

TESTING AN INTEGRATED HEALTH PROMOTION MODEL USING SOCIAL
MEDIA FOR BREASTFEEDING WOMEN:
STRUCTURAL EQUATION MODELING

by

Jane C. Wilson

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Doctor of Philosophy

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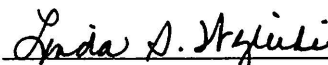
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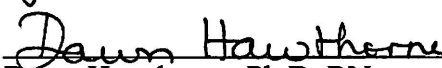
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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Linda S. Weglicki, Christine E. Lynn College of Nursing, and has been approved by all members of the supervisory committee. It was submitted to the faculty of the Christine E. Lynn College of Nursing and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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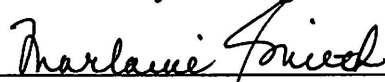

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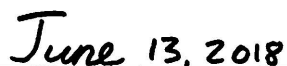

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ABSTRACT

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Exclusive breastfeeding for the first six months of life has been shown to decrease morbidity and mortality of women and infants. Organizations such as the United Nations Children's Fund (UNICEF, 2018), American Academy of Pediatrics (AAP, 2012), and the World Health Organization (WHO, 2017a) have universally endorsed exclusive breastfeeding for the first six months of life, and then continuation of breastfeeding for a minimum of one to two years, with only supplementation of other liquid or solid food sources. Breastfeeding rates in the United States have not met the minimum goals set forth by Healthy People 2020 (n.d.). Although 81% of U.S. mothers initiated breastfeeding after the birth of their infant, only 22% of mothers were found to be exclusively breastfeeding at six months postpartum (Centers for Disease Control and Prevention [CDC], 2016a).

This prospective, longitudinal, structural equation modeling study examined millennial-aged, exclusively breastfeeding women within one month postpartum who

were followers of at least one of 17 social media breastfeeding support groups. Relationships of the conceptual constructs within Pender's (1996) revised health promotion model (RHPM); House's (1981) dimensions of social support; and the added constructs of breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude were analyzed in an effort to better understand the variables that lead to sustained exclusive breastfeeding to six months.

Data supported the use of the integrated model for breastfeeding women. The normed referenced chi-square (χ^2) of 1.9 (CFI =.94, IFI =.94, NFI =.89, RMSEA =.06, CFI [PCFI] >.5) indicated a good model fit. Additionally, there were statistically significant gains in the confidence, knowledge, and attitude scores from pretest to follow-up at six months. Exclusive breastfeeding to six months was reported to be three times (66%) higher than the U.S. national average (22%) (CDC, 2016a). Future use of the integrated model has great potential to impact public health by the exploration of variables that promote exclusive breastfeeding to six months.

DEDICATION

This manuscript is dedicated to my father, Herbert S. Lenhart Jr., who left too soon from this life. His love and value of education was evident as he cheered for me from the stands as I received my registered nurse diploma back in 1987. Although it is now a lifetime later, I can still feel his pride in my heart as I complete this dissertation.

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CHAPTER 1. INTRODUCTION

Human Milk

Human milk is the gold standard of nutrition for newborn infants, superior to any other form of infant nutrition (Bouchet-Horwitz, 2015; A. Walker, 2010) and has been shown to offer health benefits to both mother and child (AAP, 2012; Danawi, Estrada, Hasbini, & Wilson, 2016; Eidelman et al., 2012; UNICEF, 2018; WHO, 2017b). It is for health promotion reasons that organizations such as UNICEF (2018), AAP (2012) and WHO (2017a) have universally endorsed exclusive breastfeeding for the first six months of life, and then continuation of breastfeeding for a minimum of one to two years, with only supplementation of other liquid or solid food sources.

Breastfeeding Introduction

Breastfeeding has been espoused to have an enormous impact on population health with the potential to prevent morbidity and mortality (Sankar et al., 2015) and to promote health and well-being for women and children (Godfrey & Lawrence, 2010). Human milk serves as a nutritional (Haschke, Haiden, & Thakkar, 2016) and immunologic factor for good health (Battersby, 2016; Eidelman et al., 2012; Oddy, 2002). Breastfed infants have been reported to suffer fewer respiratory and gastrointestinal infections (Eidelman et al., 2012); to have fewer dental caries (Shirong et al., 2015; Tham et al., 2015); and to have decreased incidences of allergies and asthma (Lodge et al., 2015), cancers (Greenop et al. 2015), sudden infant death syndrome (Zotter & Pichler, 2012), obesity (Carling, Demment, Kjolhede, & Olson, 2015; Moss & Yeaton,

2014; Yan, Liu, Zhu, Huang, & Wang, 2014), and diabetes (Hall, Frederiksen, Rewers, & Norris, 2015; Martens et al., 2016). Currently, researchers are investigating long-term infant neurodevelopmental effects of breastfeeding (Bar, Milanaik & Adesman, 2016). Recent reports have indicated that infants who were breastfed over six months are later found to have increased performance in intelligence tests as children and adolescents (Horta, Loret de Mola, & Victoria, 2015) and lower incidence of autism and attention-deficit hyperactivity disorder (Bar et al., 2016).

Mothers have been reported to benefit from breastfeeding by recovering from pregnancy and birth more rapidly and to have a decreased risk for diabetes, coronary heart disease (Dieterich, Felice, O'Sullivan, & Rasmussen, 2013), postpartum depression (Hahn-Holbrook, Haselton, Dunkel Schetter, & Glynn, 2013), and ovarian and breast cancer (Chowdhury et al., 2015; Luan et al., 2013). Although the wide array of health benefits from breastfeeding appear overwhelmingly convincing, researchers from the National Center of Chronic Disease Prevention and Health Promotion's Division of Nutrition, Physical Activity, and Obesity report that 81% of U.S. mothers initiate breastfeeding after the birth of their infant; however, only 22% of mothers are found to be exclusively breastfeeding at six months postpartum (CDC, 2016a).

In the United States, many women initiate breastfeeding after birth but are frequently unable to reach the breastfeeding goals and recommendations set forth by WHO, UNICEF, and AAP. Therefore, the U.S. Surgeon General issued a Call to Action to Support Breastfeeding and identified the following list of factors associated with early cessation of exclusive breastfeeding: lack of breastfeeding knowledge, poor social support, embarrassment about breastfeeding in public, lactation problems such as

concerns about lack of milk supply, return to employment or school, and social norms based on bottle-feeding (U.S. Department of Health and Human Services, 2011).

More recently, researchers have focused studies upon the identification of modifiable variables that have influenced breastfeeding duration, such as breastfeeding confidence (Hinic, 2016), breastfeeding knowledge (Mogre, Dery, & Gaa, 2016), breastfeeding attitude (Cox, Giglia, & Binns, 2015), and perceived adequacy of social support (Bouchet-Horwitz, 2015; Laugen, Islam, & Janssen, 2016). Gewa and Chepkemboi (2016) have demonstrated the link between social support and exclusive breastfeeding duration. Within their cross-sectional survey of 400 mothers of children ages 0-24 months old, Gewa and Chepkemboi determined that mothers who perceived a lack of social support for exclusive breastfeeding from the infant's father experienced a 117% higher risk of exclusive breastfeeding cessation prior to six months. Furthermore, an increased confidence in the ability to exclusively breastfeed (Hinic, 2016), being knowledgeable about exclusive breastfeeding (Dietrich-Leurer & Misskey, 2015), and possessing a positive attitude about exclusive breastfeeding (Cox et al., 2015) have been associated with decreased risks of premature cessation of breastfeeding. Therefore, given the evidence between breastfeeding and social support, an outcome in this dissertation study was to determine which dimensions of social support influence breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude toward breastfeeding sustainability.

Satisfactory levels of social support provided by family and peers, religious institutions, professional organizations, and peer self-help groups have been identified within the nursing literature as producing positive health outcomes (Pender, Murdaugh,

& Parsons, 2006) such as decreased stress and enhanced wound healing (Iannino-Renz, 2016) and decreased depression (Smith, Hill, & Kokanovic, 2015). Other positive health outcomes related to breastfeeding and social support include decreased postpartum depression (Tani & Castagna, 2017), decreased obesity (Kim, Faw, & Michaelides, 2017), and increased pediatric Type 1 diabetes control (A. F. Walker, Schatz, Johnson, Silverstein, & Rohrs, 2015).

To examine breastfeeding support factors, Renfrew, McCormick, Wade, Quinn, and Dowswell (2012) performed a Cochrane literature review of randomized or quasi-randomized controlled trials that included 56,451 mother-infant couplets from 21 countries. Renfrew et al. compared breastfeeding durations in mothers who were provided extra lay and professional breastfeeding support including face-to-face individual meetings; group meetings; or telephone supportive contacts by peers, lactation consultants, midwives, or nutritionists to those mothers who did not receive these services. The type of support offered was diverse, ranging from providing praise and reassurance, to information and additional opportunities to ask questions. Renfrew et al. found that breastfeeding support such as praise, reassurance, and education had a positive impact on breastfeeding duration up to six months ($p < .00001$). Furthermore Renfrew et al. explained that 52.59% of mothers who received the extra support interventions had stopped any breastfeeding by six months compared with 56.64% of mothers who did not receive extra support measures (R.R.0.91, 95% confidence interval, [C.I.] 0.88 to 0.95). In addition, results of the Renfrew et al. analysis suggested that exclusive breastfeeding durations were lengthened as well if social support was tailored to the setting,

characteristics, and needs of the population. The population used in this study were millennial mothers as described next.

Millennials

The millennial generation, defined as those born between the years 1980 and 2000 (Venne & Coleman, 2010) are currently child-bearing age. In an effort to better understand the characteristics and supportive breastfeeding needs of the millennial childbearing population, it is important to recognize that millennials are a technology-savvy generation that is both knowledgeable and at-ease with the use of technology (Frazer, Hussey, Bosch, & Squire, 2015). Millennials have grown up using the Internet via laptops, tablets, and smartphones and often prefer texting and using social media than face-to-face interaction (Frazer et al., 2015; Hussey, Frazer, & Kopulos, 2016; Wolynn, 2012). Therefore, this dissertation study examined the use of social media Internet-based platforms that support breastfeeding of millennial-aged women.

Social Media

The term social media has been defined as a group of Internet-based applications that allow their users to create and exchange user-generated content (A. Kaplan & Haenlein, 2010). Social media support groups are very popular and they provide a cost-efficient, immediate approach to gain information and social support from peers to vast populations with various socio-demographics (Bridges, 2016; Weatherspoon, Weatherspoon, & Ristau, 2015). Interestingly, a Pew Research Center report of adults using social media found that there were no notable differences in the use of social media among racial/ethnic groups with 65% White, 65% Hispanic, and 56% African Americans adults in the United States (Perrin, 2015). Perrin (2015) also suggested that social media

use is popular at all socio-economic levels. Although a higher socio-economic status has been linked to increased social media usage, 56% of individuals who are within the lowest level of household income report use of social media (Perin, 2015).

A recent ethnographic study by Bridges (2016), in conjunction with the Australian Breastfeeding Association, investigated how mothers find and share breastfeeding support online. Results from Bridges's study indicated that online communities offer valuable support for breastfeeding mothers that could augment their pre-existing support systems. Bridges described this study as a "wide-angle view of a largely new area of investigation" (p. 17). Therefore, further exploration is needed regarding the role that social support plays, using technology such as social media breastfeeding support groups to assist the current child-bearing generation in breastfeeding practices.

Background of the Problem

Exclusive breastfeeding, defined as providing only human milk without supplement of water, formula, or other food substances for the first six months (WHO, 2017a), has been determined to be the single most impactful preventive intervention of infant mortality and morbidity (WHO & UNICEF, 2014). Moreover, WHO and UNICEF described breastfeeding, as a "cornerstone of child survival and child health because it provides essential, irreplaceable nutrition for a child's growth and development" (WHO & UNICEF, 2014, para. 1).

Exclusive breastfeeding rates are poor, globally. According to UNICEF (2018), only 43% of the world's population of newborns are exclusively breastfed. UNICEF has estimated that 823,000 deaths of infants and 20,000 deaths of mothers per year could have been prevented globally through exclusive breastfeeding. Furthermore, it is

estimated that exclusive breastfeeding, globally, could produce a projected cost savings of approximately \$300 billion annually through health promotion, and that results in fewer infections, chronic diseases, and premature deaths (“Breastfeeding,” 2016).

According to the *National Vital Statistics Reports*, 3,978,497 U.S. registered births occurred in 2015 (Martin, Hamilton, & Osterman, 2015); the CDC’s (2016b) National Immunization Survey reported exclusive and non-exclusive breastfeeding rates in the United States steadily increased between the years 2002-2013. Among U.S. births from 2013, “4 out of 5 (81.1%) started to breastfeed, over half (51.8%) were breastfeeding either exclusively breastfeeding or breastfeeding with supplemental formula or other food sources at 6 months, and almost one third (30.7%) were breastfeeding at 12 months” (CDC, 2016a, p. 2). This relatively high rate of initiation of breastfeeding demonstrates that U.S. mothers are interested in breastfeeding and aspire to do so; however, the rates for mothers who exclusively breastfeed to the recommended six month period remain low at 22% (CDC, 2016a).

An important contributing factor identified by researchers that results in the low proportion of exclusively breastfeeding mothers is a lack of breastfeeding social support (Ayton, van der Mei, Wills, Hansen, & Nelson, 2015; Battersby, 2016; Bevan & Brown, 2014). The CDC (2013) broadly defined breastfeeding social support as the support of a breastfeeding mother and infant through communities, healthcare systems, healthcare providers, employers, public health professionals, and other organizations and individuals that support mothers and make breastfeeding easier. Others have noted that breastfeeding social support is delivered through networks of social human interactions obtained from healthcare professionals and peer supporters such as partners, relatives, and friends, and

that these have been recognized as invaluable assets to breastfeeding women (Battersby, 2016; Kaunonen, Hannula, & Tarkka, 2012).

The body of literature spanning six decades examining the construct of social support is voluminous and complex, and includes a number of varied definitions (Barclay, Schmied, & Williams, 2004). Seminal work by Cobb (1976) and Cassel (1976) made associations between social relationships and health. Cobb (1976) focused upon the stress-buffering capability of social support that contributes to mental and physical well-being by the enhancement of coping and the ability for an individual to adapt. Although similar, Cassel (1976) included the influence that social support has upon disease.

Furthering the examination of social support, House (1981) suggested that due to the complexity of the social support construct, an analysis attempting to define and measure all of the aspects of social support “would be impossible and fruitless in any single situation or study” (p. 28). Additionally, House stated, “social support is likely to be effective only to the extent it is perceived” (p. 27).

Others indicated that social support is a resource that is either perceived or actually available, often provided by professionals such as formal support groups as well as informally through helping relationships (Cohen, Gottlieb, & Underwood, 2000; Uchino, 2009). Drawing from the work of Cohen, Gottlieb, and Underwood (2000) and Uchino (2009), social support has been defined within the literature as a process in which social relationships promote health and well-being with the assumption that persons who perceive that they are sufficiently socially supported tend to experience increased well-being. Furthermore, well-being can be described as a “relative state where one maximizes his or her physical, mental, and social functioning in the context of supportive

environments to live a full, satisfying, and productive life” (Kobau, Snizek, Zack, Lucas, & Burns, 2010, p. 274). Therefore, it can be asserted that supportive social relationships may be necessary to achieve well-being in mothers.

A large number of social support dimensions have been described (Hirsch & Barton, 2011), tested (Forsythe et al., 2014; Jatoi et al., 2016; Pillemer & Holtzer, 2016), and used for measurement development (Grassley, Spencer, & Bryson, 2012a). Multiple dimensions of social support have been identified and defined in the literature, which results in confusion when comparing studies. For example, early work by Cobb (1976) investigating social support as a moderator of life stress distinguished three dimensions of social support, including instrumental (counseling), active (mothering), and material support (providing goods and services). This study was helpful in advancing social support science as it provided foundational distinction between types of social support that are still relevant today (Cobb, 1976).

Work by House (1981) conceptualized social support into the following four dimensions: emotional (empathy), instrumental (help others to do their work or take care of them), appraisal (giving information that enables others to evaluate themselves), and informational (providing information to help others to cope). A longitudinal analysis of primarily low-income African American mothers studied the dimensions of social support using two face-to-face interviews one year apart (Green & Rodgers, 2001). Within their study, Green and Rodgers (2001) described the dimensions of social support including tangible (concrete assistance), informational (advice), and belongingness (being connected to others). The results of their study suggested that tangible support was particularly important to this population of African American low-income mothers.

Furthermore tangible support was positively associated with self-efficacy, which was found to lead to more successful use of existing support systems such as family and peer support (Green & Rodgers, 2001). Although the specific dimensions of social support between the work of House (1981) and Green and Rodgers (2001) were not identical, the examination of social support dimensions increased our understanding of the types of social support that led to the perception of being adequately supported.

The sources, dimensions, and extent of the use of social support by support-seekers are dynamic, varying in utilization, and effectiveness over time (Uchino, 2009). For example, seeking social support using an Internet-based medium is relatively new and has become a viable medium in which child-bearing aged women receive and exchange social support (Geoghegan-Morphet et al., 2014). A study by Demirci, Cohen, Parker, Holmes, and Bogen (2016) examined 146 postpartum women to identify the women's use and preferences of obtaining perinatal and breastfeeding information. Demirci et al. found 95% reported using technology (e.g., applications, personal email, Internet text messages) to obtain pregnancy, infant care, or breastfeeding information. According to Demirci et al., e-mail was the preferred technology among White women (56%) compared to African American women (25%), married women and those living with a partner (57%) compared to single women (32%), and those with a college degree (69%) compared to women without a college degree (31%). Texting was the preferred technology more often preferred among younger women (mean age 28 years) who are childbearing age (Demirci et al., 2016).

According to a 2016 U.S. survey by the Pew Research Center (2017), 86% of all women surveyed indicated that they use the Internet. Furthermore, delineated by age,

99% of 18 to 29 year olds and 96% of 30 to 49 year olds report use of the Internet.

Women of child-bearing age have a large presence online, making Internet sources of breastfeeding support a far-reaching, cost-effective, and convenient innovation (Geoghegan-Morphet et al., 2014; Giglia & Binns, 2014).

Social media platforms (e.g., Facebook, Youtube, Twitter, LinkedIn, Pinterest, GooglePlus+, Tumblr, and Instagram) have been defined as Internet-based applications that have the capability to allow the creation and exchange of user-generated content that may provide an avenue to social support (Kaplan & Haenlein, 2010). Currently, Facebook is reported to be the most popular social media platform (eBiz, 2018), reporting 1.18 billion daily users around the globe (Facebook, n.d.). A 2014 Pew Research Center report indicated that social media platforms such as Facebook contain a multitude of health-related social media support groups for those attempting smoking cessation and for those living with various conditions such as HIV, epilepsy, breast cancer, diabetes, and hypertension (Fox, 2014). Mo and Coulson (2014) added that social media support groups enable individuals to “exchange information, share experiences, connect to others, encounter emotional support, find recognition and understanding, and help others” (p. 983).

Despite the mounting evidence of the use of social media and its various platforms as means for social support, there is a lack of published studies describing women’s use of social media breastfeeding support groups and the dimensions of perceived breastfeeding social support, and how they both relate to exclusive breastfeeding duration outcomes (Giglia & Binns, 2014). Therefore, this dissertation aimed to fill this gap by examining millennial-aged breastfeeding mothers who currently

participate in social media breastfeeding support groups to determine social support dimensions (appraisal, emotional, informational, and instrumental) (House, 1981) known to influence breastfeeding exclusivity to six months post-delivery.

Statement of the Problem

While the benefits of breastfeeding are well established for women and newborns as previously noted, the recommended breastfeeding guidelines of exclusive breastfeeding for six months are low (CDC, 2016a). At first glance, breastfeeding rates appear to be adequate with approximately 4 out of 5 (81%) new mothers initiating breastfeeding after birth (CDC, 2016a). But upon further examination of the CDC's (2016a) Breastfeeding Report Card, data derived from national telephone surveys for the CDC's (2016b) National Immunization Study (NIS) of 2014-2015 suggest that although U.S. women are initiating breastfeeding, exclusive breastfeeding rates decline to approximately 1 out of 5 (22%) at six months. The rates, according to the NIS, indicate that "mothers, in part, may not be getting the support they need from healthcare providers, family members, and employers" (CDC, 2016b, p. 2).

Health promotion and support is offered by the Office of Disease Prevention and Health Promotion, which developed the Healthy People 2020 (n.d.) initiative. Healthy People 2020 developed the Maternal, Infant, and Child Health Initiative with an aim of improving the health of women, infants, and families by increasing the proportion of infants who are exclusively breastfed through six months. With a national Healthy People 2020 emphasis on the promotion of exclusive breastfeeding and increasing breastfeeding duration, researchers are studying contributing factors (e.g., social support) that result in

breastfeeding success and failure (Bevan & Brown, 2014; Cox et al., 2015; Hinic, 2016; Mogre et al., 2016).

Studies have identified, for example, that many new mothers fail to have adequate and consistent breastfeeding social support in order to deal effectively with breastfeeding difficulties once at home following birth (Datta, Graham, & Wellings, 2012; Niela-Vilén, Axelin, Melender, Löyttyniemi, & Salanterä, 2016). Others have reported that breastfeeding social support provided by peers has been associated with increased exclusive breastfeeding duration (Bergman, Nygren-Brunell, Vilakati, & Målqvist, 2016; Kaunonen et al., 2012; Rempel & Moore, 2012). Thus, in an effort to broaden the base of breastfeeding support opportunities, researchers are beginning to study the effectiveness of breastfeeding support via social media breastfeeding support groups upon the duration of exclusive breastfeeding (Niela-Vilén et al., 2016). Breastfeeding social media support groups have been touted as cost-effective and convenient, but conflicting evidence has been published regarding their effectiveness (Hauck et al., 2016; Korda & Itani, 2013; Niela-Vilén et al., 2016).

Purpose of the Study

The purpose of the current study was to better understand the variables (age, education, social support, competing situational work and family demands, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude) that lead to sustained exclusive breastfeeding to six months for millennial-aged, breastfeeding women who are followers of Internet-based breastfeeding social support groups.

Theoretical Framework

Research that is theoretically informed is known to provide more effective

interventions that are more likely to influence health behavior (Painter, Borba, Hynes, Mays, & Glanz, 2008; Tebb et al., 2016). Furthermore, interventions using two or more theories are more likely to have greater effect or strength (Glanz & Bishop, 2010). Additionally, theory-driven research studies have been shown to better explain which interventions work and why they work (Tebb et al., 2016). A study's theoretical framework acts as a structure of support and strength. In order to firmly ground this dissertation in theory, theoretical linkages drawn from social support theory (House, 1981) and Pender's (1996) RHPM were used as a framework for this study. The following provides a brief introduction to these frameworks.

Social Support Theory (SST)

Social support has been conceptualized by House (1981) using the following four dimensions: emotional support, described as exhibiting value and caring; informational support such as providing advice and education; appraisal support such as constructive feedback; and instrumental support such as aid and services. Drawing from House's conceptualization of social support, Grassley et al. (2012a) developed and tested the Supportive Needs of Adolescents Breastfeeding scale. Within Grassley et al.'s study, emotional support conveyed empathy, trust, and concern regarding health promotion; instrumental support involved the provision of aid and services and practical assistance; appraisal support included the provision of information that is useful for self-evaluation purposes such as affirmation and constructive feedback; and informational support included provision of information, sharing points of view, advice, and suggestions. Moreover, the scale items were derived from supportive nurse behaviors taken from breastfeeding support literature guided by the four dimensions of SST. Using factor

analysis, Grassley et al. determined that two clear dimensions of nurses' social support included instructional, such as "The nurse showed my partner how to help me breastfeed," and informational support such as "The nurse talked to me about the benefits of breastfeeding." Additionally, Grassley et al. suggested that appraisal and emotional support were vital to the delivery of care to adolescent mothers. The scale has been used in research and practice with a content validity index of 0.82 (Grassley et al., 2012a), an adequate alpha estimate of internal consistency of 0.83 for the 18-item scale (Grassley et al., 2012a), and principal components analysis, resulting in a 3-dimensional scale (practical, informational, and miscellaneous support) that explained 48% of the total variance (Grassley et al., 2012a).

Theoretical constructs of social support have been identified as a useful means to understand social support regarding the type and amount of support available (Simon, Johnson, & Liddell, 2016). Various dimensions of social support have been used to examine breastfeeding exclusivity. For example, data gathered from the Canadian Community Health Survey by Laugen et al. (2016) suggested that tangible and affectionate types of support provided to breastfeeding women with lower levels of education significantly increased the likelihood of exclusive breastfeeding duration to six months. Although Laugen et al. did not use House's (1981) dimensions of social support, their dimensions were similar (tangible, affectionate, social interaction, and informational/emotional).

The following is a brief introduction of Pender's (1996) revised health promotion model that served along with SST to guide this study.

Revised Health Promotion Model (RHPM)

Pender's (1996) revised health promotion model (RHPM), derived from earlier works of social cognitive theory (Bandura, 1986) and expectancy-value theory (Feather, 1982), is a basis for health promotion (Pender, Murdaugh, & Parsons, 2002). The revised model was developed to "depict the multidimensional nature of persons interacting with their interpersonal and physical environments as they pursue health" (Pender et al., 2006, p. 50). Pender et al. (2006) noted that this framework offers a guide to better understand how individuals are motivated toward behaviors that are health promoting. Recently, the model has been used to explain and predict health behaviors in many areas including cancer prevention (Canaval & Sánchez, 2011), nutrition (Dehdari, Rahimi, Aryaeian, & Gohari, 2014), exercise (Esposito & Fitzpatrick, 2011), diabetes (A. Ho, Berggren, & Dahlborg-Lyckhage, 2010), and hypertension (Kemppainen et al., 2011), in order to optimize health and create healthy lifestyles and environments.

According to Pender et al. (2006), RHMP describes key variables related to health promotion. These variables are highly pertinent to the health promoting behavior of breastfeeding as well. Individual characteristics are included in RHPM such as prior related behavior, as well as personal factors such as biological, psychological, sociological factors due to their relevance to health promotion (Pender et al., 2006). These individual and personal factors include, but are not limited to, prior habits and experiences, age, self-esteem, self-motivation, race, education, and socio-economic status (Pender et al., 2006). Behavior-specific cognitions and affect include perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect that includes subjective feelings about breastfeeding, interpersonal influence such as beliefs

and attitudes of supportive others, and situational influences such as awareness of other feeding options available (Pender, et al., 2006). According to the model, all individual characteristics and experiences and behavior-specific cognitions and affect combine to measure one's commitment to a plan of action, which ultimately influences health outcome (Pender et al., 2006).

Breastfeeding can be considered a health promoting behavior because of the many positive effects on the health for both mother and infant (Prell & Koletzko, 2016). Pender et al. (2006) explained that most often individuals recognized health promoting activities within health behaviors related to exercise, nutrition, and weight control. However, the health promoting behavior of breastfeeding has been examined less frequently using the model, although the constructs of RHPM have been shown in the literature to positively effect health outcomes (Mafutha & Wright, 2013; Meethien, Pothiban, Ostwald, Sucamvang, & Panuthai, 2011).

Schlickau and Wilson (2005) conducted a literature review of 25 studies that examined intention, initiation, and duration of breastfeeding among Hispanic women in order to explore the usefulness of RHPM (Pender, 1996) and to gain a better understanding of the breastfeeding behaviors of this population. The evidence supporting the use of the model for studies of breastfeeding outcomes of Hispanic women was found primarily in the areas of acculturation (a personal factor), perceived self-efficacy, support (an interpersonal influence) and immediate competing demands (work and family) (Schlickau & Wilson, 2005). Schlickau and Wilson (2005) found the model provided an excellent framework to examine and develop breastfeeding interventions and to promote breastfeeding among Hispanic women. Additionally, Schlickau and Wilson indicated that

further efforts are needed to measure the usefulness of each construct in the model to promote breastfeeding across diverse populations. Four dimensions of social support (House, 1981) and Pender's (1996) RHPM provided a solid framework for this dissertation study, which was based in theory.

Summary

This dissertation study tested the constructs of individual characteristics, competing situational demands, and behavior-specific cognitions and affect in Pender's (1996) RHPM. Furthermore, within Pender's construct of behavior-specific cognitions and affect, social support was further defined and tested in this dissertation using House's (1981) four dimensions of social support. Additionally, in order to strengthen this dissertation's theoretical model, important breastfeeding modifying constructs found within nursing literature – breastfeeding knowledge (Jolly et al., 2013), breastfeeding confidence (Hinic, 2016), and breastfeeding attitude (Cox et al., 2015; Y. Ho & Yu, 2014) – were added.

Nature of Study

Recent qualitative published studies have examined participation of mothers in online informal peer support groups (Bridges, 2016; Gandy-Guedes, Vance, Bridgewater, Montgomery, & Taylor, 2016; Mo & Coulson, 2014). This dissertation study included a sample of mothers who are followers of an online informal peer support group. The participants completed an Internet-based survey that was provided to the participants by a link within their self-selected breastfeeding social support group. Participants were diverse in geographic location, socio-economic level, race, and ethnicity, which allowed for better generalizability. The survey was made available to potential participants who

were one month postpartum; participants then were retested again at six months postpartum, as described in Chapter 3.

Conceptual Terms

The following presents the primary conceptual definitions used in this study:

Dimensions of social support. These are emotional (empathy), instrumental (helping others to do their work or take care of them), appraisal (giving information that enables others to evaluate themselves), and informational (providing information to help others to cope) (House, 1981).

Exclusive breastfeeding. An infant who “receives only breast milk. No other liquids or solids are given – not even water – with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines” (WHO, 2017a, para, 2).

Informal peer support. Support offered between two persons or in a group such as a breastfeeding support group. This support is offered from someone who may be considered an equal; not a healthcare professional (Kaunonen et al., 2012).

Social media breastfeeding support groups. Internet-based support groups that provide a place to exchange breastfeeding advice, information, and support, utilizing user-generated content (Bridges, 2016).

Social media platform. Mobile and Internet-based applications where users are able to interact, such as sharing information, photos, and video and instant messaging on platforms such as Facebook, YouTube, Instagram, Pinterest, and Twitter (Chapman, Raymond, & Powell, 2014).

Social support. The perception that an individual is cared for and assisted (Hupcey, 1998) by another within an interpersonal relationship (House, 1981; Leavy,

1983) in a purposeful and positive manner (Hupcey, 1998) by significant others during a time of need (Thoits, 1986).

Social support group. A gathering of individuals who share a common health interest (e.g., breastfeeding) and understand their circumstances (McCarron, 2015).

Specific Aims

The specific aims for this study were to:

1. Conduct a longitudinal analysis using structural equation modeling (SEM) of Internet-based breastfeeding support groups used by millennial-aged breastfeeding women, guided by constructs within Pender's (1996) RHPM and House's (1981) dimensions of social support, in an effort to better understand the variables that lead to sustained exclusive breastfeeding to six months.
2. Using structural equation modeling, determine the level of influence of personal factors, competing situational demands, behavior-specific cognitions and affect, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude that results in breastfeeding sustainability at six months post-delivery.

Research Questions

In order to achieve the study aims, the following research questions were posed:

1. Is the integrated health promotion model appropriate for use with breastfeeding women in an Internet-based social media breastfeeding support group?

2. Within the integrated health promotion model, which factors (personal, competing situational demands) influence women's breastfeeding support at one month post delivery and at six months post delivery?
3. What dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) are predictive of the latent construct of social support in Internet-based social media breastfeeding support groups?
4. Does breastfeeding support (latent construct) in an Internet-based social media breastfeeding support group influence the confidence, knowledge, and attitude of millennial-aged women for sustained breastfeeding at six months post delivery?
5. Does breastfeeding confidence, knowledge, and attitude influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group?
6. Will there be gains in millennial-aged women's breastfeeding confidence, knowledge, and attitudes from pretest (one month post-delivery) to follow-up at six months after delivery?
7. How do millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group describe their breastfeeding journey?

Hypotheses

The hypotheses tested for the quantitative questions were:

1. The integrated health promotion model, derived from Pender's (1996) revised health promotion model and House's (1981) dimensions of social support,

with the added constructs of breastfeeding confidence, knowledge, and attitude, will be supported by the data.

2. Age and education and competing work and family demands will significantly predict the construct of breastfeeding social support.
3. The four dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) will be predictive of the latent construct of social support in an Internet-based social media breastfeeding support group.
4. The latent construct of social support in an Internet-based social media breastfeeding support group will influence participants' breastfeeding confidence, knowledge, and attitude.
5. Breastfeeding confidence, knowledge, and attitude will significantly influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group.
6. There will be statistically significant gains in breastfeeding confidence, knowledge, and attitudes from pretest (at one month post delivery) to follow-up at six months after delivery.

