Developing Strategies for Helping Women Improve Weight-related Health Behaviors

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Nutrition.

Chapel Hill
2009

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ABSTRACT

JENNIFER L. ZUERCHER: Developing Strategies for Helping Women Improve Weight-related Health Behaviors
(Under the direction of Marci K. Campbell)

Many programs to reduce overweight are available, however not every one can address the needs of all people. Population-specific interventions may provide the best opportunity for successfully reaching target groups. How groups are defined is a question that needs to be addressed. Further, whereas groups may be effective for some, this structure may not be optimal for all in today’s highly-mobile society. This dissertation followed three lines of research. First, eight focus groups (n=67) were conducted with women living in rural, eastern North Carolina, prior to the implementation of the HOPE Works intervention, a community based participatory research project aimed at addressing overweight and life-goals among women in these communities. In these groups, information about health, weight, and life-goals were obtained. Secondly, as younger women did not readily participate in either of these groups or in the HOPE Works program itself, four age-specific focus groups (n=28) were conducted to elicit specific health- and weight-related interests and concerns of 18-30 year old women. A brief comparison between the primarily older and the younger women indicated that whereas many of the interests and concerns of younger and older women are the same, logistical issues play a large role in why younger women were not participating in the program. Both older and younger women identified stress as a significant health issue, but while older women primarily tied their stress to financial issues, younger women identified both financial issues and competing time demands as the primary sources
of their stress. Finally, as a potential method to address face-to-face time required by weight-related interventions, such as HOPE Works, a pilot study was conducted to test the feasibility of reaching young women with feedback and support through text messaging. Females (n=177) from across North Carolina participated in the month-long study. Although significant behavior changes and improvement in self-efficacy were not generally found, the use of text messaging was found to be a potentially acceptable method of support. Overall, results from this dissertation support current topics being addressed in the HOPE Works program, but leave open the need for further research into how to most effectively reach the younger population with health- and weight-related messages and support.
ACKNOWLEDGEMENTS

I owe thanks to a great number of individuals who assisted me in the completion of this dissertation. First, I would like to thank my advisor, Marci Campbell, who guided me in my educational and practical experiences at UNC, and who brought the opportunity to work with the HOPE Works project to my attention. I would also like to thank Cindy Bulik for allowing me to use the database and format that she and her colleagues created for my intervention. And to my entire committee, for providing their perspectives and expertise for the development and the reporting of this dissertation, I owe my greatest thanks. Second, I would like to thank the HOPE Works team members, past and present, especially Salli Benedict, Katie Barnes, Pastor Patricia Peterson, Imani Rivera, Tabatha Brewer, and Leigh Belton. Their assistance in working with and in their communities was invaluable. Third, I would like to thank my community college contacts at Sampson Community College, James Sprunt Community College, and Wake Tech, for their assistance in participant recruitment. In addition, I was very fortunate to receive assistance from Tiffany Melvin, Jessica Wrenn, Brie Turner-McGrievy and Megan Parker in carrying out the focus group research. Fourth, I would like to thank Andrea Nikolai for her assistance in data collection for the intervention. She was instrumental in ensuring the high participant retention rate for this project.

Financial support for this dissertation was provided by the American Dietetic Association Foundation’s Eleanora Sense Memorial Scholarship and Cooperative Agreement U48 DP000059 from the Centers for Disease Control and Prevention. The UNC Center for Health Promotion and Disease Prevention is a member of the Prevention Research Centers Program, Centers for Disease Control and Prevention. I would also like to acknowledge the
Alexander von Humboldt Stiftung/Foundation for financial support and the text messaging program used in Aim 3 of this project.
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CHAPTER 1
INTRODUCTION

I.A. Overview

Overweight and obesity are at the forefront of the health concerns in this country, and dealing with this epidemic is one of the greatest challenges that the public health community is facing. Obesity increases risk for a variety of diseases of the heart, endocrine and reproductive systems, and increases risk for some cancers (USDHHS, 2000). How to address the problem of weight is not always clear, but research to find effective weight control methods is vital for beginning to tackle this problem.

