

**Lessons Learned from the Design and Implementation of a Health Promotion
Intervention for African American Women**

DISSERTATION

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Abstract

The purpose of this dissertation is to explore how intervention design can be enhanced to influence the health of African American women through examining the processes and methods related to health behavior theory, cultural adaptation, and participatory approaches. Data from African American women who participated in the Better Me Within (BMW) Trial, as well as, formative data from focus groups with African American women were used to investigate these intervention planning approaches through the following aims: Aim 1 addressed the question how do theoretical constructs of behavior change help to explain health outcomes in the BMW trial? This was quantitatively explored by examining theoretical constructs with outcomes of weight, diet and physical activity. Aim 2 explored the perspectives of African American women through qualitative analysis of focus groups for cultural and contextual elements that may influence the approach to intervention design, increase knowledge about cultural adaptations, and contribute methods to enhance weight management. Aim 3 critically examined how the community-based participatory research (CBPR) approach with African American faith communities in the BMW Trial aligned with the CBPR conceptual model through a case study.

Understanding how processes, operations, and decisions in intervention design contribute to health improvements is imperative for ensuring programs are relevant and effective in specific populations. One size does not fit all. The current state of health inequities and chronic conditions in African American women require thoughtful intervention strategies that center community knowledge, culture, and context. This dissertation seeks to arrive at intervention strategies that are relevant to African American women, and influence how public health professionals approach intervention development for meaningful, community-identified health improvements.

Chapter 1: Introduction

1.1 Study Rationale

Obesity-related Burden of Disease in African American Women

While over one-third of Americans are obese (BMI >30), the greatest rates of obesity are among African American women at 57.2%. This is beyond the rates of other women (White 38.2%, Hispanic 46.9%) (Flegal et al., 2016). Along with a higher prevalence of obesity, African American women have higher risk for obesity-related chronic conditions including hypertension (HR, 1.56 [95% CI, 1.49-1.64]), stroke (HR, 1.49 [95% CI, 1.26-1.78]), diabetes (HR 1.63 [95% CI, 1.47- 1.81]), overall lower life expectancy, and increased infant and maternal mortality compared to other women in the United States (US) (Chang et al., 2017; Dominguez, 2011). These data suggest that there are unique factors influencing African American women that need to be addressed in part through effective intervention approaches to manage and reduce obesity (Fitzgibbon et al., 2012; Kumanyika et al., 2014; Sutton et al., 2017).

Weight loss and African American Women

There have been many interventions over the last three decades to help women lose weight and reduce or manage risk of chronic disease. However, results from weight-loss interventions have been less than optimal for African American women showing lower weight loss and shorter periods of maintenance compared to White women in the same or similar programs (Fitzgibbon et al., 2012; Kumanyika et al., 2014; Svetkey et al., 2012; Tussing-Humphreys et al., 2013). In examining data from tables in multiple reviews, studies showed the average weight loss of African Americans was typically between 5-6 kg in a 6-month timeframe, compared to 9-10 kg among Whites (Fitzgibbon et al., 2012; Goode et al., 2017; Kong et al., 2014; Lancaster et al., 2014; Samuel-Hodge et al., 2014; Tussing-Humphreys et al., 2013; Wingo

et al., 2013). Though weight loss was demonstrated across these reviews, smaller amounts of weight loss is concerning primarily because of the associated chronic conditions that affect African American women at much higher rates than the rest of the population. Lower weight losses may be partly explained by a misunderstanding of the population's unique characteristics and context, a need for an alternate definition of success and health for African American women, or inadequate intervention development.

Why Weight Loss Programs with African American Women are not as Effective

Part of the issue in intervention development may be that research with communities of color is still limited. In a recent review of behavioral weight loss trials, only 9 of the 94 studies were conducted with exclusively racial/ethnic populations in the US, and across all studies combined the majority of participants were White (58.9%), while only 18.2% were African American (Haughton et al., 2018). These numbers indicate improvements in representation in weight loss trials compared to a previous 2009 review, exceeding US Census population proportions for African Americans (12% in 2015) (Haughton et al., 2018). However, with fewer than 1 in 5 participants being African American in weight loss trials on average, it is likely that interventions still represent a majority population perspective and are not meeting the relevant needs of African Americans to achieve weight loss.

Narrowed Focus on Weight Loss May be Problematic

Another issue that inhibits the benefits of interventions for African American women may be framing interventions to focus on weight loss only as opposed to preventing disease or improving health and well-being more generally. This focus neglects the total health impact of interventions on other health improvements, both biological and psychosocial, as well as additional factors of health that may be of importance to African American women like building

muscle strength, financial stability, or spiritual wellness (Ries et al., 2014; C. L. Woods-Giscombe et al., 2016); Weight loss that results in a change in body mass index (BMI) to normal (BMI < 25) is incredibly difficult for all populations, and even small, clinically meaningful reductions of weight by 5%, which show evidence of improving chronic disease factors, are typically regained within 2-5 years (Fildes et al., 2015).

In African American women, weight loss may not be desirable due to social norms that appreciate a larger body size or may be difficult to achieve due to environmental and contextual factors of daily life (Dodgen & Spence-Almaguer, 2017; Tussing-Humphreys et al., 2013). The idea of health is also of greater value to African American women than the value of weight loss (Dodgen et al., 2018; Dodgen & Spence-Almaguer, 2017; Kitzman et al., 2017). Furthermore, the total impact of a weight loss intervention may be hidden due to limited measures. In a scoping review, outcomes from weight loss studies with African American women often focused on weight/anthropometrics, diet, and physical activity behaviors, with limited biological measures (e.g., cholesterol, glucose, blood pressure), psychosocial outcomes, or mediating factors that lead to weight change (Kong et al., 2014; Kumanyika, 2019; Sutton et al., 2016). Interventions are needed that examine a range of health outcomes related to physical, emotional, financial, relational, spiritual, and environmental aspects of health to draw a more complete view of what achieving health and preventing chronic disease may look like among this population (Kumanyika, 2019; Kumanyika et al., 2014; Sutton et al., 2017).

Intervention Design and Program Planning in Weight Loss Studies

Intervention design and program planning are foundational skills in the field of health behavior. Many theories, models and methods are used to train health professionals how to facilitate population health improvements through interventions. Three of the most utilized

approaches in designing interventions are: 1) planning with health behavior theories and models, 2) incorporating cultural adaptations to ensure population fit and contextual relevance, and 3) applying a community-engaged approach, like community-based participatory research (CBPR), to guide the research process. There is evidence that each of these approaches has a level of effectiveness toward weight loss.

Recent reviews show weight loss when implementing theory, cultural adaptations and CBPR in studies with African Americans. Sutton and colleagues (2016) in their review reported a majority of weight loss studies with African American women (18 of 28) used theory to frame their interventions. Cultural adaptations have also been present in studies showing weight loss in African Americans. Kong and colleagues (2014) reported both sociocultural (e.g., incorporating faith, family, traditions) and constituent-involving (e.g. cultural-specific focus groups or advisory boards) adaptations were most common in studies with significant between-group differences in weight loss for African American women. Coughlin and Smith's (2017) review reported that CBPR approaches were effective for changes in diet, nutrition, and weight management in African Americans as well. Despite the implementation of these approaches, weight losses with African American women are still lower than other racial and ethnic groups. Part of the answer may lie in the processes by which these techniques are planned, implemented, and delivered to African American women.

Gaps in Intervention Development and Implementation

The processes of designing and implementing interventions are often poorly described. Published studies describe in generality the design of an intervention and focus on the results with primary outcomes. While there is strong evidence to show that programs designed with health behavior theory are more successful than interventions without theory, it is often unclear

how intervention components relate to program activities, theoretical constructs, or mediators and moderators of behaviors (Glanz & Bishop, 2010; Sutton et al., 2016). In addition, constructs may not be measured or reported, so the contributions of theory to changing behaviors may remain unknown (Kong et al., 2014; Kumanyika et al., 2014). Understanding how a theory is used to form curriculum, choose activities in a program, or how theoretical constructs are monitored for change can improve knowledge of what theoretical aspects are most beneficial for African American women.

In cultural adaptations, there have been categories or types of adaptations identified by Resnicow (1999) and Kreuter (2003). Still, there are gaps in the literature to justify *how and why* adaptations are chosen, the process of applying the adaptations, and how to measure the adaptation in a way that allows for drawing conclusions about their influence on outcomes (Kong et al., 2014; Movsisyan et al., 2019; Tussing-Humphreys et al., 2013). Knowing which cultural adaptations or combinations of adaptations may be more or less effective in addressing health behaviors would enhance intervention design (Kong et al., 2014; Movsisyan et al., 2019; Sutton et al., 2016; Tussing-Humphreys et al., 2013).

In CBPR, the approach to research is non-linear, often emphasized as an iterative process that is unique to each partnership. The essence of the approach though is found in *how* CBPR is applied throughout the entire course of the intervention from planning through dissemination, and these details are often undescribed in published studies (Arroyo-Johnson et al., 2015; Khodyakov et al., 2013). For example, how is CBPR applied to planning for different parts of an intervention, like recruitment or the design of the study survey? These details are often neglected in methods sections of published articles, yet contribute to the outcomes (Sutton et al., 2016; Kong et al., 2014; Ortiz et al., 2020). In each of these techniques, the details of methods and

applications are missing leaving gaps in knowledge as to how each technique may be impacting the health of populations, and which approaches may be most effective either due to lack of documentation, measurement, or more detailed analyses of constructs or mediators.

Application of Culture and Contextual Frameworks to Intervention Planning &

Implementation

In light of these factors, examining the intervention design process from established frameworks and approaches may help to identify changes and achieve better health outcomes for African American women. Critical to determining processes of interventions is the context of a population. For example, if community members live in a food desert context is important to consider for a program focused on dietary change since access to fresh produce is different than in more suburban areas. Another example of context may include examining community history to understand potential barriers to engagement. In African American communities that have experienced unethical medical research, building relationships with community leaders and incorporating formative work into an intervention timeline to understand community perspectives about a potential program may be necessary. Without acknowledging a community's lived experiences and context, the intervention strategies may fall short. The Community-Energy Balance (CEB) Framework (see Figure 1) provides a look into the cultural context of racial/ethnic communities with high risk for obesity (Kumanyika et al., 2012). The framework connects culture and context to the settings of implementation and the intervention strategies that may be most impacted.

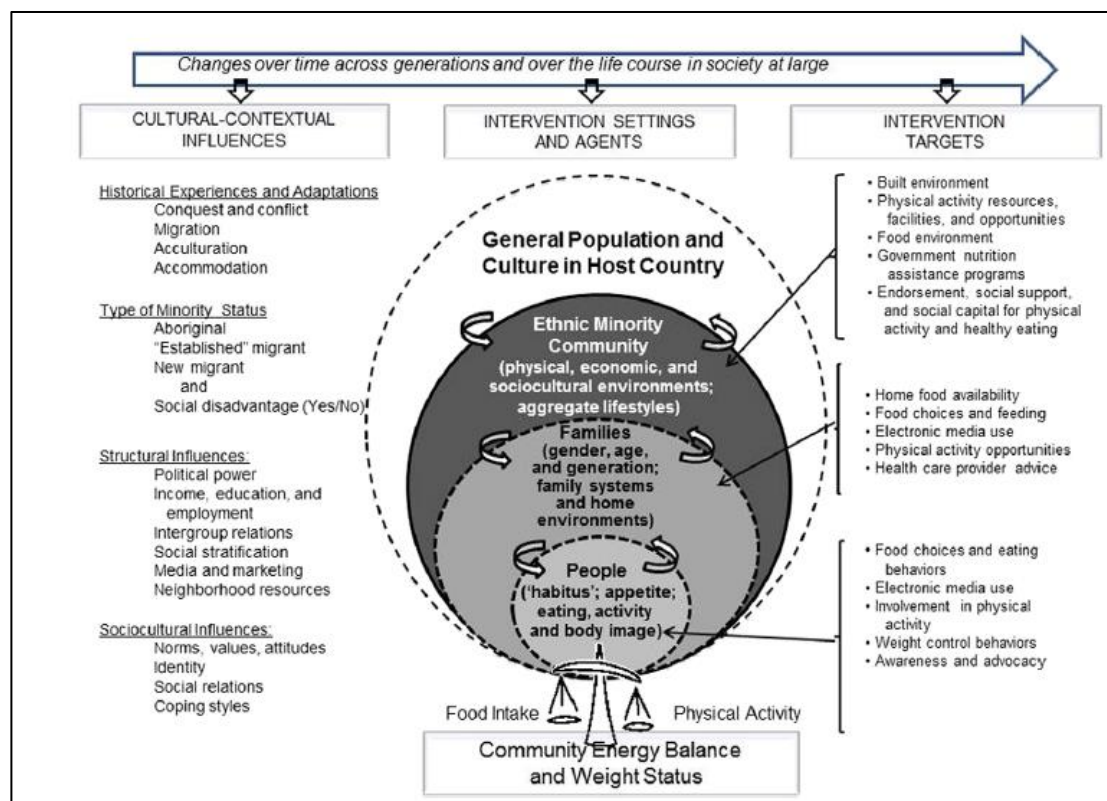


Figure 1. Community Energy Balance Framework

CBPR Conceptual Model

Adapted from Wallerstein et al, 2008 & Wallerstein and Duran, 2010, <https://cpr.unm.edu/research-projects/cbpr-project/cbpr-model.html>

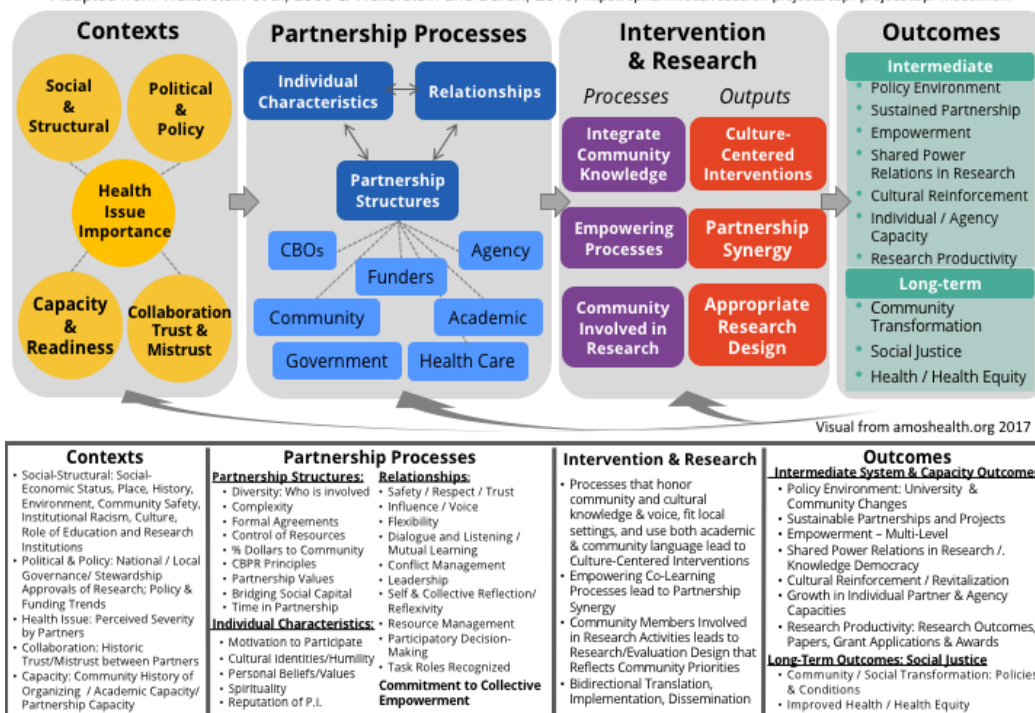


Figure 2. CBPR Conceptual Model

Community-based participatory research (CBPR) is defined as “collaborative efforts between multi-sector stakeholders who gather and use research and data to build on the strengths and priorities of the community and use multilevel strategies to improve health and social equity” (Wallerstein, 2017b). The CBPR model (Figure 2) has four domains:

- Contexts (social, structural, political, and historical context of community health issue),
- Partnership Processes (function of individuals, relationships, and partnership structure),
- Intervention and Research (processes that integrate cultural knowledge and empowerment for culturally-centered research), and
- Outcomes (encompass partner growth, shared power, and long-term changes for health, equity, and social justice).

The domains flow into one another with the Context domain grounding Partnership Processes, which then influences how Intervention and Research Methods are implemented and ultimately impact Outcomes (Wallerstein, 2017b). (Larger image in Appendix A). The CBPR model aligns well with the CEB Framework.

When the CEB framework and CBPR model are examined together, key aspects are emphasized, including an acknowledgment of roles and participation (or absence of participation) in all phases of research, cultural humility, and elevating hybrid knowledge (both academic evidence and cultural evidence, not cultural beliefs) for drawing new conclusions about improving the evaluation and design of interventions (Israel et al., 1998; Kumanyika et al., 2012; Wallerstein, 2017a). These models have an ontology that honors multiple realities, viewing both perspectives of the cultural/community group and researchers (Western approaches to research) in a participatory reality (Holkup et al., 2004). This reality frames the intervention work with both parties as central, incorporating co-learning as a key principle (Wallerstein,

2017a). The way knowledge is defined, or the epistemology of these approaches goes away from objectivity (positivist). Instead, it centers around knowledge that is experiential and partnered (constructivist or transformational), focusing on the community-defined culture and context of African American women (Kumanyika et al., 2012; Peralta, 2017; Wallerstein, 2017).

Studies working with African American women to reduce weight have rarely utilized these frameworks in their fullness and instead have focused on applying frameworks to the beginning stages of a program to aid in the development of recruitment and program planning (Cyril et al., 2015).

1.2 Research Aims

This dissertation study explores how intervention design can be enhanced to influence the health of African American women through examining the processes and methods related to health behavior theory, cultural adaptation, and participatory approaches. Data from African American women participating in the Better Me Within (BMW) Trial, as well as formative data from focus groups with African American women before the Trial were used to investigate the planning approaches through the following aims:

Aim 1 addressed the research question: how do theoretical constructs of behavior change help to explain health outcomes in the BMW trial? This was quantitatively explored by examining constructs of health behavior theories in Manuscript 1, *What's theory got to do with it: measuring effects of theory on lifestyle behaviors and weight in the Better Me Within Randomized Trial*. The procedures for Aim 1 included secondary data analysis of theoretical constructs, self-efficacy and social support from Social Cognitive Theory (SCT), and intrinsic motivation from Self-Determination Theory (SDT) with behavioral and weight outcomes measured in the BMW Trial, weight, diet, and physical activity (Bandura, 1989; Ryan & Deci,

2000). The following hypothesis was examined: Increases in self-efficacy (SCT), social support (SCT), and motivation (SDT) during the intervention (baseline to 16 weeks) were expected to result in changes to health behaviors (reductions in calories, increases in physical activity) and outcome measures of weight (baseline to 16 weeks).

Aim 2 explored the perspectives of African American women for cultural and contextual elements that could influence intervention design, aid in defining or increasing knowledge about cultural adaptation, and contribute to methods and processes to enhance effectiveness in weight management for African American women in Manuscript 2, *A Closer Look: Examining cultural-contextual influences on weight management in focus groups with church-going African American women*. The main research question of interest was: How do cultural elements and contextual factors identified by African American women influence intervention design, tailoring and adaptation approaches, and solutions to weight management for African American women?

This was examined qualitatively utilizing secondary data from focus groups previously conducted for the BMW Trial. Manuscript 2 focused on a holistic examination of cultural contexts and experiences of African American women for intervention adaption and design using the CEB and CBPR frameworks as a guide for analysis (Kumanyika et al., 2012; Wallerstein & Duran, 2010). See Table 1 for guiding questions from the frameworks used in data analysis.

Table 1. Aim 2 Guiding Questions
<ol style="list-style-type: none"> 1. What cultural elements are discussed by African American women when approached with the possibility of building a tailored intervention around weight management? 2. How do the lived experiences (identity, daily life context, and community/family life) of African American women influence perspectives on health, obesity, and weight management? 3. How are individual, social, historical, and environmental contexts described or represented for how they influence health and weight management? 4. What community assets can be leveraged to design interventions for this community?