Significance

This study's overall goal was to improve the health and well-being of women and infants by increasing the number of women who exclusively breastfeed to six months by examining the benefits of Internet-based breastfeeding support groups. A number of variables that are believed to lead to extending exclusive breastfeeding to six months, as recommended by UNICEF (2018), WHO (2017a), and AAP (2012), were examined.

Importantly, increased breastfeeding knowledge (Jolly et al., 2013), breastfeeding confidence (Hinich, 2016), and breastfeeding attitude (Cox et al., 2015; Y. Ho & Yu, 2014), have been found to be associated with longer exclusive breastfeeding duration. Social support provided by both professional and peer supporters has also been found to be valuable in extending exclusive breastfeeding duration (Dietrich-Leurer & Misskey, 2015; Kaunonen et al., 2012). This dissertation study addressed a gap in the current literature by studying the social support of young breastfeeding-aged women who are likely to use information technology and social media platforms to gather information to support their breastfeeding.

This dissertation study built upon previously published research and explored breastfeeding promotion and support to determine factors known to influence breastfeeding exclusivity and duration. Furthermore, a strength of this study is that it is theoretically grounded in social support constructs by House (1981) and constructs of Pender's (1996) RHPM.

Summary

Exclusive breastfeeding for the first six months of life has been shown to decrease morbidity and mortality of women and infants (AAP, 2012; UNICEF, 2018; WHO, 2017b). However, breastfeeding rates in the United States have not met the minimum goals set forth by the Healthy People 2020's (n.d.) Maternal, Infant, and Child Health Initiative to improve the health of women, infants, and families by increasing the proportion of infants that are exclusively breastfed through six months. Although 81% of U.S. women initiate breastfeeding after birth, a small minority (22%) continue exclusive breastfeeding prior to the infant reaching six months (CDC, 2016a).

Researchers have pointed to variables such as breastfeeding confidence (Hinich, 2016), breastfeeding knowledge (Jolly et al., 2013), and breastfeeding attitude (Cox et al., 2015; Y. Ho & Yu, 2014) as well as breastfeeding support (Laugen et al., 2016) as predictors of breastfeeding duration. Social media platforms have become widely popular in society and have considerable potential to offer a cost-effective means for health promotion and education. This dissertation study used already established Internet-based social media support groups used by millennial-aged postpartum mothers to determine the effects of social media support group use on breastfeeding knowledge, breastfeeding attitude, and breastfeeding confidence toward exclusive breastfeeding to six months.

Chapter 2 provides an introduction to breastfeeding as well as a description of Pender's (1996) RHPM and House's (1981) dimensions of social support. Additionally, social support, social support groups, and the millennial generation are discussed. Social media and social media support groups are examined as well as modifiable breastfeeding constructs of breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitudes.

CHAPTER 2. REVIEW OF THE LITERATURE

Breastfeeding

Breastfeeding is the nutritional “gold standard” for a growing infant (A. Walker, 2010, p. 3). UNICEF (2018) has ranked breastfeeding as one of the single most important activities to ensure child health and survival worldwide. Organizations such as UNICEF (2018), WHO (2017a), and AAP (2012) have endorsed exclusive breastfeeding for the first six months, then continuation of breastfeeding with added complimentary food substances for at least one to two years (WHO & UNICEF, 2014). An exclusively breastfed infant is one who receives only human milk, via breast or manually expressed, and no other substances with the exception of vitamins, minerals, or medications (WHO (2017b); WHO & UNICEF, 2014).

Researchers from the reported that although 81.1% of new mothers in the United States initiate exclusive breastfeeding after birth, only 22% of mothers sustain exclusive breastfeeding to six months, as recommended by AAP, UNICEF, and WHO (CDC, 2016a). To address low six month exclusive breastfeeding rates, Healthy People 2020 (n.d.) initiatives included maternal and infant’s health goals aimed at improving the health and well-being of women, infants, children, and families. The Healthy People 2020’s leading health indicator, MICH21.5, is aimed at improving health by increasing the percentage of infants who are exclusively breastfed to six months. Much still remains to be done to increase exclusive breastfeeding rates within the United States. The Surgeon General’s Call to Action to Support Breastfeeding was intended to mobilize

efforts to support breastfeeding, stating, “Given the importance of breastfeeding for the health and well-being of mothers and children, it is critical that we take action across the country” (Office of the Surgeon General, CDC, & Office on Women’s Health, 2011, p. 37). It is well-established in the breastfeeding literature that there are vast health benefits of exclusive breastfeeding for mother and infant, but current U.S. statistics show less than adequate percentages (22%) of women are meeting the national and professional health-promoting recommendations (CDC, 2016a).

Infant Breastfeeding Benefits

Scientists continue to discover the nutritional (Haschke et al., 2016) and immunological components unique to human milk that are optimally suited for normal human growth and development (Battersby, 2016; Eidelman et al., 2012; Oddy, 2012). Human milk reportedly contains the ideal proportion of vitamins, minerals, proteins, fats, and sugars, which may vary according to the infant’s needs, from feeding to feeding, and from mother to mother (Andreas, Kampmann, & Mehring Le-Doare, 2015; Prell & Koletzko, 2016; Purdy & Melwak, 2013). Furthermore, each drop of human milk contains substances that enhance the immature immunologic systems of the infant by promoting gastrointestinal mucosal maturation and altering gut microflora as well as providing hormones, growth factors, and cytokines, all of which decrease development of disease (Haschke et al., 2016; Oddy, 2002; Watanabe, de Oliveira, Oda, Ono, & Guembarovski, 2012).

Human milk enhances an infant’s immature immune system by strengthening defense mechanisms that fight disease (Oddy, 2002). Breastfeeding results in a decreased incidence of respiratory tract infections (Chantry, Howard, & Auinger, 2006; Yamakawa

et al., 2015). Furthermore, Chantry et al. (2006) performed a secondary analysis of data from the U.S. National Health and Nutrition Examination Survey of infants 6-24 months ($N=2,277$). Data were compared between two groups, infants exclusively breastfed for six months and those exclusively breastfed for only four to six months (Chantry et al., 2006). Results from the Chantry et al. study revealed that upper respiratory infections, including pneumonia, were significantly decreased in infants exclusively breastfed for at least six months versus four months (OR: 4.27; 95% CI: 1.27-14.35) after adjusting for demographic variables, child care, and smoke exposure. These findings support the current recommendation for exclusively breastfeeding for six months postpartum.

Gastrointestinal infections are a frequent cause of infant mortality worldwide (Eidelman et al., 2012). UNICEF (2018) reported that within developing countries, 1 in 10 childhood deaths in 2015 were due to the effects of diarrhea. UNICEF added that half of the diarrhea episodes could be prevented with exclusive breastfeeding for six months in low and middle income countries. Lamberti, Fischer Walker, Noiman, Victora, and Black (2011) performed a systematic review with a meta-analysis of non-exclusive breastfeeding as a risk factor for infant diarrhea morbidity and mortality. A total of 18 studies, published between 1980-2009, from Latin America, Africa, South Asia, the Middle East, and the Western Pacific met inclusion criteria (Lamberti et al., 2011). Lamberti et al. found exclusive breastfeeding provided a protective effect over diarrhea incidence, hospitalization, and mortality. Furthermore, the meta-analyses indicated the greatest protective effect of exclusive breastfeeding occurred among infants 0-5 months of age and by any breastfeeding among infants and young children 6 to 23 months of age (Lamberti et al., 2011). In contrast, Lamberti et al. reported that infants not breastfed had

an excess risk of diarrhea mortality in comparison to exclusive breastfeed infants 0 to 5 months of age.

Aside from gastrointestinal infections, human milk has also been found to provide a protective mechanism on the bowel lining and has been linked to decreased risk of other bowel diseases such as necrotizing enterocolitis (NEC) (Coit, 1999; Gane et al., 2014; Manea, Boia, Iacob, Dima, & Iacob, 2016), celiac disease (Pozo-Rubio et al., 2013), and various inflammatory bowel diseases (Eidelman et al., 2012).

NEC, a common and devastating disease found usually in preterm infants and affecting approximately 7% of low birth weight infants (500 g.-1500 g.) in the United States and Canada, has become a priority topic for researchers (Neu & Walker, 2011). A study to analyze the possible risk factors of NEC and infant outcomes was performed by Gane et al. (2014). The study included 100 neonates with NEC (mean gestational age 32.52 weeks) compared to 100 neonates without NEC for control (mean gestational age 32.36 weeks); results indicated formula fed neonates had a higher risk of developing NEC. The authors identified that this was likely due to human milk's ability to influence immunity and protect the gastrointestinal mucosa, as well as its effects on increasing the diversity of gastrointestinal bacterial colonization (Gane et al. 2014).

Results of a secondary analysis conducted by Colaizy et al. (2016) to estimate the risk of developing NEC for very low-birth-weight infants supported these earlier findings comparing infants fed with human milk or preterm formula. Colaizy et al. found an increased risk of NEC associated with the use of exclusive preterm formula (OR = 12.1, 95% CI 1.5, 94.2) or a mixed diet (OR 8.7, 95% CI 1.2-65.2). Although prematurity and enteral feedings are the two largest risk factors for developing NEC (Coit, 1999),

according to more recent studies, the incidence of NEC in premature infants is lessened in those consuming only human milk (Colaizy et al., 2016).

Breastfeeding provides a wide range of immediate health benefits for newborns and infants (Andreas et al., 2015), as well as long-lasting effects on health that reach far into adulthood (Eidelman et al., 2012; Victora et al., 2016). For example, the risk of childhood and adult obesity (Carling et al., 2015; Moss & Yeaton, 2014; Yan et al., 2014), and diabetes (Hall et al., 2015; Martens et al., 2016) has been reported to be decreased in infants who were exclusively breastfed. Carling et al.'s (2015) prospective study examined infant weight-gain trajectories to determine if short breastfeeding durations were linked to higher obesity risk later in life. Weight and length were gathered from medical records for infants ($N=595$) 0 to 24 months old. The researchers found infants at high-risk for obesity due to rising weight-gain patterns determined by maternal risk factors (high maternal body mass index [BMI], less than high school education, and smoking during pregnancy) benefitted the greatest with longer exclusive breastfeeding duration (at least two months) (Carling et al., 2015). Specifically, infants exclusively breastfed for less than two months were found to have a higher weight-gain trajectory, compared to infants exclusively breastfed for greater than four months who exhibited a stable weight-gain trajectory (OR, 2.55, 95% CI: 1.14–5.72, $p=.02$) (Carling et al., 2015). Similarly, Mamun et al. (2015) performed a longitudinal study ($N=3,595$) to analyze the protective effect of breastfeeding toward the development of diabetes in young adults who were breastfed longer than four months. The results of their study suggested that exclusively breastfeeding for more than four months had a protective effect against Type II diabetes, decreasing the incidence of Type II diabetes development in young adulthood

independent of current BMI (Mamun et al., 2015). Performing a 21-year follow-up study of data from a large community-based birth cohort study, Mamun et al. found that infants who were breastfed had a 58% lower risk of diabetes by age 21 years, compared to infants who were never breastfed. Interestingly, this risk was much lower (71%) for those children who were breastfed for at least four months. Although the study did not differentiate between exclusive breastfeeding and breastfeeding with complimentary feeding, it provides strong evidence regarding the protective effects of breastfeeding against Type II diabetes development later in life and the significance of the duration of breastfeeding. In addition, studies have also shown that breastfeeding decreases risks of developing childhood leukemia and lymphoma (Greenop et al., 2015), sudden infant death syndrome (Zotter & Pichler, 2012), disorders such as asthma and eczema (Lodge et al., 2015), and dental carries (Shirong et al., 2015; Tham et al., 2015), as well as evidence of enhanced cognitive development (Horta et al., 2015; Prell & Koletzko, 2016).

Maternal Breastfeeding Benefits

Researchers have also examined the benefits of breastfeeding for mothers, noting that breastfeeding is mutually beneficial to both mother and child (Godfrey & Lawrence, 2010). Prell and Koletzko (2016) indicated breastfeeding women experience a more rapid return to a pre-pregnancy state, with faster uterine involution and generalized weight loss. Other studies have reported more immediate benefits of early breastfeeding such as decreased postpartum blood loss and diminished chance of postpartum hemorrhage (Saxton, Fahy, Rolfe, Skinner, & Hastie, 2015). Furthermore, Saxton et al. (2015) reported in their retrospective cohort study of birth records ($N=7,548$) of postpartum women that mothers who breastfed and performed mother-infant skin-to-skin contact

(kangaroo care for 15 minutes or more) within 30 minutes after birth experienced half the incidence of postpartum hemorrhage (adjusted O.R. 0.55, 95% C.I.: 0.41–0.72, $p < .001$). Although Saxton et al. did not report results of mothers who breastfed without skin-to-skin contact, their findings demonstrated a significant reduction (50%) in postpartum hemorrhage. This area warrants further research.

Long-term health benefits of breastfeeding continue for mothers, including a decreased incidence of breast and ovarian cancer (Chowdhury et al., 2015; Luan et al., 2013), rheumatoid arthritis (H. Chen, Wang, Zhou, Yin, & Wang, 2015), Type I and Type II diabetes, and risk of obesity (Dieterich et al., 2013), postpartum depression (Hahn-Holbrook et al., 2013), and delayed ovulation resulting in pregnancy spacing (Dieterich et al., 2013; Victora et al., 2016).

According to Shariat and Abedinia's (2017) longitudinal study of 71 pregnant and postpartum women, ages 18-35, in Iran to evaluate attachment behaviors found increased maternal attachment was significantly related to breastfeeding persistence ($p = < .001$), but did not specify the difference breastfeeding duration between the control group and interventional group. Shariat and Abedinia defined attachment as an emotional relationship formed during pregnancy and promoted after birth by having eye-contact, smelling, touching, and skin-to-skin contact between mother and infant, which results in an interactive bonding experience after birth. Furthermore, Shariat and Abedinia described maternal-infant attachment as a psychological variable that improves the likelihood of persistence of breastfeeding and improving the health of mother and infant. They recommended attachment and bonding should be facilitated in the immediate postpartum period through skin-to-skin contact and early breastfeeding (Shariat &

Abedinia, 2017). Future interventional studies aimed at assessment and facilitation of attachment behaviors and their influence on breastfeeding duration are indicated.

Although the wide array of health benefits from breastfeeding appear overwhelmingly convincing for both mother and child, many women are not meeting breastfeeding goals and those recommended by AAP, UNICEF, and WHO for sustainability at six months post-delivery (U.S. Department of Health and Human Services, 2011). Therefore, the focus of this dissertation study was on understanding the variables that lead to exclusive breastfeeding sustainability at six months among women participating in social media, grounded in the theoretical constructs of health promotion and social support.

Theoretical Foundation

Key elements for understanding the constructs related to breastfeeding sustainability were derived from literature and were focused upon health promotion and social support. This dissertation study's conceptual framework integrated Pender's (1996) RHPM and House's (1981) SST to provide a framework incorporating concepts of health promotion, as well as dimensions of social support.

Pender's (1996) Revised Health Promotion Model (RHPM)

Pender, through the use of Pender's (1996) RHPM (Figure 1), explored the "multidimensional nature of persons interacting with their interpersonal and physical environments as they pursue health" (Pender et al., 2002, p. 61). Pender's health promotion model (HPM) was first published in nursing literature in 1982 and then revised in 1996. Pender's HPM was originally based upon the seminal work of Atkinson (1957), Feather's (1982) expectancy-value theory, and Bandura's (1986) social cognitive

theory. Pender et al. (2002) noted that RHPM had been successfully used for its “predictive capabilities for overall health-promoting lifestyle capabilities, as well as specific behaviors” (p. 64).

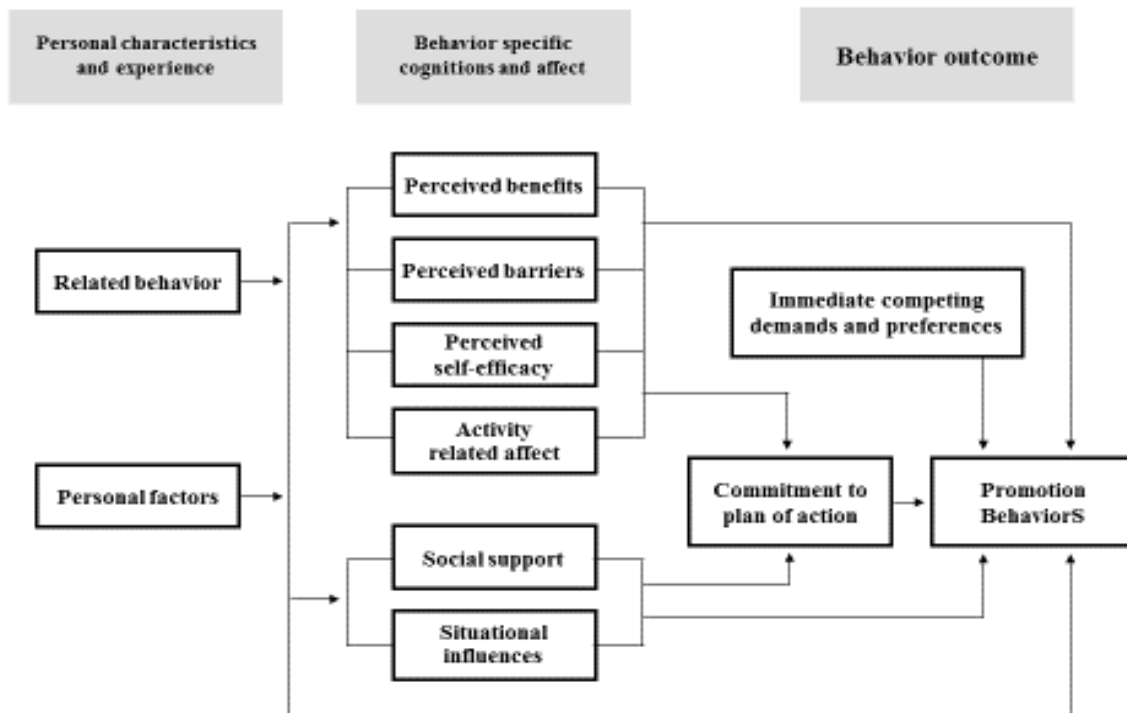


Figure 1. Pender’s revised health promotion model (RHPM). Adapted from *Health Promotion in Nursing Practice* (3rd ed.) by N. J. Pender, 1996, p. 60. Reprinted with permission (Appendix A).

RHPM has been used widely with positive applications and outcomes as a framework for health promotion studies designed to improve diet (Meethien et al., 2011), to increase exercise (Esposito & Fitzpatrick, 2011), to manage hypertension (Kemppainen et al., 2011; Mafutha & Wright, 2013), to improve medication compliance (Hacihasanoglu & Gözüm, 2011), and to improve oral health (Vakili, Rahaei, Nadrian, & YarMohammadi, 2011), as well as in cancer prevention (Canaval & Sánchez, 2011). RHPM is widely applicable to address various health promotion situations, but does not

focus upon fear or threats to health for motivation as in the Lewin, Dembo, Festinger, and Sear (1944) health belief model (Roeckelein, 2006). Instead, RHPM relies upon a wellness-oriented framework to explain and predict the likelihood of engaging in health promoting behaviors (Pender, Walker, Sechrist, & Frank-Stromborg, 1990). Therefore, the use of RHPM (Pender, 1996) has merit within this dissertation study to explore factors influencing sustained breastfeeding at six months post delivery, as breastfeeding is viewed as a health promoting behavior.

Health goes beyond the medical model definition of “freedom from disease” (WHO, 1948, p. 12). Pender et al. (2006) recognized the advantages of the WHO’s (1948) definition of health as a “state of complete physical, mental, and social well-being and not merely absence of disease and infirmity” (p. 100) due to the emphasis on the total person, focus on the social environment, and the relationship between health and an active participation of the individual (Pender et al., 2006). Pender et al. (2006) added that health promoting behaviors and their resulting healthy lifestyles are actively controlled by the individual, not an occurrence of chance or luck. Moreover, health promotion has been presented as a strategy to prevent or reverse poor health outcomes by “providing people with the techniques, support networks, and information in order to enable them to make positive changes to their health” (Yuill, Crinson, & Duncan, 2011, p. 1). Therefore, health outcomes are a result of the influences between individual characteristics and experiences, and behavior specific cognitions and affect (Pender et al., 2006).

Individual characteristics and experiences. According to Pender et al. (2002), prior related behavior and personal factors “influence beliefs, affect, and enactment of health-promoting behavior” (p. 63). Pender et al. (2006) asserted that prior behavior had

direct and indirect effects on whether the health promotive behavior will likely be attempted.

This dissertation study utilized an adaptation (Figure 2) of Pender's (1996) RHPM to provide a framework for the study of breastfeeding mothers, and the factors known to influence breastfeeding exclusivity to six months. Prior breastfeeding related experience (Bai, Fong, & Tarrant, 2015b), and personal factors such as age (Gultie & Sebsibie, 2016), parity (Hill, Humenick, Argubright, & Aldag, 1997), level of education (Akter & Rahman, 2010), socio-economic status (Brown, Raynor, Benton, & Lee, 2010), and race (Belanoff, McManus, Carle, McCormick, & Subramanian, 2012) are unique personal characteristics and experiences that affect subsequent health promotion actions of breastfeeding. With roots tied to social cognitive theory (Bandura, 1986), prior related behavior and experiences (Bai et al., 2015b) and personal factors were considered important in this dissertation study because of the supported relevance to breastfeeding duration (Gultie & Sebsibie, 2016).

Prior related behavior. Prior breastfeeding experience has been shown to be a factor in predicting exclusive breastfeeding duration (Bai et al., 2015b), although many breastfeeding research studies have been focused on primipara mothers (Boettcher, Chezem, & Adams, 1998; Ladomenou, Kafatos, & Galanakis, 2007). Roig et al. (2010) found similar results to Bai et al. (2015b) in their effort to identify factors associated with early breastfeeding cessation. Data for Roig et al.'s quantitative breastfeeding study were collected in Spain by telephone interviews with 248 of both primigravida and multigravida mothers at one, four, and six months postpartum. Roig et al. indicated that not having previous breastfeeding experience, previous breastfeeding duration of less

than four months, and negative previous breastfeeding experiences were all associated with cessation of breastfeeding prior to six months.

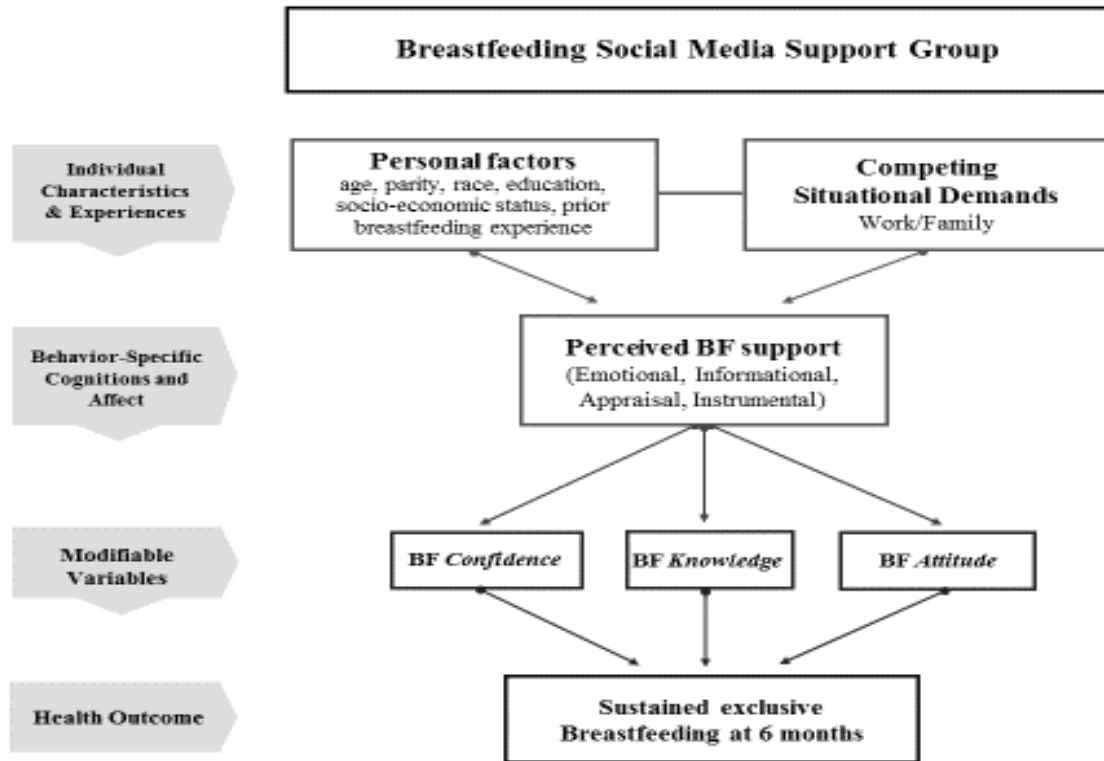


Figure 2. Health promotion model as a framework for the study of breastfeeding support. Based on Pender’s (1996) revised health promotion model.

Personal factors. Countless biologic, psychologic, and sociocultural factors can influence health outcomes. Pender et al. (2006) recommended limiting personal factors to those that are theoretically relevant to the proposed health behavior. Within the breastfeeding literature, age, maternal education, parity, socioeconomic status, and race/ethnicity are non-modifiable factors that are relevant to breastfeeding duration.

A systematic review of 78 studies published between 1976 and 2008 examined the determinants of early weaning from breastfeeding with added complementary foods before four to six months (Wijndaele, Lakshman, Landsbaugh, Ong, & Ogilvie, 2009).

Wijndaele et al. (2009) found that young maternal age, minimal maternal education, and low socioeconomic status were among the greatest factors that lead to cessation of exclusive breastfeeding prior to six months. Similar studies comparing age (Akter & Rahman, 2010; Gultie & Sebsibie, 2016; Magnusson, Lagerberg, & Wallby, 2016; Pang et al., 2016) and education (Gultie & Sebsibie, 2016; Hla, Novotny, Kieffer, & Mor, 2003; Magnusson et al., 2016; Pang et al., 2016) have produced similar results. Onah et al. (2014) suggested that the cessation of exclusive breastfeeding occurred when mothers believed their infant was able to tolerate complementary feedings, which then allowed the mother to attend to other activities. However, mothers with higher education were more likely have an increased understanding of the benefits of exclusive breastfeeding and tended to delay introduction of other food sources (Onah et al., 2014).

Conflicting evidence regarding the association of parity and exclusive breastfeeding duration. Hill et al. (1997) performed a prospective longitudinal cohort study of 120 mothers to determine patterns of breastfeeding, breastfeeding duration in relation to parity, and mothers' reasons for termination of breastfeeding. Surprisingly, Hill et al. found that parity did not affect overall breastfeeding duration: $F(2, 119) = 1.49, p = .23$.

Hill et al. (1997) found at 20 weeks postpartum, primiparas (40.6%), multiparas with experience (55.0%), and multiparas without breastfeeding experience (36.4%) had similar breastfeeding continuation rates for either exclusive or non-exclusive breastfeeding. Furthermore, group differences between breastfeeding duration, primiparas (13 weeks), multiparas with previous breastfeeding experience (14.9 weeks), and

multiparas without prior breastfeeding (11 weeks) were not found to be significant (Hill et al., 1997).

Other studies have reported an unclear association between higher parity and longer exclusive breastfeeding rates. A prospective cohort study of 1,049 postpartum mothers (Ladomenou et al., 2007) did not report an association between parity and breastfeeding duration. Findings by Ladomenou et al. (2007) concluded that it was prior breastfeeding experience, rather than the parity of a mother, that influences future breastfeeding initiation and duration. In contrast, a cohort study by Dashti, Scott, Edwards, and Al-Sughayer (2014) of 373 postpartum women found that multiparous mothers were less likely to discontinue breastfeeding prior to six months (adjHR 0.63, 95% CI 0.49–0.92, $p = 0.014$).

Results of a secondary analysis (Bolton, Chow, Benton, & Olson, 2009) aimed to examine peer counseling programs and their effects on breastfeeding outcomes among pregnant and breastfeeding mothers ($N=5,067$). Results showed that increased maternal age (over 20 years) and previous breastfeeding experience were the main predictors of longer breastfeeding duration, ranging 2 weeks to 12 months, with the average equalling 18.4 weeks ($SD\pm 15.7$). In fact, Bolton et al. (2009) indicated that with each additional year of maternal age, one to two days longer breastfeeding duration was added, resulting in several weeks difference in breastfeeding duration between oldest and youngest participants.

Socioeconomic status has been shown to have a clear impact on breastfeeding duration and has been closely tied to other variables, including race and level of education. According to Brown et al. (2010), exclusive breastfeeding rates are not equal

across socioeconomic groups. For example, the Brown et al. study that surveyed 216 multiparous women from England and Wales found that a relationship between socioeconomic status and exclusive breastfeeding duration existed; exclusive breastfeeding mothers were more likely to be older, be more educated, and earn a greater income. Furthermore, mothers who were married, owned their own home, and were employed in managerial or professional capacity exclusively breastfed for a significantly ($p < 0.05$) longer duration (Brown et al., 2010).

Breastfeeding rates have been shown to vary between races and ethnic groups regardless of the geographic region in the United States (Belanoff et al., 2012). According to the CDC (n.d.), African American mothers are least likely to initiate breastfeeding (68.0%) compared to Caucasians (85.7%) and Hispanic mothers (84.8%). Furthermore, African American mothers have shorter duration of exclusive breastfeeding up to six months (15.0%), compared with Caucasians (27.9%) and Hispanic (24.5%) mothers (CDC, n.d.). Interestingly, Hispanic women are likely to breastfeed but, according to Hardy et al. (2013), they are also most likely to feed their infant both formula and human milk, stating that the addition of formula is best for their infant (Hispanic, 37.5%; African American, 25.8%; Caucasians, 14.6%) ($p < .01$).

Furthermore, Jones, Power, Queenan, and Schulkin (2015) reported in their literature review on the racial and ethnic disparities in breastfeeding rates that the barriers to breastfeeding are unique and found more frequently in race and ethnic minority populations. Additionally, Jones et al. found the common reasons for breastfeeding inequities among ethnic and cultural groups are due to a “lack of cultural acceptance and support, language and literacy barriers, lack of maternal access to information that

promotes and supports breastfeeding, and acculturation” (p. 189). Although inequities among ethnic and racial groups were not tested in this dissertation study, they are important to explore in future studies.

Pender et al. (2002) described individual characteristics and experiences, including prior related behavior and personal factors, in the RHPM. The aspects of prior behavior and personal factors offer great flexibility to the model giving the opportunity to “capture variables that may be highly relevant to a particular health behavior...” (Pender et al., 2002, p. 68). Within this dissertation study, the prior related behavior of previous breastfeeding experience and personal factors (age, education, and competing work/family demand) were explored.

Behavior-specific cognitions and affect. Pender’s (1996) RHPM includes behavior-specific cognition and affects that are comprised of motivational variables: perceived benefit versus barrier, perceived breastfeeding self-efficacy, activity-related affect, perceived inter-personal breastfeeding support, and competing situational demands (Pender et al., 2006). Pender et al. (2006) stated that the behavioral-specific cognitions and affect are key motivational variables and are significant due to their ability to be modified by interventions. The following behavioral specific cognitions and affect – perceived benefit versus barrier, perceived self-efficacy, activity-related affect, social support, and competing situational demands – are described next, as well as their relation to breastfeeding.

Perceived benefits and barriers. From Atkinson’s (1957) expectancy-value theory, Pender (1996) included the motivating factor of perceived benefits and barriers that directly or indirectly assist in determining commitment to a plan of action (Pender et

al., 2002). Pender et al. (2002) explained that one's engagement in a health promoting behavior relies upon the individual's perception of the possible benefit or expected barrier or challenge that is anticipated. Based on Atkinson's (1957) expectancy-value theory, individuals are more likely to invest effort, time, and resource in an activity that is perceived to result in a positive outcome. Pender (1996) described that a belief in the resulting positive outcome is necessary, but is not motivationally sufficient alone (Pender et al., 2006).

Real or imagined perceived benefits and barriers such as improved health or anticipated difficulty, inconvenience, embarrassment, and pain are factors that may positively or negatively affect intentions to engage in health promotion activities such as breastfeeding (Gill, Reifsnider, Mann, Villarreal, & Tinkle, 2004). Pender et al. (2006) described additional perceived barriers as a burden, challenge, hurdle, or anticipated cost of achieving a health promotion behavior. Perceived barriers may stop an action from occurring or lessen an individual's commitment to an activity (Pender et al., 2006).