HOPE (Hope, Opportunities, Partnerships and Empowerment) Works is an existing project to address obesity among low-income and minority women in two rural counties in eastern North Carolina (Sampson and Duplin) funded through the Prevention Research Center (PRC) at UNC Chapel Hill. Participants are provided with social support and strategies for weight management, as well as help in setting goals for reaching health and economic/educational objectives. Social support is recognized as an important factor in helping women make health changes and is often a component of weight control interventions (Elfhag & Rossner, 2005; Kelsey et al., 1997; Mayer et al, 1991). In HOPE Works, group meetings (HOPE Circles) are used to provide participants with support in addition to information. Women, both young and old, are encouraged to participate in HOPE Works, yet, almost certainly due to reasons such as time constraints and competing demands, attending regular, in-person meetings is logistically more problematic for young women.
Very few of the women who participated in the first round of HOPE Circles were between the ages of 18 and 30.

In the first aim of this research, we set out to describe the specific health- and life-related interests and concerns of primarily overweight women living in these rural, eastern North Carolina communities. Focus group methodology was employed to elicit this information from participants. While the topics discussed in the groups have already been incorporated into the program, formal qualitative analysis had not yet been conducted. Doing so allows us to better understand the health and life-goal interests and needs of primarily middle- to older-aged women living in these communities. The second aim of this research focused on determining the health-related topics that are meaningful to young women (approximately 18-30 years of age). We hypothesized that addressing these topics would improve participation rates and our ability to impact women in this age group.

Again, many of the health interests and concerns expressed by women are already being incorporated into the HOPE Works program. Women are concerned about their health and weight, and often they already know some of the important tools that need to be addressed or incorporated in order for them to achieve their goals. Unfortunately, factors such as stress and true and/or perceived lack of support impede their efforts. For younger women, these issues are further impacted by time constraints related to the multiple responsibilities and multiple roles they often have, including parent, student, employee, child, homemaker, and spouse.

With this younger population, mobile interventions using cellular phones present one potential option for circumventing some of the constraints that stand in the way of program participation. The use of new technologies in some cases has already been found to be an
acceptable, effective, and convenient option in health-related interventions (Ostojic, et al., 2005; Rodgers et al., 2005; Tate et al., 2004). Text messaging has become a particularly popular communication medium among this age group, yet not much is known about its use in providing information and support for promoting health behavior change. By providing a convenient and inexpensive method to communicate with others anytime or anywhere, text messaging (“texting”) could be a promising adjunct to behavior change interventions, especially with younger persons. Pilot evidence from another study found significant effects of a text messaging intervention to impact screen time among children (Shapiro et al., 2008). Results from Aim 2 suggested that this strategy would appeal to young women.

As the final part of this research, we set out to examine the potential value of using text messaging for health behavior change among young adult females. We conducted a pilot study to test the efficacy and feasibility of using a text messaging program based on Shapiro et al (2008) as a means of support for making healthy behavior changes. We found that whereas text messaging is a feasible and potentially acceptable method of reaching young women with messages about improving health behaviors, specific behavioral interests of young women need to be further explored and incorporated into interventions to improve their success.

I.B. Specific Aims

Three specific aims were designed to address the aforementioned issues.

**Formative Aim 1:** Determine the health concerns, and intervention interests and needs of women living in Sampson and Duplin counties to better inform the design of the HOPE Works intervention.
Rationale: Addressing the health concerns and barriers to participation of women who may potentially participate in the HOPE Works intervention will improve both participation rates and intervention success.

Formative Aim 2: Conduct focus groups with young women in Sampson and Duplin counties to determine the health and weight-related issues of concern, as well as the barriers that exist/need to be overcome in order for them to become involved in the HOPE Works program.

Rationale: Health concerns are different for younger and older women, thereby explaining, at least in part, the difference in interest and participation rates between women of different ages. Young women experience a variety of competing demands for their time which limit their ability to partake in a regularly-scheduled program such as HOPE Works. In addition, their perceived health risk is low, regardless of true health condition, contributing to their lack of interest in participating in such programs.