Aim 3 critically examined how the CBPR approach with African American faith communities in the BMW Trial aligned with the CBPR model, and how processes and strategies of partners led to the formation, implementation, and outcomes of the BMW intervention with African American women (Wallerstein & Duran, 2010). This aim considered the research question: How did the BMW trial utilize a CBPR approach to design and implement an intervention ? Manuscript 3, *Evaluating the Paper Trail: A Case Study evaluating CBPR through the documentation of the Better Me Within Program*, explores this idea through a case study comparing the BMW Trial to the CBPR model. This analysis aimed to understand the black box of intervention development and implementation, helping to illuminate the methodology and operations within interventions that contribute to the outcomes that are measured. Additional questions that were considered included:

- What parts of the CBPR approach were realized? Which parts were not?
- What processes, outputs and outcomes resulted from the CBPR approach in this partnership?
- How could the CBPR approach be expanded or improved in the context of the BMW trial, and future partnership activities?

1.3 Methods

Overview

A mixed-methods approach with both quantitative and qualitative analysis was used to examine Aims 1-3 in three manuscripts.

This study was an extension of the Better Me Within (BMW) Trial (2012-2017) which assessed the effects of a faith-based DPP compared to a standard DPP to reduce weight among African American women in 11 churches in the Dallas, TX metroplex. The BMW study used a

CBPR approach working with a Community Advisory Board (CAB) of pastors and first ladies (ministry leaders that are pastor's wives) to develop the program, guide implementation, and data analysis. Recruitment for all phases of the BMW Trial was completed between 2013-2016. This study implemented focus groups in Year 1 with African American women (n=6, 53 participants) to gather formative data for use in design and tailoring the program. In Years 2-4, quantitative data, including physiological and psychosocial data were collected at baseline, post-intervention (16 weeks), and post-maintenance phases (10 months) (n= 221).

The specific measures of interest for Manuscripts 1-3 are presented below in Table 2. Aim 1 included theoretical constructs (Independent Variables) including three types of self-efficacy, one measure of social support, and two measures of intrinsic motivation; in addition to weight and behavioral outcomes (Dependent Variables) measured at baseline, 4 months and 10 months. Control variables were expected to include baseline weight, age, education, and significant covariates from correlation analysis. Aim 2 and 3 included qualitative data collected through focus groups and primarily program documents from the duration of the BMW study.

Table 2. Quantitative & Qualitative Measures		
	Data	Source
Manuscript 1	<i>Independent Variables:</i> Diet Self-efficacy (DSE) Exercise Self-efficacy (ESE) Weight loss Self-efficacy (WSE) Motivation for Diet (MDD) Motivation for Physical Activity (MDPA) Social Support (SS)	Weight Efficacy Lifestyle Questionnaire- Short Form (WEL-SF); Self-efficacy for Exercise Behaviors Scale; Physical Activity and Nutrition Self-Efficacy (PANSE) Scale; Intrinsic Motivation for Diet and Physical Activity; Weight Management Support Inventory
	<i>Dependent Variables:</i> Weight Caloric intake & Fat intake Minutes of Physical Activity	Doran Digital Scale DS6100, Delta NIRI Food Frequency Questionnaire (short form), Past Week Modifiable Physical Activity Questionnaire
Manuscript 2	Perspectives of African American women on health and weight management	Focus Group transcripts with African American women (n=6) from BMW Trial

Manuscript 3	CBPR Model: Context domain	Documents showing history of CAB, public documents to show context of city, timeline of events during the study implementation (e.g., July 2016 shooting in Dallas, Black Lives Matter movement)
	CBPR Model: Partnership processes domain	Meeting agendas, emails, notes, and presentations
	CBPR Model: Intervention and Research domain	IRB protocols, process evaluations, program curriculum, training materials, and other guiding documents for the design, implementation, and evaluation of the study
	CBPR Model: Outcomes domain	CAB activities, data, dissemination materials, and academic papers resulting from the study

These papers seek to explore and draw useable conclusions regarding the design of health interventions to meet needs and improve health outcomes of African American women through the analysis of data from the BMW Trial. The three papers help to draw connections to intervention design through first, understanding how the processes and methods utilized in designing and implementing the BMW study contributed to outcomes (manuscript 1 and manuscript 3), and second, by examining the CEB and CBPR models that center community, context and culture to inform future interventions among African American women (manuscript 2 and manuscript 3).

Understanding how processes, operations and decisions in intervention design contribute to health improvements is imperative for ensuring programs are relevant and effective in specific populations. One size does not fit all. The current state of health inequities and chronic conditions in African American women require thoughtful intervention strategies that center community knowledge, culture and context. This dissertation seeks to identify intervention strategies that are relevant to African American women and also influence how public health professionals approach intervention development for meaningful, community-identified health improvements. In the next sections, Manuscripts 1, 2 and 3 are presented in the format required for their submission to journals.

Chapter 2: Paper 1

(Current Status- revise and resubmit due August 16; presented in the format as submitted to the American Journal of Health Education)

What's theory got to do with it: measuring effects of theory on lifestyle behaviors and weight in the Better Me Within Randomized Trial

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What's theory got to do with it: measuring effects of theory on lifestyle behaviors and weight in the Better Me Within Randomized Trial

Abstract (200 words)

Background: Knowing which theoretical constructs work best to design effective interventions is essential for populations with increased burden of disease. African American women (AAW) experience greater prevalence of chronic diseases and fewer benefits from weight loss interventions compared to White women.

Purpose: To examine how theoretical constructs were associated with lifestyle behaviors and weight outcomes in the Better Me Within (BMW) Randomized Trial.

Methods: BMW used a tailored diabetes prevention program implemented in churches among AAW with BMI ≥ 25 . Regression models assessed relationships between constructs (self-efficacy, social support and motivation), and outcomes (physical activity (PA), calories, and weight).

Results: Among 221 AAW (mean (SD) age 48.8 years (11.2); mean weight 215.1 pounds (50.5), several significant relationships were found including an association between change in motivation for activity and change in PA ($p=.003$), and change in motivation for diet and weight at follow-up ($p<.001$).

Discussion: The clearest relationships emerged for PA with motivation for activity and weight management social support demonstrating significance in all models.

Translation to Practice: Self-efficacy, motivation and social support show promise to promote changes in PA and weight among church-going AAW. Opportunities to keep engaging AAW in research are essential for eliminating health inequities in this population.

Keywords (3-5): health behavior theory, African American Women, weight loss, physical activity

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Disclosure Statement: The authors report there are no competing interests to declare.

Data availability statement: Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

Word Count: 5219

Introduction

The prevalence of obesity continues to rise among adults in the United States, with the greatest prevalence among African American women as compared to White and Hispanic women.¹ In 2018, rates of obesity (BMI > 30) among African American women exceeded 55% and are nearing 20% for severe obesity (BMI >40).¹ Obesity is connected to increased risk for chronic diseases that disproportionately affect African American women, and as a result it is a prime area of focus for health intervention programs. African American women are twice as likely to die from diabetes as White women, and experience more severe complications from diabetes including 2.7 times the incidence of end-stage kidney disease, and 1.3 times the rate of cardiovascular disease mortality as compared to White women.^{2,3}

Weight loss interventions in African American women tend to result in less weight loss and shorter periods of maintenance compared to White women.⁴⁻⁶ For instance, in the original Diabetes Prevention Program (DPP), the likelihood of African American participants achieving the 7% weight loss goal was less than half of White participants.⁷ The Better Me Within Randomized Trial evaluated a faith adaption to the DPP specifically for African American women resulting in approximately 3% weight loss.⁸ Identifying specific constructs and strategies associated with better outcomes among African American women is one area where researchers and practitioners can improve intervention design.^{5,9}

There is strong evidence that programs designed using health behavior theory are more successful than interventions without theory and there is some evidence that interventions with a multi-theory approach may produce larger effects.^{9,10} Health behavior theories are a key aspect of intervention design, helping to identify the causes of behavior or explain why participants behave in different ways to promote or hinder health.⁹ Theories also identify constructs that may

lead to behavior change and improved health.¹¹ A scoping review of weight-loss interventions for African American women reported that 9 of 29 studies did not specify a theory or framework. Of those that did, many did not explain how theory was applied in their methods or how program activities were connected to theoretical constructs.¹² Thus, a gap remains in evaluating the effects of theoretical constructs in interventions,^{5,9} particularly for African American women.

The DPP is one of the most widely used weight management and diabetes prevention programs; however, it is unclear how DPP constructs impact behavior change specifically in African American women. The DPP curriculum is based on Social Cognitive Theory (SCT) and incorporates evidence-based obesity treatment strategies to promote self-efficacy and social support like goal-setting, self-monitoring, and controlling environmental stimulus.^{13–16} From SCT, the literature shows that self-efficacy is the most powerful predictor and most frequently measured determinant of the theory.¹⁷ In addition, social support has been predicted to increase self-efficacy and may work through self-efficacy as a mediator or moderator.^{17,18}

While Self-Determination theory (SDT) is not explicitly cited in the DPP, there are multiple ways that the DPP curriculum seeks to enhance intrinsic motivation.¹⁵ In SDT, three primary psychological factors are suggested to enhance intrinsic motivation and overall health including autonomy, competence and belonging.¹⁹ Intrinsic motivation is posited to be directly related to behaviors, with motivations falling on a continuum from more controlled to autonomous (independent).²⁰ The more autonomous a person's motivations, the greater likelihood of behavior changes being sustainable over time.²⁰

The Better Me Within Program (BMW), (P20MD006882), was a randomized trial that utilized health behavior theories to tailor the DPP for African American women with BMI ≥ 25 in churches and compare a faith-enhanced version to a faith-placed version.²¹ The purpose of the

current study is to conduct a secondary analysis of BMW data and examine how theoretical constructs of behavior change, self-efficacy, social support, and intrinsic motivation, were associated with lifestyle behaviors and weight outcomes in African American women enrolled in the BMW program. Determining which theoretical constructs improve health behaviors in African American women will guide the development of more effective interventions that can improve health in this population.

Methods

The BMW study was a nested randomized controlled trial in 221 African American females implemented at 11 church sites in the Dallas, TX metroplex. A community-based participatory research approach was used to design, implement, and evaluate BMW in partnership with a Community Advisory Board (CAB) of local pastors and first ladies (e.g., wife of the pastor and ministry leader). Churches were randomized to either a faith-enhanced DPP program or control group with the standard DPP curriculum. Cohorts of 3-4 churches were recruited annually between January 2014 to February 2016 and participants met for 10 months with 16 weekly, then 6 monthly sessions. The current secondary analysis aims to build knowledge for which constructs may work best in programs for African American women. This study used data collected from the BMW trial to examine how theoretical constructs from SCT and SDT were related to changes in physical activity, calorie intake and weight.

Recruitment

Full details of recruitment and measures have been reported elsewhere.²¹ Briefly, churches were recruited initially through social and professional networks of the CAB. Church eligibility requirements included: 1) > 100 members, 2) predominately African American, 3) willing to provide leaders for the program (health coaches, faith leader), and 4) had space to

accommodate group meetings. After pastor agreement to the research study, churches were randomized to either intervention group (a faith-enhanced DPP program) or control group (a standard DPP). Following randomization, participants were recruited through church events and announcements, then screened by staff in person or via phone follow-up to ensure eligibility. Inclusion criteria for participants included: identifying as female and African American, being over 18 years of age, affiliated with the church hosting the program, not enrolled in a weight loss program in the last year, not planning to relocate in the next year, free of a diagnosis of diabetes, and able to participate in changing diet and physical activity. The study was approved by the Institutional Review Board of the University North Texas Health Science Center.

Interventions

Diabetes Prevention Program

The DPP began as a randomized controlled trial that demonstrated a lifestyle behavioral intervention (diet and physical activity) reduced the risk of diabetes onset by 58% compared to the drug metformin and placebo groups.^{7,14} The lifestyle intervention was grounded in SCT with two primary goals, to lose 7% of body weight, and increase physical activity to a minimum of 150 minutes per week.¹⁶ Subsequent translations maintain the theoretical foundations and have focused on making the program adaptable for real-world settings through a curriculum created and disseminated by the CDC.^{22–24}

Better Me Within Trial

The BMW Trial used the DPP curriculum in all churches. The curriculum is grouped into a core phase with three sections over 16 weeks, then a maintenance phase where monthly sessions are continued for approximately 6 months with similarly-focused curriculum as the core.²³ The intervention group churches also received additional faith components like 15-minute

devotional with a church leader, incorporating Bible scriptures, faith handout (scripture references and faith activity), and prayer. (See BMW intervention description.²¹) Since control groups also met in churches, some of these components also occurred naturally in control groups. Process evaluations and site visits during implementation documented references to scripture and prayer.

Theoretical Connections in the BMW Program: Table 1 includes curriculum descriptions and connections of BMW program strategies to theoretical constructs. During the core 16 weekly BMW sessions, motivation, from SDT was expected to increase through the weekly practice of self-monitoring (enhancing competence), group-based learning (enhancing belonging), and the progression of the program from weekly to monthly sessions (building autonomy). In addition, prayer and scripture were thought to increase motivation as well. Each of these constructs is predicted to improve health behaviors, including weight management behaviors.^{19,25}

From SCT, self-efficacy and social support were both expected to increase through the 16-week program. Self-efficacy was promoted in all churches through aspects of the DPP curriculum including goal-setting, role-modeling, self-monitoring, action planning and observational learning, which have been shown to increase self-efficacy.¹⁷ As a result, self-efficacy was expected to influence behaviors related to reduced calorie and fat intake, increased minutes of physical activity and overall reduced weight. The construct of social support was promoted through the group-learning format, prayer, being held in the context of the participant's church, and through the influence of the Health Coach, a trained lay member from each congregation.

Data Collection

Participants completed consent and baseline measures at an event at their church. Baseline information included biological measures and surveys of demographics, behavioral, dietary, and psychosocial measures of health including self-efficacy, social support and motivation. After baseline measures, participants began the core intervention phase which met weekly for 16 weeks. After the core intervention phase was completed, another measurement was held at 16 weeks/4 months (post), where the same set of study measures were collected with the exception of some demographic items and height. Participants were compensated with a \$20 Walmart gift card at each measurement event. There was a maintenance phase of the intervention with monthly sessions lasting 6 months, and additional follow-up measures at 10 months past baseline, though these results are not reported here.

Measures

In developing the BMW program, it was expected that theoretical constructs would increase during the course of the intervention (baseline to post) and that these changes would influence physical activity, calorie intake and weight. This study examined: 1) how the theoretical constructs and outcomes may have changed during the intervention (baseline-post) after the core intervention phase, and 2) what relationships may exist between constructs and behavioral and weight loss outcomes during (change from baseline-post) and after implementation (post) of the intervention. The independent variables (IVs) for this secondary analysis included three measures of self-efficacy, one measure of social support, and two measures of motivation. Dependent variables (DV) include weight, minutes of physical activity and calories.

Self-efficacy

Three types of self-efficacy were measured in this study. First, weight loss self-efficacy was measured through the Physical Activity and Nutrition Self-Efficacy (PANSE) scale. Eleven

items assessed a person's confidence to incorporate behaviors that lead to weight loss (dietary changes, increase physical activity or reduce sedentary time). Previous studies showed good internal consistency ($\alpha = 0.89$), adequate test-retest reliability ($r = 0.55$, $p < .01$), as well as, construct validity with 3 scales showing significant correlations with PANSE and in the expected directions.²⁶ Questions were answered on a scale of 1-9 (1 = not at all, 9 = completely), then summed for a total score with higher scores representing higher self-efficacy.

Second, exercise self-efficacy was measured with the Self-efficacy for Exercise Behaviors scale.²⁷ Two subscales measured a person's confidence to exercise even with barriers: stick to it (8 items), and making time for exercise (4 items). There was good internal consistency in a previous study for both subscales, stick to it ($\alpha = 0.85$) and making time for exercise ($\alpha = 0.83$).²⁷ Questions were answered on a Likert scale (1 = I know I cannot, 5 = I know I can), and then averaged for each subscale. Higher scores represented greater exercise self-efficacy for that subscale.

Third, diet self-efficacy was measured with the 8-item Weight Efficacy Lifestyle (WEL) Questionnaire- Short Form to assess self-efficacy to resist overeating. Previously the scale was validated with the original 20-item WEL questionnaire ($r = 0.968$).²⁸ Responses were answered on a scale from 0-10 (0 = not at all confident, 10 = very confident), then summed. Higher scores represented greater confidence to resist overeating.²⁸

Social support

Social support was measured by the Weight Management Support Inventory.²⁹ This inventory used 26 items to assess the frequency of social support for weight management in the last four weeks. Test-retest reliability was confirmed in a previous study ($r = 0.75$), and the scale was also significantly associated with restrained eating.²⁹ Questions were answered for how

often social support was given on a Likert scale (1= never, 5= daily), and then summed. Higher scores represented more social support.

Motivation

Motivation was measured with an adapted version of the Self Regulation Questionnaire for Exercise by Lawman and colleagues.^{30–32} Two subscales were used one for intrinsic motivation for diet (8 items), and another for intrinsic motivation for physical activity (11 items). A previous study demonstrated internal consistency reliability for the diet scale ($r=.053$), and the physical activity scale ($r= 0.78$).³¹

Questions were answered on a Likert scale with three items “not like me”, “a little like me” or “a lot like me”. The responses were added together separately for each scale to produce a total measure of motivation. Higher scores reflected greater levels of motivation.³⁰

Weight

Weight was collected with a Doran Digital Scale DS6100 with participants wearing light clothing with shoes removed. Measures were taken twice to the nearest 0.1 lbs and averaged.

Physical Activity

Minutes of physical activity was determined by the Past Week Modifiable Activity Questionnaire which collected information about the length (minutes) and frequency (day of the week) of physical activity outside of work in the past 7 days.³³ A previous study demonstrated test-retest reliability ($r = 0.74$, $p < 0.0001$) and convergent validity (Spearman $r = 0.60$, $p < 0.0001$).³³ Minutes from each day were summed for total weekly minutes of activity.

Diet

Dietary measures including calories were measured using the Delta Nutrition Intervention Research Initiative Questionnaire short food frequency questionnaire (FFQ).³⁴ Validation of this

tool occurred through a previous study comparing the Delta short FFQ with the mean of four 24-hour diet recall surveys.³⁵ Authors concluded there was adequate validity ($r=0.40$ across all nutrients) based on comparisons to other validation studies of FFQs.³⁵ The Delta short FFQ had 158 items that assessed how often a portion of food was eaten (less than once per month to twice daily), and portion size.³⁴ Surveys were sent to Northeastern University for processing and results reported values of daily nutrients including calories.

Statistical Analysis Plan

Intervention outcomes were previously reported showing significant improvements in weight, dietary intake, and physical activity in both treatment conditions.⁸ Thus, intervention and control churches were combined for this analysis since the purpose was to identify how theoretical constructs relate to behavioral and weight outcomes. Specifically:

- (1) if there was a relationship between theoretical constructs at post and behaviors/weight at the end of the core intervention phase (A models);
- (2) if changes in theoretical constructs during the intervention were related to behaviors/weight at the end of the core intervention phase (B models); and
- (3) if changes in theoretical constructs during the intervention were related to changes in behaviors/weight that happen during the intervention (C models).

Analysis began by calculating descriptive statistics with means and frequencies for all variables. Next, Cronbach's alpha for each scale was calculated to examine reliability of the scale in this specific study population compared to previous literature. Then, correlations of demographic variables and independent and dependent variables were examined to inform models for significance testing.

Before models were run, paired t-tests were calculated to see if means of independent and dependent variables were significantly different between baseline and 4 months (post). Then, mixed effect models were calculated for each outcome variable with related theoretical constructs to account for repeated measures over time in the same participants, cluster randomization of churches, and changes in constructs over time.³⁶ Models used maximum likelihood estimation due to unbalanced data (different number of participants in each church cluster) with unstructured covariance. Outcomes included change scores (post-baseline) for weight, minutes of physical activity, and calorie intake. In initial mixed effect models tested with intercept only, physical activity change and calorie change showed the estimate of covariance structure as 0.00 for the cluster variable (e.g., church), indicating no effect of church. Since there was no cluster effect, further analyses were conducted using multiple linear regression models. Mixed effect models tested with intercept only for the outcome of weight change, showed the covariance structure for church was not significant ($p=.228$), so further analyses proceeded with the simpler model of multiple linear regression.

