers' decisions to engage or not engage in active living habits physical activity; whereas, social norms, social support, self-efficacy, income and population were not influential factors related to active living habits physical activity participation. Increased as well as routine active living habits physical activity was associated with neighborhood environment, specifically a safer and walkable neighborhood, findings that were consistent with the literature (Cleland, Timperio, & Crawford, 2008; Hamilton et al., 2013; Wang, Chau, Ng, & Leung, 2016). Increased, but not routine, active living habits physical activity was associated with lower neighborhood aesthetic quality in this study, consistent with one study (Cleland et al., 2010), but not with another study (Cleland et al., 2008) in the literature.

Sports/Exercise Physical Activity

Factors associated with increased sports/exercise physical activity were higher friend social support, higher self-efficacy, lower neighborhood violence, less safe neighborhood, being non-Hispanic White, and higher annual household income. These findings are consistent with other studies of women, and mothers in particular, in which self-efficacy, social support and less neighborhood violence have been found to be influential in sports/exercise physical activity participation (Cleland et al., 2010; Hamilton & White, 2012; Mailey & McAuley, 2014; Miller, Trost, & Brown, 2002; Vrazel et al., 2008; Webber-Ritchey, Taylor-Piliae, Insel, & Loescher,

2016; Wendel-Vos et al., 2007). The relationship between low neighborhood safety and increased sports/exercise physical activity was an unexpected finding that was contrary to the literature, which indicated a positive relationship between increased sports/exercise physical activity and a safer neighborhood (Cleland et al., 2008, 2010; Hamilton, Cuddihy, & White, 2013; Wang, Chau, & Leung, 2016). Perhaps, mothers in this study did not engage in sports/exercise physical activity in their neighborhood, but instead in alternate locations. In addition, the findings were reflective of national trends, in which non-Hispanic White and higher-income individuals have been found to engage in more physical activity than non-White and lower-income persons (CDC, 2017b).

Routine, regular sports/exercise physical activity was associated with increased ability to navigate social norms, supportive family and friends, self-confidence, neighborhood walkability and low neighborhood violence. These findings were consistent with the literature (Cleland et al., 2008, 2010; Hamilton et al., 2013, Hamilton & White, 2012; Mailey & Mc Auley, 2014; Miller et al., 2002; Vrazel et al., 2008; Webber-Ritchey et al., 2016; Wang et al., 2016; Wendel-Vos et al., 2007). A notable finding was that social norms navigation, but not social norms, played a role in determining mothers' physical activity. It may be that how mothers frame their own physical activity in the context of perceived norms has more proximal impact on leisure time physical activity rather than the perception of prevalent social norms alone. The literature was mixed in regards to the relationship between social norms and physical activity. In contrast to this study, Ball, Jeffery, Abbott, McNaughton, and Crawford (2010) found a relationship between social norms and physical activity among a sample of women of whom a majority were mothers. Similar to this study, other studies did not find a relationship between social norms and physical activity (Hamilton & White, 2012; McIntyre & Rhodes, 2009; Rhodes et al., 2014), but

did find a relationship between social norms and intent to engage in physical activity (Hamilton & White, 2012; McIntyre & Rhodes, 2009).

Study Limitations

The study had a number of limitations, which may have affected the internal and external validity of the study and thus generalization of the findings beyond this sample. All of the tools were self-report and objective measures, particularly for physical activity, were not obtained. Recall and overreporting are common problems of self-report physical activity measures (Sallis & Saelens, 2000). The active living habits physical activity subscale had low internal consistency reliability in this study and results should be interpreted taking this into account. This study took a novel approach to defining and contextualizing social norms related to mothers' physical activity. The social norms and social norms navigation concepts, however, were measured by an investigator-developed tool, which demonstrated acceptable internal consistency reliability in this sample and content validity based on a literature review and experts. An exploratory factor analysis revealed that the items might be situated within three domains rather than the proposed two: social norms and social norms navigation. Further psychometric studies are needed.

The sample was a nonprobability, convenience sample of reproductive age mothers, 18 to 45 years, and may not be representative of the overall population of reproductive age mothers. Snowball sampling was used as a strategy to recruit participants and may have introduced bias in the sample and contributed to the homogeneity of the sample. Although recruitment attempted to include maximum variability among the sample's characteristics, the sample was predominantly non-Hispanic White, educated, and had a relatively high annual household income. Furthermore, a majority of the sample was recruited through online avenues or resources, such as email and social media.

