

Determining Health: Using Dyadic Peer Support to Promote Health in African American
Faith Communities

by

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in Nursing in the
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ABSTRACT

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Abstract

African Americans face persistent health inequities. Obesity is linked to multiple chronic disease conditions and prevalence has climbed sharply in the last decades (Budd & Peterson, 2014; Samuel-Hodge et al., 2009) – especially for African Americans. African American churches and relationships between its members are trusted community resources that support and promote health. Health disparities are best addressed by understanding and optimizing resources, such as churches, within environments where people live, work, play and pray. Dyadic peer support has been used successfully to promote weight loss and improve diabetes management. It is recommended as a potential health promotion strategy for African Americans. This dissertation explored the concept of religious social capital as a health promoting asset, and the feasibility of using dyadic peer support to promote healthy weight in African American churches. To our knowledge, using dyadic peer support to promote healthy weight among members in African American churches has not been researched. The Transactive Goal Dynamics Model, Community Empowerment Theory, and the Socioecological Model provided the theoretical framework for this dissertation.

Religious social capital is a significant contributor to the health of individuals and communities, particularly among African Americans and ethnic minorities. A concept analysis of religious social capital within the context of health was conducted. Rogers Evolutionary Concept Analysis method was used. The analysis identified antecedents, attributes, and consequences of religious social capital. An operational definition, including bonding, bridging, and linking types of religious social capital, was developed. The analysis provided a basis to better understand how religious social capital can be utilized to improve health in populations experiencing health disparities.

In Chapter three, formative research was conducted to explore African American church members' and health educators' perceptions of using dyadic peer support to promote healthy weight in African American churches. From 2017-2018, I conducted 21 semi-structured interviews to better understand perceptions of using a dyadic peer support program to promote healthy weight. Seventeen African American church members and four county and regional health educators from North Carolina were interviewed. Conventional qualitative content analysis was used to analyze the data and identify themes across cases. Key themes included: 1) the church and health are intertwined 2) working in pairs is natural and beneficial; 3) members want to help and be helped; 4) attitude and motivation are important considerations for dyads; and 5) dyad activities should be structured and frequent. The study showed that because of strong ties and relationships, participants felt churches were fertile ground for using dyadic support to promote healthy weight.

In Chapter four, a prospective multi-method 18-week pre/post-test study was completed to determine the feasibility of using dyadic peer support to augment an existing healthy weight program in African American churches. Descriptive statistics, multilevel models, and semi-structured interviews were used to assess: 1) program feasibility; 2) changes in weight, blood pressure, fruit and vegetable intake and physical activity; and 3) how dyad partners cooperate to achieve their health goals. Eighty participants from three churches in three counties in North Carolina enrolled.

The program completion rate was 78%. Over 95% of participants report wanting to work with a partner again. Participants achieved small but significant average increases of 1.1 servings of fruit (p value=0.001) and 1.2 days (p value=0.01) of 30 minutes of physical activity pre and post intervention. Significant changes in weight (-2.6

pounds, 95% CI= -4.18, -1.1, p-value= 0.001) and average daily vegetable intake (0.545 servings, 95% CI=0.143, 0.939, p value=0.008) achieved during the first nine weeks of the program were maintained during the second nine weeks. Dyads were strongest at developing team goals, communicating weekly, and providing motivation in the form of encouragement. Dyads had difficulty identify solutions to goal attainment challenges and finding consistent times to communicate. This study indicated that it is feasible to implement a dyadic peer support program to promote healthy weight within African American churches. Future programs should help dyads identify consistent times to meet, and improve problem solving to overcome challenges by initiating partnering earlier during the program, and tapering group meeting frequency more slowly.

African American churches and relationships between members are community assets that promote health. Dyadic peer support programs may optimize these relationships to improve health promotion programs. Additional dyadic peer support studies including control groups are needed to better understand their effects and sustainability. If found effective, they may be used to augment community-based health promotion programs to address health equity. Additional community assets and unique characteristics of different African American communities should be considered when designing health promotion programs.

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1. Introduction

1.1 Problem and Introduction

Cardiovascular disease, cancer, stroke and diabetes are the most common chronic conditions in the United States (National Center for Chronic Disease Prevention and Health Promotion, 2019a). They cost 600 billion dollars in annual health care spending and account for over half of all deaths (National Center for Chronic Disease Prevention and Health Promotion, 2019a). Sixty percent of all adults in the United States have at least one chronic condition and forty percent have at least two (National Center for Chronic Disease Prevention and Health Promotion, 2019a). African Americans experience a disproportionate chronic disease burden (Office of Minority Health, 2019b). By age 55, 76% of African American adults are diagnosed with high blood pressure compared to 55% of White males and 40% of White women (Thomas et al., 2018). In 2017, African American adults were 1.6 times more likely to be diagnosed with diabetes than White Americans and twice as likely to die from it (Office of Minority Health, 2019a). Compared to Whites, African Americans experience a higher mortality rate from cancer, 30% higher in African American men and 15% higher in African American women (American Cancer Society, 2014), and cardiovascular disease, twice as high for 18-49 year old African Americans (Centers for Disease Control and Prevention, 2017b). Finally, obesity, a chronic disease and risk factor for other chronic diseases, is higher among African Americans (38%) compared to Whites (30%) (National Center for Health Statistics, 2018).

Chronic disease risk can be lowered by eating more fruits and vegetables and being more physically active. Several reviews and meta-analyses associate increased fruit

and vegetable intake with reduced risk of cardiovascular disease, premature mortality, cancer (Aune et al., 2017), stroke (Hu, Huang, Wang, Zhang, & Qu, 2014), diabetes (Li, Fan, Zhang, Hou, & Tang, 2014), and weight loss and maintenance (Schwingshackl et al., 2015). According to the United States Department of Agriculture (USDA), it is recommended that Americans consume at least seven or more servings of fruits and vegetables per day (L. V. Moore et al., 2015). Yet, only about 10% of all Americans meet the recommended daily servings (Lee-Kwan, Moore, Blanck, Harris, & Galuska, 2017). Physical activity can decrease risk for multiple chronic diseases and provide protection against obesity (Saffer, Dave, Grossman, & Leung, 2013). Yet less than one fourth (24%) of all Americans achieve the recommended 150 minutes of moderate intensity aerobic exercise along with two days of strengthening exercises each week (Centers for Disease Control and Prevention, 2018b) In 2015, African Americans were 20% less likely to engage in physical activity than Whites (Office of Minority Health, 2017). Therefore, interventions that increase both physical activity and fruit and vegetable intake serve to decrease chronic disease rates.

Health disparities are preventable disproportionate burdens of disease shared by members of socially or economically disadvantaged populations or communities. Federally funded research as well as national and state health policies have aimed to address these disparities. For instance, the US Health and Human Services Healthy People 2010 and 2020 initiatives were developed with goal of decreasing and eliminating health disparities (Office of Disease Prevention and Health Promotion, 2020). Progress has been limited. A review of the 2010 goals revealed that 70% of objectives were unmet and gaps in health status have remained unchanged or worsened (Caiola, 2015). Given the disparate and persistent burden of chronic disease disparities among African

Americans, a different approach to health promotion and disease prevention is needed. The purpose of this dissertation is to begin to address the disproportionate burden of chronic disease among African Americans by exploring how to optimize the capacity of African American faith communities – a well known and accessible community asset - to promote healthy eating, physical activity and healthy weight.

1.2 Social Determinants of Health and Fundamental Causes

Social and structural determinants “are conditions in environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks” (Office of Disease Prevention and Health Promotion, 2020). Models of health behavior change historically focused on changing an individual’s health behavior without regard to conditions that affect their behaviors (Ohri-Vachaspati et al., 2015). While health behaviors explain 30% of a person’s health status social determinants account for 50% and are the most significant drivers of health inequities (University of Wisconsin Population Health Institute, 2016a). The 2002 Institute of Medicine’s report on health inequities in the United States highlighted the need to include social determinants in health promotion efforts to address health disparities (Institute of Medicine, 2003). For example, one explanation for health disparities in obesity related chronic disease is that African Americans are more likely to live in obesogenic environments (Bryant, Hess, & Bowen, 2015; Lakerveld & Mackenbach, 2017). Obesogenic environments provide fewer options for physical activity, healthy food, and health services, but increased exposure to violence, stress, discrimination and poverty. These factors lead to unhealthy weight gain and eventually chronic disease (Lakerveld & Mackenbach, 2017). Efforts to improve health warrant a

thorough understanding of these social determinants of health and their influence on health behaviors. The Social and Structural Determinants of Health Framework illustrates the pathway by which socioeconomic, environmental, and policy related factors lead to health disparities.

The Social and Structural Determinants of Health Framework draws attention to the myriad of factors that may contribute to individual health behaviors (Solar & Irwin, 2010). The focus of this dissertation is optimizing the influence of faith communities - a resource that promotes health. However, understanding the impact of other health promoting or health limiting socioeconomic and environmental factors is essential, and is incorporated in the assessment plan for the dissertation project (Chapter four). Second, although it is argued that policy level changes are most important to reverse health disparities, the Framework shows there are multiple points in the pathway where interventions can address health inequities. This dissertation identifies and explores a new way to support faith communities - a highly accessible community resource – to improve health.

Social determinants can be classified as proximal and distal factors (D. Williams & Mohammed, 2009). Proximal factors are health promoting or health limiting socioeconomic resources and environmental conditions that directly affect the health behaviors and health status of people and communities. Distal factors are institutions and policies that create and reinforce socioeconomic and environmental conditions. Figure 1 is an adapted version of the World Health Organization's Social and Structural Determinants of Health Framework. It illustrates the relationship between proximal and distal factors, their impact on health behaviors, and the resulting health status of individuals, communities, or populations.

The term ‘social determinants of health’ is most often used to describe the socioeconomic and environmental factors that influence health. Increasingly, however, other terms such as ‘social drivers of health’ and ‘social influences’ are used (Cutts & Gunderson, 2017; Jenerette, 2018; Taira, 2019). These terms reconsider the perception that socioeconomic and environmental factors are intractable and exposed populations are inevitably destined to poorer health. For the purpose of this dissertation, the term social determinants of health is used for clarity and consistency because it is the term most often cited in the literature, frameworks and theories used.

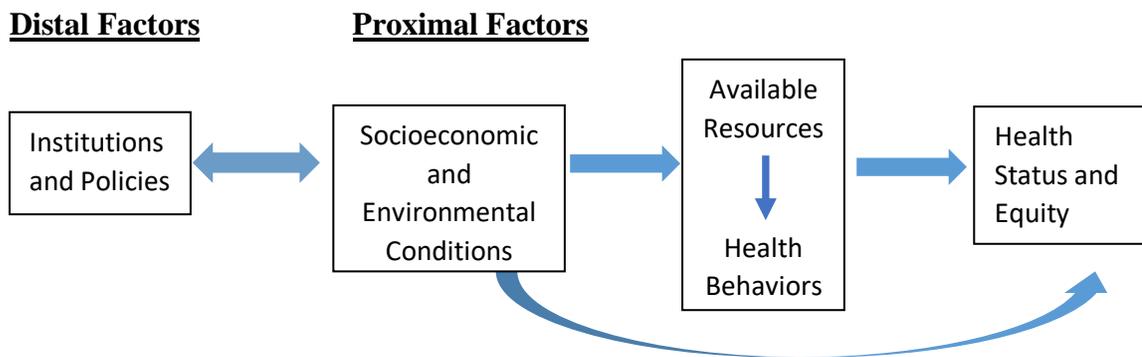


Figure 1. Social and Structural Determinants of Health Framework (Adapted from World Health Organization) (Solar & Irwin, 2010)

1.2.1 Proximal Determinants of Health – Socioeconomic and Environmental Conditions

The proximal characteristics of communities and populations that influence health behavior and healthy choices can be quality of schools, neighborhood green spaces, opportunities for employment, places for health care, community organizations, level of poverty, or other socioeconomic and environmental conditions. D. Williams and Mohammed (2009) report that these community characteristics become health limiting instead of health promoting when 1) neighborhoods are segregated by class and race or

ethnic minority status, 2) there is unequal access to health care goods and services, and 3) individuals experience ongoing stress associated with discrimination and other measures of disadvantage like poverty and exposure to violence.

Residential segregation is linked to higher levels of illness and death for multiple reasons. Environmental conditions like air and noise pollution affect health by disrupting sleep and respiratory health. The higher cost, but less availability of fresh foods, along with increased targeting of low income neighborhoods by companies promoting cigarettes, liquor and fast food makes it more difficult for residents to consume health promoting foods. The concentration of poverty in some neighborhoods result in lower resourced schools and fewer job opportunities, poor quality housing, and decreased walkability and safety that can decrease opportunities for physical activity (D. Williams & Mohammed, 2009).

Differential access to goods like medical services, well-stocked pharmacies, and health promoting service outlets can also cause disparities. Beyond just access, minorities are more likely to receive poor and less intensive health care, such as fewer procedures and less pain medicine (Hall et al., 2015; Kennedy, 2013; Maina, Belton, Ginzberg, Singh, & Johnson, 2018). These differences are seen even when controlling for socioeconomic status (SES), health insurance, severity of disease, and comorbidities. Similarly, Rowland and Isaac-Savage (2014) report that ethnic and racial groups have not benefited equally from some medical advances that have improved health of Whites. For instance, although breast cancer morbidity and mortality has decreased for White women after decades of intensive research, outcomes for Black women have barely budged (Haynes-Maslow, Allicock, & Johnson, 2017).

In addition to neighborhood segregation, unequal access to medical goods and services, the ongoing stress associated with discrimination and other measures of disadvantage such as poverty and exposure to violence, are also health limiting. One example often used to illustrate this point are disparities in infant and maternal mortality rates. African American women are three to four times more likely to die from pregnancy related causes than White women (Centers for Disease Control and Prevention, 2017a) In addition, the ratio of Black to White infant mortality rates has actually increased from 1.6/ 1000 in 1950 (D. R. Williams, 2005) to 2.3/1000 in 2019 These racial disparities exist regardless of income or education, suggesting that even after we consider differences in socioeconomic status, a factor often used to explain disparities, African Americans still experience disparities in health outcomes (Adler & Rehkopf, 2008; Centers for Disease Control and Prevention, 2017a). Another example is difference in self-reported health, considered a reliable measure of an individual's health status, between Blacks and Whites. Although Blacks with high incomes report better health than Blacks who are poor, they self-report worse health than their White counterparts at all income levels (D. R. Williams, 2005). D. R. Williams (2005) also cites national data which shows that Black women in the highest SES category report higher rates of hypertension than White women in the lowest category of SES. Disparities are also often explained by variation in access to health care. However, social experiments in Canada, England and the United States from the 1960's to 1970's showed that even when access to health care was 'equalized', disparities remained (House, 2002).

1.2.2 Distal Determinants of Health – Policies and Institutions

Distal factors that give rise to health inequities include policies and large influential institutions and systems. For example, when African Americans and other minorities seek care for illness, they receive poor and less intensive health care services, such as fewer procedures and less pain medicine (Hall et al., 2015; Kennedy, 2013; Maina et al., 2018). These differences in care continue when controlling for socioeconomic status (SES), health insurance, severity of disease, and comorbidities. They also increase as people enter into middle age (Adler & Rehkopf, 2008). This phenomenon has been explained by unintentional and intentional bias within the health care system (Kennedy, 2013) stemming from the legacy public and private policies and institutions which sanctioned poor treatment of African Americans (Kennedy, 2013; Rowland & Isaac-Savage, 2014; D. Williams & Mohammed, 2009).

Similarly, social policies begun in the 1800's affected African Americans' access to health care, housing, education and employment. The persistent problem of unfair housing policies specifically, restrictive covenants and redlining that forced African Americans into less desirable land and neighborhoods, resulted in residential segregation. Residential segregation prevented long term wealth accumulation, and created high poverty neighborhoods with lower resourced schools, fewer job opportunities, poor quality housing, increased violence, and decreased access to safe outdoor spaces and goods and services in these neighborhoods (D. Williams & Mohammed, 2009). The combined effect of these and similar policies have worked together to impact socioeconomic and environmental characteristics of communities, constraining health choices, and contributing significantly to disparities in chronic disease prevention, treatment, and outcomes (Cerda, Tracy, Ahern, & Galea, 2014).

1.3 Churches are a Community Resource that Help Combat Health Disparities

A decade ago, the World Health Organization (WHO) and the Centers for Disease Control (CDC) made addressing social determinants of health a priority (Centers for Disease Control and Prevention, 2018a; Solar & Irwin, 2010). The CDC also emphasized the need for more comprehensive interventions that expanded focus beyond individual behaviors to integrate social determinants in health promotion. Their National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) recommended as two of its four key action areas to prevent chronic disease 1) environmental approaches that improve community policies and design to make healthy choices easier and 2) to have community programs linked to clinical services that help people prevent and manage their chronic diseases (National Center for Chronic Disease Prevention and Health Promotion, 2019b). The emphasis on expanding health promoting activities within communities underscores the need to support community members and organizations working to improve the health of African Americans.

Despite socioeconomic, environmental and institutional challenges to good health, disadvantaged groups find ways to cope and contend with these barriers, and even thrive (Pearson, 2008). This quality is sometimes termed resilience, meaning "...the skills, abilities, knowledge, and insight that accumulate over time as people struggle to surmount adversity and meet challenges. It [resilience] is an ongoing and developing fund of energy and skill that can be used in current struggles" (Saleebey, 1996). Multiple studies point to religion and African American churches as a source of resilience and buffer against socioeconomic disadvantage within the African American community (R. Clark, Anderson, Clark, & Williams, 1999; House, 2002; Pearson, 2008; D. R. Williams,

2005). African American churches are in a unique position to support health initiatives due to: 1) their respected status as a trustworthy community institution for fellowship and support; 2) the heightened importance of religion in the lives of African Americans; and 3) church leaders and lay people's beliefs that the church should address health issues (Rowland & Isaac-Savage, 2014; Rowland & Isaac-Savage, 2014).

1.3.1 Religion and The Black Church

Though the faith of Black Americans is not monolithic, the term 'Black Church' refers to the institution which formed in the 1700s when many enslaved and free Africans in the United States began to worship independently as Christians (Mellowes, 2010). During the 17th and 18th century, ongoing missions by Europeans and White Americans, led many African captives to convert or adopt tenets of Christianity (mainly Protestant denominations) into their own faith. Seeking opportunity to express their religious beliefs, and needing to circumvent laws which prohibited slave gatherings or mandated separate worship spaces for Blacks and Whites, the Black Church arose as a way for African-Americans to safely worship while creating and upholding culturally relevant religious teachings and traditions (Mellowes, 2010).

The Black Church spearheaded efforts to improve the lives of African Americans by assisting in efforts to abolish slavery, providing education, hunger relief, combating political disenfranchisement, establishing social support systems and networks , and promoting health (Lincoln & Mamiya, 1990; Rowland & Isaac-Savage, 2014; Rowland & Isaac-Savage, 2014). The church remains an institution intertwined in the everyday lives and functioning of many African Americans. Seventy five percent of African Americans compared to 49% of Whites report that religion is very important in their lives

(Masci, 2018). Further, 63% of Older African Americans are affiliated with a historically Black denomination (Masci, 2018). Close to two-thirds of African Americans state that church members are important parts of their social networks (Taylor, Chatters, & Levin, 2004). Older African Americans especially have high levels of religious involvement that influence how they see health and cope with stressful events (J. Levin, Chatters, & Taylor, 2005). In sum, African American churches, as a community resource, work in concert with other socioeconomic and environmental determinants to improve health.

1.4 Religion and Health

Religious involvement and church attendance benefits mental and physical health (R. Clark et al., 1999; Pearson, 2008; D. R. Williams, 2005). Religion is defined as an organized set of practices and beliefs, cultivated over time within a community, that connects one to a Higher Power (Koenig, 2012). Religious involvement is active participation in one's religion. A comprehensive review of 3300 studies published on religion and health over the past century (Koenig, 2012) links religion to multiple health-promoting behaviors. Twenty one studies in the review looked at diet. Thirteen (62%) found significant positive relationships with religion and increased consumption of fruits and vegetables, whole grains and less salt (Koenig, 2012). Higher levels of physical activity were also positively associated with religion in 25 of 37 studies assessing religion and exercise (Koenig, 2012). Twenty five studies focused on weight and 44% of them showed a positive relationship between more religious involvement and higher weight (Koenig, 2012). Only 20% associated higher religious involvement with lower weight. The review did not associate higher weights and higher prevalence of obesity related illness. One possible explanation is that the protection conferred by other positive health

behaviors or exposure helps mitigate some of the potentially negative effects of unhealthy weight.

Religion is also linked to health status. Of the 29 studies which examined the relationship between cancer and religion, 60% found an inverse relationship between level of religiosity and risk of developing cancer, and poor outcomes such as earlier mortality or worse quality of life (Koenig, 2012). Eleven of sixteen (69%) studies targeting cardiovascular function found higher levels of religiosity associated with better post-surgical outcomes, and lower levels of inflammatory markers (Koenig, 2012). Of the 63 studies on hypertension and religion, 57% reported a significant inverse relationship between high blood pressure and religiosity (Koenig, 2012). A more recent study found frequent church attendance was associated with a 40% reduced hazard of all cause mortality compared to those who did not attend (Idler, Blevins, Kiser, & Hogue, 2017).

Similar associations are found between health and religion looking specifically at African Americans (Taylor et al., 2004). Higher levels of religious involvement are linked to health promoting behaviors such as regular blood pressure checks, dental care visits, seeking immediate care for health problems (Aaron, Levine, & Burstin, 2003), increased fruit consumption and avoiding smoking and excessive alcohol use (C. Holt, Roth, Clark, & Debnam, 2014). Higher religious involvement among African Americans has also been linked with significantly better self- reported health (van Olphen et al., 2003), fewer hospital admissions for sickle cell patients (Bediako et al., 2011) lower incidence of suicide (Taylor, Chatters, & Joe, 2011) and higher life satisfaction (J. S. Levin, Chatters, & Taylor, 1995). As with studies done in the general population (Koenig, 2012), Church attendance is associated with higher weight among African American men (Bentley-Edwards et al., 2019; Taylor, Belay, Park, Onufrak, & Dietz,

2013). Associations with high blood pressure are mixed (Taylor et al., 2004). These results further highlight the need for healthy weight promotion programs in faith communities. About 80% of research on the link between religion and health involves studies on mental health (Koenig, 2012). They also show that higher levels of religiosity are linked with lower rates of stress and depression (Ellison et al., 2017). This is especially relevant for populations experiencing increased burden of disease and stress associated with socioeconomic or environmental disadvantage (Bradshaw & Ellison, 2010).

1.4.1 Mechanisms of the Religion and Health Connection

Various mechanisms (i.e., mediators) exist to account for the relationship between religion and health. First, the personal relationship religious people hold with a Divine power is a source of comfort during major life stressors including illness (DeAngelis, Ellison, Christopher, & Reed, 2017; Pargament, Smith, Koenig, & Perez, 1998; Pearce, 2005), or chronic stress associated with social and environmental disadvantage (Taylor et al., 2004). Chronic stress affects physiologic systems within your body (i.e., immune, endocrine, cardiovascular) in a way that leads to long term damage, dysregulation, and morbidity (Adler & Rehkopf, 2008; House, 2002). Stress also affects health through maladaptive behaviors like substance abuse or unhealthy eating which can both increase risk for chronic disease (Gholampour, Jaderipour, Jeihooni, Kashfi, & Harsini, 2018). Second, going to places of worship and participating in events reduces exposure to potentially harmful environments and activities (Mason, Schmidt, & Mennis, 2012). Third, an emphasis on moral, ethical and responsible behaviors leads to fewer risky behaviors like alcohol and illicit drug use (Ellison & Henderson, 2011).

There is a positive relationship between better health outcomes, members of one's religious social network and support received and expected to be received from that network (Ellison & Henderson, 2011; Koenig, 2012). Within religious social networks, people interact and build trusting relationships with others. Network members provide useful health information, tangible resources such as food or transportation, and emotional support and understanding – all of which positively affect health (Ellison & Henderson, 2011; Koenig, 2012). Churches pool or share resources and they have relationships with larger organizations willing to provide health care or social services to members who lack access. van Olphen et al. (2003) found that social support from church members partially mediated the relationship between better self-reported health and religion. Religious social support also predicted healthier eating, increased physical activity, and lower rates of excessive alcohol use (Debnam, Holt, Clark, Roth, & Southward, 2012). This network is a naturally occurring and culturally relevant avenue for health promotion. The church as a community asset, and the unique social networks of members and their potential influence on health is the focus of this dissertation study.

1.5 African American Churches and Health Promotion

Given the importance of religion and the 'Black Church' as an important community institution among African Americans, churches are popular places to implement wellness programs. Pragmatically, churches can reach large segments of a community consistently, provide space for programming, and grant access to influential leaders who can promote participation and establish health-promoting church culture (Lancaster, Carter-Edwards, Grilo, Shen, & Schoenthaler, 2014). Churches are also institutions that often interact with people from "the cradle to the grave"; meaning

churches can influence the lifetime trajectory of chronic disease risk of its members.

Finally, when surveyed, both pastors and congregants agree churches should be involved in promoting wellness (Lancaster, Carter-Edwards, et al., 2014).

Through their social networks, churches are poised to support the health of neglected and underserved communities or individuals (Bopp, Peterson, & Webb, 2012). The sometimes difficult relationship between members of underserved communities and the health care system (due to experiences with biased treatment (M. K. Campbell et al., 2007; Hall et al., 2015), can result in the church pastor and members being seen as more trusted sources for health-related discussions and activities. The church may also influence the neighborhood or community outside of its walls by extending its social network and offering health programs that are open to the public (Lancaster, Carter-Edwards, et al., 2014).

1.5.1 Healthy Weight Promotion and Chronic Disease Prevention Programs in African American Churches – Success and Challenges

Obesity interventions in African American faith communities often target and measure healthy eating and physical activity in addition to or instead of weight. These programs were usually supported by the pastor, included health education classes or health screenings, and distributed health education information. Programs reported in the literature almost always partnered with outside organizations who provided technical or financial support. Studies targeting healthy eating and healthy weight revealed positive effects on chronic disease prevention, including increased knowledge related to cardiovascular topics, weight loss, decreases in blood pressure, decreases in calorie intake and high fat and salty food consumption, and increases in healthful foods intake (Allicock et al., 2013; M. K. Campbell et al., 2007; Campbell, Resnicow, Carr, Wang, & Williams,

2007; Oexmann et al., 2000; Resnicow et al., 2004; E. D. Smith, Merritt, & Patel, 1997; L. B. Williams et al., 2015; Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001). For instance, four major intervention studies, Healthy Body Healthy Spirit, Eat for Life, Black churches United for Better Health and Body Soul, all resulted in statistically significant but small increases in intake of 0.7-1.3 servings of fruits and vegetables over three to 12 month interventions (Condrasky, Baruth, Wilcox, & Carter, 2013). A 2014 review of obesity focused interventions showed a significant reduction in weight (0.5 to 4.5kg) in 12 of 27 included studies over a period of 6 weeks to twenty months. These weight loss outcomes are comparable to other large lifestyle interventions studies (Franz, Boucher, Rutten-Ramos, & VanWormer, 2015; Williamson, 2017). In addition to weight loss, six studies in the review showed significant increases in fruit and or vegetable intake (Lancaster, Carter-Edwards, et al., 2014).

Program shortcomings were noted as well. Specifically, program implementation was difficult or incomplete in some studies, especially when going from efficacy to effectiveness trials (Allicock et al., 2012; Lancaster, Carter-Edwards, et al., 2014). Difficulties with implementation can result in lower than expected participation, small or no changes in outcomes, or poor program sustainability or dissemination potential (Allicock et al., 2013; Oexmann et al., 2000; L. B. Williams et al., 2015; Yanek et al., 2001). These shortcomings were in part attributed to intervention complexity. For example, they required technical expertise, time, and/or financial resources that most churches lack and must rely on outside organizations to provide (Lancaster, Carter-Edwards, et al., 2014).

As a remedy to relying heavily on external organizations, the lay health leader model, based on the idea of building and utilizing capacity within faith communities, is

often used. Lay health leaders gained popularity in the 1990s as researchers sought to increase participation and buy-in of community members with whom they worked (Eng & Hatch, 1991). Lay health leaders are church members who either volunteer or are appointed by the pastor to work on health initiatives. Rules or qualifications for lay leaders vary among faith communities and projects, but willingness and commitment to serve is important (Pemu et al., 2019; Tkatch et al., 2018) as well as the experience of health professionals in some programs (Lancaster, 2014). Lay health leaders' duties vary and involve all aspects of programming. In some studies, their primary function is recruitment and marketing of programs (Davis et al., 1994; P. Johnson et al., 2014). Understanding the value of lay leaders in increasing program sustainability, researchers have trained them as peer group educators (C. L. Holt et al., 2013; S. Lee et al., 2018; Tang, Nwankwo, Whiten, & Oney, 2014), service referral coordinators (Molock, Matlin, Barksdale, Puri, & Lyles, 2008), telephonic peer counselors (Derose, Fox, Reigadas, & Hawes-Dawson, 2000; Leone et al., 2016), program coordinators (Pinsker et al., 2017; (Tkatch et al., 2018), and peer motivational interviewers (Lancaster, Schoenthaler, et al., 2014; Pinsker et al., 2017).

While the lay health leader model shows some success in achieving positive enrollment, participation, and health outcomes, challenges exist. Studies show that translating program components, such as motivational interviewing, are too time consuming and complex for lay leaders to become skilled at quickly, and they may lack the confidence to implement their new skills. In addition, lay members are often saddled with more responsibilities than they can handle for the duration a program, leading to suboptimal program recruitment, implementation, or infrequent contact with members. (Campbell et al., 2007; Allicock et al., 2013; Campbell, Resnicow, Carr, Wang &

Williams, 2007, Lancaster, 2014). Further, because it can be difficult to recruit lay leaders (Lancaster, 2014), some programs rely on heavily incentivizing lay leaders which is not a sustainable or translatable approach for many faith communities (Timmons, 2010; Tucker et al., 2017).

In sum, multiple approaches have been used to promote health within African American churches, including partnering with organizations that provide financial and technical expertise, and utilizing a lay health leader model. Results from these efforts, however, indicate there is room for improvement. Indeed, the architects of Body & Soul, a popular and widely disseminated obesity prevention program supported by the National Cancer Institute, stressed the need for more immediate research to determine how best to implement church health programs (Allicock et al., 2013).