In regression models, education was dichotomized for analyses (0= high school or less, 1= technical school and more). Initial models for all outcomes showed non-normal distributions of residuals and in some models heteroscedasticity; therefore, outliers (± 3 SD) were removed for all independent and dependent variables. In addition, physical activity values at 4 months were trimmed to a maximum of 800 minutes (in 1 week), and baseline and post data were square-root transformed to adjust for skewed distributions. Natural log and square root transformations were also applied to weight and calorie outcomes to adjust for heteroscedasticity. However, results were similar to non-transformed models, so the non-transformed models were used for better interpretation of results. Regressions that used change

scores subtract 4-month measures (post) from baseline enrollment measures. All analyses were conducted in SPSS version 27.

Three types of regression models were run separately for each outcome (weight, physical activity, calories) with corresponding IVs (self-efficacy, motivation, social support) controlling for education, age, baseline weight and baseline construct values:

- **A Models (IV Post/DV Post)**- These models helped to determine if a relationship existed between theory constructs (IV post) and behavioral and weight outcomes (DV post) at the end of the core intervention 4 months after enrollment.
- **B Models (IV Change/DV Post)**- These models helped to show if a change in the theoretical construct (IV change) that occurred during the intervention from baseline to post was related to the outcomes at the end of the intervention (DV post).
- **C Models (IV Change/DV Change)**- These models examined if changes from baseline to post in theoretical constructs (IV change) were related to changes during the same time period for outcomes (DV change).

Results

Demographics

Participants in the study were 221 African American women, mean (SD) age 48.8 years (11.2), 48.1% had college education or more, 46.6% married or in a relationship, 51.6% had one or more children under the age of 18 living at home. Mean (SD) weight at baseline was 215.1 pounds (50.5), with 20% clinically overweight ($BMI \geq 25 < 30$), 32.1% class I obese, 20.8% class II and 27.1% class III obese. Retention at 4-month follow-up was 83.3%.

Internal consistency of scales

Cronbach's alpha was calculated for each of the scales in this study. All values were above $\alpha = .84$, except the subscale of exercise self-efficacy making time, at $\alpha = 0.57$. This was likely influenced due to a change to this subscale by the original authors from 7 to 4 questions.³⁷

Changes in constructs and outcomes from baseline to post

Paired t-tests in Table 2 showed statistically significant changes ($p < .001$) for all independent variables from baseline to 4 months, except the subscales for exercise self-efficacy, as well as, dependent variables of mean weight, mean minutes of physical activity, and mean calories. This showed that during the first 16 weeks of the program positive and significant changes occurred in the outcomes of interest (e.g. calorie intake, physical activity, weight), as well as, most theoretical constructs that were posited to affect health behaviors and weight loss.

Relationships between theory and outcomes

To examine if the BMW program produced associations between theoretical constructs and outcomes, individual multiple linear regressions were run controlling for age, education, and baseline weight. Three types of models were run separately for each outcome: A models (IV post/DV post) explained if there were relationships at the end of the intervention between constructs and outcomes; B models (IV change/DV post) explained if theoretical constructs changed during the intervention, then was it related to the outcome at the end of the intervention; and C models (IV change/ DV change) explained if both theory and outcomes changed during the intervention, then, were they related to each other. Results by outcome (weight, physical activity, calories) are described below, see also Table 3 and 4.

Weight

In A Models (IV post/DV post), post measures of weight loss self-efficacy and motivation for diet were significant with post weight. This means after the core intervention,

weight loss self-efficacy was associated with weight. In B Models (IV change/DV post), a relationship was indicated for change in weight loss self-efficacy, change in motivation for diet and change in motivation for activity with post-weight; which showed that changes in these constructs during the intervention period were related to weight at 4 months. Change in motivation for diet showed the highest estimate across all three constructs suggesting for every 1-unit difference in change in motivation for diet there was a 0.60 pound decrease in weight holding all other predictors constant. In C Models (IV change/DV change), change in weight and change scores for theoretical constructs were all non-significant ($p > .05$), though the same relationships that were shown in B models appeared and were in similar directions. See Table 3.

Physical Activity

Minutes of physical activity ($PA^{1/2}$) was square-root transformed to normalize the skewed distribution in A (IV post/DV post) and B models (IV change/DV post). In A Models (IV post/DV post), post measures of motivation for activity, exercise self-efficacy-stick to it, and weight management social support were all significantly associated with square root minutes of physical activity at post. This means after the core program these constructs were influencing physical activity. In B Models (IV change/DV post), change in motivation for activity and change in weight management support were both significantly associated with post $PA^{1/2}$. This means that a change in these constructs during the intervention influenced physical activity after the intervention. In C Models (IV change/DV change), models remained significant for both predictors of change in motivation for activity and change in weight management support with change in PA. This meant that changes in constructs during the intervention were related to changes in physical activity during the program. Across all constructs, change in motivation for activity showed the highest estimate for change in PA suggesting that for every 1-unit difference

in change in motivation for activity there was a 9.39 minute increase in change in PA holding all other predictors constant. See Table 4.

Calories

In A Models (IV post/DV post), post measures of weight management social support were significant with calories at post. However, the relationship was positive indicating that for every 1-unit increase in support, mean calories were expected to *increase* by 10.05 holding all other predictors constant. This relationship was expected to be negative showing higher levels of mean support related to lower mean calorie intake. In B (IV change/DV post) and C models (IV change/DV change) there were no significant relationships between changes in theoretical constructs and calories or change in calories. This meant that these constructs were not influential with caloric intake.

Discussion

This study evaluated SCT and SDT constructs in the BMW Trial, a tailored DPP, with outcomes among African American women in churches. Paired t-tests revealed significant changes in all constructs and outcomes between baseline and post, except for exercise self-efficacy. In regression analyses, the clearest relationships emerged for physical activity with motivation for physical activity and weight management social support demonstrating significance in all models. Models with weight were also promising, showing significant relationships with weight loss self-efficacy and motivation for diet at post-intervention and during the intervention (change from baseline to post).

While theories are often discussed in the development of interventions, reporting how theories may change or influence intervention behaviors and outcomes during and after the intervention is rare. This study used three different models to assess the possible impact of theory

in the intervention by examining: 1) relationships between theory and outcomes after the intervention (A models); 2) changes to theory constructs during the intervention with outcomes at the end (B models), and 3) changes during the intervention for both theory and outcomes (C models). Several constructs showed significant relationships, and may assist researchers and practitioners in deciding what theories to include in interventions for African American women.

Motivation is a frequently reported barrier for physical activity in many studies among African American women.^{38,39} The current study found that motivation had a positive and significant relationship with physical activity in all models, with a 1-unit increase in motivation for activity change resulting in a 9.39 minute increase in physical activity holding all other predictors constant. This suggests that small changes in motivation could produce physical activity that leads to increased health benefits for African American women. The latest physical activity guidelines have removed the requirement that exercise bouts should be at least 10 minutes, and are now supporting the benefits of smaller increases (less than 10 min) that contribute to meeting total daily physical activity.⁴⁰ Other studies also support the relationship between motivation and physical activity. For instance, a study with 221 middle-aged, overweight women (race not reported) found that autonomous motivation predicted physical activity outcomes and mediated the effect of the intervention on physical activity outcomes at 2 years and weight change at 3 years follow up.^{41,42} In a systematic review of studies with overweight/obese adults,⁴³ autonomous motivation was one of the top predictors and mediators of long-term physical activity, though race/ethnicity was not reported in the review.⁴³

Motivation for diet also had a significant relationship with weight for models at post and when examining changes of motivation for diet during the intervention period. Other studies have shown a relationship between motivation and weight, though dietary motivation is less

often cited. In a study by Teixeira et al⁴⁴ intrinsic motivation for exercise predicted changes in weight after 24 months among middle-aged women (race not reported).⁴⁴ Multiple health behaviors have been predicted in studies with women (race not reported) by autonomous and intrinsic motivation including exercise, eating self-regulation, weight loss.^{20,45–49} Improving motivation through intervention is important to support increases in physical activity and other healthy lifestyle-promoting behaviors.¹⁵

Another construct, weight management social support also showed consistent relationships with all physical activity models in the current study. Prior studies have also documented the important role of social support in physical activity. In a qualitative study of physical activity companions among active African American women, participants reported that women use many dimensions of social support to maintain a lifestyle that is active.⁵⁰ In 2011, Peterson and Cheng reported a large effect of social support on change in physical activity.⁵¹ Similarly, Kwarteg⁴¹ found in her study with African American breast cancer survivors that more support from friends regarding exercise resulted in higher amounts of physical activity. Social support has also been shown to be important for long-term maintenance of physical activity. Kinsey et al⁵² recently reported, 56% of African American women who had maintained physical activity for > 6 months described engaging in physical activity with others.

Next, self-efficacy is a cornerstone of SCT and is consistently related to behavior changes for weight loss and physical activity.^{9,17,53,54} In this study, weight loss self-efficacy had a significant relationship with weight for models at post, and when examining changes of weight loss self-efficacy during the intervention period. Other studies have found similar results. In the PREMIER study, participants who had the largest increases in diet self-efficacy or exercise self-efficacy had the greatest weight loss; models confirmed statistically significant relationships

between exercise self-efficacy changes and weight change, and also diet self-efficacy change and weight change.⁵⁵ In the same study, stratified analyses showed for African American women diet self-efficacy was the only construct associated with weight loss.¹⁸ In a 2015 meta-analysis, self-efficacy was a common predictor of short-term (< 12 months) weight control in 6 studies.⁴³ In another study with 246 African American women breast cancer survivors, self-efficacy was associated with weight loss.⁴¹ Together these studies support the benefits of including self-efficacy in an intervention where weight is being addressed.

Identifying constructs that influence calorie intake is also important for improving interventions in African American women. In this study only weight management social support at post was related to calories at the end of the intervention. No other determinants/constructs were significantly related to calories or change in calories in any of the other models. Interestingly, it was in the opposite direction as expected, showing an increase in calories with increased social support for weight management. One reason for this result may be the social and eating norms of the church context. Traditions around food in Black churches go back to slavery; food was and remains a way to express oneself and show love, identity, creativity and even wealth.^{56,57} Within the Black Church, food and meals are often a sign of unity among believers and a place of community where everyone is welcome.⁵⁶ Dodor⁵⁸ found in a study of religiosity and health among African Americans that those who participated in prayer more frequently and considered their religion important were more likely to eat fast foods. Despite this surprising finding showing increased weight management social support and increased calories, there were significant decreases in mean calories from baseline to post.

Although some studies suggest that churches support unhealthy eating behaviors, , there is also evidence that churches are a primary facilitator for increasing healthy eating.⁵⁹⁻⁶¹ Baruth

et al⁶² found that perceived church support was associated with a healthier diet among church members. This finding reinforces the complexity of eating behaviors. Other constructs may be influencing calories that were not accounted for in this study like mood or stress that may be tied with emotional eating behaviors.⁶⁰

Strengths from this study include, first, participants in BMW were all African American women which adds to the knowledge base of intervention research with this population. Studies with African Americans for behavioral lifestyle interventions are low compared to Whites (18% vs. 59%).⁶³ Second, this study fills another gap in the literature by evaluating the use of theory in intervention design. Specifically, how theoretical constructs were connected to intervention components, examining if and how they change, and the relationship of theoretical constructs to health outcomes.^{5,9,64} The current study provides evidence for researchers and practitioners working in intervention design for what components may increase effectiveness in programs for African American women.

There are also limitations to this study and how the results can be applied. Due to purposive sampling of churches, and also the ability for women to choose to participate in the program, results in this study may not be generalizable to all African American women. There may also be differences between African American women who attend church or who would volunteer to be in a health program and those who would not. In addition, participants with conditions like diabetes were excluded from the study. Other limitations include the use of self-report measures of the theoretical constructs, as well as, diet and physical activity. Measures may also have been tested in different populations and may have varying definitions of constructs though they were chosen to fit this population as close as possible. In addition, results may be impacted by missing data due to listwise deletion during regression.

Translation to Health Education Practice

Despite these limitations, the BMW trial showed that applying SCT and SDT theories, resulted in improvements in self-efficacy, motivation and social support related to weight and physical activity in church-going African American women enrolled in the DPP. With preventable chronic diseases continuing to impact African American women at higher rates than White women, and interventions persistently resulting in smaller health benefits from lifestyle interventions, the need to understand how theoretical constructs impact behaviors is important to measure and report. This study may give researchers and practitioners some direction as they design or adapt interventions. Future studies may examine further how theoretical constructs may mediate or moderate health outcomes, as well as incorporate strategies to mitigate the environmental barriers African American women may encounter when trying to implement healthier behaviors.^{5,53}

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Table 1. Connections between Program Strategies and Theoretical Construct by Level of Intervention

Program Strategy or Activity	Source	Theoretical Construct
<i>Individual Level</i>		
Skill-building: Goal-setting, self-monitoring diet and physical activity, and action-planning	DPP Curriculum- section 1	Self-efficacy Motivation (competence)
Controlling the external environment: Problem-solving, reflection, planning for high risk situations (work, home, social contexts, holidays)	DPP Curriculum- section 2	Self-efficacy Motivation (competence, autonomy) Social Support
Dealing with psychological and emotional issues: Managing stress and fluctuations in will power	DPP Curriculum- section 3	Motivation (competence) Social Support Self-efficacy
Self-monitoring	Food & Activity Logs Weekly Weigh-In	Self-efficacy
Scripture references	Health Coaches and Church-going participants	Motivation (competence, belonging)
<i>Interpersonal Level</i>		
Health Coach(es)	Trained lay member(s) from church	Social Support
Modifying food and activity examples to match the group social/cultural norms	Health Coach	Self-efficacy
Communication through calls or emails	Health Coach	Social Support
Make up Sessions	Health Coach	Self-efficacy Motivation (competence)
Role-modeling	Health Coach and program participants	Self-efficacy
Observational learning	Health Coach and program participants	Self-efficacy
Prayer	Health Coach and program participants	Motivation (competence, belonging) Social Support
Accountability	Food & Activity Logs Weekly Weigh-In Group Meetings Health Coach	Social Support
Group learning format	Group Meetings	Social Support
<i>Environmental Level</i>		
Meetings in familiar and trusted social context	Church settings	Social Support
Church Health Sundays and Celebration Dinners	Church settings	Social Support Motivation (belonging)

Table 2. Paired T-test Results of Independent and Dependent Variables by Time

Variables	Baseline	4 month	p-value
Weight (lb.), mean (SD) n=181	212.38 (43.8)	207.50 (44.87)	<0.001
Physical Activity (minutes), mean (SD) n=147	97.95 (120.97)	190.93 (191.19)	<0.001
Calories, kcal, mean (SD) n=156	2312.37 (1245.71)	1653.94 (844.24)	<0.001
Weight Loss Self Efficacy, mean (SD) 11 questions, range 11 - 99 n=158	73.79 (13.47)	75.93 (13.35)	0.021
Weight Management Social Support, mean (SD) 26 questions, Range 0-104 n=158	26.79 (19.68)	33.78 (20.10)	<0.001
Motivation for Activity, mean (SD) 11 questions, range 0-22 n=159	10.66 (6.03)	13.26 (6.21)	<0.001
Exercise Self Efficacy			
Mean Stick to It, mean (SD) 8 questions, range 0-5 n=157	3.83 (0.73)	3.75 (0.84)	0.209
Mean Make Time, mean (SD) 4 questions, range 0-5 n=156	4.03 (0.81)	3.93 (0.81)	0.151
Motivation for Diet, mean (SD) 8 questions, range 0-16 n=158	9.28 (4.20)	11.07 (3.77)	<0.001
Diet Self-efficacy, mean (SD) 8 questions, range 0-80 n=158	54.51 (16.37)	57.58 (15.64)	0.004

Table 3. Regression Analysis for Weight Outcomes

	A Models: IV Post & Weight Post		B Models: IV Change & Weight Post		C Models: IV Change & Weight Change	
	Show if a relationship exists between theoretical constructs (IVs) and behavioral and weight outcomes (DVs) at the end of the core intervention 4 months (post)		Show if a change in the theoretical construct (IV change) occurring during the intervention from baseline to post is related to the outcomes at the end of the intervention (post)		Show if changes from baseline to post in theoretical constructs (IV change) are related to changes during the same time period in outcomes (DV change)	
Variables	Estimate (SE)	p-value	Estimate (SE)	p-value	Estimate (SE)	p-value
Weight Loss Self-Efficacy (WSE) Models						
N	157		155		153	
Constant	4.77 (5.98)	0.43	-5.33 (4.69)	0.26	-5.60 (4.30)	0.20
Age	-0.02 (.05)	0.74	-0.04 (0.06)	0.50	-0.04 (0.05)	0.45
Education	1.35 (1.68)	0.42	1.35 (1.71)	0.43	1.74 (1.56)	0.27
Weight (baseline)	1.00 (.01)	<0.01**	1.00 (0.01)	<0.01**	0.01 (0.01)	0.66
WSE (4M)	-0.14 (.05)	<0.01**	-	-	-	-
WSE Change	-	-	-0.12 (0.05)	0.02*	-0.11 (0.05)	0.03
R ²	0.98	<0.01**	0.97	<0.01**	0.05	0.14 ^a
Weight Management Social Support (WMSS) Models						
N	158		155		153	
Constant	-6.28 (5.04)	0.22	-5.78(4.74)	0.22	-6.27 (4.36)	0.15 ^a
Age	-0.02 (.06)	0.70	-0.02 (.06)	0.71	-0.02 (0.05)	0.66 ^a
Education	1.28 (1.73)	0.46	1.10 (1.76)	0.53	1.54 (1.62)	0.34 ^a
Weight (baseline)	1.01 (.01)	<0.01**	1.00 (0.01)	0.00**	0.01 (0.01)	0.64 ^a
WMSS (4M)	-0.01 (.03)	0.71	-	-	-	-
WMSS Change	-	-	-0.05 (0.03)	0.13	-0.03 (0.03)	0.36 ^a
R ²	0.97	<0.01**	0.97	<0.01**	0.02	0.66 ^a
Motivation for Diet (MOTD) Models						
N	157		154		152	
Constant	-2.02 (5.23)	0.70	-3.68 (4.62)	0.43	-4.65 (4.31)	0.28 ^a
Age	-0.02 (0.06)	0.75	-0.05 (0.06)	0.38	-0.04 (0.05)	0.41 ^a
Education	1.49 (1.72)	0.39	0.89 (1.67)	0.59	1.36 (1.56)	0.38 ^a
Weight (baseline)	1.00 (0.01)	0.00**	1.00 (0.01)	0.00**	0.01 (0.01)	0.65 ^a
MOTD (4M)	-0.36 (0.17)	0.04*	-	-	-	-
MOTD Change	-	-	-0.60 (0.17)	<0.01**	-0.43 (0.16)	0.01 ^a
R ²	0.97	<0.01**	0.98	<0.01**	0.06	0.07 ^a
Motivation for Physical Activity (MOTPA) Models						
N	158		155		153	
Constant	-3.15 (5.32)	0.56	-3.26 (4.78)	0.50	-3.84 (4.38)	0.38 ^a
Age	-0.02 (0.06)	0.67	-0.04 (0.06)	0.49	-0.04 (0.05)	0.45 ^a
Education	1.22 (1.72)	0.48	1.35 (1.74)	0.44	1.80 (1.59)	0.26 ^a
Weight (baseline)	1.00 (0.02)	<0.01**	1.0 (.01)	<0.01**	-0.00 (.01)	0.91 ^a
MOTPA (4M)	-0.16 (0.11)	0.14	-	-	-	-
MOTPA Change	-	-	-0.26 (.11)	0.02	-0.23 (0.10)	0.02 ^a
R ²	0.97	<0.01**	0.97	<0.01**	0.05	0.12 ^a