Implications for Health, Nursing and Research

The health benefits associated with different types of physical activity were not assessed in this study. There is a need to assess self-rated health and physical activity-related biomarkers using subjective and objective measures, such as biometrics (e.g., accelerometers), of different types of physical activity in reproductive age mothers. For example, the evidence for the health benefits of domestic-related physical activity is inconclusive (Sabia et al., 2012; Smith, Ng, & Popkin, 2014; Stamatakis, Hamer, & Lawlor, 2009) and future research should include differentiating between low-intensity and high-intensity housework. Intervention strategies that target increasing physical activity of each type need to be designed and tested for efficaciousness in the reproductive age mother population. Such tailored interventions to mothers' specific needs and responsibilities may be more effective with longer-lasting results. In addition, findings of this study demonstrated that multiple levels of influence likely impact reproductive age mothers' physical activity behavior. Studies are needed to measure the impact of these influences longitudinally on mothers' routine physical activity intent as well as their behavior, along with qualitative studies to contextualize the findings and to understand the conflicts and decision making associated with engaging in physical activity for mothers.

Given the effects of multiple levels of influence on physical activity behavior, public health approaches to physical activity promotion have the potential to work synergistically with individual-level interventions by contributing to physical activity promotion on a larger scale (Yancey et al., 2007). One possible public health approach would be media campaigns promoting physical activity while also taking parents' roles and responsibilities into account by incorporating messaging focused on parents, and mothers specifically. In the US, public health campaign efforts such as the former First Lady's *Let's Move* and the National Football League's

Play 60 campaigns have emphasized increasing physical activity levels among children, rather than among parents (Georgiadis, 2013; National Football League, n.d.). Parents are also at risk for being insufficiently active with the potential to affect not only their physical activity behavior, but also their family's physical activity behavior. Thus, public health efforts and research should be expanded to consider parent-specific physical activity promotion and engagement and to assess the effectiveness of such campaigns and the potentiality of placing an undue amount of increased burden and feelings of failure and self-blame on mothers, who traditionally have been responsible for the health of the family (O'Brien, Lloyd, & Ringuet-Riot, 2014).

Social norms and social norms navigation related to physical activity have been studied little and are areas that are in need of further investigation, such as examining the effects on mothers who do not meet social expectations of being a physically active mother (O'Brien et al., 2014). Interventions need to be designed that offer strategies to change behavior and encourage physical activity without mothers feeling selfish, or judged as a failure. Research needs to focus on the attributes or components that would be needed for a social norms for physical activity campaign that would be targeted and tailored to reproductive age mothers. Further research is needed to explore and contextualize the social norms and social norms navigation concepts, along with further exploration of the social support and self-efficacy for physical activity concepts among reproductive age mothers. There is a need to include a more heterogeneous sample across the diversity spectrum (income, education, race/ethnicity, sexual orientation, etc.).

Conclusions

In general, this homogenous sample of reproductive age mothers were not engaged in routine physical activity, whether it was housework/caregiving, occupation-related, active living

habits, or sports/exercise. Participants fared better in sports/exercise physical activity and non-Hispanic White mothers engaged in more occupation and sports/exercise physical activity than non-White mothers. The influence of personal, social, and environmental correlates varied among the types of physical activity engaged in by participants. While housework/caregiving, occupational, and active living habits sources of physical activity played an important role in mothers' overall activity levels, sports/exercise physical activity remained the most likely area to engage reproductive age mothers in physical activity. Social support and self-efficacy are well-studied concepts in women's physical activity, and their relevance to reproductive age mothers' physical activity was somewhat supported, primarily for sports/exercise physical activity. Neighborhood environment, specifically walkability, safety and violence, was also an influential factor in multiple types of physical activity among mothers and confirmed as well as refuted existing literature. Social norms navigation, but not social norms, was also influential in determining mothers' sports/exercise physical activity. Further work must be done to develop a fuller understanding of the social norms and social norms navigation concepts as they relate to the processes surrounding mothers' physical activity in the context of prevailing social norms.