1.5.2 Peer Support and Health Promotion in African American Churches

A new model for churches to use to improve sustainability and efficacy is dyadic peer support. Peer support is a form of social support defined as ongoing engagement between individuals who share similar goals, health conditions or experiences (Fisher et al., 2017). Peer support improves both mental and physical health (Perry, Zulliger & Rogers, 2014; Umberson & Montez, 2010). Lay health leaders serve as peer support coaches, counselors, and educators to other members. While they are vital sources of expertise, time constraints, inability to reach all members, lack of confidence, and or inadequate training can challenge their abilities to implement programming effectively. In contrast to peer support counselors or coaches, dyadic peer support is two people, who share a similar health goal or condition, working together to achieve their goal or manage their condition. Qualitative studies with African Americans in faith-based health

promotion programs shows there is a desire for peer support at all levels (i.e. pastoral, ministry leadership, members) (Shanks, 2017) and for support ‘buddies’ specifically (Boltri et al., 2006). Dyadic peer support dyads have also been recommended as a potentially feasible and effective strategy within African American populations, but overlooked (Wolfe, 2004). Existing church-based programs have not leveraged sufficiently the powerful effects of dyadic peer support by capitalizing on how participants themselves might engage and empower each other as peers support dyads to promote health and prevent obesity related chronic disease.

1.6 Dyadic Peer Support in Health Promotion and Chronic Disease Prevention

Dyadic peer support may improve upon the small effects found with church healthy weight promotion programs, because people working in pairs are more successful at achieving health goals than individuals working alone (Black, Gleser, & Kooyers, 1990; Prestwich et al., 2014; Wing & Jeffery, 1999). It may address sustainability because church members working as dyads require less intensive resources or time commitment from lay leaders or outside experts. Thus, the dyadic support model can augment efforts of external organizations and position the church and its members to continue health promotion efforts even when resources from external partners end (Aschbrenner et al., 2016). The dyadic peer support approach is especially suitable for African American church settings in that partnering harnesses the church’s trusted established social networks as well as the collectivist cultural attributes of African American communities (Eng & Hatch, 1991; Kreuter, Lukwago, Bucholtz, Clark, & Sanders-Thompson, 2003; Parker & Grinter, 2014).

1.6.1. Outcomes of Dyadic Peer Support Interventions

Dyadic peer support studies often target weight loss. Compared to individuals attempting to lose weight on their own, studies targeting dyads find greater weight loss for family and friend pairs. In dyadic studies that included a comparison group, participants with support partners lost significantly more weight (3.5 -11.4 kg) than those working alone (1.1kg-7.8 kg) (Gorin et al., 2005; Kumanyika et al., 2009; Wing & Jeffery, 1999) and more inches around the waist (1.12 inches, $d=0.19$) (Prestwich et al., 2014). A meta-analysis of 12 dyadic weight loss studies reported a significant moderate effect size of 0.331 (Black et al., 1990) for weight loss among couples compared to individuals. Importantly, behavior change leading to weight loss is most likely when both partners participate and are successful in losing weight. For example, Samuel-Hodge et al. (2017) found that dyads who participated in all 20 weight loss and diabetes prevention classes lost -7.1.4 kg) while those who attended 17 classes only lost 5.9 kg. (Jackson, Steptoe, & Wardle, 2015) found that the more health conscious behaviors of one partner led to the adoption of more health conscious behaviors of the other partner. In a study by Cornelius, Gettens, and Gorin (2016), health promoting changes in the home environment led to significantly correlated ($r=.37$) decreases in couples' BMI compared to couples where only one partner was treated ($r = -0.38$) In another study, participants took part in a weight loss program with three other friends or with assigned partners that they did not know (Wing & Jeffery, 1999). After the ten month study, results showed friend participant groups, compared to individual participants, experienced higher levels of completion (95% vs 75%), higher weight loss (8.8 kg vs. 6.7), and better full weight maintenance after 10 months (66% vs. 24%). Though not a study of dyads, other researches note the results have implications for the potential role of dyadic partnerships

in weight loss maintenance (Black et al., 1990; Cornelius et al., 2016; Wing & Jeffery, 1999) In general, when one person is targeted to lose weight, they are more successful when other family members and friends are involved and also lose weight.

Obesity interventions in African American faith communities affect a wide range of health behaviors. They have shown moderate success in health improvement with shortcomings related to effective implementation and reliance on outside technical and financial assistance, despite the more recent integration of lay health leaders. Dyadic studies provide evidence of health improvement for partners who participate and both lose weight. Using dyads within African American faith communities to support health promotion, in addition to lay health leaders, may improve implementation, sustainability, and health outcomes.

1.7 Theoretical Approach to the Dissertation

One approach to address health disparities is identifying community assets and optimizing their influence to support healthy behaviors and environments. This dissertation will explore the feasibility of using of dyadic peer support within African American churches, a community asset, to augment an existing healthy weight promotion program. This peer support framework contextualized within church settings is supported by three health promotion theories: The Socioecological Model (SEM), the Community Empowerment Theory (CET), and the Transactive Goal Dynamics Model (TGDM). While the Social Determinants of Health Framework accounts for the multiple structural, socioeconomic and environmental factors that create health disparities, the SEM, CET, and TGDM identify where in that framework communities and individuals can intervene to improve their health.

1.7.1 The Socioecological Model

The Socioecological Model (Bronfenbrenner, 1977; McLeroy, Bibeau, Steckler, & Glanz, 1988) focuses on the many layers of personal and social influences on health. The SEM (Figure 2) shows that health is influenced by five concentric spheres – individual, interpersonal, community, organizational, and public policy. Individual factors include personal knowledge, behaviors and biological factors like sex. Interpersonal influences are the relationships with family, peers, and individuals within a social network. Organizations may be churches, places of work, and schools while the community environment includes the physical spaces of a community and access to and organizations such as schools, work places, and faith health promoting resources. Finally, laws and policies are factors that can affect health at all of the other levels by influencing available resources, knowledge, and access to both. Importantly, the model emphasizes that layers do not exert influence

completely independent of one another. Instead, each layer may interact with other layers to influence health.

Health behavior change interventions that consider the social, policy, or intrapersonal spheres of influence are more effective than those that target the individual only (Bowen, Barrington, & Beresford, 2015; Casey, Eime, Payne, & Harvey, 2009; Robinson, 2008; Tehrani, Majlessi, Shojaeizadeh, Sadeghi, &



A Social-Ecological Model for Physical Activity - Adapted from Heise, L., Ellsberg, M., & Gottemoeller, M. (1999)

Figure 2. Socioecological Model
<https://blogs.uw.edu/somehm/2017/08/12/social-ecological-model/>

Hasani Kabootarkhani, 2016), especially when considering the social and environmental context contributing to health disparities among African Americans (M. K. Campbell et al., 2007; Robinson, 2008). An example of working across multiple levels – individual, interpersonal, organization, and public policy - is introduced by Bronfenbrenner (1977). The intervention would restructure after school care of children by introducing a policy that brings together the network of parents with school leaders to decide on new activities that can take place in new community locations (i.e. parents' homes) as well as on school grounds.

The Socioecological Model is used as the theoretical reasoning for promoting healthy weight by targeting more than one sphere of influence – individual (health education targeting personal diet and physical activity goals), interpersonal (dyadic peer support with church members), and organizational (faith community support of health promotion).

1.7.2 Community Empowerment Theory

Community Empowerment Theory (M. J. Smith & Liehr, 2008) argues that the most influential and sustained health improvements within a community is achieved by identifying and strengthening community-based resources. A theoretical assumption is that community members best understand their own strengths and weaknesses; therefore, they are in the best position to decide on the most appropriate and viable solutions to challenges. Empowerment is defined as "...the process of developing problem-solving capacity and self-competence by which people gain mastery over their lives. It is applicable at individual, family, and community levels" (M. J. Smith & Liehr, 2008). Thus, in addition to targeting multiple layers of influence identified by the SEM, it is also

necessary to identify and build upon existing community assets within each of those layers. African American churches have played a significant role in the socioeconomic and political survival of African Americans. Religion and attending a “Black Church” remain important for African Americans – especially older adults in the South. Therefore, African American churches and relationships among members within them are community and interpersonal resources.

The CET uses an asset- or strength-based approach to community health improvement, as opposed to a deficit model (Lassiter, 2014; Saleebey, 1996). Using a strengths based approach is beneficial for several reasons. First, individuals and communities want to focus on their strengths rather than their weaknesses (Parker & Grinter, 2014). Focusing on resources and assets may increase interest in health promotion activities leading to increased participation. Second, it allows individuals and communities to play a larger and more significant role in their own health improvement by identifying their own personal and community resources and assets and then coordinating efforts to use those resources to improve health (Saleebey, 1996) . Third, building upon existing resources enables communities to rely on long standing community characteristics and not solely on aid from external entities that may have shifting priorities or limited funding that eventually is taken away from the community.

A weakness of a strength-based approach is that it diverts attention away from policy related and institutional determinants of health represented in the outermost layer of the Socioecological Model. These are larger structural level factors like laws and policies which lead to health disparities by creating social and economic conditions that constrain the ability of communities and individuals to make healthier choices. Therefore, it is argued, larger structural factors should be the main focus of any interventions aiming

to address health disparities (Caiola, 2015; Phelan, Link, & Tehranifar, 2010). However, as the Socioecological Model shows health is influenced at multiple levels indicating that a multipronged approach to health improvement is needed. Structural level changes are time consuming, sometimes resources intensive, and involve players and stakeholders who may be removed from the priority individuals or community. Researchers, policy makers, providers and community members should continue efforts to address structural level policy and institutional changes. However, individuals and communities must continue to work, pray, play and live from day to day within their socioeconomic and environmental context. Therefore, they need practical, feasible, and immediate solutions to their challenges that consider their constraints, but build upon their strengths and allow for the possibility of progress.

Consistent with CET, this study seeks to enhance opportunities to promote health among African Americans by exploring religious social capital as a resource (Chapter two) and optimizing the interpersonal relationships among church members by assessing the feasibility of a dyadic peer support health promotion program (Chapter four). In addition, the influence of these multiple spheres of health will be explored through semi structured interviews of participants completing the dyadic peer support program (Chapter four).

1.7.3 Transactive Goal Dynamics Model

The Transactive Goal Dynamics Model provides a specific blueprint for how dyadic peer support interactions can facilitate goal attainment (Fitzsimons, Finkel, & vanDellen, 2015)(See Figure 3). When individuals become part of a dyad, interpersonal processes become a salient

driver of goal setting and attainment (D. W. Johnson, 2003; Lewis et al., 2006). The TGDM identifies two main constructs (TGDC) that describe interactions within dyadic relationships which facilitate goal attainment

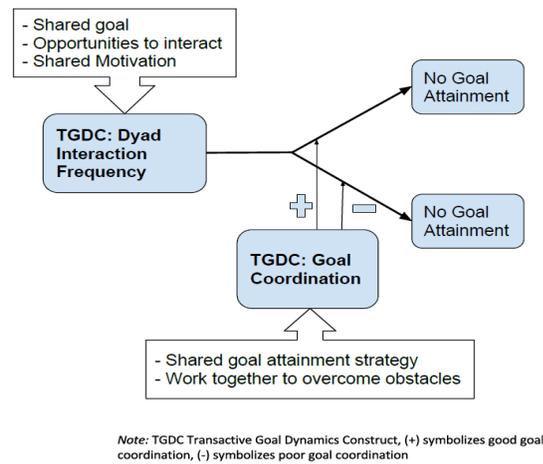


Figure 3. Modified Transactive Goal Dynamics Theory

(Figure 2). The two constructs are Dyad interaction frequency and Goal coordination. Dyad interaction frequency is driven by three factors: shared dyadic goal(s), strong motivation to achieve the goal(s), and opportunities to work together to achieve the goal(s). Goal coordination is determined by two factors: whether dyad members agree on how they are to achieve their shared goal(s), and how well they assist each other in overcoming obstacles and utilizing resources. Dyads are most likely to achieve their goals when their Interaction frequency is high and their goal coordination, which serves as a mediator, is strong.

Dyadic interventions introduce and encourage interactions and coordination by including general peer support training on communication - including motivation, conflict resolution, and problem solving. Dyadic interactions and coordination are

assessed by the degree to which they: 1) use language which is autonomy supporting and encourages internal motivation for behavior change (Gorin, Powers, Koestner, Wing, & Raynor, 2014; Leahey & Wing, 2012), 2) increase one another's self efficacy (Prestwich et al., 2014), 3) communicate frequently (Heisler & Piette, 2005), 4) improve feelings of being supported by a partner (Aschbrenner et al., 2016; Kulik et al., 2015), or improve partner's ability to problem solve to achieve goals (Samuel-Hodge et al., 2017; Sorkin et al., 2014).

The dissertation project tests the feasibility of dyads working together to improve health (Chapters three and four). The TGDM constructs (Dyad interaction frequency and Goal coordination) provide the most specific proposal for how dyads can work together to achieve their goals. Therefore, it was used to guide the development of a dyadic peer support healthy weight promotion intervention in African American churches. Surveys and semi structured interviews are used to assess the extent to which dyads in this intervention interact and coordinate goals.

1.7.4 Combined Theoretical Model

In summary, this dissertation explores how to enhance the health of African Americans by identifying and optimizing community resources to implement a dyadic peer support healthy weight and lifestyle promotion program. It is supported by three theoretical models (Figure 4). The SEM illustrates and categorizes in five layers the many factors which affect health and should be considered when designing health promotion initiatives. The focus of this dissertation are the intrapersonal, interpersonal, and organizational spheres of influence. The CET emphasizes the importance of identifying, within those spheres, community assets that can be optimized for more sustainable and

effective health promotion. The assets identified for this dissertation are African American faith communities and their resources, along with their members, relationships between members, and their shared resources. These assets are the cornerstone for the design of a dyadic peer support program to promote healthy weight in African American churches. Finally, the dynamic interactions needed for dyads to effectively work together to attain their health goals are mapped out in the TGDM, which was used to guide the design of the dyadic intervention.

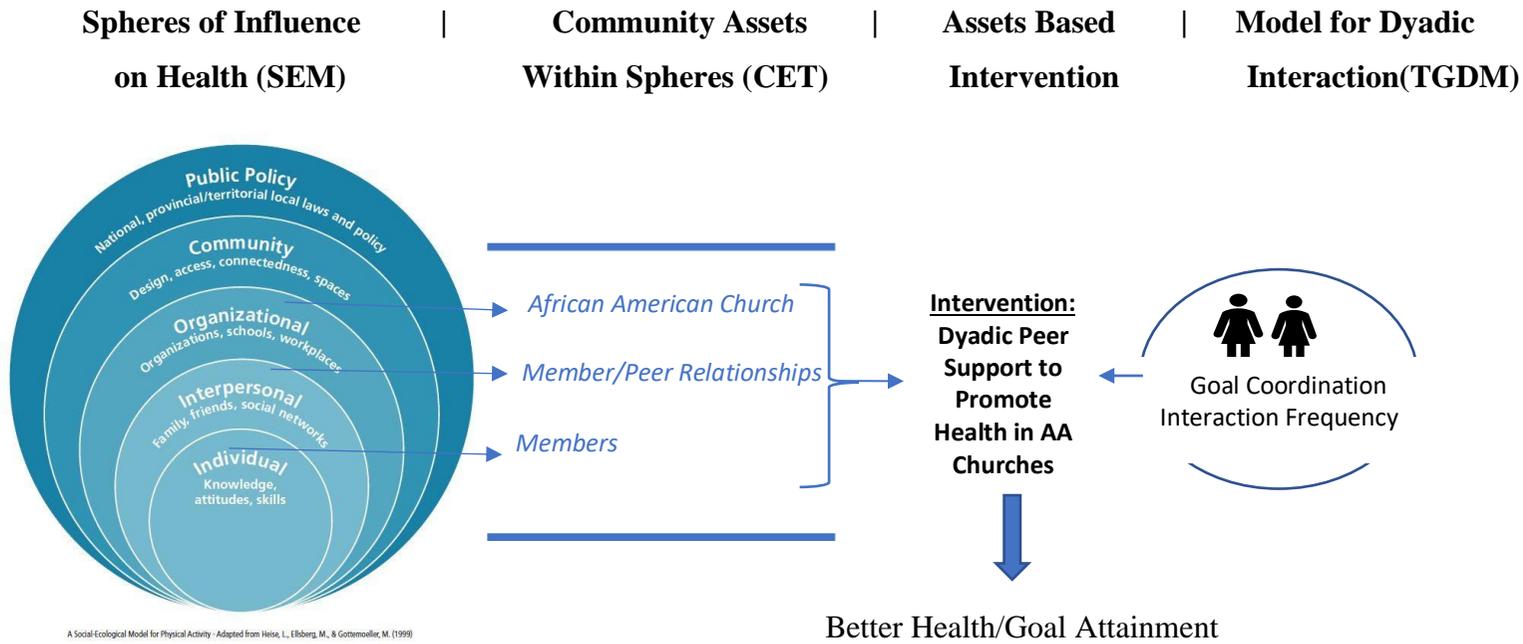


Figure 4. Combined Theoretical Model

1.8 Purpose Statement and Aims/Dissertation Structure

Addressing chronic disease disparities among African Americans requires a multipronged approach that includes targeting structural factors, community level characteristics, and individual behaviors. African American churches and its members may serve as health promoting community assets. As guided by the guided by the Socioecological Model, Community Empowerment Theory, Transactive Goal Dynamics Model, this dissertation explores how best to optimize these resources to promote healthy weight using dyad peer support. This purpose will be accomplished by five aims, with each chapter representing one aim.

1.8.1 Chapter 1 Aim 1

To introduce the problem and significance of health disparities specifically related to obesity related chronic disease among African Americans, the social determinants of health, and the role of African American churches and peer support as community assets in chronic disease prevention. This chapter will also introduce the theoretical foundations of this dissertation.

1.8.2 Chapter 2 Aim 2

To explore, analyze and expand our understanding of the concept of religion as a positive social determinant of health by presenting a concept analysis of religious social capital.

1.8.3 Chapter 3 Aim 3

Explore and describe the perceptions of African American church members and health educators about dyadic peer support and the role of the church in addressing health issues.

1.8.4 Chapter 4 Aim 4

Overall aim is to test the feasibility of a peer support dyad intervention in the promotion of healthy weight in African American members of three North Carolina churches.

1.8.4.1 Aim 1

Assess feasibility, via survey, logs, attendance, and interview data, of a dyadic peer support intervention to augment an existing program to promote fruit and vegetable intake (FVI), physical activity (PA), and healthy weight.

1.8.4.2 Aim 2

Assess goal attainment and health outcomes through biometric measurements (i.e. changes in body mass index (BMI), blood pressure, and weight), survey data (i.e. FVI, PA), and semi structured interviews (participant perceptions of goal attainment and social or environmental factors that influenced their ability to achieve better health).

1.8.4.3 Aim 3

Assess and describe dyad cooperation using semi-structured interviews, guided by the Transactive Goal Dynamics Model (TGDM) (Fitzsimons et al., 2015); Specific constructs are 1) dyad interaction frequency - how dyads develop team goals, interact with and motivate each other to achieve those goals, and 2) goal coordination - how dyads discuss challenges to attaining their health goals and strategies used to overcome them.

1.8.5 Chapter 5 Aim 5

Chapter five synthesizes findings pertaining to the feasibility of using peer support dyads to promote healthy weight and prevent overweight and obesity in African American church goers. The long-term goal of my research is to develop sustainable and

feasible community based intervention to address chronic disease health disparities among African Americans. If found feasible, support dyads may be a significant contributor to this effort as an adjunct component of established programs or independent initiatives in faith communities, resource limited settings, or underserved populations.

2. Evolutionary Concept Analysis: Religious Social Capital and Health Among Racial and Ethnic Minorities in the United States

2.1 Introduction

Religious social capital is a significant contributor to the health of individuals and communities. Among racial and ethnic minorities in particular, higher levels of religious social capital have been associated with lower rates of depression (Michael, Farquhar, Wiggins, & Green, 2008), lower rates of stress associated with immigration (Sanchez et al., 2019), better sexual health (Wingood et al., 2013), and decreased risk of substance abuse (Mason et al., 2012). Beyond one's own individual beliefs, religious social capital captures interactions and subsequent effects of belonging to and engaging with an organization that supports those same beliefs. Religious social capital incorporates two concepts: religion and social capital. Religion is best described as a set of beliefs, behaviors, and rituals shared by a community and practiced in public or private that relate to a higher power such as God or Allah (Koenig, 2012). Social capital is defined as "...the social networks, norms, and trust that enables people to act together effectively in the pursuit of shared objectives" (Putnam, 1995, pp. 684). Religious social capital considers how these two concepts meld to provide a distinct and more comprehensive concept that can affect health at the individual and community level.

Despite its potential to significantly impact health, few studies have explored fully the concept of religious social capital to better explain the link between religion and (Yeary, Ounpraseuth, Moore, Bursac, & Greene, 2012) health, or as part of an innovative approach to health promotion interventions. Therefore, a concept analysis of religious social capital within the context of health was conducted.

2.2 Background

Religion is widely recognized as a significant contributor to health (Boudreaux, Catz, Ryan, Amaral-Melendez, & Brantley, 1995; Brownley, Fallot, Wolfson Berley, & Himelhoch, 2015; E.-K. O. Lee & Sharpe, 2007). Attendance at religious services is associated with lower mortality rates (Idler et al., 2017) and lower rates of depression. Subscribing to church doctrines and social norms which sanction harmful behaviors is associated with decreased substance use (Folland, 2007). The social support and interactions that typify involvement in religious organizations have also been linked to better health (Idler et al., 2017). Further, individuals perceive their faith as a source of emotional strength and comfort, especially in the face of tragic events such as the loss of a loved one or diagnosis of serious illness (C. L. Holt, Clark, Debnam, & Roth, 2014; Pargament et al., 1998).

Religion is especially important to vulnerable populations including racial and ethnic minorities, immigrant communities, and rural populations (Chatters et al., 2008; E.-K. O. Lee & An, 2013; Sanchez et al., 2019). African-Americans are more religious (79%) than the general American population (53%) (Masci, 2018) and close to two thirds of African-Americans claim that church members comprise important parts of their social networks (Taylor et al., 2004, p. 94). Historically, African American churches have functioned as institutions that provide more than just spiritual support. They have led the way in various social causes like education, hunger relief, combating political disenfranchisement and promoting health (Rowland & Isaac-Savage, 2014). Similar claims are true about churches in other ethnic minority and immigrant communities in the United States; the church's role expands beyond spiritual support into a source of cultural

kinship, socialization to the US, and a source of social, economic, and political support (Chan, 2009; Leung, Chin, & Petrescu-Prahova, 2016).

Social capital is a personal and community resource that builds on existing community structures and resources like relationships and trust, to accomplish goals (Chan, 2009; Michael et al., 2008). It is based on principles of reciprocity, trust, social norms, and the exchange of information and resources within a defined social network (Coleman, 1988). High levels of social capital lead to outcomes greater than what an individual or community might have been able to do alone and it is associated with better mental health and physical health - both on individual and community levels (Dageid & Gronlie, 2015; Folland, 2007; Sharma & Reimer-Kirkham, 2015; Ysseldyk, Haslam, & Haslam, 2013). Therefore, it has been explored as a possible path to improve health in less advantaged populations that have not fully benefited from other health promotion efforts aimed at the larger society (Michael et al., 2008; Uphoff, Pickett, Cabieses, Small, & Wright, 2013).

Religious social capital is a type of social capital. Religion is a common belief in a Divine Power and the principles and practices held by its members. Social capital is the collection of resources and connections within a defined community that produce some type of outcome. Religious social capital refers to resources and outcomes available to an individual or community belonging to a particular religious body. It is an important concept to explore given the importance of both religion and social capital to the health and wellbeing of vulnerable populations.

The concepts of social capital and, to a lesser extent, religious social capital, are studied across multiple disciplines, including economics, political science, and education. However, studies of both show similar shortcomings. Namely, while operationalization

of the concept is widespread, varying definitions and measures make operationalization incomplete and inconsistent (Folland, 2007; S. Moore & Kawachi, 2017). Originators of the concept focused on principles of reciprocity, trust, social norms, and informational networks within a defined social structure (Coleman, 1988). Subsequent studies have added, merged or removed domains both when defining and measuring the concept. For instance, some studies ignore reciprocity (Maselko, Hughes, & Cheney, 2011) and trust (Beaudoin, 2009). Others use large datasets and proxy variables such as religious attendance (de Oliveira & Cortes, 2016; Glanville, Sikkink, & Hernández, 2008; Hahn, Yang, Yang, Shih, & Lo, 2004), or parse scales using only some of the relevant variables (Folland, 2007; Hodge, Marsiglia, & Nieri, 2011). With such a wide range of definitions and measurements, it is difficult to get a clear picture of what religious social capital actually is and how it is distinct from similar concepts.

A central paradigm of nursing is understanding the interactions between person, place and health. This includes the influence of religion (M. B. Clark & Olson, 2000, p. 83) on health. However, there has been little exploration of religious social capital as a social driver of health. A recent concept analysis of cultural capital illustrates the interplay of culture and community on health and suggests the need for further studies into different types of community resources or capital (Ohashi, Taguchi, Omori, & Ozaki, 2017). By studying religious social capital, we can explore and clarify another resource that affects health and better understand how it might be integrated into efforts to care for people and communities.

A concept analysis allows for an examination and consensus of characteristics necessary to lay the foundation for a phenomenon to exist (Cowles, Cowles, Rodgers, & Rodgers, 1991). This is an especially helpful approach for religious social capital because

when it is present, it can improve health (Ferlander, 2007). If it is not present, understanding the conditions necessary to create it, extends its potential as a factor that individuals, healthcare providers, and communities can bolster to influence health (Michael et al., 2008; Wingood et al., 2013). A concept analysis also clearly defines expected outcomes. Defining outcomes distinguishes religious social capital from similar concepts and highlights specific benefits.

This concept analysis was conducted to clarify the concept of religious social capital in the context of health, with special consideration for its relevance to ethnic or racial minority groups, and immigrant populations in the United States. We explored the meaning of religious social capital, its attributes and characteristics using Rodger's Evolutionary Model (Rodgers & Knafl, 2000, pp. 80-120). A model case of African American women will further illustrate the concept and support the development of an operational definition of religious social capital. This analysis will assist researchers, nurses and other providers, to better understand how religious social capital can be integrated into health care planning and delivery to improve the health of patients and communities.

2.3 Methods

Rodger's Evolutionary Model was selected as the method of inquiry for this concept analysis. Rodger's model takes into account the dynamic nature of a concept (Rodgers & Knafl, 2000). This an especially helpful process for a concept that has derived meaning from a variety of contexts and disciplines but is underdeveloped or needs to be clarified within a new context. Rodger's approach synthesizes the breadth of descriptions of a concept in order to clarify its meaning and potential uses for further

research or practice (Toftthagen & Fagerstrøm, 2010). The steps of the evolutionary model are: identifying the concept and selecting an appropriate realm for data collection; collecting and analyzing data to help identify attributes, antecedents, and consequences; developing a definition; identifying a model case; and finally discussing implications of the results and possible directions for further analysis (Rodgers & Knafel, 2000).

The databases searched for this analysis were PubMed, CINAHL, and PsychInfo. No limitation was set for dates in order to broadly survey existing literature. Each database was searched for the terms “religion or religious or religiosity or spiritual or spirituality or faith” and “capital” and “health” in the abstract; or the phrase "religious social capital" or "spiritual capital" or "religious capital" in the full text. “Health” was included as a search term because the purpose of this concept analysis is to explore religious social capital in the health context. Articles were limited to English language and peer-reviewed manuscripts. The search yielded 152 articles (PubMed-45, CINAHL-33, and PsychInfo-74). After duplicates were removed, 108 articles remained. Exclusion criteria were articles where religion and social capital were not main variables or concepts being assessed and therefore did not help clarify the concept of religious social capital and health. For instance, some articles assessed social capital of elderly populations by sampling from religious congregations, without focusing specifically on the impact of religion or health outcomes. Thirty-eight were retained after abstract review. According to Rodgers and Knafel (2000, p. 89), a random sample of 20% or at least 30 articles should be included. In total, a random sample of 30 articles that best clarify the concept were included (Appendix A). Six additional articles obtained through snowballing were included to further clarify and reach a consensus on the concept’s definition and characteristics (Cowles et al., 1991). In addition, purposive samples of

seminal or landmark texts introducing the concept of social capital were also included to provide theoretical underpinnings of the concept (Cowles et al., 1991).

Articles were read and analyzed based on the series of questions outlined by (Toftthagen & Fagerstrøm, 2010), in their description of how to apply Rodger's Model. Questions focused on concept definitions, (e.g., how does the researcher define religious social capital or similar terms, did they provide examples, use measurements, or conduct a study that represent their definition of religious social capital), attributes and antecedents (e.g., do they define or describe characteristics that are necessary for religious social capital to exist or develop), and consequences (e.g., what type of outcomes did they expect or observe from any studies or interventions they implemented). Findings from each study were documented and organized to identify patterns and compare similarities and differences in studies within the context of health. Through this process, data was brought to consensus regarding the main themes used in the literature to describe the concept of religious social capital.

2.4 Definitions and Uses of Religious Social Capital

2.4.1 Social Capital

Religious social capital is a type of social capital. Social capital is a concept developed and popularized by Putnam (Putnam, 1995) and Coleman (Coleman, 1988) and serves as the theoretical basis for religious social capital. Coleman and Putnam define social capital as being a member of and participating in a trusted social network where members have shared norms and values. Resources can be exchanged in a reciprocal manner, resulting in the improved ability of members of that network to produce desired outcomes (Hussen et al., 2014). The concept of social capital is well known and widely

used across disciplines, including social work (Irwin, LaGory, Ritchey, & Fitzpatrick, 2008), political science (Coddou, 2016), economics (Mellor & Freeborn, 2011) and public health (Scott, Hodge, White, & Munson, 2018).