^aF-test for Model is not significant; *p-value<0.05; **p-value<0.01

Table 4. Regression Analysis for Minutes of Physical Activity (PA)

	A Model: IV Post & PA^a Post		B Model: IV Change & PA^a Post		C Model: IV Change & PA Change	
	Show if a relationship exists between theoretical constructs (IVs) and behavioral and weight outcomes (DVs) at the end of the core intervention 4 months (post)		Show if a change in the theoretical construct (IV change) occurring during the intervention from baseline to post is related to the outcomes at the end of the intervention (post)		Show if changes from baseline to post in theoretical constructs (IV change) are related to changes during the same time period in outcomes (DV change)	
Variables	Estimate (SE)	p-value	Estimate (SE)	p-value	Estimate (SE)	p-value
Exercise Self-Efficacy- Stick to It (ESE-RR) Models						
N	128		126		130	
Constant	3.02 (4.87)	0.54	13.02 (3.94)	<0.01**	169.34 (138.43)	0.22
Age	0.00 (0.05)	0.93	-0.01 (0.05)	0.86	-0.71 (1.70)	0.68
Education	-2.05 (1.56)	0.19	-2.79 (1.52)	0.07	-112.38 (53.90)	0.04*
Weight (baseline)	0.01 (0.01)	0.50	0.00 (0.01)	0.92	0.52 (0.41)	0.21
Min. PA (baseline)	0.22 (0.08) ^a	<0.01**	0.20 (0.08) ^a	0.02*	-0.44 (0.15)	<0.01**
ESE- RR (4M)	1.93 (0.63)	<0.01**	-	-	-	-
ESE- RR Change	-	-	1.08 (0.73)	0.14	19.89 (25.97)	.45
R ²	0.15	<0.01**	0.10	0.03*	0.12	0.01**
Weight Management Social Support (WMSS) Models						
N	129		127		130	
Constant	8.06 (4.22)	0.06	11.99 (4.01)	<0.01	91.26 (128.93)	0.48
Age	0.03 (0.05)	0.52	0.00 (0.05)	0.99	-0.63 (1.57)	0.69
Education	-2.71 (1.55)	0.08	-2.78 (1.52)	0.07	-61.51 (50.73)	0.23
Weight (baseline)	0.00 (0.01)	0.77	0.00 (0.01)	0.98	0.51 (0.37)	0.17
Min. PA (baseline)	0.24 (0.08) ^a	<0.01**	0.26 (0.08) ^a	<0.01**	-0.35 (0.13)	0.01*
WMSS (4M)	0.07 (0.03)	0.01*	-	-	-	-
WMSS Change	-	-	0.05 (0.03)	0.05	1.89 (0.91)	0.04*
R ²	0.13	<0.01**	0.12	0.01*	0.12	<0.01**
Motivation for Physical Activity (MOTPA) Models						
N	129		127		131	
Constant	-0.36 (4.17)	0.93	9.96 (3.92)	0.01	65.67 (137.93)	0.64
Age	0.04 (0.04)	0.38	0.02 (0.05)	0.73	0.05 (1.66)	0.98
Education	-2.46 (1.41)	0.08	-2.29 (1.47)	0.12	-91.60 (52.46)	0.08
Weight (baseline)	0.02 (0.01)	0.04*	0.00 (0.01)	0.76	0.62 (0.39)	0.10
Min. PA (baseline)	0.17 (0.07) ^a	0.02*	0.22 (0.08) ^a	<0.01**	-0.42 (0.14)	<0.01**
MOTPA (4M)	0.48 (0.08)	<0.01**	-	-	-	-
MOTPA Change	-	-	0.30 (0.09)	<0.01**	9.39 (3.06)	<0.01**
R ²	0.28	<0.01**	0.17	<0.01**	.175	<0.01**

^a indicates square root transformation *p-value<0.05; **p-value<0.01

Chapter 3: Paper 2

DRAFT

To be submitted to Qualitative Health Research

Title: A Closer Look: Examining cultural-contextual influences on weight management in focus groups with church-going African American women

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3.1 Introduction

Chronic diseases continue to rise among African American women making lifestyle programs a critical aspect of risk reduction and disease prevention (Ogden et al., 2020). Weight management programs often have a reduced impact among African American women compared to White women, especially when they are delivered in community settings (Diabetes Prevention Research Group, 2009; Diabetes Prevention Research Group, 2004; Knox-Kazimierczuk & Shockly-Smith, 2017; Kumanyika et al., 2014; Stolley et al., 2009; Svetkey et al., 2012). The reduced impact has been attributed to interactions between individual barriers, as well as, social and environmental influences (Knox-Kazimierczuk & Shockly-Smith, 2017; Kumanyika et al., 2014; Sutton et al., 2016).

In the Community Energy Balance (CEB) framework, Kumanyika and colleagues (2012) propose examining the cultural-contextual influences in which ethnic minorities live for intervention targets that may affect weight status. The model suggests cultural-contextual influences sociocultural factors (norms and identity), structural influences (power, politics, and access to health-promoting resources), and history that need to be considered along with the position of individuals within settings (family, community and cultural) (Kumanyika et al., 2012). These influences and settings help to determine appropriate intervention targets for minority populations (Kumanyika et al., 2012). Sutton and colleagues' conceptual model specific to weight management for African American women similarly describes extrinsic conditions of culture, environment and social support which interact with individual intrinsic conditions (motivation, self-efficacy, knowledge, perceived vulnerability and barriers) to influence the processes of behavior change and ultimately outcomes of interventions (Sutton et al., 2017). The factors and pathways in these models may help to explain the reduced effects in weight

management interventions with African American women (Kumanyika et al., 2012, 2014; Sutton et al., 2017).

Culturally adapted interventions are one potential way to increase the effectiveness of programs for African American women. Resnicow and colleagues differentiate between “surface structure” and “deep structure” adaptations. Surface adaptations assist with the initial fit of intervention materials and components to a particular population through matching with people, places, foods, media that are common to the group. Deep structure assists with salience and efficacy of programs through demonstrating sociocultural, environmental and historical influences on health; for example integrating meaningful holiday traditions or spiritual practices into programs (Resnicow et al., 1999). Kreuter and colleagues (2003) proposed adaptations across 5 categories--peripheral (surface features like colors, photographs), evidential (stories and data that are group-specific), linguistic (using preferred terms and language of population), constituent-involving (engaging the community and utilizing insider knowledge), and sociocultural (including context of population through foods, traditions, and other factors) (Kreuter et al., 2003). A review by Lancaster and colleagues (2014) of faith-based obesity programs concluded that deep structure techniques, like inclusion of faith beliefs, incorporating scripture, and spiritual themes in the design of activities, may improve the acceptability of health messages and lead to greater behavioral change (Lancaster et al., 2014; Resnicow et al., 1999). Another review by Kong et al. (2014) examined culturally adapted obesity, diet, and physical activity studies for African American women and showed a majority of studies with significant between-group differences utilized both socio-cultural and constituent-involving strategies. Additionally, constituent-involving strategies were common in the planning and recruitment phase of studies that showed significant results. Taken together, these reviews indicate cultural

adaptions as a promising approach to improve outcomes of weight management programs in African Americans.

Recently, Kitzman et al. (2017) utilized a community-based participatory research approach in the Better Me Within Trial to incorporate constituent-involving and socio-cultural adaptations in the design of a faith-enhanced diabetes prevention program (DPP) for African American women in churches (Kitzman et al., 2017). Focus groups were conducted to inform adaptations related specifically to faith and implementation in church settings. Outcomes of the BMW Trial showed significant weight loss in both intervention and control conditions, with high attenders (at least 15 of 16 sessions) in the faith-enhanced intervention showing twice the weight loss of participants in the low attending groups (14 or less sessions) or control group (standard DPP) overall, reaching 5% weight loss (Kitzman et al., 2021). Cultural adaptations may have assisted with higher attendance among the faith-enhanced group that led to greater weight loss. While these results contribute to the body of evidence for cultural adaptations, they also point to a need to expand approaches to reach participants that were unable to achieve high attendance. Further work is needed to connect adaptations to outcomes to enhance participant engagement.

The purpose of the current study was to discover how cultural elements and contextual factors identified by church-going African American women may influence intervention design, cultural adaptation approaches, and solutions to weight management. A closer look at BMW focus group data through secondary analysis applying the CEB framework may deepen understanding of factors, in addition to faith, that influence perceptions, behaviors, and motivations related to health and weight management in this population. Insights from church-going African American women may provide context for why traditional behavioral weight

management approaches are less effective and identify new targets for cultural tailoring and adaptations in intervention design.

3.2 Methods

Previous study- focus group data collection

A team of researchers and a Community Advisory Board (CAB) of African American church leaders partnered to complete focus groups for the development of a faith-enhanced weight loss program in Spring 2013. Focus group questions asked about perspectives related to weight loss and maintaining a healthy lifestyle including: 1) current needs of church members trying to reach a healthy weight, 2) perceptions (e.g. beliefs, values, knowledge and attitudes) regarding the connection between faith and healthy lifestyle, 3) barriers that prevent weight loss, 4) facilitators and motivators of weight management, and 5) delivery preferences for church weight management programs. The focus group guide was developed utilizing the program planning model PRECEDE to assess predisposing, reinforcing and enabling factors (PRE's) related to weight in African American women (see Table 1) (Green et al., 2005). Each focus group discussed core questions and topical questions related to barriers to weight loss, self-efficacy and support for weight loss, or program preferences.

Table 1. Focus Group Guide Questions with PRECEDE Model	
Predisposing Factors	<ul style="list-style-type: none"> • How concerned are you about obesity? • How important is it to reach and maintain a healthy weight? • How do you think weight influence's one's health? • How does a healthy lifestyle influence one's health? • How important is a healthy lifestyle to you? • How important do you think faith is in achieving overall health? • What is God's role in your health and having a healthy weight? • How does faith in God help or improve your health? • What are the biggest challenges to reaching and maintaining a healthy weight? <ul style="list-style-type: none"> ○ <i>Probes: Individually, At home, At church, In your neighborhood, Your environment?</i>
Reinforcing Factors	<ul style="list-style-type: none"> • What role should the church play in promoting health? • How confident do you feel in your ability to change or improve your lifestyle? <ul style="list-style-type: none"> ○ <i>Probe: What would make you more confident?</i>

	<ul style="list-style-type: none"> • In what ways can you support yourself in reaching and maintaining a healthy weight/healthy lifestyle? • In what ways could the church (environment and leaders) help you in achieving a healthy weight/healthy lifestyle? <ul style="list-style-type: none"> ○ <i>Probes: Your family (i.e your home)?, Your neighborhood?, Your environment?</i>
Enabling Factors	<ul style="list-style-type: none"> • How confident do you feel in your ability to reach and maintain a healthy weight? <ul style="list-style-type: none"> ○ <i>Probe: What would make you more confident?</i> • What are your preferences for a weight management program in your church? • Have any of you ever tried to lose weight or change your lifestyle to improve weight in the past? <ul style="list-style-type: none"> ○ <i>Probe: If yes, what did you try?, How did it work for you?</i> ○ <i>Probe: What are some ways that would have made better or more successful?</i>

Participants and Procedures

African American women from six churches were recruited using purposive sampling from CAB-coordinated church meetings in City, TX. Eligibility to participate in focus groups included: 1) African American female; 2) 18 years or older; and 3) member of church congregation. Six focus groups were held with 53 congregation members (5 - 13 per group) and lasted 90-160 minutes. Participants completed informed consent and a brief demographic questionnaire prior to recording the focus group. A meal was served and participants received a \$20 gift card. Digital recordings were transcribed verbatim by a transcription company, then destroyed. This study was approved by the Institutional Review Board of the University.

The Current Study

In this study, the community-energy balance (CEB) framework and the community-based participatory research (CBPR) model were studied to develop guiding questions for analysis of BMW focus group data. Memos were written to document key aspects and questions from CEB and CBPR to serve as a lens for initiating data analysis and preparing for coding (Kumanyika et al., 2012; Wallerstein & Duran, 2010). Guiding questions included:

1. What cultural elements are discussed by African American women when approached with the possibility of building a tailored intervention around weight management?
2. How do the lived experiences (identity, daily life context and community/family life) of African American women influence perspectives on health, obesity and weight management?
3. How are individual, social, historical, or environmental contexts described in relationship to health and weight management?
4. What community and cultural assets can be leveraged to design interventions for this community?

Data Analysis

Two researchers (an African American woman with two years of experience with qualitative analysis and a Caucasian woman with 10 years of qualitative experience), formed the team to complete analysis of the data. An applied thematic analysis approach was used with the transcripts that involved generally: 1) immersion in the data through repeat reading of transcripts; 2) coding of the data with inductive and deductive codes; 3) creating data displays for distinguishing details; 4) data reduction through summary devices to arrive at themes, and 5) interpretation and recontextualization of themes to derive meaning for the study purpose (Nowell et al., 2017; Tolley et al., 2016).

Once immersive reading of the transcripts was complete, the researchers met to begin the codebook. First, deductive codes from CEB and CBPR were created, as well as, inductive and deductive codes from repeat reading of transcripts. Codes were named and given detailed definitions for how they should be applied to the transcripts. Over 6 weeks the codebook was finalized and intercoder reliability was established. An iterative process was followed for

intercoder reliability where one transcript was coded separately by coders, then reviewed in a meeting to discuss discrepancies, redefine codes, reach consensus and recode sections. This process happened twice with two transcripts, then the remaining 4 transcripts were divided evenly between coders to complete coding. Transcripts were coded with the final codebook, using MAXQDA qualitative software (version 22). Memos were used during coding to create an audit trail to document decisions in coding, process thoughts about participant discussions, practice reflexivity, and document possible themes (Nowell et al., 2017). After coding was completed, data displays and tables were used to distinguish details across codes and transcripts, and to summarize the data during three separate meetings (Tolley et al., 2016). During each meeting, coders discussed how to interpret and recontextualize the data in light of the guiding questions and purpose of the study (Tolley et al., 2016).

3.3 Results

A total of 53 women (mean (SD) age = 44.0 years (11.3); 95% African American; 5% Multi-racial) from six Protestant Christian congregations (2 Baptist, 3 Non-Denominational, and 1 Presbyterian) participated in focus groups. (See Table 2).

Table 2. Focus Group Demographics N (%)			
Sex		Race	
Male	0	African American	50 (94.3%)
Female	53 (100%)	Other	3 (5.6%)
Age mean years (SD)	44.0 (11.3)	Children in Household	37 (70%)
Marital Status N (%)		Education Level	
Married	27 (50.9%)	Some High School	2 (3.7%)
Single	16 (30.2%)	HS/GED	11 (20.7%)
Divorced	7 (13.2%)	Technical	3 (5.3%)
Widow	1 (1.8%)	Some College	17 (32%)
Separated	2 (3.7%)	College	19 (35.8%)
		Graduate	1 (1.8%)

Employment		Health Rating	
Part time	8 (15%)	Very Good	10 (18.9%)
Full time	33 (62.3%)	Good	24 (45.3%)
Unemployed	6 (11.3%)	Fair	16 (30.2%)
Retired	3 (5.6%)	Poor	3 (5.6%)
Disabled	2 (3.7%)		
Other	1 (1.8%)		

There were two socio-cultural influences related to body appearance and identity discussed in-depth across the focus groups. Four themes were developed from these factors that have implications for intervention design and cultural adaptations.

Theme 1: Inside my community, a thick body appearance is desirable and attractive.

Focus groups discussed that preferences for body appearance were shaped by individual and familial experiences, personal preferences, and socio-cultural norms. Women discussed their health status and perceived a larger body size not only to be attractive, but also healthy.

“I wear this well”

Personal perceptions of what qualifies as “obese” did not match the medical definition of obesity (BMI>30), and women were surprised when they found out their weight placed them in an obese category. Thin was considered undesirable, and often associated with illness. Defying body norms, also seemed to be a way that some women exerted their independence or affirmed their self-esteem, “The size that people say you per se should be – that’s not a weight I want to be. So, I’m not looking to [lose weight] - I’m happy.” Further, a thick physique was viewed as attractive and highly valued, not just for themselves but also their significant others. One participant stated, “it’s not that I feel out of place because I don’t have a problem with my weight... I have a man that happens to like all of this. So, whether it’s a size 10 or a size 22 - so I don’t have that issue.” Participants described a desire for their bodies to be toned and not flabby. A thick, toned shape was so esteemed that multiple groups described gaining weight back to be more satisfied with their appearance.

For me, just to be a little transparent, when I lost my 20-30 pounds, I feel great but then I didn't like how my buttocks looked....So, I put on some more weight..., I was proud that I lost the weight, but I was not liking what my buttocks looked like. (Laughter) So, it was looking a little saggy...

Body appearance came into conflict with weight loss for many women causing them to lose motivation for their health goals. While all groups discussed an acceptance of larger body size, groups also described experiences related to body appearance that were less positive, often in broader societal contexts.

Theme 2: Outside my community, I face limitations and discrimination because of my size causing mental strain, stress, and decreasing quality of life.

Women did recognize problems with their size describing closets full of clothing that they could not wear, or not being able to find fashionable clothing in their size. These were temporary motivators for weight loss, but the continuous cycle of yo-yo weight loss and gain without any sustainability or long-term success was discussed as a stressor and for some a burden.

“Life and then the overweight part”

Participants expressed exhaustion, stress and building anxiety for those who continued to unsuccessfully manage their weight. Groups discussed being the only person that was not thin at the gym, and having anxiety over new experiences, traveling or social situations.

Even for classrooms, going to college. And you're thinking okay what kind of classroom setting is it? Are they going to have the seats - cause I've gone to some of them and they've had the seats that have the arm and the...you know, it's not like the auditorium type...you know...at least I can lift the armrest up if it is, you know, and hope that nobody

*wants to sit by me or it's crowded and every seat has to be taken, you think about even things like that...Just to take a college course. Just so, it's a lot you think about and take into consideration, and it does hinder your fulfillment of really just, really living life. You know, you already have a lot of issues anyway. Period. I don't care who you are. **Skinny, fat, black, white, indifferent. You're going deal with life. Period. But then, when you're overweight, you got life and then the overweight part. That's two parts.***

Experiences of discrimination and preferential treatment, or mistreatment due to a larger body size were also discussed. This included people receiving promotions because of weight loss and being viewed as more capable, as well as, people not receiving positions because they could not fit into the required uniform. There was discussion of hiring practices that favor individuals with a normal BMI, while individuals that were overweight or obese felt they were viewed as a liability possibly due to increased insurance costs. Examples of medical discrimination were also shared:

When I had an operation, the doctor expressed that I was too fat... ..and he wasn't very kind about it. Then I went to go to another doctor... and the doctor just stopped me right at the door. He said, 'I won't take you because you're black and you're fat... You just need to lose weight.' ...I can't believe this happened to me... But when my [family member] died, the nurse brought me and my [siblings] together and said, "Now, look" you know, you're black and you're overweight and you just need to get it together." So it is embarrassing.

Mistreatment or discrimination related to body appearance and race contributed to feelings of anxiety and shame. Since most participants had not sustained success in managing their weight, these experiences may contribute to feelings of hopelessness, and lack of

motivation. Outside of physical appearance the role of African American women in their homes and communities also influenced weight management.

Theme 3: My identity as a Black woman and nurturer of others enables me to build up my family and community often impacting my own physical, emotional, and mental needs.

Women described in detail the many roles and positions they held to support the needs of their family, church, workplace, and community. This identity manifested itself in a physical flurry of activity, and also in a drained mental and emotional state.

“We sacrifice ourselves”

African American women discussed being a mother, wife, daughter, and, in general, a nurturer to their church and communities. The priority to take care of others’ needs resulted in an omission of their own care or sometimes an inability to recognize their own needs. Women described the jobs of feeding their families, managing households, school, work, and church with a list of ongoing responsibilities. The constant state of doing for others contributed to norms of not resting and not prioritizing their own needs. Consequences of adopting these norms included expressions of fatigue, and in some cases physical illness. Women expressed the adoption of unhealthy behaviors such as eating late, frequently consuming fast food, minimizing sleep, and the absence of physical activity which could increase the risk of illness or chronic diseases.