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Appendix A

University of California, San Francisco

Institutional Review Board Approval Letter

UCSF
University of California
San Francisco

Human Research Protection Program
Institutional Review Board (IRB)

Exempt Certification

Principal Investigator
Catherine M Waters

Co-Principal Investigator
Andrea V Quinonez

Study Title: Influence of social norms on physical activity behavior in mothers
IRB #: 16-19242
Reference #: 162425

Committee of Record: Mount Zion Panel
Type of Submission: Initial Review Submission Packet
Certification Date: 04/20/2016

IRB Comments:
This research qualifies as exempt under the following category:
(2) Research using educational tests, survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, insurability, or reputation.

Modifications: For exempt research only, researchers can make *minor* changes to the study without notifying UCSF IRB. However, significant changes must be submitted to the UCSF IRB. The UCSF IRB website includes examples of minor vs. significant changes. All changes must follow UCSF guidance, and some changes are not allowed in the consent materials.

Study Closeout Report: This study does not have an expiration date. However, you are required to submit a study closeout report at the completion of the project.

Documents Reviewed and Approved with this Submission (includes all versions – final approved versions are labeled 'Approved' in the Outcome column):

Other Study Documents

Study Document			
Title	Version #	Version Date	Outcome
Study Information Sheet	Version 1.1	04/04/2016	Approved
Focus group guide	Version 1.1	04/04/2016	Approved
Eligibility screening script	Version 1.1	04/04/2016	Approved
General contact script	Version 1.1	04/04/2016	Approved
Recruitment flyer	Version 1.1	04/04/2016	Approved

References	Version 1.0	04/04/2016	Approved
Sociodemographic Information	Version 1.0	04/04/2016	Approved
Neighborhood Environment Scales	Version 1.0	04/04/2016	Approved
Exercise Confidence Survey	Version 1.0	04/04/2016	Approved
Social Support and Exercise Habits Survey	Version 1.0	04/04/2016	Approved
Social Norms Questionnaire	Version 1.0	04/04/2016	Approved
Kaiser Physical Activity Survey	Version 1.0	04/04/2016	Approved
Contact information face sheet	Version 1.0	04/04/2016	Approved

For a list of all currently approved documents, follow these steps: Go to My Studies and open the study – Click on Informed Consent to obtain a list of approved consent documents and Other Study Documents for a list of other approved documents.

San Francisco Veterans Affairs Medical Center (SFVAMC): If the SFVAMC is engaged in this research, you must secure approval of the VA Research & Development Committee in addition to UCSF IRB approval and follow all applicable VA and other federal requirements. The UCSF IRB website has more information.

Appendix B

Kaiser Physical Activity Survey

SECTION I. HOUSEHOLD AND FAMILY CARE ACTIVITIES
First, we want to know about your activities at home, not including activities you may do at your home or other people's home for pay.

During the past year (12 months back from today), how much time did you spend...

	None or less than 1 hour a week	1 hour or more but less than 20 hours a week	20 hours or more a week
1. Caring for a child or children under 2 years of age	1	2	3
2. Caring for a child or children between 2 and 5 years of age	1	2	3
3. Caring for a disabled child or elderly person (only count time actually spent in feeding, dressing, moving, etc.)	1	2	3

	None or less than ½ hour a day	½ hour or more but less than 1 hour a day	1 hour or more but less than 1 ½ hours a day	1 ½ hours or more but less than 2 hours a day	2 hours or more a day
4. Preparing meals or cleaning up from meals on weekdays?	1	2	3	4	5
5. Preparing meals or cleaning up from meals on weekends?	1	2	3	4	5

	Never or less than once a month	Once a month	2-3 times a month	Once a week	More than once a week
6. Doing major cleaning, such as shampooing carpets, waxing floors, or washing walls or windows?	1	2	3	4	5

7. Doing routine cleaning such as dusting, laundry, vacuuming, or changing linens?	1	2	3	4	5
8. Going grocery shopping and pushing a shopping cart?	1	2	3	4	5

During the past year (12 months back from today), how much time did you spend...

	Never or less than once a month	**Once a month**	**2-3 times a month**	**Once a week**	**More than once a week**
9. Doing gardening or yard work, such as mowing lawn or raking leaves?	1	2	3	4	5
10. Doing heavy outdoor work, such as chopping wood, tilling soil, shoveling snow, or baling hay?	1	2	3	4	5
11. Doing major home decoration or repair, such as plumbing, tiling, painting or building?	1	2	3	4	5

SECTION II. OCCUPATIONAL ACTIVITIES
Now, some questions about your employment situation.