Gill et al. (2004) conducted a qualitative study using focus groups to explore breastfeeding beliefs among low-income Mexican Americans, asking the participants "What do you think about breastfeeding?" According to Gill et al., participants were able to identify breastfeeding benefits and reasons to breastfeed such as "breastfeeding's health benefits for baby and mother, the superiority of breast milk, the nutrient content of breast milk, breastfeeding's ability to increase closeness to the baby, and the cost savings of breastfeeding" (p. 43). Participants also identified time, embarrassment, pain, and inconvenience as perceived barriers (Gill et al., 2004). Furthermore Gill et al. found that many mothers, fathers, and grandmothers reported that breastfeeding in public was

inappropriate, expressing that although participants verbalized the breastfeeding benefits correctly, the perceived barriers that breastfeeding created were too great of a hurdle to overcome to sustain breastfeeding to six months.

Although perceived breastfeeding benefits and barriers have significant relationships to health behavior intention, within this dissertation study's hypothesized model, the construct of breastfeeding benefits and barriers were similar to breastfeeding knowledge and breastfeeding attitude. In order to maintain a more parsimonious model and avoid confounding effects, breastfeeding benefits and barriers were removed from the hypothesized model due to the similarity to breastfeeding knowledge and attitude.

Perceived self-efficacy. Perceived self-efficacy, an essential component of Bandura's (1986) social cognitive theory, is based on the perception of one's ability to perform a behavior rather than the actual skill one possesses (Pender et al., 2006). Pender et al. (2006) explained that the perception of competence in performing an activity is motivational, and therefore encourages one to pursue a health promoting activity.

A qualitative study to explore support for breastfeeding and the experiences of breastfeeding women by Entwistle, Kendall, and Mead (2010) found that if a breastfeeding mother's self-efficacy was high and her breastfeeding attempts have been successful, subsequent breastfeeding attempts would be enhanced. Consequently, if breastfeeding self-efficacy was poor, then expectations would be negative and future self-efficacy regarding breastfeeding would be lowered (Entwistle et al., 2010). Breastfeeding self-efficacy predictors were identified by Zhu, Chan, Zhou, Ye, and He (2014) in their cross-sectional descriptive study of 201 antenatal women intending to breastfeed. Zhu et al. found, "perceived social support, previous experience breastfeeding, previous

experience watching others breastfeed, timing of maternal decision to breastfeed, and perceived attitude of husband towards breastfeeding” (p. 705) to be strong predictors of breastfeeding self-efficacy. In their literature review of breastfeeding self-efficacy measures, Tuthill, McGrath, Graber, Cusson, and Young (2016) added self-efficacy as a key predictor of breastfeeding initiation and duration.

Within breastfeeding literature, the terms self-efficacy and confidence have been closely aligned (Grassley & Nelms, 2008). Confidence has been described as “the feeling or consciousness of one’s powers or of reliance on one’s circumstances. Individuals can feel confident in their ability to perform a specific task but not feel effective at changing others’ behaviors related to this task” (Finch, Weiley, Ip, & Barkin, 2008, p. 76).

Furthermore, Liu, Chen, Yeh, and Hsieh (2012) have related the conceptual definition of maternal confidence to the mother’s belief in her own ability to care for her infant, and they have related the term confidence closely with infant care competence or self-efficacy in their prospective correlational study of 372 Taiwanese postpartum mothers with infants less than four months old.

In social cognitive theory, Bandura (1986) defined self-efficacy as an individual’s beliefs about their ability to produce effects. In his later writings, Bandura (1994) likened self-efficacy to confidence. Although self efficacy may have some relation to breastfeeding, in order to have a parsimonious model, self efficacy was removed from the hypothesized model due to the similarity to the confidence construct.

Activity-related affect. Activity-related affect has been referred to as a “gut-level response to a behavior” or a “subjective feeling state that occurs prior to, during, and following an activity (Pender et al., 2002, p. 71). Pender et al. (2002) described that the

subjective feelings associated with an activity, either positive or negative, indicate if an individual will repeat the behavior. Activity-related affect has most recently been added within RHPM (Pender, 1996) with scant studies to date having explored it in relation to breastfeeding.

Qualitative work from Schmied and Lupton (2001) of 25 first time mothers in Australia found for some mothers breastfeeding was pleasurable and intimate, while others found the experience draining and restrictive and felt a loss of self. Furthermore, Wojnar (2004) conducted a prospective correlational study of 110 postpartum mothers to explore the relationship between women's perceptions of their infant's behavior and their breastfeeding status at six weeks. In telephone interviews with breastfeeding women, Wojnar reported that the majority of breastfeeding women's subjective feelings included feelings of enhanced attachment, enjoyment, and a sense of pride and fulfillment. Conversely, in a longitudinal and cross-sectional study of 389 mothers from Scotland, Sweden, Spain, and Italy (Scott et al., 2015), found that a mother's activity-related negative affect included embarrassment when breastfeeding in public. At the time, the researchers asserted that breastfeeding in public was against the cultural norm and often a reason women confined themselves to private places to breastfeed or stop breastfeeding altogether, rather than incur negative feelings of embarrassment in response to breastfeeding in public (Scott et al., 2015).

Thus, within breastfeeding literature, there remains a dichotomy of activity-related affect responses. Pender et al. (2006) recognized that some behaviors elicit both positive and negative affect responses. Pender et al. stated that an individual's response to an activity leaves the individual to determine whether their response to a stimulus will be

to repeat the behavior again, to continue the behavior for a longer duration, or to discontinue. Although activity-related affects may have some relation to breastfeeding, in order to have a parsimonious model, activity related effects were removed from the hypothesized model due to the similarity to the benefits/barrier construct.

Social support. Social support within revised model refers to “cognitions concerning the behaviors, beliefs, or attitudes of others” (Pender et al., 2002, p. 72). Social support may be derived from sources of support such as fathers (Bich, Hoa, & Malqvist, 2014), grandmothers (Grassley, Spencer, & Law, 2012b), peers (Bergman et al., 2016), or health care providers (McLelland, Hall, Gilmour, & Cant, 2015). Through his study of social support and social networks, House (1981) identified that social support from informal sources such as family and peers and formal sources such as health care providers directly enhanced health by meeting a basic human need for security, contact, approval, and belonging.

Competing situational demands. Pender’s (1996) RHPM built upon the original model by adding competing demands and preferences. Demands were defined by Pender et al. (2002) as “alternate behaviors over which individuals have a relatively low level of control” (p. 73) such as work and family demands, and preferences as “alternative behaviors with powerful reinforcing properties” (p. 73) such as giving in to a behavior.

Bai, Fong, and Tarrant (2015a) studied 1,738 employed breastfeeding mothers in their longitudinal cohort study to examine the relationship between support of a mother’s social network and the continuation of breastfeeding, and found that most mothers who returned to work were less likely to continue breastfeeding (32%). Bai et al. found 85% of participants returned to employment within three months postpartum, with over 90%

of these employed full-time. The researchers cited that a breastfeeding supportive work environment and workplace changes (i.e., supportive maternity leave policies and more flexible work options) were a plausible mediator for this breastfeeding barrier (Bai et al., 2015a). Those who reported breastfeeding after returning to work had shorter working hours, parental childcare, mandated workplace breaks, and higher maternal education (Bai et al., 2015a).

Competing situational demands, as well as Pender's (1996) other constructs as previously mentioned, are significant to breastfeeding duration. Therefore, Pender's RHPM provided a framework for the understanding of key constructs within the health promoting behavior of breastfeeding. Individual characteristics such as prior breastfeeding experience (Bai et al., 2015b) and personal factors including age (Gultie & Sebsibie, 2016), parity (Dashti et al., 2014), race (Belanoff et al., 2012), education (Akter & Rahman, 2010), and socio-economic status (Brown et al., 2010) have all been shown to be related to breastfeeding duration. Additionally, Pender's (1996) RHPM includes behavior specific cognition motivational variables that may also be linked to breastfeeding promotion: perceived benefit versus barrier (Gill et al., 2004), perceived breastfeeding self-efficacy defined as confidence (Entwistle et al., 2010), activity-related affect (Wojnar, 2004), social support (Brown, Raynor, & Lee, 2011), and competing situational demands (Bai et al., 2015a). Pender's (1996) RHPM was combined with social support constructs (House, 1981), creating a strong theoretical framework in this dissertation study.

House's (1981) Social Support Theory

Literature examining the health promoting behavior of breastfeeding and methods

to achieve breastfeeding sustainability often focus primarily on modes of maternal social support such as peer support (Bergman et al., 2016), family support (Grassley et al., 2012b), or professional support (McLelland et al., 2015). Although SST has been studied over six decades, researchers continue to examine social support due to its great impact on health behavior, finding that higher levels of social support are significantly related to higher levels of a health promoting behavior (Cho, Jae, Choo, & Choo, 2014).

Social support theory originated in the field of sociology from the work of Barnes (1954) and Cassel (1976). Social support, according to Cassel, was thought to be a protective mechanism or buffer against the health threatening consequences of stress. Work by B. Kaplan, Cassel, and Gore (1977) found that although most studies of that time period attempted to link absence of adequate social support to illness and disease, there was little empirical evidence to confidently make that assumption.

Barrera (1986) acknowledged that the stress-buffering model of support has been widely described in social support literature (Gore, 1981; Gottlieb, 1983), as well as other models linking stress to distress (Frydman, 1981; R. Turner & Noh, 1982). Barrera (1986) sought to clarify and operationalize social support concepts into the concepts of social embeddedness, perceived social support, and enacted support. According to Barrera, social embeddedness refers to the amount of “connectedness that individuals have to significant others in their social environments” (p. 415). Although similar to social embeddedness, perceived social support is the individual’s “cognitive appraisal of being reliably connected to others” (Barrera, 1986, p. 416). Enacted support refers to actions and “rendering assistance to a focal person” (Barrera, 1986, p. 417). Early work

by Barrera aimed to reduce confusion about social support concepts that were either confounding or vague in social support literature.

Other researchers also suggested a migration from an abstract view of support to one that encompassed perceptions and quality and quantity of support, as well as attempts to identify dimensions of support (Hupcey, 1998). House's (1981) social support theory was especially valuable to this dissertation study for its distinction between four supportive dimensions: appraisal, emotional, informational, and instrumental. Appraisal support provides a mechanism for evaluation or constructive feedback; emotional support involves caring, which includes validation, empathy, and reassurance; informational support provides its recipient with knowledge and advice; and instrumental support is tangible assistance or a service that is helpful (House, 1981).

Tarkka and Paunonen (1996) explored the construct of social support regarding tangible aid or physical assistance, affirmation, and affect or emotional support in regard to the care of 200 postpartum mothers in an effort to discover the type of social support offered to new mothers from their nurses. The results of their study demonstrated tangible aid or physical assistance as the primary area of support provided by nurses, although new mothers reported a need for increased informational/guidance for child care and breastfeeding (Tarkka & Paunonen, 1996). Furthermore, Tarkka and Paunonen expressed that it is important to provide social support during the hospital stay, and then to continue support after discharge. Tarkka and Paunonen explained that the success of infant care, including breastfeeding, depended upon the type and amount of social support offered at the time of birth and well after discharge from the hospital.

Social support. The construct social support is complex, often difficult to conceptualize, and has been defined within the literature in a variety of ways. Barrera (1986) argued that definitions of social support are broad and researchers have little consensus of its definition, causing individual concepts of social support to lose their distinctiveness. The following presents a chronological overview of social support across related disciplines.

Thoits (1986) posited that social support is something provided to a distressed individual by significant others. Sarason, Sarason, and Pierce (1992) focused more upon the nature of the relationship, adding that the supportive effort hinged on the motivations and expectations of both parties. Hupcey (1998) added that social support encompasses an action within a relationship that is well-intentioned to someone who shares a personal relationship, which produces a positive response.

Barclay et al. (2004) conducted a literature review to identify the definition of social support in relation to the experience of becoming a new parent. They found the number of social support definitions to be numerous and inconsistent, relaying that the definitional constructs held little relevance to the studies in which they were used (Barclay et al., 2004). As a result, they conducted a critical analysis of 30 definitions of social support to reveal the constructs within each definition and to explore their use in research and practice (Barclay et al., 2004). The authors found that no single definition of social support is sufficient in all situations, although common dimensions were derived (Barclay et al., 2004). Barclay et al. concluded by identifying that the definition of social support needed to include details about relationships and social ties, intentionality of the

supporter, the impact of the support, and recognition of a supportive need, as well as the supportive resources utilized.

Social support has been described in relation to family and peers (Hautsalo, Rantanen, & Astedt-Kurki, 2013), religious institutions (Moxey, McEvoy, Bowe, & Attia, 2011), the work environment (Dinour & Szaro, 2017), professional organizations (Hong, Song, Liu, Wang, & Wang, 2014), and peer self-help groups (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004). The family was often a primary source of social support, although the family member offering support needed to have keen insight and sensitivity to the type of support that was needed and identified as most beneficial (Pender et al., 2006).

Pender et al. (2006) defined peer support as “people who function informally to meet the needs of others” (p. 227). Peer self-help groups such as social media support groups include individuals who have encountered similar circumstances and who, through their insight and experience, are often thought of as helpful in providing advice and encouragement (Adamsen, 2002; Pender et al., 2006). Adamsen’s (2002) qualitative work intended to examine how participants evaluate their experiences with self-help groups described the benefits of peer self-help groups as a channel to gain new friendships and networks of support, opportunity to learn from others’ experiences, and the ability to come to an understanding of their specific circumstance. Professional sources of support such as medical health professionals offer resources and information (Pender et al., 2006), although family and peers are often the preferred source of social support initially (Benkel, Wijk, & Molander, 2009). In addition to providers of social

support, the type and amount of support needed at any time is dynamic and changes with current circumstances (Benkel et al., 2009).

Various types of social support have been tested within numerous populations. Researchers have studied the dimensions of social support provided to cancer survivors stating that cancer survivors desired to help and support one another (Wong et al., 2014). H.-H. Chen et al. (2016) studied social support perceived by immigrant mothers and postpartum depression, finding emotional support superior to other dimensions of social support such as instrumental and informational and significantly associated with depression ($\beta = -0.09, p < .01$) (H.-H. Chen et al., 2016).

A number of qualitative breastfeeding support studies have emerged within the past 10 years to address the gap in the literature by studying breastfeeding women and their supportive network (such as care providers). For example, Chaput, Adair, Nettel-Aguirre, Musto, and Tough (2015) conducted a qualitative inquiry of 86 breastfeeding mothers to explore experiences with help, advice, and support for breastfeeding, including the perception of the quality of support, whether beneficial or negative. Four key themes emerged, including knowledge, effectiveness, sensitivity/emotional support, and accessible when sought. Breastfeeding mothers reported their need for advice and support without undue pressure from people with knowledge to ensure the resolution of breastfeeding problems as they occur (Chaput et al., 2015). Timely and accessible support was perceived as essential, but unsolicited advice was reported by mothers to undermine the maternal role (Chaput et al., 2015).

McLelland et al. (2015) used focus groups to explore the views of midwives and maternal/child nurses regarding the supportive needs of postpartum mothers while in the

hospital. Four themes were identified: guiding women over breast-feeding hurdles, timing and time to care, continuity of women's care, and imparting professional knowledge (McLelland et al., 2015). Four practice recommendations to improve breastfeeding emerged from this study; these included: increased informational support from midwives and nurses to assist mothers to increase their milk supply, how to offer alternatives to formula, additional breastfeeding support services within the home to fill the gap between day 5 and day 14 postpartum, and the need for community-based drop-in breastfeeding center staffed by a lactation consultant (McLelland et al., 2015).

Social support instruments. Many instruments have been developed and tested using House's (1981) four dimensions of social support (i.e., emotional, appraisal, instructional, and instrumental). For example, Grassley et al. (2012a) developed an 18-item scale, Supportive Needs of Adolescents Breastfeeding scale (SNAB), which measures the postpartum social support needs of breastfeeding mothers. SNAB was used to study 101, 15-20 year-old postpartum mothers to measure adolescents' perceptions of breastfeeding initiation support provided by nurses. Principal components analysis resulted in a 3-factor scale: practical support; informational support; and a miscellaneous factor dimension, which was related to immediate skin-to-skin care and mothers' support persons (Grassley et al., 2012a). Grassley et al. reported that three subscales were "moderately correlated to each other (Pearson's coefficient of $r = 0.35$ [instrumental with informational support], $r = 0.41$ [instrumental and network/skin-to-skin], and $r = 0.36$ [informational and network/skin-to-skin])" (p. 712). The 3-factor scale explained 48% of the total variance (Cronbach's alpha = 0.83) (Grassley et al. 2012a).

The SNAB was subsequently used by Pentecost and Grassley (2013) in a content analysis of 90 adolescents' responses to the SNAB scale items as well as two open-ended questions that explored adolescent mothers' (ages 13-20) supportive needs when initiating breastfeeding. Within this study, Pentecost and Grassley indicated that adolescent mothers desired a combination of informational, instrumental, emotional, and appraisal support. Additionally, adolescent mothers noted that they valued time to talk with their nurses about their breastfeeding concerns as well as how to effectively position their infant when breastfeeding (Pentecost & Grassley, 2013).

Most recently, Laugen et al. (2016), using data from the Canadian Community Health Survey of 2009-2010, also studied the relationship between social support and exclusive breastfeeding among breastfeeding women. Laugen et al. studied mothers who gave birth within the past five years ($N=2,133$). Four dimensions of social support were measured by the 20-item Medical Outcomes Study Social Support scale (MOSS) developed by Sherbourne and Stewart (1991), designed to determine tangible, affectionate, positive social interaction, emotional, and informational support (Laugen et al., 2016). Participants' responses were placed into two categories: high social support or low social support (respondent answered one or more items less than 4) on a 0-4 scale (4= all of the time and 0=none of the time) (Laugen et al., 2016). Laugen et al.'s (2016) findings suggested that there were no significant differences between exclusive breastfeeding women who reported a high versus low level of social support (tangible, affectionate, positive social interaction, and emotional and informational). Significant results were identified when comparing education level; for mothers with below high school level education ($n=156$), a higher probability of breastfeeding exclusively existed

if high levels of tangible (RR 1.07, 95% CI 0.80, 1.33) and affectionate support (RR 1.17, 95% CI 0.80 1.54) existed (Laugen et al., 2016).

Although researchers vary in their definitions and reported findings of social support, many researchers agree that poor support often leads to early breastfeeding cessation (Almqvist-Tangen, Bergman, Dahlgren, Roswall, & Alm, 2012; Bai, Fong, Lok, & Tarrant, 2016; Oakley, Henderson, Redshaw, & Quigley, 2014). Therefore, examining the value and types of social support related to breastfeeding sustainability warrants further examination (Stuebe et al., 2014). Thus, borrowing from prior social support researchers, social support was defined in this dissertation study as the perception that an individual is cared-for and assisted (Hupcey, 1998) by another within an interpersonal relationship (House, 1981; Leavy, 1983) in a purposeful and positive manner (Hupcey, 1998) during a time of need by significant others (Thoits, 1986).

Social support groups. Hupcey (1998) argued that social support remained a complex, multidimensional, fluid concept that had not been easily defined or measured. Therefore, for this dissertation study, social support was conceptualized and measured using House's (1981) four supportive dimensions (informational, appraisal, emotional, and instrumental) as a means to understand the perception of a breastfeeding mother towards the amount and type of assistance available. Furthermore, using House's dimensions of social support, this dissertation study moved beyond the prior published research of Cassel (1976), which had indicated that social support had only stress-buffering benefits. Instead, House's (1981) dimensions of social support were used within this dissertation study's conceptual framework and within the social support measure to identify the dimensions of social support to determine the factors that

influenced the health-promoting behavioral outcome of exclusive breastfeeding to six months.

A social support group, defined within this dissertation study, is a gathering of individuals who share a common health interest (e.g., breastfeeding) and understand their individual circumstances (McCarron, 2015). Social support groups may present in a variety of formats, including face-to-face, or in an increasingly popular online environment (Muhammad, Allan, Ali, Bonacina, & Adams, 2014) led by a professional facilitator such as a physician, nurse, social worker, or by peers who possess the same interest (M. Turner, Chur-Hansen, & Winefield, 2015).

Social support groups have been shown to be a valuable resource for those seeking health-related support (Blusi, Kristiansen, & Jong, 2015; McCarron, 2015) in a variety of health-related topics and in improving health outcomes (Voerman et al., 2007). McCarron (2015) explored the perceived effects of social support groups in her qualitative study using 23 individuals who participated in a six month rheumatoid arthritis (RA) peer-support group. McCarron found that members of the RA peer-support group experienced a generalized lack of support because their family and friends did not understand the emotional and physical difficulties that those with RA face. A content analysis identified that the benefits of the RA support group included an avenue to gain the support and understanding of peers and building new friendships, as well as learning new strategies (e.g., relaxation, stress reduction) that would enable those with RA to better care for themselves (McCarron, 2015). Participants reported that the RA social support group led to an improved quality of life, social support, and emotional well-being (McCarron, 2015).

Voerman et al.'s study (2007), using logistic regression analysis, aimed to determine the strongest predictors of participation in a support group in their study of 238 men with prostate cancer. Findings revealed that the strongest predictors to participation in a social support group included a positive attitude towards social support group participation (OR 1.67, CI: 1.40–2.00, $p < .001$), perceived control (OR 1.73, CI: 1.07–2.80, $p = .03$), lack of general support (OR 1.03, CI: 1.00–1.06, $p = .03$), and being younger in age (OR 0.93, CI: 0.89–0.98, $p < .001$).

In a cross-sectional qualitative study using semi-structured interviews, M. Turner et al. (2015) examined a social support group of nine mothers of babies who were born prematurely and who were cared for within the neonatal intensive care unit (NICU). The purpose of the study was to explore the maternal experience of having an infant receiving care in the NICU and to better understand the maternal views of a NICU parent support group (Turner et al., 2015). They reported informational and emotional support provided by NICU professionals (e.g., nurses, social workers, and midwives) and the ability to share common experiences within the peer group were key to decreasing stress and anxiety related to their role as mother. The authors noted that the NICU social support group provided a weekly, at no cost, supportive environment for parents to ask questions and to receive education, information, and support from other parents and professionals (Turner et al., 2015). Additionally, participants were also able to maximize their ability to receive professional support, as well as increase their supportive networks by initiating friendships and maintaining social contact with other NICU parents (Turner et al., 2015). Overall, Turner et al. reported that the NICU social support group provided emotional and educational support for mothers with infants treated within the NICU.

Breastfeeding social support groups can be local (e.g., Mom’s Morning Out Social Support Group, Clermont, FL, or The Pump Station, Santa Monica, CA), as well as international (e.g., Dairy Queens Online International Social Support Group). One of the most well-known international breastfeeding social support groups is the Le Leche League International (n.d.), with a mission for the past 60 years to “help mothers worldwide to breastfeed through mother-to-mother support, encouragement, information, and education, and to promote a better understanding of breastfeeding as an important element in the healthy development of the baby and mother.” Le Leche League International serves as a local and international resource for parents and healthcare providers that includes services such as face-to-face social support groups, online forums, conferences, and breastfeeding advocacy activities aimed to develop a proactive breastfeeding presence around the globe.

Local social support groups where participants come together face-to-face in order to share common experiences at a set time and place may be limiting to some individual populations who have limited resources for support and who live in rural locations (Ahmed, Roumani, Szucs, Zhang, & King, 2016). However, with the advent of information technology, the accessibility to remote individuals need not be confined to a local hospital, church, or community center. Novel ways of communication are being used to address the supportive needs of the current millennial generation who have been born into a world where technology is omnipresent.

Social support and caring. This present dissertation has defined and measured social support using House’s (1981) dimensions, including emotional support. House defined the social support dimension of emotional support as an act of caring. Finfgeld-

Connett (2007) performed a qualitative concept comparison to determine the similarities and differences of social support and caring concepts. Finfgeld-Connett examined qualitative social support studies (44), linguistics analysis (3), and qualitative studies of caring (43) and found caring and social support contain similarities in attributes such as kindness, advocacy, empathy, positive regard, and personal respect. Similarities exist in the outcome of caring and social support, which include improved capacity to cope, improved self-esteem and perceived confidence, and decreased distress (Finfgeld-Connett, 2007). In Finfgeld-Connett's study, differences between the concepts were directed toward the type of recipient need. Recipient needs in caring tend to be holistic, pertaining to the entire psychological, physiologic, sociological, and spiritual being in nature. In contrast, social support recipient need appear more focused, encompassing emotional needs related to stressors such as sadness and anxiety or instrumental needs in relation to lack of tangible goods, financial support, and transportation (Finfgeld-Connett, 2007).

Definitions of caring are diverse and complex. Mayeroff (1971) implied that caring is not merely to take interest in another; instead, it is a process where the one providing care and the one receiving care both have opportunity for personal growth. Furthermore, Mayeroff expressed the reciprocal relationship in caring where the care for another person activates caring back, which in return strengthens the resolve for future caring behaviors. This reciprocal process is not considered a trade; instead, there is a primary center of attention on the other, with the intent to assist them to grow and actualize themselves in a relationship of trust, humility, hope, courage, and honesty (Mayeroff, 1971).

Boykin and Schoenhofer (2001) asserted that humans are caring persons, and that caring is innate and deeply rooted in human nature. Caring, according to Boykin and Schoenhofer, is lived moment-to-moment; the emphasis is on the discovery of subtle opportunities to care in each moment. Furthermore, living life grounded in caring enhances personhood due to engagement in relationships with caring others (Boykin & Schoenhofer, 2001). Thus, persons are constantly growing, self-reflecting, and seeking connection with others to create wholeness (Travelbee, 1971).

Caring actions such as attentive listening, teaching, advocacy, and being there emotionally for others may be considered therapeutic interventions that assist individuals to achieve wholeness (Morse, Solberg, Neander, Bottorff, & Johnson, 2013). According to Swanson (1991), “Caring is a nurturing way to relate to others” (p. 165). Swanson (1991) has stated that caring begins with a fundamental belief in another’s capacity to make it through events and transitions. Furthermore, according to Swanson (1991), a caring person strives to understand another person’s situation or event and its meaning in the other’s life. Caring also conveys availability of the other person to share feelings without burdening the one caring or the one cared for. The one offering care works to avoid prior assumptions and possesses a selfless desire to understand the reality of the one cared (Swanson, 1991). Additionally, Swanson suggested that it is essential to appreciate the other’s personhood as unique and significant. Being emotionally present to the other, able to feel his/her joys and sorrows, is an important aspect in a caring relationship.

Swanson (1991) described caring as “facilitating the other’s passage through life transitions and unfamiliar events” (p. 164). According to Swanson, a caring person is

working on the behalf of the other, ultimately looking to enhance well-being. Furthermore, the purpose of caring is to facilitate the capacity for another to grow (Swanson, 1991). For example, caring may involve providing information or explanations, offering emotional support, encouraging the validation of feelings, assisting the other to focus on their concerns, generating alternatives, and giving different perspectives (Swanson, 1991). Swanson's description of caring aligns nicely with Mayeroff's (1971) definition of caring, stating "to care for another, in the most significant sense, is to help him grow and actualize himself" (p. 1). Swanson's (1991) descriptions of a caring relationship was used within this dissertation to better identify caring within the individual relationships of social media breastfeeding support group participants.

Breastfeeding support and caring. Caring opportunities among this dissertation study's sample of breastfeeding women included caring for others (followers of the breastfeeding support group), caring for their infant, and caring for self. Caring within a social media breastfeeding support group is unique since relationships between followers are built online rather than in person. Within this present dissertation, caring relationships were discovered within social media breastfeeding support group followers' online posts and replies. Caring comments by breastfeeding social media support group followers included statements such as "Stop and take a breath right now and repeat, I am good enough" and "I needed this right now, I had an emergency C-Section yesterday and I am trying my hardest to breastfeed."

In alignment with Mayeroff's (1971) description of caring, social media breastfeeding support followers have the opportunity to engage in caring through their

reciprocal online conversation often directed toward personal growth and self-actualization. Additionally, similar to Boykin and Schoenhofer's (2001) description of caring, connections found between members of social media breastfeeding support groups are lived moment-to-moment, often including opportunities for followers to self-reflect and to connect with others. Although social media breastfeeding support group members are not physically present, Swanson's (1991) description of caring as nurturing is quite evident through followers' teaching and advocacy and as they seek to attain growth in another individual by being emotionally present, feeling their joys and sorrows.

It can be asserted that caring for infant and caring for self is demonstrated by breastfeeding mothers through their nurturing act of breastfeeding. Multiple studies have reported that women breastfeed because they are aware that breastfeeding is the superior to formula feeding for their infant and for themselves and therefore choose to breastfeed (Gewa & Chepkemboi, 2016; Mbada et al., 2013; Mogre et al., 2016). Swanson (1991) described caring as a nurturing activity. In this dissertation, caring for infant via breastfeeding was explored using the broad qualitative survey item, "Briefly describe your breastfeeding journey."

Millennial Generation

The millennial generation, often called millennials, is comprised of Americans who were born between the years 1980 and 2000 (Venne & Coleman, 2010). According to the United States Census Bureau, millennials are now the largest generation (75.4 million), bypassing baby boomers (74 million) (Fry, 2016). This generation represents more than one-quarter of the U.S. total population or approximately 83 million people (Fry, 2016). Furthermore, women of the millennial generation are now within child-

bearing age as defined as ages 15-44 (Daugherty & Copen, 2016). Additionally, 1.2 million millennial women gave birth in 2016, raising the total number of U.S. millennial women who became mothers to more than 17 million (Livingston, 2018).

Millennials are unique in many ways due to the technological age in which they grew up. In fact, millennials are the first generation to be more technological competent than their parents, never knowing a world without computers and cellular phones (Hussey et al., 2016; Wolynn, 2012). Wolynn (2012) described millennials as those with great racial, ethnic, and socio-economic diversity sharing one common defining characteristic: “They’re always online” (p. 364). Millennials, according to Frazer et al. (2015), have grown up with the Internet through the use of laptops, tablets, and smartphones, and they generally prefer texting to face-to-face interaction (Hussey et al., 2016). This instant access to technology has created a technology savvy generation who are proficient at multitasking, are accustomed to immediate satisfaction of needs, and experience close contact with family and peers through the use of social media (Frazer et al., 2015; Roberts, Newman, & Schwartzstein, 2012; Wolynn, 2012).

Communication has been dramatically altered within this generation with the ever-present ability to communicate using technology. Methods of communicating needs have also changed because millennials have been raised by “helicopter parents, who hovered nearby, making themselves available to assist with any type of need or challenge” (Roberts et al., 2012, p. 276). Therefore, millennials are more apt to reach out for support when faced with difficulties and life’s challenges (Roberts et al., 2012). Roberts et al. (2012) asserted that millennials are often less patient in dealing with delayed resources or when faced with difficulty in obtaining support, often having the

expectation that support of any nature should be available for them 24 hours a day and seven days a week as through varied social media platforms.

A Pew Research Center's Internet and American Life Survey performed between the years 2008-2010 focused upon the Internet health-seeking behavior of millennials, finding 78% of millennials searched for health information using the Internet (Fox, 2011). Health-seeking information was reported as the third most popular online activity behind email and the use of search engines (Fox, 2011). Interestingly, the Pew Report identified White, millennial-aged women, with a recent change in physical health such as gaining or losing weight, becoming pregnant, or attempting to quit smoking as leading Internet health information seekers (Fox, 2011). Moreover, the Internet has provided millennials with instant access to information and social connectedness through the use of social media, desired in this generation.

Social Media

With a keen interest in technological connectedness, the millennial generation has embraced the engagement of social media (Roberts et al., 2012). Social media has been defined as a group of Internet-based applications that allow users to create and exchange user-generated content (A. Kaplan & Haenlein, 2010). Social media readily provides a source of support and a community connectedness that is desirable among millennials due to their boundless access to cell phones and the Internet (Korda & Itani, 2013).

Social networking sites (e.g., Facebook or Twitter), the most popular form of social media, are applications by which users can create personal profiles and can communicate with others by sending text updates, photos, videos, and audio files (Korda & Itani, 2013). The largest social networking site, Facebook, was created in 2004 by

Mark Zuckerberg (Sensis, 2015). By 2018 there were 2.2 billion active users worldwide, capturing 93% of all social media platform users (Sensis, 2015; Statista, 2018). Facebook has dominated the social media industry since it entered the virtual world. Sensis (2015) reported that 24% of Facebook members log into their account more than five times per day with users spending an average of eight and a half hours per week on the site for the purpose of seeking out information and to engage in social interactions/communications.