I mean, I’m in school and then I work full-time - so when they [kids] go to sleep, normally it is either homework or I have to prep for the next day, or I gotta do somebody’s project, or he needs me to help him with something he’s doing or --- I remember one time I was sick and I was so sick to the point where I had to go to the hospital and that was the only quiet time I had... the nurse was like, “Are you okay?”

Because I was so paranoid that I was thinking that a child was going to call... my name any minute now...

Identity influenced women's perspectives on barriers to health through the life stage they were in as well. In each stage there was a connection to time allocation and priorities. The idea of "making time for yourself" was viewed as next to impossible and perhaps selfish for some, especially for those caring for young children or aging parents. For single or retired individuals, responsibilities at work or church often consumed their time. Women expressed that they wanted to be healthy, especially to be able to be around for their families and not be a burden on them.

"Our [mind] never goes to relax mode"

Identity also influenced mental health and coping skills. The example of denying self to care for others was described across generations within the focus groups. Women described not being able to relax, and being consumed with thoughts of what else they should be doing. This was modeled by their foremothers, resulting in a lack of skills or awareness about self-care.

I'm more subconscious – because, like you say, we wasn't taught or anything – we never was aware about the eating. And, for me was an emotional eater – I would eat when I was happy. I eat when I was sad. Stress...I would definitely eat if I was stressed. Uh. Also, we as womens, we more – I can talk about me – I'm also goin' to take care of everybody but me. I have tried to break the (gets emotional) - but it is hard because it's all I know to do – take care. But, I would neglect myself. I start, but I will.....I can't tell you why I do that – but I do. You know. It's a - obesity falls into so many things. But, it's not some much that we greedy and we want to overflow with food. You know. Because, I fast. I push back. I do all those particular things. But, I think mine's more knowing how to take care of somebody else than myself.

Women described developing unhealthy coping responses to deal with life stressors which were often connected to eating behaviors including self-described addiction to sweets and eating to manage emotions. The desire and effort to care for others consumes any motivation women may have to care for themselves, and the pressure to figure out how to be more disciplined and improve is also present.

Theme 4: I need to do better by being more disciplined and faithful to God in order to manage my weight and be healthier.

The last theme women discussed was framed as both determination and sometimes obligation to “do better” in their efforts to be healthier. This was fueled by two ideas: 1) the power of knowledge and 2) spiritual beliefs about taking care of your body. These ideas operate within African American women’s identity as nurturers and Christians impacting motivation for health.

“When you know better, you do better”

Across groups this refrain was repeated equating knowledge with the ability to “do better” or take action in adopting healthy behaviors. A participant remarked, “We know the things to do - we just need to do it, the big D word, discipline...”. Participants had suggestions for helping themselves to be more disciplined including receiving support and accountability from their Sisters (other women at church), and from church leaders. One participant stated, “Now, if the pastor stand up and say, we’re going to be disciplined - we’ll do it. But, if we have to discipline ourselves, it’s like we don’t have no control.” New knowledge, or leaders support may act as a temporary motivator, but when women failed to do better, this was a personal failing and a result of a lack of discipline or in some cases lack of faith.

“Do better to serve the Lord”

This desire to do better and have more discipline was partially fueled by their desire to live out their faith through loving and serving God, taking care of themselves, and caring for others.

So, in summary, basically, our bodies are temples. It is our responsibility to take care of them and to make them healthy. We have a responsibility beyond ourselves to minister to others. We can't do that effectively if we are sick and broke down and can't function. You know. Mentally, we are not there. Emotionally we are not there because the stress has gotten to us and all that kind of stuff because we allow it. Our time management is crappy like mine and you know, so you got to a better job of all that stuff so that you can be better vessels for the service of the Lord.

This quote shows the connection between the nurturing/caregiving identity and the charge to do better, not only to improve health, but also to serve God and others. In this example, this was a positive extrinsic motivation, but if women were lacking skills to identify and care for their own needs, these beliefs could contribute to discouragement, decreased motivation, and further unhealthy behaviors.

Some of the spiritual beliefs related to this theme were that being overweight or not taking care of one's body was a sin, and that only healthy foods existed during historical biblical times. These beliefs sometimes came from church leaders or individual interpretations of the Bible and were, in some cases, not fully accurate from a historical or scientific perspective (e.g., the belief that all foods in biblical times were healthy). Women also described a need to apply their faith better to their health, "I don't have the revelation...yet in this part of my life", or lack of obedience to God as a reason for not being able to maintain their weight. These beliefs led to guilt and shame for participants not being able to achieve a healthy lifestyle.

You grasping for everything, you feel so desperate and instead of just following God's plan and God's order, you so desperate, you scratch for everything. And most of it's a what...a quick, easy fix. Because we don't want to not overeat, exercise, read, and take care of ourselves. We want the quick fix. Everybody wants to lose weight quick. Lose weight fast. Come up with a new simple way. And everything is according to God's word and he even tells us what to eat, how to eat...it's just in His word. And if we'd just do it, be willing and obedient...you know.

The desire to do better was also produced out of positive experiences of faith.

Participants described experiencing increased motivation from times when their faith was growing or when they felt closer to God.

... I think that motivates me because like when you feel like your growing in Christ, if that's gonna help me to be able to be better or help or help with those, than that's what I need to do; ... and if I can trust Christ for everything else why can't I do it with this?...It seems so hard, but if we can do it with everything else that's hard, why can't we do it with this.

Participants desired to extend their trust in God from other areas of their life to their health. To “do better,” interventions for African American women will need to incorporate skills to build discipline, and partnerships between faith leaders and health professionals could offer connections to combine faith and health together. Table 3 displays themes with additional representative quotes and targets for cultural adaptation.

Table 3. Thematic Quotes and Intervention Targets for Cultural Adaptations		
Theme	Representative Quotes	Intervention Targets for Cultural Adaptations
Theme 1: Inside my community, a thick body	“So I think this could be my size that I am and I could be this the rest of my life and I be fine or if I gain weight. I’m not small... like healthy is not small. So	Utilize motivational interviewing to identify participants’ goals for how they want to look and feel vs. prescribed percent weight loss

<p>appearance is desirable and attractive.</p>	<p>that's why I'm saying weight doesn't matter to me cuz that doesn't mean you're healthy just cuz your small".</p> <p>"And so you can still have a heavy set build still be healthy and not have all of that fat. And I mean that is one of my aims. Cuz I've always wanted to be big, I mean I was what you call stick. I mean when I was growing up. I mean a stick. And I've always wanted to be [thick]. To have a little bit of weight on me. Ya know a little bit of meat on ya (group laughter) and so ya know for me right now, even though I want to lose weight, I don't want to just loose it and ya know look all flabby."</p> <p>"It's interesting that you say that because when I lost all the weight, honestly, I did not get any feedback from my husband at all. And that kind of bothered me. So I put some of the weight back on because I remember my mentor even asking at a family dinner, "What do you think of [your wife] losing weight?" "Oh, she's fine as long as she doesn't lose them hips." I'm like, "Really?" (Laughter) So even that, I think triggered for me looking at my buttocks, and thinking 'Oh, okay.'"</p>	<p>Equip participants to understand indicators of health risk beyond weight/BMI Include education about physiological effects of BMI > 30, and discuss the implications for risk for chronic diseases, as well as, equipping women to understand which risk factors they should monitor</p> <p>Offer physical activity options that tone and strengthen (e.g. weight lifting, pilates, yoga)</p> <p>Measure outcomes related to physical activity (ex. Strength) and changes in muscle/fat mass (e.g. Tenita scale) vs. self-reported min of physical activity</p> <p>Explore social norms and prepare participants for changes that may happen as they get healthier (e.g. changes in body appearance, habits, and how to prepare people in your life for change)</p>
<p>Theme 2: Outside my community, I face limitations and discrimination because of my size causing mental strain, stress and decreasing quality of life.</p>	<p>"...I know at LA fitness they have...where you can go and you can [join a] group. And it is really, really nice but again, you know, everybody in there is thin. In the group. Because they are regulars. You know, so when I finally got in there, I'm the heavy set one. Most of the girls are thin."</p> <p>"...when you're invited to go somewhere or a group of folks are going to do something, you think about every aspect of that trip...and you 20 question a person...., But they don't realize that you're asking... ..that you're asking, "Okay, we got to do the airplane. What kind of plane is this? Is it those little small seats or this is a regular seat? Do I need to buy a first-class ticket to get a wider seat?" You know all these aspects....it's bookoos of things that the average person, all they're thinking about is it's all inclusive, I paid my money, and now I just got to get my wardrobe and I'm done...."</p> <p>"So, being a dancer, I dance with a [local theater]. Most of my dancers are small dancers, so being a bigger dancer, I can still do the moves but I don't get chosen because I can't fit the uniform."</p>	<p>Promote health activities for all abilities and all sizes</p> <p>Seek to understand unconscious bias, promote anti-racism strategies, and cultural humility in health promotion teams to improve program strategies, curriculum development, and promote equity</p> <p>Measure stress, mental health, quality of life</p> <p>Utilize motivational interviewing to address quality of life issues</p>

Theme 3: My identity as a Black woman and nurturer of others enables me to build up my family and community often impacting my own physical, emotional, and mental needs.	<p>"I will say this. I think sometimes as mothers - and I'm just going to say that we are all mothers in here - I think sometimes we always take care of other things...and we are always the last ...on the list..." Female: Yes."</p> <p>"...I do for me after the house is done. I eat after everybody has eaten. Or, I'll wait until my house is quiet and then I take care of me. Well, by that time, it's 12:00, 11:00...and you're sitting up eating your meal that you done cooked at 7:00...By 12:00, by 1:00, you're in the bed, so that stuff is just sitting there...and we really haven't done anything. So, even with me, I prioritize...and I look at my schedule everyday. [I'm] always at the bottom ...it just a lack of how we prioritize our lives... We just have to figure out where do we put ourselves in the schedule for the change."</p>	<p>Use the Superwoman Schema to measure identity and adjust program based on results</p> <p>Teach mindfulness and reflection as a way to identify personal needs</p> <p>Build skills for identifying, coping with, and reducing stress</p> <p>Teach participants how to identify emotional eating and build skills toward change</p>
Theme 4: I need to do better by being more disciplined and faithful to God in order to manage my weight and be healthier.	<p>"...I need to put it at the throne and really ask for help and guidance in so many different areas with my health. And, I know that it's gonna be there. But it's gonna be up to me to stop that fork...it's gotta be up to me...to stop it...and I know He [God] will give me the help if I have the will to start stopping it. I think that He [God] will help me along. I just gotta get there..."</p> <p>"I'm just tired. I just...these kids, this job, whatever, we make excuses. (Female: Um-hum.) So it's just that. Oh, I'm just so beat up. (Laughter) Okay, Lord, I'm going to do better. (Female: Um-hum.)"</p> <p>"I got fat in the last 15, 20 years, and I could tell it's really bad. I mean, I'm sluggish, I'm tired, I don't have energy, ... It's just I gotta, I hadn't been able to stay focused. Something will disrupt, get me sidetracked. The last five years has been my back. But it's like, oh, God, every time I turn around it's something. And I just gotta get to a point where I can - even with the disruptions - pick up and keep going. I, I stop. You know. That's what...but it is important to me. Very important."</p>	<p>At the start of interventions, assess barriers that may be harder to change despite individual level of motivation; equip with action planning skills to maneuver barriers</p> <p>Teach participants about stages of change and how to manage the normal cycle into relapse</p> <p>Equip participants to understand how to grow in the skill of discipline</p> <p>Acknowledge how identity plays a role in wanting to do better</p> <p>Cultivate social support through group activities and partnering with churches</p> <p>Utilize health professionals in local congregation or organizations to partner with church leaders to combine faith and health messages for congregations</p> <p>Church leaders promote health by discussing stress reduction, mental health, self-care, and asking for help</p> <p>Utilize church space for group activities and adopt church policies to encourage healthy eating at events</p>

3.4 Discussion

This study describes an analysis of focus groups with church-going African American women that identified themes that may be useful as cultural adaptations to enhance intervention design. The four themes representing identity and body appearance were described inside and outside of cultural, social, and environmental contexts for how they work as motivators and barriers to health behaviors.

Identity was expressed in two themes, first, through African American women's identification as nurturers and caretakers, and second, as a reinforcing factor to identity through an expressed desire or obligation to do better (or be better) as a way to improve their health, serve God, and care for others. Caring for others presented as a barrier to weight management behaviors due to the many tasks across home, work, and church that consumed time and energy. In addition, there was a lack of skills or knowledge about how to rest or care for themselves (Woods-Giscombé, 2010). Women expressed never being “taught” about caring for themselves and never seeing rest or self-care modeled by their mothers or grandmothers. The demands of this role outweighed the expressed internal motivation to live longer to care for family members. This identity and associated behaviors have been documented previously in work related to the “strong black woman” (Allen et al., 2019; Woods-Giscombé, 2010).

Woods-Giscombé identified five characteristics to create the Superwoman schema (SWS): obligation to help others, obligation to manifest strength, obligation to suppress emotions, resistance to being vulnerable or dependent, and determination to succeed despite limited resources (Woods-Giscombé, 2010). Factors influencing the SWS, included lessons passed along from their foremothers and spiritual values (Woods-Giscombé, 2010). Recent studies have found SWS characteristics be positively and significantly associated with symptoms

of depression, perceived social stress, poor sleep, lack of physical activity, and use of food as a stress coping strategy (Allen et al., 2019; C. L. Woods-Giscombe et al., 2019).

Also connected with identity was women's perception that they needed to 'do better' to manage their weight. Doing better was often connected with knowledge, "when you know better, you do better," a need for more discipline, and spiritual belief connected to serving God and others. Discipline was discussed almost as a character trait rather than a learned skill minimizing the complexity of what may be needed to achieve health goals. Some women discussed the desire to do better when connected to growing in their faith, producing intrinsic motivation to take care of themselves and others. While others described a disconnect between their faith and health, "I don't have the revelation of it," which sometimes produced guilt and shame, leading to extrinsic motivation (e.g., duty, responsibility, and obligation) to be healthy and serve God and others. Higher levels of intrinsic motivation have been shown to contribute to initiation and sustained behaviors, whereas extrinsic motivation has shown to be temporary and dependent on the external motivator (ex. obligation) (Ryan & Deci, 2000).

Some interventions have addressed aspects of this identity by acknowledging the importance of family obligations and providing childcare (Fitzgibbon et al., 2005; Kong et al., 2014; Kumanyika et al., 2005). However, more interventions are needed that consider culture further by incorporating measures of identity, like the SWS, to guide intervention development and evaluate the impact on health outcomes (C. L. Woods-Giscombe et al., 2019; Woods-Giscombé, 2010). In addition, there is a role for church leaders to play in combatting this identity's negative aspects through role-modeling, promoting mental health resources, coping skills, self-care, stress reduction, and asking for help (Abrams et al., 2014).

Body appearance preferences led to positive and negative manifestations in the focus groups with church-going African American women. Many women described a thick, toned body appearance as attractive and desired, with some gaining weight to achieve this ideal. This finding has been well documented in the literature (James et al., 2022; Lynch & Kane, 2014; Sutton et al., 2017; Walker & Gordon, 2014). While this suggested a positive body-image, it also indicated a lack of perceived risk for chronic conditions, a disconnect with medical definitions of obesity, and decreased motivation for weight management behaviors or program participation contributing to greater risk for chronic conditions (Altabe, 1998). These motivations and barriers may influence the desire to participate in weight loss programs and motivation to lose weight (Hagger et al., 2014; Lynch & Kane, 2014; Ryan & Deci, 2000; Walker & Gordon, 2014).

There were also negative experiences related to body appearance. African American women experienced anxiety in public settings where they may be required to purchase a seat belt extender or two seats, as well as preparing for vacations or social situations where they may need special garments like going to a beach. Thinking through the details of situations was difficult. Women also described discrimination due to their race and size from medical professionals and employers. Studies show a link between racial discrimination and increased BMI (Williams et al., 2019). These negative experiences of larger body size within broader societal settings are juxtaposed with the positive social norms and beauty standards within African American women's socio-cultural context. Both experiences can serve as barriers to motivation and action toward adopting health behaviors among African American women. Adverse experiences may increase extrinsic motivation for weight loss; however extrinsic motivation often lasts only a short time (Hagger et al., 2014; Ryan & Deci, 2000). In addition, when combined with the

cultural norms of body size acceptance, women may feel conflicted in their goals to be healthy (Sutton et al., 2017).

Despite these findings, few studies have incorporated body appreciation as a cultural adaptation into their weight management programs. Stolley (2009), in an randomized controlled trial with African American women, Obesity Reduction Black Intervention Trial (ORBIT) intervention was culturally adapted in many ways, including addressing body image and motivations for weight loss in the intervention however these items were not measured or reported in the study (Stolley et al., 2009). In PATHWAYS, a randomized pilot study (N=39), messages in this intervention were careful to avoid promoting a slender body type while still encouraging weight loss due to African American women's preference for larger body sizes (McNabb et al., 1997). Befort (2008) incorporated cultural adaptations for preference for larger body size into a group lifestyle balance program by emphasizing benefits of weight loss at 5 - 10% body weight (Befort et al., 2008). Again, no measures of this adaptation were recorded, so the exact impact on outcomes is unclear.

There are several intervention targets to support cultural adaptations for body appearance from the current study. First, incorporating self-directed goal-setting through motivational interviewing may lead to increased motivation for health behaviors and greater participation in programs (Burgess, Hassmén, Welvaert, et al., 2017; Walker & Gordon, 2014). A recent pilot study, SHE Tribe, used these strategies showing significant improvements in health behavior activation, sleep, diet, and physical activity (Chhetri et al., under review; Spence & Chhetri, 2022). By assessing women's preferences for how they want to look and feel, instead of focusing on a particular percentage of weight loss, motivational interviewing may build sustained intrinsic motivation (Walker & Gordon, 2014). This may also increase program acceptance and

attendance, which is critical for achieving health changes (Burgess, Hassmén, & Pumpa, 2017). In addition, teaching women to monitor their health risk with multiple indicators (ex. waist circumference, cholesterol, hemoglobin A1C) and not only weight or BMI may increase women's ability to make informed decisions and prioritize health changes (James et al., 2012; Kumanyika et al., 2014). Also, focus on exercise specific to African American women's body goals, through strength-building activities (e.g. weight lifting, yoga). This may increase the appeal of programs by aligning with preferred beauty standards, and evidence has shown that building self-determination and motivation for exercise may spill over to influence nutritional behaviors (Mata et al., 2011; Sutton et al., 2017; Walker & Gordon, 2014).

While themes addressed the individual and social context, there was less discussion about the environmental context. Participants acknowledged the food environments of their communities and a lack of easily accessible and affordable places to do physical activity, but they did not discuss solutions to these barriers. Literature supports a need for environmental changes to assist with the adoption of health behaviors (Kumanyika et al., 2014; Sutton et al., 2017). This takes different avenues outside of intervention development, though, into community-building and policy (Golden et al., 2015). For intervention design, important implications for the environment include connecting with communities to identify the places where access already exists for healthy foods or physical activity and incorporating those places into programs; building partnerships with existing resources to support sustainable changes in health; identifying ways to reduce cost or create programs with centers to provide affordable access for participants; and providing childcare.

Limitations

This study is limited by a focus on African American women, who identify as Christian, and are from a specific geographic area of Dallas, TX; which may limit its transferability to other African American populations. This study also applied the CEB and CBPR frameworks to guide a secondary analysis of the data, however original focus group questions did not specifically ask about the cultural elements (i.e. body appearance or identity) in relation to a healthy lifestyle or weight management. The sample size may be considered small, with only six focus groups, although saturation was achieved among groups.