Experimental Aim 3: Conduct a one month pilot study using cell phones as a means of informational feedback and social support to determine if 1) automated text messages are a feasible and acceptable means of providing support for making positive health behavior changes among young women and 2) if automated messages promote an increase in physical activity (steps) and a decrease in television watching (screen time) and consumption of soda (sugar-sweetened beverages) among participants compared to controls.
**Hypothesis:** Text messaging will provide a unique and accessible avenue for young women to receive support. Support provided via automated text message feedback will be an acceptable mode of support and will be associated with an increase in self-efficacy for meeting the goal behaviors. The automated feedback will also be associated with improved health behaviors, namely an increase in number of steps taken per day, a decrease in number of minutes of screen time per day, and a decrease in the number of sugar-sweetened beverages consumed per day.
II.A. Obesity in the southern U.S.

With approximately two-thirds of Americans now considered overweight or obese (Ogden et al., 2006), the obesity epidemic is receiving a great deal of attention. The problem is not confined to adults; more than thirty-four percent of 12 to 19 year olds are considered ‘at risk for overweight’; 17.4% in this same age group are considered ‘overweight’ according to the latest NHANES data (Ogden et al., 2006). A higher prevalence of obesity can be found in the Southern United States as compared to other parts of the country (Ezzati et al, 2006), providing additional support for intervention in these locales. Trends within the state of North Carolina are alarming. More than half of North Carolina’s adults are overweight or obese, a result of a 27.3% increase in obesity from 1995-1999 to 2002-2003 (Healthy Carolinians, 2005).

Overweight and obesity are caused by a multitude of factors, including environment, genetics, behavior, and culture, and are associated with numerous health problems (Wellman & Friedberg, 2002). Adverse effects associated with overweight include type 2 diabetes, cardiovascular disease, and certain types of cancers, all of which occur at greater rates in North Carolina as compared to the rest of the country (Healthy Carolinians, 2000; USDHHS, November 2000). Moreover, obesity is among the top 5 causes of preventable death in the United States (American Obesity Association, 2005). Many of these health concerns that
were once associated with aging are now being seen even in very young children. For example, in a study by Sinha et al, it was found that 25% of 55 obese children and 21% of 112 obese adolescents in the study had documented insulin resistance (2002). Within North Carolina, a dramatic increase in overweight can be seen specifically during the third decade of life (Healthy Carolinians, 2000). If not addressed, obesity is likely to contribute to one’s death.

Further, socioeconomic status (SES) is one of the strongest predictors of health. Social determinants of health, including income, education, occupation, and neighborhood and community characteristics, play a greater role in health than individual behaviors or access to health care (Prevention, 2002; Syme, 1998). As in other parts of the world and the US, health disparities in the South often accompany economic disparities; within the state of North Carolina, these lines tend to be drawn between the metropolitan and rural areas (Healthy Carolinians, 2000). Income disparity, or the gap between those at the highest and lowest levels, also predicts health and is increasing within North Carolina (USBEA, 2006; Syme, 1998). Whereas North Carolina per capita income has increased, Duplin and Sampson counties have experienced a relatively flat income level between 1994 and 2004, leading to greater income disparities. Compared to the state average, the average income disparity for Duplin and Sampson counties was -$2695 in 1997, -$6397 in 2004, and -$7973 in 2006 (US BEA, 2008).

II.B. Effect of weight at different life stages

Evidence suggests that those who are overweight as children will remain so as adults (Guo & Chumlea, 1999). Additionally, individuals who are overweight as young adults are at
even greater risk of being overweight later in life. Many things are occurring at this time that are associated with overweight and weight gain. Leaving home and making decisions about food consumed and physical activities participated in play a role for the more than one-third of college students who are overweight (ACHA, 2006). Though not formally documented, some college health practitioners have noted that many former high school athletes do not continue to participate in sports at the college level, significantly impacting their physical activity levels (Litt, 2005). In fact, between 1991 and 1997, the greatest increase in obesity was found among 18-29 year olds (7.1 to 12.1%) and those with some college education (10.6 to 17.8%) (Huang et al., 2003). By 2001, the prevalence of obesity among 18-29 year olds increased to 14% and 21% among those with some college education. Finding a life-partner/getting married is also associated with weight gain (Sobal et al., 2003). Weight gained during pregnancy is a predictor of obesity (Fowles & Walker, 2006), providing further evidence that this target population is especially at risk of becoming obese. Furthermore, obesity also increases complications during pregnancy (Dietl, 2005).