According to a 2014 Pew Report, 72% of adults who use the Internet use a social media website for social networking or social engagement with individual social media users (Duggan & Smith, 2014). Asiodu, Waters, Dailey, Lee, and Lyndon (2015) added that the social interaction aspect of social media is a valuable avenue for women to explore other women's lived experiences pertaining to infant care and feeding.

Social media communication has become a valuable tool within healthcare due to its user's capability to access and share health educational information, as well as to provide social support (Antheunis, Tates, & Nieboer, 2013). An online descriptive study of patients ($n=139$) and healthcare professionals ($n=153$) conducted by Antheunis et al. (2013) reported that 99.3% of patients use one or more social media sites and 31.7% of the patients use social media for health-related reasons. Furthermore, Antheunis et al. cited 59.3% of the healthcare professionals use one or more social media sites and 26.8% of the health professionals use social media for health-related reasons.

Numerous social media platforms exist and each varies in their usefulness. Antheunis et al. (2013) performed a descriptive study exploring the motives and use of social media sites: Facebook, Twitter, LinkedIn, and YouTube. Antheunis et al. found Facebook has been used for social support and to exchange advice, LinkedIn for

communication with colleagues and marketing, and Twitter and YouTube for increasing knowledge and exchanging advice. Healthcare communication has been enhanced through the use of social media due to its “cost effective access to large numbers of people across geographic distances” (Korda & Itani, 2013, p. 15).

Researchers seeking to disseminate health-promoting information and to provide social support cannot ignore the advantage of social media and its rapidly growing information and support-seekers worldwide. Although healthcare communication through technology is popular with the millennial generation, Hussey et al. (2016) cautioned that health literacy concerns may affect the ability to understand and use the information. Dalmer (2017) also pointed out that studies examining the accuracy of health information obtained from online social media sites is lacking. Most studies examining the accuracy of online health information have been focused upon traditional online health websites, not social media outlets (Dalmer, 2017). Still, social media remains a widely used public platform, available for health-promoting information, which can reach large audiences including women seeking support for breastfeeding.

Social Media Breastfeeding Support Groups

Breastfeeding health benefits to both mother and child have been well documented. Unfortunately, many new mothers have aspired to exclusively breastfeed but have fallen short of their desired goals (CDC, 2016a). Peer breastfeeding social support groups are defined as a group that provides emotional, appraisal, and informational assistance by another who possesses experiential knowledge of a specific behavior such as breastfeeding (Dennis, 2003). Peer breastfeeding social support groups

serve as a catalyst for building social networks, which encourage supportive cohesion for breastfeeding mothers (Youens, Chisnell, & Marks-Maran, 2014).

Social media breastfeeding support groups are vast and varied. These groups range tremendously in participant population. For example, Best Beginnings Breastfeeding Support Group contains 29 followers, compared to Breastfeeding Mama Talk, which has approximately 820,000 followers. Social media breastfeeding support groups vary in geographic location such as city (Kansas City Breastfeeding Support Group), county (Coos County Breastfeeding Support Group), state (Arkansas Breastfeeding Support Group), and country (Breastfeeding Philippines). Additionally, there are groups for particular populations such as African American women (Black Women Do Breastfeed), Hispanic women (Breastfeeding Latinas), mothers of multiples (Breastfeeding Twins and Triplets), mothers of children with special needs (Breastfeeding Children with Down Syndrome and/or Special Needs), young mothers (Breastfeeding Teen Moms), mothers who are teachers (Teachers Who Breastfeed), and military mothers (Breastfeeding in Combat Boots). Social support groups offer a far-reaching, cost-effective strategy for millennials to provide and receive breastfeeding support regardless of socioeconomic status and geographic location (Bahkali et al., 2015).

Researchers have begun to study how childbearing women use social media and the effects of the use of social media breastfeeding support groups (Asiodu et al., 2015; Bridges, 2016). The following studies examined breastfeeding mothers' use of breastfeeding social media support. Asiodu et al. (2015) performed an ethnographic study of antepartum and postpartum African American women ($n=14$) and their support persons ($n=8$) in an effort to describe their social media use. The Asiodu et al. results

indicated that 91% of their participants used social media for education and social support on a daily or weekly basis, which was accessed primarily by smart phones and computers. In fact, participants reported a lack of support from family and friends during the postpartum period and subsequently used social media to fill that void (Asiodu et al., 2015).

Conversely, Bahkali et al. (2015) studied the impacts of a breastfeeding support campaign using the social media platform Twitter to promote breastfeeding. Bahkali et al. surveyed 484 postpartum women to explore their awareness of breastfeeding and their duration of breastfeeding using an Internet-based questionnaire. Interestingly, the Bahkali et al. study concluded that knowledge of breastfeeding practices (95.5%, $n=462$), and willingness to continue breastfeeding to six months (52.7%, $n=255$) had increased in this sample of Saudi Arabian mothers. Therefore, the researchers concluded that the adoption and continuation of social media breastfeeding support groups are a promising new strategy to promote breastfeeding, and more studies are necessary to generalize their results (Bahkali et al., 2015).

Bridges (2016) built upon the work of Bahkali et al. (2015) by describing breastfeeding support groups as a trusted community of peers that complemented their existing support systems. Bridges (2016) conducted semi-structured interviews within three Internet-based Facebook breastfeeding social support groups ($N=23$) in an effort to gain understanding of the experiences of mothers who seek breastfeeding support using social media support groups. Findings from Bridges' study conveyed that support was the overarching theme, along with four subthemes, including community, complementary, immediate, and information. Participants spoke positively of the Internet-based social

media support group's ability to provide immediate support of valuable and practical breastfeeding information for its users (Bridges, 2016). Furthermore, Bridges encouraged the use of social media breastfeeding support groups in conjunction with face-to-face breastfeeding support for maximum benefit. It is clear, according to Bridges, based on these studies, that social media support groups have the potential to provide breastfeeding information and support to breastfeeding mothers, and thus have an influence in increasing exclusive breastfeeding duration.

Breastfeeding Knowledge

Despite the broad recognition of the advantages of breastfeeding to mother and infant (Godfrey & Lawrence 2010), many mothers have reported difficulty exclusively breastfeeding for six months (CDC, 2016a). Opportunities exist to study modifiable maternal variables that may support the likelihood of the sustainment of breastfeeding. Multiple determinants such as breastfeeding knowledge (Gewa & Chepkemboi, 2016; Mogre et al., 2016), breastfeeding confidence (Hinic, 2016), breastfeeding attitude (Cox et al., 2015; Stuebe & Bonuck, 2011; Thomas et al., 2015), and support (Bevan & Brown, 2014) have been shown to influence a mother's desire and commitment to continued sustained breastfeeding.

Within breastfeeding literature, lack of breastfeeding education has been cited as a cause for early exclusive breastfeeding cessation (Aksu, Küçük, & Düzgün, 2011; Kuzma, 2013). Researchers have studied maternal infant feeding knowledge, which is defined as an understanding of truths, facts, and principles regarding breastfeeding (De Jager, Skouteris, Broadbent, Amir, & Mellor, 2013) as well as performed educational interventions in an attempt to achieve longer exclusive breastfeeding durations (Aksu et

al., 2011; Mogre et al., 2016). In their qualitative study exploring breastfeeding mother's infant feeding experiences, Dietrich-Leurer and Misskey (2015) cited informational gaps that are commonly linked with early cessation of breastfeeding. Specifically, many women do not understand concepts related to milk supply, correct latch-on, nipple care and soreness, and ways to express or pump human milk (Dietrich-Leurer & Misskey, 2015). A modifiable risk factor linked to early breastfeeding cessation, such as poor breastfeeding knowledge, is a significant area for further study (Dietrich-Leurer & Misskey, 2015). However, researchers whose interventions that were focused solely on maternal breastfeeding knowledge have reported varying degrees of success in lengthening exclusive breastfeeding duration (Lin, Chien, Tai, & Lee, 2008; Lumbiganon et al., 2016).

Lumbiganon et al. (2016) performed a Cochrane Review of 24 studies involving over 10,000 women that studied the effect of antenatal breastfeeding education on breastfeeding duration. Although many breastfeeding interventions had focused solely on education, Lumbiganon et al. found many breastfeeding education interventions by peer counseling and lactation consultants reported insignificant results relating to breastfeeding duration rates in the United States, Canada, United Kingdom, and Australia. Lumbiganon et al. did, however, find a few breastfeeding education interventional studies in Nigeria and Singapore that appeared to have significantly positive results at six months. Many other studies do not rely on maternal knowledge as the sole modifiable variable; instead, researchers are starting to add factors such as confidence (Hinic, 2016), attitude (Cox et al., 2015), or maternal support (M. Turner et al., 2015) within their study in order to better understand the concepts that lead to

increased exclusive breastfeeding duration (Bevan & Brown, 2014; Khanal, Lee, Karkee, & Binns, 2015; Kuzma, 2013).

Breastfeeding Attitude

Breastfeeding attitudes, defined as feeling, emotions, and moods about breastfeeding, are an impactful variable in studies measuring breastfeeding duration (De Jager et al., 2013). Researchers are finding that women with more positive attitudes towards breastfeeding were more likely to exclusively breastfeed for six months (Cox et al., 2015; Nam Mi, Yoon Ji, Taisun, & Jung Eun, 2015). In a cohort study of 427 postpartum breastfeeding women, Cox et al. (2015) aimed to examine maternal breastfeeding attitudes and breastfeeding duration. Cox et al. found that if a mother's attitude reflects beliefs such as breastfeeding is more convenient, healthier, and economical, the less likely she will be to supplement infant feeding with formula prior to six months. In fact, a study by Twells et al. (2016) found that maternal attitudes may be a better predictor of breastfeeding duration than many sociodemographic variables such as "age, marital status, level of education, and lifestyle factors" (p. 9).

Other researchers found that attitude above all else impacted breastfeeding duration (Niela-Vilén et al., 2016). Niela-Vilén (2016) performed a randomized control trial with a one-year follow-up study of 124 breastfeeding mothers of pre-term infants who participated in a social media peer-support group. Interestingly, Niela-Vilén found significant results regarding a breastfeeding-favorable attitude and mothers who were multiparous as predictors of longer duration of breastfeeding ([95% CI 0.91-0.98], $p=0.0013$).

Further studies revealed attitude and parity as significant variables, explaining that as parity increases, so does a more positive breastfeeding attitude, along with an increase in exclusive breastfeeding duration (Laantera et al., 2011; Niela-Vilén et al., 2016). Multi-parity, having at least two previous children, as well as more favorable attitude scores, measured using the Iowa Infant Feeding Attitude scale (IIFAS), a 17 item scale (Cronbach's alpha of 0.86) intended to measure breastfeeding attitude and predict method of infant feeding (Ho & McGrath, 2011), were linked to longer breastfeeding duration to six months (Niela-Vilén et al., 2016).

Breastfeeding Confidence

Maternal breastfeeding confidence within the early postpartum period is a key factor in predicting breastfeeding exclusivity and duration (Hinich, 2016; Linares, Rayens, Dozier, Wiggins, & Dignan, 2015). According to Bandura's (1986) social cognitive theory, perceived self-efficacy relates to one's own ability to perform the behavior needed for a specific outcome. For example, self-efficacy pertains to a woman's ability to properly assist her infant to latch on to her breast, whereas "confidence is the feeling or consciousness of one's powers or of reliance on one's circumstances. Individuals can feel confident in their ability to perform a specific task but not feel effective at changing others' behaviors related to this task" (Finch et al., 2008, p. 76).

Grassley and Nelms (2008) defined women's breastfeeding confidence in their qualitative study as a "dynamic, embodied, and interdependent interaction among their expectations, their infant's breastfeeding behavior, and their sources of support" (p. 841). Grassley and Nelms's study of 13 mothers (7 currently breastfeeding, 3 who had weaned within the last 4 months, and 3 who had weaned within the last 1-2 years) validated prior

studies (Dennis, 1999; Dykes & Williams, 1999) that depicted breastfeeding confidence as a central component of a woman's breastfeeding experience from breastfeeding initiation to weaning (Grassley & Nelms, 2008). Furthermore, Grassley and Nelms (2008) found that breastfeeding confidence was heightened if a mother's breastfeeding experience closely reflected her prior expectation and when she perceived a "synchronous relationship with her infant" (p. 856). Moreover, support and assistance of a consistent other who possesses breastfeeding knowledge also built confidence (Grassley & Nelms, 2008). Conversely, mothers who felt overwhelmed by too many opinions of others felt unprepared for breastfeeding, and those who had difficulty initiating breastfeeding within the early postpartum experienced a diminished sense of breastfeeding confidence (Grassley & Nelms, 2008). Grassley and Nelms indicated that mothers who experienced their baby crying inconsolably; mothers with infants who had unexpected breastfeeding patterns during growth spurts or after their mother returned from work; and mothers who experienced negative comments regarding breastfeeding from family, friends, and health care professionals caused an additional decrease in breastfeeding confidence.

Additionally, researchers have found that as maternal confidence increases, the ability to breastfeed rises, and the exclusivity of breastfeeding and duration increases as well (Hinic, 2016; Wu, Hu, McCoy, & Efid, 2014). This rise in exclusivity and duration of breastfeeding was mainly contributed to a mother's ability to overcome breastfeeding difficulties as they occurred (Entwistle et al., 2010). Wu et al.'s (2014) intervention was aimed at improving a mother's breastfeeding confidence, which included interactions that instructed mothers on reasons why breastfeeding is important, how to position the baby at

the breast, how to express human milk, and how to calm common fears like not having enough breast milk.

Predictors of high breastfeeding confidence, as outlined by Zhu et al. (2014) in their cross-sectional descriptive study, included previous breastfeeding experiences or vicarious experience (through watching others) and making an early decision to breastfeed. Zhu et al. indicated that the perceived attitude of others toward breastfeeding was another major factor that correlated positively with high breastfeeding confidence, which was related to breastfeeding sustainability (Cox et al., 2015; Laanterä et al., 2011). Therefore, it is valuable to study the multiple modifiable variables of breastfeeding duration, including breastfeeding, knowledge, attitude, and confidence, to better understand the factors that affect exclusive breastfeeding sustainability.

Summary

The advantages of exclusive breastfeeding are well-established in the literature (Andreas et al., 2015; Battersby, 2016; Eidelman et al., 2012; Haschke et al., 2016; Oddy, 2012; Prell & Koletzko, 2016). Therefore, organizations such as WHO (2017a), UNICEF (2018), and AAP (2012) have endorsed exclusive breastfeeding to six months. Additionally, Healthy People 2020 (n.d.) initiatives include maternal and infant's health goals aimed at improving the health and well-being of women, infants, children, and families through promotion of breastfeeding.

Breastfeeding offers both short- and long-term health benefits that decrease the risk of morbidity and mortality to both mother and infant (Eidelman et al., 2012; Prell & Koletzko, 2016; Sankar et al., 2015). Although the benefits of breastfeeding appear

overwhelmingly convincing, 81% of U.S. mothers initiate breastfeeding but only 22% of U.S. mothers are found to be exclusively breastfeeding at six months (CDC, 2016a).

Many non-modifiable factors influence exclusive breastfeeding duration outcomes, including age, parity, and education, but breastfeeding knowledge (Mogre et al., 2016), breastfeeding attitude (Cox et al., 2015) and breastfeeding confidence (Hinich, 2016) may be considered modifiable through interventions. Researchers are interested in exploring social support, in relation to the promotion of positive health behaviors such as breastfeeding (Iannino-Renz, 2016). Therefore, this dissertation study also aimed to determine which dimensions of social support in an Internet-based social media breastfeeding support group influence millennial-aged women's breastfeeding confidence, breastfeeding knowledge, breastfeeding attitude, and the positive health behavior of exclusive breastfeeding sustainability at six months post delivery.

Social support has been defined as the perception that an individual is cared for and assisted (Hupcey, 1998) by another within an interpersonal relationship (House, 1981; Leavy, 1983) in a purposeful and positive manner (Hupcey, 1998) during a time of need by significant others (Thoits, 1986). Additionally, social support serves to augment an individual's personal strengths with an aim to achieve life goals (Pender et al., 2006). Sources of social support relating to health include family and peers, religious institutions, professional organizations, and peer self-help groups (Pender et al., 2006). Satisfactory levels of social support have positively influenced the promotion of health outcomes for those with various health-related issues such as cancer survivors (Wong et al., 2014) and women suffering with postpartum depression (H.-H. Chen et al., 2016), as well as breastfeeding women (McLelland et al., 2015).

Dimensions of social support have been identified within social support theory by House (1981) as relating to the following categories: appraisal, emotional, informational, and instrumental. Appraisal support provides a mechanism for evaluation or constructive feedback; emotional support involves caring, which includes validation, empathy, and reassurance; informational support provides knowledge and advice; and instrumental support is tangible assistance or a service that will be of help (House, 1981). Using social support theory by House (1981), this study aimed to determine which dimensions of social support influenced exclusive breastfeeding sustainability.

Social support groups have been a valuable resource for those seeking health-related support (Blusi et al., 2015; McCarron, 2015). Multiple supportive groups are available including support groups for individuals who suffer with rheumatoid arthritis (McCarron, 2015) and parents of infants who are treated in the NICU (M. Turner, Chur-Hansen, & Winefield, 2015), as well as local Le Leche League groups (Le Leche League International, n.d.) supporting mothers to achieve their breastfeeding goals.

This dissertation study also examined exclusive breastfeeding duration using an adaptation of Pender's (1996) revised health promotion model (RHPM), which provided a health promotion framework to explore variables such as individual characteristics and experiences (e.g., prior breastfeeding experiences) and personal factors (e.g., age, parity, and education). Other motivational factors integral in RHPM include perceived benefit and barriers, perceived self-efficacy, perceived support, and situational influences. The revised model has been used as a theoretical framework in studies of adolescents (Mohamadian et al., 2011), college students (Bryer, Cherkis, & Raman, 2013), adults (Khalil, 2014), and the elderly (Stark, Chase, & DeYoung, 2010). The flexibility of

Pender's model ensured a good fit for this study's population of millennial-aged breastfeeding women.

The millennial generation is currently childbearing age (Venne & Coleman, 2010) and methods of breastfeeding support have evolved to better match the needs of this generation (Frazer et al., 2015). Social support obtained by using social media is very popular and has the capability to be a cost-efficient, immediate approach to provide support for vast populations with various socio-demographics (Bridges, 2016). Furthermore, social media has been described as "consumer-centric and consumer-controlled, enabling anonymity, flexibility, and instant access to support needs" (Korda & Itani, 2013, p. 16).

Although the social media support group is an online environment, opportunities exist among breastfeeding mothers to care for others (followers of the breastfeeding support group), care for their infant, and care for self. Within this present dissertation caring relationships were discovered within social media breastfeeding support group followers' online posts and replies. Caring was explored further using an open-ended question asking participants to summarize their breastfeeding journey.

Support offered by social media breastfeeding support groups provided a far reaching, cost-effective strategy for millennials to provide and receive breastfeeding support regardless of socioeconomic status and geographic location (Bahkali et al., 2015). Therefore, within the interest of studying exclusive breastfeeding support duration, this study aimed to establish the extent to which millennial-aged women's participation in an Internet-based social media breastfeeding support group leads to sustained breastfeeding at six months postpartum. Current statistics do not support the fact that breastfeeding

women are reaching the recommended duration of exclusive breastfeeding set forth by WHO (2017a), UNICEF (2018), and AAP (2012). Further exploration is needed regarding the role that social support offers within the current child-bearing generation, using means such as Internet-based breastfeeding social media support groups to assist breastfeeding women. The data derived from this study may serve to develop future interventional studies focused on achieving exclusive breastfeeding durations of six months.

The following chapter includes a review of the research questions, hypotheses, and study design, as well as an overview of the study methods: research site, description of the participants, sample size, measures, data collection technique, management of missing data, method and data analysis plan, and the study ethical considerations.

CHAPTER 3. METHODOLOGY

Introduction

The two aims of this study were to (a) conduct a longitudinal analysis using structural equation modeling (SEM) of Internet-based breastfeeding support groups used by millennial-aged breastfeeding women, guided by constructs within Pender's (1996) RHPM and House's (1981) dimensions of social support, in an effort to better understand the variables that led to sustained exclusive breastfeeding to six months; and (b) using structural equation modeling, determine the level of influence of personal factors; competing situational demands; behavior-specific cognitions and affect; and breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude that results in breastfeeding sustainability at six months post-delivery.

Research Questions

In order to test the aim of this study, the following research questions were posed:

1. Is the integrated health promotion model appropriate for use with breastfeeding women in an Internet-based social media breastfeeding support group?
2. Within the integrated health promotion model, which factors (personal, competing situational demands) influence women's breastfeeding support at one month post delivery and at six months post delivery?

3. What dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) are predictive of the latent construct of social support in Internet-based social media breastfeeding support groups?
4. Does breastfeeding support (latent construct) in an Internet-based social media breastfeeding support group influence the confidence, knowledge, and attitude of millennial-aged women for sustained breastfeeding at six months post delivery?
5. Does breastfeeding confidence, knowledge, and attitude influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group?
6. Will there be gains in millennial-aged women's breastfeeding confidence, knowledge, and attitudes from pretest (one month post-delivery) to follow-up at six months after delivery?
7. How do millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group describe their breastfeeding journey?

Hypotheses

The hypotheses tested for the quantitative questions were:

1. The integrated health promotion model, derived from Pender's (1996) revised health promotion model and House's (1981) dimensions of social support, with the added constructs of breastfeeding confidence, knowledge, and attitude, will be supported by the data.
2. Age and education and competing work and family demands will significantly predict the construct of breastfeeding social support.

3. The four dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) will be predictive of the latent construct of social support in an Internet-based social media breastfeeding support group.
4. The latent construct of social support in an Internet-based social media breastfeeding support group will influence participants' breastfeeding confidence, knowledge, and attitude.
5. Breastfeeding confidence, knowledge, and attitude will significantly influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group.
6. There will be statistically significant gains in breastfeeding confidence, knowledge, and attitudes from pretest (at one month post delivery) to follow-up at six months after delivery.

Research Design

This structural equation modeling study used a hypothesized structural model to depict the relationships between breastfeeding women's individual characteristics (prior breastfeeding experience, age, parity, race/ethnicity, education, socioeconomic status) competing work/family demands, and behavioral-specific cognitions and affect (dimensions of social support). Furthermore, potential relationships were explored between modifiable factors of breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude as indirect and direct predictors of sustained breastfeeding to six months.

Research Site

Site Social Media Platform

According to Rainie, Purcell, and Smith's (2011) Pew Research Center Survey, 62% of American Internet-users use the social media platform Facebook. A more recent Pew Research Survey by Duggan, Lenhart, Lampe, and Ellison (2015) found that 91% of parents, defined as those having at least one child under the age of 18, use the Internet. Of these Internet-users, 83% of parents use social media, and Facebook was found to be the most popular social media platform among Internet-users who are parents (74%) (Duggan et al., 2015). Additionally, more online mothers (81%) compared to online fathers (66%) were found to use Facebook (Duggan et al., 2015). Therefore, due to Facebook's online prevalence among Internet-users and mothers, Facebook was used as the social media platform of choice for this study.

Site Recruitment

Site recruitment began on March 20, 2017 with a Facebook Internet search of social media breastfeeding support groups within the Facebook social media platform. Keywords, including breastfeeding support and infant feeding, were used to generate 43 social media breastfeeding support groups within the Facebook platform. An additional search using the term "related search" yielded 72 additional sites. A total of 115 social media breastfeeding support groups were found by this researcher in a Facebook internet search. Although the keyword infant feeding generated 17 additional sites, most infant feeding sites focused upon formula feeding or a combination of breastfeeding and formula feeding, as well as weaning to solid food, and thus were not included within this dissertation study.

The following criteria were chosen for the purpose of site selection.

1. The site's goal, as stated on its Internet introduction page to new members, was to promote and support breastfeeding.
2. The site was active, producing at least one participant-generated post for discussion per day.
3. The site was not narrowed to one geographic location or specialized need.

The social media breastfeeding support groups (Table 1) were selected by this researcher based upon the published site goals (Table 2), site activity, and general nature (not specific to one location or specialized need) of the site. The groups included in this dissertation study were either open or closed. Open groups allowed anyone to join simply by pressing the "follow" button on the site's main page. Closed groups involved a vetting process performed by the site's administrator in order to join the group. Site administrators are often the founders of the support group or an assistant appointed by a founder. Some closed group's vetting procedures were extensive. For example, to join The Cleavage Club Breastfeeding Support Group (n.d.), potential followers needed to click on a link that provided the potential follower with a description of the purpose of the group. Then, potential followers needed to agree to the following site rules: (a) Be respectful to all members and honor their privacy; (b) Keep the group drama-free; (c) Search prior discussions for answers before posting a duplicate question or concern; (d) Do not post off-topic questions or misinformation; (e) Do not recommend "cry-it-out" (a sleep training method); (f) Do not recommend supplements such as Mothers Milk Tea to increase milk supply; (g) No spam; (h) Contact the administrator prior to asking questions about extreme feeding issues or tongue tie or lip tie (connective tissue under the

tongue or behind the upper lip, which may cause difficulty breastfeeding) questions; (i) Do not request or offer milk donation services; (j) Do not post pictures of a large “stash” of milk, causing others to feel discouraged, or inappropriate pictures; (k) Be aware that most physicians do not have current training in breastfeeding and are often unable to answer breastfeeding questions; (l) Understand that this group is voluntary; (m) Do not block an administrator from seeing your posts; (n) Do not refer followers to other support groups; and (o) If contacting the administrator, allow for ample time to receive a response.

Once the potential follower of The Cleavage Club Breastfeeding Support Group clicks on the tab “I agree,” they need to answer the following questions or directives: (a) Provide your Facebook profile name; (b) Sign, indicating that you read and agree to rules; (c) Provide a reason you want to join the group; and (d) State if you are a lactation consultant or other medical professional. Then the potential follower was instructed to click submit and wait to see if the administrator will allow the potential follower to join the support group.

This researcher was able to join the open (1) and closed (16) social media breastfeeding support groups selected to conduct this study, giving her access to the support group site and the site’s administrators. All groups included in this dissertation study met the site inclusion criteria and each group’s administrator provided letters of permission to conduct research to the researcher.

Table 1

Internet Breastfeeding Social Media Support Groups

Breastfeeding Support Group	<i>n</i>	Type of Group
Beth's BF Blog!!!	323	Closed
The Breastfeeding Group	3,010	Closed
Breastfeeding Mamas	19,519	Closed
Breastfeeding Mama Support Tribe	2,933	Closed
Breastfeeding Mama Talk	930,875	Open
Breastfeeding Matters	2,103	Closed
Breastfeeding Support for Indian Mothers	48,216	Closed
Breastfeeding Yummy Mummies	32,005	Closed
Breasts for Babes – Breastfeeding Support Group	108	Closed
Chi Chi Mama's Breastfeeding Support Group	1,986	Closed
The Cleavage Club: Breastfeeding Support	3,211	Closed
Dairy Queens Breastfeeding Support	6,801	Closed
Intact Health & Natural Parenting	4,562	Closed
Janet's Breastfeeding Support Group	1,028	Closed
KellyMom Breastfeeding Support	1,825	Closed
Milky Mamas	11,724	Closed
Women Interested in Breastfeeding	1,998	Closed

Note. Total followers ($N = 1,072,227$) at the time of data collection on 7/28/2017.

Table 2

Breastfeeding Support Group Mission

Breastfeeding Support Group	Targeted Audience	Mission Statement
Beth's BF Blog!!!	Bf women	To support and encourage each other on the beautiful journey of motherhood.
The Breastfeeding Group	Bf women	Support of breastfeeding women and help with breastfeeding questions.
Breastfeeding Mamas	Bf women	Provide a friendly supportive place to chat about all the questions, concerns, and advice you have about breastfeeding.
Breastfeeding Mama Talk	Bf women	Helping support mothers to reach their personal breastfeeding goals.
Breastfeeding Mama Support Tribe	Pregnant women Bf women	Supply tips, support, and advice about breastfeeding in a supportive drama-free zone.
Breastfeeding Matters	Bf women	Normalize breastfeeding and provide evidence based information to support breastfeeding mothers.
Breastfeeding Support for Indian Mothers	Bf women Expectant parents Support systems Medical professionals	Empower breastfeeding parents with support and information so they can make better decisions.
Breastfeeding Yummy Mummies	Pregnant women Bf women	Provide valuable support to offer others who are breastfeeding and looking to meet others in the same situation.
Breasts for Babes – Breastfeeding Support Group	Pregnant women Bf women	Provide breastfeeding support for moms who have concerns and for those planning to nurse.
Chi Chi Mama's Breastfeeding Support Group	Bf women	Provide drama-free breastfeeding support and to inform each other of upcoming support events.
The Cleavage Club: Breastfeeding Support	Bf women Support system	Provide support for breastfeeding.
Dairy Queens Breastfeeding Support	Bf women	Provide support for breastfeeding women at any stage in their journey.
Intact Health & Natural Parenting	Bf women Parents	Share research-based information, provide a safe place to seek advice, help educate one-another, and to gain support from like-minded people and make friends.

Table 2 (cont.)

Breastfeeding Support Group	Targeted Audience	Mission Statement
Janet’s Breastfeeding Support Group	Bf women	To support moms with breastfeeding questions and to connect with each other.
KellyMom Breastfeeding Support	Bf women	Support of breastfeeding, providing a supportive, caring environment for parents to come together.
Milky Mamas	Bf women	Ask questions, support breastfeeding mothers and share struggles.
Women Interested in Breastfeeding	Pregnant women Bf women	Support breastfeeding moms or moms-to-be

Note. Information obtained from the “About this group” section on the home page of each support group site.

Participants

Sample

A voluntary convenience sample of self-identified postpartum mothers of any socioeconomic status, ethnicity, or race, and geographically located anywhere in the world were eligible for this study. Participants who met the following participant inclusion criteria were asked to participate.

Participant inclusion criteria:

1. Participants who were self-identified as among the millennial generation born between the years 1980 and 1999 (Venne & Coleman, 2010).
2. Participants who self-identified as exclusively breastfeeding within one month postpartum. This longitudinal study’s focus was on the health promoting behavior of exclusive breastfeeding mothers from within one month of their infant’s birth to six months.
3. Participants were followers (members) of at least one of the 17 Facebook social media breastfeeding support groups included within the study.

Participant exclusion criteria included:

1. Participants who could not read, write, or comprehend English. The survey instrument was written in English; thus, only participants who were able to read, write, and comprehend English were included.
2. Participants with infants with life threatening illnesses or prematurity currently being treated in the neonatal intensive care unit.
3. Women who self-identify as not exclusively feeding their infant human milk at the start of the study.

Participant Recruitment

Participant recruitment began after IRB approval of the study was attained from Florida Atlantic University's Institutional Review Board (Appendix B). An email request was sent to each site's administrator seeking permission to recruit participants within their site (Appendix C). The email request contained an introduction describing the researcher, the study's objectives, and a brief explanation of the study's process. After permission was obtained from each site's administrator, participants were recruited through a participant invitation (Appendix D) posted on each site's discussion board. Invitations were reposted on seven occasions at various times of the day and night, over a one-month time period. The invitation to the study yielded a sample size of 518 participants who completed the first survey (pretest). The participant invitation included (a) information about the researcher, (b) a description of the study's purpose, (c) a declaration of the Florida Atlantic University affiliation, (d) the site administrator's approval to conduct the study, (e) instruction on how to complete the study survey, and (f) a link to the survey that also was used to address consenting. Interested potential participants clicked on the link to the survey. At this point they were immediately taken

to the Qualtrics online study survey. The following presents the assessment of participant eligibility.

Participants Assessed for Eligibility

Prior to the start of the online survey, participants were welcomed and thanked for their interest and participation in the study. Then the participants were asked following inclusion questions: (a) Where you born between the years 1980 and 1999? (b) Are you a postpartum breastfeeding woman within one month postpartum who is exclusively breastfeeding or exclusively expressing human milk to feed your baby? (c) Is your baby currently being treated in a neonatal intensive care unit? (d) Are you a member or follower of at least one of the Internet-based breastfeeding social support groups included in this study? (Appendix E). If any participant self-identified that they were not millennial-age, not exclusively feeding their infant human milk via their breast or by using their expressed human milk, not within one month postpartum, not followers of an Internet-based breastfeeding social support group included in this study, or if their infant was currently being treated in the neonatal intensive care unit, they would receive an automatically generated reply thanking them for their time and the survey automatically was terminated. The survey continued for participants who met the inclusion criteria.

The voluntary consent (Appendix F) portion of the survey started with a statement thanking the participant for their interest in participating in the study. The study's purpose, study design, and an explanation of the voluntary nature of this study were explained. Additionally, the potential risks and benefits of their participation were described. The participant was asked if they consent to participate in this study and were directed to click yes or no to indicate their consent or dissent.