3.5 Conclusion

This study provides insight into the perspectives of church-going African American women and the cultural and contextual aspects that may help design more effective interventions specifically related to body appearance and identity. Evidence for the effectiveness of cultural adaptations in weight management programs in African American women is still lacking. Recent reviews have called for more precise definitions and measurements of adaptations to assess their impact on programs and define quality implementation (Kong et al., 2014; Kumanyika et al., 2014). In addition to cultural adaptations, the idea of cultural tailoring interventions to individuals within interventions has also been proposed to improve health for African American women (Kumanyika, 2014). Future research is needed to determine the best approaches for assessing the impact of individual tailoring within weight management programs for African American women.

Chapter 4: Paper 3

DRAFT

To be submitted to the Journal of Participatory Methods

Title: Evaluating the Paper Trail- A Case Study evaluating CBPR through the documentation of
the Better Me Within Program

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4.1 Introduction

Community-based participatory research (CBPR) is a research approach favored for centering community voices and context to grow interventions, research, and policies. Recent definitions describe CBPR as ‘collaborative efforts between multi-sector stakeholders who gather and use research and data to build on the strengths and priorities of the community and use multilevel strategies to improve health & social equity’ (Wallerstein et al., 2017). CBPR aims for equitable partnerships between community partners and researchers (Israel et al., 1998). CBPR is recommended for many health-related programs, especially those that seek to reduce and eliminate health disparities (Wallerstein & Duran, 2010).

African American women are disproportionately impacted by chronic conditions compared to women in the United States (US) and experience a greater prevalence of stroke, cancers, diabetes, and hypertension (Chinn et al., 2021; NCHS, 2019). In addition, African American women over 20 years old have the highest prevalence of obesity (56.2%) compared to all other populations in the US (NCHS, 2019). As a risk factor for chronic conditions, interventions related to reducing obesity have been less effective for African American women than White women (Chinn et al., 2021; Knox-Kazimierczuk & Shockly-Smith, 2017; Kong et al., 2014). Participatory approaches may hold promise for achieving more success than traditional behavioral weight loss studies due to incorporating contextual factors, characteristics, and viewpoints of African American women (Sutton et al., 2017). CBPR and the promotion of community assets can improve the obesogenic factors impacting African American communities (Coughlin & Smith, 2017; Kumanyika et al., 2012, 2014).

The continuum of participatory approaches ranges from engaging communities in outreach or consulting to full partners with shared ownership and community-driven decision-making (Clinical and Translational Science Awards Consortium, 2011). This variety of

engagement means that each partnership is unique and nuanced, so understanding the processes, mechanisms, and activities within each CBPR partnership are essential for connecting elements of the CBPR approach to outcomes. Areas of participatory research have been growing exponentially since the late 1990s, yet descriptions of process-related details of studies are lacking (Ortiz et al., 2020).

A 2020 scoping meta-review of community-engaged research (CEnR) and CBPR identified a ‘black box’ related to partnering processes that may contribute to outcomes (Ortiz et al., 2020). Another review of patient and public involved research, a CEnR approach, with black and minority participants concluded that there was ‘poor reporting’ of the extent and kind of contributions of involvement of participants at all stages of the research (Dawson et al., 2018). These details are essential for the continued advancement of the science of CBPR, maybe more so for the communities disproportionately impacted by health inequities that engage with researchers to improve the health of their communities (Ortiz et al., 2020).

While CBPR projects have grown over the last two decades, there are a limited number of studies utilizing CBPR with African American women to address weight management/obesity (Ortiz et al., 2020). In a review of CBPR studies to prevent obesity among African Americans, only 2 of 16 studies were focused on African American women alone, with the remaining having at least 50% of participants African American (Coughlin & Smith, 2017). Authors concluded that CBPR approaches can effectively promote weight management and healthy diet among African American adults (Coughlin & Smith, 2017). However, this review did not evaluate *how* CBPR was utilized. Therefore, information is still lacking on which mechanisms, processes, or qualities of the CBPR approach influenced outcomes.

A community-academic partnership utilized a CBPR approach to design and implement a cluster randomized control trial, Better Me Within (BMW), from 2012-2017. The project was created from a previous study and relationships built with predominantly African American churches in the Southern Sector of Dallas since 2005. This laid the foundation for the work in the BMW program and contributed to the essential relationships and team that would implement the five-year grant together. The study team was comprised of four Community Advisory board (CAB) members and research team members, including the principal investigator, two co-investigators, a project coordinator, and two graduate assistants. The CAB and research team worked together through BMW's development, implementation, data analysis, and dissemination phases. As a result of this partnership, BMW compared a faith-enhanced Diabetes Prevention Program (DPP) to a standard DPP with 221 African American women across 11 churches in a metropolitan area of Texas. Multiple publications have highlighted primary and secondary outcomes from this study and have shown improvements in participants' health, namely statistically significant changes in weight, allostatic load, metabolic syndrome, physical activity, calories, and blood pressure across all participants; and statistically significant weight loss in participants with high attendance in the faith-enhanced DPP compared to participants in the standard DPP or low attenders in the faith-enhanced DPP (Kitzman et al., 2017, 2021; Mamun et al., 2020; Tan et al., 2017, 2019).

This study seeks to critically examine how the CBPR approach with African American faith communities in the BMW program aligned with the CBPR model, describing through a case study the processes and strategies of partners that led to the formation, implementation, and outcomes of the study.

4.2 Methods

Three questions guided the approach to this case study:

1. What parts of the CBPR approach were (and were not) realized through BMW's formation and implementation?;
2. What BMW processes, outputs and outcomes resulted from the CBPR approach in this partnership?; and
3. How could the approach be expanded or improved in the context of the BMW trial, and future partnership activities?

To be able to answer these questions, the CBPR conceptual model was used as an analytical tool (Engage for Equity Research Team, 2017; Oetzel et al., 2018; Ortiz et al., 2020). Constructs were taken from the model (See Figure 1), and the Promising Practices Guide developed for CBPR partnerships (Engage for Equity Research Team, 2017; Oetzel et al., 2018; Wallerstein & Duran, 2010). This guide offers definitions of each construct and corresponding questions intended to be answered by a partnership.

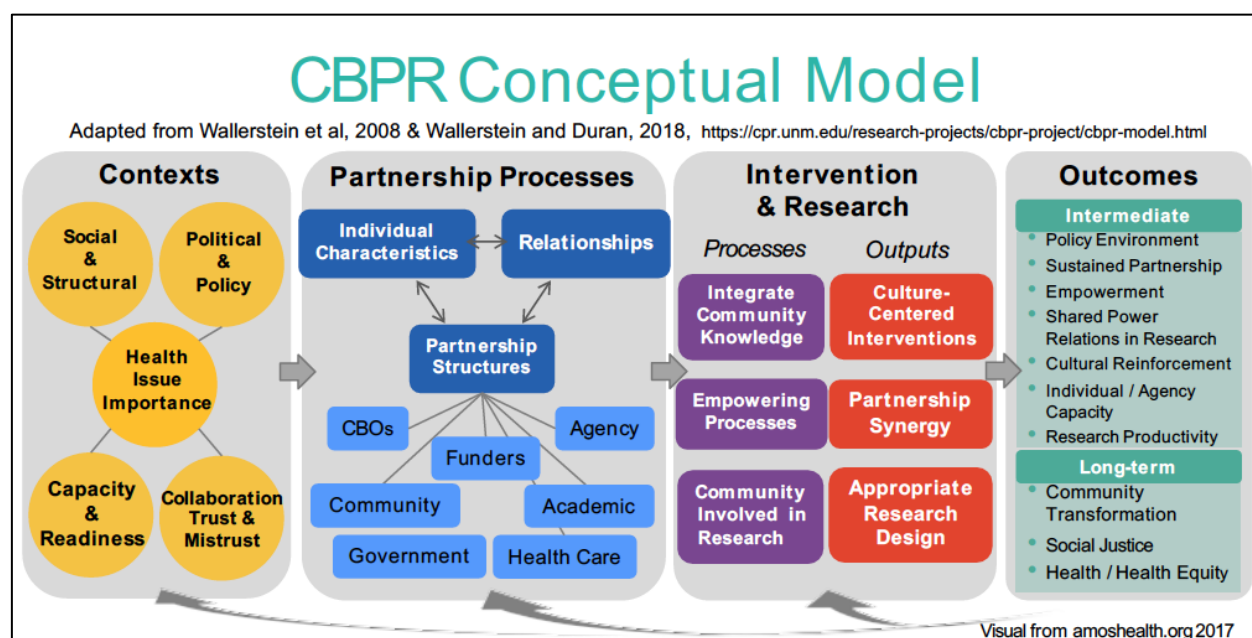


Figure 1. Modified CBPR Conceptual Model

A document review was performed to answer research questions for this study. Program personnel maintained extensive documentation through the study period (2012-2017) in compliance with the North Texas Regional IRB at HSC (2011-164). All recorded documents (n=346) were organized into folders matching the CBPR model domains (context, partnership processes, intervention and research, and outcomes). Table 1 below shows the documents included in the study by domain.

Table 1. Data Sources for Document Review		
CBPR Model Domain	Source Descriptions	Number of Documents
Context	Documents showing history of CAB, grant application, project timeline, focus group data, public documents to show context of city, events during study implementation (e.g. July 2016 shooting in Dallas, Black Lives Matter movement)	41
Partnership Processes	Meeting agendas, emails, notes, budgets, letters of support, presentations	112
Intervention and Research	IRB protocols, process evaluations, program curriculum, training materials, and other guiding documents for the design, implementation, and evaluation of the study	147
Outcomes	CAB activities, data, funder reports, participant and church reports, conference posters, presentations, and journal articles resulting from the study	46

Documents for the context folder included focus group data, gathered during the first grant year with African American women from six churches and church pastors from seven congregations, that was utilized for intervention planning. Furthermore, news articles, blogs, and publications from 2012-2017 were reviewed to understand contextual factors in the Dallas-Fort Worth region and nationally regarding political movements, racism, and health that may have influenced program development. Agendas and notes from all CAB meetings between 2012-2017 were placed in the partnership processes folder, as well as, budget documents highlighting

compensations for all parties involved, and email correspondence between the academic team and CAB on crucial milestones (e.g., leadership changes). All program documents such as curriculum, sermons, and handouts developed in collaboration with the CAB were uploaded to the intervention/research folder. Dissemination materials distributed to participating churches and individuals and participant feedback from satisfaction surveys were gathered into the outcome folder.

A rapid analysis method was used to assess how the CBPR framework was applied through all stages of the BMW study. Rapid analysis was selected as a preferred method of analysis for multiple reasons. First, the rapid analysis offered a structure for a summary table based on the existing CBPR framework, which the coders used to populate results, making it easy to compare and answer the abovementioned research questions (Gale et al., 2019). Second, this method allowed for review of large amounts of data (346 different documents) efficiently and consistently (Vindrola-Padros & Johnson, 2020).

Two coders with experience in qualitative methods, community engagement, and study coordination worked in collaboration to develop the coding structure in Microsoft Excel. First, the domains of CBPR (context, partnership processes, intervention-research, and outcome) were separated into individual Excel sheets. Next, codes based on CBPR model constructs and their definitions were populated into the first two columns of each sheet by domain. Once the coding structure was developed, documents in the four folders were divided among the coders, and a thorough review was completed. Coders updated the excel sheet to include the document source, if evidence was found for a CBPR construct, and a supportive summary or quote from the document. During analysis, coders met regularly to discuss questions and cross-check methods for consistency. After each round of document reviews, the coder who was the former study

coordinator went through the excel sheets to check for accuracy and add content for clarifications if needed. Finally, data were examined for pattern matching across different sources in each domain and displayed in a table (See table 2).

4.3 Results

The CBPR conceptual model illustrates how the context domain affects partnering processes, yielding research and interventions that result in various outcomes. Results are organized by domain (in narrative format), describing how the constructs within each domain were observed or not observed. See Table 2 for a summary, and Table 4 for examples of specific processes and activities that supported each domain.

Table 2. Summary of CBPR Constructs in the Better Me Within Trial			
CBPR Model Domain	Higher-Order Constructs	Constructs	Evidence of occurrence
Context	Capacity	Community History of Organizing	Yes
		Partners/Community Capacity	Yes
	Trust	Community Trust/Mistrust	Yes
	Health Issue Importance	Health Issue Importance/ Perceived Severity by Partners	Yes
	Political Policy	Community Approval of Research	Yes
Partnership Processes	Structures	Control of Resources	No
		Community compensation	Yes
		Formal Written Agreements	Partial
		Shared CBPR principles	Yes
		Community fit	Yes
		Partnership Values	Yes
		Bridging Social Capital	Partial
	Relationship	Leadership	Yes
		Conflict management	Yes
		Participatory Decision Making	Yes
		Trust within Partners	Yes
		Effective resource management	Yes
		Respect	Yes
		Influence, Voice, Power	Yes
		Collective reflection/reflexivity	Yes
		Participation, Dialogue and Listening	Yes
Intervention and Research Design	Community Involvement in Research	Background/Design	Yes
		Data Collection	Yes
		Analysis and Dissemination	Yes
		Community Action	Yes

	Synergy	Partnership Synergy	Yes
Outcomes-Immediate		Program-related Health Changes	Yes
Outcomes-Intermediate	Systems & Capacity Changes	Sustainability of Partnership and Projects	Yes
		Shared Power Relations in Research	No
		CAB/Community Capacity Building	Partial
		Researcher/Academic Capacity Building	Yes
Outcomes-Future		Future Policy Change	No
		Future Research Integrated into Community	Yes
		Social/ Community Transformation	Unknown
		Population Health Changes	Unknown

Table adapted from (Engage for Equity Research Team, 2017; Wallerstein et al., 2020)

Context domain

The Context domain represents the social, structural, political, and historical context of the community health issue (Belone et al., 2016; Wallerstein & Duran, 2010). There was evidence of occurrence for most aspects of this domain during the BMW program.

Community History of Organizing

A community history of organizing was shown through several aspects of the program. First, broadly across the churches represented in the study, there was a sense of pride in seeing the Black church as a “highly influential” force in the community, with pastors describing the movements that have influenced past political policies. Within specific congregations, though, church leaders told how they organized to promote health in their congregations with a message that supported healthy living resulting in feeling good and “doing good” (i.e., being able to be active in service to the church and community). This aided the acceptance of BMW by participating churches.

Capacity

Evidence of partner/community capacity was also present. For example, academic partners had previously worked on a similarly funded project in the same geographic area. They

brought their existing community relationships, skills for community engagement, grant writing, and knowledge of academic research to BMW. Similarly, all four CAB members were African American church leaders (pastors or first ladies) between 40-65 years (n=4, 50% female). Each had experience from the previous research study and contributed skills in writing, teaching, speaking/preaching, and building community partnerships to the team. Both provided the foundation for BMW's development.

Health Issue Importance

During the grant writing process for BMW, a previous Advisory Board (n=21, which included the four members who joined BMW's CAB group) was consulted about pressing health issues in the community. There was a consensus that a focus on obesity would benefit the community, particularly among African American women who were viewed as controlling the food system within the home. The community's interest in addressing obesity was further demonstrated through letters of support for the grant submission by two BMW CAB members. Furthermore, during focus groups conducted in the program's formative stage, church leaders and African American women confirmed the need to address obesity. Still, they clarified that perceptions of obesity and perceived risk were based on cultural norms, not medical definitions, and were often tied to a desire to live longer, be effective in their ministry, and avoid financial burden or medical costs.

Trust

Participants also voiced skepticism and mistrust regarding the medical definitions of obesity. One pastor said during focus groups, "Excuse me. My wife - this is how she explains her weight to me; she says this chart that I'm looking at wasn't done for black people. White people did it. No offense." Hence, the BMW team acknowledged the existing mistrust in the community

and worked towards drawing attention to overall health instead of weight loss alone. This manifested in the name of the program, choosing the core curriculum (the Diabetes Prevention Program), and including the faith component, to reconceptualize the definition of health in African American communities with the help of CAB members.

Partnership Processes domain

The Partnership Processes domain encompasses how individuals, relationships, and partnership structures contribute to the function and work produced by the partnership (Belone et al., 2016; Wallerstein & Duran, 2010). See figure 2 for a timeline of program and partnership activities.

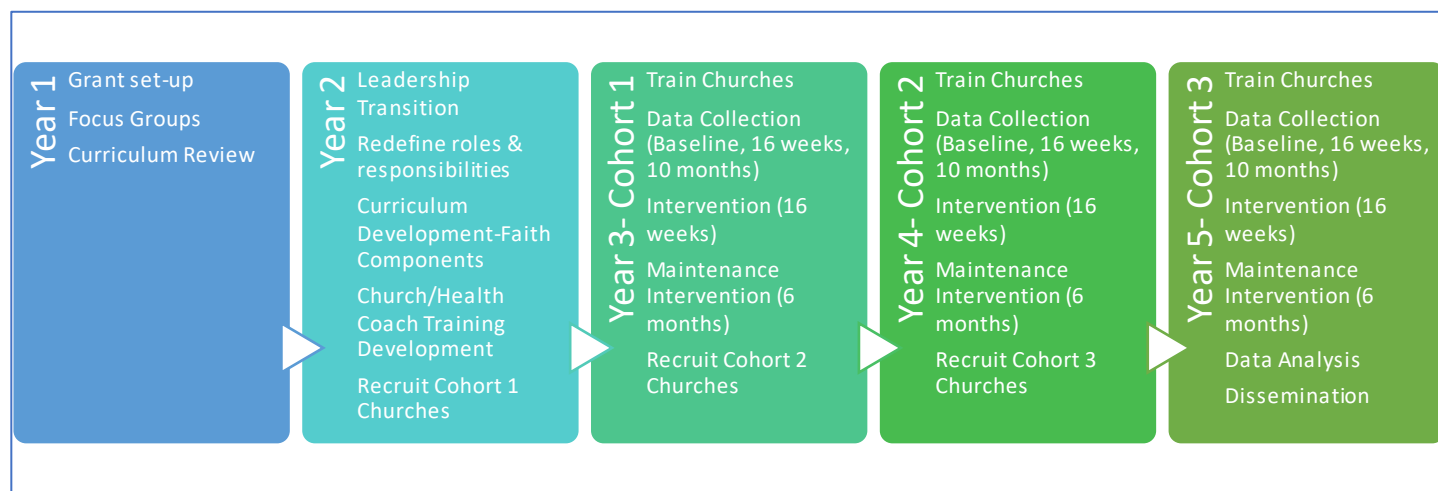


Figure 2. BMW Program Timeline

Conflict Resolution, CBPR Principles, Participatory Decision-Making

The BMW partnership was met with a challenge during a transition of leadership. At the beginning of year 2, there was an unexpected departure of the original Principal Investigator (PI) and a Co-Investigator, which left many questions, threatened the CAB partnership, as well as the feasibility of working with African American churches. In response, the project coordinator met with the CAB to discuss concerns about the transition and, together with the new PI, organized a

dinner with the CAB to discuss next steps. The new PI showed leadership and respect for the community by working to establish a relationship with the CAB, providing transparency with the budget, and providing space for dialogue.

Together the CAB and university partners reviewed CBPR principles, examples of by-laws, and agreements from other community-academic partnerships. Instead of a formal agreement, the partners developed a scope of work to define responsibilities for the CAB. See Table 3. The PI made changes to the budget to adjust compensation to the CAB from the former budget which was an initial step to show respect and establish more equity in the partnership. In addition, CAB members took human subjects research training on conflict of interest to be more integrated with the university. These strategies are reflected in correspondence and meeting minutes from the community-university team, and provide evidence of how trust was cultivated in the face of conflict.

Table 3. Community Advisory Board (CAB) General Responsibilities
<ol style="list-style-type: none"> 1. Assist with recruitment and community engagement 2. Develop faith-focused training & curriculum materials to add to the Diabetes Prevention Program for Pastors and Lay Health Promoters 3. Grow a Pastor and Community Advisory Board for the project as needed 4. Represent community interests and perspectives in grant activities 5. Assist in the development, implementation, evaluation, and/or dissemination of programs/projects 6. Develop strategies to support grant 7. Advise university staff on strategies and the translation of research findings for work in the community and future projects 8. Participate in meetings and trainings throughout the project 9. Disclose any conflicts of interest to the full grant committee and the PI

Partnership meetings (i.e., CAB meetings) were held 4-6 times a year throughout the grant period to assist with shared decision-making. The program name, “Better Me Within” was

formulated in one of the early CAB meetings. The CAB ensured community fit for all study decisions and activities (e.g., utilizing religious terminology for program materials). Meetings held towards the end of the grant period focused on collective reflection, discussing study outcomes and implications for how to further address health for African American communities in future work particularly mental health, stress, and personal and structural racism.