12. What is your occupation? (if more than one job, describe your occupation for the job with the most hours worked per week)

_____

13. What is the name of your employer, business or company?

_____

14. What kind of business or industry is this? (For example, hospital, newspaper publishing, mail order house, auto engine manufacturing, etc.)

_____

15. What are your most important specific activities or duties? (For example, selling cars, keeping account books, etc.)

1. _____

2. _____

3. _____

16. Which best describes your current occupation:

1. Employee of private company, business or individual for wages, salary, or commissions
2. Employee of Federal government
3. Employee of state or local government
4. Self employed in own business, professional practice or farm
5. Working without pay in home, family business or farm

	Much lighter	**Lighter**	**The same as**	**Heavier**	**Much heavier**
17. In comparison with other women your age, do you think your work is physically...	1	2	3	4	5

	Never	**Seldom**	**Sometimes**	**Often**	**Always**
18. After work, are you physically tired...	1	2	3	4	5

19. When you are working at your current occupation, how often do you do each of the following:

	Never	**Seldom**	**Sometimes**	**Often**	**Always**
a. Sit	1	2	3	4	5
b. Stand	1	2	3	4	5
c. Walk	1	2	3	4	5
d. Lift heavy loads	1	2	3	4	5
e. Sweat from exertion	1	2	3	4	5

SECTION III. ACTIVE LIVING HABITS

This next section asks about the general level of physical activity involved in your daily routine during the past year

	Less than 5	5 or more but less than 15	15 or more but less than 30	30 or more but less than 45	45 or more
20. How many minutes a day do you usually walk and/or bicycle to and from work, school or errands?	1	2	3	4	5

	Less than 1 hour a week	1 hour or more a week but less than 1 hour a day	1 hour or more a day but less than 2 hours a day	2 hours or more a day but less than 4 hours a day	4 hours or more a day
21. Did you watch television?	1	2	3	4	5

	Never or less than once a month	Once a month	2-3 times a month	Once a week	More than once a week
22. Did you walk (for at least 15 minutes at a time)?	1	2	3	4	5
23. Did you bike (for at least 15 minutes at a time)?	1	2	3	4	5

SECTION IV. PARTICIPATION IN SPORTS AND EXERCISE

Finally, we want to ask about your participation in sports and exercise during the past year.

	Much less	Less	Same as	More	Much more
24. In comparison with other women of your own age, do you think your recreational physical activity is...	1	2	3	4	5

	Never or less than once a month	Once a month	2-3 times a month	Once a week	More than once a week
25. Did you play sports or exercise?	1	2	3	4	5
26. Did you sweat from exertion during sports or exercise?	1	2	3	4	5

We are interested in mothers' participation in sports or exercise activities during their free time, like jogging, brisk walking, swimming, gym classes, dance, yoga, or sports like soccer or softball.

27. During the past year, did you participate in any of these activities or in any other similar activities not included in the list?

1. Yes
2. No

==> **If you answered "yes"**, please continue to the next question.
==> **If you answered "no"**, this is the end of the physical activity survey.

28. Which sport or exercise did you do most frequently? (Specify only one)

_____

	Less than 1	1 to 3	4 to 6	7 to 9	More than 9
29. How many months in this past year did you do this activity?	1	2	3	4	5

	Less than 1	1 or more but less than 2	2 or more but less than 3	3 or more but less than 4	4 or more
30. How many hours a week did you usually do this activity?	1	2	3	4	5

31. Did you do any other exercise or play any other sport in this past year?

1. Yes
2. No

==> **If you answered "yes"**, please continue to the next question.
==> **If you answered "no"**, this is the end of the physical activity survey.

32. What was the second most frequent sport or exercise you did? (Specify only one)

_____

	Less than 1	1 to 3	4 to 6	7 to 9	More than 9
33. How many months in this past year did you do this activity?	1	2	3	4	5

	Less than 1	1 or more but less than 2	2 or more but less than 3	3 or more but less than 4	4 or more
34. How many hours a week did you usually do this activity?	1	2	3	4	5

35. Did you do any other exercise or play any other sport in this past year?

1. Yes
2. No

==> **If you answered "yes"**, please continue to the next question.
==> **If you answered "no"**, this is the end of the physical activity survey.