II.C. Intervening during young adulthood

As young adulthood is already a time of transition, it might be considered an ideal time to intervene effectively. This is especially true for risk behaviors and factors that are associated with chronic disease risk (Millstein et al., 1993). Young adults are rarely provided with adequate skills training to handle the flood of life-changes that seemingly occur all at once, let alone one at a time. Unfortunately as well, many of the choices made do not promote health, but rather increase risk (CDC, 1997; Steptoe & Wardle, 2001; Steptoe et al., 2002). It is during this time period that most young adults experience the most rapid
reduction in physical activity levels of any age group, and consume fewer fruits and vegetables and exercise less frequently than recommended (Grace, 1997). It is also the time of the greatest increase in overweight and obesity (Mokdad et al., 1999). In fact, the pursuit of life-event goals that generally emerge at this point in the life-cycle, such as being autonomous, finding a partner, and pregnancy, often end up being factors that compete with healthy habits and health promotion activities. By and large, making decisions that aid in the prevention of chronic disease risk is not salient in this age group. In order to reach this group, we need to gain a better understanding of their health priorities and frame messages accordingly. Currently though, a large gap exists in our knowledge of how to intervene effectively with this age group.

The recognition of the need for creating effective interventions for young adults is further evidenced by the negligible participation rate of young women in the HOPE Works program. Approximately 20% of the female adult population in the study counties falls within the 18 to 34 year old age group (NCOSBM, 2007), yet a mere 13% of the participants in the first round of HOPE Circles were within this age group (unpublished data). Previous research has revealed a variety of reasons why women don’t participate in research, such as skepticism of large research institutions and concerns about confidentiality (Brown et al., 2002). While such reasons may apply to young women living in Sampson and Duplin counties as well, this type of doubt is most likely minimal in this context as university researchers have been building relationships within these communities through 15 years of intervention projects and the participatory research experience. Therefore, we anticipate that content and mode of intervention delivery plays a greater role in the low participation rate among young women in this project rather than the aforementioned possibilities. We
anticipate that by specifically addressing health related topics that are meaningful to young women in a manner that is feasible for young women, we will increase participation rates and improve our ability to impact women in this age group.

II.D. Intervention studies focused on weight loss among women

There is no lack of clinical programs designed for the purpose of promoting weight loss. A meta-analysis of 25 years worth of weight loss programs by Miller et al revealed that a weight loss of more than 20 pounds results from a 15 week diet (1997). More recently, a review of long-term weight loss studies by Douketis et al. revealed that diet and lifestyle treatments resulted in <5 kg wt loss after two to four years (2005). Studies such as that conducted by Heshka et al provide evidence that the addition of social support for making health behavior changes can promote even greater results (2003). In this two-year randomized, parallel-group study, participants were assigned to either the self-help group (2-20 minute consultations with a dietitian at weeks 0 and 12; provided publicly available diet and exercise information) or commercial group (provided vouchers to cover the cost of weekly Weight Watcher meetings for the study duration which provided social support, educational materials, and role models). Although the self-help group lost approximately 1.3 to 1.4 kg for the first year, their weight returned to baseline by the end of year 2. On the other hand, the commercial group experienced a larger weight loss at the end of year 1 (4.3 to 5.0 kg), and continued to maintain a 2.7 to 3.0 kg loss compared to baseline at the end of the 2 years. While some studies focus on diet or exercise alone, NIH clinical guidelines on obesity recommend a combination of strategies including dietary restriction, increased physical activity, as well as behavior therapy ("Clinical guidelines", 1998). Although structured,
individual-based clinical trials have shown efficacy, there has been little translation to feasible and effective community-based approaches to reach the broader population, at least until recently (Ayyad & Andersen, 2000). One example is the DEPLOY pilot study conducted by Ackerman et al. (2008). In their pilot study for translating the Diabetes Prevention Program into a YMCA-based community setting, researchers found that social support provided by the group enhanced the overall effectiveness of the program.