Community compensation, resources and agreements

While the university managed grant funds, the CAB was involved in resource management by examining the costs and expenses of the study. This helped to bridge social capital as CAB members had previously not been involved with grant budgets, and it was a learning experience for the whole team. Mechanisms for community compensation were built into the grant to show respect for the community's time and contributions. For churches and peer facilitators, "Expectations" documents (i.e., agreements) were provided for each which outlined the mission, program goals of the study, and time commitment. There were also descriptions about qualifications to participate, deliverables from the church or facilitator, in addition to what the university would supply to the church or facilitator (e.g., program materials, stipend/honorarium, training, summary of study findings). Participating churches and peer facilitators received compensation for hosting and implementing BMW over ten months (\$500 per church; \$2500 if one coach). Facilitator compensation was based on an estimate of 8-10 hours of work per session of the program at \$10-12/hr. However, if more than one facilitator assisted with the program the amount was split, since budgets had been set for one facilitator.

Intervention and Research Design

This domain highlights community involvement in research and synergy among partners involved (Belone et al., 2016; Wallerstein & Duran, 2010). There is evidence that both

community partners and the university team in BMW worked together to accomplish several constructs of this domain, including background/design, data collection, analysis and dissemination, community action, and partnership synergy.

Background and Design

While CAB members supported the grant writing process, they were not directly involved with writing and editing the grant application. However, once the funding for BMW was received, there was evidence that CAB members actively contributed to the design and implementation of the program. In year 1, the community-university team completed literature reviews, examined existing evidence-based curricula, consulted obesity experts, and assessed community preferences, needs, and barriers through focus groups with pastors and community members. Following focus groups, the team collectively identified the DPP curricula as the core curriculum and a faith-enhanced adaptation was added for the intervention program. Pastors and First Ladies in the CAB wrote the intervention's faith-based content to align with weekly objectives of the DPP working closely with the university team in drafting, editing, and finalizing 22 mini-sermons and faith handouts. This was a time-intensive endeavor especially for the CAB members who also had full-time day jobs and were pastoring congregations. Hence, this intervention development process between the CAB and the university team offers examples of partnership synergy, commitment, and understanding of shared goals.

Recruitment and Data Collection

The CAB utilized their social networks to promote BMW and make connections between local church leaders and the university team. A CAB member and project coordinator usually set up recruitment meetings with Pastors where the study was explained, and sample recruitment and study materials were given out. Once a pastor committed to the program, they would nominate 1-

2 female congregation members to serve as peer facilitators for the BMW program. Peer leaders and pastors were invited to training for the program led by the community-university team. Following training, each church team (pastors and peer leaders) helped promote the program through recruitment events at their respective churches, and hosted data collection events three times during the program. Furthermore, participating churches allowed the university team to collect observation data for process evaluation, which assessed how peer leaders performed their roles and delivered faith-based content.

Data Analysis, Dissemination, and Community Action

There was evidence that the CAB also participated in some aspects of data analysis. For example, CAB members reviewed focus group results and interpreted how results could be utilized for the development of the intervention. While the CAB's direct involvement with quantitative data analysis was limited, they participated in editing and reviewing 2 publications and contributed to the study results reports sent to individual participants and churches.

There is was evidence that the community was informed about the research process and findings that supported community action. Participants received individual reports with their measures from data collected at baseline, 4 months, and 10 months after intervention implementation was completed in June 2017. Additionally, each participating church received a copy of a church report post-completion, December 2018, with information about the study, followed by results from their individual congregation, then a summary of results from all churches in the study, and actionable steps they could take post-program to continue promoting health in their congregation. The CAB was instrumental in the content and design of these reports.

Some areas of this construct were not met or partially met based on available evidence. For example, the individual reports did not include information on church performance because church-specific data were not compiled until 1.5 years after completion of the program in December 2018. While actional next steps were included in church reports which could serve as evidence for findings that aided community action and benefit, there is no evidence if pastors received/read this communication. Similarly, it is unknown if individuals received/read their reports as well. Furthermore, while findings for this study have been disseminated to a wide range of audiences through conferences, the funder's report, and peer-reviewed articles, it was not targeted to reach policymakers.

Outcomes

This domain is categorized into immediate, intermediate, and future outcomes. Immediate outcomes are related to health changes observed among participants during and after the program's implementation. Intermediate outcomes refer to the sustainability of partnerships and projects, shared power relations in research, CAB/community capacity building, and research/academic capacity building. Finally, future outcomes are related to opportunities for policy change, future research integrated into the community, social/community transformation, and population health changes (Belone et al., 2016; Wallerstein & Duran, 2010).

Immediate Outcomes

All dissemination documents, including reports to the funder, individual participant reports, church-specific reports, conference presentations, and peer-reviewed articles provided evidence for positive health changes observed among BMW participants before and after the program's implementation. For example, across BMW participants, average minutes of weekly physical activity increased by the end of 4-months and was sustained through the program.

Similarly, the average weight loss per person was 5 pounds, and 1,119 pounds were lost during the program across all 11 churches.

Intermediate Outcomes

Despite the CAB's involvement in many aspects of this research, power relations regarding the study were not entirely shared (e.g., funds controlled by the university; CAB not involved in data collection decisions). At the time of this writing, the CAB is still reviewing results from this analysis and has been asked through email to describe how they benefitted from being a part of this partnership. This section will be updated with their responses. At the church level, there was some evidence of capacity building for church leaders and peer facilitators through participating in BMW training and the experience of implementing the program in their congregation.

Overall, the experience of implementing BMW has improved the ability of university partners to integrate community perspectives into various aspects of their research. For example, the principal investigator of BMW has incorporated new measurements of poverty, stress, racism, and mental health, as well as emphasizing individually directed goal-setting and motivational interviewing in current work. Similarly, the project coordinator helped develop another project with lessons learned from BWM entitled SHE (She is Healthy and Empowered) Tribe, a social network-based 5-week wellness program for women that supports lifestyle changes for improving their health (Dodgen et al., 2018). Furthermore, there is evidence that partners were willing to sustain partnerships and projects even after the cessation of funding for the program; CAB members continue offering advice and taking on roles in ongoing article development and assist with grant-making efforts through sharing funding and conference

announcements and providing letters of support to promote the work. However, these activities happen with decreased frequency.

Future Outcomes

Several constructs of this domain were either partially met or not met based on the documentation review. For example, while BMW's processes and outcomes provide valuable insight on working with local church leaders and implementing weight programs to improve individuals' health, there is no evidence that this improved population health or that this will lead to a policy change in the future.

4.4 Discussion

In this case study of the BMW program, we analyzed over 300 program documents using the CBPR model as an analytic tool, demonstrating clear congruence of the partnership and program with the CBPR approach to research. The case study detailed the partnership's inner workings, showing instances of conflict management, decision-making about partner responsibilities, involvement in program development, and overall glimpses into the BMW collaboration as it moved through each stage from planning to dissemination; there is evidence for how context influenced the partnership process leading to program design/implementation and outcomes.

The evaluation of documents using rapid analysis with the CBPR conceptual model as an analytic framework to our knowledge has not been completed previously. However, two reviews have also used this model. Cyril et al. (2015) used the model domains to connect with study success, and Ortiz et al. (2020) evaluated community-engaged research and CBPR review articles to see how the literature mapped to the CBPR model and demonstrated effectiveness (Cyril et al., 2015; Ortiz et al., 2020). This method presents a way to evaluate partnerships

beyond the life of the grant or collaboration, and continue learning how to improve, change and modify processes to strengthen work in communities. This is especially important for communities impacted by continued health inequities.

This method also identified numerous ways that CBPR was integrated into the partnership that were not otherwise measured or reported as an outcome of the study. For example, the efforts of the CAB are more fully revealed (e.g., call logs, meeting agendas, in-person pastor meetings) in this process to show their direct impact on getting churches to participate in the program, as well as their extensive commitment to the BMW program, and to their communities (ex. developing faith components while having full-time jobs). This supports studies that have called for collecting a broader range of data on CBPR for a more holistic analysis of how community change occurs (Cyril et al., 2015; Rifkin, 2014). These data are important for bridging mistrust, improving participation of racial and ethnic communities in clinical trials, and creating more meaningful interventions to improve health inequities (Julian McFarlane et al., 2021).

In addition, the partners' time in completing the work was more evident in this process. The four CAB members, PI, and project coordinator with 2-3 graduate students were the primary team working to recruit, monitor, collect data, and implement the program in 3-4 churches each year of implementation (2014-2016). Incredible work was completed and documented, yet one of the standards of successful CBPR is to have a long-standing partnership that remains regardless of funding. This may have been an unrealistic goal for a young partnership made up of individuals and not organizations, who were brought together for the purposes of the grant (Israel et al., 2006).

The BMW partnership showed congruence with the CBPR approach. It demonstrated success in partnership processes and community outcomes. There was evidence of the intangibles that Israel and colleagues (2020) discuss (genuine friendship, goodwill, collaboration, acceptance) in successful long-term partnerships. Unfortunately, as grant funding ended, so did much of the partnership activity. Two strategies previously suggested by Brush and colleagues (2020) are needed to re-ignite the partnership's work. First, a full value contract, memorandum of understanding, or other official document is necessary to indicate the processes and procedures of decision-making, allocation of funds, strategies for working on presentations and publications, preparing for transitions in leaders, and grant-making processes (Brush et al., 2020; Hicks et al., 2012). There is evidence that these things were discussed (e.g., early CAB meeting documents), and there are some documents (e.g., the scope of work) showing CAB member responsibilities, discussing feedback for presentations/reports, and grant opportunities. However, these were discussions and not formal procedures. To create sustainability in the partnership and grow capacity, official by-laws and operating procedures are needed to assist in moving the partnership forward (Brush et al., 2020).

Second, group reflection about the partnership and set times for partnership evaluations are needed to continue strengthening processes, promote power-sharing, and assess the goals of the research (Brush et al., 2020). The BMW partners often reflected on the project as it was implemented in the churches, but there were no documented reflections or evaluations of the partnership itself. Focusing on the work and not the partnership may have been a necessity since a small team was implementing this large study. There may not have been time or resources available for any activities outside of the intervention; however, this is needed to promote partnership growth.

Limitations

There are several limitations to this work. First, it was a retrospective study of the BMW program and partnership. Since these documents were not reviewed in real-time, it is possible that some context could have been missed and thereby distorted contributions to the CBPR model. However, since one of the coders was the former project coordinator for the entirety of the study, much of the context was able to be remembered or verified.

Second, the analysis only had one type of source, documents. This means that some processes or activities may have been missed if they were not written down or collected by the project team. Usually, case studies also involve interviews, focus groups, or other sources that bring participant voices to the study (Yin, 2014). While formative focus groups were included in this study, these individuals were not participants. Plans to complete focus groups with participants, peer leaders, and church leaders in year 5 were not possible due to loss of funds from leadership transitions and time constraints (e.g., delays in cohorts starting/completing programming, time for analysis of primary outcomes). While this was not a traditional approach, this method presents a unique way to evaluate a partnership beyond the life of the program (i.e., after funding is over), utilizing the necessary program documents and materials that are often shelved or stored after a program

Third, the lens of the coders is present, and the community absent, as documents were interpreted. For coder 1, the former project coordinator, this is impacted by deep involvement in the partnership and her identity as a Christian, white, female researcher. For coder 2, this includes being an outsider to BMW, but a member of the university and a community-engaged researcher, and being a South Asian female from Nepal. This was acknowledged throughout the process through conversations after coding each domain and also mitigated by utilizing the

questions from the Promising Practices Guide to analyze each construct in the CBPR domains (Engage for Equity Research Team, 2017). In addition, written results were also submitted to Community Advisory Board. However, participants of the study and church leaders may have presented different views if they had the opportunity, so results should be interpreted with caution.

Last, the results are representative of one partnership and program, and data was interpreted for if it aligned with the CBPR approach. The extent or quality of CBPR was not assessed, though authors give specific examples of *how* the model was viewed as showing evidence for fulfilling constructs.

Implications for policy, research, practice

The CBPR approach to research is demonstrated in the methods of developing and implementing studies. However, as noted previously, the methods are rarely fully described, leaving conclusions about successful CBPR to be drawn from published outcomes. This case study shows one example of the inner workings of a CBPR partnership with a community-university team working in African American faith settings. Table 4 provides examples of processes and activities that met the criteria for constructs in each of the CBPR domains.

Table 4. Processes of the BMW Partnership	
CBPR Model Domain	Examples of Processes and Activities of the BMW Partnership
Context	<p>Capacity building- Regular CAB meetings where co-learning occurred in context of conversations</p> <p>Trust- Building trust in the community through participating in church events and getting to know people in the congregation before and during the program</p> <p>Health issue importance- Focus groups with African American women and church leaders to determine perceptions of obesity, faith, and health</p> <p>Community approval- assessed in board meeting where grant application was discussed; CAB members wrote letters of support</p>

	<p>Expertise of CAB as faith leaders in the community (e.g., service on boards, community involvement, etc.)</p> <p>University controlled funding, but budgets determined with CAB</p>
Partnership Processes	<p>Community compensation- Annual or bi-annual payments to CAB; Payment to peer leader(s) and church</p> <p>Agreements- Reviewed existing agreements from other partnerships; Decided on roles/responsibilities together</p> <p>Reviewed CBPR principles together during early CAB meetings and discussed frequently during ongoing meetings</p> <p>Conflict management- Face-to-face meetings/communication; Sharing full, itemized budget with CAB; Listening, asking direct questions; Showing past documents, previous budgets, or communications</p> <p>Decision-making- Setting agendas with topics for discussion, sent ahead of meetings for CAB contributions</p> <p>Building trust with partners- Sharing a meal together without discussion of the grant prior to the meeting; important for building relationships and establishing trust</p> <p>Resource Management- transparency of spending/budgets and line-by-line review with the CAB through each year of the grant; changes to budget to increase CAB compensation</p> <p>Dialogue and Listening- Frequent communication with PC through calls, emails, texts, conference calls; PC serving as liaison between PI and CAB in between meetings to ensure timely communication; PI willingness to make changes based on CAB feedback</p>
Intervention and Research Design	<p>Background/Design- Calendars and project timelines allowed for CAB members to know when they had deliverables due</p> <p>Technology- Email, phone, use of Microsoft Word, Powerpoint; CAB was able to use technology that allowed for easy transfer into curriculum components</p> <p>Tool- summary PowerPoint of Focus Group results with questions for CAB to consider in developing faith elements for DPP</p> <p>Shared language- PC shared similar faith-background as CAB, so faith terminology was able to be discussed and clarified</p> <p>Recruitment- Pastor meetings with each church by CAB member and PC</p> <p>Proxy trust- Utilizing CAB members to introduce study in community through social networks; followed by visit with PC and CAB member</p>

	<p>Study occurring in social context of participant- in their church with a peer leader from the church</p> <p>Recruitment folders for each church- brochure, FAQ, short summary (2-pager) of the study; sample curriculum (standardized)- discussed randomization</p> <p>For enrollment and post measurement events- recruited 10-15 student volunteers per event who had been trained by the PC and PI in measures</p> <p>Training- with CAB lead faith aspects of the training, PI explained the study, funding, design and connections to health improvement; PC trained Peer Leaders in facilitation, DPP curriculum, active listening, and use of curriculum</p> <p>Analysis and Dissemination- CAB review and editing of reports prior to sending to program participants; Church report sent to church leaders with summary of church participant outcomes, overall study results, and suggestions for continued health promotion in congregations</p>
Outcomes	<p>Sustainability- training members of each church as facilitators in the program; leaving curriculum with the church</p> <p>Capacity-building- CAB participated in Research Conflict of Interest at university to assist with recruiting churches; terminology was not tailored for a community audience</p> <p>Some relationships with peer leaders extended from the BMW study to other studies, serving as steering committee members and assisting with development and testing of a new intervention</p>
<p><i>Abbreviations: BMW- Better Me Within, CAB-Community Advisory Board, DPP- Diabetes Prevention Program, PI-Principle Investigator, PC-Project Coordinator</i></p>	

Chapter 5: Discussion

5.1 Purpose

The purpose of this dissertation was to explore how intervention design can be enhanced to influence the health of African American women through examining the processes and methods related to health behavior theory, cultural adaptation, and participatory approaches in the Better Me Within Trial (BMW). These three areas are essential for health professionals building interventions for populations that experience health inequities; since they contribute to understanding mechanisms of behavior change, enhance program acceptability, and promote population fit (Glanz & Bishop, 2010). The BMW intervention was designed with these methods providing the opportunity to examine and draw conclusions about intervention development for African American women.

In the first manuscript, the research question focused on how theoretical constructs of behavior change may have contributed to health outcomes among African American women participating in the BMW study. Quantitative analysis of health behavior theory constructs from Social Cognitive Theory (self-efficacy and social support), and Self Determination Theory (intrinsic motivation) were analyzed through three regression models by outcome (weight, physical activity, calories). Models examined if relationships occurred between theoretical constructs and health outcomes during the intervention (change scores post-baseline) and after the core phase (4 months post), controlling for education, age, baseline weight, and baseline construct values. It was expected that increases in self-efficacy, social support, or motivation would influence participants' overall weight, eating, and exercise behaviors.

The second manuscript sought to identify important cultural and contextual elements to influence the design of weight management interventions for African American women, with a particular interest in cultural adaptations and tailoring approaches. Qualitative methods were implemented to analyze focus group discussions about African American women's perceptions of health, obesity, and faith to design a weight management program in churches. The Community Energy Balance framework and CBPR were used to guide questions for the analysis and create the first round of deductive codes. Themes from the analysis were suggested for new intervention approaches for church-going African American women.

Manuscript three examined the CBPR approach within the BMW program with African American faith communities and how the processes and strategies of partners led to the formation, implementation, and outcomes of the intervention. The research question guiding this final paper was how did the BMW program use a CBPR approach to design and implement the intervention? The qualitative method of rapid analysis was applied to systematically review over 300 program documents by each domain in the CBPR model. The resulting case study described the intricacies of designing and implementing an intervention within a community-university partnership.

This dissertation in three manuscripts seeks to fill gaps in the literature by taking a closer look at the methodological aspects of the BMW Trial. Conclusions are drawn, and learning is described about health behavior theory, cultural adaptations, and CBPR for how researchers and interventionists can become better at meeting the specific needs of African American women, centering their voices and context, and working to improve the partnerships, processes, and activities that create health interventions. Useable conclusions and lessons learned from each analysis are presented below.

5.2 Key Findings

In study 1, constructs from health behavior theories, Social Cognitive Theory, and Self-Determination Theory, showed significant relationships with outcomes for physical activity and weight, but not diet (i.e., calories) among African American women in BMW.

From Social Cognitive Theory, weight loss self-efficacy (measured at post and change from baseline to post) only showed significant relationships with post weight, with each 1-unit increase in change in weight loss self-efficacy resulting in decreased weight by 0.12 pounds. While weight management social support showed consistent significance with physical activity in all models.

From Self-Determination Theory, intrinsic motivation for diet (measured at post and change from baseline to post) showed significant relationships with weight, but only post-intervention and intrinsic motivation for physical activity showed significance in *all* models for physical activity. Change score models showed that for each 1-unit increase of change in motivation for activity, there was a 9.39-minute increase in physical activity, holding all other predictors constant. This is promising for interventions demonstrating that even small changes in motivation can support meaningful changes in physical activity.

This study provides evidence that planning interventions with Social Cognitive Theory and Self-Determination Theory are beneficial for increasing self-efficacy, social support, and motivation and producing changes in physical activity and weight among African American women.