Putnam (2000) also introduced subcategories of social capital known as bonding – relationships and social networks between very homogenous people, or bridging – relationships and networks between people who have some things in common but not all. An example of bonding social capital is the relationship shared by individuals who live in the same neighborhood and are all members of a church within that neighborhood. Examples of bridging social capital are members of different churches with the same denomination, or members of the same church who come from very different neighborhoods or cultural or socioeconomic backgrounds. A third category of social capital, particularly useful in relation to health inequities, is linking social capital. Linking social capital is an outgrowth of relationships between groups or individuals that experience formal or institutionalized differences in social, economic, or political position (Ferlander, 2007; Szreter & Woolcock, 2004). Bonding and bridging social capital help optimize resources within similar network relationships and influences health at the intrapersonal, interpersonal, and community level. Linking social capital expands networks and access to institutions and organizations that shape the environmental, social and economic policies that influence health (Szreter & Woolcock, 2004).

2.4.2 Religious Social Capital

Similar to social capital, the most salient aspects of religious social capital are membership and reciprocal participation in a social network, shared norms and values, trust, and improved productivity. Maselko et al. (2011) and C. L. Holt et al. (2012)

provide two representative definitions of religious social capital which incorporate most of these aspects and have been used to guide other's work (Scott et al., 2018; Wingood et al., 2013). Maselko et al. (2011) defines religious social capital as: "social resources available to members of a religious group through their social connections and socializing, and shared trust and common values". They also developed a scale to measure social capital as a determinant of health. C. L. Holt et al. (2012) explored the link between religion, health and social capital, and defined religious social capital as simply "interconnectedness, social support, and community participation".

However, measures and definitions of religious social capital vary and may include some but not all aspects of social capital. For example, neither C. L. Holt et al. (2012) nor Maselko et al. (2011) included productivity in their definitions, though Maselko et al. (2011) referenced available social resources that can lead to increased productivity. Productivity is an essential feature of religious social capital as discussed in the seminal work of Putnam (1995) and in more recent studies as well (Irwin et al., 2008). For example, researchers looking at characteristics that precipitate Latino immigrants' ability to advocate for civil rights, defined religious social capital as the increased productivity of a community that comes as a result of the skills, resources, and productivity of the church body (Coddou, 2016). In other studies, the same concept may be measured differently or, as in the example cited above, excluded completely. For instance, two different studies of homelessness and depression (Fitzpatrick, Myrstol, & Miller, 2015; Irwin et al., 2008), measure religious social capital only by how often people participate in church activities and if they have a trusting relationship with the pastor or another member. Another study about substance abuse in youth also looked at participation in church as a measure of the strength of social networks. However, trust

was measured by internalization of religious beliefs (Hodge et al., 2011). Researchers in this study also included religious norms as part of their assessment of religious social capital.

2.5 Surrogate Terms and Related Concepts for Religious Social Capital

A surrogate term is one that can be used synonymously with another. Related terms, on the other hand are those which may have a similar meaning but cannot be used in place of the original term (Rodgers & Knafl, 2000). Religious social capital is defined by membership in and reciprocal participation within a defined social network, shared norms and values within that network, trust, and improved productivity as an outcome. Based on this conceptual definition, no surrogate terms were found. However, six related terms, (1) spiritual social capital (Duggan & Dijkers, 2001; C. L. Holt, Clark, Wang, Williams, & Schulz, 2015a; C. L. Holt et al., 2012; Scott et al., 2018), (2) religious involvement (Agadjanian & Jansen, 2018; Coddou, 2016; Gomes, de Andrade, Izbicki, Moreira-Almeida, & de Oliveira, 2013; C. L. Holt et al., 2015a; Yates, Yates, Rushing, & Schafer, 2018), (3) faith based social capital (Hodge et al., 2011), (4) social support (Debnam et al., 2012; Irwin et al., 2008), (5) faith based community support (E.-K. O. Lee & An, 2013), and (6) religiosity (Eitle, 2011; Mason et al., 2012; Mpofo et al., 2011) were found (Table 1). With the exception of spiritual social capital and social support, all concepts have in common the importance of shared values and norms. Social support, faith-based social capital, and faith based community support all are expected to produce outcomes beyond what is normally achieved without support from others. All except spiritual social capital involve participation, but none require reciprocal participation where information and resources are exchanged versus flowing from one person to

another. Faith based social capital is similar to religious social capital in that trust is included as an essential component. However, trust is measured as the level of personal trust or belief in religious values as opposed to trust of the social network.

The concept of social support is often conflated and used interchangeably with social capital. Social support involves individuals receiving support from others that is material, in the form of goods or services, and or emotional, in the form of prayer or encouragement (Irwin et al., 2008; Yates et al., 2018). Religious social capital, however, is a broader concept that provides one explanation for why, how, and under what circumstances social support functions within the context of religion. Social support does not require reciprocity, participation by all individuals, shared values, or a defined social network. For instance, a webpage could be set up by an individual or group and anyone who sees the site can provide emotional or material support without knowing the other person's values, being a part of their personal network, or ever interacting with or receiving anything from that person. Social support has been cited as a possible link between a person's religion and why they may be healthier (Folland, 2007). However, a study looking at factors that decrease risk of depression among homeless persons showed that religious social capital, over and above social support alone, helped decrease risk (Irwin et al., 2008).

Of all the related concepts, spiritual capital was the most dissimilar term. Spiritual capital was defined as a personal attribute characterized by one's relationship with a higher power (C. L. Holt et al., 2012). An individual has personal practices and beliefs that reflect and help build a relationship with that Higher Power which can enrich their life and give them strength to cope with challenging situations. The concept of spiritual capital is invoked often in studies of people and populations who rely on their personal

relationship with a Higher Power as a way of coping with major illness such as depression (E.-K. O. Lee & An, 2013) and diabetes (Namageyo-Funa, Muilenburg, & Wilson, 2015). Spiritual capital as a means of coping with illness is especially well documented in racial and ethnic minority populations such as African Americans (Namageyo-Funa et al., 2015) and Korean Americans (E.-K. O. Lee & An, 2013). However, spiritual capital does not require membership and reciprocal participation in a social network with others who share similar beliefs, or trust. Therefore, it is not a surrogate term to religious social capital.

Table 1. *Related Terms to Religious Social Capital*

<u>Terms</u>	<u>Definition</u>	<u>Similarities</u>	<u>Differences</u>
Spiritual Social Capital ^[1-4]	One's personal relationship to a higher power	Productivity	No trust, social network, shared values/norms, membership, reciprocal participation
Religious involvement ^[5-9]	Engagement, often measured by attendance, in an organized system of religious beliefs, practices, rituals, and symbols	Shared values/norms, social network, membership	No Reciprocal participation, productivity, trust
Faith based Social Capital ^[10]	A composite of three components: norms, networks, and trust	Shared values/norms, social network, trust	No Reciprocal participation, productivity, membership
Social Support ^[11,12]	Receiving or giving emotional or material resources to help fill a need	Productivity, social network	No shared norms/values, trust, membership, reciprocal participation
Faith based community support ^[13]	Material or emotional support provided by members of a religious community to others	Social network, productivity, trust	No Reciprocal participation, membership, shared values
Religiosity ^[14-17]	Attendance at religious events, member of church groups(public) and prayer and personal study(private)	Shared values/norms	No Trust, social network, productivity, reciprocal participation, membership

Note. [1-4] denotes articles (1) Duggan & Dijkers, 2001, (2) Holt, Clark, Wang, Williams, & Schulz, 2015a, (3) Holt et al., 2012, (4) Scott et al., 2018; [5-9] denotes articles (5) Agadjanian & Jansen, 2018, (6) Coddou, 2016, (7) Gomes, de Andrade, Izbicki, Moreira-Almeida, & de Oliveira, 2013, (8) Holt et al., 2015a, (9) Yates, Yates, Rushing, & Schafer, 2018; [10] denotes

article (10) Hodge et al., 2011; [11,12] denotes articles (11) Debnam, Holt, Clark, Roth, & Southward, 2012, (12) Irwin et al., 2008; [13] denotes article (13) Lee & An, 2013; [14-17] denotes articles (14) Eitle, 2011, (15) Mason et al., 2012, (16) Christopher Schmidt, & Jeremy Mennis, 2012, (17) Mpofu et al., 2011

2.6 Attributes, Antecedents and Consequences of Religious Social Capital

2.6.1 Attributes of Religious Social Capital - Relationships

Relationships that arise from social networks are the most important attributes of religious social capital (Hodge et al., 2011; Mason et al., 2012; Wingood et al., 2013).

Key attributes (Table 2), or necessary characteristics, of religious social capital are based on definitions provided in the literature as well as those developed within the foundational concept of social capital itself. Relationships allow for interaction between members of social networks (Hodge et al., 2011; Mason et al., 2012). Beyond simply being a member, an individual must participate (Mellor & Freeborn, 2011) and interact to share capital. Reciprocity must be a part of their participation (Sanchez et al., 2019). For instance, they must give time, skills, or knowledge to their network in exchange for similar resources from other members.

Table 2. *Religious Social Capital: Antecedents, Attributes, Consequences*

<u>Antecedents</u>	<u>Attributes</u>	<u>Consequences</u>
Defined social Network	Relationships	Increased productivity
Voluntary membership	Information/resource exchange and sharing	Increased resources/information (e.g. HIV prevention)
Shared values/norms	Reciprocal participation	Community Benefits Protective barrier against negative social determinants of health (e.g. substance misuse)
Trust		Better outcomes (e.g. fewer depressive symptoms)
		Trust

2.6.2 Antecedents of Religious Social Capital – Defined Social Network

In order for religious capital to develop, several antecedent characteristics (Table 2) must first be in place. The first characteristic that must be present is a defined social network or structure within which religious social capital can be created (Coleman, 1988). A defined social network provides a structure to work within and an opportunity for membership (Agadjanian & Jansen, 2018). Social networks are the ties members have with one another that lead to relationships within which information and resources are shared (Buys, Marler, Robinson, Hamlin, & Locher, 2011). Ties may be with people who are very similar, as with bonding social capital, or between people or groups who do not share as many common characteristics, as with bridging social capital (Agadjanian & Jansen, 2018; Buys et al., 2011). There must also be voluntary membership within the social structure (E. Williams, 2008). If it is not, there is no motivation to participate or maintain trusting relationships. Importantly, members of the defined network must share common values and norms that dictate behaviors and beliefs. One of, if not the most important antecedents, is trust (Beaudoin, 2009; C. L. Holt et al., 2012; E. Williams, 2008; Wingood et al., 2013). Trust generally pertains to the unspoken feeling of comfort that members of a group share that lays a foundation for other attributes. Without trust, the network is not able to build the essential relationships between members that allow for free flow and exchange of information and resources which lead to increased productivity.

A clear illustration of how social networks and similar values and beliefs are established to create religious social capital is within Korean American immigrant communities. When new immigrants become members of the religious community, they are able to expand immediately their social network based on shared norms and values

reflected in language, cultural customs, and religious values. Having established this foundation, the eventual outgrowths are reciprocal interactions within trusted relationships. These interactions are often the initial and most significant source of support for new immigrants to the United States coping with challenges such as acculturative stress, migratory grief, and adjustment to new roles that can affect mental and physical health, (E.-K. O. Lee & An, 2013).

2.6.3 Consequences of Religious Social Capital – Improved Productivity

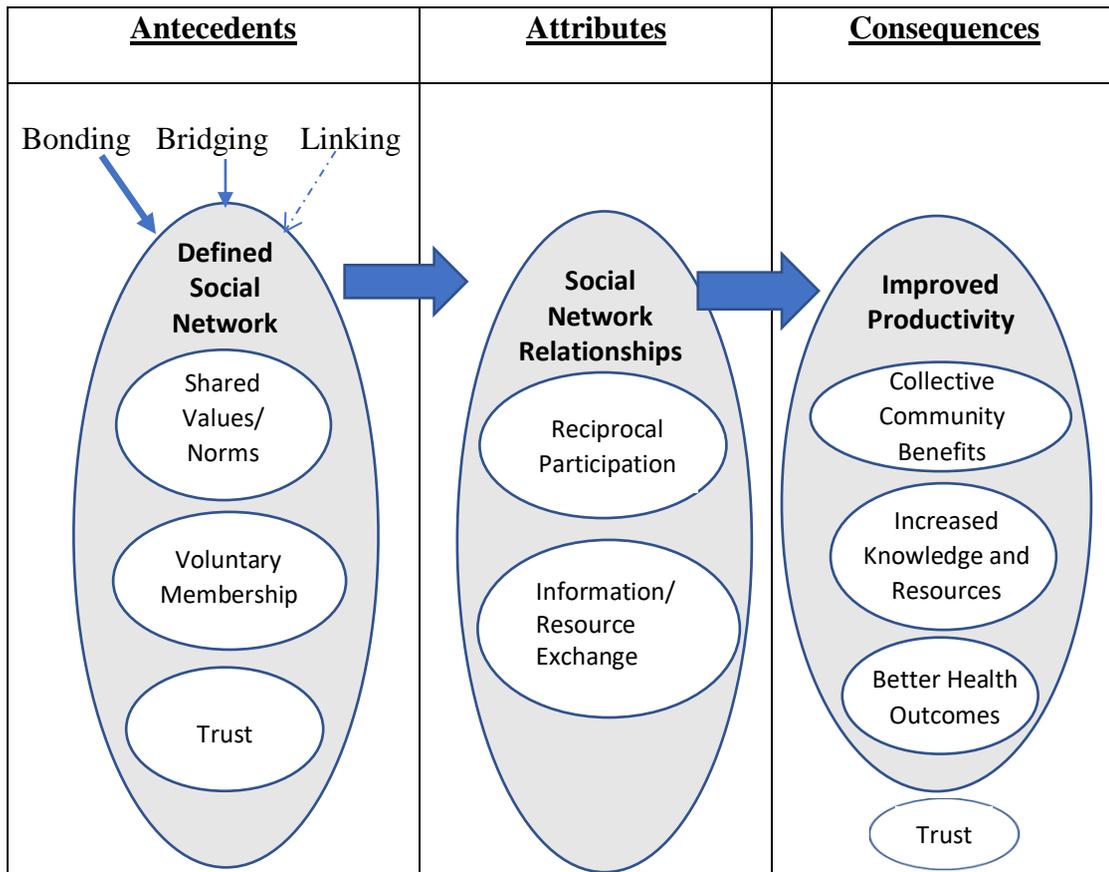
Religious social capital leads to improved productivity. Improved productivity is manifested in three main health consequences. The first consequence is increased knowledge and resources that can influence health for participating group members. For instance, a survey of Chinese American churches found that for those with high levels of trust, shared norms, and reciprocal participation, it was easier to disseminate information about HIV prevention with congregants (Leung et al., 2016). Importantly, churches with members that had higher levels of bridging religious social capital (ties with others who have some but not all characteristics in common) compared to those with more bonding social capital, were more likely to uptake the information. The authors concluded that the relationships resulting from bridging social capital reflect and reinforce environments that are open to new and possibly controversial topics. Therefore, they were more likely to discuss HIV despite the negative stigma associated with the illness. This points to the advantage of different types of social capital and having relationships from a variety of available social networks in order to gain knowledge that might not otherwise be accessible.

A second health consequence of religious social capital is collective community benefits such as lower crime rates. While there has been some debate about whether social capital is possessed by individuals or groups, it is argued that it can benefit both (Maselko et al., 2011; Poortinga, 2006). This community “spillover” effect happens when neighborhood churches are able to develop the social networks, trust and participation to a point where outcomes from their efforts are distributed into the community (Mason et al., 2012; Werber, Mendel, & Derose, 2014). For instance, among African American and Mexican American teens, increased participation in church, exposure to resources within the church network, and socializing within the established network decreased the initiation of drug use (Hodge et al., 2011; Mason et al., 2012). In this study, Mason et al. (2012) go on to suggest that churches with higher levels of religious social capital might be better able to galvanize active participation and resources for youth community outreach efforts as well as provide a protective barrier against negative social pressures. The potential community impact is important considering neighborhood factors such as poverty level, decreased access to health care services, and increased violence have significant influence on health and can often increase risk of drug use for youth.

A third health consequence of religious social capital is when participants are able to experience or produce some type of health outcome beyond what they would have produced alone (Hodge et al., 2011; Park, 2012; Putnam, 1995; Wingood et al., 2013). For example, several studies show that independent of high levels of religious attendance or social support, high levels of religious social capital predicted less risk of depressive symptoms in homeless individuals (Irwin et al., 2008), adult African American women (C. L. Holt et al., 2012) and youth in foster care (Scott et al., 2018).

Trust is the final consequence of religious social capital. According to Coleman (1988) and Putnam (1995), religious social capital doesn't create trust, but it capitalizes off of what is already present. This perspective suggests that trust is an antecedent that must be present for religious social capital to exist, as opposed to an attribute or even consequence. However, an intervention targeting HIV prevention in African American women successfully attempted to increase religious social capital by increasing trust through increased participation and interactions among members of a specific church network (Wingood et al., 2013). Therefore, it may be argued that while some level of trust must be present as an antecedent, it is possible for trust to be a consequence as well.

Figure 1 is a conceptual model of the relationships between antecedents, attributes and consequences of religious social capital. The defined social network provides a foundation for relationships to be formed and leads to increased productivity in the form of better health outcomes. The arrows represent religious social capital networks with high homogeneity (bonding - heavy arrow), lower homogeneity (bridging – medium arrow), and the least homogeneity (linking - light arrow). The diversity of social networks can influence the types of relationships formed, information exchanged, and ultimately health outcomes. Trust is an antecedent as well as a potential consequence of religious social capital which reinforces trust already present in the system.



Note: heavy arrow=religious social capital networks with high homogeneity (bonding), medium arrow=lower homogeneity (bridging), light arrow=least homogeneity (linking)

Figure 5. Conceptual Model of Religious Social Capital

2.7 Model Case

A study examining HIV prevention behaviors among African American women belonging to church congregations in Atlanta (Wingood et al., 2013) illustrates how religious social capital functions and can be utilized as a resource to promote better health. First, researchers defined social capital as trust within a defined social network (the church), social networking, and participation within the network; all of which are the key antecedents or attributes of social capital. They measured the desired consequence of social capital –improvement in a target behavior beyond what one is able to accomplish alone – by looking at changes in sexual practices. The intervention consisted of HIV

education as well as educational sessions designed to highlight and encourage the benefits of increased engagement in the church community to improve their overall life satisfaction and personal health. After the intervention, women who participated reported increased levels of trust measured by more frequent episodes of ‘confiding’ in religious leaders, increased participation in the church social network by volunteering and getting to know members in various groups, and more internalization of shared religious values and norms. Additionally, they reported higher and more consistent condom use, longer abstinence periods, and fewer partners. Significantly, the intervention group had retention rates 9-14% higher over the course of the study than a control group that did not attempt to increase religious social capital. This study illustrated that religious social capital can be increased and can be a resource to support health promotion activities for individuals and communities.

2.8 Discussion

2.8.1 Religious Social Capital – a Definition

A new definition of religious social capital was developed based on the definitions and cases within the literature of social capital and religious social capital, as well as the attributes, antecedents and consequences identified. The definition of religious social capital is: Increased individual and collective capabilities that result from reciprocal participation in bonding, bridging or linking social network relationships and activities. These relationships are based on mutual trust and shared values of the members of an established religious body. Unlike previous definitions, the unique influence of bonding, bridging and linking social capital are included to acknowledge that the benefits

of religious social capital may vary depending on the diversity of network ties that are available to an individual or community.

2.8.2 Operationalization of Definition

There is no one agreed upon definition of religious social capital, in the literature, (Byfield, 2008; C. L. Holt, Clark, Wang, Williams, & Schulz, 2015b; Maselko et al., 2011; Wingood et al., 2013). Similarly, there are various ways that religious social capital is operationalized. Some researchers use it as a guiding theory, but may focus on measures of spirituality or religiosity which assess personal convictions, but not social capital specifically (C. L. Holt et al., 2015b). Others operationalize the concept using factors specific to religious social capital, but focus on certain domains - which may include or exclude attributes such as trust or defined social networks (Chen & Meng, 2015; Fitzpatrick et al., 2015; Wingood et al., 2013). Researchers also often use a religiosity scale or measure which determines church or religious involvement by asking questions about church attendance or affiliation (Byfield, 2008; Hodge et al., 2011) as opposed to participation or reciprocity.

Based on our definition, operationalization should include measures of trust, existence of a social network, membership and reciprocal participation in the social network, types of relationships within the social network to assess different types of social capital (i.e. bonding, bridging, and linking), shared values and norms with other members, and increased productivity. Scales developed by Wingood et al. (2013), E. Williams (2008), and Maselko et al. (2011) incorporate most aspects of religious social capital and the combination of all three provides a good basis for operationalization.

The existence of a social network is measured by being able to name the place or organization with which they are affiliated and the names of at least five members with whom they have a relationship (Maselko et al., 2011). Trust is measured by asking whether or not other members of the organization can be trusted and whether or not the religious leaders can be trusted (Maselko et al., 2011). Religious values and norms can be measured by asking if they share same values and beliefs as other members (Maselko et al., 2011), and if church doctrines and beliefs influenced their health decision making (specific to the outcome of interest or in general) (Wingood et al., 2013). Membership and participation are measured by activity in various groups (Wingood et al., 2013) and whether or not participant considers themselves a member. The two components missing from these scales is a measure of reciprocal participation and increased productivity as a consequence of religious social capital. Based on scales of social capital, reciprocal participation can be measured by whether or not a member has provided other members with information, support or goods, and whether or not they received information, support or goods from others (C. L. Holt et al., 2015a). Increased productivity can be measured as individual perceptions of increased capabilities as a result of being part of the network, or by measuring a particular variable or outcome of interest as successfully done by (Wingood et al., 2013).

Bonding, bridging and linking capital describe the diversity of social networks and relationships and contribute to how religious social capital affects health. Bonding capital can be measured by observing and asking about the extent of trusting relationships and networks within the church who they consider similar to them (Leung et al., 2016). Bridging capital can be measured by observing and asking about connections with members of other religions, other congregations, other racial/ethnic groups or others of

different education and income levels (Leung et al., 2016; E. Williams, 2008). Linking capital can be measured by observing connections (both individual and the religious body as a whole) with outside groups through leadership positions and activities in community, state or national organizations (E. Williams, 2008).

2.9 Implications

A concept analysis helps highlight next steps needed to better operationalize a concept or use it to improve research or promote health. This concept analysis shows that religious social capital is an important contributor to health that can be optimized to decrease risk of some illness and promote health in individuals, organizations and in communities.

It is also important to recognize potential limitations of religious social capital. Health is an outcome of factors at multiple levels of society – intrapersonal, interpersonal, community and policy level (Bronfenbrenner, 1977). Examples of bonding, bridging, and linking religious social capital illustrate how it can be used at the intrapersonal, interpersonal, and policy level to improve individual and community health outcomes. However, in their study of homelessness, Irwin et al. (2008) showed that while religious social capital decreased disease risk, it did not fully mitigate the detrimental effects of poverty. This was explained by unequal access to all types of social capital. More specifically, bonding and bridging social capital connect individuals or groups to others who have similar characteristics and life circumstances.

Often a person's network consists of other similarly disadvantaged individuals (reflected in bonding or bridging religious social capital). Without means to expand the network to include relationships with individuals and organizations that are more

socioeconomically and politically advantaged (reflected in linking religious social capital), overall benefits of religious social capital may be limited (Mpofu et al., 2011). Our concept analysis did not uncover any examples of linking religious social capital and its health consequences. However, this finding is significant for understanding religious social capital as a contributor to health and highlights the importance of examining the breadth of social networks and relationships in order to understand and optimize religious social capital. Going forward, nurses need reliable ways to measure an individual or religious body's access to bonding, bridging and linking religious social capital. This type of assessment should be included in health promotion efforts. When needed, interventions that increase different types of religious social capital, building on relationships and resources already in a community, can be implemented to improve program outcomes.

Another challenge for religious social capital research, is not having a standard instrument that can be used as a tool for comparison of the concept across different contexts. One standard instrument might also allow researchers to more accurately assess changes or differences in levels of religious social capital both within and between studies. This standardization would also allow results from more studies to be compared and used to better design and evaluate interventions. Future research should explore the development of a measurement tool and how it can be applied and interpreted. The conceptual model and operational definition incorporate all aspects of religious social capital and may serve as a good starting point for developing one reliable and comprehensive measure.

A standard definition and measure of religious social capital is needed and beneficial; but, it may also limit understanding the diverse ways that religion may affect

health (Laird, Curtis, & Morgan, 2017). The purpose of analyzing the concept of religious social capital was to clarify a personal and community resources that may be optimized for better health. However, religion is a broad and dynamic concept which people may perceive differently depending on context. Therefore, even after a standard tool is developed to assess religious social capital, utilizing it in conjunction with other measures should be considered to provide a comprehensive picture of how religion might affect health. This can be done by combining a religious social capital survey with another tool that discusses perception of what religion and spirituality is, or utilizing interviews and mixed methods research to supplement survey results (Laird et al., 2017).

Nurses are trusted professionals with a history of serving religious institutions, and a guiding practice principle which understands health as complex web of environmental, social, and personal interactions within and outside of the health system. Thus, nurses are in a unique position to lead further research efforts to optimize religious social capital as a social driver of health – especially in racial and ethnic minority communities. Health promotion activities should include assessing individual and organizational religious social capital to identify areas of strength and opportunities for collaboration; creating a formal system to link community religious institutions, health care facilities and academic institutions; and engaging in ongoing discussions about how to develop or enhance health promotion initiatives which complement existing church networks, relationships, and values.

3. Perspectives on Using Dyadic Peer Support to Promote Health in African American Churches – Preliminary Study

3.1 Introduction

Obesity is a major public health issue in the United States. In 2016, 39.8% of adults were classified as obese (Centers for Disease Control and Prevention, August 2018). Obesity is the second leading cause of preventable death², and a risk factor for leading causes of morbidity such as Type 2 diabetes, heart disease, stroke, and certain cancers (Centers for Disease Control and Prevention, August 2018). The prevalence of obesity among African Americans is 48% (Centers for Disease Control and Prevention, August 2018) and is associated with higher levels of hypertension, stroke, and diabetes (Centers for Disease Control and Prevention, 2017b). Multiple factors, including individual, interpersonal, and community level factors, work together to influence health (Allicock et al., 2013; Harvey & Ogden, 2014). For example, accessibility of safe places for families to exercise near their neighborhood may affect how often they exercise. This in turn affects their risk for weight gain and associated illnesses (D. R. Williams, 2005). Importantly, rates of overweight and obesity among African Americans have increased by 23 percent over the past two decades (National Center for Health Statistics, 2017). Thus, preventing and addressing obesity among African Americans is a complex public health priority in need of effective, disseminable, and sustainable interventions.

Obesity prevention programs in African American churches have used peer support approaches such as group meetings and lay health educators (Allicock et al., 2013). However, existing programs have not leveraged sufficiently the powerful effects of dyadic peer support. The aim of this study was to explore African American church

members' and health educators' perceptions of using dyadic support to promote healthy weight in African American churches.

3.1.1 Healthy Weight Promotion in African American Churches

African American churches have long been a popular site to implement health behavior change programs (Allicock et al., 2013; M. K. Campbell et al., 2007; C. L. Holt et al., 2015a). However, researchers note challenges associated with implementing church health promotion programs. Chief among them is the complexity some interventions require; these include: a level of technical expertise, human capital, and financial resources that most churches do not have, leading to suboptimal implementation and sustainability (M. K. Campbell et al., 2007; Marci Kramish Campbell et al., 2007; Carter-Edwards, Jallah, Goldmon, Roberson, & Hoyo, 2006). Additionally, lay leaders and church members who agree to help researchers implement programming can become overwhelmed by all of their duties. Once overwhelmed, program implementation and sustainability can suffer leading to less robust participation and outcomes (M. K. Campbell et al., 2007; Marci Kramish Campbell et al., 2007; Carter-Edwards et al., 2006). Thus, church-based prevention programs may benefit from implementing programs with less complex approaches that simultaneously attract and keep members engaged.

3.1.2 Dyadic Peer Support

Peer support is ongoing engagement between individuals who share similar goals, health conditions or experiences (Fisher et al., 2017). Positive peer support includes engagement between individuals that brings emotional support, exchange of information about helpful services, and practical advice about how to overcome obstacles to care or

goal attainment (Fisher et al., 2014). Peer support has been shown to improve diabetes management (Heisler & Piette, 2005) and weight loss (Gorin et al., 2014; Samuel-Hodge et al., 2017), and is effective in both high and low resource settings (Fisher et al., 2014).

Dyadic peer support, or peer-to-peer support, relies on program participants instead of outside experts or lay health leaders to provide support and engage with one another to achieve personal health goals. When compared to peer support models using peer coaches or professional health coaches, dyadic support was more effective at improving health behavior than peer coaching and as effective as professional health coaching (Leahey & Wing, 2012). Peer support dyads have been suggested for use to improve sustainability of formal health education programs (Gorin et al., 2005) and with African Americans populations (Wolfe, 2004). Utilizing dyadic peer support may also reduce the burden put on church lay leaders or outside experts to implement and sustain programs. It can also potentially improve program participation and in turn health outcomes (Fitzsimons et al., 2015).

3.2 Methods

3.2.1 Study Design

A qualitative descriptive design was used to frame the study (Sandelowski, 2000). The perspectives of health educators, who implement programs in churches, and church members were compared and contrasted to provide a more comprehensive understanding of how a dyadic support program might be received. This study was approved by the Duke University Institutional Review Board (IRB).

3.2.2 Participants and Recruitment

Seventeen African American men and women residing in four counties in North Carolina were interviewed. Semi-structured interviews of church members about topics related to health gain meaningful information from sample sizes of six to fifteen (Ford, 2013; Patel, Lycett, Coufopoulos, & Turner, 2017). In addition, because of the narrow scope of this study and surface nature of the interview topic, a small sample size was considered appropriate (Morse, 2015). Participants were purposely chosen to represent both rural and urban settings and counties where future healthy weight promotion programs will take place, and a variety of Christian denominations to achieve maximum variability within the sample (Sandelowski, 2000).

The director of a state-wide obesity prevention program provided a list of health educators, churches, and church members affiliated with the program – either as educators or participants. Members and educators were recruited by the principal investigator via follow up emails and phone calls. Members were also recruited through word of mouth at African American social groups, such as sororities, and churches with majority African American congregations known to the primary study team. All candidates were screened for eligibility and consented to participate in the study. Inclusion criteria were: African American ethnicity by self-report; at least 21 years old; and member of a majority African American church congregation. Educators from rural and urban North Carolina counties (a list was provided by the director of the state-wide program) were emailed to request participation in the study. A convenience sample of four educators who responded to the inquiry was selected for interviews. Health educators were included in the study because they have experience working with many different faith communities and providing faith-based health promotion across the state of

North Carolina. Therefore, they can offer valuable input about how an intervention using dyadic peer support might be received and implemented within African American churches.