36. What was the third most frequent sport or exercise you did? (Specify only one)

_____

	Less than 1	1 to 3	4 to 6	7 to 9	More than 9
37. How many months in this past year did you do this activity?	1	2	3	4	5

	Less than 1	1 or more but less than 2	2 or more but less than 3	3 or more but less than 4	4 or more
38. How many hours a week did you usually do this activity?	1	2	3	4	5

Appendix C

Social Norms Questionnaire for Physical Activity

We would like to know about the social influences and expectations mothers experience that might influence their physical activity, and how mothers make sense of their own physical activity while dealing with those social pressures. The following pages contain a series of statements about how mothers might think, feel, or behave.

Thinking about your own actions, feelings, and beliefs, please indicate how much you personally agree or disagree with each statement by circling "5" for "Strongly Agree," "4" for "Agree," "3" for "Neither Agree Nor Disagree," "2" for "Disagree," or "1" for "Strongly Disagree."

Please circle only one choice for each statement. **There are no right or wrong responses. You should give the responses that most closely reflect your own actions, feelings, and beliefs**. It is best if you respond with your first impression when answering.

	Strongly Agree	**Agree**	**Neither Agree Nor Disagree**	**Disagree**	**Strongly Disagree**
1. Most people whose opinions I value would approve of me engaging in regular physical activity over the next month	5	4	3	2	1
2. Most of my friends with children would approve of me engaging in regular physical activity over the next month	5	4	3	2	1
3. Most people who are important to me will engage in regular physical activity themselves over the next month	5	4	3	2	1
4. Most of my friends with children will do regular physical activity in the next month	5	4	3	2	1
5. I often see other people walking in my neighborhood	5	4	3	2	1
6. I often see other people exercising (for example, jogging, bicycling, playing sports) in my neighborhood	5	4	3	2	1

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
7. There are places that I consider to be appropriate for mothers to be physically active in my community	5	4	3	2	1
8. There are choices that I consider to be acceptable for mothers to be physically active in my neighborhood	5	4	3	2	1
9. There are things I can be physically active doing and feel like I belong	5	4	3	2	1
10. I should be the primary caregiver in my family	5	4	3	2	1
11. I should have primary responsibility for household chores in my family	5	4	3	2	1
12. It is acceptable for me to prioritize time for myself to be physically active	5	4	3	2	1
13. I ought to work around my family's schedule when making my own plans to be physically active	5	4	3	2	1
14. I am expected to take care of my family's needs before taking time out to be physically active	5	4	3	2	1
15. I am expected to take care of my household responsibilities (such as chores) before taking time out to be physically active	5	4	3	2	1
16. I should put others' needs before my own	5	4	3	2	1
17. I should make my schedule fit the needs of my family	5	4	3	2	1
18. Time out for myself to be physically active is unacceptable if my family's needs are not met first	5	4	3	2	1

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
19. Taking time out to be physically active takes away from my family	5	4	3	2	1
20. Taking care of myself by being physically active is good for my family	5	4	3	2	1
21. I can care for my family better if I make time to take care of myself by being physically active	5	4	3	2	1
22. My own physical activity helps create an active family culture	5	4	3	2	1
23. Being physically active makes me feel good	5	4	3	2	1
24. Being physically active is a good way to spend time with other people (such as other moms, family, and/or friends)	5	4	3	2	1
25. It's OK for me to give my caregiving responsibilities to others so that I can be physically active	5	4	3	2	1
26. It's OK for me to give my household responsibilities (such as chores) to others so that I can be physically active	5	4	3	2	1
27. Taking time out to be physically active makes me feel selfish	5	4	3	2	1
28. I see being physically active as an added responsibility or chore for me	5	4	3	2	1
29. Making time to be physically active creates stress for me	5	4	3	2	1
30. My family members see my physical activity as something they are also responsible for accommodating	5	4	3	2	1
31. It's OK if I let some of my daily	5	4	3	2	1

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
duties go so that I can be physically active					
32. I have control over how I spend my time	5	4	3	2	1
33. I deserve time set aside for me to be able to be physically active	5	4	3	2	1
34. Having less control over time for physical activity is part of being a mother	5	4	3	2	1