II.E. Weight-related interventions in the young adult population

The few interventions specifically targeting younger adults have, in large part, been carried out in university settings. These interventions primarily focus on providing information and/or behavioral modification techniques. Application of behavioral techniques in diet- and/or exercise-related weight-loss interventions is considered the most effective method for treating obesity (Smith & Wing, 2000). Researchers at Mississippi State University designed their “Weight Loss 101” trial to address constructs from Behavioral Modification, including self-monitoring, stimulus control, problem solving, and cognitive restructuring (Hunt et al., 2001). Unfortunately, results of this study have not been published and so the true effectiveness of the use of this theory and study remains unknown. More recently, Hivert et al. conducted a two-year trial for preventing weight gain among new, normal weight, college students (Hivert et al., 2007). Over the two years, participants attended 23 small group seminars which provided both information (seminars 1-3) and behavior-modification techniques such as problem solving and goal setting (seminars 4-23). Over the two years, participants in the control group gained weight whereas those in the intervention group lost weight (0.7 ± 0.6 kg vs -0.5 ± 0.5 kg, p = 0.04). While these results
are positive, low attendance at seminars may have reduced the overall effectiveness of this intervention. Only 53% of participants in the 1st year and 26% in the 2nd year attended more than 60% of the seminars. Again, this speaks to the need to find a potential alternative to in-person meetings, particularly among those in this age group.

II.F. Technology in health interventions

Various types of media have been used and tested in health-related research to date. The internet is one of the most obvious avenues, with more than 44 million households having Internet access at home (2001). While this number is high, it has been found that groups who are prone to overweight and obesity and live in rural areas tend to have lower rates of internet access and use (Flegal et al., 2002). The fast pace and variety of commitments of modern life make portability even more important. In the realm of nutrition and diet, personal digital assistants (PDAs) have been used to help participants track their intake (Burke et al., 2005; Tate et al., 2004; Yon et al., 2006). While an effective method for tracking diet, PDAs alone do not have the capability for interacting with others. More recent advances in technology have combined some of the attributes of the PDA with cellular technology. Because of these improvements, what is available to the regular consumer has become more sophisticated as well. Further, cellular phone ownership is much higher than that of PDAs, establishing the possibility of yet another technological option for intervention.

II.G. Utilization of text messaging as an innovative and effective means of intervention

Cellular technology is a relatively recent development, but already, approximately 81% of households own at least one mobile phone (Wike, 2007). Even among the low
income population, trend surveys are showing an increase in cell phone use (Stutts et al., 2002). Furthermore, large numbers of young adults in both high- and middle-income countries own mobile phones (Rodgers et al., 2005). More specifically, young adults are particularly interested in the use of text messaging. This mode of communication gets around the obstacles of time and space (Tachakra et al., 2003). Text messages can be sent and received wherever a person is. Also, text messaging is a inexpensive method of communication; cellular phones are far cheaper to purchase than many other electronic devices and unlimited service plans can be purchased to minimize cost per message.

Mobile phones have proven to be useful tools for multiple intervention issues, such as improving outpatient attendance at medical appointments. Text messaging can also be effective in providing feedback for both participants and investigators or medical personnel. In a study to improve asthma control, text-messaging was used by participants as a means for submitting their peak expiratory flow (PEF) measurements to medical personnel who could then respond with therapy and follow-up recommendations in a timely manner, also via text-messaging (Ostojic et al., 2005). Results indicated that text messaging was a convenient, reliable and affordable method to improve control of asthma symptoms. More specifically to young adults, text messaging interventions have shown positive results in a variety of contexts. Rodgers et al used personalized text messages to provide support and advice for quitting, and to distract participants from thinking about smoking (2005). The program resulted in improved quit rates, which remained high at six months follow-up, among those in the intervention vs. those in the control group. Regular, tailored feedback is also feasible in interventions that use text messaging. In Bauer et al’s study of the use of text messaging as a means of providing aftercare support for patients with bulimia, patients provided answers to
three specific questions as numbers in a standardized form and in turn received an automated response generated from an existing databank (Bauer et al., 2003).