3.2.3 Procedures

All semi-structured interviews were completed from June 2017 to June 2018 in settings convenient to participants (i.e. places of worship, public library). A semi-structured interview guide was created to help better understand what participants thought about pairing up church members to work together during a church wellness program (Table 3). It was informed by previous dyadic support studies evaluating the frequency of communication and whether participants enjoyed working together (Aschbrenner et al., 2016; Heisler & Piette, 2005). To guide a future feasibility study, questions were also included to explore program characteristics members thought would be helpful if working with a partner to improve health.

The first interview question was broad and explored participants' perspectives on the church and health (i.e., 'What is the role of the church, if any in health?'). Subsequent questions asked about perspectives on relationships among church members and how to create a successful health program where two church members worked together (i.e., 'If you/ participants in your health education class did pair up with another church member for a healthy eating or weight loss program, what would you want it to be like?'). At the end, members were asked, 'Is there anything else you can think of that would contribute to you/ participants in your health education class being healthy?' to allow for participants to express any other thoughts on health, or social determinants of health, not covered during the interview. All church members' demographic information (i.e. – age,

marital status, level of education, denomination) was collected at the start of each interview. At the end of each interview and throughout, participants were offered a chance to add or clarify any points they felt were missed and important to share (Lewis et al., 2006). Interviews were digitally recorded, and lasted between 20-45 minutes. Participants were provided a \$15 gift card or equivalent gift for the interview.

Table 3. *Themes and Corresponding Interview Questions*

Themes
<u>Interview Question(s)</u>
The church and health are intertwined
Q1 What is the role of the church, if any in health
Members are eager to help and be helped by other members
Q2 If you/participants were to talk about health and wellness with another person who would it be?
Q3 Can you see yourself talking to other church members about health and wellness?
Q4 If you were to talk to other members about health and wellness, what do you think you would talk about?
Working in pairs is natural and beneficial in achieving health goals
Q5 What do you think about pairing up with other church members/participants in your health education class as part of a wellness program?
Dyad interactions/activities should be goal oriented and structured, face-to-face
Q6 If you/ participants in your health education class did pair up with another church member for a healthy eating or weight loss program, what would you want it to be like?
Q7 If you/ participants in your health education class did pair up with another church member for a health promotion program, how would you/they interact? (Face to face, text, email, phone? How often?)
Personal behaviors and motivation are as important as socioeconomic factors
Q8 Is there anything else you can think of that would contribute to you/ participants in your health education class being healthy?

3.2.4 Data Analysis

Audio-recordings of interviews were transcribed into electronic documents, proofed against the audio file, and then imported into and stored in NVivo qualitative data analysis software system to aid in coding, organizing, and managing text. Data were analyzed using conventional content analysis (Hsieh & Shannon, 2005). No a priori codes or themes were used to develop the guide in order to allow thorough exploration of members' perceptions of dyadic support. Each transcript was read to identify key words and assign codes inductively. Cross interview comparisons were made in an iterative process to ensure new codes and themes were identified throughout the process.

Codes were grouped into categories for each interview question and then combined to form themes when appropriate (Sandelowski, Voils, Leeman, & Crandell, 2012). A total of 17 church member and four health educator interviews were conducted. Interviews with church members continued until saturation was reached at interview 15 and no new categories or themes were identified with two additional interviews. To ensure credibility and dependability (Morse, 2015), first a codebook was developed. Next a random sample of 15% (21 of 140 pages) of the interview transcripts was reviewed by a coauthor to ensure that codes and themes derived from the data were accurate and relevant.

3.3 Results

Of the 17 African American church members who were interviewed for this study, there were seven men and ten women (Table 4). The average age was 53.71 (SD 17) years. Four were married while the other 13 were widowed (2), divorced (1) or single (10). All had some high school or were graduates; 11 had some college or completed

college. Nine were retired or on disability, seven were working, and one was looking for work. Ten members were from rural areas and seven from urban areas in North Carolina. Six were Baptist and six attended non-denominational faith communities. The other five members represented Apostolic, Church of God in Christ, Pentecostal, and African Methodist Episcopal Zion faith traditions. All but one of the members attended church at least once each week. The four health educators worked in a total of 44 counties and the average number of years on the job was six. Two of the health educators were African American, and two were White. Characteristics of each interviewee (pseudonyms used) quoted are represented in Table 5. Unless otherwise indicated, those quoted in text were church members – and referred to as ‘members’.

Table 4. *Social Demographic Data and Religious Affiliation of Church Member Members (n=17)*

	<u>Characteristics</u>	<u>n</u>
	Range	Mean(SD)
Age:	29-80 years	53.71 (17.02)
Sex:	Male	7
	Female	10
Education:	Some Highschool or Completed	6
	Some College or Completed	11
Marital Status:	Married	4
	Single/Widowed/Divorced	13
Residence:	Urban	7
	Rural	10
Employment:	Retired/Disability	9
	Working	7
	Looking	1
Religious Affiliation:	Baptist	6
	African Methodist Episcopal Zion	1
	Non-denominational	6
	COGIC	1
	Apostolic	1
	Pentecostal	2

Note: COGIC = Church of God in Christ

Table 5. *Pseudonyms, Social Demographic Data, and Religious Affiliation of Members Introduced in Text (n=11)*

<u>Participant</u>	<u>Age</u>	<u>Denomination</u>	<u>Education</u>	<u>Employment</u>	<u>Gender</u>	<u>Marital Status</u>
BH	65	Baptist	Highschool	Retired/Disability	Male	Single
MS	55	Baptist	College	Retired/Disability	Male	Single
CM	69	Baptist	College	Retired/Disability	Male	Married
AR	80	AME	College or more	Retired/Disability	Female	Single
JB	47	Apostolic	Highschool	Employed	Male	Single
NF	67	Non-Denominational	College or more	Retired/Disability	Female	Single
PC	29	Pentecostal	College or more	Retired/Disability	Female	Single
VR	63	Non-Denominational	Highschool	Retired/Disability	Female	Single
NC	30	Non-Denominational	College or more	Employed	Male	Single
JS	30	Non-Denominational	College or more	Employed	Female	Single
SL	n/a	Health Educator	n/a	n/a	Female	n/a

Note: AME = African Methodist Episcopal

3.3.1 Themes

Five key themes emerged from the data analysis (Table 3): 1) ‘the church and health are intertwined’; 2) ‘working in pairs is natural and beneficial’; 3) ‘members want to help and be helped’; 4) ‘attitude and motivation are important considerations for pairs’; and 5) ‘dyad activities should be structured and frequent’.

3.3.1.1 Church and Health are Intertwined

Church members felt health should be an integral part of the church’s mission – especially pertaining to health disparities affecting African Americans. As PC stated, “...Health issues that are quite common for the African American community, I do feel that it’s the church’s job to at least bring some awareness, some education.” Several members also felt that the church is a trusted source of information, with BH explaining that “A lot of times when it comes from church, people tend to believe it.” AR pointed out, “... a lot of church members, they do not go out into the community to learn about um, the different health issues and what’s available.” Therefore, the church becomes the main place where some members obtain help for or information on a variety of health topics.

When asked who should be involved in promoting health, most (12) members felt pastors more than anyone else have to support the endeavor. They also mentioned lay leaders, health ministries, elders, other members, and members of auxiliary boards. Two members felt it was important to identify people in the church who had specialized knowledge that could be used to improve the health of the congregation. For example, NC stated, “Talk to the professionals in the church...every single thing that you can deal with out there in the real world, you have here in the church, the resources are here.”

Members emphasized that health should be thought of as holistic. Therefore, the church should feel responsible for improving the mental, spiritual, and physical health of members. According to one church member, CM, "...the church has a moral responsibility to keep good focus on righteous living including what we take into our bodies and how we live in relationship with uh, with other creations on this earth." VR also explained that without being healthy, church members will be unable to physically do the church work and "fulfill the Great Commission", which is to share Christianity with others in the world. Two of three younger (30 and under) members especially emphasized that the church needs to work on having more open and honest conversations about African American health issues – especially mental health.

Members also talked about traditions of the African American church, and Southern churches especially, that are not healthy. Members gave the example of church dinners where "fat back" and fried foods were often served. However, another perspective was that the church can be a safe, non-threatening environment for people to try new things. Part of a discussion VR had with another church members illustrates this:

You might want to try olive oil or piece of smoked Turkey or avocado, [and they might say] 'Well I always wanted to know what that green thing was when I go to the grocery store'... so they are looking for the information.

Thus, although the church does have long standing traditions that may not promote physical health, people may feel more comfortable venturing into new food choices or types of exercise in this supportive and familiar environment.

3.3.1.2 Church Members Talk to Family and Friends about Health as Much as Healthcare Professionals

Most members (12) said the first person they would talk to about health is a friend or family member, because as BH stated, "...you want them to live long." Church

members specifically talked about the care and concern they had about the health and quality of life of their children and other younger family members. In the following quote, NF explains why she would speak with family first.

Well, I would, well my daughter 'cause we talk a lot...And the reason why I would start with my daughter because that way some of the information that I'm sharing with her then she can take it on and use it you know for herself and then for the family. So we can try...to keep the family as healthy as possible.

One church member, MS, described the idea of passing on some practices or traditions like cooking or frying food in animal fat from older adults to younger members was a type of “generational curse” and prevented younger people from understanding how to prepare healthier foods. This led some members to make it a point to discuss better food choices and related health concerns with family members. One, BH, described several approaches he used to help his niece lose weight. For example, he first encouraged her to try to add a little water to the artificially sweetened juice that she liked to drink, and to gradually increase the water so she was getting fewer calories. To encourage physical activity, instead of driving to her mailbox that was located about 25 yards from the house, he told her to try walking – and even incentivized her with a monetary reward when she was able to complete the trek. Four church members said - and one health educator recounted from her classes - that members enjoyed talking about how when they were younger, or some now, garden and grow their own food. They discussed the importance of sharing this practice with others, including younger people, in hopes that they might also do it more often to improve their health.

In addition to family, two church members also said they would speak to their physician first. However, members acknowledged that going and speaking with a physician and even following the physician's advice was no longer as popular. People

now have access to internet search engines and feel more comfortable questioning what their doctor tells them to do. Given the availability of information from so many different sources, they felt that others (not necessarily themselves) might be less inclined to speak with physicians about all health problems immediately.

3.3.1.3 Members are Eager to Help and be Helped by Other Church Members

To find out whether or not church members might be comfortable talking to one another about health, they were asked if they could see themselves talking to other church members about health and if so, what would they talk about. Members overwhelmingly (17) believed that church members want to talk to one another about health to help each other become healthier, and live better quality lives. Members view other members as part of their extended family for whom they feel it is their responsibility to show concern. One member, JS, talked about how it had become much more common for church members to talk about health and wellness at his church because of a very active health ministry leader. As a result, he said, "...a lot of people are talking about things that are happening around wellness because it always comes across the pulpit...even our pastor has lost weight."

Further, members had various suggestions they wanted to share with others to help improve their health. For example, JB talked about coaching someone through a sugar craving, "...you might have a sweet tooth craving or something and Ima tell you to take a cinnamon pill...they calm that sweet craving down." Another, BH, recounted how he might help another church member based on a time when he helped a family member start drinking more water to help her lose weight:

I took half of her bottles of fruit punch and poured it out and replaced it with water. I told her she had to drink it, not to pour it out. She drank it and said it wasn't too bad, because it still had some taste to it. She told me she was encouraged by me.

Four church members said that while they might want to talk to other members, the member first must, as JB put it, "hath an ear to hear" what they have to say. They talked about how important it is to be very sensitive to how other members may feel if they bring up health issues, like obesity, that the member may find offensive.

3.3.1.4 Working as a Pair to Improve Health is a Natural Outgrowth of Church Culture and Has Many Benefits

All members agreed that pairing up to achieve health goals would be helpful. Nine talked about how partners could provide support and four mentioned benefits of having an accountability buddy. Eleven said not only would they like to pair up but would have no hesitation about pairing up with any church member. Church members saw working with a partner as an almost natural outgrowth of church relationships. They cited examples of pairing up that already goes on in the church like for prayer. They also cited Biblical references that spoke of the power of two people gathered together and the effectiveness of two people accomplishing a goal over just one. When asked what he thought of pairing up with another member to work on health, JB said:

I think that's a excellent way to achieve almost any goal because the scripture say, two is better than one. If one fall, the other one can pick him up. It also says, how can two walk together except they agree. So often in the scriptures we got two...where two are gathered. One can chase a thousand, two can chase ten thousand. So you're always better off with a partner.

Members agreed that working with a partner would be beneficial for a myriad of reasons, such as having an accountability partner, someone to discuss strategies for healthy eating and exercising with, and providing encouragement. The main benefit mentioned was motivation. In the words of CM, "It'd be good...you could be motivated with a teammate.

Or a teammate could motivate me.” While all members would be open to pairing up with anyone in their church, some (five) members also stated that they would be dismayed to have a partner who was not motivated to put effort into participation or who had a negative attitude or low motivation.

3.3.1.5 Dyad Activities Should be Goal Oriented, Structured, Frequent and Face-to-Face

Members were asked to think about what they would expect out of a health program where they worked with a partner. Members responded that they would want to identify goals with their partner before starting the intervention. This was reflected in CM’s statement, “Yeah, you start... yeah I think you would set goals. To me it would be helpful if you want to work towards a structured program then you develop a plan and goals to target.” Other structured activities discussed were getting together to exercise, talk, or participate in health-related church activities. The most common activity desired and discussed was exchanging good information about health to support health improvement. Members reported good information could come in various forms like classes, pamphlets, and health fairs. It could also come from anyone who has useful information to share – whether that be an expert health professional or another member who has experienced and grown from a particular health challenge.

Most members (14) stated that they felt other members preferred meeting face-to-face to did not like the idea of using text messaging. One interviewee, NF put it bluntly, “...don’t give me no text!” Face-to-face was preferred because other forms of communication prevented the member from getting a good understanding of how the partner might be feeling at the time or because the member might not be comfortable with mobile technologies. Eleven members, however, were open to using the phone, text,

or email in addition to face-to-face contact, in order to stay in constant communication with a partner to be ready to provide encouragement and or help at any time. Some members mentioned the importance of face-to-face interactions because of the lack of phone service or of phone ownership in the rural counties. While acknowledging that other members might prefer face-to-face, the youngest interviewee (29 years) preferred interactions to take place mostly through social media. Frequent interaction of at least twice per week was also seen as necessary for partners to successfully achieve their goals.

3.3.1.6 Personal Behaviors and Motivation are as Important as Socioeconomic Factors in Achieving Health Goals

Given the myriad of social, personal, community, policy and health system level characteristics that affect health, members were asked what would be necessary for them or other church members to achieve their best health. Members provided several different suggestions for what might help them improve their health. The most frequently cited factors were related to personal behaviors. Nine of the members focused on the need for increased motivation to participate in health promoting behaviors, and the importance of improving their spiritual life to help them focus on improving their overall health. As MS reflects in the following quote, spiritual and emotional factors interact with motivation.

...and again the spiritual standpoint, getting your mind set and doing what you're supposed to do cause you need to have your mind set and have motivation to do those things. And it's hard for a lot of people to get motivated, like me. Sometimes it's hard to do what you're supposed to do. Most times it's easy to do the wrong things with eating habits and things like that. Yeah. Or just do what you're used to doing. You know, it's just habit.

Three members mentioned the need to have more open and honest conversations about the health issues that other church members are dealing with. Despite the fact that most of the church members reside in lower resourced counties, only four mentioned larger

structural or socioeconomic barriers like lack of transportation to get to grocery stores from rural areas or lack of money to buy healthy foods. One member mentioned lack of affordable weight loss programs.

3.3.2 Perspectives of Health Educators and Participants

3.3.2.1 Similar Perspectives

Health educators and church members interviewed had similar perspectives on most themes. First, they both agreed that members are eager to help one another. In general, health educators stated that they noticed members felt comfortable sharing information about their own health and personal lives. They felt that this was because church members have long standing relationships as members of the same church. They reflected that these relationships were richer and allowed them to be more vulnerable with one another than relationships between participants in other community health education classes they facilitate.

Second, health educators agreed with church members that working as a pair is a natural outgrowth of church relationships. They also agreed that members would probably be open to pairing with anyone, but were more likely to suggest that pairing should be based on one common characteristic like gender, neighborhood location, or age group to increase engagement.

Third, similar to church members, health educators felt that an intervention without clearly defined expectations of what should happen and consistent communication while pairs worked together would not work. Health educators also echoed members sentiment regarding the importance of face-to-face interactions. In their case however, it was mainly because of their observations of technological challenges of

members in their classes such as the lack of phone service or of phone ownership in the rural counties.

3.3.2.2 Different Perspectives

Church members reported that they would be more likely to talk first with other family members about health. However, all four health educators, felt that the person the members would talk to first about health is a healthcare professional. They discussed their experience teaching health education classes and having members come up to them after class and ask for clarification about instructions their physician may have given them. This is illustrated in the following quote, by one educator, SL. She describes how church members are often given very restrictive diets to follow at the doctor's office and then have difficulties figuring out what they can eat once home and need extra guidance.

About 98% of the time whenever they go to the doctor and they come back to the class with this issue or that, they will just say, 'the doctor said I got this and I got that and I can't eat this or whatever', but they don't tell them what they can eat or give them any recipes on that you know? Its just, they're stuck...you know and if you're limited resource you only know a few things you gonna cook anyway and now, now you're being told, well you can't eat spam you can't eat rice you can't eat this and that... Okay, so I know what I can't do, but is there something that I can?

In addition to differing perspectives on who church members prefer to talk to first about health, when asked what is needed overall to improve health, health educators were more likely to focus on the need to address socioeconomic barriers like transportation, poor access to fresh food grocery stores, places to exercise and healthcare providers. Two of the four discussed these barriers. But they also agreed that personal choice and lifestyle were important to emphasize as well, reflecting comments heard from church members as well

3.4 Discussion

Historically African American churches have been institutions where members of the community are provided not only with spiritual guidance and uplift, but with social, political, and economic support as well (Ford, 2013; C. L. Holt et al., 2015a). As such, they have also long been a key partner for health promotion programs (Carter-Edwards et al., 2006). The purpose of this study was to assess the perceptions of African Americans of partnering with other church members to improve health. The main study findings indicate that: 1) members see the mission of the church intertwined with health and feel safe exploring new food choices at church; 2) dyadic peer support is a welcomed approach and consistent with established church practices that emphasize partners working together; 3) participants believe personal motivation is as important as socioeconomic factors in improving health.

3.4.1 Health and Church Intertwined

African American churches have functioned as a community organization that has helped advocate all manners of social causes like education, hunger relief, combating political disenfranchisement and promoting health (C. L. Holt et al., 2015a; Potorti, 2014). Similar to other studies, church members felt that health should continue to be an integral part of the church's mission (M. K. Campbell et al., 2007; Rowland & Isaac-Savage, 2014). Further, they indicated that the church was a safe space to explore new ways of thinking about healthy living. More specifically, and in contrast to established cultural traditions, members indicated readiness to introduce new and healthier food options at church. This was in part due to members' realization of the importance and

challenge of passing on health promoting practices from the older generation to the younger.

Generational drag is when structural and socioeconomic inequalities from one generation can have lasting effects on the health of subsequent generations (Gee, 2011). For instance, during and after African enslavement in the United States, Black people were prevented from accessing enough food and better quality food. Communities developed ways to enhance what food they did have (such as seasoning with salt pork and frying in animal fat) and developed food traditions around these meals. These traditions continue to be passed from generation to generation as part of the diet of African Americans, especially in the South (Herbert & Dwight, 2009), though they may prevent the incorporation of food preparation that may be more healthful. Members were clear that while they want to be cautious about the transfer of practices that might be less healthful, the importance of passing along health promoting cultural practices like gardening, was echoed throughout the interviews.

A second key finding was that dyads are an extension of well-established church practices that emphasize members working together, often in pairs, and are consistent with spiritual perspectives readily cited by members. African American churches have been a safe place where people in the community build friendships and establish social support systems and networks (Rowland & Isaac-Savage, 2014). Therefore, members saw dyad peer support as natural and were open to working with any other member to achieve their health goals. However, members also said they would not want to be paired with someone who is not as motivated or positive in their thinking about the possibility of change. Thus, it may be important to consider assessing motivation level or stage of change (Prochaska, DiClemente, & Norcross, 1992) and pairing up members accordingly.

Additionally, it will be important before starting an intervention to teach participants about effective communication techniques to use with their partner (Heisler & Piette, 2005).

3.4.2 Dyadic Peer Support Aligns with Church Tradition

Members gave multiple reasons for why dyadic support is a potentially effective approach. For instance, they expressed that church members want to talk to one another about health to help each other live the healthiest and best-quality lives possible. This was because they felt that other church members were like family; and, as they noted later, they were most likely to first speak with family and friends about health topics. Members not only desired to speak with one another about health, but demonstrated their knowledge about specific activities they can do and information they can share with each other to promote health. In other words, beyond wanting to work with other members to show their care and concern for ‘family’, members felt they had tangible knowledge and resources that could help one another.

Social capital within a religious context is described by Maselko et al. (2011) as resources available to members of a church. In a study of African American women at risk for HIV, researchers increased social capital among the women by increasing their interactions with others at the church, and subsequently decreased HIV risk (Wingood et al., 2013). Members’ eagerness to share strategies and learn from one another may indicate that social capital and resources within churches can be better leveraged to improve health. Given members’ feelings about their desire and duty to speak with and support one another in health, a dyadic support intervention may be well received among

African American church goes because it builds off of the collectivistic (Kreuter et al., 2003) and family-oriented perspective of members towards one another.

In contrast to members' reporting that they would first speak to family or friends about health, health educators felt that they would be most likely to speak first to a professional about health. This discrepancy may be because church members and educators interpreted the question differently. Church members may have thought about who they would share information with first, while educators thought about who they would talk to first to get advice about health. Another explanation may be that because health educators' relationships with church members is limited mostly to interactions where they provide education and guidance on health-related questions. It could also be that health educators attribute a higher level of significance to their interactions with church members. This might explain why one educator felt any dyadic peer support program would need ample involvement from educators, but none of the church members expressed this need. It will be important in future studies to assess when and how health educators should be utilized during a dyadic support intervention.

3.4.3 Personal Motivation is Important

A third key finding of this study is that members emphasized personal motivation as much as socioeconomic factors as influencing their health behaviors. Multiple studies (Lieberman, Golden, & Earp, 2013; Whitt-Glover et al., 2013) have identified social determinants of health like residential segregation and access to goods and services as the most important impediments to achieving health equity. Ten of the 17 church members interviewed reside in rural counties which lack extensive structural support to address

obesity related health disparities like access to fresh foods and exercise facilities (University of Wisconsin Population Health Institute, 2016b).

Despite this evidence, and in contrast to the opinions of the health educators, members emphasized personal motivation over structural determinants as barriers to better health. There are several possible explanations for this. First, the majority of members had some college or education. Though college education does not necessarily equate with income, given that most were working or retired and only one person was unemployed, it is possible that this relatively well-educated sample may not be experiencing some of the challenges associated with living in lower resourced communities. On the other hand (Taylor, Chatters, & Levin, 2004)(Taylor, Chatters, & Levin, 2004) even within the context of social and environmental conditions that are barriers to good health, disadvantaged groups still find ways to cope with, contend with and in some circumstances thrive (Pearson, 2008).

Religion and the church is a source of resilience and buffering against socioeconomic disadvantage within the African American community (Pearson, 2008; D. R. Williams, 2005). Thus, it is plausible that these members have found a way, through their religious involvement, to cope with circumstances and environments that may be challenging. Similarly, members' focus on personal motivation over structural barriers may also indicate that despite environmental challenges, individuals are aware of and are still interested in ways to exert their own control and agency over their personal health (Pearson, 2008). Finally, it is also possible that some members had either not identified structural barriers in their communities, or were not comfortable discussing socioeconomic barriers with the interviewer.

Given health educators' responsibility to promote health in multiple counties – many of which are resource poor - it is possible their answers reflect overall patterns of what they observe as well as their knowledge of what resources are and are not available in the areas they serve. The very real and telling observations, perspectives, and experiences of both the educators and the church members points to the importance of continuing to address personal behaviors like education, self-efficacy, and goal attainment techniques in church wellness programs, while also addressing structural barriers to health attainment. The importance of situating health promotion programs within a socioecological framework has been documented (Office of Disease Prevention and Health Promotion, 2020). Health will be improved not just by health care providers working with patients in health care settings, or by solely changing policies and laws, but providing support at all levels that have a significant influence on human development, including at the individual, relationship, and community level in places where people “live, learn, work, and play” (Office of Disease Prevention and Health Promotion, 2020).

3.5 Limitations

This study investigated the potential strategy of using a dyadic support intervention to promote healthy weight among African American church members. Although Baptist and African Methodist Episcopal are the largest denominations (Seale et al., 2013), African American churches are not monolithic. One strength of the study was the variety of denominations represented by members. However, the members were recruited from a convenience sample of church members and may not accurately represent the general population of African American church members who did not participate.

Another limitation is the possibility of social desirability bias. Social desirability bias is the tendency of participants to respond to questions in ways they know are more socially acceptable or appropriate (Bergen & Labonté, 2019). Topics like sexual health, substance abuse and religion are especially prone to produce this type of bias (Steenkamp, Martijn G. De, & Baumgartner, 2010). Members were asked about the connection between religion and health and perceptions of working with other members. It is possible that members may have felt pressure to be more positive about participating in church wellness programs and uncomfortable making any statements that might be perceived as negative about the church or church members. Most interviews took place in the church which could have added to that pressure. However, the fact that all participants had a similar sentiment, regardless of interview location, makes this less likely. Members reporting that personal motivation most influenced their health instead of socioeconomic or environmental factors, might also reflect social desirability bias. Members may be less inclined to blame external factors for any shortcomings in maintaining or improving their health, rather than accept responsibility themselves.

Social desirability bias may have been limited by using several strategies (Bergen & Labonté, 2019). First, interviews were conducted in private areas to ensure confidentiality. Second, the interviewer used the consent process to build rapport and trust by explaining there were no right or wrong answers, answers were confidential, and a variety of opinions and experience would be helpful in order to design an effective future program. Third, ethnicity of the interviewer and members matched which can create empathy and trust and elicit more honest answers. Finally, members were asked what resources were needed for better health at the end of the interview, when the tendency to provide socially desirable responses decreases (Bergen & Labonté).

3.6 Implications

Dyadic peer support is an effective strategy to improve weight loss. Dyadic support interventions have included family members (Samuel-Hodge et al., 2017), friends (Kumanyika et al., 2009), and even strangers (Travis et al., 2010). It has been suggested for use among African Americans and to augment existing health promotion programs. However, exploring how the unique relationship between church members might be leveraged in dyadic partnerships to promote healthy weight and healthy behaviors has not been done, to our knowledge, and may be useful in promoting faith based and faith placed interventions.

The results of this descriptive qualitative study suggest that due to the strong ties and relationships, some African American churches may be fertile ground for a dyad support intervention. Both members and health educators agreed that dyad activities should be goal oriented and structured. Thus, future interventions should incorporate helping dyad partners at the beginning of the intervention draft mutually beneficial health goals and specific activities that they would like to do together to achieve them. In addition, any intervention should encourage consistent and relatively frequent (at least twice/week) face to face interaction as most members and health educators saw that as essential important to success. By working with a partner consistently, participants may be able to help one another address personal barriers as well as overcome structural barriers to better health.

4. Feasibility of a Dyadic Peer Support Intervention to Promote Healthy Weight in Three African American Faith Communities

4.1 Introduction

Cardiovascular disease, cancer, stroke and diabetes are the most common chronic conditions in the United States. Sixty percent of all adults in the United States have at least one chronic condition and forty percent have at least two (National Center for Chronic Disease Prevention and Health Promotion, 2019a). Obesity is linked to multiple chronic diseases and prevalence has climbed sharply in the last decades (Budd & Peterson, 2014; Samuel-Hodge et al., 2009). This rise is especially pronounced for African Americans and has created a disproportionate burden of obesity-related chronic diseases (Office of Minority Health, 2019b). By age 55, 76% of African American adults are diagnosed with high blood pressure compared to 55% of White males and 40% of White women (Thomas et al., 2018). In 2017, African American adults were 1.6 times more likely to be diagnosed with diabetes than White Americans and twice as likely to die from it (Diabetes and African Americans, 2019).

Health disparities are preventable disproportionate burdens of disease shared by members of socially or economically disadvantaged populations or communities. Federally funded research as well as national and state health policies have aimed to address these disparities (Office of Disease Prevention and Health Promotion, 2020). Despite efforts to implement various health promotion and disease prevention programs, disparities persist (Caiola, 2015). There is a need for new and effective solutions. The use of peer support and specifically peer support dyads, has been recommended as a feasible and effective health promotion strategy within African American populations (Wolfe, 2004). The purpose of this pilot study was to determine the feasibility of using dyadic

peer support to augment an existing healthy weight promotion program in three African American churches.

4.2 Background

4.2.1 Peer Support

4.2.1.1 Benefits of Dyadic Support in Health Promotion

Dyadic peer support is when two people who have the same goals or health condition work together to achieve health goals (Leahey & Wing, 2012). Dyadic support is also referred to as peer-to-peer support (Heisler, 2007), reciprocal support (Friedman, Niznik, Bolden, & Yee, 2016) or mutual peer support (Travis et al., 2010). Utilizing dyadic support has potential benefits. Dyads may allow for more sustainable changes because they can extend the care received in group classes or with health professionals, and offer a chance for partners to reinforce each other's skills and knowledge (Travis et al., 2010). Dyads may have similar experiences or backgrounds and can help with problem solving, and be available more often to lend encouragement for health promoting behaviors (Black et al., 1990).