Sample Size

An adequate sample size is important to generate reliable results when using structural equation modeling (SEM). According to Wolf, Harrington, Clark, and Miller (2013), sample size requirements for SEM studies commonly range between 30-460 participants. Schreiber, Nora, Stage, Barlow, and King (2006) recommended a minimum of 10 participants per variable in order to maintain the stability of the parameter estimates. Furthermore, Nunnally and Bernstein (1994) recommended 20-30 participants per independent variable within SEM studies in order to increase the chances that results may be replicated and not mere artifact.

Sample size for this dissertation study was estimated using existing literature that most approximated the variables within this study (Saffari, Pakpour, & Chen, 2017). Thomas-Jackson et al. (2016) performed a structural equation study ($N=160$) examining the relationships and predictors of breastfeeding intentions of new breastfeeding mothers who planned to return to work after giving birth in southwest United States. Independent variables (7) identified in Thomas-Jackson et al. included socioeconomic status, maternal education, maternal age, marital status, return to work intention, depressive features, and maternal fetal attachment. Similar to Nunnally and Bernstein's (1994) sample size recommendation for SEM, Thomas-Jackson et al. (2016) recruited 23 participants per independent variable.

Similarly, De Jager, Broadbent, Fuller-Tyszkiewicz, and Skouteris (2014) performed a structural equation analysis of 174 women who had given birth within six months to two years prior to the study, using an online questionnaire. The purpose of the study was to investigate psychosocial variables associated with the ability to breastfeed to

six months postpartum (De Jager et al., 2014). The structural model contained 10 independent variables, including pregnancy attitude, psychological adjustment, postpartum attitude, internal locus of control, perceived strength, perceived comfort of breastfeeding in public, intention to exclusively breastfeed, self-efficacy, and early breastfeeding difficulties (De Jager et al., 2014). The De Jager et al. study included 17 participants per independent variable, slightly less than Nunnally and Bernstein's (1994) sample size recommendation for SEM. In accordance with Nunnally and Bernstein's sample size recommendation of 20-30 participants per independent variable, as well as existing literature containing similar variable numbers and type, this dissertation study aimed for a minimum of 20-30 participants per independent variable (12), equaling a total 240-360 potential participants.

Although 518 participants completed the first survey, it was expected that this repeated measures survey would have significant attrition. One strategy to address participant attrition within repeated measures studies is to increase recruitment (Lu, Luo, & Chen, 2008). Guo, Logan, Glueck, and Muller (2013) recommended an addition of 20% of the desired sample size to account for missing data and participant attrition. Within this dissertation study, the sample size was increased above 20% due to anticipatory missing data due to its lengthy Internet survey and participant attrition associated with longitudinal repeated measures studies. In this dissertation study, a range of 240-360 (20-30 participants per variable) participants plus an added 30% expected attrition (108) were expected to be recruited, totaling an anticipated sample size of 468 participants. This sample size was thought to be acceptable due to the large sum of all selected support group's followers totaling over one million at the time of sampling.

Although the anticipated sample size was 468 participants, at the time the window of enrollment closed, 518 participants had already accessed the survey. The decision to retain all participants was made to better insure that the minimum sample size would be attained.

Instruments

The survey, which included the following five instruments, was pilot tested prior to its use within this dissertation study. A convenience sample of 12 participants reviewed each item for clarity and understanding. The participants were also timed to determine the total time necessary to take the survey. The pilot participants were all female ranging in age from 25-60 years old. All 12 pilot participants had current or prior breastfeeding experience and included a lactation consultant (1), mothers who breastfed within 10 years (8), grandmothers who had breastfed their children (2), and a mother currently breastfeeding (1). Although the pretest survey contained 120 items, the average time for the completion of the survey was determined to be 25 minutes. According to the Qualtrics (n.d.b) online survey management system, an online survey should take less than 10 minutes for participants to complete, which limits the number of questions to 30-40 depending on the difficulty of the question. Since this survey was approximately three times as long as the length recommended by Qualtrics, the survey remained open for two weeks once started for participants to stop and restart as necessary. The following is a brief description of each instrument used within this dissertation study's survey.

Individual Characteristics and Experiences

Individual characteristics and experiences included personal factors that were collected through a general survey (Appendix G) composed of 14 multiple choice and

fill-in-the-blank formatted questions. The general survey was developed by this researcher to measure socio-demographic information, including age, parity, race, education, socioeconomic status, and prior breastfeeding experience, as well as marital status; geographic location; prior prenatal breastfeeding education; and frequency of viewing, replying, and posting a message within their social media breastfeeding support group.

Competing Situational Demands

The Perceived Work Demand scale (PWD) and the Perceived Family Demand scale (PFD) (Appendix H) were developed by Boyar, Carr, Mosley, and Carson (2007) in an effort to measure an individual's perceived work-family conflict. Items with the Perceived Work Demand scale measure demand levels within the work environment, where the Perceived Family Demand scale focuses upon the family domain. Boyar et al. (2007) tested both scales using a sample of 187 semi-skilled male and female workers in manufacturing in the United States.

PWD and PFD were found to have predictive validity when compared to two established scales within the literature: Work Interfering with Family and Family Interfering with Work scales (Carlson, Kacmar, & Williams, 2000). Both scales were assessed by Boyar et al. (2007) for face validity, and a confirmatory factor analysis evaluated the fit for each construct. Three items from each scale were removed due to poor fit (Boyar et al., 2007). An acceptable Cronbach alpha's for the adjusted scales were found: PWD .83 and PFD .88 (Boyar et al., 2007).

Both PWD and PFD use a 5-point Likert scale with responses ranging from strongly disagree (1) to strongly agree (5), with a maximum possible score for family

demand (20) and work demand (25), which indicates a high perception of family or work demand (Boyar et al., 2007). A “not applicable” option was added to the work-related competing demand upon the suggestion from pilot participants. Pilot participants explained that they were not clear which response to mark if they did not work outside the home. Additionally, two questions from the work-related situational demand scale and one question from the family-related demand scale were removed during pilot testing due to pilot participants’ perception they were redundant. For example, the majority of the pilot participants stated that “I am given a lot of work to do” and “I feel like I have a lot of work demand” were too similar to “I have a lot to do at work.” Also, “I feel like I have a lot of family demand” was too similar to “I have a lot of family responsibility.” Removal of three redundant questions from the competing situational demand scales (PWD and PFD) were thought to be important due to the possibility that participants would grow weary and not complete the survey. For this dissertation study, a combined maximum score in the work-related (15 points) and the family-related (15 points) competing situational demand was 30. Higher scores indicated higher perceived work and family demand with a satisfactory combined Cronbach alpha (.713).

Behavior-specific Cognitions and Affect

Breastfeeding social support was measured using the Perceived Health-Related Social Support from Facebook Friends Measure (Appendix I) (Oh, Lauckner, Boehmer, Fewins-Bliss & Li, 2013) to “measure use of social networking sites for health purposes and its impact on their perception of social support” (p. 2072). Responses were measured using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items in this instrument measured social support dimensions: emotional (3 items; $\alpha=.91$), appraisal (3

items; $\alpha=.89$), informational (4 items; $\alpha=.92$), and instrumental (tangible) (3 items; $\alpha=.91$) (Oh et al., 2013). Although instrumental support was hypothesized to be less represented within an online social support group environment, this dimension of social support has been demonstrated as important within the breastfeeding literature (Grassley et al., 2012b) and therefore included within this dissertation study. Along with high internal consistency, each social support dimension was validated through confirmatory factor analysis with an acceptable fit (Oh et al., 2013). A maximum combined score using the Perceived Health-Related Social Support from Facebook Friends Measure totaled 65, indicating the participants' high perception of social support (Oh et al., 2013).

Breastfeeding Confidence, Knowledge, and Attitudes

The Breastfeeding Confidence, Knowledge, and Attitudes Measure (BCKAM) (Appendix J) by Laanterä, Pietilä, Ekström, and Pölkki (2012) was designed as an Internet survey to measure prenatal breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude of childbearing parents.

No revisions to the breastfeeding confidence subsection were indicated after the pilot testing for this dissertation study. The breastfeeding confidence section contained 20 items designed to measure the participants' level of breastfeeding confidence with statements such as, "I know how to interpret my baby's needs." Each item was scored using a 4-point Likert scale ranging from strongly disagree (1) to strongly agree (4). A higher score (maximum score of 80) indicated the participant perceives a higher level of breastfeeding confidence (Laanterä et al., 2012).

The knowledge section consisted of 20 items scored using a 5-point Likert scale, (0) for I don't know, (1) strongly disagree, to (4) strongly agree. Items that stated

erroneous information about breastfeeding were reverse coded. Pilot participants for this dissertation study recommended an “I don’t know” option for responses within the breastfeeding knowledge section. The pilot participants did not want to respond if they truly had no idea of the answer. A maximum score (80) reflected that the participant answered all knowledge questions correctly.

Within the breastfeeding attitude section, two questions were found to be identical to questions from the confidence subsection (“I find breastfeeding to be easy” and “I find breastfeeding to be difficult”). For the purpose of avoiding redundancy, the two questions were removed in the survey. During analysis, the responses from the two identical questions recorded in the confidence subset were then added back into the attitude subset.

The breastfeeding attitude subsection (15 items) was scored using a 4-point Likert scale ranging from strongly disagree (1) to strongly agree (4). A higher score (maximum score of 60) indicated the participant expressed a more positive attitude about breastfeeding. Items were reverse coded if the item contained a negative response toward breastfeeding such as “Breastfeeding seems to be painful.” All measures for this dissertation study’s survey were available for use without seeking written permission.

Breastfeeding Duration

Breastfeeding duration was measured in this dissertation study by the following questions in the second survey: “Are you currently breastfeeding?” “Are you exclusively breastfeeding your baby at this time (no formula, juice, or other food)?” and “How long did you exclusively breastfeed your new baby (no formula, juice, or other food)?”

Data Collection

Online Survey

This dissertation study's Internet-based survey was built in and accessed through Qualtrics, a private research software company. This researcher used the Qualtrics (n.d.b) Online Survey Building Tool to build and share the online surveys. The Qualtrics software provided flexibility in creating the survey question format (multiple choice, open-ended).

Data obtained from the first Internet-based (online) survey (120 items) ascertained personal factors, competing situational demands, behavioral-specific cognitions and affect, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude. According to Kennedy et al. (2016), Internet-based surveys have the ability to reach hard-to-reach populations with diverse demographics and tend to be a fast and economical alternative to the traditional paper survey. Also, Tappen (2011) suggested that Internet-based surveys prove to be a valuable source of data about sensitive, intimate, or embarrassing topics. For this dissertation study, an Internet-based survey was found to be appropriate due the potential to reach a global population of potential participants, asking breastfeeding questions that could be perceived as sensitive, intimate, and/or embarrassing. Many recent breastfeeding studies have used Internet-based surveys for the same reasons. Ya, Yan-Qiong, Redding, Zhao, and Ouyang (2017) studied Chinese adults ($N = 2,021$) and their perception and attitudes about breastfeeding in public. Although the descriptive study was only targeted for the Chinese population, the Internet-based survey yielded a large sample size, and was able to ask intimate questions about breastfeeding. Interestingly, almost half (47%) of the participants ($n=950$) were able to confess that

viewing breastfeeding in public to be embarrassing, even though most (80%) found breastfeeding in public places appropriate and descent (Ya et al., 2017).

Conversely, Internet-based surveys completed by participants online tend to be incomplete and often suffer from low and selective participation rates (Heiervang & Goodman, 2011). Furthermore, a large portion of Internet-based social support groups consists of participants who are described as “lurkers,” or social media support group followers who only read messages but do not participate by posting their own messages (Malik & Coulson, 2011). However, Malik and Coulson (2011) found in their study of 295 participants recruited from several Internet-based social media infertility support groups that, although the possibility of lurker participants exist, indirect participation through reading messages of other participants may be as beneficial in supplying support as directly interacting with the group. Malik and Coulson attempted to increase the quantity of participants in their study by obtaining the administrator’s permission prior to any advertisement of their study within the social media support group. Therefore, within this dissertation study, the administrator’s permission was obtained prior to posting the invitation to the study with the expectation that followers would be more comfortable participating in this study.

In this dissertation study, consented participants were asked to complete the survey twice, once prior to one month postpartum, then again at six months postpartum (Appendix K). The first survey was accessible via a survey link posted upon the participant’s breastfeeding social media support group. The second survey was automatically generated by Qualtrics via participant’s email only to those who completed the first survey at one month postpartum. In the event participants did not respond to the

the second survey, a reminder email was generated by Qualtrics one week later. If the participant did not respond to the reminder email within two weeks, the participant was dropped from the study. Once all data were collected, the analysis began after a review for missing data. The following presents an overview of the management of missing data.

Management of Missing Data

This dissertation study, as with many longitudinal studies, had the potential for missing data (Tappen, 2011). Missing data was a problem not only due to the study's longitudinal design that collected data at two time points, six months apart, but also due to the lengthy surveys. Missing data was managed by performing a Missing Value Analysis in SPSS 24. This analysis was conducted to discover the extent and randomness of missing data and then eliminate the affected cases. First the Missing Value Analysis was done using only the cases that entered complete data. Next, using the original data set, this researcher imputed the missing values using the Empirical Bayesian method and reanalyzed the data. If the slopes are not different, it is suggested to use the imputed data for the analyses (Hair, Black, Babin, Anderson, & Tatham, 2006). However, if the reanalysis shows that the slopes of the complete and imputed analyses are different, the data set with no missing data will be used. In this study, the slopes were different and the cases with missing data were removed prior to analysis.

Method and Data Analysis

Survey data was downloaded from Qualtrics into Statistical Package for the Social Sciences (SPSS) version 24, and Analysis of a Moment Structures (AMOS) version 24, which is an added SPSS module often used for SEM, path analysis, and confirmatory factor analysis (Schumacker & Lomax, 2010). Data were downloaded

directly from the Qualtrics survey management system to SPSS, therefore minimizing random human data input errors (Qualtrics, n.d.a). Prior to analysis, cleansing of the data included observation for erroneous outliers, missing data, and inconsistencies. Analysis of demographics was performed next using frequency distributions, means, ranges, and standard deviations. A structural equation analysis was done to study the effects of each independent variable upon exclusive breastfeeding duration to six months postpartum. The independent variables were selected based upon well-validated theories including Pender's (1996) RHPM and House's (1981) dimensions of social support.

Introduction to Structural Equation Modeling

Structural equation modeling (SEM) has been described as an extension of multiple regression analysis (Schumacker & Lomax, 2010) or a combination of multiple regression and exploratory factor analysis because SEM is more of a confirmatory technique (Ullman & Bentler, 2003). According to Olobatuyi (2006), SEM is a “statistical technique, using both bivariate and multiple regression techniques to test causal relations among variables specified in the model” (p. 41). A causal relationship is an often misunderstood term because SEM does not verify a cause and effect. Instead, when using SEM, the direct, indirect, and total effects of the latent constructs dictated by a theory are what should be discussed instead of a cause (Schreiber et al., 2006). SEM tests correlations between variables to determine if hypothesized directional relationships exist within a theory or model, and if the hypothesized model is a good fit to the observed data. (Schreiber et al., 2006; Schumacker & Lomax, 2010). Specifically, SEM is able to produce a clear and explicit result of the strength of the mathematical relationship contained in the theory or model (Kellar & Kelvin, 2013; Olobatuyi, 2006) By analyzing

the structural paths, SEM can examine the effects between data and the theorized model by using a visual representation via a structural diagram (Kellar & Kelvin, 2013; Streiner, 2005).

In SEM, exogenous variables (independent variables determined by causes outside the causal model) such as competing situational demands may have direct effects upon other variables such as exclusive breastfeeding, where the effect of one variable on another is not mediated by any other variable (Olobatuyi, 2006; Streiner, 2005).

Examples of exogenous variables within this dissertation study included personal factors and prior related behavior and situational demands. The endogenous variable (dependent variable) of this dissertation study was exclusive breastfeeding to six months postpartum.

According to Schumacker and Lomax (2010), SEM, unlike path analysis which is limited to observed variables, includes latent variables in the theoretical model. Latent variables such as social support are not directly observable and often are depicted by circles or ovals in the model (Schumacker & Lomax, 2010). Byrne (2010) added that latent variables, which are not measured directly, but, instead, are linked to other observable variables, make measurement of the latent variable possible. Social support was indirectly observed through the totaled scores of informational support, appraisal support, emotional support, and instrumental support. Thus, in this dissertation study social support was a measurement of the observed variables also called measured variables or indicators of the underlying construct which they represent (e.g., totaled scores of informational support, appraisal support, emotional support, and instrumental support) (Byrne, 2010; Schreiber et al., 2006).

SEM may be performed in a model generating approach, as in this dissertation study. According to Schumacker and Lomax (2010), in the model generating approach, a theoretical model such as the revised health promotion model as a framework for the study of breastfeeding support is formulated by researchers and then tested to determine if the data fit the model. If the data do not fit the hypothesized model, structural paths are added or deleted to arrive at the best fit model (Schumacker & Lomax, 2010).

Use of SEM methodology has gained in use due to four strengths as described by Schumacker and Lomax (2010). First, researchers are aware of the need to use multiple observed variables within their analysis, especially when seeking to model complex phenomenon such as in this dissertation study. Second, SEM has the ability to account for measurement error of each model construct, therefore increasing validity and reliability of observed scores from measurement instruments (Grapentine, 2000; Schumacker & Lomax, 2010; Ullman & Bentler, 2003). Third, Schumacker and Lomax (2010) mentioned a maturity of SEM methodology, where researchers are able to analyze more advanced theoretical SEM models such as multilevel SEM modeling, causing less reliance on basic statistical methods. Finally, advanced software has become increasingly available such as AMOS 24 used for this dissertation's SEM (Schumacker & Lomax, 2010).

SEM methodology is becoming more prevalent in breastfeeding literature. For example, using SEM to study 952 mother-infant dyads in a maternity ward of a public hospital in Singapore, Lau, Htun, Peng, Ho-Lim, and Klainin-Yobas (2015) examined the relationships between exclusive breastfeeding initiation, maternal, infant characteristics (e.g., maternal age, infant gestational age, infant birthweight, infant jaundice), postnatal

complications, and breastfeeding techniques (rooting, latching, active sucking, and audible swallowing).

Lau et al.'s (2015) hypothetical model was based on concepts of a breastfeeding decision-making model (Martens & Young, 1997), a breastfeeding initiation model (Dusdieker, Booth, Seals, & Ekwo, 1985), and social cognitive theory (Bandura, 1986). Lau et al. (2015) reported the theoretical model fit the data satisfactorily (GFI = 0.979–0.987; AGFI = 0.951–0.962; IFI = 0.958–0.962; CFI = 0.955–0.960, and RMSEA = 0.029–0.034).

The final model of Lau et al. (2015) showed that multiparty ($\beta = 0.15, p < .001$) was significantly positively associated with breastfeeding technique, jaundice of the infant ($\beta = -0.21, p < .001$) was significantly negatively associated with breastfeeding initiation, and breastfeeding techniques ($\beta = 0.15, p < .001$) were significantly positively associated with exclusive breastfeeding initiation in the entire sample. According to Lau et al., maternal age and race, infant gestation and birth weight, and postnatal complications had no significant effects ($p > .05$) on breastfeeding techniques or exclusive breastfeeding initiation. Lau et al. recommended addressing other predictors of breastfeeding initiation, including maternal pre-pregnancy mass index and smoking status, previous breastfeeding experiences, belief, confidence, and social support.

Schumacker and Lomax (2010) described the ultimate goal of using SEM as a statistical method is to “provide a quantitative test of a theoretical model hypothesized by the researcher” (p. 2). Furthermore, SEM can be used by researchers to generate a model that both fits the statistical data, as well as make sense theoretically and practically. Schumacker and Lomax provided a five-step process in performing SEM that was used

within this dissertation study: (a) specification, (b) identification, (c) estimation, (d) fit-testing, and (e) re-specification. Each step is briefly described.

Specification

The initial step, according to Schumacker and Lomax (2010), is model specification. In model specification, the researcher fully specifies what variables will be tested prior to the initiation of any analysis (Schumacker & Lomax, 2010). A thorough understanding of the literature is imperative in order to avoid a specification error. Olobatuyi (2006) defined a specification error as a “mistake committed by researchers when deciding upon causal model” (p. 46). For example, specification errors occur when omitting relevant exogenous variables or when including irrelevant exogenous variables within the theoretical model (Olobatuyi, 2006). This dissertation study used Pender’s (1996) RHPM and House’s (1981) dimensions of social support, as well as a body of breastfeeding support literature to further support the use of the variables postulated in the theoretical model. Furthermore, each variable chosen for the model had already faced extensive literary testing.

Identification

During the second step of SEM, the researcher determines if the model is over-identified, under-identified, or just-identified (Olobatuyi, 2006). A structural equation model should be identified, meaning there “should be the same number of knowns (correlations), and unknowns (structural coefficients)” (Olobatuyi, 2006, p. 89). According to Olobatuyi, an over-identified model occurs when the known information (variances and co variances) of the data set are less than the number of structural paths. In an over-identified model, there is more information than needed to estimate the

parameters (Olobatuyi, 2006). For example, if there exists four correlations but only three structural coefficients to estimate, the model would be considered over-identified and the unique estimation of all the parameters of the model will be impossible (Olobatuyi, 2006).

Another identification problem exists when a model is under-identified (or not identified), meaning that there are too many unknowns to be solved or too many structural paths than variances and covariances (Streiner, 2005). Olobatuyi (2006) described an under-identified model as one that “contains insufficient information for the purpose of obtaining a determinate solution of parameter estimation” (p. 51). An under-identified model may challenge the researcher by causing it to be impossible to estimate the structural coefficients in the equation, resulting in estimates that are inconsistent (Olobatuyi, 2006; Streiner, 2005).

A just-identified model is one that has an equal amount of variables to structural paths to be estimated, resulting in no paths deleted (Olobatuyi, 2006). Schumacker and Lomax (2010) further explain that a model is just-identified if “all the parameters are uniquely determined because there is just the amount of information on the matrix” (p. 57). Generally, if a model is just-identified or over-identified, then the model is considered identified.

Schumacker and Lomax (2010) provided three methods to avoid identification problems, which were used in this dissertation study. First, within the measurement model, “either one indicator for each latent variable must have a factor loading fixed to 1, or the variance of each latent variable must be fixed to 1” (p. 58). Second, Schumacker and Lomax warned against using a reciprocal or non-recursive model. A reciprocal or

non-recursive model contains “feedback loops” (p. 59) where two latent variables are reciprocally related. Third, Schumacker and Lomax encouraged the use of a parsimonious model, with a minimum number of parameters that only includes variables that have been well proven in the literature. Within this dissertation study, it was determined that breastfeeding confidence and self-efficacy were closely related (Grassley & Nelms, 2008), occasionally used interchangeably in the literature. In order to assure a more parsimonious model, the self-efficacy variable was removed and breastfeeding confidence was retained.

Estimation

The third step in SEM is the calculation of correlation coefficients and determining structural coefficients between variables using regression. The extent that two or more variables are related to one another is expressed as a correlation coefficient (Olobatuyi, 2006). Moreover, Olobatuyi (2006) stated that the correlation coefficient is a “measure of the direction and strength of a linear relationship” (p. 27). A separate regression calculation must be performed for each exogenous variable that exerts either a direct effect or indirect effect on the endogenous variable. Structural coefficients and multiple correlation coefficients are made available using SPSS software.

Model Fit

A major question of a researcher performing SEM is to determine if the model matches the data. Model fit, or goodness-of-fit test (Olobatuyi, 2006), explains how well the causal model fits the data set. If the goodness-of-fit test matches the data, the quality of the model can be assured (Olobatuyi, 2006). There are numerous fit indices. One of the most common and traditional goodness-of-fit tests is the chi-square for determination of

fit test. Chi-square test, according to Olobatuyi (2006), “measures the difference between the sample covariance (correlation) matrix and the fitted covariance (correlation) matrix” (p. 115). Simply, the smaller the chi-square value, the better the theoretically based model fits the covariance (data), or a smaller or insignificant chi-square statistic indicates that the data observed fit the expected data very closely. Schumacker and Lomax (2010) asserted that it is not prudent to use chi-square test alone to determine goodness-of-fit, but to instead consider the use of multiple indices. Hooper, Coughlin, and Mullen (2008) explained that the chi-square statistic is a statistical significance test that is sensitive to sample size; meaning large sample sizes such as in this present dissertation will cause a rejection of the model. Hooper et al. (2008) added that small sample sizes will lack power and may cause difficulty in recognizing good-fitting models versus poor-fitting models. Additional goodness-of-fit indices for consideration include root mean square error of approximation (RMSEA), centrality index (CI), goodness of fit index (GFI), and adjusted goodness-of-fit index (AGFI) (Hooper et al., 2008; Hu & Bentler, 1999; Olobatuyi, 2006). Scores from RMSEA .06 to .07 demonstrate a good model fit; the rest of the three indices (CI, GFI, and AGFI) range from 0-1.0, with scores that are closer to 1 being preferred (Hu & Bentler, 1999; Olobatuyi, 2006).

Respecification or Model Modification

The final step, according to Schumacker and Lomax (2010), is respecification where the relationships in the initial model are considered for modification as needed. A structural equation model is good when the model has been supported by the data. Respecification is done in poorly fit models to seek a better fitting model. If necessary, one way to modify the model is to remove parameters that are not significantly different

from zero, or, if necessary, parameters may be added to achieve a better fitting model. According to Schumacker and Lomax, a perfect model will have residuals of 0 and a poorly fitted model would be evaluated by how many standard deviations the residuals are from 0.

Structural Equation Modeling Assumptions

Assumptions are rules that guide the statistical analysis. According to Olobatuyi (2006), researchers need to strive to satisfy the assumptions of their statistical method or the subsequent findings may be useless. There are many assumptions linked with SEM that deal with the relationships between variables that guide researchers in the formation of their theoretical models and hypothesis testing.

The SEM assumptions described by Olobatuyi, (2006) and Schumacker and Lomax (2010) are outlined: (a) Minimum of interval level data: All data within this dissertation study's analysis were at the interval or ratio level, which provides precision to distinguish relationships. (b) Avoidance of multicollinearity: Efforts were made to maintain low multicollinearity, meaning the residual and predictor variables should not be correlated. Within this dissertation, self-efficacy was removed from the theoretical model in anticipation of multicollinearity between the two variables. (c) Identification: Structural models should be either just-identified or over-identified. (d) Sample size: SEM requires a robust sample size compared to most statistical techniques. In order to accurately estimate the value of the structural paths, variance, and covariance, a minimum 10, and ideally 20, participants for each parameter that is measured was used within this dissertation study. (e) Measurement error: Data was measured and collected without error using Qualtrics to assure accuracy in predictions. (f) Normality: Data met

normality (distributions, homoscedasticity, and linear distributions) assumptions. (g) Lack of auto correlation: Residuals or error terms and exogenous variables were not be correlated with each other. (h) Recursiveness: The direction between the variables was unidirectional, meaning one must precede the other or the model becomes ambiguous. (i) Specification error: Each exogenous variable was selected carefully from the larger body of research. Irrelevant variables were not included and relevant variables were not excluded. (j) Nonspurious relationships: Relationship effects did not disappear when other variables are controlled.

Limitations of Structural Equation Modeling

Although the SEM methodological technique has been an immensely valuable research technique (Olobatuyi, 2006; Schumacker & Lomax, 2010), it is not without its limitations. Limitations of SEM are: (a) SEM allows researchers to examine causal processes; it does not demonstrate causality. Results can be misinterpreted by a researcher anxious to prove the validity of a theory or assign causality between variables. Correlation does not imply causality (Olobatuyi, 2006; Schumacker & Lomax, 2010). (b) SEM methodology requires multiple assumptions. Violations to an assumption occur frequently and need to be addressed to safeguard the validity of the study (Olobatuyi, 2006; Schumacker & Lomax, 2010). (c) SEM is most useful with clear hypotheses to test and less useful to research in the exploratory phase (Olobatuyi, 2006; Schumacker & Lomax, 2010). (d) All relationships in the structural diagram must be capable of analysis using multiple regression (Olobatuyi, 2006; Schumacker & Lomax, 2010). (e) Proper specification: Although the researcher is responsible for choosing exogenous variables

according to the larger body of research, variable selection is subjective and may be erroneous (Streiner, 2005).

Ethical Considerations

Participation in this dissertation study posed no more than minimal expected risks of physical or psychological harm. Since breastfeeding is a highly personal and intimate experience, it was possible that participation could trigger emotional discomfort when answering questions about participants' supportive needs of breastfeeding. Therefore, participants were made aware that their participation was voluntary and they could withdraw their participation at any time without repercussion to mother or infant. Additionally, the researcher's contact information was provided for participants in the event that any participant experienced any emotional discomfort. Protection of human subjects protocols were followed after IRB approval was obtained from Florida Atlantic University and all efforts were made to ensure confidentiality. During data collection and after, all responses to the survey were stored electronically within the password protective Qualtrics survey system. Only the researcher in this study had access to the password. All data files will be deleted five years after the completion of the study.

Summary

This dissertation study examined exclusive breastfeeding duration in breastfeeding mothers who participate in an Internet-based social media breastfeeding support group. Examining descriptive statistics and using SEM, effects were investigated between participant's individual characteristics, behavior-specific cognitions and affect, perceived social support, and modifiable variables including breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude. There are many variables that

influence exclusive breastfeeding duration, each variable chosen to be examined within this dissertation study was derived from breastfeeding literature as having either direct or indirect relationships to exclusive breastfeeding duration. The theoretical model was developed using Pender's (1996) RHPM and House's (1981) dimensions of social support.

Surveys were available to participants online within the participant's breastfeeding support group. Survey invitations to potential participants were posted on the discussion board of all Internet breastfeeding social support groups six times until the desired minimum sample size for the first survey was reached. Multiple postings of the invitation to the study were necessary to keep the invitation current and visible in their discussion feed and to reach enough participants. An additional 30% (108) was added to the desired sample size in expectation of significant study attrition and missing data, for a minimum desired sample size of 468 participants. A total of 518 initial surveys were submitted within the window of time that the online survey was available in Qualtrics.

An analysis of the descriptive data and multiple regression analysis was done for each variable located within the proposed model. SEM was then used to verify the predictive model. SEM was chosen as the statistical method for this study because multiple relationships could be examined simultaneously and the validity and magnitude of the relationship of direct and indirect structural paths could be ascertained. The remaining chapters include the description of the sample, followed by discussion of the results including limitations and future direction.

CHAPTER 4. RESULTS

Introduction

This chapter presents the description of the sample and the results of analyses. The primary aims of this study were twofold. First, to conduct a longitudinal analysis using structural equation modeling (SEM) of Internet-based breastfeeding support groups used by millennial-aged breastfeeding women, guided by constructs within Pender's (1996) revised health promotion model and House's (1981) dimensions of social support, in an effort to better understand the variables that led to sustained exclusive breastfeeding to six months. Second, using structural equation modeling, determine the level of influence of personal factors, competing situational demands, behavior-specific cognitions and affect, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude that results in breastfeeding sustainability at six months post-delivery.

The analyses were conducted to evaluate the following posed research questions derived from the specific aims:

1. Is the integrated health promotion model appropriate for use with breastfeeding women in an Internet-based social media breastfeeding support group?
2. Within the integrated health promotion model, which factors (personal, competing situational demands) influence women's breastfeeding support at one month post delivery and at six months post delivery?

3. What dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) are predictive of the latent construct of social support in Internet-based social media breastfeeding support groups?
4. Does breastfeeding support (latent construct) in an Internet-based social media breastfeeding support group influence the confidence, knowledge, and attitude of millennial-aged women for sustained breastfeeding at six months post delivery?
5. Does breastfeeding confidence, knowledge, and attitude influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group?
6. Will there be gains in millennial-aged women's breastfeeding confidence, knowledge, and attitudes from pretest (one month post-delivery) to follow-up at six months after delivery?
7. How do millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group describe their breastfeeding journey?

Hypotheses

The hypotheses tested for the quantitative questions were:

1. The integrated health promotion model, derived from Pender's (1996) revised health promotion model and House's (1981) dimensions of social support, with the added constructs of breastfeeding confidence, knowledge, and attitude, will be supported by the data.
2. Age and education and competing work and family demands will significantly predict the construct of breastfeeding social support.