II.H. Summary and implications for our research

Tackling the issue of obesity is complicated, yet extremely important. Women face increased responsibility for not only their own eating habits, but for those of their families as well as they are often the gatekeepers for their families’ meals. Young adults are at a point in their lives when they are creating new habits and contexts for change, making this an ideal time to intervene and promote positive health habits. Young women are experiencing a variety of competing events during this time period, increasing the importance of innovative methods of intervention to both reach and entice those in this age group. It remains yet to be seen whether content or mode of delivery of health interventions will increase young adults’ interest in and adherence to health promotion strategies. This research will provide some insights into the needs and modes of intervention delivery for this important target population.
CHAPTER III

CONCEPTUAL FRAMEWORK

III.A. Theoretical frameworks for weight loss

A variety of health behavior theories have been applied to weight loss interventions, including the Health Belief Model, the Theory of Reasoned Action, the Transtheoretical Model, and Social Cognitive Theory. Interventions based on the Transtheoretical Model and Social Cognitive Theory that use tailored information have proven most effective as these programs lend themselves to being able to match content to individuals’ health needs (Tufano & Karras, 2005). In these studies, health interests and needs identified by participants are matched to content that is stored in a message library and chosen based on an algorithm, and ultimately compiled into a deliverable format (i.e. print, email, etc). By specifically addressing the needs and interests of each participant, individuals’ recognize the personal relevance of the message and therefore may be more motivated to make changes (Kreuter et al., 2000).

Few theories have been assessed as part of interventions related to nutrition and weight for young adults specifically. As already mentioned, young adults tend not to think about their long-term health or the long-term effects of the actions they take at this point in their lives. While important, perceived benefits and barriers to maintaining a healthy weight are not at the forefront of the minds of those in this age group. That being said, Social Cognitive Theory (SCT) provides a framework through which behavior can be effectively assessed and changed (Levitsky et al., 2004). Through goal setting and improved self-
efficacy, two constructs of SCT, multiple studies have demonstrated both increased probability and action to partake in new, diet-related behavioral changes (Ammerman et al., 2001; Cullen et al., 2001).

III.B. Hope theory and the HOPE Works project

HOPE (Health, Opportunities, Partnerships, and Empowerment) Works is the Core project of the University of North Carolina’s Prevention Research Center (PRC) and is an extension of previous intervention projects. The goal of the project is to “develop, implement and evaluate a community-based obesity and empowerment program for overweight and obese, low-income and minority women in two rural counties through a community-based participatory research approach.”

Integral to this project’s objectives is the focus on increasing hopefulness. Hope is a concept from positive psychology, and is defined as “a positive motivational state that is based on an interactively derived sense of successful a) agency (goal-directed energy) and b) pathways (planning to meet goals)” (Snyder et al., 1991). Studies have demonstrated a relationship between hope and quality of life, especially during times of stress and loss (Farran et al., 1995; Gottschalk, 1985; Stephenson, 1991). Multiple studies have shown that those who have a higher level of hope tend to participate in more preventive behaviors and cope better with chronic illnesses, experience less depression, and have more strategies for dealing with life’s many obstacles (Affleck & Tennen, 1996; Barnum et al., 1998; Elliott et al., 1991; Irving et al., 1998; Taylor, 2000). Bender also found a positive relationship between hope and coping style and coping effectiveness. Further, preliminary analysis of randomized community surveys collected in the two project counties, as well as the two other
neighboring counties, indicate a strong negative association between hope and obesity [unpublished data].

III.C. Community based participatory research

Another model often used in health promotion research, Community Based Participatory Research (CBPR), involves members of the community at all phases of a project, from development to implementation to evaluation (AHRQ, 2003). Israel et al. stated that CBPR “involves systems development and local community capacity development”, and is “a co-learning process” for both community members and researchers (Israel et al., 1998). Involving community members in the research process has been shown to help improve cultural sensitivity, expose existing assets among the community and its members, and increase community trust, all improving the chances for intervention success (Minkler, 2004).

III.D. Role of social support

Social support, or the “functional content of relationships”, can be an important factor in the effectiveness of public health interventions for children through adults (Heaney & Israel, 1997; Hurdle, 2001). It can play a significant role in helping people cope with serious medical conditions (Glass et al., 2000). Further, it has been shown to be important in maintenance of health and disease prevention (Glass et al., 2000). A variety of interventions, from smoking cessation to encouraging breast self-examinations have demonstrated the value of this concept (Kviz et al., 1994; Mayer et al., 1991; West et al., 1998). Within obesity-related interventions, social support can be used to monitor each other’s weight, provide
encouragement, discourage behaviors that would hinder progress, and may be useful for long-term change and maintenance (Elfhag & Rossner, 2005; Kelsey et al., 1997). For the current project (specifically, Aim 3), we will focus on informational (advice and suggestions for addressing health issues), emotional (empathy and caring), and appraisal (constructive feedback) support (Heaney & Israel, 1997).