Dyadic peer support has been used successfully in health promotion studies. An early study by Wing and Jeffery (1999) examining friend dyads illustrated that when participants were recruited for a weight loss program with a friend, participants lost more weight and were better able to maintain weight loss after ten months. Heisler and Piette (2005) used dyadic peer support to improve diabetes management. Participants were matched by gender, disease severity, or zip code, and were assigned to call each other once a week for six weeks. Participants reported better diabetes management. Ninety percent of them stated that they wished their health care providers had a peer support program. Over 70% of participants stated that their partner helped them improve

behaviors like making healthier food choices. Participants found dyadic support enjoyable and helpful, especially when acute situations arose and they needed someone to talk to; or when they wanted to talk about any personal issues in private, as opposed to a group setting. Leahey and Wing (2012) compared dyadic peer support from a mutual peer support partner, to dyadic peer support from a peer health coach or professional healthcare provider. Fifty percent of mutual peer support dyads were able to achieve clinically significant weight loss after a six month intervention. Importantly, this study also showed that pairing people with a peer led to almost as much weight loss as being coached by a professional healthcare provider.

4.2.2 Faith Communities and Health

It is recommended that to best address health inequities, initiatives are needed that promote health where people live, work, play and pray (Institute of Medicine, 2003; Office of Disease Prevention and Health Promotion, 2020). For African Americans, especially older adults living in the southern United States, churches are very influential community institutions (Catanzaro, Meador, Koenig, Kuchibhatla, & Clipp, 2007). Churches can reach large segments of a community consistently, provide space to host community programs, and provide access to leaders who can promote participation and help sustain programs (Hardison-Moody & Stallings, 2012; Lancaster, Carter-Edwards, et al., 2014). Social support from one's religious community, over and above general support, can be especially helpful for adopting healthier lifestyles (Krause, 2016), coping with illness (C. L. Holt et al., 2014), maintaining better mental health, and preventing substance abuse (Mason et al., 2012; Michael et al., 2008; Sanchez et al., 2019)

Though African American faith communities are popular settings for health promotion programs, researchers note significant challenges in implementing and sustaining these programs (M. K. Campbell et al., 2007; Lancaster, Carter-Edwards, et al., 2014). First, there may be an overreliance on lay leaders to implement and maintain health promotion programs. The lay leader model of community interventions was introduced to encourage shared ownership of programs between organizations introducing the program and the faith communities (Eng & Hatch, 1991) hosting them. Often, however, lay leaders have multiple roles in their church and can become overwhelmed with additional duties supporting the program (M. K. Campbell et al., 2007; Lancaster, Carter-Edwards, et al., 2014). Second, without ongoing technical support, expertise, and resources from outside organizations, it is difficult for faith communities to implement fully or sustain the programs (Gittner, Hassanein, & Murphy, 2007; Tussing-Humphreys, Thomson, & Onufrak, 2015; Yanek et al., 2001). As a result of these challenges, the architects of Body & Soul, a popular and widely used obesity prevention program supported by the National Cancer Institute, stressed the need for more immediate research to determine how best to implement church-based health programs (Allicock et al., 2013).

4.2.3 Theoretical Basis

This study is guided by the Transactive Goal Dynamics Model (TGDM) and the Socioecological Model (SEM). The TGDM builds on existing theories of goal setting and social support among dyads (e.g. interdependence theory)(D. W. Johnson, 2003; Lewis et al., 2006). When individuals become part of a dyad, interpersonal processes become a salient driver of goal setting and attainment (D. W. Johnson, 2003; Lewis et al., 2006).

The TGDM identifies two main constructs (TGDCs), 1) dyad interaction frequency, and 2) goal coordination, that describe cooperation within dyadic relationships which facilitate goal attainment (See Figure 6). Dyad interaction frequency is driven by three factors: shared dyadic goal(s), strong motivation to achieve the goal(s), and opportunities to work together to achieve the

goal(s). Goal coordination is determined by two factors: whether dyad members agree on how they are to achieve their shared goal(s), and how well they assist each other in overcoming obstacles and utilizing available resources. Dyads are most likely to achieve their goals when

interaction frequency is high and when goal coordination, which serves as a mediator, is also strong. While this study does not test the model, TGDM constructs, dyad interaction frequency and goal coordination, were used to design content for the dyad training session and to guide development and analysis of dyad cooperation in semi structured interviews.

The Socioecological Model (SEM) illustrates that health is affected by intrapersonal, interpersonal, community, organizational and policy level spheres of influence (Bronfenbrenner, 1977; McLeroy et al., 1988). Policy level factors create social, environmental, and economic conditions that promote or limit opportunities for health in communities and organizations. These conditions in turn affect intrapersonal processes and individual health behaviors. The intrapersonal processes and health

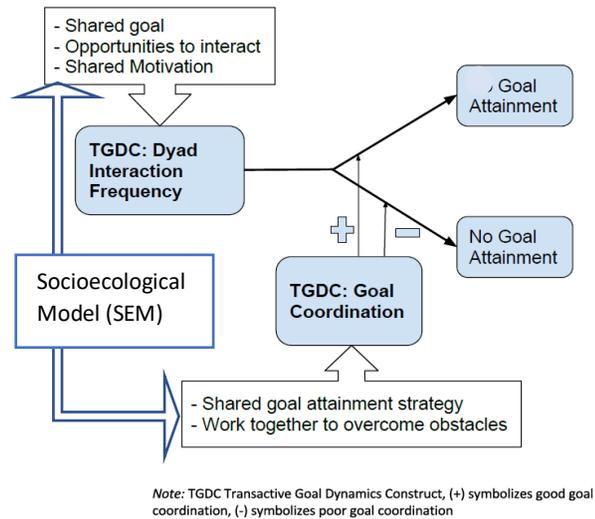


Figure 6. Modified Transactive Goal Dynamics Model

behaviors include goals that dyads select, strategies they choose to overcome challenges, and the opportunities they have to interact. Therefore, concepts of the SEM are integrated into the modified TGDM to account for broader social factors that may affect participants' ability to work together and achieve their health goals.

4.3 Aims

This prospective multi method study explores the feasibility of using dyadic peer support to augment an existing state-wide healthy weight promotion program in three African American churches in North Carolina. The study aims are to:

Aim 1: Assess feasibility, via survey, logs, attendance, and interview data, of a dyadic peer support intervention to augment an existing program to promote fruit and vegetable intake (FVI), physical activity (PA), and healthy weight.

Aim 2: Assess goal attainment and health outcomes through biometric measurements (i.e. changes in body mass index (BMI), blood pressure, and weight), survey data (i.e. FVI, PA), and semi structured interviews (participant perceptions of goal attainment and social or environmental factors that influenced their ability to achieve better health).

Aim 3: Assess and describe dyad cooperation using semi-structured interviews, guided by the Transactive Goal Dynamics Model (TGDM) (Fitzsimons et al., 2015); Specific constructs are 1) dyad interaction frequency - how dyads develop team goals, interact with and motivate each other to achieve those goals, and 2) goal coordination - how dyads discuss challenges to attaining their health goals and strategies used to overcome them.

4.4 Methods

4.4.1 Design Overview

This was a prospective multi-method 18-week feasibility study to explore using peer support dyads to augment an existing healthy weight promotion program, Faithful Families Thriving Communities (Faithful Families), in African American churches in North Carolina. The intervention included nine weeks of group health education classes, followed by nine weeks of dyads working together to achieve their health goals (Table 6). For the first nine weeks, participants attended weekly 90-minute group health education classes at their faith community. At the end of the nine weeks, each participant selected or was assigned a peer support partner. After attending one 90-minute dyadic training session, dyads worked together for the second nine weeks to improve fruit and vegetable consumption, physical activity, and other health goals they identified. The group reconvened twice during the second nine weeks to share progress. Before starting the program, all participants were consented in a private area of the church. The Duke University Institutional Review Board approved the study.

4.4.2 Intervention

4.4.2.1 The Existing Faithful Families Thriving Communities Program

Faithful Families Thriving Communities (FF) is a practice tested healthy weight and lifestyle promotion curriculum developed through a partnership with the North Carolina Department of Health and North Carolina State University (Hardison-Moody & Yao, 2019). The program consists of nine weekly health education classes delivered at the faith community by a North Carolina Cooperative Extension nutrition educator (referred to as “nutrition educators” going forward). Church lay leaders co-lead the program with nutrition educators by adapting elements of the curriculum to the needs of

their community and integrating spiritual elements such as a song or scripture. Classes focus on nutrition and physical activity (e.g. Choosing More Fruits and Vegetables, Making Smart Drink Choices, Choosing To Move More Throughout The Day). Each session involves a Powerpoint[®] lecture, group discussion questions, a physical fitness activity, and cooking demonstrations or tastings. ‘Faithful Families Thriving Communities’ is based on the Socioecological Model of health and therefore encourages faith community changes at the policy, interpersonal, and intrapersonal levels as well (Hardison-Moody & Yao, 2019). Faithful Families Thriving Communities has been implemented in faith communities across the state of North Carolina for the past 12 years (Hardison-Moody et al., 2011) . Program evaluations show communities enjoy the program and want to continue to improve health after it ends. Thus, a peer support component was designed to augment the existing program and allow faith communities to continue to improve their health by building capacity within the organization for members to support one another.

Table 6. 18 Week Dyadic Peer Support Program Outline

Weeks 1-9: <u>Health Education</u> <u>Classes</u>	Weeks 10-18: <u>Dyadic Peer Support</u>		
‘Choosing More Fruits and Vegetables’ ‘Plan Know What’s for Dinner’ ‘Shop for Value, Check the Facts’ ‘Shop: Get the Best for Less’ ‘Fix it Fast, Eat at Home’ ‘Fix it Safe’ ‘Making Smart Drink Choices’ ‘Choosing to Move More’ ‘Making the Connection’	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">SEM, CET</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">TGDM, Behavior Change Literature</div> <div style="border: 1px solid black; padding: 5px;">Peer Support Literature</div>	Week 10: <u>Dyad Peer Support Training Session</u> Community and Individual Assets Team Goal Setting Shared Motivation Shared Challenges Shared Strategies Supportive Communication	Week 14: <u>Group Meeting</u> Progress Challenges Strategies Week 18: <u>Group Meeting</u> End of Program
Weekly Health Education Newsletters			

Note: SEM = Social Ecological Model, CET = Community Empowerment Theory, TGDM = Transactive Goal Dynamics Model

4.4.2.2 The New Dyadic Peer Support Component

The dyadic peer support component included one dyad peer support training session, dyads working together on their goals for nine weeks, and two group sessions during the nine weeks. Participants also received weekly newsletters. The purpose of using dyadic peer support to augment an existing health promotion program was twofold. First, evaluations from past Faithful Families Thriving Communities programs showed participants want additional health promotion programming once the standard FF curriculum is complete. Second, using existing networks and resources to promote health

increases the possibility of successful program implementation and behavior change (Aschbrenner et al., 2016; Eng & Hatch, 1991; Leahey, LaRose, Fava, & Wing, 2011). Existing resources in this program were faith communities (i.e. relationships among members, available goods and services) and the longstanding relationship between the North Carolina Cooperative Extension offices and the faith communities. At the end of the first nine weeks, participants either chose or were assigned a partner if they did not have a preference. Partners were assigned by the lay leaders and PI based on any relationship they had prior to the program, or developed during the classes – evidenced by repeatedly choosing to sit next to one another and talking during classes.

Dyads first attended a 90 minute dyadic peer support training session delivered by the PI. Session topics were 1) setting team goals, with an emphasis on increasing fruit and vegetable intake and physical activity; 2) ways to cooperate with your partner to achieve your goals (e.g., motivation, interaction, supportive communication); 3) potential challenges and solutions to improving health (including asset identification); and 4) expected dyad activities for the next nine weeks (communicate with partner, track progress on logs). During the training, dyads were provided work sheets and asked to choose one nutrition and one physical activity SMART (specific, measurable, achievable, realistic, timely) goal (Hooker, Punjabi, Justesen, Boyle, & Sherman, 2018) to work on together. The recommended guidelines for daily fruit and vegetable consumption (at least seven servings per day) (American Heart Association, 2017b; L. V. Moore et al., 2015) and minutes of physical activity (150 minutes of moderate activity) (American Heart Association, 2018) were reviewed and dyads were encouraged to incorporate both into their goals. Participants also developed individual goals if they had unique health concerns. During the session, scenarios were presented that illustrated common

challenges to achieving health goals. Dyads were asked to discuss their own potential challenges. Solutions to challenges were presented and discussed in the group and among dyads. Participants identified personal, church level, and community assets that might help them achieve goals (Whiting, Kendall, & Wills, 2012) and overcome challenges. Partners were encouraged to discuss their motivations for wanting to achieve their health goals and how to keep each other motivated. Participants also learned effective supportive communication techniques.

Topics were based on the TGDM, SEM, Community Empowerment Theory (CET), behavior change literature (Hooker et al., 2018) and dyadic peer support literature (Cherrington et al., 2015; Gorin et al., 2014; Kowitt et al., 2017). Training on shared goals, motivation, frequent interaction, and shared strategies to overcome challenges was based on constructs the TGDM identified are important for successful dyad cooperation (Fitzsimons et al., 2015). Formative research (Chapter three) reflected African American church members' desire to work with another to improve health and identified the need for partners to have specific goals and be motivated to be successful. These results corroborate the theoretical foundation of the training. Also, dyads identified their own community and personal assets. Health is influenced by multiple spheres of personal, social and community factors. Communities and community members have resources and assets that when identified can be shared among community members (in this case dyads, specifically) and used to improve health (McLeroy et al., 1988; Saleebey, 1996; M. J. Smith & Liehr, 2008).

Peer support studies distinguish different types of communication and how they can affect outcomes. Directive communication is instructive, and may be perceived as controlling, even if encouraging (Kowitt et al., 2017). Autonomy supporting, non-

directive communication acknowledges and enhances an individual's confidence in their own personal choices and motivations, avoiding exerting pressure or control as a way to motivate (Cherrington et al., 2015; Gorin et al., 2014). While both may be useful (e.g. using directive when someone has no idea of how to perform a basic task and needs specific direction; using autonomy supporting when a partner is making a renewed effort to carry out their plan), goal achievement tends to increase with autonomy supporting communication (Gorin et al., 2014; Leahey & Wing, 2012). Thus, during the training, participants discussed how to ask about and provide support for plans and actions their partners identified (Peers for Progress, n.d.).

Formative research (Chapter three) and results from other weight loss and peer support studies show that participants perform better and prefer structured supervision (MaineGeneral Health, 2004). Thus, rather than leaving dyads on their own for eight weeks without any contact, the PI reconvened the groups after four weeks to share progress and challenges. To assist in goal attainment, participants were given a log sheet to help monitor (Hooker et al., 2018) their progress; they wrote the number of servings of fruit and vegetable consumed each day, minutes of daily physical activity, and number of weekly communications with their partner.

4.4.3 Participants and Setting

The inclusion criteria for churches were faith communities with predominantly African American members in one of three counties served by Expanded Food and Nutrition Education Program (EFNEP) nutrition educators. Participant criteria were adults ages 18 years and older who identify as African American; reported being church members or regular church goers; speak, read and write English; willing to complete

study activities and assessments; and able to engage in moderate physical activity. (e.g., walking – based on their own activity level and assessment).

This feasibility study captured qualitative and quantitative data. Data from qualitative interviews generally reaches information saturation between 10-15 interviews (Guest, Bunce, & Johnson, 2006). Thus, a sample size of 20 dyads or 40 participants was planned to ensure data saturation and account for an attrition rate of 30%, as found in a meta-analysis of weight loss programs (Lemstra, Bird, Nwankwo, Rogers, & Moraros, 2016). Also, because statistical significance is not the aim of this feasibility study, a sample size of 40 was considered sufficient to allow insights into patterns of change for quantitative outcomes such as weight and physical activity (Leahey & Wing, 2012; O'Brien et al., 2015). Due to great interest, 80 members across the three sites (site one – 18 members, site two – 24 members, site three – 38 members) were enrolled.

4.4.4 Procedures

Three county nutrition educators were recruited to participate. Before starting recruitment, the PI, program director and county nutrition educators met to review the program purpose, timeline and how to integrate intervention activities. Each nutrition educator works in one county. After meeting with the PI and reviewing the program, nutrition educators began recruiting churches in their counties via word of mouth, online searches, and face-to-face visits. Faith communities were recruited from May-November of 2018. A search of African-American faith communities and faith community-affiliated organizations was conducted via online searches, neighborhood canvassing, and word of mouth. Faith communities and faith community-affiliated organizations were contacted

via email, their Facebook sites, phone, community organization board meetings, or face-to-face visits.

Initial contact of churches was made by the PI or county nutrition educators. A total of 62 churches were approached. Contact was made with 36 to introduce the program and provide contact information to schedule a follow-up meeting if interested. Of the seven churches that expressed interest, three were ready to begin immediately and selected to start the program. No additional churches were selected because it was anticipated that the first three would be able to recruit the desired sample size of 40 participants. After agreeing to participate, lay leaders, educators, the faith community pastor and the PI helped to recruit church members through church announcements describing the program and flyers.

4.5 Measures

4.5.1 Participant Characteristics

At baseline, participants completed a survey assessing age, level of education and sex.

4.5.2 Program Feasibility (Aim 1)

Feasibility was assessed in three domains: 1) church and participant recruitment and retention - based on number of churches contacted that agreed to participate, and participant attendance at each class during the 18-week program; 2) nutrition educators' perceptions of feasibility – based on post intervention semi-structured interviews, and 3) participants' perceptions of feasibility – based on how many times per week they communicated with their partner, post intervention semi-structured interviews, and a nine item feasibility survey. The nine items were adapted from a 21 item feasibility survey

from a dyadic diabetes management program (Heisler & Piette, 2005). Survey items specific to diabetes management such as blood testing or medications were omitted. Questions for this dyadic study included: ‘My peer support partner helped me do things to improve my eating habits’, ‘I would work with my peer support partner again’, and ‘I helped my partner achieve their goals’. The survey consists of 5-point Likert items from 1=strongly disagree to 5=strongly agree. Cronbach’s alpha of 0.87 showed good internal consistency of the feasibility scale in this study.

Post-intervention semi-structured interviews were completed with a random sample of seven dyads from each church and the nutrition educator assigned to each church. Participants who completed the interview received a \$25 gift card. Participant feasibility questions included in the interview were: ‘What was your overall experience like working with a partner?’, ‘What made it easier or harder to work with a partner to achieve your health goals?’. Nutrition educator questions included in the interview were, ‘What were some of the barriers and facilitators of using dyads?’, ‘What aspects of this intervention would you keep, or change and why?’.

4.5.3 Goal Attainment and Health Outcomes (Aim 2)

Weight, blood pressure, and BMI were measured at weeks 1, 9, 14, and 18 by the PI in a private area in the church. Blood pressure was taken using an Omron electronic cuff or Welch Allen manual blood pressure cuff if measures could not be obtained electronically, after participants were seated for three to five minutes. Systolic or diastolic pressures greater than 130 or 80 were considered high, 120-129 and 70-79 elevated, and less than 120 or 70 normal (American Heart Association, 2017a). Floor scales were used to measure weight. Height was self-reported for BMI calculations. BMI is a standard

measure of obesity based on an individual's weight in proportion to their height. Values greater than 29 kg/m² are considered obese, 25-29 kg/m² is overweight and 18.5-24.9 kg/m² is the normal range (American Heart Association, 2014).

Fruit and vegetable intake and physical activity were measured at weeks 1, 9, and 18 using survey items developed by the United States Department of Agriculture (USDA) Expanded Food and Nutrition Education Program (EFNEP) survey (Bradford, Serrano, Cox, & Lambur, 2010; National Institute of Food and Agriculture, 2018). Dietary intake is measured in two different ways. One is a 24 hour food recall which asks participants to write down all foods consumed in the past 24 hours, resulting in a summary of the number of vegetables and fruits eaten during that time period. The other question asks for the number of servings of fruits and of vegetables that participants think they eat each day, on average. These items are part of the entry and exit surveys normally completed by Faithful Families Thriving Communities participants and thus have been used successfully among African American churchgoers (Hardison-Moody et al., 2011). Cronbach's alpha of 0.6 at baseline, 0.7 at week nine, 0.6 at week 18, and 0.8 between all three time points showed acceptable internal consistency of the survey items used in this study. Finally, in semi structured interviews, participants were asked if any other social or environmental variables, such as access to food or places to exercise, influenced their ability to achieve their health goals.

4.5.4 Dyad Cooperation (Aim 3)

Semi-structured interviews were used to obtain an in-depth understanding of how dyads cooperated to set, pursue, and attain their goals. Prompts were guided by the two main TGDM constructs – interaction frequency, which includes, opportunities to interact,

mutual motivation, and shared goals, and goal coordination, which includes discussing challenges and coming up with strategies. Examples of prompts include ‘What were your team’s goals?’, ‘How did you and your partner motivate one another?’, and ‘Tell me about strategies you used to achieve your goals?’.

4.6 Analysis

Table 7 outlines the timeline and analysis methods for each aim.

4.6.1 Participant Characteristics

Participant characteristics obtained at baseline were analyzed using descriptive statistics (e.g., means, standard deviations). T-tests were used to identify any differences between participants who completed the program and those who did not. ANOVA and fisher’s exact statistical tests were used to identify any significant differences in baseline characteristics between participants at the different church locations.

4.6.2 Program Feasibility (Aim 1)

Feasibility survey item scores were averaged to provide a total score. The frequency of choosing ‘agree’ or ‘strongly agree’ was also calculated for each item. Dyad communication frequency was tallied from participant logs. A multilevel model (participants nested in dyads) was used to determine what, if any, characteristics (i.e., partner choice, type of partner relationship, education, age, sex, church) predicted higher feasibility scores and dyad communication frequency.

4.6.3 Goal Attainment Health Outcomes (Aim 2)

Unconditional means models were run for each outcome and the intraclass correlation was calculated to assess for dyad dependence. A three-level mixed model (participants nested within dyads over time) was used to assess changes in weight, BMI,

systolic blood pressure, fruit and vegetable intake, and physical activity. Both unadjusted and adjusted models were run. Church site, dyad relationship (i.e., friend, family or acquaintance), dyad assignment (whether dyads chose or were assigned their partner), and participant characteristics (age, sex, education) were added as model covariates. Dependence of participants during the second nine weeks was accounted for by creating a dichotomous variable to separate measurements taken before participants were paired and measurements taken after they were paired.

First, significant changes from baseline to 18 weeks were assessed. Second, significant changes during the first nine weeks before participants were paired, compared to the second nine weeks after they were paired, were assessed. Third, three interaction terms were entered into three different models to assess whether or not dyad relationship type, dyad partner assignment, or dyad communication frequency influenced changes in health outcomes while participants were paired. Additional descriptive statistics were generated to assess the proportion of participants who were able to achieve clinically significant weight loss (weight loss $\geq 5\%$ of body weight) (Leahey, Kumar, Weinberg, & Wing, 2012; West, Coulon, Monroe, & Wilson, 2016) as well as the recommended servings of fruits and vegetables and daily minutes of physical activity.

4.6.4 Dyadic Cooperation (Aim 3)

Directed content analysis (Hsieh & Shannon, 2005) was used to analyze semi structured interviews. Deductive a priori coding guided by the TGDM was used to analyze dyad cooperation. Inductive coding was used to analyze participant's perceptions of program feasibility, and the influence of social and environmental factors that influenced their health. Transcripts were read and re-read to identify and

assign codes. Codes were grouped according to themes. Ten percent of transcripts were read by a second reviewer to compare codes, resolve discrepancies in coding, and interpret results.

Table 7. *Assessment Variables and Timeline*

<u>Aim</u>	<u>Variable</u>	<u>Week Assessed</u>	<u>Analysis Method</u>
Participant Characteristics	Participant characteristics	1(Baseline)	Descriptive statistics
Participant Characteristics	Baseline differences between church sites	1	ANOVA, Fisher's exact
Participant Characteristics	Baseline differences between those who did and did not complete the program	1	T-test
Feasibility	Church and participant recruitment and retention	1-18	Descriptive statistics
Feasibility	Feasibility Survey Scores, Dyad communication frequency	18	Descriptive statistics
Goal Attainment/Health Outcomes	Changes in FVI and PA and interactions	1, 9, 18	Mixed Model
Goal Attainment/Health Outcomes	Changes in SBP, BMI, weight and interactions	1, 9, 14, 18	Mixed Model
Feasibility; Goal Attainment; Dyad Interactions	Perceptions of feasibility, dyad interactions - challenges and strategies	18	Directed Content Analysis

4.7 Results

The purpose of this 18 week intervention was to determine the feasibility of using dyadic peer support to augment an existing health promotion program in three African American churches. To assess feasibility, we use descriptive statistics to present data on church and participant recruitment and retention, dyad communication frequency, and participants' feasibility survey results (Aim 1). Next, to assess health outcomes (changes in weight, blood pressure, BMI, fruit and vegetable intake and physical activity) we present results from a mixed model analysis. Specifically, we assess significant changes over 18 weeks, changes during the first nine weeks (participants independent) compared to the second nine weeks (dyads), interactions of two dyad level independent variables with changes in outcomes, and the proportion of dyad members able to achieve clinically significant improvements (Aim 2). Finally, we present results from semi structured interviews to illustrate how dyads cooperated to achieve their goals; specifically, 1) how they developed team goals, communicated, and motivated one another to action, 2) how they identified challenges and came up with strategies to overcome them, and 3) if they were able to attain their goals. Also presented are qualitative findings of participant and nutrition educators' perceptions of feasibility, social or environmental conditions that influenced health, and recommendations for program improvement (Aim 3).

4.7.1 Program Feasibility (Aim 1)

4.7.1.1 Church Recruitment

Between May and November of 2018, of the 62 churches approached, 36 (58%) were reached for initial contact to either discuss the program or set up a time to talk. Of the 36 reached, 14 followed up for further information. Of those, seven declined to participate; five because they had other programs or commitments, one because of

program length, and one because they were more interested in stress and mental health. Seven (19%) were interested in participating and three were selected based on their earliest available start date. The three participating churches were one large (1000 members) urban metropolitan Baptist church in Mecklenburg county, a Baptist church (300 members) in a smaller urban area in Edgecombe county, and an African Methodist Episcopal(AME) church (100 members) in a micropolitan area of Johnston County. The flow diagram (Figure 7) shows the process for recruitment of churches and retention of participants.

4.7.1.2 Participant Enrollment and Retention

Eighty church members consented and enrolled. Though 40 was the original target enrollment, because of interest, enrollment capacity was doubled. Sample descriptive statistics at baseline are presented in Table 8. Mean age was 64 years (SD= 11.79), ranging in age from 18 to 87. Forty-three percent of participants completed or had some high school education, 49% had some college education or had graduated, and 7.5% completed or had some graduate education. The mean years of education was 14 (some college). All self-identified as African-American and 84% were women. Participants were affiliated with Baptist (67%) and African Methodist Episcopal (AME) (23%) denominations. Each nutrition educator worked with the church within their county. Educators were all female, two were African American and one Hispanic. All had over 5 years experience delivering health promotion programming in community-based settings.

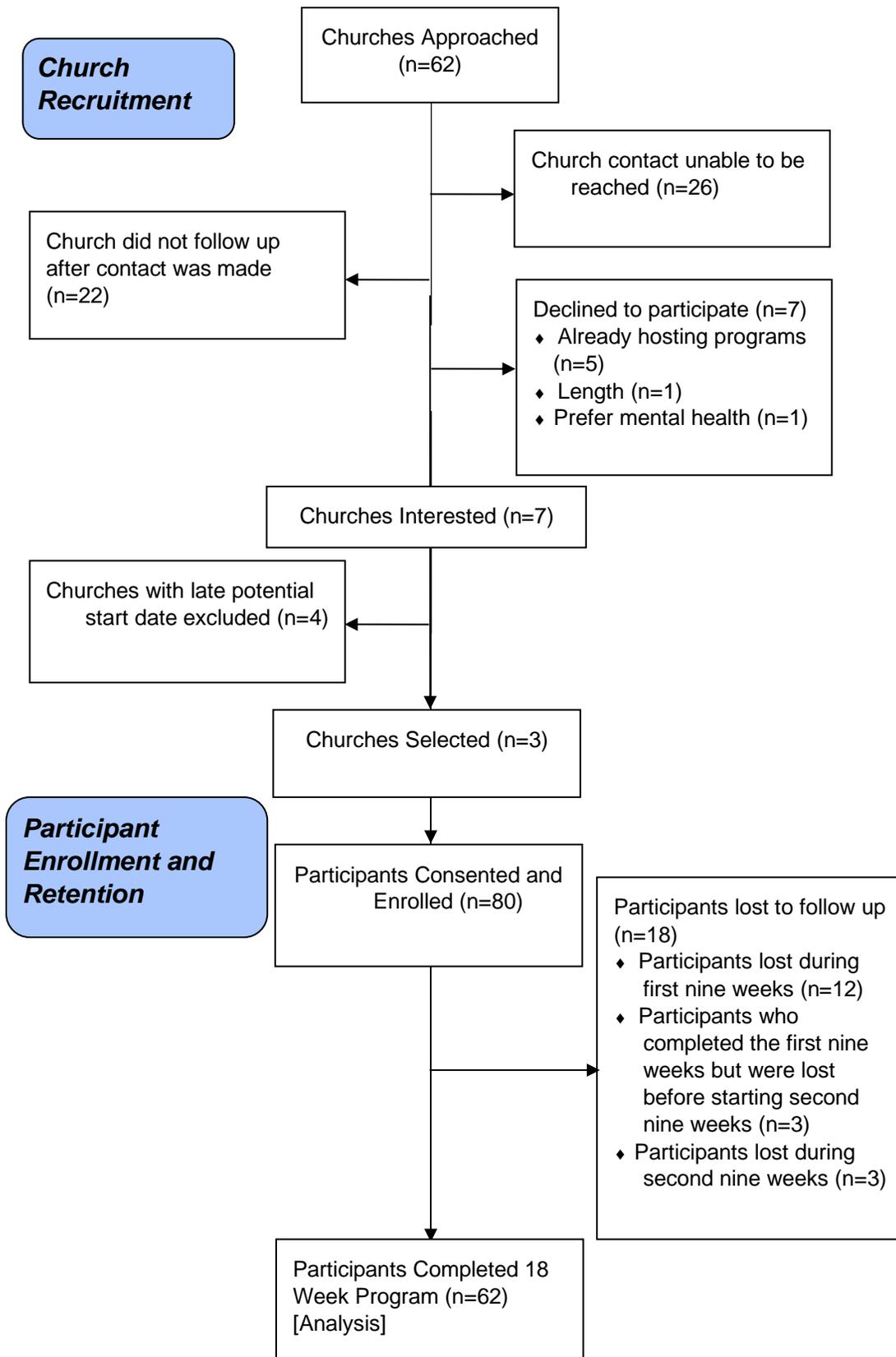


Figure 7. Recruitment and Retention of Churches and Participants

Sixty eight (85%) of the eighty participants completed the first nine weeks of the education classes. Sixty two (78%) of the 80 participants completed the entire 18 week program. Ninety five percent (n=65) of participants who paired with a partner completed the remaining nine weeks of the program. Participants were considered completers if they continued after the first nine weeks to work with a partner and completed the semi-structured interview. Of the twelve total classes (nine health education classes, one dyad training session, one dyad group meeting, final program class), the mean number of classes attended was nine (75%).