3. The four dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) will be predictive of the latent construct of social support in an Internet-based social media breastfeeding support group.
4. The latent construct of social support in an Internet-based social media breastfeeding support group will influence participants' breastfeeding confidence, knowledge, and attitude.
5. Breastfeeding confidence, knowledge, and attitude will significantly influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group.
6. There will be statistically significant gains in breastfeeding confidence, knowledge, and attitudes from pretest (at one month post delivery) to follow-up at six months after delivery.

Description of the Sample

Survey Pretest

A purposeful sample of 1,322 participants accessed the online survey through a link to Qualtrics, a private research software company; the survey was made available to participants within 17 breastfeeding social media support groups. It should be mentioned that of the original 1,322 participants, only 678 (51%) met the inclusion criteria, provided voluntary consent, and began the first survey (pretest). Of the participants that started the 120-item pretest survey (678), a total of 518 (76%) participants finished. At pretest, all participants were self-described breastfeeding women within one month postpartum, as required by the study's inclusion criteria.

Follow-up Survey

The second survey (follow-up) was conducted six months later. All women who completed the pretest were requested to continue in the study whether or not they continued to breastfeed. The follow-up survey was identical to the pretest, with exception of the demographic section. Demographic items were removed in the follow-up survey and three additional questions related to breastfeeding duration were added: “Are you still breastfeeding your baby?” “Are still exclusively breastfeeding your baby at this time with no formula, juice, or other food?” and “How long did you exclusively breastfeed your new baby with no formula, juice, or other food?” Additionally, one qualitative question was added to the follow-up survey: “Briefly describe your breastfeeding journey.”

A significant attrition of participants occurred during the six-month period between the pretest and follow-up. Of the 518 participants who finished the pretest survey, 76 participants (15%) did not start the follow-up survey. Of the 442 participants who began the follow-up survey, only 342 (79%) finished. A total of 101 participants needed to be removed due to missing data, reducing the final number of participants who completed both surveys with no missing data to 241. Figure 3 provides details of participant inclusion and attrition.

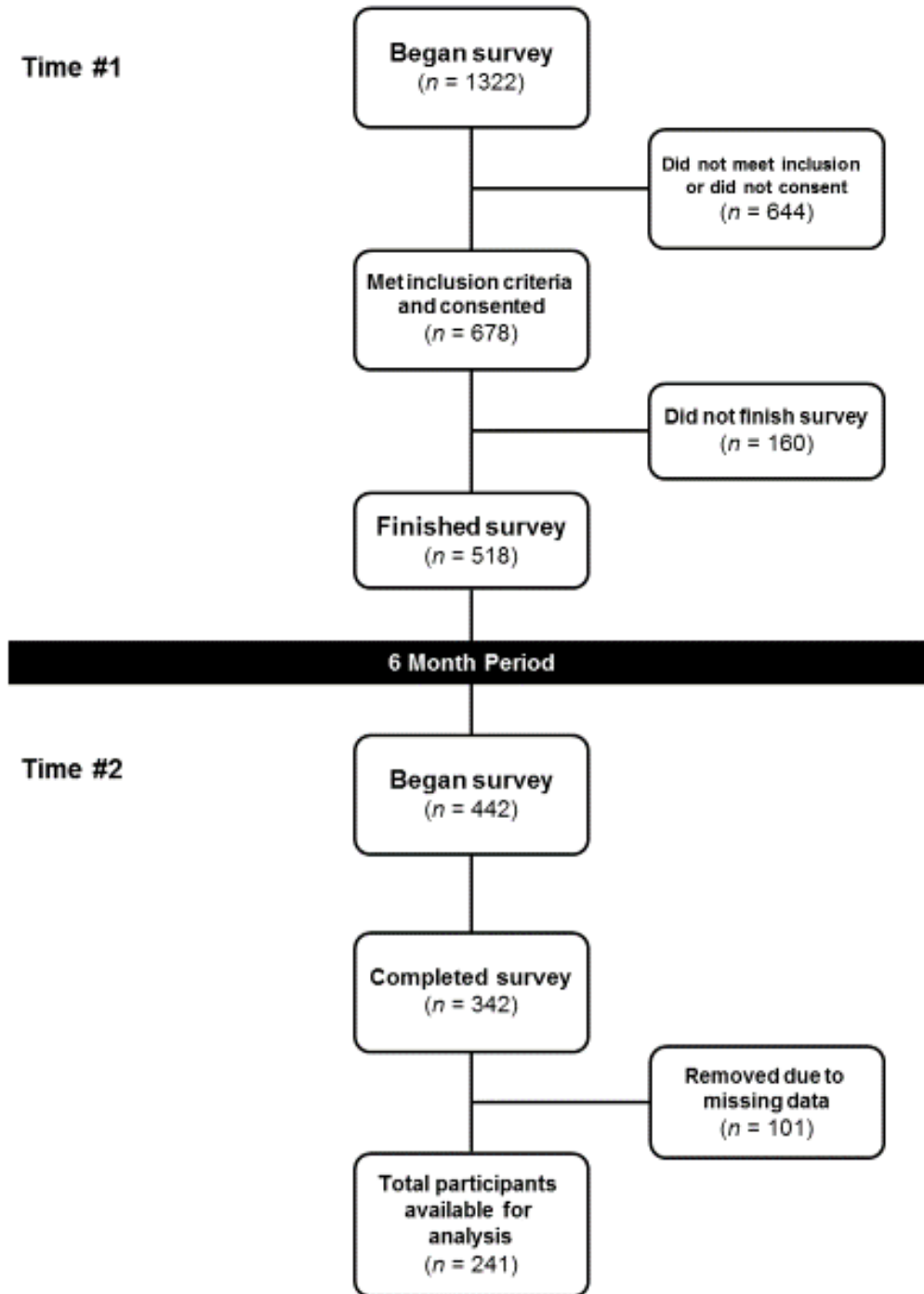


Figure 3. Participant flow chart.

Preliminary Data Analysis

A constant concern when conducting repeated measures is the potential loss between pretest and follow-up. There originally were 678 participants who completed the informed consent with only 531 completed enough to calculate the subscales from the instruments used in this analysis. There was a substantial decrease in the number of participants at follow-up with only 442 responding; 241 (20 participants per variable) contained no missing data from both data collection periods, a requirement for SEM.

There are multiple methods for handling missing data. The most common method is to impute missing data using either a regression multiple imputation technique or Bayesian imputations (Rubin, 1987). Other methods such as using the mean value or even a carry forward procedure are also viable but tend to lead to more biased estimates (Rubin, 1987). Even the best imputation methods become invalid when the data are not missing at random, and especially when there are statistical differences between those that are missing values and those that are not (Rubin, 1987). To assess a potential follow-up selection bias, independent sample *t*-tests were conducted on participants' demographic characteristics and model parameters.

As can be seen in Table 3, there were statistically significant differences noted in three of the five demographic characteristics presented. Participants who completed this follow-up were slightly older: 29.9 years of age, compared to those who partially completed: 28.9 years of age ($p=.003$); older participants also reported having more education ($p=.002$). There were also statistically significant differences on parameter mean scores between participants who completed both surveys and those who did not complete both surveys. For example, those who completed the survey reported more

family demands (11.3 mean score on family/work demands parameter) than those who did not complete both surveys (11.8 mean score on family/work demands parameter) ($p=.020$). Also, participants who scored higher in breastfeeding knowledge (66.1) were more likely to complete the survey, than those that reported a lower knowledge score (62.7) ($p= <.001$).

Table 3

Independent Sample t-test Assessing Follow-up Response Bias by Demographic Characteristics and Model Parameters

Predictors	Complete Surveys		Non-Complete Surveys		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Demographic							
Age	29.9	3.8	28.9	4.3	3.0	559	.003**
Education	7.3	1.7	6.9	1.9	3.2	621	.002**
Income	4.4	1.8	3.8	1.9	4.4	610	<.001**
# of Children	2.0	1.0	1.8	0.9	1.8	620	.065
# of SS Group View per Week	18.6	37.3	24.6	83.6	-1.1	617	.256
Parameters							
Social Support Informational	11.4	3.8	11.8	3.8	-1.3	551	.184
Social Support Appraisal	11.5	2.1	11.6	2.3	-0.7	551	.472
Social Support Emotional	12.0	1.9	12.1	2.0	-0.9	550	.383
Social Support Instrumental	6.4	2.7	6.7	2.7	-1.2	550	.231
Social Support Total	41.3	7.8	42.2	8.1	-1.3	551	.181
Comp Demands Work	8.3	5.7	7.9	5.4	0.7	544	.478

Table 3 (cont.)

Predictors	Complete Surveys		Non-Complete Surveys		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Comp Demands Family	11.8	2.3	11.3	2.5	2.3	541	.020*
Comp Demands Total	20.0	6.1	19.2	6.0	1.7	544	.098
Knowledge Total	66.1	8.8	62.7	10.9	3.9	529	<.001**
Confidence Total	63.1	7.7	62.4	7.7	1.0	515	.327
Attitude Total	50.3	3.8	50.2	3.9	0.1	519	.897
KAC Total	176.8	22.2	172.8	24.5	2.0	529	.051

Note. (N=241), * $p < .05$, ** $p < .001$

Data for this dissertation study did not satisfy the missing data conditions to conduct data imputations because the slopes of the complete and imputed analyses were different; therefore, the data set with no missing data was used in this dissertation study.

Final Data Set

Sample Demographics of Final Data Set

The final dataset that contained only participants who reported all data reflected in the theoretical model for the pretest and the 6-month follow-up contained 241 participants. Sample demographics statistics were obtained using the 14-item demographic questionnaire created by this researcher. Demographic data included age, race/ethnicity, education level, marital status, employment, income, country, state, parity, prior breastfeeding experience, prenatal education with this and prior pregnancies, whether or not the participant was breastfed herself, and the frequency of their participation in a social media breastfeeding support group.

Age. In accordance with the inclusion criteria, all participants were millennial-age mothers born between 1980 and 1999. At the time of intake data collection (2017), the mean age was 29.9 years ($SD=3.8$) with a range between 19-37 years old.

Race/ethnicity. The vast majority of participants were White (86%), Asian, Native Hawaiian, or Pacific Islander (5%), Hispanic or Latina (5%), Black or African American (2%), and Other (2%).

Education. The majority of participants reported completing their bachelor's degree (39%). Others described their level of education as doctoral degree (4%), master's degree (23%), associates degree (12%), some college (14%), technical/trade school (3%), high school graduate (4%), and some high school (1%). No participants reported having no schooling completed.

Marital status. The vast majority of respondents reported being married or in a domestic partnership (90%), while others reported being single/never married (8%) or divorced (2%).

Employment. The majority of participants stated that they were either employed for wages (57%) or a stay at home mother (33%). Less people reported being self-employed (4%). Similar percentages of participants reported they were out of work but not looking for work (1%), out of work and looking for work (2%), and being a student (2%), and others identified as currently serving in the military (1%).

Income. Reported annual household incomes: \$150,000 (14%), \$100,000-\$149,999 (19%), \$75,000-\$99,999 (19%), \$50,000-\$74,999 (15%), \$35,000-\$49,999 (17%), and \$25,000-\$34,999 (10%). A smaller percentage reported a lower income level of less than \$25,000 (6%) per year.

Country/state. The web-based study design allowed for participant representation from countries around the globe. Initially, participants who started the pretest survey represented a total of 21 countries and all 50 U.S. states. With the elimination of participants who did not complete the follow-up survey at six months ($n=100$) and those removed due to missing data ($n=101$), the total countries represented decreased to 10, with the highest percentage representing the following countries: United States (86%), United Kingdom (7%), and Canada (2%), and Australia, India, Malta, and South Africa each accounting for 1%, and Romania, New Zealand, and Japan representing the smallest percentage (each $<1\%$) of participants. Forty-three U.S. states were represented within the set of participants finishing both surveys with no missing data. The states with the highest population as recorded by the U.S. Census Bureau (2018) also were most frequently represented in this study: California (9%), Texas (6%), Florida (5%), and Illinois (5%).

Parity and breastfeeding experience. Interestingly, first-time mothers made up 35% of the participants while 45% were second-time breastfeeding mothers; others reported three (15%) or more (5%) children. Primiparous women were within one month postpartum and exclusively breastfeeding at the start of the study. Primiparous women reported a range of exclusive breastfeeding between 1-4 weeks, $M=3$ weeks, $SD=1.01$ at pretest. Multiparous women reported breastfeeding their previously breastfed children an average duration of 14 months.

Prenatal education. Most participants reported never attending prenatal classes that contained information about breastfeeding with their recent pregnancy (68%), and

48% of participants who reported more than one child attended prenatal classes that contained breastfeeding information with any prior pregnancy.

Participants who were breastfed as an infant. Most participants reported that they were breastfed when they were infants (58%) while others reported they were formula fed (39%) or stated they did not know (3%).

Frequency of participation in a social media breastfeeding support group. In an effort to understand how often respondents participated within their social media breastfeeding support group, they were asked the frequency in which they viewed a post within their group (averaged 21 times/week), posted an original comment (averaged 2 times/week), or posted a reply (averaged 2 time/week).

Table 4 presents means and standard deviation statistics of pretest scores and follow-up scores taken at six months post-delivery.

Table 4

Means and Standard Deviations for Pretest and 6-month Follow-up

Predictors	<u>Pretest</u>		<u>6-month Follow-up</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	29.9	3.8		
Education	7.5	1.6		
Number of Children	2.0	0.9		
Informational-SS	11.3	3.8	12.0	3.9
Appraisal-SS	11.4	2.0	11.6	2.2
Emotional-SS	12.0	1.9	12.1	2.0
Instrumental-SS	6.3	2.6	6.6	2.9
Social Support Total	40.9	7.6	42.3	8.2
Work Demands	8.5	5.7	8.5	5.9
Family Demands	11.7	2.3	12.1	1.9
Knowledge	66.0	8.8	68.6	7.3
Attitude	55.4	5.2	57.0	4.7
Confidence	62.9	7.7	65.9	7.4

Note. (N=241)

Primary Hypotheses

The six inferential research hypotheses, derived from research questions 1-6, were tested using structural equation modeling and multiple linear regression, with the following results.

Hypothesis 1. The integrated health promotion model, derived from Pender's (1996) RHPM and House's (1981) dimensions of social support, with the added constructs of breastfeeding confidence, knowledge, and attitude, was supported by the data of this dissertation study.

Hypothesis 2. Age and education and competing work and family demands significantly predicted the construct of breastfeeding social support.

Hypothesis 3. The four dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) were found to be predictive of the construct of social support.

Hypothesis 4. The latent construct of social support in an Internet-based social media breastfeeding support group are related to participants' breastfeeding confidence, knowledge, and attitude.

Hypothesis 5. Breastfeeding confidence, knowledge, and attitude do influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group.

Hypothesis 6. There were statistically significant gains in the knowledge, confidence and attitudes from pretest to posttest.

Primary Data Analysis

The primary data analysis began with an investigation of the theoretical model's individual primary relationships.

Overall Model

The primary hypothesis in this dissertation study was to assess the appropriateness of using Pender's (1996) RHPM and House's (1981) dimensions of social support to promote six-months of exclusive breastfeeding. To assess the overall fit of the hypothesized breastfeeding support model, the operationalized theoretical model presented in Figure 4 was assessed using SEM in the AMOS 24 package in SPSS.

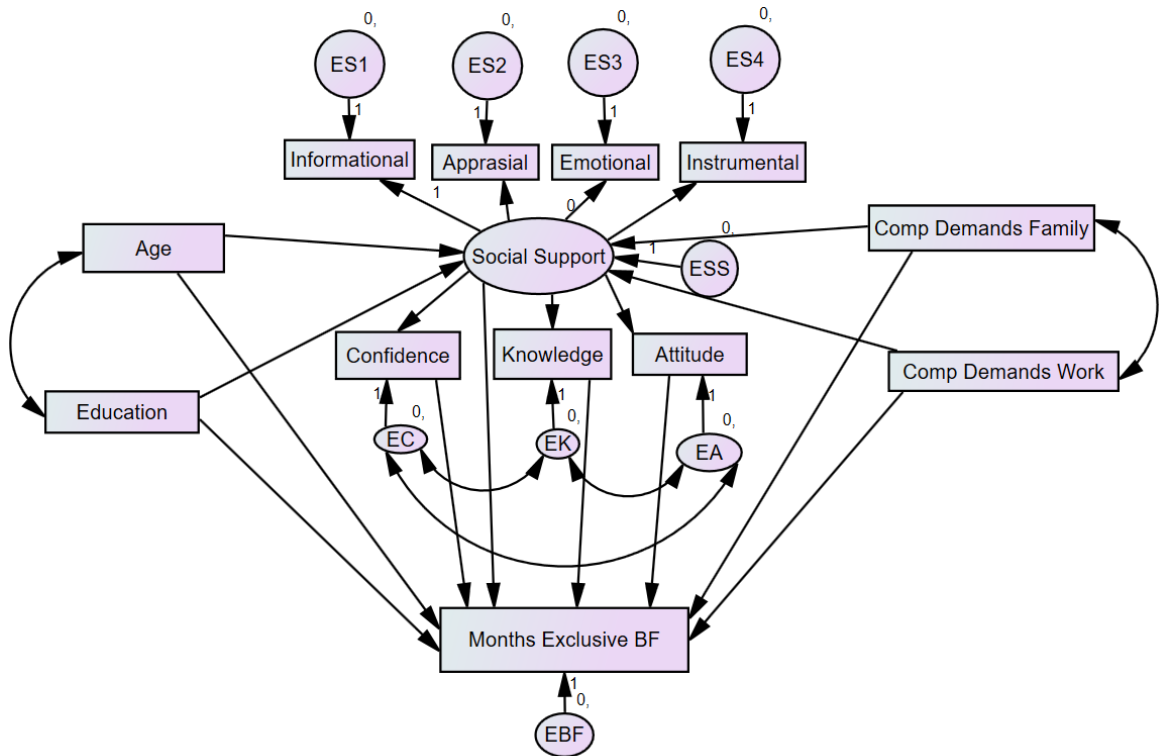


Figure 4. SEM theoretical model. ES1=error support informational, ES2=error support appraisal, ES3=error support emotional, ES4=error support instrumental, ESS=error social support, EC=error confidence, EA=error attitude, EK=error knowledge, EBF=error breastfeeding.

Structural equation modeling was conducted using maximum likelihood estimated. There were a total of 90 sample moments with 48 parameters estimated, leaving 48 degrees of freedom in this model. The final sample contained no missing values of 241 participants. There were five observations per estimated parameter and 20 per observed variables. All of the variables included in this model from the final data set were normally distributed, with no significant skewness or kurtosis values falling far below the calculated critical value calculated by AMOS (Byrne, 2010). There were, however, 17 participants who had observations that were furthest away from the centroid, identified using Mahalanobis distance (Byrne, 2010). It was decided to retain all 17 of these observations in the model since the outliers were all within possible range of scores (Byrne, 2010). As a result, this increased the potential model variance and resulted in a poorer model fit (Byrne, 2010). The subsequently reported fit indices were based on this more conservative model that included larger variability.

Model Fit-testing

The first step in assessing the adequacy and fit of the model was to assess if there was a high proportion of multicollinearity (Byrne, 2010). As the initial assessment of multicollinearity, the model demonstrated that there were several items among the social support components that had high bivariate correlations: emotional support and appraisal support ($r=.801, p<.001$), informational support and appraisal support ($r=.541, p<.001$), and emotional support and informational support ($r=.519, p<.001$). These highly correlated items are anticipated among observed variables of a latent construct. All correlations other than those related to the latent construct of social support were low to moderate as shown in Table 5.

Table 5

Parameter Correlations

Item	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11
(1) Social Support Informational											
(2) Social Support Appraisal	.541**										
(3) Social Support Emotional	.519**	.801**									
(4) Social Support Instrumental	.231**	.227**	.220**								
(5) Knowledge Total	.083	.139*	.176**	-.159*							
(6) Attitude Total	.049	.127*	.166*	-.046	.286**						
(7) Confidence Total	.059	.166*	.224**	-.079	.338**	.576**					
(8) Month Exclusive BF	.099	.038	.054	.014	.073	.231**	.194**				
(9) Demographics Age	-.142*	-.192**	-.208**	-.099	.020	.020	-.036	.076			
(10) Demographics Education	-.096	-.208**	-.193**	-.120	-.046	-.072	-.084	.014	.390**		
(11) Comp Demands Work	.273**	.122	.142*	-.064	.005	-.130*	-.042	-.115	.068	.075	
(12) Comp Demands Family	-.139*	-.027	-.025	-.219**	.117	-.018	.113	-.026	.066	-.063	-.087

Note. (N=241), *p<.05, ** p<.01

Theoretical Model Analysis: Model Respecification

To improve the overall fit of the model, there were slight modifications to the original theoretical model where correlations between the errors of confidence, knowledge, and attitudes were added. Correlations were added to the model based upon the suggested model modification that reduces the unexplained variance as part of common observations in a specific level of latent construct (Byrne, 2010).

The fit for the initial theoretical and the modified model was then compared to the saturated and null model. The modified model had an overall estimate of a good fit and had substantially better fit indices compared to the original theoretical model. The addition of the correlated errors between the three endogenous variables of confidence, knowledge, and attitudes improved the overall fit of the model. The data do support the use of Pender's (1996) RHPM with House's (1981) dimensions of social support, with the added constructs of breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude to promote six month exclusive breastfeeding.

Even though the statistically significant chi-square ($\chi^2[45] = 4.4, p < .001$) would suggest a poor fit absolute or predictive fit, the chi-square index is not appropriate since the chi-square goodness of fit test is extremely sensitive when used with large sample sizes and complex models (Byrne, 2010). Complex models with a large number of estimated parameters, as in this dissertation study, suggest using a normed or relative chi-square ($\chi^2/\text{degrees of freedom}$) instead of the traditional χ^2 for complex models with a good fit model ($\chi^2/df < 5.0$) and a great fit ($df < 2.0$). The normed referenced chi-square (χ^2) of 1.9 reported for this model indicated a great absolute fit model. The set of comparative fit described next also suggested a good model fit: comparative fit index

(CFI) =.94, which indicated good fit since it is greater than .93; incremental fit index (IFI) =.94, which is analogous to an overall R²; and normative fit index (NFI) =.89, which approaches the critical value of .90. Unexplained covariance also suggested a good model fit with the root mean square error of approximation (RMSEA) =.06; which was less than the .08 criteria (Kenny, 2015). Lastly, model parsimony was assessed using the parsimony adjusted CFI (PCFI) >.5 (Hu & Bentler, 1999). Table 6 presents the goodness of fit statistics for the theoretical, modified, saturated and null models. Figure 5 provides the final model with the standardized structural weights.

Table 6

Model Goodness of Fit Indices

Model	DF	χ^2	<i>p</i>	χ^2/DF	NFI	IFI	CFI	RMSEA	PCFI
Theoretical	45	199.1	<.001	4.4	.70	.75	.74	.12	.504
Modified	42	80.3	<.001	1.9	.89	.94	.94	.06	.595
Saturated	0	0			1	1	1	0	0
Null Model	66	657.5	<.001	9.9	0	0	0	.19	0

Note. Bold indicates final modified theoretical model. DF= degrees of freedom; χ^2/DF =Normed Referenced Chi-Square; NFI=Normed Fit Index; IFI= Incremental Fit Index; CFI=Comparative Fit Index; RMSEA= Root Mean Square Error of Approximation; PCFI= Parsimony adjusted CF

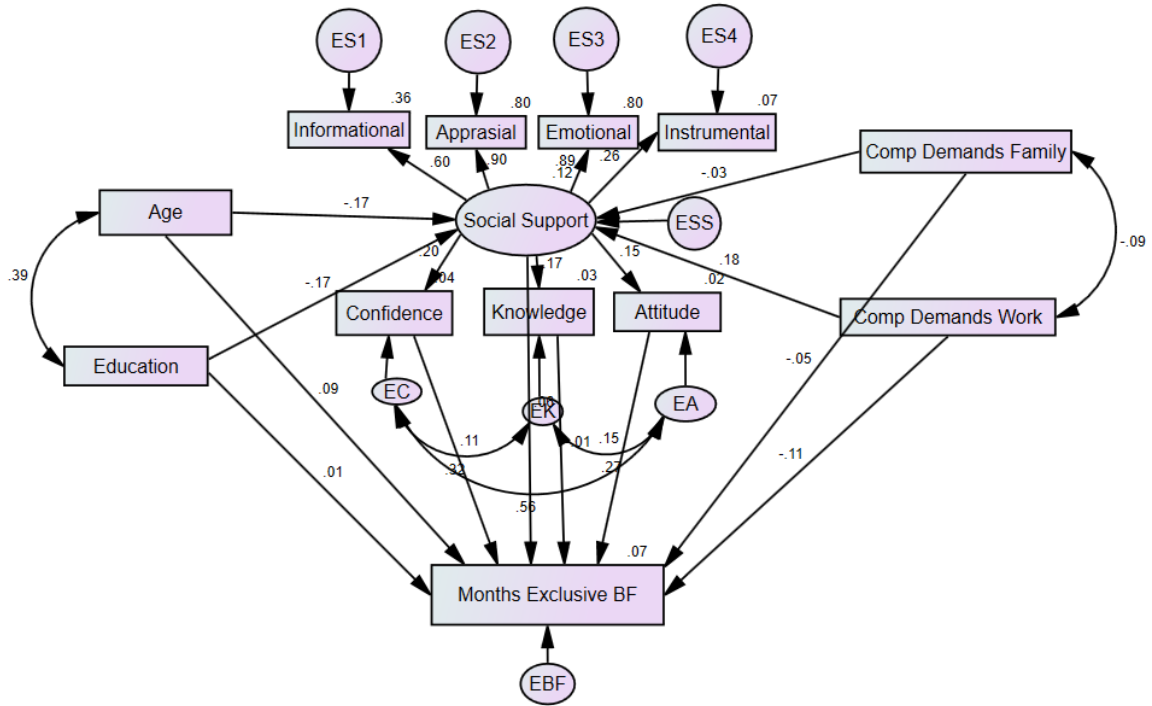


Figure 5. Final model with standard weights. ES1=error support informational, ES2=error support appraisal, ES3=error support emotional, ES4=error support instrumental, ESS=error social support, EC=error confidence, EA=error attitude, EK=error knowledge, EBF=error breastfeeding.

Hypothesis 1. The integrated health promotion model, derived from Pender’s (1996) RHPM and House’s (1981) dimensions of social support, with the added constructs of breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude, was supported by the data of this dissertation study. As seen in Table 7, the standardized coefficients and the associated p -values demonstrated support for the theoretical relationships within the Pender’s (1996) RHPM: Age ($\beta = -.17, p = .021$), education ($\beta = -.17, p = .017$), and competing work demands ($\beta = .18, p = .007$) were all statistically significant. Structural weights accounted for unique variance in predicting social support. Likewise the four components of the latent construct of social support: appraisal ($\beta = -.90, p < .001$), instrumental ($\beta = -.26, p = .017$), emotional ($\beta = 0.89, p < .001$),

and informational ($\beta = 0.60, p < .001$) show support for the underlying construct of social support. The construct of social support did have statistically significant structural weights predicting confidence ($\beta = .2, p = .004$), knowledge ($\beta = .17, p = .017$), and attitudes ($\beta = .15, p = .029$). Some structural coefficients appear weak, which can be accounted for by their correlations. Lastly, the predictors (education, age, competing work and family demands, social support, confidence, knowledge, and attitude) accounted for approximately 9% of the total variance in total number of months of exclusively breastfeeding ($R^2 = .088$). The relatively weak overall R^2 of the model may be a result of the homogeneous sampling of multigravida mothers with breastfeeding experience.

Table 7

Unstandardized and Standardized Partial Structural Coefficients

Endogenous		Exogenous	β	Estimate	SE	CR	p
Social Support	<---	Education	-0.17	-0.25	0.10	-2.39	.017*
Social Support	<---	Age	-0.17	-0.10	0.04	-2.31	.021*
Social Support	<---	Family Demands	-0.03	-0.04	0.08	-0.44	.657
Social Support	<---	Work Demands	0.18	0.07	0.03	2.70	.007**
Confidence	<---	Social Support	0.20	0.65	0.22	2.91	.004**
Knowledge	<---	Social Support	0.17	0.52	0.22	2.38	.017*
Attitude	<---	Social Support	0.15	0.30	0.14	2.19	.029*
Appraisal-SS	<---	Social Support	0.90	0.85	0.09	9.95	<.001**
Exclusive BF Months	<---	Age	0.10	0.03	0.02	1.37	.171
Exclusive BF Months	<---	Education	0.01	0.01	0.05	0.21	.834
Instrumental-SS	<---	Social Support	0.26	0.32	0.09	3.65	<.001**
Exclusive BF Months	<---	Family Demands	-0.05	-0.03	0.04	-0.73	.468
Emotional-SS	<---	Social Support	0.89	0.78	0.08	9.73	<.001**

Table 7 (cont.)

Endogenous		Exogenous	β	Estimate	SE	CR	p
Exclusive BF Months	<---	Knowledge	-0.01	0.00	0.01	-0.14	.890
Exclusive BF Months	<---	Attitude	0.15	0.04	0.02	1.91	.056
Informational-SS	<---	Social Support	0.60	1.00			<.001**
Exclusive BF Months	<---	Social Support	0.06	0.03	0.03	0.78	.436
Exclusive BF Months	<---	Confidence	0.11	0.02	0.01	1.32	.186
Exclusive BF Months	<---	Work Demands	-0.11	-0.02	0.01	-1.73	.083

Note. β = Standardize Coefficient, Estimate = Unstandardized Coefficient, SE=Standard Error, CR=Critical Value. * p <.05, ** p <.01

Hypotheses 2 through 5 were tested using multiple linear regression or correlations to assess the theorized relationships.

Hypothesis 2. Age, education, and competing work and family demands significantly predict the latent construct of breastfeeding social support. Age, education, and competing work and family demands were all found to be statistically significant. These constructs were supportive of their theoretical aspect of the model ($F=7.57$, $R^2=0.11$, $p<.001$). Age ($\beta= -0.15$, $p=.029$), education ($\beta = -0.16$, $p=.021$), work demand ($\beta=0.18$, $p=.003$), and family demand ($\beta= -0.14$, $p=.025$) were all statistically significant and all had structural weights accounting for unique variance in predicting social support.

Hypothesis 3. The four dimensions of breastfeeding support (informational, appraisal, emotional, and instrumental) were found to be predictive of the latent construct of social support. This hypothesis was partially supported in the theoretical model ($F=611.1$, $R^2=0.94$, $p<.001$). Informational ($\beta= 0.52$, $p=<.001$), appraisal ($\beta=0.30$, $p=<.001$), emotional ($\beta= 0.27$, $p=<.001$), and instrumental ($p=<.001$) all were found to

have significance. However, as predicted in the hypothesized model, instrumental support was less likely found in an Internet-based environment.

Hypothesis 4. The latent construct of social support in an Internet-based social media breastfeeding support group will influence participant’s breastfeeding confidence, knowledge, and attitude. This hypothesis was assessed using correlations as shown in Table 8. Each of the four social support constructs correlated with knowledge (informational, $r=0.057$; appraisal, $r=.162$; emotional, $r=.203$; and instrumental, $r=-.178$), confidence (informational, $r=0.039$; appraisal, $r=.128$; emotional, $r=.178$; and instrumental, $r=-0.075$), and attitude (informational, $r=.135$; appraisal, $r=.124$; emotional, $r=.186$, and instrumental, $r=-0.01$). Instrumental social support correlated less with knowledge, confidence, and attitude (knowledge, $r=-.178$; confidence, $r=-0.075$; and attitude, $r=-0.01$) since instrumental support (e.g., lending money, driving to appointments, shopping) was least expected to be present in an Internet-based environment of social media breastfeeding support groups.

Table 8

Correlation between the Four Dimensions of Social Support and Knowledge, Confidence, and Attitude

Dimension	Knowledge	Confidence	Attitude
Informational	0.057	0.039	.135*
Appraisal	.162**	.128*	.124*
Emotional	.203**	.178**	.186**
Instrumental	-.178**	-0.075	-0.01

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

Hypothesis 5. Breastfeeding confidence, knowledge, and attitude will significantly influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group. Overall breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude were found to be highly correlated with each other and statistically significant in positively influencing exclusive breastfeeding at six month ($F=4.96$, $R^2=.07$, and $p<.002$), as shown in Table 9. Individually, their unique standardized coefficients and the associated p -values appear minimal: breastfeeding confidence ($\beta= 0.09$, $p=.241$), breastfeeding knowledge ($\beta= -0.01$, $p=.883$), and breastfeeding attitude ($\beta=0.18$, $p=.021$) due to their high correlation.