Appendix D

Social Support for Physical Activity Measure

	(Circle One Number on Each Line)				
How much do?	**Never**	**Only Rarely**	**Sometimes**	**Often**	**Very Often**
FAMILY					
Exercise with you	0	1	2	3	4
Offer to exercise with you	0	1	2	3	4
Encourage you to exercise	0	1	2	3	4
FRIENDS					
Exercise with you	0	1	2	3	4
Offer to exercise with you	0	1	2	3	4
Encourage you to exercise	0	1	2	3	4

Appendix E

Self-efficacy for Physical Activity Measure

	(Circle One Number on Each Line)				
How **confident** are you about?	**I'm sure I cannot**	**Mostly I cannot**	**Don't Know**	**Mostly I can**	**I'm sure I can**
Being able to set aside time for regular exercise	0	1	2	3	4
Exercising when feeling sad or highly stressed	0	1	2	3	4
Exercising when **family** commitments take a lot of time	0	1	2	3	4
Exercising when **social** commitments take a lot of time	0	1	2	3	4

Appendix F

Neighborhood Environment Scales

Instructions: When answering the following statements, think about the area about one (1) mile around your home.

	Strongly Agree	**Agree**	**Neither Agree Nor Disagree**	**Disagree**	**Strongly Disagree**
Aesthetic quality					
1. There is a lot of trash and litter on the street in my neighborhood	1	2	3	4	5
2. There is a lot of noise in my neighborhood.	1	2	3	4	5
3. In my neighborhood the buildings and homes are well-maintained.	1	2	3	4	5
4. The buildings and houses in my neighborhood are interesting.	1	2	3	4	5
5. My neighborhood is attractive.	1	2	3	4	5
Walking environment					
1. My neighborhood offers many opportunities to be physically active.	1	2	3	4	5
2. Local sports clubs and other facilities in my neighborhood offer many opportunities to get exercise.	1	2	3	4	5
3. It is pleasant to walk in my neighborhood.	1	2	3	4	5
4. The trees in my neighborhood provide enough shade.	1	2	3	4	5
5. In my neighborhood it is easy to walk places.	1	2	3	4	5
Safety					
1. I feel safe walking in my neighborhood, day or night.	1	2	3	4	5
2. Violence is not a problem in my neighborhood.	1	2	3	4	5
3. My neighborhood is safe from crime.	1	2	3	4	5

During the past 6 months, how often:	Often	Sometimes	Rarely	Never
Violence				
1. . . .was there a fight in your neighborhood in which a weapon was used?	1	2	3	4
2. . . .were there gang fights in your neighborhood?	1	2	3	4
3. . . .was there a sexual assault or rape in your neighborhood?	1	2	3	4
4. . . .was there a robbery or mugging in your neighborhood?	1	2	3	4

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Social Cohesion					
1. People around here are willing to help their neighbors.	1	2	3	4	5
2. People in my neighborhood generally get along with each other.	1	2	3	4	5
3. People in my neighborhood can be trusted.	1	2	3	4	5
4. People in my neighborhood share the same values.	1	2	3	4	5

Appendix G

Sociodemographics Form

1. What is your age? _____

2. What is your race/ethnicity? _____

3. What is your current partnership status? *(circle one)*:

    1. Single
    2. Married/Partnered
    3. Divorced
    4. Widowed

4. On average, how many hours of paid work do you do per week? For students, please also count time spent in class or on school work.

    _____ hours

5. What is the highest grade in school that you completed? *(check one)*

    1. Less than high school
    2. High school
    3. Undergraduate degree
    4. Graduate degree

6. Counting yourself, how many people currently live in your home? _____

7. How many children under the age of 18 years live in your home? _____

    7a. What is/are their age(s)? _____

8. What is the total amount of your yearly household income? Please include money from jobs, net income from a business or farm, dividends, interest, net income from rent, social security, and any other money income. *(circle one)*

    1. Under $5,000
    2. $5,000 - $5,999
    3. $6,000 - $6,999
    4. $7,000 - $7,999
    5. $8,000 - $9,999
    6. $10,000 - $12,499
    7. $12,500 - $14,999
    8. $15,000 - $17,499
    9. $17,500 - $19,999
    10. $20,000 - $24,499
    11. $24,500 - $34,999
    12. $35,000 - $49,999
    13. $50,000 - $64,999
    14. $65,000 - $74,999
    15. $75,000 or more

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