Table 8. *Baseline Demographics, FVI, PA, weight, BMI, SBP for the Total Sample and for those Who Did and Did Not Complete the Program*

<u>Baseline Characteristics</u>	Total (n=80) <u>M(SD)</u>	Completers (n=62) <u>M(SD)</u>	Non Completers (n=18) <u>M(SD)</u>	<u>p-value</u>
Age	64(11.79)	65(10.25)	56(15.38)	0.056
Education(years)	14(1.96)	13.65(1.97)	14.67(1.61)	0.101
Sex-Female n(%)	67(83.75%)	51(82.3%)	16(89%)	0.722
SBP	140(20.81)	142(19.79)	133(23.63)	0.15
Weight	198(51.2)	192(44.77)	219(66.13)	0.117
BMI	32.9(7.2)	32.4(6.81)	34.4(8.43)	0.306
Avg Vegetables	1.4(0.85)	1.43(0.87)	1.39(0.77)	0.868
24h Vegetables	1.7(1.19)	1.62(1.17)	2.13(1.3)	0.171
Avg Fruits	1.2(0.97)	1.2(1)	1.46(0.8)	0.247
24h Fruits	1(1.06)	0.91(1.08)	1.29(0.96)	0.256
Days of Physical Activity	3.1(2.1)	3.05(2.06)	3.3(2.5)	0.701

Note. FVI = fruit and vegetable intake PA = physical activity BMI = body mass index SBP= systolic blood pressure

4.7.1.3 Feasibility of Dyad Communication

Thirty-two dyads were created (Table 9). Participants from same churches were paired. Rather than being assigned, most chose their partner (74%), and most paired up

with a friend (49%) instead of family members (40%) or an acquaintance (4%). Forty eight (74%) participants turned in logs which recorded their communication frequency with their partner. Mean communication frequency was 2.6 (SD=2.21) times per week. Multilevel model analysis assessed seven predictors of communication frequency, church site, education, age, sex, partner choice, choosing versus being assigned a partner, and type of dyadic relationship – family, friend or acquaintance. Only age predicted higher frequency of dyad communication – a very slight increase of 0.03 times per week for every year of age (95% CI= 0.002, 0.052, p-value 0.037) which translates into one additional weekly contact for every 30 years of age.

Table 9. *Dyad Characteristics and Communication Frequency (n=32)*

<u>Characteristics</u>	<u>n (%)</u>
Number of Dyads	32
Dyad Assignment	Assigned 8(25)
	Chosen 24(75)
Dyad Relationship Status	Acquaintance 4(11)
	Friend 16(49)
	Family 12(40)
Contact with partner	<1/week 7(4)
	1-2/week 20(42)
	>2/week 21(44)
	Weekly average Mean(SD) 2.59(2.21)

4.7.1.4 Participant Feasibility Surveys

At 18 weeks, participants completed a 9-item feasibility survey (Cronbach's alpha= 0.87) scored on a 5 point Likert scale (5=strongly agree) (Table 10). The mean feasibility score was 4.4 (SD=0.56). Ninety five percent of participants agreed or strongly

agreed that they would work with their partner again. Ninety percent agreed or strongly agreed that their partner helped them achieve their goals. There was no significant correlation between dyad communication frequency and perceived feasibility ($r=0.14$, p value= 0.337) or between feasibility scores of partners within a dyad ($r=0.14$, p value= 0.447). Multilevel model analysis assessed whether partner choice or type of dyadic relationship predicted feasibility scores. Predictors of higher feasibility scores were friend dyadic relationships (0.846 points, 95% CI= 0.394, 1.298, p value= 0.001) or family dyadic relationships (0.606 points, 95% CI = 0.183, 1.029, p value= .006) compared to acquaintance relationships.

Table 10. *Feasibility Survey Results*

<u>Feasibility Survey</u>	Agree or Strongly Agree <u>n(%)</u>
Would partner again	59(95)
I helped my partner	53(85)
Easy to reach partner	57(92)
I enjoyed talking with partner	59(95)
Partner helped me achieve my goals	56(90)
Partner made eating healthy easier	53(85)
Partner made exercising easier	44(71)
Comfortable sharing with partner	61(98)
Continue working with partner	58(94)
Overall Feasibility Score (out of 5) Mean (SD)	4.36(0.52)

4.7.2 Goal Attainment and Health Outcomes (Aim 2)

Participants had their weight, blood pressure, BMI, FVI and PA measured at weeks 1,9,14 (weight, BMI and blood pressure only), and 18. The study team analyzed 1) changes from baseline to 18 weeks, 2) changes during the first nine weeks compared to

the second nine weeks, 3) interactions of dyad relationship type, dyad communication frequency, and dyad assignment with changes in each health outcome, and 4) clinically significant changes (e.g., weight loss >5% of body weight) in health outcomes for the sample.

4.7.2.1 Baseline Health Status

First, descriptive statistics at baseline revealed no significant differences in demographic characteristics, biometrics, FVI or PA between those who completed the program (n=62) and those who did not (n=18) (Table 8). Therefore, all analyses focus on participants who completed the program (n=62). At baseline, participants reported an average of 3.0 (SD=1.1) days per week of 30 minutes of physical activity. Average daily servings of vegetable intake was 1.4(SD=0.87) and average daily servings of fruit intake was 1.2(SD=1). The average fruit intake over the past 24 hours was one serving (SD=1.06) and the average vegetable intake over the past 24 hours was 1.6(SD=1.17) servings. Mean sample weight was 192 lbs. (SD=44.77) and BMI was 32.4(SD=6.81). The mean systolic blood pressure at baseline was 142 mmHG (SD=19.79).

4.7.2.2 Intraclass Correlation

Unconditional means models were used to calculate intraclass correlation coefficients for dyads for each dependent variable. The calculated ICCs ranged from .003 (average daily servings of vegetable), to 0.6(systolic blood pressure). The average ICC for all outcomes was 0.11 (physical activity=0.05, 24 hour vegetables=0.089, average daily servings of fruit=0.1, 24 hours fruits=.02, BMI=0.028, weight=0.216) meaning on average, participants' scores were correlated 0.11 within any given dyad. Therefore, dependency between dyad partners was accounted for by including it as a level in the mixed model analysis.

4.7.2.3 Changes in Outcomes from Baseline to 18 Weeks

Results showed small but significant increases in fruit intake (Figure 8) and physical activity (Figure 9) from baseline to week 18.

Significant changes in fruit intake from baseline to 18 weeks (Table 11). Daily average fruit intake increased an average of 0.06 servings (95%CI= 0.027, 0.093, p value=0.001) for each week of the program, which is an average increase of 1.1 servings from week one to week 18. Servings of fruits consumed in the last 24 hours also increased by an average of 0.06 servings (95%CI= 0.013, 0.098, p value= 0.0113) each week of the program, which is an average increase of 1.1 servings from week one to week 18.

Table 11. *Fixed Effects for Mean Fruit and Vegetable Intake, Physical Activity Level, Weight, Systolic Blood Pressure, and BMI from Week 1 to Week 18 (n=62)*

<u>Variable</u>	Week 1	Week 9	Week 14	Week 18	<u>Estimate</u>	<u>95% CI</u>
	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>		
Weight ±	192(44.8)	189(45)*	189(43.2)	189(44.5)	-0.043	-0.171, 0.084
BMI	32.4(6.8)	32(6.8)	32(6.5)	32(6.8)	-0.005	-0.044, 0.034
SBP	141(19.8)	135(15.7)	135(17.4)	135(19.8)	-0.011	-0.57, 0.548
24H Vegetables ±	1.6(1.2)	2.1(1.2)*	-	2(1.4)	-0.024	-0.063, 0.014
Average Vegetables ±	1.4(0.95)	1.8(1)*	-	1.9(1.1)	0.0002	-0.03, 0.03
24H Fruits	0.91(1.1)	1.2(1.1)	-	1.8(1.4)	0.056*	0.013, 0.098
Average Fruits	1.2(1.2)	1.6(1.2)	-	2.2(1.2)	0.06*	0.027, 0.093
Days of PA	3.1(2.1)	4(2)	-	4.5(2.2)	0.068*	0.017, 0.119

Note. *p value < 0.05; Controlling for dyad nesting, partner choice, partner relationship, age, sex, church site, and education.

± Significant at the p<0.05 level during first nine weeks

Significant changes in physical activity from baseline to 18 weeks (Table 11).

There was a significant increase in activity level of 0.068 days (95%CI=0.017, 0.119, p-value=0.01) of 30 minutes of activity per week, which is an average increase of 1.2 days

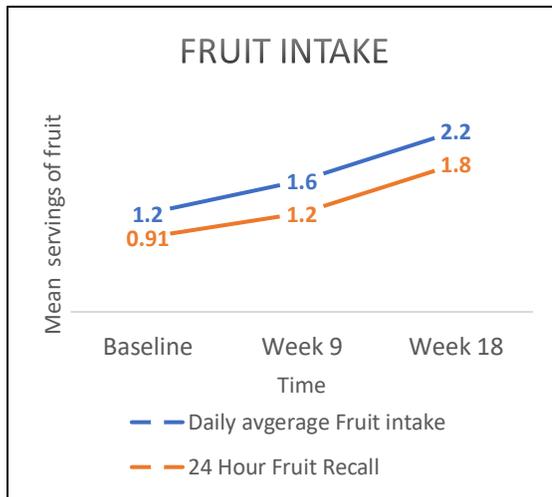


Figure 8. Significant Changes in Servings of Fruit from Baseline to 18 Weeks (n=62)

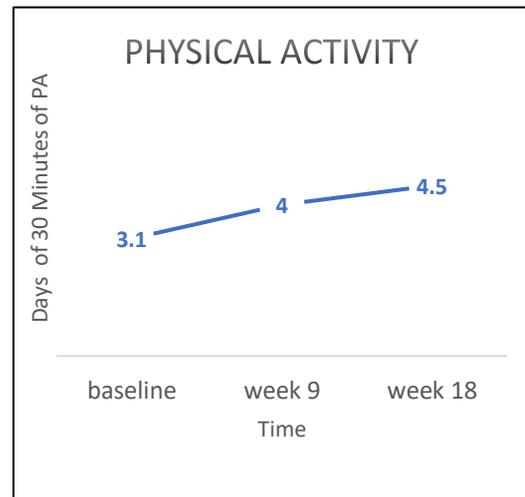


Figure 9. Significant Changes in Mean Days of 30 Minutes of Physical Activity per Week from Baseline to 18 Weeks (n=62)

of exercise from week one to week 18. There were no significant changes in weight, systolic blood pressure, BMI, or vegetable intake from baseline to 18 weeks.

4.7.2.4 Changes in Outcomes During the First Nine Weeks Compared to the Second Nine Weeks

Results showed small but significant increases in vegetable intake (Figure 10) and weight (Figure 11) during the first nine weeks that were maintained during the second nine weeks.

Significant changes in vegetable intake (Table 11). Results from the mixed model showed significant differences in average daily vegetable intake and weight when comparing the two time periods (Figure 10). The average number of daily servings of vegetables was a little more than half of a serving more (0.545 servings, 95% CI=0.143,

0.939, p value=0.008) on average during the first nine weeks compared to the second (Table 10); the change was significant. The number of servings of vegetables consumed in the last 24 hours was on average, a little less than half of a serving more (Estimate=0.474 servings, 95% CI= -0.262, 1.2, p value=0.197) during the first nine weeks of the program compared to the second nine weeks, but was not significant.

Significant changes in weight (Table 11). Results from the mixed model analysis also showed significant differences in average weight when comparing the two time periods. On average, there was a 2.6 pound decrease (95% CI= -4.18, -1.1, p-value= 0.001) in weight for the sample during the first nine weeks compared to the second nine weeks.

Post hoc analyses using a new multilevel model to look for significant changes in vegetable consumption and weight exclusively during the second nine week time period were not significant. These post hoc results indicate that the small but significant changes in vegetable intake and weight during the first nine weeks did not increase, or decrease, but were maintained during the second nine weeks.

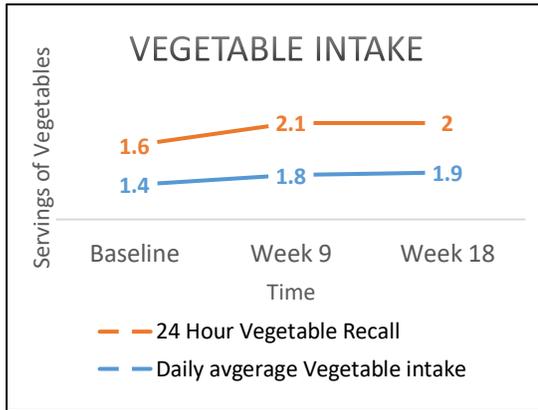


Figure 10. Significant Differences in Mean Daily Servings of Vegetables, First Nine Weeks Compared to Second Nine Weeks (n=62)

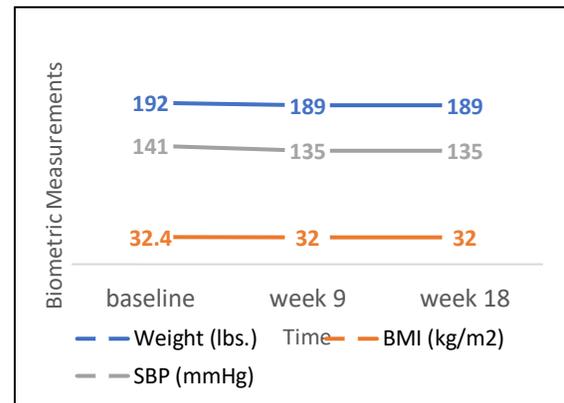


Figure 11. Differences in Mean Weight, Systolic Blood Pressure, and BMI, First Nine Weeks Compared to the Second Nine Weeks (n=62)

Note. Only weight is significant. BMI = body mass index, SBP = systolic blood pressure

4.7.2.5 Interactions (Relationship Type, Partner Assignment, Communication Frequency)

A final mixed model was run to assess whether partner relationship type, partner assignment, or frequency of dyad communication contributed to changes in FVI, PA, weight, SBP, or BMI while dyads worked together. Although the sample size was small, interactions were run to look for possible trends that might reflect or help explain results seen in semi structured interview or feasibility results. The mixed model analysis was repeated looking specifically at changes during the time that participants were in dyads. Interaction terms, dyad communication frequency, dyad relation type (family, friend or acquaintance) and partner assignment (chosen or assigned), were introduced in three separate models. Only one interaction - partner relationship type and weight change - was significant. Though there was no significant change in weight on average for the sample as a whole during the second nine weeks, there were significant differences based on dyad relationship type. Compared to acquaintances, friend dyads lost more weight over

time, on average (Estimate= -0.64, 95% CI=-1.167, -0.113, p value=0.019). Though not as much as friends, family dyads also lost more weight over time (estimate= -0.57, 95% CI= 1.1, -0.036, p value=.037), on average compared to acquaintances (Table 12).

Table 12. *Fixed Effects of Interaction Between Changes in Weight (Weeks 9,14,18) and Dyad Relationship Type*

<u>Weight</u>	<u>Estimate</u>	<u>SE</u>	<u>95% CI</u>	<u>P value</u>
Weight*Relationship Type				
Interaction Family Dyad*weight changes	-0.363	0.172	-1.104, -0.036	0.0372
Interaction Friend Dyad*weight changes	-0.473	0.169	-1.1673, -0.1126	0.0189
Acquaintance Dyad*weight changes (Ref.)	0		-	-

Note. Ref. = reference group, Controlling for dyad nesting, partner choice, partner relationship, age, sex, church site, and education.

4.7.2.6 Clinically Significant Changes

We used descriptive analysis to look at the proportion of participants who achieved clinically significant outcomes during the 18 week program (Figure 12). Of the participants who completed the program (n=62), 39 (63%) were classified as obese at the beginning of the program. Eight (21%) of these participants achieved clinically significant weight loss (at least 5% of body weight) at 18 weeks. At baseline, one (1.6%) participant reported having eaten seven or more servings of fruits and vegetables in the last 24 hours. At 18 weeks, seven participants (11.3%) reported consuming seven or more servings in the last 24 hours. The number of participants who reported consuming an average of seven or more servings of fruits and vegetables daily increased from zero at baseline to 6 (10.5%) at 18 weeks. The number of participants reporting at least 5 days

of 30 minutes or more of physical activity increased from 14 (22.6%) at baseline to 26 (41.9%) at the end of the program.

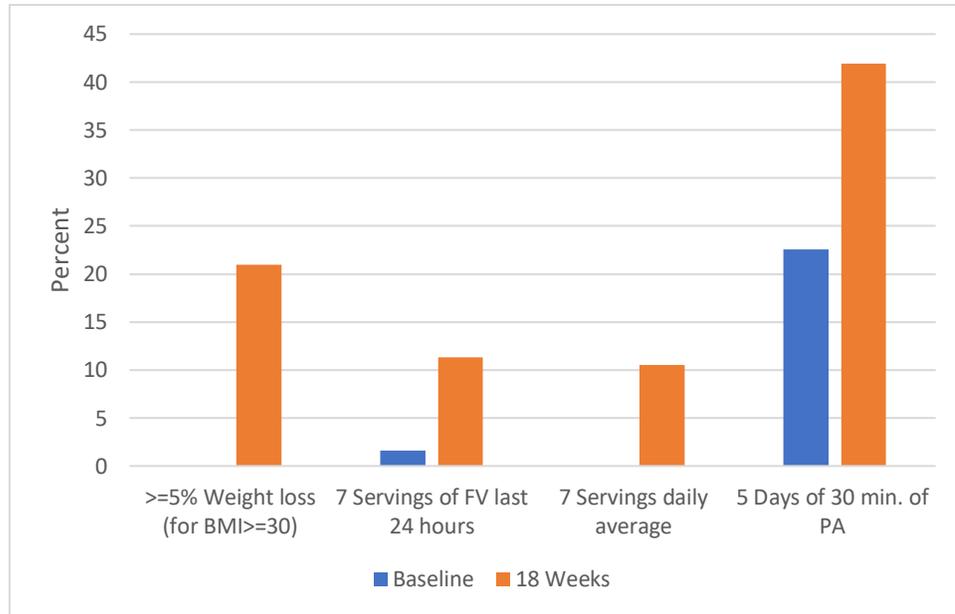


Figure 12. Clinically Significant Changes, Baseline Compared to 18 Weeks

Finally, an average six point decrease in systolic blood pressure (SBP) during the first nine weeks was maintained during the second nine weeks. The decrease was not statistically significant (Estimate= -6.171 mmHG, 95% CI= -15.06, 2.72, p-value=0.1708). However, a sustained decrease in mean systolic blood pressure of 6 points does have clinical significance. A decrease of 2–3mmHg is associated with a 2-4% reduced risk of heart attack, 4-6% reduced risk of stroke. Similar reductions were achieved in a controlled trial by Simmons et al. (2015) looking at diabetes management and peer support.

4.7.3 Dyad Cooperation (Aim 3) - Semi-structured Interviews

The third aim was to gain an in depth understanding of how dyad members cooperate. To achieve this aim, semi structured interviews were conducted with 21

randomly selected dyads (Table 13) (one member of two different dyads was unable to complete the interview, leaving 40 total who were interviewed) who completed the program, and with the three nutrition educators who led the health education classes. The interview questions (Appendix D) and analysis were guided by the two main Transactive Goal Dynamics Model (TGDM) constructs, dyad interaction frequency and goal coordination, which describe the ways dyads should cooperate to attain their goals.

Interviews were also used to explore qualitatively participants' and nutrition educators' perceptions of feasibility, other personal or social contributors to their health, and recommendations for program improvement. To assess feasibility, participants were asked whether or not they enjoyed working with a partner and if it was helpful in achieving their goals. Given the importance of socioeconomic and environmental contributors to health, participants were asked about any factors outside of the program that affected their ability to pursue their health goals. Finally, participants reflected on their experiences and suggested how to improve the program.

Deductive open coding was used to describe additional themes that arose outside of the a priori TGDM framework. All participant and nutrition educator interviews were completed by the PI and lasted from 23 minutes to one hour and 34 minutes. During each interview, answers were summarized and read back to the interviewee to allow them the opportunity to clarify any statements and confirm that their answers were interpreted correctly. Interviews were digitally recorded and transcribed verbatim. Transcribed interviews, were stored in NVivo qualitative data analysis software system to aid in coding, organizing, and managing text.

4.7.3.1 TGDM Construct 1: Dyad Interaction Frequency (Goals, Interactions, Motivation)

It is important to understand how dyad partners cooperate and whether any patterns emerged that helped them achieve their health goals. Dyads that are high in interaction frequency, the first construct of the TGDM, are most successful at achieving their goals. Interaction frequency includes dyads having similar goals that they decide on together, opportunities to interact together to achieve those goals, and mutual motivation. Dyads developed both individual and team goals, communicated via text, phone, and face-to-face, and most often motivated one another by providing emotional support and encouragement.

Team goal setting – To come up with their goals, during the dyad training session, dyads talked about what was important to them and then decided on their team goals. Most dyads did set a goal to eat more fruits and vegetables and increase physical activity. They also identified a variety of additional health goals. Some focused on decreasing salt intake or sugar intake in order to decrease their blood pressure and manage their diabetes, and ultimately to get off medicine. Increasing water and walking and decreasing portion sizes were also common goals. One participant reported that she and her partner's goals were "Basically, cutting off at the six o'clock time [eating], more water, trying to get that water...take my blood pressure medicine at night, she doing the same thing." Dyads had both team goals and individual goals if there was a specific health concern of one member or one member was already doing what is recommended. For example, one dyad agreed they would both focus on increasing vegetable intake, but only one needed to focus on increasing physical activity.

...we decided that we would try to make a conscientious effort to eat more, you know, vegetables. [My partner] is an exercise fanatic...but I exercise like Tuesday,

Thursday..., my goal is, you know, to be very conscious of what I'm doing, trying to incorporate a little bit more activities.-MH

Opportunities to interact – Dyads used a combination of calls, texts, and face to face meetings to interact. Calls and face to face were more popular for participants who were less text savvy. Very few were able to do activities together, but often interacted face to face on Sunday mornings for quick conversations. One participant described her interactions...

Probably two, at least twice a week, sometimes three, I would always see her on Sunday...we sat together on Sunday morning. And then we talk about what we did for the week, what we didn't do. And then I would text her during the week or she would text me. -PC

Of all the dyad relationships, the friend dyads were most likely to report making time to do activities together. For example, one participant described her and her partner's weekly walks.

We both walk on the weekends...early Saturday morning. We both up early anyway. So it's not difficult. I don't have to wake her up she don't have to wake me up. So we can both walk and its cool, its crisp outside. We've managed to walk and then we put on the Word of God and allow him to minister to our heart and minister to our mind -GR

Interactions between dyads were largely described as “check ins” and the phrase “accountability partner” was often used to describe the nature of the relationships. When asked to describe what their conversations or text exchanges were like, a typical response was,

I would text and say, how did you do this week? And she would respond and say, Well, you know, I did this today, or I did that today, or I didn't get to eat all my fruits and vegetables. You know, I didn't exercise. -MH

Motivation - During the peer support training class, dyads shared their motivation for joining the class and what motivates them to achieve their goals. Most participants reported joining the class to increase their knowledge about health topics they know are

important. Some mentioned knowing how valuable the class was and being interested in taking it because it was offered at no cost. Many mentioned their desire to better manage a chronic condition like diabetes, high blood pressure, or obesity. “I needed more strength and I noticed my legs and knees was hurting because of the weight and because of all the walking I gotta do.” A few people also talked about seminal events in their past that motivated them to start making changes. For instance, one participant talked about his experience with kidney disease 12 years ago.

Well I, um, I used to be a big guy. A real big guy. I used to be um around about 230-240, until I got sick, truly sick...and went on dialysis. I lost all the weight. So then afterwards, I decided I don't want to be a big boy no more. So I'm going to try and stay, maintain the weight I had.-JJ

When asked how they motivated their partners while working together, or how their partners motivated them, participants overwhelmingly cited encouragement, being there to talk or text, or that just knowing someone was there was motivational. As one participant put it, “Well, it’s just like you know, it was kind of like just a fellowship. Just talking”. When asked how they would respond if their partner shared that they were falling short of achieving their goals, most participants said they would try to encourage their partner by reminding the partner of their goals, or that ‘there was always tomorrow’, ‘that their best was all they could do’, and ‘that they could in fact do better’. Dyads were more likely to model healthy behavior instead of directly instructing their partners to make changes. One participant described how emotional support helped her with eating...“And then a lot of times, we'll sit there and if we're talking, we're talking about issues because you know, there's stress eating and we'll talk about that and we won't eat.” Another participant talked about how just having someone there to talk to was helpful.

It [having a partner] was good to have. You know you called and mess around...Did you walk today man, yeah I walked around the church. Or I did this, I did that. I say okay. You go away, you out there by yourself. You know, sometimes you do need a little encouragement.-ES

Among good friends, support might also be chastising their partner in a joking manner. For example, one participant said of her communication with her partner after being tempted at work to eat junk food, "I'm texting her and I'll tell her, girl I'm having a bad day...I had the nerve to [have] some donuts. And she'll say, 'girl you know good and well you don't need that on that butt!'[laugh]". Partners reported not feeling overwhelmed or taken aback by their partner's chastisement if they felt it was being done in a considerate way. As one participant said, "You know, I knew she was coming from a good place. As far as trying to get me to, you know, to stay on course, you know, and do a little bit more." Partners also noted that when they saw or shared how their partner was able to keep up with their goals, just seeing or hearing about their accomplishments was motivational.

Eight of the dyads had one member who felt guilty for not motivating their partner enough. In each case, the other member acknowledged that they were the driver of the relationship. Three of these were family dyad members who expressed wanting their partner to do better, but knowing they had tried unsuccessfully before to help their partner improve their health. Two of the three family members felt that there were mental health issues impacting ability to change. All but two of the dyads with unequally motivated partners were happy to provide support, even if it was not always reciprocated with the same intensity.

Participants appreciated motivation from their partners, but they also drew motivation from the personal enjoyment they got from being healthy or from engaging in

physical activity. Several participants talked about reconnecting with activities like dance, Zumba and softball that they always liked or did when young. An added bonus was that they now had a chance to help motivate someone else, or be acknowledged for maintaining or improving on their own good habits.

4.7.3.2 TGDM Construct 2: Dyad Goal Coordination (Challenges and Strategies to Goal Attainment)

Dyads high in interaction frequency and goal coordination are most successful at achieving their goals. Goal coordination is the second main TGDM construct and requires dyads talk about challenges that inhibit goal attainment and together think of strategies to overcome them. Dyads were asked to share some of the challenges as well as strategies that they or their partners thought of to overcome challenges. The most commonly cited challenges were not enough time to shop for or plan ahead to make healthy meals or maintain an exercise routine, or meet together for activities. In response, however, dyad members rarely discussed specific strategies that could be used to overcome challenges. Members were more likely to come up with solutions on their own.

Challenges to goal attainment - Although participants stated that they would have liked to get together with their partner to, for instance, go to an exercise class or walk, the vast majority were unable to do so. They cited scheduling problems as the main reasons why. One participant describes he and his partner's conflicting schedules, "He might be doing something around the church and I might have to go do something for someone else or go cut some grass or change some breaks or something like that. So we won't really be able to be together." Even finding a consistent time to talk or text was difficult for some. The program took place in the spring and part of summer and many participants went to church conferences during this time or out of town to visit family or vacation.

The majority of participants were also very active in their churches as deacons, teachers or serving on various committees. Others were working and did not like to go out in the evening or had family obligations after work. Another challenge was not being motivated to make changes to a comfortable routine, As one participant stated,

Yeah, I mean, yes, there were challenges. Like I said, you know, you get in a routine in your life. And to, you know, bring something new into it, it can be, you know, challenging to change your way of doing things.-MH

Several participants talked about the fact that they were already eating vegetables every day, but didn't know that the recommended amount was more than they would normally eat. Therefore, it was a challenge for them to fit in all of the servings each day. Along the same lines, participants talked about eating and preparing and liking only a few types of vegetables. They sometimes got tired of eating those vegetables, but weren't familiar with or didn't not know how to prepare others that they liked. This was one of the reasons they gave for enjoying the recipes and food tastings – they were exposed to something new. Despite the exposure, however, it was still a challenge to expand the types and quantities of vegetables that they ate. They were more familiar with different types of fruits and consumed more of them. Compounding this issue, they felt, was having to cook vegetables (unlike fruit) to eat them which took time that they did not always have.

Therefore, when they ran out of vegetables, instead of cooking again, they would simply snack or find something else convenient to eat.

And, and like I said...its there. You know, sometimes, you know, like, my vegetables be there. But its just maybe, okay. I might feel like okay, you know, I don't really feel like eating a whole lot right now. You know? Just let me eat something to kill the hunger. -MH

Additional challenges mentioned were not having the time to do extra food preparation or exercise – especially with a busy work schedule, difficulty making good food choices or exercising while traveling, and craving sugary foods.