Hypothesis 6. There will be statistically significant gains in breastfeeding confidence, knowledge, and attitudes from pretest (at one month post delivery) to follow-up at six months after delivery. Table 10 demonstrates the statistically significant increase in confidence from 62.89 to 65.87 ($t[240] = -6.78$, $p<.001$, $d=0.88$), knowledge from 66.04 to 68.6 ($t[240] = -5.33$, $p<.001$, $d=0.69$), and attitude from 55.45 to 57.00 ($t[240] = -5.30$, $p<.001$, $d=0.68$), from pretest at one-month postpartum to six-month follow-up.

Table 9

Multiple Linear Regression Results for Hypotheses Two, Three, and Five Investigating Aspects of the Model

H	Outcome	Predictors	B	SE	β	t	p	R2	F	p
2	Social Support	Intercept	62.85	5.12		12.27	<.001	0.11	7.57	<.001**
		Age	-0.32	0.14	-0.15	-2.20	.029			
		Education	-0.79	0.34	-0.16	-2.33	.021			
		Work Demands	0.26	0.09	0.18	2.97	.003			
		Family Demands	-0.60	0.27	-0.14	-2.26	.025			
3	Social Support	Intercept	2.67	1.10		2.42	.016	0.94	611.1	<.001**
		Informational	1.11	0.06	0.52	19.69	<.001			
		appraisal	1.12	0.14	0.30	7.94	<.001			
		Emotional	1.10	0.15	0.27	7.32	<.001			
		Instrumental	1.00	-	-	-	<.001			
5	Exclusive BF	Intercept	2.36	0.96	-	2.47	.014	0.07	4.96	0.002**
		Knowledge	0.00	0.01	-0.01	-0.15	.883			
		Attitude	0.04	0.02	0.18	2.33	.021			
		Confidence	0.01	0.01	0.09	1.18	.241			

Note. *p<.05, ** p<.01

Table 10

Paired Sample t-test Assessing Changes in Knowledge, Attitude, and Confidence from Pretest to Posttest

Outcome	Pretest		6-month Follow-up		<i>T</i> (240)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Knowledge	66.04	8.83	68.61	7.35	-5.33	<.001	0.69
Attitude	55.45	5.24	57.00	4.65	-5.30	<.001	0.68
Confidence	62.89	7.70	65.87	7.36	-6.78	<.001	0.88

Note. ** $p < .01$

Qualitative Findings

The majority of the participants (66%) in this study reported that they were exclusively breastfeeding to six months, which is three times higher than the U.S. national average (22%) (CDC, 2016a). While this percentage is high in this sample compared to the national average, many new mothers (19%, $n=310$) reported that they ended exclusive breastfeeding between four to five months. In order to further explore each unique breastfeeding experience and to gain a better understanding of why some mothers did not breastfeed to six months, participants were asked an open-ended question to describe their breastfeeding journey.

Of the 342 participants who partially completed the six-month follow-up survey, 310 (91%) participants took this opportunity and provided a short summary of their overall experience as a breastfeeding mother, as reported in Table 11. The participant responses were read and re-read to discover commonalities as well as contrasts and to discern the meaning of emergent themes. A manual tabulation of similar words and phrases was conducted by this researcher until saturation was reached and the following six themes (codes) emerged and were recognized.

Table 11

Qualitative Comments about Breastfeeding Journey

Category	<i>n</i>	%	Sample Comments
Overall positive	111	36	<p>“I love it. With both of my kids it has been the most precious times. It makes me feel powerful knowing that I have all I need for my child.”</p> <p>“I didn’t know how much it would mean to me but I adore feeding my 5 month old daughter and I’m proud of our breastfeeding story and want it to continue.”</p> <p>“Amazing! I know how good it is for her and she only deserves the best.”</p> <p>“The most beautiful experience with my baby is the moment that we share when his drinking milk from my breast.”</p> <p>“Beautiful, special, and something I’ll cherish forever for all 3 of my children.”</p>
Overall negative	8	3	<p>“The lack of sleep, lack of free time, lack of freedom, and pressure to attend to the baby in addition to everything else is dreadful, frustrating, and exhausting. It’s not something I would encourage other mothers to do.”</p> <p>“Food intolerances, overactive letdown still at 6 months. I don’t agree with breastfeeding openly in public, my nipples are still my nipples and I don’t want them seen. I hallucinated in the beginning from sleep deprivation and constant crying if not nursing. It makes him happy and feel good so I still continue even though it’s the hardest thing I’ve ever done. He still does not accept bottles or pacifiers. No one has been able to help me this entire time.”</p>
Combination statement	128	41	<p>“Easy, hard, exhausting, wonderful, rewarding and blessed ;) it has many ups and downs, but I wouldn’t change it for anything!”</p> <p>“The best and hardest thing I have ever done is breastfeed my babies.”</p> <p>“It’s the hardest and also most amazing thing I’ve ever done.”</p> <p>“My breastfeeding journey has been wonderful, not without difficulty but worth providing my daughter breastmilk.”</p> <p>“Exhausting, hard work, memorable, loving.”</p>
Pertaining to support	32	10	<p>“It was tough in the beginning but with the help of my support group I’ve gotten it down and I love it.”</p> <p>“We are six months strong, but I did not have the same support or experience with the first two and I really do understand how difficult it can be for some mothers in various situations.”</p> <p>“We’ve had a few bumps along the way but with a little professional help and online advice, everything is going smoothly. I am so thankful to be able to nourish and bond with my baby in this way.”</p>

Table 11 (cont.)

Category	n	%	Sample Comments
			<p>“The beginning was extremely difficult. My milk didn’t come in until day 3. The lactation consultant at the hospital was a joke. Thank god for the LC at my pediatrician’s office. Dealt with three bouts of mastitis. After 2 months it got easier. Hoping to make it to a year.”</p> <p>“Very difficult for the first three months. After that it became much easier and natural. I would not have succeeded without the support of my pediatrician office, their lactation consultant, and my husband.”</p> <p>“A lot of difficulty and pain the first 6 weeks, we live in a very rural location without lactation support so I drove 90 miles twice to meet with a lactation consultant in the closest city, costing me \$400 (not counting travel). Since then breastfeeding has been better, no/less pain. I utilize Kellymom Facebook support group for input, ideas, and support regularly.”</p>
Pertaining to employment	31	10	<p>“Went back to work and unable to produce enough. Stopped breastfeeding at 3 months. Still miss it.”</p> <p>“Shortly after returning to work, he started to reject the breast. I exclusively pump for him every day and send him to the sitters with more than enough milk for the day.”</p> <p>“I have had to supplement with formula due to returning to work and not being able to maintain my supply, but I am still happy to breastfeed whenever I can.”</p> <p>“Exclusively breastfeeding for 6 months and counting, despite latch issues and working 50+ hours a week.</p>
Pertaining to caring	96	31	<p>“It has helped form me into the loving, responsive, caring, intuitive mother that I am today.</p>

Note. N=310

Code 1. Overall positive breastfeeding journey. A total of 111 (36%) of the 310 responses reflected only positive descriptive terms such as wonderful (39), easy (32), great (27), joyful (24), and rewarding (20). An example of an overall positive response was: “Beautiful, special, and something I’ll cherish forever for all 3 of my children.”

Code 2. Overall negative breastfeeding journey. A total of 8 (3%) responses reflected only negative descriptive terms such as hard (5) and exhausting (3). In these responses, no positive terms were used to describe these mother’s breastfeeding experience. An example of overall negative response included: “The lack of sleep, lack of

free time, lack of freedom, and pressure to attend to the baby in addition to everything else is dreadful, frustrating, and exhausting. It's not something I would encourage mothers to do."

Code 3. Combined positive and negative breastfeeding journey. A total of 128 (41%) of the responses contained both positive and negative terms to describe their breastfeeding experience. Responses often started with negative terms such as hard (40), difficult (44), exhausting (16), and struggle (16), but ended using a positive term, including love (39), worth it, (20), rewarding (20), easier (19), beautiful (12), better (12), and thankful (4). An example of a combined response included: "It was easy, hard, exhausting, wonderful, rewarding and blessed, it has many ups and downs, but I wouldn't change it for anything!"

Code 4. Breastfeeding support. A total of 32 (10%) responses were both positively and negatively worded but the central idea of the response related to breastfeeding support. For example,

A lot of difficulty and pain the first 6 weeks. We live in a very rural location without lactation support so I drove 90 miles twice to meet with a lactation consultant in the closest city, costing me \$400 (not counting travel). Since then breastfeeding has been better, less pain. I utilize Kellymom Facebook support group for input, ideas, and support regularly.

Code 5. Work. A total of 31 (10%) of those who responded made comments pertained to returning to work. For example: "I went back to work and was unable to produce enough milk. Stopped breastfeeding at 3 months. Still miss it."

Code 6. Caring. Elements of caring were found in participant responses that align well with the concept of caring, which has been described by Swanson (1991) as a nurturing way to relate to others in order to facilitate the other's growth. Participants spoke less often (6 responses, 2%) about nurturing caring for or from others in their breastfeeding social support group; instead, caring was more often described as it related to other sources of social support (25 responses, 8%). For example: "My husband is the best support and had been throughout the entire time, especially with our first, and talking about positioning, and as an emotional rock!"

Caring responses were made by mothers who expressed the belief that they breastfeed because is "best" for their infant's health. For example,

My son has always been demanding and doesn't sleep for long periods of time, which is hard on me. I have persevered because I know breastfeeding is best for his health, and I want to give him the best that I am able to.

Or, "I didn't expect it to be so tough but I was determined to do what I felt was best for my daughter!"

Although participants were not specifically asked to describe how they perceived breastfeeding as caring, participants did describe themselves as caring, as shown in the following quote:

It has helped form me into the loving, responsive, caring, intuitive mother that I am today. I have learned to always trust my instincts and my body thanks to breastfeeding. Breastfeeding has helped give me the strength and drive I needed. Breastfeeding should be written on my resume to prove my dedication (lol!).

As mentioned earlier, greater than half of the mothers in this study exclusively breastfed to six months ($n = 159$, 66%). Of those who ended breastfeeding prior to six months ($n = 82$, 34%), many mothers ($n = 46$, 19%) finished between four to five months. Participant responses of mothers who exclusively breastfed for four to five months were compared with mothers who exclusively breastfeed to six months in order to gain a better understanding of why some mothers stop exclusively breastfeeding prior to the full six months as recommended by AAP (2012), WHO (2017a), and UNICEF (2018).

Most notable, breastfeeding women who concluded breastfeeding between four to five months described breastfeeding as hard or difficult without mentioning a resolution of their particular difficulty ($n = 19$, 69%). Specifically, mothers who breastfed exclusively until four to five months often described their breastfeeding difficulties as exhaustion with poor sleep, mastitis, blocked milk ducts, cracked nipples, infant tongue lip tie or tongue tie, infant biting, and poor latch onto the breast. Interestingly, mothers who reached the six month milestone for exclusive breastfeeding also mentioned that breastfeeding was hard, difficult, or a struggle. Almost half of the six month group ($n = 54$, 48%) indicated many of the same breastfeeding difficulties: exhaustion, mastitis, cracked nipples, pain, diminished breast milk supply, infant tongue and lip ties, poor infant weight gain, problems with infant latch. When reporting these breastfeeding difficulties, most ($n = 48$, 42%) mothers who reached six months specified that they experienced breastfeeding difficulties in the beginning of their breastfeeding journey, but the difficulties were no longer a problem for them. Furthermore, many of those mothers ($n = 17$, 15%) discussed their belief that breastfeeding was tough but rewarding and

worth it. For example, “The benefits of breastfeeding make it worth it” and “It has been the hardest but most rewarding journey.”

Another distinction between groups was about employment or working while exclusively breastfeeding. Working was mentioned slightly more often (17%) in the responses of mothers who breastfed for four to five months, compared to mothers who were breastfeeding at six months (13%). Furthermore, all comments about work by mothers who breastfed for four to five months were negative, such as “Shortly after returning to work, he started to reject the breast” and “I wish I could’ve done it longer, but working night shift made it really hard, so I decided it was time to quit.” Consequently, when work was mentioned by mothers at the sixth month, it was often in a more positive manner. For example, “It’s a lot of work with a fulltime job but I love it and wouldn’t have it any other way.”

Women’s responses about social support were also compared between mothers who ended breastfeeding between four and five months and those who breastfed to six months. There was minimal mention of social support ($n=1$, 3%) by mothers who breastfed from four or five months. Mothers who continued breastfeeding to six months were much more likely ($n= 25$, 22%) to describe their support network to include lactation consultants, nurses, doulas, family (husband, sister), and social media breastfeeding support groups. All social support comments reflected positive views for mothers who were breastfeeding at six months. One participant commented, “A good support system is paramount from health professionals to family friends and strangers in public.” Another participant stated, “I’ve had minor issues but knew when and how to seek advice and solved them easily.” Still another remarked,

I attribute that mostly to the support and knowledge my sister has given me. She's had no shame in showing me the process and I feel that was paramount for how easily breastfeeding seemed to come to my baby and me.

These distinctions between breastfeeding mothers who breastfed for six months and those that ended prior, highlight future areas for breastfeeding research. For instance, areas of future investigation may include finding additional ways to support and help breastfeeding women resolve common initial breastfeeding difficulties (e.g., pain with breastfeeding, exhaustion with poor sleep, mastitis, blocked milk ducts, and cracked nipples) and the importance of receiving adequate social support to assist mothers to exclusively breastfeed to six months.

Summary

The following descriptive statistics detailing individual characteristics and experiences of breastfeeding women who use social media breastfeeding support groups were reported. The sample for this study were, on average, 29.9 years old, Caucasian, and educated most often to the bachelor's degree level, with two or more children. A large percentage (90%) reported being married or in a domestic partnership who were most often currently employed for wages or were a stay at home mother. Many participants reported their annual household income as \$75,000-\$149,999 (38%). This use of a web-based Internet survey provided an opportunity for women to participate in this study regardless of geographic location, providing the opportunity for greater diversity among the sample. As such, participants represented the United Kingdom (7%); Canada (2%); Australia, India, Malta, and South Africa (1% each); and Romania, New Zealand and Japan (each <1%). The United States represented 86% (from 43 states) of the sample.

Using SEM, relationships were examined between personal factors (age and education), competing situational demands, and social support. Age, education, and competing work and family demands were all found to be statistically significant and predictive of social support. Age ($\beta = -0.15, p = .029$), education ($\beta = -0.16, p = .021$), and family demand ($\beta = -0.14, p = .025$) were also found to have moderately negative structural weights in predicting social support. In this dissertation study's sample, older, more educated breastfeeding mothers, and those who experience more demands from family responsibilities reported less support from their social media breastfeeding support group. However, work demand ($\beta = 0.18, p = .003$) was moderately positive and statistically significant, suggesting that as demands at work rise, breastfeeding women are more likely to seek and find social support within their social media support group. Additionally, data from measuring personal factors and competing situational demands of family and work, derived from Pender's (1996) RHPM, were supportive of the theoretical model ($F = 7.57, R^2 = 0.11, \text{ and } p < .001$) and therefore retained in the final model.

Social support has been described by House (1981) and operationalized by Grassley et al. (2012a) as the following four dimensions: informational support (included provision of information, sharing points of view, advice, and suggestions) appraisal support (included the provision of information that is useful for self-evaluation purposes such as affirmation and constructive feedback), emotional support (conveyed empathy, trust, and concern regarding health promotion), and instrumental support (involved the provision of aid and services and practical assistance). Results of this dissertation's study found all four dimensions of social support to be statistically significant and highly correlated with each other. All four observed dimensions of social support were also

predictive of the latent unobserved variable of social support in the final model: informational ($\beta = 0.52, p < .001$), appraisal ($\beta = 0.30, p < .001$), emotional ($\beta = 0.27, p < .001$), and instrumental ($p < .001$). However, as predicted in the hypothesized model, instrumental support was less likely found in an Internet-based environment where followers are less likely to be in close proximity to each other.

The addition of the constructs of breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude improved the overall fit of the final model during the respecification process. Social support was found to positively influence breastfeeding confidence, knowledge, and attitude. The four social support dimensions correlated with breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude. Instrumental social support correlated less with the other three dimensions of social support since instrumental support (lending money, driving to appointments, shopping) was found to be least present in an Internet-based environment of social media breastfeeding support groups.

Breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude were found to influence sustained exclusive breastfeeding at six months in millennial-aged breastfeeding women in an Internet-based social media breastfeeding support group. Overall breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude were found to be highly correlated with each other and statistically significant in influencing exclusive breastfeeding at six months ($F = 4.96, R^2 = .07, \text{ and } p < .002$). Individually, their standardized coefficients and the associated p -values appear minimal: breastfeeding confidence ($\beta = 0.09, p = .241$), breastfeeding knowledge ($\beta = -0.01, p = .883$), and breastfeeding attitude ($\beta = 0.18, p = .021$). Interestingly, attitude and confidence were

most correlated and predictive of exclusive breastfeeding whereas breastfeeding knowledge was not statistically significant with a minimal negative structural weight.

Exclusive breastfeeding to six months was the dependent variable of this dissertation study. A majority of participants (66%) in this study reported that they were exclusively breastfeeding to six months on average, which is higher than the U.S. national average of 22% (CDC, 2016a). While this percentage is rather high, it was noted that many new mothers (19%) ended exclusive breastfeeding between four to five months. In order to further explore each unique breastfeeding experience and also gain an understanding of why some mothers stop breastfeeding prior to the universal recommendation of exclusive breastfeeding to six months, participants were provided an opportunity to respond to an open-ended question at the six month survey to describe their breastfeeding journey. While many mothers (36%) described their breastfeeding experience to be positive and an experience that they would cherish, there were also mothers who commented about their breastfeeding difficulties (3%) such as exhaustion due to poor sleep, mastitis, blocked milk ducts, and cracked nipples. A number of participants who reported breastfeeding at six months also identified similar breastfeeding difficulties, but more often also expressed having caring supportive resources such as family members, lactation consultants, and social media breastfeeding support group followers who helped them resolve their early breastfeeding difficulties.

The primary aims of this study were achieved by conducting a longitudinal analysis using SEM with the purpose of better understanding the mediating and moderating variables that contribute to sustained exclusive breastfeeding to six months, by millennial aged breastfeeding women who are enrolled in Internet-based breastfeeding

support groups. The data were found to support the use of Pender's (1996) RHPM with House's (1981) dimensions of social support with the added constructs of breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude to promote six month exclusive breastfeeding. The theoretical model explained approximately 9% of the common variance in total months of exclusive breastfeeding, although most mothers were found to be exclusively breastfeeding at six months, thereby reducing the variability in the dependent variable.

The final chapter begins with an overview of the study's purpose, aim, design, measurements, sample, and a discussion of the study's conclusions supported by the findings. The chapter concludes with a description of the study's strengths, its limitations, and implications for future research and practice.

CHAPTER 5. DISCUSSION

Purpose

Exclusive breastfeeding for the first six months of life has been shown to decrease morbidity and mortality of women and infants (AAP, 2012; UNICEF, 2018; WHO, 2017b). Although most U.S. women initiate breastfeeding after birth, a large majority discontinue exclusive breastfeeding prior to their infant reaching six months (CDC, 2016a).

Many variables (e.g., social support, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude) in previously published breastfeeding literature have been studied and found to contribute to supporting breastfeeding duration (Bevan & Brown, 2014; Cox et al., 2015; Gewa & Chepkemboi, 2016; Hinic, 2016; Mogre et al., 2016; Stuebe & Bonuck, 2011). This study was guided by an integrated theoretical framework Pender's (1996) RHPM with House's (1981) dimensions of social support and tested using structural equation modeling (SEM) to examine and analyze the structural relationship between the measured variables (age, education, competing situational demands of family and work, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude) and the latent construct of social support among women participating in web-based breastfeeding social support groups and who self-identified as having initiated breastfeeding at one month postpartum.

Structural equation modeling is a very powerful multivariate analysis technique that combines factor analysis and multiple regression analysis to analyze the structural

relationship between measured variables and latent constructs by estimating the multiple and interrelated dependence in a single analysis. SEM allows the researcher to examine the relationships simultaneously and to determine the validity and magnitude of direct and indirect paths of the endogenous and exogenous model variables. The final model with standard weights was specified using breastfeeding women's individual characteristics (prior breastfeeding experience, age, parity, race/ethnicity, education, and socioeconomic status), competing demands, behavioral-specific cognitions, and affect (social support). Additionally, relationships were explored between modifiable factors such as breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude as predictors of sustained breastfeeding to six months.

Evaluation of the Specific Aims

The two study aims were assessed using a longitudinal analysis of Internet-based breastfeeding support groups used by millennial-aged breastfeeding women. Again, this study was guided by constructs within Pender's (1996) RHPM (1996) integrated with House's (1981) dimensions of social support, and provided an understanding of the relationship of the variables that support sustained exclusive breastfeeding to six months postpartum.

Sample Characteristics

This dissertation's sample ($N=241$) consisted mainly of Caucasian, married, multiparous mothers with an average age of 30. Most participants were living in the United States, educated to the Bachelor's degree level, and reported a diverse family income fairly equal across all income levels. Most participants never attended any prenatal classes that included breastfeeding education, but viewed posts on their

breastfeeding support group site an average of 21 times per week and posted their own comment or question and replied to another's post twice a week on average.

Research studies examining the use of social media support groups used for breastfeeding support have just recently begun to appear within breastfeeding literature (Asiodu et al. 2015). Even though Facebook, the largest social media networking site, has been in existence since 2004 (Sensis, 2015). Furthermore, many published studies examining breastfeeding, social support, and the use of social media are qualitative in nature (Bridges, 2016; Thepa, Marais, Bell, & Muangpin, 2018), possibly narrowing sample size and diversity. Some studies fail to recruit or retain a sample diverse in race and ethnicity (Konkel, 2015), which was true in this dissertation study's sample (86% Caucasian) as well. Studies that are successful in recruiting a racially diverse sample may develop more effective interventions that increase exclusive breastfeeding in diverse populations.

The following describes the conclusions supported by the finding of this dissertation study.

Discussion of the Conclusions

Breastfeeding has been found to have an enormous impact on population health, with the potential to prevent morbidity and mortality (Sankar et al., 2015) and to promote health and well-being for women and children (Godfrey & Lawrence, 2010). Pender's (1996) RHPM was selected as the framework for this study's theoretical model due to its extensive use cited in the literature for health promotion purposes (Esposito & Fitzpatrick, 2011; Kempainen et al., 2011; Mafutha & Wright, 2013; Meethien et al., 2011).

In an attempt to conceptualize the latent construct of social support, no single definition of social support was found to be sufficient in all situations (Barclay et al., 2004). House's (1981) four dimensions were used to measure the latent construct of social support because of their previous proven validity in the use in breastfeeding support research (Grassley et al., 2012a). Thus, the initial theoretical model was modified to include the four dimensions of social support (House, 1981).

Breastfeeding confidence (Hinich, 2016), knowledge (Gewa & Chepkemboi, 2016; Mogre et al., 2016), and attitude (Cox et al., 2015; Stuebe & Bonuck, 2011; Thomas et al., 2015) have been shown to influence a mother's desire to continue breastfeeding. Dietrich-Leurer and Misskey (2015) described knowledge gaps related to milk supply, correct latch-on, nipple care and soreness, and ways to express or pump human milk, which have been commonly linked with early cessation of breastfeeding (Dietrich-Leurer & Misskey, 2015). Another predictor of early breastfeeding cessation is a lack of breastfeeding confidence (Hinich, 2016; Wu et al., 2014). Breastfeeding confidence is a modifiable variable that has been described as a central component of a woman's breastfeeding experience, from breastfeeding initiation to weaning (Grassley & Nelms, 2008). Breastfeeding attitude is also considered modifiable; if a mother has a negative attitude toward breastfeeding (e.g., belief that breastfeeding is hard or inconvenient), she is more likely to supplement with formula (Cox et al., 2015). Therefore, the endogenous variables of breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitudes were added to the theoretical model, which served to improve the overall fit of the model.

Model Fit

The data satisfactorily supported the use of the theoretical model for breastfeeding women. Model goodness of fit was demonstrated using the normed referenced chi-square (χ^2) of 1.9 along with the comparative fit index (CFI =.94), incremental fit index (IFI =.94), and normative fit index (NFI =.89), and the unexplained covariance also suggested a good model fit with the root mean square error of approximation (RMSEA =.06) (Kenny, 2015). Lastly, model parsimony was assessed using the parsimony adjusted CFI (PCFI >.5) (Hu & Bentler, 1999). The model goodness of fit indices decreased without the constructs of confidence, knowledge, and attitude, adding further support to their addition to the theoretical model ($X^2/DF=2.28$, CFI=.88, IFI=.901, RMSEA=.81, PCFI=.549).

Age, education, competing work and family demands, social support, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude accounted for approximately 9% of variance of the outcome of exclusive breastfeeding ($p=.009$). Additionally, when looking at the relationships of all the variables to each other within the hypothesized model, 94% of the total variance of the data (which was measured by the Incremental Fit Index [IFI=.94], which is analogous to an overall R^2), indicated that a large amount of variance in the covariance matrix has been accounted for by the model, proving a good-fit model.

Further support of the use of this model was demonstrated by the data: 66% of mothers were exclusively breastfeeding at six months. Although this study did not have a control group for comparison, 66% of the followers of a social media breastfeeding support group continued to breastfeed exclusively to six months. This percentage is three

times the U.S. national average of 22% (CDC, 2016a) of U.S. mothers exclusively breastfeeding to six months. It is possible a self-selection bias occurred in this dissertation study, bolstering the percentage of mothers who breastfed to six months. One recent randomized controlled trial (RCT) in Finland by Nieva-Vilén et al. (2016) examined whether an Internet-based social support group intervention had an effect on the duration of breastfeeding. In their study, Nieva-Vilén et al. examined 123 mothers of preterm (<35 weeks) infants. The experimental group contained 60 mothers who were followers of a closed Internet-based social media breastfeeding support group of mothers with premature infants; 64 mothers were placed in the control groups and were not part of the support group (Nieva-Vilén et al. 2016). The results of the RCT found that the mean duration of breastfeeding was three months for the experimental group and 4.3 months for the control group. These findings indicate that there were no direct effects related to exclusive breastfeeding and social media support groups, which contradicts the findings of this study. Possibly, the sample that was comprised of mothers of premature infants could have introduced variability due to the infant's medical condition and its effect on feeding.

However, similar to this dissertation study, in the RCT, maternal age ($p=.44$) and education ($p=.99$) were not found to be statistically significant to exclusive breastfeeding, and a positive attitude toward breastfeeding was found to be a statistically significant predictor ($p=.001$) of exclusive breastfeeding duration to six months. Future studies using a RCT design are indicated for comparison to examine the exclusive breastfeeding duration and to better understand the influences of variables of confidence, knowledge, and attitudes in followers of breastfeeding social support groups.

Individual Characteristics and Experiences

This study's findings demonstrated that the individual characteristics and experiences of breastfeeding women, which are the exogenous variables (e.g., age, education, and competing family/work demand) with the SEM model, were able to predict the amount of social support found within social media breastfeeding support groups and if mothers were exclusive breastfeeding at six months using the modified model. As expected, correlations were significant between age and education ($r=.390$; $p<.01$) and both age and education had a direct negative relationship (both at $\beta=-0.17$) with exclusive breastfeeding to six months. Age and education were correlated to each other, and both reported an inverse relationships to social support. As age and education level increased, it may be theorized that breastfeeding mothers in this study were less likely to seek and find social support within their breastfeeding social media support group. This does not indicate that older, more educated mothers are less supported; rather, it may indicate these mothers have developed other sources of social support. Additionally, insignificant weak positive direct structural paths were found between age ($\beta=0.10$, $p<.171$) and education ($\beta=0.01$, $p=.834$) to exclusive breastfeeding duration at six months. Age and education were correlated with each other, which may account for the limited unique variance found in relation to exclusive breastfeeding to six months. However, the insignificant finding between age and education to exclusive breastfeeding contradicts many breastfeeding studies that found increased age (over 20 years) (Bolton et al., 2009) and higher levels of education (Laugen et al., 2016) increase the incidence of mothers exclusively breastfeeding to six months.

Competing Demand's Relationships to Social Support and Breastfeeding

As predicted in the theoretical model, the final model suggests that mothers who report higher levels of family and work demands reported lower exclusive breastfeeding durations. This finding is consistent with other studies that report decreased duration of breastfeeding with mothers who return to work (Ogbuanu, Glover, Probst, Hussey, & Liu, 2011). This dissertation study built upon previously published studies that solely focused on effects of breastfeeding mothers returning to work (Bai et al., 2015a; Thomas-Jackson et al., 2016). However, this dissertation's survey included an open-ended question that asked participants to describe their breastfeeding journey. When describing their breastfeeding journey, some mothers (10%) chose to discuss their perception of how demanding their role is in the family and at work. As expected, the structural coefficients for family ($\beta=-.05$) and work competing demands ($\beta=-.11$) were both inversely proportional to exclusive breastfeeding duration, family demand ($\beta=-.03$) had an inverse direct relationship to social support, and work demand ($\beta=.18$) had a weak direct positive relationship with social support. One possible theory is that women who have high work demand seek and attain more supportive sources from other sources such as their work environment that enable them to balance a high level of demand at work, while those reporting high family demand may not.

Dimensions of Social Support

This dissertation study found that social support was directly and indirectly related to exclusive breastfeeding duration to six months. Mothers who reported higher levels of social support also reported an increase in breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude, which in turn made them more

likely to continue exclusive breastfeeding than mothers who reported less support. Mothers reported they found the following dimensions of social support within their social media breastfeeding support groups: primarily appraisal (constructive feedback) and emotional (empathy) support, followed by informational (providing instruction) and instrumental (tangible assistance). The Internet forum provided opportunities for followers to give and receive appraisal, emotional, and informational support. It was expected that instrumental support would be minimal in an online environment as followers were not physically close to others and may not have the opportunity to provide instrumental assistance such as transportation or picking up prescriptions, etc. Interestingly, informational support was reported behind appraisal and emotional, even though a large proportion of posts on breastfeeding social support group discussion boards are informational in nature.

Breastfeeding Confidence, Breastfeeding Knowledge, and Breastfeeding Attitude

Breastfeeding knowledge had the weakest structural coefficient in comparison to breastfeeding confidence and breastfeeding attitude, which may indicate that an increase in breastfeeding knowledge may not lead directly to sustained breastfeeding duration. Instead, increased knowledge leads to increased confidence and a more positive attitude, which indirectly influences increased breastfeeding duration. These findings support results from previously reported studies that have examined the relationship between breastfeeding attitude (Cox et al., 2015; De Jager et al., 2013; Nam Mi et al., 2015) and breastfeeding confidence (Laanterä et al., 2011; Mossman, Heaman, Dennis, & Morris, 2008).

Study Strengths

There were a number of study strengths, including the integrated theoretical framework that also included confidence (Hinich, 2016), knowledge (Gewa & Chepkemboi, 2016; Mogre et al., 2016), and attitude (Cox et al., 2015; Stuebe & Bonuck, 2011; Thomas et al., 2015) toward breastfeeding and breastfeeding sustainability; the prospective longitudinal design (Tappen, 2011); and use of a web-based online survey (Akard, Wray, & Gilmer, 2015; Tappen, 2011).

Theoretical Framework

This dissertation study tested constructs from Pender's (1996) RHPM, a proven theoretical model used widely to promote and enhance health (Canaval & Sánchez, 2011; Esposito & Fitzpatrick, 2011). Additionally, dimensions of House's (1981) social support were used to test the presence of social support in an breastfeeding social media support group. Theory-driven research studies have been shown to better explain which interventions work and why they work (Tebb et al., 2016).

Research Design

Another strength of this study was its rigorous repeated longitudinal prospective design, which did not rely on the participant's recall. Although this study had a longitudinal design with a six month period between test and retest, participants were not asked to comment on historical data, prompting possible error in memory recall, which is possible in retrospective studies (Tappen, 2011). In addition to this study's design, the surveys were built using psychometrically validated instruments with shown reliability and validity (Boyar et al., 2007; Laanterä et al., 2012; Oh et al., 2013).

Online Format

A strength of this dissertation study was found in its use of Internet-based social media support group sites. Invitations for this dissertation study reached thousands of participants worldwide in a time-efficient, effective, and low-cost manner. Through the use of social media technology, participants were recruited using the survey link advertised in multiple social media breastfeeding support group sites. Researchers recruiting participants from social media support group sites have the potential to access a great number of social media support group sites according to their population of interest. An adequate sample size and a diverse demographic were achieved for this dissertation study due to the multiple social media support sites available online, adding to the study's generalizability. Additionally, the online format allowed for participant responses to be rapidly received. Through the use of the password protected Qualtrics survey management system, participant data were analyzed and stored in a manner that preserved confidentiality. Lastly, the online format worked well to discuss the breastfeeding experience, which can be perceived as sensitive, intimate, and/or embarrassing (Ya et al., 2017).