In study 2, focus groups revealed two main cultural elements influencing African American women's perspectives on health and weight management, identity, and body appearance. The characteristics of being a nurturer and caretaker of others were an integral part

of African American women's identity. This presented as a barrier to their own weight management and health because of how this role consumed their time and energy and was compounded by a lack of knowledge and skills in how to rest and care for themselves. While caretaking identity positively impacted those around them through care and support for their family and community, it negatively impacted their own health through low-quality sleep, emotional eating, and increased experiences of stress.

Within identity, there was also a perceived feeling that they needed to 'do better' to manage their weight. Doing better was connected with knowledge, a need for more discipline, and spiritual beliefs. Women described how spiritual growth produced a desire (i.e., intrinsic motivation) to take care of themselves and others. In contrast, women who spiritually felt a disconnect between their faith and health expressed guilt and shame using language about duty, responsibility, and obligation to be healthy to serve God and others (i.e., extrinsic motivation).

Body appearance preferences led to positive and negative manifestations in the focus groups with church-going African American women. Viewing their size as disconnected from their health status ("skinny is not healthy) and having a desire for a thick and toned physique personally, along with socio-cultural acceptance of larger body size, may contribute to African American women feeling conflicted in their goals to be healthy. Women also described anxiety in social settings where their size may not be accommodated (ex., air travel, classroom seating) and facing discrimination due to their race and size from medical professionals and employers. Both kinds of experiences can serve as barriers to motivation and action toward adopting health behaviors among African American women.

This study provides evidence to support cultural adaptations that consider the nurturing/caretaking identity and address both positive and negative aspects of body appearance in intervention development.

In study 3, a case study documented evidence for how the BMW intervention and community-university partnership aligned with the domains of CBPR. Highlights from the case study included the partnership managing conflict and leadership transitions, decision-making about partner responsibilities, procedures for transparency in budgets, and CAB integration in each intervention area from design to dissemination. The role of the CAB was central to the case study, showing their expertise in working with congregations and applying their pastoral skills to the intervention elements. Other successes included identifying the strength of flexibility in being a small team adjusting quickly during leader transitions and the leadership of the PI by demonstrating respect and value for the community, which cultivated trust. Due to the way funding was structured, these qualities contributed to giving power to the CAB in non-monetary ways. From a methodological standpoint, the qualitative technique of rapid analysis was highly effective in examining the breadth of documents from this program and in addition, utilizing the CBPR domains and constructs for creating a coding scheme allowed for a rigorous review of documents to determine alignment with the CBPR model.

This study provides evidence for utilizing a CBPR approach in working with African American faith communities. The impact of the CAB in the creation of curriculum, recruitment of churches, and influence on implementation and dissemination strategies contributed to engaging African American women in a research study. In addition, co-learning within the partnership produced new knowledge about grant processes for CAB members and grew

university members' understanding of the impacts of stress and racism in African American communities.

5.3 Practice Implications

The purpose of this dissertation was to learn how to improve interventions for African American women by examining health behavior theory, cultural adaptations, and CBPR from the data collected during the BMW Trial.

Constructs from Social Cognitive Theory (self-efficacy, social support) and Self-Determination Theory (intrinsic motivation) were significant in the BMW Trial. Changes in motivation for physical activity and social support showed consistent and significant relationships with changes in physical activity, and motivation for diet and self-efficacy demonstrated a relationship with weight. In addition, focus group data supported motivation and social support as facilitators for weight management through cultural aspects of identity and body appearance. Strategies in the BMW study that were connected to intrinsic motivation, social support, and self-efficacy were:

Table 5.1. Strategies for Connecting to Theoretical Constructs	
Social Cognitive Theory	
<i>Self-efficacy</i>	<ul style="list-style-type: none"> • Drawing connections between health and faith • Skills and knowledge from the Diabetes Prevention Program • Having a peer leader from their church as the health coach (role-modeling)
<i>Social Support</i>	<ul style="list-style-type: none"> • Being held in the participant's church • Group class format • Having a peer leader from their church as the health coach • Receiving support, accountability, and encouragement from women at church
Self-Determination Theory	
<i>Motivation</i>	<ul style="list-style-type: none"> • Being held in the participant's church (belonging) • Having choices about how to achieve program goals of weight loss and increasing physical activity (autonomy)

Focus groups identified themes related to identity and body appearance that are in need of being addressed through cultural adaptations in interventions. Though the faith-adapted portions of the BMW program were viewed as cultural adaptations and thought to increase motivation by making connections between the Christian faith and health (ex. viewing the body as temple), incorporating further adaptations to address body appearance and identity may continue to enhance intervention effectiveness. Suggested intervention strategies for cultural adaptations related to body appearance and identity include:

Table 5.2. Strategies for Cultural adaptations	
Body appearance	<ul style="list-style-type: none"> • Promote strength-building activities (e.g. yoga, weight-lifting) for preferences for a thick, toned physique • Acknowledge racial and size discrimination in medical encounters and measure experiences through existing scales • Promote a range of measures to assess health beyond body mass index, and equip women to learn these measures to assess their risk • Assess body image and preference for body appearance • Utilize self-directed approaches like motivational interviewing to assess goals related to how they want to look and feel in their body
Identity-Caregiving/Nurturer	<ul style="list-style-type: none"> • Utilize self-directed approaches like motivational interviewing to equip women to think about the goals they have for themselves not others • Promote skills in stress management, mindfulness, self-care, quality sleep, and rest • Connect with church leaders to emphasize self-care and stress-relieving practices like prayer, honoring the Sabbath (i.e. a day of rest), silence, and solitude • Measure identity through established scales (e.g. superwoman schema)^a • Assess mental health, stress, emotional eating, sleep quality, coping skills, intersectionality, social network stress, and experiences of racism including macro and microaggressions^b
^a (C. L. Woods-Giscombe et al., 2019), ^b (Abrams et al., 2019; Allen et al., 2019; Kessler & McLeod, 1984)	

The case study illuminated how the BMW program and partnership aligned with CBPR, especially through work with the CAB. Future interventions using CBPR or partners in early stages of forming a relationship may benefit from considering the following:

Table 5.3. Strategies for applying CBPR to enhance Interventions for African American Women	
Context	<ul style="list-style-type: none"> • Utilize partnership structures that are already in place and train in CBPR (e.g. existing boards, churches)

	<ul style="list-style-type: none"> • Work with communities before a grant to plan interventions so that aims and research questions align with what is important to community members (ex. weight loss as primary outcome in BMW, but focus groups showed weight as not important to women) • Utilize community assets through shared-use agreements with community-based resources for healthy movement
Partnership Processes	<ul style="list-style-type: none"> • Set times to evaluate the CBPR partnership^a • Prepare plans for transitions of staff, leaders, and the end of projects in advance on community and academic side • Make processes and operations official through documents and protocols • Ensure that community organizations and/or partners are structured into the grant budget and understand sub-contracting^b
Intervention & Research	<ul style="list-style-type: none"> • Set expectations with participants of studies, and repeat during the course of the intervention, so they know how results will be communicated and when to expect them • Include measurements of CBPR in interventions^c • Measure social determinants of health with participants in particular experiences of racism, stress, depression, anxiety, poverty
Outcomes	<ul style="list-style-type: none"> • Disseminate results widely, perhaps repeatedly to ensure they are received
^a (Brush <i>et al.</i> , 2020; Israel <i>et al.</i> , 2020), ^b (Golden <i>et al.</i> , 2015), ^c (Cyril <i>et al.</i> , 2015; Oetzel <i>et al.</i> , 2018)	

5.4 Limitations

Across the dissertation, there are several limitations that need to be considered. First, the conclusions about improving intervention design are from one study with purposive sampling of churches and restricted to adult, African American women without diabetes, so conclusions are not generalizable to all African American women. There may also be differences between African American women who attend church or who would volunteer to be in a health program like BMW and those who would not.

Second, this was a retrospective, secondary analysis of data therefore all research questions were established after the study had already been completed. There was not primary data collection to answer each of the questions, though questions and measures were considered carefully for suitability to answer the questions posed in each of the three manuscripts.

Third, as the project coordinator of the BMW study this could influence my perspective during data analysis for both qualitative papers. In addition, I am a white female researcher

studying data and drawing conclusions for African American women. To help with this in manuscript two an African American woman with an MPH and qualitative experience assisted with analysis to assist with an insider perspective and help me to identify any blind spots from my own position, privilege, or perspective. Also in manuscript three, a second person a South Asia (Nepal) female with a Ph.D. and experience in qualitative methods and community engagement helped to bring an outsider perspective to the analysis.

Additional limits on data in each paper are also present. In manuscript one, the sample is combined, so there is no control group, and all data were self-report except for weight. There were additional psychosocial data available (e.g. stress, depression) that may have impacted how theory was related to the outcomes of weight, calories, and physical activity, however, these were excluded since they were not part of the hypotheses in the paper (e.g. increases in theoretical constructs result in decreases in weight and calories and increases in physical activity). In addition, results may be impacted by missing data due to listwise deletion during regression. In manuscript two, focus group questions were not asked about cultural-contextual elements, or about the themes found in the analysis related to identity and body appearance. The purpose of the focus groups was to design an intervention to promote weight loss in African American women. In manuscript three, the voice of the community is limited due to the data source of documents, and the inability to do focus groups with participants in the final year of the grant. The CAB also did not have a role in analysis, though they are reviewing results and will have the ability to give feedback and edits as coauthors.

5.5 Dissemination Plan

This dissertation was possible because of the church leaders, health coaches, and participants that chose to be in the BMW program from 2014-2016. There are several ways that I

may be able to disseminate the work of this dissertation back to them, and follow up from previously sent reports. Options for dissemination pending CAB review include:

- 1) Invite former health coaches and pastors to a presentation about the dissertation and other work that has been published about the BMW program in a community location or virtually (Microsoft Teams or WebEx)
- 2) Share abstracts of papers and publications in a newsletter or thank you communication
- 3) Create a series of graphics or visuals to communicate results
- 4) Create a short video or video series about the findings and disseminate to the churches to share with their congregations

Additionally, published articles and conference presentations provide the opportunity for dissemination to wider audiences that are also involved with community-engaged research. They may reach community members who are in attendance, especially at local and regional conferences.

5.6 Future Research

The results of these studies showed interesting crossover throughout intervention planning strategies. Theoretical constructs from the first manuscript, motivation and social support, were discussed in the second manuscript, with cultural elements of caretaking identity and body appearance norms for how they may increase or decrease motivation and be influenced by social support. The second and third manuscripts were also connected through identifying stress as an important health problem. Focus groups suggested obligations of caretaking, perceived needs for self-discipline, and experiences of racial and size discrimination as contributing causes of stress, and the CAB suggested stress from structural and individual racism

as a reason for intervention outcomes and a target for future intervention development. The synthesis of these manuscripts has inspired several areas for future work and research.

Incorporating Racial Identity and Stress

First, measures of racial identity and stress of African American women need to be incorporated into intervention planning and programs to understand how various aspects of identity, like caregiving, may impact stress and health behaviors. For example, the Superwoman Schema (SWS) assesses the identity of the Strong Black Woman, which includes characteristics of obligation to care for others and motivation to succeed despite limited resources (echoes “do better” theme) (Allen et al., 2019; C. L. Woods-Giscombe et al., 2019). Studies have shown that individuals who identify with SWS, especially the caretaking identity, may have increased social network stress; in addition, there is evidence of interactions between caretaking identity and racial discrimination with using food as a stress coping strategy (Allen et al., 2019; Kessler & McLeod, 1984). Understanding how personal identity and types of stress (e.g., personal, social network, racial discrimination) are connected to health behaviors will produce better strategies for understanding how to change outcomes and perhaps identify more proximal outcomes of change like reducing stress, addressing mental health, or increasing self-care that are needed before a difference in another outcome like weight may occur.

Identifying Alternative Theories and Measures

Second, the current theories in public health are limited in how they address and measure aspects identified in the manuscripts, namely community responsibility, discipline (or self-discipline), and obligation. Future work incorporating theories outside of the public health field and Western academic environments may help address these areas. In manuscript two, the identity of caretaking among African American women was integral to cultivating community

and family well-being, but often to the neglect their own health needs. To begin understanding this sense of community responsibility, an alternative framework, like indigenous paradigms, may be helpful. For example, the African-based relational paradigm presents an ontology from Southern Africa represented through the expression, “I am because we are” (Chilisa et al., 2017). This community-integrated identity includes belonging to a larger whole, with individuals viewed as being built up by the growth and success of others and diminished when others are torn down or oppressed (Chilisa et al., 2017). Identifying theories and measures to understand motivations, stressors, and other influences on health in relation to community identities and a sense of community care will assist with intervention design (e.g., framing care of one’s body as contributing to family/community well-being vs. individual self-care).

Theories and measures needed to understand the connections between motivation for health behaviors and a sense of obligation (perhaps the negative side of community care) and self-discipline may also require expanding to other fields or innovation. African American women expressed a need for more discipline to be healthy or achieve weight loss, sometimes from an obligation to care for their bodies out of positive (i.e., desire) and negative (i.e., duty) motivations to serve God or others. The field of psychology offers theories like, Self Determination Theory to address positive and negative or intrinsic and extrinsic motivations, and various measures of self-control and self-discipline (Haggar et al., 2021; Patrick & Williams, 2012). While literature around obligation and caregiving is in studies of aging and older adults (Epps, 2014). However, the role of caregiving, not the caregiving identity within African American women (e.g., strong black woman), is more often explored, and no studies were found at this time that integrate motivation, self-discipline, and obligation together. Incorporating

measures of these constructs together will enrich understanding of the pathways influencing African American women and provide insight into how and where to intervene.

Applying Effective Intervention Strategies

Working with faith settings and church partners was integral to the success of BMW and confirmed as an effective intervention strategy for African American women through this dissertation. Future studies may build on this success by utilizing the strengths of faith-based partnerships to incorporate their knowledge in spiritual practices (prayer, meditation, sabbath, stillness) to address the needs of African American women identified in manuscripts two and three related to stress, strain, and mental health. Interventions with African American church leaders may also be conducted to distally influence congregational health through the influence of health changes among leaders.

Additionally, the themes regarding body appreciation and the connection to individual motivations for weight management in manuscript two, and consistent trends for the influence of motivation on health behaviors in manuscript one suggest an approach like motivational interviewing may be beneficial for African American women. Motivational interviewing would promote participant choice and reflection on choosing their own health and body appearance goals (Patrick & Williams, 2012). Incorporating this approach into existing evidence-based interventions and testing the effects on health outcomes may be another area for continued work.

Introducing CBPR in Non-academic Settings

Finally, there are opportunities beyond academic settings to create sustainability for CBPR partnerships. Health care organizations may be ideal due to financial structures incorporating broader funding outside of grant-based resources. For example, non-profit healthcare organizations may be able to access funds through community benefit dollars (part of non-profit

healthcare tax exemptions) to support CBPR partnerships and improve health outcomes (Rozier & Enard, 2022).

5.7 Conclusions

The findings from this dissertation add to the current body of research on weight management interventions with African American women by 1) examining intervention design elements and outcomes with African American women who are often under-represented in research studies; 2) contributing to gaps in the literature in health behavior theory by measuring the actual constructs of the theories; seeing the effects in this population; 3) capturing the voices of African American women in guiding the intervention design process and drawing conclusions about how cultural adaptations could be better defined and measured for health management; and, 4) offering insight into the specific decisions, processes, and operations contributing to design and implementation in a CBPR study.

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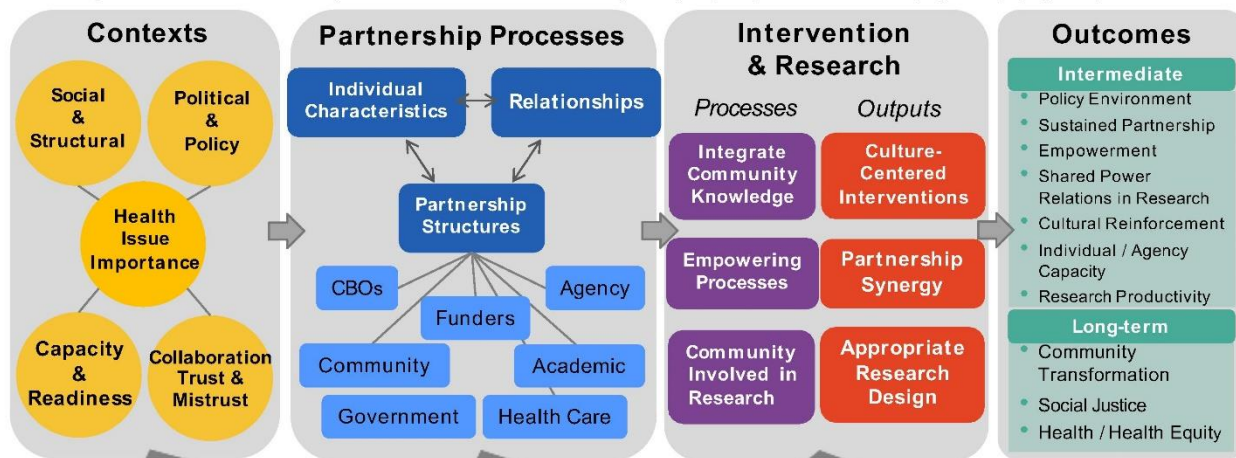
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Appendix

A. Large Version of CBPR Model

CBPR Conceptual Model


Adapted from Wallerstein et al, 2008 & Wallerstein and Duran, 2018, <https://cpr.unm.edu/research-projects/cbpr-project/cbpr-model.html>



Visual from amoshealth.org 2017

Contexts	Partnership Processes	Intervention & Research	Outcomes
<ul style="list-style-type: none"> Social-Structural: Social-Economic Status, Place, History, Environment, Community Safety, Institutional Racism, Culture, Role of Education and Research Institutions Political & Policy: National / Local Governance/ Stewardship Approvals of Research; Policy & Funding Trends Health Issue: Perceived Severity by Partners Collaboration: Historic Trust/Mistrust between Partners Capacity: Community History of Organizing / Academic Capacity/ Partnership Capacity 	<p>Partnership Structures:</p> <ul style="list-style-type: none"> Diversity: Who is Involved Complexity Formal Agreements Control of Resources % Dollars to Community CBPR Principles Partnership Values Bridging Social Capital Time in Partnership <p>Individual Characteristics:</p> <ul style="list-style-type: none"> Motivation to Participate Cultural Identities/Humility Personal Beliefs/Values Spirituality Reputation of P.I. <p>Relationships:</p> <ul style="list-style-type: none"> Safety / Respect / Trust Influence / Voice Flexibility Dialogue and Listening / Mutual Learning Conflict Management Leadership Self & Collective Reflection/ Reflexivity Resource Management Participatory Decision-Making Task Roles Recognized <p>Commitment to Collective Empowerment</p>	<ul style="list-style-type: none"> Processes that honor community and cultural knowledge & voice, fit local settings, and use both academic & community language lead to Culture-Centered Interventions Empowering Co-Learning Processes lead to Partnership Synergy Community Members Involved in Research/Evaluation Design that Reflects Community Priorities Bidirectional Translation, Implementation, Dissemination 	<p>Intermediate System & Capacity Outcomes</p> <ul style="list-style-type: none"> Policy Environment: University & Community Changes Sustainable Partnerships and Projects Empowerment – Multi-Level Shared Power Relations in Research/ Knowledge Democracy Cultural Reinforcement / Revitalization Growth in Individual Partner & Agency Capacities Research Productivity: Research Outcomes, Papers, Grant Applications & Awards <p>Long-Term Outcomes: Social Justice</p> <ul style="list-style-type: none"> Community / Social Transformation: Policies & Conditions Improved Health / Health Equity

B. Submission Confirmation of Paper 1

 American Journal of Health Education

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Thank you for your submission

Submitted to	American Journal of Health Education
Manuscript ID	UJHE-2022-0056
Title	What's theory got to do with it: measuring effects of theory on lifestyle behaviors and weight in the Better Me Within Randomized Trial
Authors	Dodgen, Leilani Kitzman, Heather Spence, Emily Mamun, Abdullah Walters, Scott Cervantes, Diana
Date Submitted	15-May-2022