Strategies to overcome challenges - Dyads reported rarely sharing specific details of their individual challenges with their partners in order to find solutions. Instead, they shared general challenges like, ‘this was a tough week’ or ‘I just haven’t been able to exercise’, and received general encouragement like, ‘I know what you mean’ and ‘keep trying, you can do it’. They figured out specific strategies often on their own based on information they received in class or their prior experience and knowledge. For instance, to address the challenge of not being able to fit in the required servings of fruits and vegetables each day, one interviewee said,

Well, I got some examples from the class. You know, at first I found it difficult, you know, because I thought that that was a lot of fruits and vegetables. And they said, make smoothies. So that's what I've been doing. So, you know, that's helped me reach my target.-PC

Another strategy reported was not buying junk foods so they were no longer in the house and accessible. One participant stated that he stopped eating candy bars before bed and noticed a decrease in his morning blood sugars which prompted him to continue this new behavior. Several who live in an area where buffets are popular eating places stated that they started staying away from buffets because they knew they would likely overeat once inside. Planning ahead to shop for and prepare meals during a time in their schedule they know isn’t as busy was another strategy. One participant discussed her new shopping habits,

...when I go to the grocery store, you know, my mentality of what I'm going to purchase is different. You know, I'm looking at labels there, you know, I make sure that I get my fruits and vegetables that I intend to, you know, prepare for the week. -MH

She explained that while she used to only prepare a few vegetables and then snack or just eat a sandwich when she ran out, she now prepares double the vegetables so she won't run out and doesn't have the burden of cooking more often. Several people said that overcoming a challenge was something that you had to put your mind to and just do. "If you quit something, you gotta quit cold turkey. Just leave it alone."

There were a few examples of dyads strategizing together to overcome challenges. For example, one shared activity that several interviewees expressed wanting to do was to get together and walk. Only four of the dyads interviewed were actually able to do this. However, a strategy that two dyads came up with was to call one another and set a time when they would walk on their own. As one member stated, "Yeah, both of us is kind of busy. So we decided we were going to walk, do the walking thing. So, he was going to walk on his own and I was going to walk on my own." In this way they were both able to accomplish their goal by coming up with a shared solution.

4.7.3.3 Goal Attainment

As a secondary aim of this feasibility study and as part of understanding the outcomes of dyad cooperation, we were interested in whether dyads were able to achieve their health goals. Participants were asked if they felt they accomplished their goals. Partners do better when they are aware of their partner's goals and want them to succeed as much as they want to succeed themselves. Therefore, interviewees were also asked to discuss what they knew about their partner's goals. We found that all participants made some improvements and felt they did well in accomplishing their goals. They were less familiar with their partner's specific individual goals.

Examples of the individual achievement that participants highlighted including increasing their vegetable consumption, decreasing portions of high fat foods, making more time to walk or cutting down on sugar consumption. All participants cited having achieved something during the class whether it was all of their goals or simply becoming more aware of their eating and exercise habits and how to improve them. One participant described his dietary changes.

I usually eat fried chicken just about every day. Cuz my sister would cook it right? And that's where I would usually eat it. And when I stopped eating the fried chicken, She said what's wrong with you? I say, well you know, I'm in this nutrition class you know, I want to try to stick with it. -ES

Dyads had some difficulty remembering their partner's specific goals. They were able to identify broad goals like wanting to lose weight or eat better; but, when asked anything more specific answered "I'm not sure", or "I don't know". Although dyads couldn't always remember their partner's individual goals, they expressed how they enjoyed hearing about their partner's success or sharing the success of accomplishing goals with their partner.

4.7.3.4 Peer Support Program Feasibility

To explore qualitatively perceptions of feasibility, participants were asked to share their feelings and thoughts about working with a partner on health goals for an additional nine weeks after the first nine weeks of health education classes. Overall, participants and nutrition educators thought pairing with another member to work on health goals was a positive experience, easy to do, and a good way to practice what they learned during the first nine weeks of classes.

Participants' perceptions of program feasibility - All interviewees reported that they enjoyed the program and that it added to their health knowledge. They also

overwhelmingly agreed that it was helpful having dedicated time to work on their health goals after the first nine weeks. As stated by one participant...

I think it was needed to help because if you just told people about the food and the fruits and stuff and sent them on their way, that probably wouldn't, even I probably wouldn't try anything else. But [when you have a partner] you got someone seeing if you progress with this, or you just going to leave it alone. So, I think it was great; absolutely need the next nine weeks. See what you learned. If you've learned anything, you put it to use.

Two participants said they would have opted against having the peer support component of program, feeling either that the first nine weeks of health education classes was long enough, or that they had enough information to work on their own.

Dyads liked working with a partner during the second nine weeks and felt like it was easy to do. One participant said of his partnership with a friend, "For me it wasn't hard, because like I say, we get along. So it wasn't hard working with him." Another woman described her interaction with her sister, "...It's easy to talk with S., because she knows me and I know her. And we know our weaknesses, as well as our strengths. And so that helped a lot." Friend dyads were most positive about their experiences. Among the dyads who were acquaintances, some participants expressed uncertainty about how often to reach out to their partner – especially if they were not getting a consistent response. Among family dyads, some partners recounted past negative experiences encouraging behavior change. In these cases, they felt their family member had to be self-motivated and were weary of pressuring them. Despite the hesitancy, only two participants from two different dyads – one family dyad and one acquaintance dyad - expressly said that they would have chosen another partner. Most participants stated they would work together again, and several made specific plans for ongoing engagement and support.

Yeah, and I told her, my goal next year, is to do that walk with you. And I told P, I said P, we are going to continue you know, I said we're going to continue to kind of keep each other accountable from now on. We will not let this be the end.-MH

Nutrition Educators' Perceptions of Feasibility - There was consensus among all three nutrition educators that it was feasible to add a peer support component on to the existing healthy weight promotion program. Their biggest concern was that it might be difficult to recruit churches and maintain participant interest for the duration of the program. While it was difficult for two of the nutrition educators to recruit faith communities, they did not think program length was a deterrent. They explained that they never made contact with most churches and when leaving messages, only mentioned the program's focus and not length. The third nutrition educator stated that she had three churches that were excited about having a peer support program. One declined participation because of the length. They also expressed that initially it was difficult to fully grasp what incorporating dyadic peer support would look like, but once implemented found it helpful for participants. Each suggested having participants set their goals earlier in the program.

4.7.3.5 Socioeconomic and Environmental Influences on Health Goal Achievement

Health is influenced by interpersonal relationships and community and environmental characteristics beyond the church program. Therefore, participants were asked about other social contributors to health and if they influenced their ability to achieve health related goals. Generally, participants stated they had the resources needed to be healthy. Stressful and time consuming work and home environments were the biggest social influences. They also said changes they made positively impacted their family members and the larger church community.

Participants cited several resources that helped them improve or maintain their health. Resources cited included connections to the food bank, living near grocery stores, utilizing their home or yard if they couldn't get to a gym or park for physical activity, and having their needed medications. Health prohibitive factors were work stress, or getting home too late or tired from work to cook or exercise. Several participants described family circumstances, specifically taking time to care for a family member who was sick, that made it difficult to exercise or cook in advance for themselves or to follow their health goals.

Participants influenced their home environment by cooking more healthfully, buying fewer snacks for the home, and eating out less. One participant reported that as a result of increasing the fruits and vegetables she and her husband consumed, his diabetes blood sugars had greatly improved. Participants also noted that their actions and the program led to changes in their church environment.

Oh yeah, cause we had a Mother's Day program. They had baked chicken, salad,...fruit cups...bottled water, and I think we did have some lemonade. But we didn't have like we used to have, no BBQ, no fried chicken. We don't have none of that no more.-JJ

Few participants said these changes in the church environment affected their health habits because they were already making changes. Almost two thirds reported that they would have joined the program whether it was offered in their faith community or elsewhere in the community because they saw it as such a valuable program. Those who preferred having the program at church felt that having it at church was more convenient, more personal and comfortable, and important in order to educate members about health topics.

4.7.3.6 Recommendations

This study was implemented to assess the feasibility of using dyadic peer support to augment an existing health promotion program. It was important to learn any suggestions participants had to improve the program. Several suggestions were made.

Participants felt that having dyads partner earlier in the program would be helpful. They also recommended instead of going from weekly to monthly classes, to decrease to biweekly classes, and then monthly. Tapering group classes more slowly would allow dyads to learn what other dyads accomplished over the two weeks, and some of the challenges they faced. They felt both would be motivational. One participant felt that the group would be able to gather together for this meeting independently so as to increase their ownership of the program.

Participants also offered their opinion for how members should be matched, though there was not a consensus. Dyads liked choosing their partner but suggested the next best matching method was by location. Motivation level or goals were also suggested. Participants reported being open to partnering with anyone but preferred their partner have a similar level of motivation or be easy to get along with..."I can get along with anybody, you know, as long as they got a good personality. You know I have to check the personality off first." [laugh] This is why they were happy with being allowed to choose their own partner.

Table 13. *Interviewees*

<u>Dyad Initials</u>	<u>Site</u>	<u>Dyad</u>	<u>Age</u>	<u>Sex</u>	<u>Highest Level of Education</u>	<u>Relationship Type</u>	<u>Partner Chosen or Assigned</u>	<u>Weekly Interactions</u>	<u>Feasibility Score</u>	<u>Classes Attended</u>
EW	1	1	69	F	Some college	Friends	C	1.8	4.7	11
OH	1	1	67	F	Completed College	Friends	C	1.8	4.7	9
AK	1	2	40	M	Completed College	Family	C	0.7	4.6	9
RK	1	2	39	F	Completed College	Family	C	0.7	4.1	11
FG	1	4	73	F	Completed HighSchool	Family	C	1.4	4.1	12
RG	1	4	60	F	Some college	Family	C	.	4.7	10
JB	1	5	63	M	Completed HighSchool	Friends	A	.	3.6	12
LD	1	5	78	M	.	Friends	A	.	3.3	11
EE	1	6	73	F	Completed HighSchool	Friends	C	7.0	4.4	10
JR	1	6	68	F	Completed College	Friends	C	7.0	4.0	10
BS	1	7	66	F	Some College	Family	A	.	3.8	8
DS	1	7	74	F	.	Family	A	1.0	4.3	10
GR	1	8	58	F	Completed HighSchool	Family	C	3.1	5.0	11
SO	1	8	53	F	Completed HighSchool	Family	C	5.0	4.9	10
CC	2	9	60	F	Completed College	Acquaintance	A	0.3	4.1	10
LB	2	10	56	F	Completed College	Friends	C	2.5	3.7	10

CM	2	10	55	F	Completed College	Friends	C	2.5	4.6	10
DM	2	11	.	F	.	Friends	C	6.8	4.2	11
EB	2	11	68	F	Completed HighSchool	Friends	C	7.0	4.2	10
MH	2	12	66	F	Completed College	Friends	C	1.9	4.6	11
PC	2	12	66	F	Completed College	Friends	C	1.3	3.3	12
AP	2	13	.	F	.	Friends	A	2.0	4.4	9
RB	2	13	62	M	Some College	Friends	A	2.8	4.9	11
AM	2	14	.	F	.	Acquaintance	A	.	4.6	11
LD	2	14	52	F	Completed College	Acquaintance	A	0.5	3.7	11
AJ	2	15	.	F	.	Acquaintance	A	.	4.6	8
CB	2	15	61	F	Some College	Acquaintance	A	1.0	4.7	8
TR	2	15	64	F	Some College	Acquaintance	A	1.0	2.7	12
SM	3	16	75	M	Some College	Family	C	0.6	4.3	12
ES	3	17	61	M	Completed HighSchool	Friends	C	1.0	4.4	12
JJ	3	17	50	M	Completed HighSchool	Friends	C	1.0	4.0	11
MH-2	3	18	67	F	Completed HighSchool	Friends	C	.	5.0	10
JR	3	18	68	M	Completed HighSchool	Friends	C	7.0	4.2	12
FL	3	20	69	F	Completed College	Friends	C	0.3	4.6	12
MW	3	20	64	F	Completed HighSchool	Friends	C	0.3	5.0	10
MK	3	22	75	F	Some College	Family	C	.	4.1	11

EK	3	22	80	F	Some College	Family	C	.	4.2	9
AR	3	26	71	F	Grade 11	Friends	C	1.0	4.7	10
JT	3	26	54	F	Completed HighSchool	Friends	C	1.0	4.2	12
MB	3	28	62	M	Completed HighSchool	Family	C	7.0	5.0	12
DB	3	28	62	F	Completed College	Family	C	7.0	5.0	12
AW	3	32	78	F	Grade 10	Family	C	.	4.4	11

4.8 Discussion

Dyadic peer support is a unique and potentially sustainable and effective approach to health promotion that has not been used in African American churches. The purpose of this multi method prospective study was to evaluate the feasibility of using dyadic peer support to augment an existing nutrition, physical activity, and weight promotion program in three African American churches in North Carolina. Both quantitative and qualitative analysis was done to address three aims: 1) program feasibility, 2) changes in health outcomes during the 18 week program, and 3) how dyad partners cooperate to achieve their health goals. Study results across all three aims indicate that it is feasible to implement a dyadic peer support program within African American churches.

4.8.1 Aim 1 -Feasibility was Measured by Church and Participant Recruitment and Retention, Participant Feasibility Scores, and Participants' and Nutrition Educators' Perceptions of Feasibility.

4.8.1.1 Quantitative Results

Church recruitment across the three counties took nine months which was longer than expected but in keeping with other church health promotion studies (L. B. Williams et al., 2015). Of the 14 churches where follow up contact was made, busy church scheduling was the most often cited reason for not hosting the program. Participant feasibility outcomes were similar to results in other dyadic and weight loss studies. Participation rates in health promotion programs over 50% are associated with better outcomes (O'Brien et al., 2015; Patel et al., 2017). The program completion rate was 78% and the average number of classes attended was nine out of 12 (75%) (L. B. Williams et al., 2015). When looking just at participants who were part of a dyad, 95% actually completed the program which is similar to completion rates seen in other dyadic weight loss studies (Aschbrenner et al., 2016; Leahey & Wing, 2012; Samuel-Hodge et al.,

2017). This may be due to having additional accountability while working with a partner or reflect that after the first nine weeks, only the most dedicated participants remained. Feasibility survey results showed that over 95% of participants would work with their partner again on health goals.

4.8.1.2 Qualitative Results

Interviews with participants and nutrition educators also reiterated feasibility survey results. Participants enjoyed the program and felt that in addition to the first nine weeks of health education classes, having the opportunity to work with a partner for an additional nine weeks to achieve health goals was helpful.

Finally, dyads provided their perceptions of the partner matching process. Dyadic studies have paired people randomly based on a few matching characteristics like gender or goals (Heisler & Piette, 2005; Leahey & Wing, 2012), allowed participants to choose their partners (Kumanyika et al., 2009; Wing & Jeffery, 1999), or with natural partners like spouses or parents (Samuel-Hodge et al., 2017; Sorkin et al., 2014). No studies to our knowledge have reported on how church members, who at times describe themselves like family, might best be paired. Formative research with African American church members revealed that most members stated they would be willing to work with anyone. However, dyadic studies show friend pairs working relatively better than family pairs or stranger pairs in achieving weight loss. Therefore, participants were allowed to pick a partner or be paired randomly if they had no preference. Participants were happy with being allowed to choose their partner and felt that that method worked well. With the exception of two participants, they also had no objections to being assigned.

4.8.2 Aim 2 - Goal Attainment and Health Outcomes of Participants were Measured Over the Course of the 18 Week Program and While Working as Dyads.

4.8.1.3 Quantitative Results

A third aim of this study was to assess whether participants were able to make any changes in diet and physical activity during the 18 week program while working independently and as dyads. Other studies show peer support from church goers helps participants improve physical activity (Baruth et al., 2013) and fruit and vegetable consumption (Condrasky et al., 2013; Thomson, Zoellner, & Tussing-Humphreys, 2014). Similarly, in this study, participants made continuous improvements in both physical activity and fruit intake over the whole 18 weeks. Changes in servings of fruit intake were small (0.4-1) but significant and reflective of other church based health promotion programs which had significant but small increases (0.4-1.3) in fruit and vegetable intake (Allicock et al., 2013; Resnicow et al., 2004). Weight loss was significant (-2.89 lbs, $p < .05$) during the first nine weeks and was similar to weight loss (-2.3 lbs, $p < .01$) in another nine week lifestyle change program for African American churches (Oexmann et al., 2000).

Maintenance of improved health behaviors after intensive programming is a challenge for health behavior change programs and social support can help (Kirchhoff, Elliott, Schlichting, & Chin, 2008). In this study, changes in weight, as well as improvements in vegetable consumption gained during the first nine weeks, were maintained during the second nine weeks while participants worked in dyads. It is possible that augmenting programs with a dyadic peer support component may also improve maintenance and should be explored further in future randomized controlled efficacy studies. Importantly, participant engagement with this 18 week health promotion

program was high and, as seen in other studies where participation is high, translated into clinically significant results in weight loss, FVI and physical activity for a proportion of participants (Quinn & McNabb, 2001; Samuel-Hodge et al., 2017; Sattin et al., 2016).

4.8.1.4 Qualitative Results

Participants felt their goal attainment was high and were excited with their achievements. Goal attainment described by participants included being more aware of the foods they should eat, portion sizes, eating late into the evening, increasing the number of fruits and vegetables, decreasing sugar and fried foods, increasing water intake, increasing physical activity, losing weight, and decreasing blood pressure and blood sugar levels. Specific ways in which dyad partners influenced one another's goal attainment was further explored as part of Aim 3.

4.8.2 Aim 3 – How Dyads Cooperated to Attain Goals was Explored in Semi Structured Interviews

4.8.2.1 Quantitative Results

Thirty-two friend, family, and acquaintance dyads either chose or, if they had no preference, were assigned to work together. Dyads communicated on average 2.5 times each week. Other dyadic studies suggested a minimum of once per week for partners who do not live together (Heisler & Piette, 2005; Leahey & Wing, 2012).

4.8.2.2 Qualitative Results

Dyads were strongest at developing team goals, communicating weekly (though limited in their ability to get together for activities), and providing motivation in the form of encouragement. They were less likely to share details about challenges they experienced and to work out strategies as a team to overcome the challenges.

Interdependence frameworks, such as the TGDM, state that when participants are paired together and share similar goals, they are as interested in their partner's success as their own. Dyads reported no problems talking together to come up with team goals. Participants also had individual goals which they were more likely to remember at the end of the program. While participants were encouraged to focus on increasing fruits and vegetables and physical activity, they created a variety of goals. This may have made it more difficult to remember partner goals compared to other dyadic studies that focus on one topic such as weight loss (Cornelius et al., 2016; Leahey & Wing, 2012) or diabetes (Heisler & Piette, 2005).

The TGDM also suggests that when dyads are aware of each other's strength and challenges, they can develop shared strategies to overcome the challenges and better achieve their goals. This is especially true when they cooperate and provide supportive communication (Samuel-Hodge et al., 2017). Participants communicated relatively frequently (twice weekly), but did not often discuss with their partners in depth or in detail the specific challenges that they had achieving their health goals. Therefore, they did not often work together to figure out strategies to overcome the specific challenges. Interviews revealed several reasons for this.

First, conversations were often health check ins without partners going into depth about their experiences. An important theme that emerged in formative research with church members is that people are adults and that they will do what they want and know to do. All members participated in education classes. Long term participation in the peer support program and semi structured interviews indicated that most were familiar with what they needed to do to improve their health and were motivated to change. Participants perceived that their partners were in a stage of change that didn't require

more information, but instead were ready for action and just needed support (Prochaska et al., 1992). Thus, although participants were interested in their partner's success, they did not feel it was their duty to diligently track their partner's behaviors or insist on behavior change. Instead, they allowed their partners to share what they felt comfortable sharing

Members were clear that their first concern was the partner's overall well-being and to uplift and not criticize or demand more of their time. Further, conversations often included brief discussions of other things that may be going on in the church, activities that partner might be involved with, or about family members. Members repeatedly said they assumed their partners were doing as much as they could given their busy schedules or their personal and family challenges. Acquaintance partners especially, and some friend and family partners, expressed that they were unsure of how often they should reach out to their partner – especially if they stopped hearing back from them. As a result, participants limited both the extent to which they requested in depth information from their partner's progress with respect to diet and exercise, and the extent to which they made specific suggestions about changing behaviors.

Collectivist cultures prioritize community well being over individual concerns. African American culture has been described as collectivist (Kreuter et al., 2003), In a literature review focusing on the interaction between culture and social support, Kim, Sherman, and Taylor (2008) found that collectivist cultures might be less likely to share explicit details about their challenges or to expect peer support. Reasons included not wanting to overburden peers, knowing that they would receive some support without asking, and avoiding disrupting personal relationship by revealing too many problems. Participants did indicate that they did not want to burden their partners, especially if they

felt they were already doing as much as they could to provide support or manage their own challenges. They also discussed the importance of caring for the whole person and not asking so much about health habits that it might jeopardize positive relationships between church members. However, I did not include African Americans not affiliated with a faith community or members of White American faith communities. Therefore, it is not clear if these perceptions were due to African American cultural characteristics or might be common to other faith communities or cultures as well.

Though participants rarely helped each other strategize to overcome challenges, most were grateful for the support they did receive and did not initially express the desire for their partners to be more assertive or offer more suggestions. Diabetes self-management includes both education and support for self-management behaviors (Powers et al., 2017). Results from this study might reflect that after attending education classes, participants felt that what they most needed from their partner was emotional support and encouragement and not instruction.

When probed, however, some partners acknowledged that not speaking with their partners more often or more in depth may have been a missed opportunity. For example, one interviewee was asked if she had considered using an exercise band at her desk when she could no longer leave and walk on lunch break, which caused her to stop exercising. She said neither she nor her partner had talked about this specific challenge or possible solution, although they spoke weekly and encouraged one another. However, she also agreed that she would have welcomed the solution had it been offered by her partner. Even during group classes, when suggestions were made by church members about how to overcome challenges, people were always receptive.

There is a gap between the perception that partners may not be open to suggestions or already know what to do, and the reality that members were actually interested in hearing suggestions that might help them. This may mean that dyads will benefit from training that allows more opportunities to practice communicating their ideas and reassurance that they will be received positively. It also highlights the nature of relationships among this sample of adult church members. Church members sought to remain cognizant of the multiple experiences impacting other's lives and health, and respect that other individuals are adults capable of making sound decisions for themselves.

Participants overwhelmingly and enthusiastically reported that the type of motivation and support most often provided and received was in the form of social and emotional support and encouragement. Qualitative data from two dyadic studies, one targeting weight loss (Aschbrenner et al., 2016) and the other diabetes (Heisler & Piette, 2005), found that dyads reported they enjoyed supporting and encouraging their partner. Likewise, they appreciated receiving reminders to stay on track with their goals. One dyad reported trying to get together several times during the week to exercise. Partners were especially happy to talk with someone with their same condition. In this study, participants gave specific examples of texts or face to face communication that included encouragement. Some participants, especially those who had more supportive partners or who were dealing with personal challenges, were especially grateful. Participants said knowing someone was there to talk to if they wanted was helpful. Higher frequency of communication did not correlate with higher program feasibility scores, reiterating findings that participants benefited from knowing their partner was there for them, even if they were not able to communicate or get together often.

4.9 Limitations

There were several limitations to this study. First, this was a feasibility study and did not utilize any control groups. It is possible that changes may have occurred regardless whether an intervention or dyadic peer support component was implemented. This study's findings should be further explored using a control group.

Second, this study took place in three different faith communities with three different nutrition educators. The differences could have influenced outcomes and perceptions of feasibility. However, church site was controlled for in analysis of biometric, diet and exercise outcomes. In addition, there was no significant difference in feasibility scores between churches. Thus, although differences were present, the study team made an effort to account for them in data analysis methods and they did not lead to differences in perceptions of feasibility.

Another potential limitation is not all participants were interviewed. It is possible that dyads not interviewed may have provided different information or perceptions of their experiences. However, given that participants were interviewed from three different church sites and the themes which emerged were universal based on the random samples interviewed, it is likely that the results from the interviews are credible (Morse, 2015).

Restricting the study to churches in North Carolina limits our ability to generalize results to other geographic areas. It is possible that the nature of relationships between members of faith communities may be different in the South. It's also possible that the organization and structure of faith communities in North Carolina may be different than on other regions and maybe more or less conducive to this type of intervention.

One final limitation is that this study did not include a measure of stress, well-being, or religious social capital. Through semi structured interviews, it became clear that

although participants did not talk about how they were affected by stress, they sometimes described their lives as very busy which can lead to stress and affect health or the ability to make health behavior changes. One of the benefits of dyadic peer support and working with other members of your church is that social interaction can sometimes strengthen social capital and sense of belonging and in so doing, decrease stress. Decreasing stress can in turn improve mental and physical health directly, or the ability to take action to improve health. Therefore, measures of both may have been helpful in further clarifying or improving how dyadic peer support may be used to improve health and should be included in future studies.

4.10 Implications

African American churches are popular sites for health promotion programming to combat health disparities. Peer support in the form of group classes and lay health leaders is often used to promote ownership and sustainability. Challenges reported while using the lay health leader model and success using dyadic peer support warrant alternative approaches to program implementation.

Findings indicate that using dyadic peer support to augment an existing health promotion program in African American faith churches is feasible. Participants enjoyed working with their partners for nine weeks and were able to achieve many of their health goals. Though some participants felt they didn't need a partner to accomplish their goals, they all appreciated having someone available to check in with and share emotional support and encouragement. Over 95% report wanting to work with a partner again. More studies are needed to test the effects of dyadic peer support with control groups. Future programs should help dyads improve problem solving to overcome challenges, identify

consistent times to meet, initiate partnering earlier during the program, and taper group meeting frequency more slowly.

During the 18 week program, dyads achieved a small but significant increase of 1.1 servings of fruit. Body and Soul, a federally supported and widely known health promotion program designed for African American churches, achieved a gain of 0.35 servings of fruits and vegetables (Allicock et al., 2013) over six months using lay health leaders trained as peer counselors. The challenges that the health leaders experienced (e.g., reaching members inconsistently, lacking confidence to act as counselor) implementing the program may be reflected in the small gains. The comparative outcomes from the current study highlight the need for controlled studies to explore the potential of peer dyads to promote health with less extensive training and greater reach.

Small but significant changes in weight and vegetable intake that were achieved during the first nine weeks were maintained while dyads worked together. The design of this feasibility study does not allow us to conclude that change maintenance was due to the implementation of the dyadic peer support component. Results from other studies suggest that a dyadic peer support component may maintain behavior change when used to augment more time and labor intensive health promotion programs. For instance, in two peer support studies on diabetes and weight loss, lay health leaders provided bimonthly phone calls and monthly in person booster sessions for three and six months to maintain changes gained initially during weekly classes (Sattin et al., 2016; Tang et al., 2014). These leaders underwent extensive training and were paid a stipend – two factors which may not be possible in less resourced environments. To fully explore the potential of a dyadic peer support component to maintain or improve health behaviors, additional studies including control groups are needed.

In this study, group classes were held weekly for nine weeks and after the ninth class, participants only worked with their partner and didn't reconvene as a group until four weeks later. Participants said during interviews, however, that they truly enjoy convening as a group and missed the interaction when weekly classes were changed to monthly, partly because they were used to the group and partly because they had not yet gotten used to working with their partner. Future dyadic peer support programs can improve partner communication and support and potentially outcomes by tapering class meetings more slowly. They may also benefit by partnering people earlier during the first nine weeks of class so that they can practice how to strategically tackle challenges while having the support of the group.

Dyad feasibility scores were high for the whole sample; they were highest among friend pairs and slightly higher for family pairs compared to acquaintances. Thus, allowing participants to choose their partner and encouraging friends, not just family members, may make a difference in how engaged participants are in the program and how willing they are to complete it. Participants suggested that matching by location would be good because it is easier to get together; further, matching by goals would work well because people have the same focus. However, even participants who lived nearby had difficulty scheduling meetings times. Future programs should strongly encourage dyads when they first begin working together, to negotiate the best weekly times to interact – maybe using class time once the weekly classes have ended.

Although participants perceived that asking questions or detailing challenges and strategies might not be well received by their partner, most interviewees were receptive to suggestions from their partners. Training sessions which focus on problem solving and have ample time to practice role play (Samuel-Hodge et al., 2017; Sorkin et al., 2014;

Whitt-Glover et al., 2013) increase participants' reported ability to problem solve with their partners (Samuel-Hodge et al., 2017; Sorkin et al., 2014). Future interventions should allot more time to training participants through role play to openly communicate and work through challenges with their partner in ways that they feel are helpful, respectful, and caring.

As illustrated by the Socioecological Model, social or environmental factors beyond the church might affect feasibility. Beyond family interactions, no other social or environmental barriers or facilitators to health were often mentioned, even though this group of African Americans was disproportionately affected by obesity and high blood pressure. Participants were so enthusiastic about the program they said they would go whether it was held at church or in the community, but that they enjoyed the personal connections of the church and appreciated seeing healthful changes in the church environment. Thus, for African American church going adults, church based health promotion is still a viable approach. Although structural barriers are often cited as contributors to health disparities among African Americans, participants reported having access to things they needed to be healthier. This may be due to participants not being able to pinpoint barriers, not feeling comfortable sharing their barriers, feeling as though structural barriers are less important than personal motivation, or that this is a subset of African Americans that are less impacted by those barriers.

There was concern that 18 weeks of a program would be too long and deter faith communities from participating; this was not the case. The bigger challenge was faith communities already being very busy with other programs and unable to accommodate additional programs because of limited space, volunteers or free days and times at the church to allow another group to convene. Thus it is important when working with faith

communities to be aware of the best season to start a program based on the community's calendar. Communities that are not too busy to host an additional program and have a need for the program in their community should be prioritized.

4.11 Conclusion

The social and physical church environment can be an important factor influencing members' exercise and dietary habits (Baruth, Wilcox, & Condrasky, 2011). This study indicates that dyadic peer support is a feasible approach to further explore healthy weight promotion and chronic disease prevention in African American faith communities. Future dyadic peer support programs can be improved by incorporating suggestions made by participants and nutrition educators to pair participants earlier and encourage the group to taper weekly educational meetings more slowly. Another study with a larger sample size and comparison faith communities who are provided an 18 week program without dyadic support could further elucidate the value of peer support for improving and sustaining outcomes.

5. Conclusion

5.1 Summary of Findings

African Americans face persistent health inequities. Improvements in health can occur by having a better understanding of and optimizing resources within environments where people live, work, play and pray. The purpose of this dissertation was to explore how to optimize a community resource, African American faith communities and their members, to promote health. This was accomplished by: 1) presenting a concept analysis of religious social capital; 2) conducting formative research to explore and describe African American church members' perceptions about using dyadic peer support to promote health; and 3) implementing a feasibility pilot study of a dyadic peer support intervention to promote healthy weight in three African American churches in North Carolina.