Study Limitations

Several study limitations deserve mention. Limitations existed within the method, sample, site, and online format and are described in the next section.

Method

While SEM is a robust statistical approach to examining the relationship between measured variables and latent constructs, SEM possesses multiple assumptions that must be satisfied (Schumacker & Lomax, 2010). It was a challenge to avoid violating at least

one assumption. Failure to meet the assumptions may result in findings that are worthless (Olobatuyi, 2006). For example, Schumacker and Lomax (2010) stressed the importance of careful specification when choosing model variables. Variable selection is subjective and may be erroneous (Olobatuyi, 2006). Specification error occurs when variables that are relevant are omitted in the theoretical model (Schumacker & Lomax, 2010), while unrelated variables are included. Schumacker and Lomax (2010) recommended thorough theoretical and conceptual preparation work with a comprehensive understanding of the literature prior to building the theoretical model. In order to avoid specification error in this dissertation study, Pender's (1996) RHPM, a well validated health promotion model (Esposito & Fitzpatrick, 2011; Hacıhasanoğlu & Gözüm, 2011; Kemppainen et al., 2011; Mafutha & Wright, 2013; Meethien et al., 2011) was used as the framework.

Sample

Limitations within the targeted sample existed. Within this study, the intended participants were women who delivered an infant within one month. It is possible women within one month postpartum may have experienced limits in their endurance, concentration, and time. Most women participating in this study were multiparous, having two or more children, therefore limiting both time and perhaps endurance. Although having an infant in the NICU was an exclusionary question for this study, no questions were asked regarding the health of the mother or her ability to concentrate and devote sufficient time in answering the lengthy surveys. Additionally, at the time of the second survey, a majority of the sample may have returned to employment, possibly further limiting endurance, concentration, and time.

A self-selection bias may have occurred within this non-random convenience sampling. It is possible a larger number of women with a positive breastfeeding experience chose to participate in this study, and those with negative experience or who were no longer breastfeeding did not feel included. It is also possible that some women who are no longer breastfeeding may either feel disappointed in not reaching prior breastfeeding goals or they may have felt guilt due to a moral obligation to provide nutrition for their children by breastfeeding (Williams, Kurz, Summers, & Crabb, 2013), and therefore opted out of the second survey.

Attrition was a limiting factor. Of the 1,322 participants who started the inclusion criteria and consenting process, only 241 participants finished both surveys without missing data. The high attrition rate may have been due to the test/retest six month window, as well as the study's two long surveys including 120 and 104 questions, respectively. To adjust for the expected high attrition rate, attempts to increase sample size were made by posting multiple invitations to the study (7), as well as a reminder email.

In future studies, it would be interesting to broaden the sample without limiting the participants to the millennial generation or to one-month postpartum in order to provide comparison among groups. Twenty-three potential study participants contacted this researcher, and their comments included: "Am I too old?" "Women over 37 breastfeed too," or "My baby is over one month, but I would like to participate" and "I'd love to help you but my baby is nine months old." These comments illustrated an untapped larger population willing to participate in breastfeeding research.

The participants of this study were diverse in all measured demographic areas except race/ethnicity, which was somewhat homogenous with 207 participants (86%) selecting White. Many current studies either do not delineate between races or have a racially non-diverse sample (Konkel, 2015). Within this study, social media breastfeeding sites such as Caribbean Breastfeeding Support, Breastfeeding Support for Black Women, Black Women Do Breastfeed, and Breastfeeding Latinas did not provide this researcher permission to conduct research within their site. The inclusion of these sites might have increased the racial diversity in this study. The White majority of this study may represent the racial disparity in breastfeeding rates (CDC, n.d.) in the United States. More needs to be done to attract participants and to study more racially and ethnically diverse populations.

Site

Research site selection bias was a threat to this study. In order to minimize the potential for site selection bias, site recruitment inclusion/exclusion criteria were closely observed. Site selection was limited because many site administrators were non-responsive or would refuse requests to conduct research within their support group. Additionally, the largest site, Breastfeeding Mama Talk (930,875 followers), refused to post an invitation to join the study in the general feed where it could be easily viewed by participants. Instead, the invitation was approved by their administrator to be posted only on the visitor's page, which was a smaller area off to the side of the viewing screen.

Online Format

Limitations existed regarding the online format of this study. Potential participant's time to view the study's invitation was brief. As new original comments

from other followers were posted to the breastfeeding support group site, the invitation would be buried behind newer posts. Depending on the activity on the site, the potential participant would need to scroll down on their device to find the invitation. Many site administrators would bump or refresh the invitation so it would appear at the top of the feed once again. If the invitation was not refreshed by the administrator, this researcher would need to repost the invitation multiple times per week to attract new potential participants. In total, invitations were reposted in each support group site seven times, on various days of the week and times of day to attract a maximum audience of potential participants in multiple time zones.

Finally, online surveys and traditional surveys contain many similar limitations. First, as with traditional surveys, the data collected were self-reported. This researcher is unable to guarantee the truthfulness of the participant when answering the survey items or the inclusion criteria. As with any long survey, the participant may become bored, annoyed, or tired and not take the time to consider each item. Participants may not have understood negatively worded items, introducing error. Headings of the survey such as “knowledge section” or “attitude section” may have guided the participant to answer in an expected way. Online surveys introduce their own distinctive limitations. The researcher is unable to know if the participant is in a conducive environment to concentrate with enough uninterrupted time to fill out the survey to the best of their ability. The researcher is also unable to assess if the participant is completing the survey on small phone or mobile device, making the survey formatting more difficult for participants to view. Additionally, participants were unable to ask questions as they completed the surveys.

Implications for Research

Findings of this dissertation study provide direction for future research on breastfeeding support and duration. Understanding the complex factors that affect breastfeeding (social support, competing situational demands or work and family, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude) is very important from a scientific perspective.

Although the sample size was adequate, like many breastfeeding studies, it lacked heterogeneity since the majority of the sample were White, married, and educated to some degree. The lack of diversity in these area limited generalization to other populations. Breastfeeding studies that recruit participants with more demographic diversity may find data that lead to more successful interventions within various populations.

Examining different populations as well as interventional time periods may lead researchers to more successful outcomes. Although the CDC's (2016a) breastfeeding report card recommends the early postpartum period as a critical time to provide breastfeeding support, this study's findings suggest that many women report breastfeeding as difficult and experience breastfeeding problems far after the initial postpartum period. Therefore, future interventional studies and supportive interventions should take place during pregnancy to establish supportive ties and then extend at least six months after birth to assure women receive the support they need.

Additionally, a mother's perception of high family and work demand have been shown in this study to have a negative impact on the duration of exclusive breastfeeding. Furthermore, family demand also was shown to be inversely related to social support.

Future researchers studying breastfeeding duration may want to focus interventional studies on competing demands of both family and employment to successfully mediate these negative effects. Also, correlational data of this study strongly links breastfeeding attitude and breastfeeding confidence. Exclusive breastfeeding rates may be sustained for longer periods by implementing interventions that pay particular attention to the development of increased breastfeeding confidence and positive attitude rather than providing means to increase breastfeeding knowledge alone.

Lastley, researchers are beginning to discover the advantages of conducting online research (Nahm et al., 2011). This researcher found great benefit using an online environment to conduct this dissertation study. This study's international sample was recruited in a time-efficient, low-cost manner using Internet-based social media support groups. Participants were able to gain access and complete the online survey at a time and location convenient to the participant. Data collection and data management were also enhanced using Qualtrics, an Internet-based survey building and management tool.

However, conducting online research had its own inherent difficulty. Participant trust needed to be gained by this researcher due to recent reports of Internet fraud and identity theft (Nahm et al., 2011), making participants cautious about providing email information and personal demographics. To combat participant concerns of trustworthiness, the approval to conduct this research was attained from the site administrators. Additionally, an informed consent that included the study's purpose, design, and researcher contact information was made available. Using those strategies to alleviate trust issues, a sufficient sample size sample was attained.

Implications for Practice

This study was done to provide health care professionals with a better understanding of the strength of relationships of the predictors that may lead to the positive health outcome of exclusive breastfeeding to six months as recommended by AAP (2012), UNICEF (2018), and WHO (2017a). As a result of the findings that social support had a direct effect on a mother's breastfeeding confidence and a positive effect on breastfeeding attitude and breastfeeding duration, healthcare professionals can use this information more meaningfully. Nurses and other healthcare professionals are well positioned to identify pregnant and postpartum women who may lack adequate social support and breastfeeding confidence or who have not yet developed a positive attitude towards breastfeeding who might benefit from focused education and support for breastfeeding initiation.

Ideally, an assessment of a mother's supportive network and her breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude should begin prenatally and then extend to at least six months post-partum. Previous studies have shown evidence that prenatal interventions such as prenatal classes and support groups have a powerful impact on exclusive breastfeeding initiation and duration (Rosen, Krueger, Carney, & Graham, 2008) Furthermore, interventions that are aimed at providing mothers with resources to gain breastfeeding social support (e.g., social media support groups) may be vehicles to improve women's confidence and attitudes toward breastfeeding. Although in this dissertation's findings breastfeeding knowledge alone was found to be statistically insignificant with a low structural weight ($\beta=-.01$) toward exclusive breastfeeding at six months, this statistic accounts only for unique variance. In this dissertation study, social

support, breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude are highly correlated with each other and statistically significant ($p > .01$). Therefore, going forward, it would be useful for researchers and healthcare professionals to focus on interventions that include all four constructs (social support, knowledge, confidence, and attitude) in their aim to support exclusive breastfeeding mothers.

The findings of this study suggest clinicians focus on strategies that lead to increasing social support for breastfeeding women. One potential strategy to increase social support and build breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude as used in this study is to recommend that pregnant and new mothers become familiar with, join, and participate in social media breastfeeding support groups, which are available as a source of information, appraisal, and emotional support. As a result, healthcare practitioners who are aware of the relationships between the supported constructs that influence exclusive breastfeeding duration may have more success using interventions to assist mothers to exclusively breastfeed.

Summary

This dissertation study examined relationships within an integrative theoretical breastfeeding support model based upon Pender's (1996) RPHM and House's (1981) dimensions of social support. Additionally, variables reported to modify breastfeeding (e.g., breastfeeding knowledge, breastfeeding confidence, and breastfeeding attitude) were included in the theoretical framework to test the relationship between these well documented variables of exclusive breastfeeding initiation and sustainability at six months postpartum.

An important finding of this dissertation study is the large percentage (66%) of women who were found to be exclusively breastfeeding to six months in this sample of social media breastfeeding support group followers. This large percent is relatively three times the current U.S. percentage (22%) according to reports of the CDC's (2016a) Breastfeeding Report Card. Additionally, although the expected variance in this sample is low due to the large numbers of mothers found to be exclusively breastfeeding at four to five months (19%) and at six months (66%), approximately 9% of the common variance (effects) was found through the use of structural equation modeling. Additionally, a number of variables (social support, breastfeeding confidence, breastfeeding knowledge, and breastfeeding attitude) were found to be significant and to produce direct or mediating effects toward the health outcome of exclusive breastfeeding to six months.

Breastfeeding exclusivity and duration are influenced by numerous variables. It is possible that there are other variables worth investigating, such as social norms and culture, not considered in this study. Many of these variables could be assessed through web-based Internet social support platforms, as in this study. Therefore, it is recommended that these important variables be included in future studies so that comprehensive effective intervention studies provide personalized culturally sensitive support to breastfeeding women in their journey to exclusively breastfeeding to six months.

UNICEF (2018) has estimated that 823,000 deaths of infants and 20,000 deaths of mothers per year could have been prevented globally through exclusive breastfeeding. According to WHO (2017b), breastfeeding provides infants with an unequalled source of nutrition and immunologic properties needed for healthy growth and development.

Additionally, mothers benefit from breastfeeding by recovering from pregnancy and birth more rapidly (Dieterich et al., 2013) and a decreased risk for postpartum hemorrhage (Saxton et al., 2015) and post-partum depression (Hahn-Holbrook et al., 2013).

Furthermore, breastfeeding benefits are not limited to the short term; long-term benefits (Binns, Lee, & Low, 2016) to both mother and infant include decreased risk of obesity, diabetes type 1 & 2, coronary heart disease hyperlipidemia, and hypertension (Dieterich et al., 2013), as well as some forms of cancers (Chowdhury et al., 2015; Luan et al., 2013). The projected cost savings of exclusive breastfeeding globally is approximately \$300 billion annually through health promotion, due to fewer infections, chronic diseases, and premature deaths (UNICEF, 2018). It is because of these far reaching benefits that UNICEF (2018) reported that exclusive breastfeeding has the greatest potential impact on infant survival of all preventive interventions. With the understanding of the great health and economic impact breastfeeding has upon women, children, and the greater society, studies that are effective in assisting mothers to increase exclusive breastfeeding rates to six months continue to be needed in the United States and globally.

APPENDICES

Appendix A. Permission to Reprint Revised Health Promotion Model

From: Nola Pender <npender@umich.edu<mailto:npender@umich.edu>>
Date: May 30, 2018 at 11:59:06 AM EDT
To: JANE WILSON <JANE_WILSON@pba.edu<mailto:JANE_WILSON@pba.edu>>
Subject: Re: Reproduction of the RHPM

Jane:

You have my permission to use the Health Promotion Model in your dissertation and reproduce it as needed. I wish you academic success. Here are websites in the attachment that may be useful.

Nola Pender

On Tue, May 29, 2018 at 11:41 AM, JANE WILSON
<JANE_WILSON@pba.edu<mailto:JANE_WILSON@pba.edu>> wrote:
Hello Dr. Pender,

I wanted to ask for permission to reproduce your Revised Health Promotion Model for my dissertation at Florida Atlantic University with Dr. Linda Weglicki as my chair. The title is: Testing an Integrated health promotion model using social media for breastfeeding women: Structural equation modeling. If it is at all possible, if you agree, could you please send me a document that I can include in my dissertation as proof of your approval to reproduce the model. Thank you very much,
Jane Wilson

God Bless,

Jane C. Wilson MSN RN
Assistant Professor of Nursing
School of Nursing
Palm Beach Atlantic University
P.O. Box 24708
West Palm Beach, FL 33416
561-803-2808 Office
561-803-2828 Fax

<HEALTH PROMOTION MODEL WEBSITES.docx>

Appendix B. FAU IRB Approval



Institutional Review Board
Division of Research
777 Glades Rd.
Boca Raton, FL 33431
Tel: 561.297.1383
fau.edu/research/researchint

Charles Dukes, Ed.D., Chair

DATE: August 4, 2017

TO: Linda Weglicki, PhD
FROM: Florida Atlantic University Social, Behavioral and Educational Research IRB

IRBNET ID #: 1075136-2
PROTOCOL TITLE: [1075136-2] Using Social Media in Breastfeeding Support: A Path Analysis

PROJECT TYPE: *New Project*
ACTION: APPROVED

APPROVAL DATE: August 4, 2017
EXPIRATION DATE: August 4, 2018

REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review category # B7

Thank you for your submission of Response/Follow-Up materials for this research study. The Florida Atlantic University Social, Behavioral and Educational Research IRB has APPROVED your *[enter project type]*. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

- This study is approved for a maximum of **1,000** participants.
- It is important that you use the approved, stamped consent documents or procedures included with this letter.
 - Advertisement - 3 Participant Invitation to the Study.docx (stamped)
 - Advertisement - 2nd Participant Invitation to the Study.docx (stamped)
 - Revised Informed Consent.docx (stamped)
 - Protocol - Appendix 1a_Basic Protocol Format V.2-1.doc (stamped)
- ****Please note that any revision to previously approved materials or procedures, including modifications to numbers of subjects, must be approved by the IRB before it is initiated.** Please use the amendment form to request IRB approval of a proposed revision.
- All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All regulatory and sponsor reporting requirements should also be followed, if applicable.
- Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.
- Please note that all research records must be retained for a minimum of three years.

- **This approval is valid for one year.** A Continuing Review form will be required prior to the expiration date if this project will continue beyond one year.

If you have any questions or comments about this correspondence, please contact Donna Simonovitch at:

Institutional Review Board
Research Integrity/Division of Research
Florida Atlantic University
Boca Raton, FL 33431
Phone: 561.297.1383
researchintegrity@fau.edu

* Please include your protocol number and title in all correspondence with this office.

**This letter has been electronically signed in accordance with all applicable regulations,
and a copy is retained within our records.**

Appendix C. Permission Request to Administrator to Conduct Research

Hello, I am a follower of (insert support group name here). My name is Jane Wilson and I am a mother, maternal child registered nurse, and a doctoral student in the Christine E. Lynn Graduate School of Nursing at Florida Atlantic University. I have had the pleasure of breastfeeding my three children, and I know how challenging breastfeeding may be at times. I appreciate the encouragement and information mothers receive as members of your breastfeeding support group.

I am performing a research study on the use of social media to provide support for breastfeeding mothers. This study will assist researchers and health care professionals understand how mothers receive support; if this support increases their knowledge, attitudes, and confidence about breastfeeding; and if this support increases breastfeeding duration. This study can provide valuable insight in how the healthcare community can assist women reach their breastfeeding goals.

I would like to obtain your permission to post an invitation to my study which will include a link to a survey starting in August, 2017. The survey is completely voluntary and confidential.

Please reply to me at your earliest convenience by stating your approval to offer this opportunity to your members. Once I hear from you, I will begin the process of obtaining IRB approval from Florida Atlantic University.

I would appreciate your support in our common goal to supporting breastfeeding and I welcome any questions or suggestions and I look forward to your response.

Thank you so much!

Jane Wilson RN MSN

██████████

Janewilson2014@health.fau.edu

Appendix D. Participant Invitation to the Study Posted to Online Social Media

Support Groups



Have you been exclusively breastfeeding for less than 1 month?
Please join this important breastfeeding study!

Hello! My name is Jane Wilson and I am a mother, a maternal child registered nurse, and doctoral student doing a research study about the use of social media for support by breastfeeding mothers.

You can help support other breastfeeding moms by filling out this survey. Your administrator has given me permission to post the link to a survey below. Some questions may be difficult to view on smaller mobile devices, therefore it is recommended to access this survey using a desktop, laptop, or tablet device.

Please click on this link to get started.

https://fau.az1.qualtrics.com/jfe/form/SV_ewYZOk4SbCIhmND

Thank you very much!

Jane Wilson RN MSN
Linda Weglicki PhD RN
Michael DeDonno PhD

Appendix E. Exclusionary Questions Meant to Discern Participant Eligibility

- Were you born between the years 1980 and 1999? ____yes ____no
- Are you a breastfeeding woman within one month postpartum who is exclusively breastfeeding or exclusively pumping/expressing your human milk to feed your baby? ____yes ____no
- Mark the breastfeeding support group(s) in which you follow:
 - Beth’s Breastfeeding Blog ____
 - Breastfeeding Mama Support Group ____
 - Breastfeeding Mama Talk Support Group ____
 - Breastfeeding Matters ____
 - Breastfeeding Support for Indian Mothers ____
 - Breastfeeding Support Group ____
 - Breastfeeding Mama’s Support Tribe ____
 - Breastfeeding Yummy Mummies ____
 - Breasts for Babes ____
 - Chi Mama’s Breastfeeding Support Group ____
 - Cleavage Club ____
 - Dairy Queens Breastfeeding Support ____
 - Intact Health/Natural Parenting ____
 - Janet’s Breastfeeding support Group ____
 - Kelly Mom ____
 - Milky Mamas ____
 - Breastfeeding Mama Talk Support Group ____
 - Women Interested in Breastfeeding ____
- Is your baby currently being treated in a neonatal intensive care unit? ____yes ____no

If any participants do not meet inclusion criteria, the survey will terminate and they will receive an automatically generated response: “Unfortunately you do not meet the criteria for this study. Thank you for your time and I wish you the best on your breastfeeding journey.”

Appendix F. Informed Consent

TITLE: Testing an Integrated Health Promotion Model Using Social Media for

Breastfeeding Women: Structural Equation Modeling

Investigators: Linda Weglicki PhD; Jane Wilson RN MSN; Michael DeDonno PhD


Thank you for your interest in participating in our research study. The purpose of this study is to examine the duration of exclusively breastfeeding in millennials who are a part of an online breastfeeding support group and to gain information about breastfeeding. You will be asked to fill out 2 online surveys. The first survey will be within one month postpartum, then another survey link will be emailed to you at 6 months postpartum. It should take you approximately 25-30 minutes to complete each survey. Your participation in this study is your choice. You are free to withdraw from the study at any time without penalty. You will be asked to provide an email address. Your email address and all of the collected information will be securely obtained and stored in Qualtrics which is a password protected online survey management system. Qualtrics will automatically generate a second survey that will be emailed to you at 6 months postpartum. Your email address will not be directly linked to you or your support group. During the analysis, study data will then be stored within a password protected computer which is only available to the investigators involved with this study.

The risks involved with participating in this study are minimal, although emotional discomfort may occur due to the fact breastfeeding is a highly personal and intimate experience. Potential benefits that you may receive from participation include the ability to assist researchers and the healthcare community to understand the supportive needs of breastfeeding women in an effort to help mothers reach their breastfeeding goals. It is possible that the information gained from this study will be published, but all of your identifying information will be removed.

If you experience problems or have questions regarding your rights as a research subject, contact the Florida Atlantic University Division of Research at (561) 297-1383. For other questions about the study, you should call the principal investigator: Linda Weglicki PhD at 561-297-2048. Please click yes or no to give your informed consent to participate.

Yes

No

	1075136-2	
	Approved On:	August 4, 2017
	Expires On:	August 4, 2018

Appendix G. General Survey

Age _____

Race/Ethnicity

White

Hispanic or Latino

Black or African American

Native American or American Indian

Asian / Pacific Islander

Other

Education

No schooling completed

Elementary School to 8th grade

Some High School, no diploma

High School, graduate, diploma or the equivalent (for example: GED)

Some college credit, no degree

Trade/technical/vocational training

Associate degree

Bachelor's degree

Master's degree

Doctorate degree

Marital Status

Single, never married

Married or domestic partnership

Separated

Divorced

Widowed

Employment

Employed for wages

Self-employed

Out of work and looking for work

Out of work but not currently looking for work

A stay at home mother

A student

Military

Unable to work

What was your total household income during the past 12 months?

Less than \$25,000

\$25,000 to \$34,999

\$35,000 to \$49,999

\$50,000 to \$74,999

\$75,000 to \$99,999

___ \$100,000 to \$149,999

___ \$150,000 or more

Country where I live _____

If US, State in which I live _____

How many children do you have including your new baby?

How long did you breastfeed exclusively (no formula, juice, or other food)?

New baby _____ weeks _____ months

Child 2 _____ weeks _____ months _____ years

Child 3 _____ weeks _____ months _____ years

Child 4 _____ weeks _____ months _____ years

Were YOU breastfed as a baby?

___ Yes

___ No

___ I don't know

Did you attend prenatal classes with this pregnancy?

___ Yes

___ No

___ Not applicable

If no, did you attend prenatal classes with a prior pregnancy?

___ Yes

___ No

___ Not applicable

In your Internet breastfeeding support group, how many times do you view posts?

_____ per day

_____ per week

_____ per month

Post an original comment to your Facebook breastfeeding support group?

_____ per day

_____ per week

_____ per month

Post a reply to someone else's comment to your Facebook breastfeeding support group?

_____ per day

_____ per week

_____ per month

Appendix H. Perceived Work Demand Scale (PWD) and Perceived Family Demand Scale (PFD)¹

Test Format: Both PWD and PFD scales used a 5-point Likert scale with responses ranging from strongly disagree (1) to strongly agree (5).

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Perceived Work Demand

My job requires all of my attention.

1 2 3 4 5

I feel like I have a lot to do at work.

1 2 3 4 5

My work requires a lot from me.

1 2 3 4 5

Perceived Family Demand

I have to work hard on family-related activities.

1 2 3 4 5

My family requires all of my attention.

1 2 3 4 5

I have a lot of responsibility in my family.

1 2 3 4 5

¹ Boyar, S. L., Carr, J. C., Mosley, D. C., & Carson, C. M. (2007).

Appendix I. Perceived Health-Related Social Support from Facebook Friends

Measure¹

Test Format: The response format is a 5- point Likert scale ranging from “strongly disagree” to “strongly agree.” Higher scores indicate greater perceived breastfeeding support.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Strongly Disagree		Neutral		Strongly Agree

Informational Support

I have used my Facebook Breastfeeding support group to get health-related information from others

1 2 3 4 5

I have used my Facebook Breastfeeding support group to seek out people who have experienced similar health problems as I have.

1 2 3 4 5

If I have a health question, I often go to my Facebook Breastfeeding support group to seek out advice from others.

1 2 3 4 5

I have used Facebook to update others on my health

1 2 3 4 5

If I have a breastfeeding problem, my Facebook breastfeeding support group friends will . . .

Appraisal support

Give objective feedback to me about how I’m handling my problem.

1 2 3 4 5

Make me feel comfortable discussing sensitive health issues.

1 2 3 4 5

Make me feel comfortable sharing my private worries and fears about breastfeeding.

Emotional support

Provide encouragement to me.

1 2 3 4 5

Show me empathy.

1 2 3 4 5

Make me feel relieved.

1 2 3 4 5

Tangible support

Drive me to the doctor if I ask for a ride.

1 2 3 4 5

Provide a quick emergency loan if I need it for my health issue.

1 2 3 4 5

Buy me medicine if I ask for it.

1 2 3 4 5

¹ Oh, H. J., Lauckner, C., Boehmer, J., Fewins-Bliss, R., & Li, K. (2013).

Appendix J. The Breastfeeding Confidence, Knowledge, and Attitudes Measure (BCKAM)¹



Breastfeeding Confidence, Knowledge, and Attitudes Measure Version Attached: Full Test

Note: Test name created by PsycTESTS

PsycTESTS Citation:

Laantera, S., Pietila, A.-M., Ekstrom, A., & Polkki, T. (2012). Breastfeeding Confidence, Knowledge, and Attitudes Measure [Database record]. Retrieved from PsycTESTS. doi: <http://dx.doi.org/10.1037/t36082-000>

Instrument Type:

Inventory/Questionnaire

Test Format:

This measure consists of 63 items. Breastfeeding knowledge, attitudes, and confidence were measured by 22 items, 21 items, and 20 items, respectively. Breastfeeding knowledge and attitudes were measured using either 4-point Likert-type scales (strongly agree, somewhat agree, somewhat disagree, strongly disagree), open-ended questions, or response choices of yes, no, and I don't know. A 6-point semantic differential scale was used in the confidence section. A score of 1 indicated total agreement and a score of 6 total disagreement with the statement. Points 2 to 5 had no words attached.

Source:

Laantera, Sari, Pietila, Anna-Maija, Ekstrom, Anette, & Polkki, Tarja. (2012). Confidence in breastfeeding among pregnant women. *Western Journal of Nursing Research*, Vol 34(7), 933-951. doi: 10.1177/0193945910396518, © 2012 by Midwest Nursing Research Society. Reproduced by Midwest Nursing Research Society.

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PsycTESTS™ is a database of the American Psychological Association

¹ Laantera, S., Pietila, A.-M., Ekstrom, A., & Polkki, T. (2012).

Breastfeeding Confidence, Knowledge, and Attitudes Measure

Items

The questions and statements of the breastfeeding knowledge section

- The consistency of breast milk and formula is equal.^b
- It is recommended to breastfeed a healthy infant regularly.^b
- The infant sucks in the same way from mother's breast and bottle.^b
- Most mothers with small breasts have insufficient lactation.^b
- Most mothers have sufficient breast milk for an infant.^b
- A healthy full-term infant does not need complementary foods in the maternity hospital.^b
- Bottle-feeding may complicate the infant's learning of the attachment.^b
- If breastfeeding lasts more than 10 min, the nipples will be cracked.^b
- Cracked nipples are because the infant is allowed to suckle too long in the first days.^b
- A dummy should be used to prevent cracked nipples.^b
- Lactation is dependent on how often the infant is breastfed.^b
- Donor milk is used in the making of formula.^b
- Five wet diapers in a 24-hour period is a sign of adequate intake when the infant is at home.^b
- There is a need to give water to all infants, including exclusively breastfed infants, especially on hot days.^b
- It is recommended to follow a special time schedule while breastfeeding.^b
- A breastfed infant needs complementary food from at least 4 months of age.^b
- If a breastfeeding mother has diarrhoea, it is recommended to cease breastfeeding.^b
- Breastfeeding at night increases lactation.^b
- It is recommended to pump the breasts after alcohol consumption before the next breastfeeding.^b
- Breastfed or formula-fed infants have as many ear infections until they are 1 year old.^b
- What kind of benefits do breastfeeding and breast milk have?^c
- How can the lactation be increased?^c

The questions and statements of the breastfeeding attitude section

- Choosing the feeding method for the newborn is a thing that the parents need to decide together.^b
- Choosing the feeding method for the newborn is solely the mother's decision.^b
- I find it important that my baby receives breast milk.^b
- I find it important that both parents can feed the newborn.^b
- I find it important that the mother has her own time after the baby is born.^b
- I find it important that the family spends time together when the baby is born.^b
- I find it important that the spouse supports the mother in breastfeeding.^b
- If the mother breastfeeds, I am worried about how the father can create a close relationship with the baby.^b
- If the mother breastfeeds, I am worried if the father feels himself to be an outsider.^b
- Breastfeeding seems to be handy.^b
- Breastfeeding seems to be painful.^b
- Breastfeeding seems to be easy.^b
- Breastfeeding seems to be difficult.^b

Breastfeeding Confidence, Knowledge, and Attitudes Measure

Items

Breastfeeding gives strength to the mother.^b

Breastfeeding exhausts the mother.^b

Breastfeeding puts pressure on the mother.^b

Breastfeeding brings joy to the mother.^b

Breastfeeding brings joy to the baby.^b

The father would like the mother to breastfeed because he thinks the breast milk would be the best for the baby. Should the mother breastfeed the baby?^d

Laura is breastfeeding when her friends (a man and a woman) come to visit.

Should Laura move to another room to breastfeed?^d

Kathy is in the hamburger restaurant with her 1-year-old baby. There are many customers and her meal is unfinished when the baby starts to cry. The baby is tired. Does Kathy do right when she starts to breastfeed her baby at the table?^d

^bA 4-point Likert-type scale was used (*strongly agree*, *somewhat agree*, *somewhat disagree*, *strongly disagree*).

^cAn open-ended question.

^dResponse choices were *yes*, *no*, and *I don't know*.

Breastfeeding Confidence Among Pregnant Women

Factor 1: Initiation of breastfeeding

I know how to monitor my baby's nutrition sufficiently.

I know how to initiate breastfeeding as well as possible.

I know how to react if there is a need to increase lactation.

I know how to react if my baby cannot suck at the beginning.

I can interpret my baby's needs after the delivery.

I believe I know when my baby wants to eat.

I think I will manage the situation very well if my baby refuses to breastfeed.

Factor 2: Personal ability to breastfeed

I feel that breastfeeding comes easily.

I feel that breastfeeding is difficult.

I feel that I am well prepared to breastfeed.

I feel that my milk is sufficient for my baby from the beginning.

I feel that my baby needs complementary feeding during the early days.

Breastfeeding Confidence, Knowledge, and Attitudes Measure

Items

Factor 3: Surveying of attachment

- I think I will manage the situation very well if breastfeeding feels painful.
- I think I will manage the situation very well if I have cracked nipples.
- I think I will manage the situation very well if my baby has latching problems.
- I think I will manage the situation very well if my baby falls asleep soon after the initiation of breastfeeding.

Factor 4: Frequency of breastfeeding

- I think I will manage the situation very well if my baby wants to be at the breast for 2 hr at a time.
 - I think I will manage the situation very well if my baby feeds from 10 to 12 times during the day.
 - I think I will manage the situation very well if my baby sleeps 2 hr at a time during the daytime.
 - I think I will manage the situation very well if my baby feeds five times during the night.
-

Appendix K. Email Follow-up Participant Invitation to the Study

Subject line: Facebook Breastfeeding Support Study

Thank you for completing the first survey in our breastfeeding study about the use of social media for support by breastfeeding mothers. You completed this at approximately 1 month after you had your baby and began breastfeeding. Please take the time to complete the follow up survey, whether or not you continued to breastfeed your baby up to now.

You can help support other breastfeeding moms by finishing this survey. It should take 15-20 minutes. Please click on this link to get started.

[http://](#) (A link to the second survey will be placed here)

Thank you very much!

Linda Weglicki PhD RN
Jane Wilson MSN, RN
Michael DeDonno PhD

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