5.1.1 Concept Analysis of Religious Social Capital

Religious social capital is a significant contributor to the health of individuals and communities, particularly among African Americans and ethnic minority communities in the U.S. A concept analysis of religious social capital within the context of health using Rodger's Evolutionary Concept Analysis method resulted in a review of 108 publications from multiple disciplines including political science, economics, social work and medicine. Based on the review, the definition of religious social capital is: Increased individual and collective capabilities that result from reciprocal participation in bonding, bridging or linking social network relationships and activities. These relationships are based on mutual trust and shared values of the members of an established religious body. In this definition, bonding, bridging and linking religious social capital describe the

diversity of social networks and relationships that contribute to how religious social capital affects health.

The review produced antecedents, attributes, and consequences of religious social capital. The antecedents are a defined and trusted social network with voluntary membership and shared values. The attributes are relationships within the network that promote the reciprocal exchange of information and resources between members. The consequences of participating in these networks is increased network trust, more access to resources, less community exposure to negative social determinants of health, and better health outcomes. A model case of African American women and HIV prevention illustrated how religious social capital can be developed and optimized to promote health.

A concept analysis helps highlight next steps needed to better operationalize a concept or use it to improve research or promote health. Additional research is needed in two areas, measurement and interventions. First, a standard instrument is needed to measure this multidimensional concept. A standard instrument might allow researchers and practitioners to more accurately assess changes or differences in levels of religious social capital both within and between studies and communities. Second, two common components of religious social capital missing from existing scales are measures of reciprocal participation and increased productivity. Based on scales of social capital, reciprocal participation can be assessed by whether a member has provided other members with information, support or goods, and whether or not they received information, support or goods from others (C. L. Holt et al., 2015a). Increased productivity can be measured as individual perceptions of increased capabilities, or by measuring changes in a particular outcome of interest (Wingood et al., 2013).

Finally, measures of bonding, bridging and linking religious social capital are rarely included in measures of religious social capital. An example of bonding social capital are the relationships shared by individuals who live in the same neighborhood and are all members of a church within that neighborhood. Examples of bridging social capital are members of different churches with the same denomination, or members of the same church who come from very different neighborhoods or cultural or socioeconomic backgrounds. (Ferlander, 2007; Szreter & Woolcock, 2004). Linking social capital expands networks and access to institutions and organizations that shape the environmental, social and economic policies that influence health (Szreter & Woolcock, 2004).

It is essential to understand the breadth and nature of social networks and relationships in order to best understand and optimize religious social capital. Reliable measures of bonding, bridging and linking religious social capital can inform the development of more effective interventions that build on an individual or religious body's existing or potential relationships and resources.

5.1.2 Preliminary Study on Perspectives of Using Dyadic Support to Promote Health in African American Churches

African American faith communities and the relationships between members are community assets that promote health. Health promotion programs in African American churches use peer support approaches such as group meetings and lay health educators. However, existing programs have not leveraged sufficiently the unique kinship among church members by utilizing another type of peer relationship - dyadic peer support. Dyadic peer support has been used successfully in health promotion programs and as an adjunct to existing programs. It has been suggested as a potentially powerful approach to

health promotion for African Americans. The aim of the formative research study was to explore African American church members' and health educators' perceptions of using dyadic support to promote healthy weight in African American churches.

A qualitative descriptive design was used to frame the study. Semi-structured interviews were conducted with four county health educators and 17 African American church members residing in five different counties in North Carolina. The focus of interviews was to explore participants' perceptions of the role of the church in health, working as a dyad to improve health, and what should be included in a dyadic peer support health program. Participants were recruited from faith communities affiliated with Faithful Families Thriving Communities (an existing North Carolina health promotion program), other African American churches, African American social groups, and word of mouth. Conventional content analysis was used to derive key themes from the semi-structured interviews. Main study findings indicate that: 1) members see the mission of the church intertwined with health and feel safe exploring new food choices at church; 2) dyadic peer support is a welcomed approach and consistent with established church practices that emphasize partners working together; 3) participants believe personal motivation is as important as socioeconomic factors in improving health.

The results of this descriptive qualitative study suggest that due to the strong ties and relationships, some African American churches may be fertile ground for a dyad peer support intervention. Both members and health educators agreed that dyad activities should be goal oriented and structured. Thus, future interventions should incorporate helping dyad partners at the beginning of the intervention draft mutually beneficial health goals and specific activities that they would like to do together to achieve them. In addition, any intervention should encourage consistent and relatively frequent (at least

twice/week) face-to-face interaction as most members and health educators saw that as essential to success. By working with a partner consistently, participants may be able to help each other address and overcome barriers to better health. Future studies should assess the feasibility of using dyadic peer support to promote health in African American faith communities.

5.1.3 Feasibility of a Dyadic Peer Support Intervention to Promote Healthy Weight in Three African American Churches in North Carolina

Chapter four presents results from a prospective multi-method 18-week intervention study to determine the feasibility of using dyadic peer support to promote healthy weight in African American churches. Faithful Families Thriving Communities, an existing healthy weight promotion program, was augmented afterwards with a new dyadic peer support component. The dyadic peer support component was developed based on findings from formative research (Chapter three), other peer support studies, behavioral health literature, and three theoretical frameworks (i.e., the Transactive Goal Dynamics Model (TGDM), Community Empowerment Theory (CET), and the Socioecological Model (SEM)). As part of the existing Faithful Families program, participants had nine weeks of group health education classes to promote healthy eating and physical activity. This was followed by nine weeks of dyads working together to achieve their health goals as part of a new dyadic peer support component. I used descriptive statistics, multilevel models, and semi-structured interviews to assess: 1) program feasibility; 2) changes in weight, blood pressure, fruit and vegetable intake and physical activity; and 3) how dyad partners cooperate to achieve their health goals.

Eighty participants from three churches in three North Carolina counties enrolled. The program completion rate was 78%. Sixty-two participants (32 dyads) completed the

study. Over 95% of participants report wanting to work with a partner again. Participants achieved small but significant average increases of 1.1 servings of fruit (p value=0.001) and 1.2 days (p value=0.01) of 30 minutes of physical activity pre and post intervention. There were no significant changes in weight, systolic blood pressure, BMI, or vegetable intake from baseline to 18 weeks. Significant changes in weight (-2.6 pounds, 95% CI= -4.18, -1.1, p value= 0.001) and average daily vegetable intake (0.545 servings, 95% CI=0.143, 0.939, p value=0.008) achieved during the first nine weeks of the program were maintained during the second nine weeks. Dyads were strongest at developing team goals, communicating weekly, and providing motivation in the form of encouragement. Formative research interviews (Chapter three) emphasized church members' desire to interact face to face and share information and resources that could help others overcome challenges. In this feasibility study, dyads had difficulty identifying solutions to goal attainment challenges and finding consistent times to interact face to face.

Findings from Chapter four indicate that it is feasible to implement a dyadic peer support program to promote healthy weight within African American churches. More studies are needed to test the effects of dyadic peer support on health improvement by using control groups. Future programs should help dyads improve problem solving to overcome challenges, identify consistent times to meet, initiate partnering earlier during the program, and taper group meeting frequency more slowly.

5.2 Implications

To our knowledge this dissertation includes the first study to use dyadic peer support in African American churches as an approach to optimizing community assets to address disparities. Results show that African American churches and relationships

among members are assets that support health. Results from Chapters three and four highlight that members have devoted and ongoing relationships with their church and with other members. These relationships provide support and encouragement to improve or maintain healthy diets, physical activity and overall well-being. Additional dyadic peer support studies, which build on the strengths of these relationships, are needed to better understand their effects and sustainability. If found effective, they may be used as an adjunct to various community-based health promotion programs to address health equity. To address health disparities, future studies should identify and optimize community assets in addition to African American churches, and research how to tailor health promotion programs for the unique interests, assets and challenges of different African American communities.

5.2.1 Community Assets

Results suggest the church is a vital community asset for healthy weight promotion and chronic disease prevention among older African Americans. Future studies should: 1) seek to offer programs that align with new and emerging church health priorities; 2) consider shifting religious identities of younger African Americans and those residing outside of the South; and 3) explore effects of various types of religious social capital on health.

Effective health promotion programs should align with priorities identified by the target African American faith community. The studies in this dissertation focused on health promotion and disease prevention through healthy eating and physical activity. Participating church pastors and lay leaders agreed that their congregations needed and wanted this information. However, interviews also revealed that participants were

juggling multiple personal, familial or work responsibilities that were at times stressful. In addition, during recruitment, one pastor (who did not participate) mentioned that their real need was in mental health, not just physical. In Chapter three, several members cited the need for more open discussions about mental health within their faith communities. These results, in addition to literature illustrating the mental and physical health connection (i.e., connection between hypertension, sleep and stress among African Americans, women especially (D. A. Johnson et al., 2016; Tomfohr, Cooper, Mills, Nelesen, & Dimsdale, 2010)), indicate both: 1) the rising importance of addressing mental health among African Americans; and 2) the importance of assessing community need and aligning program and research aims with those needs.

Not only are needs of church members expanding, but religious identities of African Americans are also evolving. Younger African Americans are less likely than older African American counterparts living in the South to go to church or be religious (Masci, 2018). Moreover, African Americans from the Northern United States are increasingly moving back to Southern states. This migration may explain and contribute to shifting religious identities. Therefore, to address health inequity, especially those affecting younger African Americans, community assets in addition to African American churches should be identified and supported. For instance, recent studies use barbershops and beauty salons as a point of entry to promote health (Linnan, D'Angelo, & Harrington, 2014; Randolph, Pleasants, & Gonzalez-Guarda, 2017). Other initiatives may consider neighborhood schools, or students at Historically Black Universities, neighborhood community centers, social organizations, or online groups that cater to African American populations through mobile technology (Brewer et al., 2019; Buis et al., 2019). One study suggested inviting African American men and women to a health initiative in

conjunction with a car show or bowling league (Gluck, Shaw, & Hill, 2018). Needed are innovative approaches to health promotion that are culturally relevant and build on specific local assets and interests to reach African Americans who no longer affiliate with churches.

The concept analysis in chapter two revealed three types of religious social capital – bonding, bridging, and linking – whose influence on health is rarely measured or explored. These different types of religious social capital represent relationships, knowledge and resource sharing between communities that influence health outcomes of members. Shifting identities of African American church members may introduce new relationships with members of other faith communities that have different resources and assets. New relationships may create more pathways for communities to share assets and knowledge that can influence health or introduce health initiatives. Future studies should explore or facilitate connections between different faith communities and members to assess and optimize them for better health.

5.2.2 Health Equity and Health Promotion Programs Targeting African Americans

African Americans' health, assets, and perceived challenges to better health vary among subpopulations and should be considered when designing interventions. Multiple examples from interviews with members illustrate this point. First, differences in geographic location may affect perceived challenges. In Chapter three, health educators from more rural counties identified lack of phone service as a potential barrier to member communication. Therefore, they suggested all communication should be face-to-face or written. Health educators and participants from more urban areas did not mention this as a barrier. Similarly, participants from a metropolitan church had two instances of gun

violence during the course of the program. After the incidents, members talked and prayed during group class and discussed the importance of addressing mental health and youth safety. Members from more rural churches did not bring up gun violence, or its relationship to mental health, or youth safety. Differences based on neighborhood context can drive differences in faith communities' health promotion programming priorities and design.

Second, generational differences also affect perceived challenges and assets and should be considered when designing programs. In Chapter four, most members described being very physically active and eating fresh foods from the garden or the farm when young. Their families did this because they did not have much money or other food options. Also, living on farms, they spent their free time outside. Members noted that the environment has changed for younger African Americans. They have less access to fresh food and are more reliant on convenience foods. Additionally, they spend less time outside because of safety concerns, fewer green spaces, and preference to play inside with computers instead of games outside. As a result, they are suffering from chronic diseases like diabetes, hypertension, obesity earlier. Members' observations reflect the importance of social and environmental drivers of health, and how drivers may vary by age within African American populations. In this feasibility study, all participants received, and benefited similarly from the same intervention. Future studies should consider and design programs to address challenges within African American communities that are specific to population context (i.e., age, income, location).

Third, even when presented with the same challenges, subpopulations within this sample of African Americans were able to achieve optimal results. For example, in Chapter four, some church members reported lack of time or motivation as an

impediment to improving or maintaining health. Other members, however, identified peer support as well as strong self-motivation as factors that helped them overcome obstacles and improve health. These members achieved clinically significant weight loss (weight loss $\geq 5\%$ of body weight) (Leahey & Wing, 2012; West et al., 2016) and improvements in diet and exercise. Some participants pointed to a life-long love of exercise or preference for eating healthy that started when they were young - inspired by a family member or their own internal interest. Others identified major changes in health status, such as need for dialysis, or being diagnosed with diabetes, as reasons to make an effort to improve their health. More studies are needed that focus on these sub populations that experience similar challenges but also achieve optimal health outcomes. Delving deeper into the experiences of these members would reveal what helped them cultivate, improve or maintain their health. These results might identify key factors or new approaches to develop more effective and innovative interventions to address disparities among other African Americans.

5.2.3 Nursing Implications

This study has implications for nursing education, research and practice. Nursing education in community health should incorporate social determinants of health and socioecological model frame works that clarify the multiple social, community, and environmental factors that either promote or limit health and health behaviors. Teaching should include students better understanding these factors by working with community members on asset mapping which includes both community members and students' assets in all spheres of influence. These activities would serve to allow students to be aware of their own position in society as well as to be aware of community assets such as

relationships and peer support available to enhance community members' health.

Nurses can advance health disparities research by exploring how the breadth and evolving identities of African Americans affects health status and access to care. Methods such as community based participatory research and mixed methods research can more thoroughly reveal the intersection and influence of these identities. Secondary data analysis and longitudinal analysis can show patterns and characteristics associated with subpopulations of African Americans who achieve optimal health despite social, economic or environmental challenges.

If proved effective, nurses practicing community health may utilize or propose dyadic peer support as a means to augment formal health promotion programs in high or low resourced communities. Within health care systems, nurses can increase patient screening for personal and community assets that support transitions from inpatient to home and prevent readmissions. Nurses should also continue to advocate for the importance of community members collaborating and participating in shared decision making in local, state, and federal policy making.

5.3 Conclusion

Achieving health equity requires broad based solutions that improve distal (i.e., food policies, educational systems, etc.) and proximal (intrapersonal health behaviors, interpersonal interactions) factors. Health equity is best achieved when multiple spheres of influence (e.g. intrapersonal, community, etc.) are addressed and populations experiencing health disparities identify culturally relevant assets to drive initiatives. Dyadic peer support is a feasible approach to health promotion in African American churches. More controlled studies are needed to determine its effectiveness and impact.

In addition to African American churches, future studies should identify additional culturally relevant assets and approaches to health promotion that align with the specific needs and experiences of different African American communities.

Appendix A. Articles Selected for Concept Analysis Review

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Appendix B. Participant Perceptions of Dyad Feasibility – Post Intervention Structured Survey

PARTICIPANT ID #

Participant Perceptions of Dyad Feasibility – Post Intervention Structured Survey

Please read each question and circle the number that reflects your thoughts					
I would work with a peer support partner again to improve my health	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
I helped my peer support partner do things to improve their health	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
I felt it was easy to get in touch with my peer support partner	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
I enjoyed talking and/or meeting with my peer support partner	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
My peer support partner helped me do things to improve my health	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
Having the support of a peer made it easier to eat better compared to if I did not have their support	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
Having the support of a peer made it easier to exercise compared to if I did not have their support	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
I felt comfortable sharing with my peer support partner	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree

I would like to continue to work with a partner to improve my health	1 Strongly disagree	2 Disagree	3 Not Sure	4 Agree	5 Strongly agree
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Appendix C. Expanded Food And Nutrition Education Program (EFNEP) Food & Physical Activity Questionnaire

Participant Entry Form

01/18 Traditional Entry-Eng



ID #: _____

Group Name: _____

TELL ME ABOUT YOU!

Today's Date: _____

Name: _____

Address: _____

City: _____

North Carolina Zip: _____

Phone number: (_____) _____

Email: _____

Age: _____ Sex: Female Male

Would you be willing to receive text messages from EFNEP regarding classes? Yes No

Are you pregnant? Yes No

Are you breastfeeding? Yes No

Are you Hispanic or Latino? Yes No

What is your race?

- American Indian or Alaskan Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

What is your highest grade completed in school?

- Grade 6 or below
- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12
- GED
- Some College
- Graduated 2 Year College
- Graduated College
- Post Graduate

Programs in which you and your family participate

- Child Nutrition (Free/Reduced Lunch)
- FDPIR (Food Distribution Program on Indian Reservations)
- Head Start
- SNAP (EBT Card)
- TANF (Temporary Assistance for Needy Families)
- TEFAP Commodity (Emergency Food Assistance Program)
- WIC
- Medicaid
- Work First

Approximate household income:

\$ _____ per week per month

Please write the age of your child(ren).

Age: _____ Age: _____ Age: _____

Age: _____ Age: _____ Age: _____

How many adults live with you? _____



Expanded Food And Nutrition Education Program

FOOD & PHYSICAL ACTIVITY QUESTIONNAIRE

Please mark the response that **best** describes how you **usually** do things.

1. How many **times a day** do you eat fruit?

Examples of **fruits** are apples, bananas, oranges, grapes, raisins, melon and berries. Include fresh, frozen, dried, or canned fruit. *Do not include juice.*

- I rarely eat fruit
- Less than 1 time a day (a couple times a week)
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

2. How many **times a day** do you eat vegetables?

Examples of **vegetables** are green salad, corn, green beans, carrots, potatoes, greens, and squash. Include fresh, canned and frozen vegetables. *Do not count french fries, potato chips or rice.*

- I rarely eat vegetables
- Less than 1 time a day (a couple times a week)
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

3. Over the last week, **how many days** did you eat red and orange vegetables?

Examples of **red or orange vegetables** are tomatoes, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.

- I did not eat red and orange vegetables
- 1 day a week
- 2 days a week
- 3 days a week
- 4 days a week
- 5 days a week
- 6 or 7 days a week

4. Over the last week, **how many days** did you eat dark green vegetables?

Examples of **dark green vegetables** are broccoli, spinach, dark green lettuce, turnip greens, or mustard greens.

- I did not eat dark green vegetables
- 1 day a week
- 2 days a week
- 3 days a week
- 4 days a week
- 5 days a week
- 6 or 7 days a week

5. How often do you drink regular sodas (not diet)?

- Never
- 1-3 times a week
- 4-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

6. How often do you drink fruit punch, fruit drinks, sweet tea or sports drinks?

- Never
- 1-3 times a week
- 4-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

7. In the past week, **how many days** did you exercise for at least 30 minutes?

This includes things like jogging, playing soccer, and doing fitness or dance classes, or exercise videos. **This 30 minutes could be all at once or 10 minutes or more at a time.** Do not count housework, taking care of your kids, or walking from place to place.

- | | |
|---------------------------------|---------------------------------|
| <input type="checkbox"/> 0 days | <input type="checkbox"/> 4 days |
| <input type="checkbox"/> 1 day | <input type="checkbox"/> 5 days |
| <input type="checkbox"/> 2 days | <input type="checkbox"/> 6 days |
| <input type="checkbox"/> 3 days | <input type="checkbox"/> 7 days |

8. In the past week, **how many days** did you do workouts to build and strengthen your muscles?

This includes things like lifting weights and doing push-ups, sit-ups or planks.

- | | |
|---------------------------------|---------------------------------|
| <input type="checkbox"/> 0 days | <input type="checkbox"/> 4 days |
| <input type="checkbox"/> 1 day | <input type="checkbox"/> 5 days |
| <input type="checkbox"/> 2 days | <input type="checkbox"/> 6 days |
| <input type="checkbox"/> 3 days | <input type="checkbox"/> 7 days |

9. How often do you make small changes on purpose to be more active?

This includes things like walking instead of driving, getting off the bus one stop early, doing a few minutes of exercise, or moving around instead of sitting while watching TV.

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

10. How often do you wash your hands with soap and running water before preparing food?

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

11. After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods?

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

12. How often do you thaw frozen food on the counter or in the sink at room temperature?

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

13. How often do you use a meat thermometer to see if meat is cooked to a safe temperature?

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

14. In the past month, how often did you eat less than you wanted so there was more food for your family?

- Never
- Rarely (about 20% of the time)
- Sometimes (about 40% of the time)
- Often (about 60% of the time)
- Usually (about 80% of the time)
- Always

15. In the past month, how often did you not have money or another way to get enough food for your family (such as SNAP, WIC, or a food pantry)?
- Never
 - Rarely (about 20% of the time)
 - Sometimes (about 40% of the time)
 - Often (about 60% of the time)
 - Usually (about 80% of the time)
 - Always
16. How many **days a week** do you cook dinner (your main meal) at home?
- I rarely cook dinner at home
 - 1 day a week
 - 2 days a week
 - 3 days a week
 - 4 days a week
 - 5 days a week
 - 6 or 7 days a week
17. How often do you compare food prices to save money?
- Never
 - Rarely (about 20% of the time)
 - Sometimes (about 40% of the time)
 - Often (about 60% of the time)
 - Usually (about 80% of the time)
 - Always
18. How often do you plan your meals before you shop for groceries?
- Never
 - Rarely (about 20% of the time)
 - Sometimes (about 40% of the time)
 - Often (about 60% of the time)
 - Usually (about 80% of the time)
 - Always
19. How often do you look in the refrigerator or cupboard to see what you need before you go shopping?
- Never
 - Rarely (about 20% of the time)
 - Sometimes (about 40% of the time)
 - Often (about 60% of the time)
 - Usually (about 80% of the time)
 - Always
20. How often do you make a list before going shopping?
- Never
 - Rarely (about 20% of the time)
 - Sometimes (about 40% of the time)
 - Often (about 60% of the time)
 - Usually (about 80% of the time)
 - Always

**Families Eating Smart and Moving More Liability Acknowledgement Form
INFORMED CONSENT AND RELEASE FROM LIABILITY**

In consideration for agreement by NC Cooperative Extension to participate in the Families Eating Smart and Moving More program (hereinafter "Program") the undersigned hereby agrees as follows:

I do hereby affirm and acknowledge that I am participating in the Program for my own personal benefit, and have been fully informed of the inherent hazards and risks to me associated with this Program. I understand that the determination of my ability to participate in the Program should be made by my physician if necessary.

I shall indemnify and hold harmless NC Cooperative Extension (NC State and NC A & T State universities, their trustees, officers, employees and agents from any liability, losses, costs, damages, claims or causes of action of any kind or nature whatsoever, and expenses, including attorney's fees, arising from or proximately caused by my participation in this Program. I further agree to accept and assume for myself, my assigns, executors, and heirs any and all such risks and losses that may occur.

I acknowledge that I have read this Liability Acknowledgement and that I am freely and voluntarily signing it, and agree to be bound by it.

Signature

Date

PHOTO RELEASE (optional)

I, the undersigned, hereby authorize North Carolina State University, North Carolina A&T State University, and the North Carolina Cooperative Extension Service to use photographs, video or audio, which I have voluntarily allowed to be taken by University representatives. I understand that such use may include but shall not be limited to publications, slide shows, newspaper articles, websites, social media (including but not limited to Facebook, YouTube, Twitter, Instagram) or displays.

I hereby waive the right to which I or my heirs may otherwise be entitled by law to assert against the University on account of injury sustained by my reputation arising from causes of action including but not limited to libel, slander, defamation of character and invasion of privacy as a result of such publications and hereby release the University from any liability on account of such injury.

I fully understand the comprehensive nature of this release and voluntarily consent to sign it.

Signature

Date

TO BE COMPLETED BY STAFF:															
Place of Residence:	<input type="checkbox"/> Farm <input type="checkbox"/> Towns under 10,000 and rural non-farm <input type="checkbox"/> Towns & cities 10,000 to 50,000 and their suburbs <input type="checkbox"/> Suburbs of cities over 50,000 <input type="checkbox"/> Central cities over 50,000														
Lesson Type:	<input type="checkbox"/> Group <input type="checkbox"/> Individual <input type="checkbox"/> Both														
Subgroups:	<input type="checkbox"/> Faith community <input type="checkbox"/> Worksite <input type="checkbox"/> Health clinic <input type="checkbox"/> Food pantry <input type="checkbox"/> Head Start <input type="checkbox"/> Healthy All Together <input type="checkbox"/> On-Line <input type="checkbox"/> Grant or pilot project: _____ <input type="checkbox"/> Other: _____														
<table border="1"> <thead> <tr> <th colspan="2">ERS CONTACTS TRACKER (Optional)</th> </tr> </thead> <tbody> <tr> <td>Non Face to Face</td> <td>Face to Face</td> </tr> <tr> <td>Phone: _____</td> <td>EFNEP Sessions: _____</td> </tr> <tr> <td>Email: _____</td> <td>Other: _____</td> </tr> <tr> <td>Texts: _____</td> <td>(i.e. Marketing, Recruiting, etc.)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total: _____</td> </tr> <tr> <td colspan="2">Did you encourage this participant to connect with our social media pages? <input type="checkbox"/> Yes <input type="checkbox"/> No</td> </tr> </tbody> </table>		ERS CONTACTS TRACKER (Optional)		Non Face to Face	Face to Face	Phone: _____	EFNEP Sessions: _____	Email: _____	Other: _____	Texts: _____	(i.e. Marketing, Recruiting, etc.)	Total: _____		Did you encourage this participant to connect with our social media pages? <input type="checkbox"/> Yes <input type="checkbox"/> No	
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Total: _____															
Did you encourage this participant to connect with our social media pages? <input type="checkbox"/> Yes <input type="checkbox"/> No															
	Number of Face-to-Face Lessons: _____ Total Hours Face-to-Face: _____ Number of Non-Face-to-Face Lessons: _____ Total Hours Non-Face-to-Face: _____ Total EFNEP Lessons: _____ Total EFNEP Sessions: _____ Total Hours of Instruction: _____														
Program Assistant: _____															

North Carolina State University and North Carolina A&T State University commit themselves to positive action to secure equal opportunity regardless of race, color, creed, national origin, religion, sex, age, or disability. In addition, the two Universities welcome all persons without regard to sexual orientation.

Appendix D. Semi Structured Participant Interview Guide

PARTICIPANT ID #

Participant Perceptions of Feasibility - Post Intervention Semi-Structured Interview

Feasibility

- What was your experience like working with a partner?
 - Tell me about some of your experiences?
 - What types of activities did you do?
- What made it hard to work with a partner?
- What made it easy to work with a partner?
- What about working with a partner would you change?
 - Prompts:
 - partner selection
 - health focus
 - length of intervention
 - method of communication
 - types of interactions

Goal Setting and Attainment

- Tell me about the first week working with your partner. How did you get started?
 - Prompts:
 - How did you and your partner decide what your goals would be?
- What was the rest of your experience like?
 - Prompts:
 - How did you motivate each other?
 - How did you communicate with your partner? Face to face, text, phone, email
 - How often did you communicate?
 - How did you deal with any challenges?
 - What resources did you both share to achieve your goals?

Appendix E. Dyadic Peer Support Semi-structured Interviews A priori and Inductive Themes, Codes

		Description
Theme	Dyad Interaction Frequency	2/2 TGDM construct: Dyad Interaction – Shared goals, interaction, motivation
Codes	Goals-Individual	
	Goals-Shared	
	Individual Attainment	
	Individual Motivation	
	Opportunities to Interact	
	Shared Attainment	
	Shared Motivation	
Theme	Feasibility	Feasibility of Peer Support Program
Codes	Eval - food tastings	
	Eval - logs	
	Eval - measurements	
	Eval - newsletters	
	Overall program experience	
	Partner experience	
	Peer Support Program experience	
Theme	Goal Coordination	1/2 TGDM Construct: Goal Coordination – Shared challenges and strategies
Codes	Challenges	
	Strategies-Individual	
	Strategies-Shared	
Theme	Partner Assignment	Dyad Relationship
Codes	Assigned	
	Matching process	
	Selected	
Theme	Partner Relationship	Dyad Relationship
Codes	Acquaintances	
	Family	
	Good friends	
Theme	Peer Support Domains	Types of Peer Support
Codes	Daily Management Help	
	Emotional, Social Support	

	Linkages to Community Resources	
	Ongoing Engagement	
Theme	Social Determinants	Socioeconomic, Home, Community, Church, Work factors affecting Health
Codes	Church	
	Community	
	Home/Family	
	Work	
	Open Coding	Additional Codes
Codes	Adults are responsible for their actions	
	Faith community relationships	
	Health behaviors across generations - attitudes about eating and health	
	Unknown healthy Habits when young	

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Biography

Cherie Conley completed her Bachelor of Science (BS) in Biology at Spelman College (1996). While there she participated in the inaugural exchange program with Stanford University where she spent her junior year researching novel HIV strains and studying international development. During undergrad, she was also involved in cancer research and served as the student ambassador for the Spelman College-Centers for Disease Control and Prevention Women's Health Initiative. Her senior year, Cherie received a Fogarty International Research Training Grant to study reproductive health at Parirenyatwa Hospital in Harare, Zimbabwe.

Cherie went on to earn a Master in Health Science (MHS) at Johns Hopkins University School of Public Health in International Health - Disease Control and Prevention (1999). While there, she worked with research teams to implement a hypertension education class targeting African American men, and to support lead paint abatement efforts in the city. As a recipient of the Johns Hopkins University Alumni Community Service Grant, she worked with the Bea Gaddy Family Center to design and implement a youth summer enrichment program in East Baltimore.

Cherie began her nursing career after graduating summa cum laude from Cleveland State University's Accelerated Bachelor of Science in Nursing (BSN, 2005) Program. There she was a recipient of the National Black Caucus Foundation Scholarship and the Lillian Wald Communication Award. She also earned a Master of Science in Nursing (MSN) degree in Community Health Nursing from the University of North Carolina at Charlotte (2013). Her Master's thesis project explored the use of health risk

communication using an online platform to mitigate HIV risk in college-age African American women. The project was presented and won first place at Sigma Theta Tau Research Day hosted by the University of North Carolina at Wilmington.

As a doctoral student at Duke University School of Nursing, Cherie received multiple honors. She was named a Jonas Scholar in her second year, served as the student representative for the Community Health Improvement Partnership Program, was team lead for an interdisciplinary Bass Connections project aimed at improving physical activity in Durham, North Carolina, and received the Dean's Award for Excellence in Mentoring. Cherie received an F31 training grant from the National Institutes of Nursing Research to support her doctoral training. Her dissertation was selected for the Distinguished Dissertation Award. Cherie will receive her PhD in Nursing in May 2020.