The HOPE Works project already recognizes the importance of social support through the use of HOPE Circles. Over the course of six months, project participants meet either weekly or bi-weekly in groups of 8-12 women, and work on health and life/empowerment goals that they each set at the initial group meeting. During subsequent sessions, participants learn, exercise, and discuss together, and support each other in their efforts to achieve these goals. Because we are not convinced that the HOPE Circle format is the most effective means of social support for young females, we think that it is worth exploring other modalities. Lifestyle as well as trends in adoption of new technology differentiates this group from older generations. This highly-mobile population is often the first to adopt new advances in technology. The use of advanced mobile equipment as a means of providing social support may provide a needed link for creating effective interventions in this population.

III.E. Role of health communication in creating behavior change

Health communication provides an avenue by which practitioners can increase awareness and influence perceptions of issues or problems facing individuals and communities. Defined by the National Cancer Institute and the CDC, health communication is “the study and use of communication strategies to inform and influence individual and
community decisions that enhance health” (Arkin, 2001). The Elaboration Likelihood Model (ELM), often used in health communications, purports that individuals are more likely to consider information if they find it personally relevant (Petty & Priester, 1994). Messages are thought to influence or persuade people through two routes: the Central route and the Peripheral route. The Peripheral route comes into play when people have a low level of motivation and perceive the message to be of low quality or not applicable to them. Change through the Central route occurs because the person has thoughtfully considered the information, and found it to be personally relevant within the context of their own lives. Studies have shown that information (messages) processed through the Central route tend to be retained longer and are more likely to lead to permanent attitudinal change. In the present study, we hypothesized that because the messages received by participants were going to be in direct response to the information that they entered/supplied, they would feel more connected to the information and therefore, be more likely attend to the information provided and more likely to exert the changes.

III.F. Targeted behaviors

The specific behaviors being targeted in Aim 3 of this project are based both on convenience and relevance. It is well accepted that improvements in both diet and physical activity provide the greatest likelihood of successful weight loss and weight loss maintenance (Wing & Phelan, 2005). Further, television viewing has been associated with increased risk for obesity in adults (Foster et al., 2006). Bulik, Shapiro, and colleagues had previously set up and used a text messaging database in their study with young children and their parents (Shapiro et al., 2008). This database was made available to us to use in this study, thereby
allowing us to easily target behaviors in these three domains [diet (sugar sweetened beverages), physical activity (steps), and television time (screen time)].

III.G. Project-specific framework

While the theories described above all play a role throughout this project, the theoretical framework outlined below primarily pertains to the randomized trial in the third aim of this dissertation, discussed in Chapter six. The project’s theoretical framework, shown in Figure 1, is based on Social Cognitive Theory (SCT) (Bandura, 1989), Elaboration Likelihood (Petty & Priester, 1994, and Social Support Theory (Israel, 1985). Important concepts from these theories include self-efficacy (confidence) to make changes, repetition and personal relevance of messages, and social support. The qualitative research described in Aims 1 and 2 informed the development of the framework. We hypothesize that through the informational and personalized feedback and reinforcement provided in the intervention, the young women would be better able and more likely to improve the selected health behaviors.
Figure 1. Conceptual Model

**Determinants**
- Self-efficacy for making positive health behavior change
- Prior experience with text messaging
- Pre-existing knowledge of health risks and benefits of behavior change

**Pilot Intervention**
Personalized feedback, information, support, repetition, and reinforcement via text messaging

**Intermediate Outcomes**
- Increased:
  - Perceived social support
  - Self-efficacy
  - Elaboration likelihood

**Outcomes**
- Increase in steps
- Decrease in screen time
- Decrease in sugar sweetened beverages
CHAPTER IV

CREATING *HOPE* Works: A COMPREHENSIVE HEALTH PROMOTION PROGRAM FOR WOMEN LIVING IN RURAL, EASTERN NORTH CAROLINA

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IV.A. Abstract

The purpose of this qualitative study was to explore the health, weight, and life interests and concerns of primarily overweight women living in rural, eastern North Carolina in order to design the HOPE Works intervention, a community based participatory research (CBPR) project. Eight ethnically homogeneous focus groups were conducted. Sixty-seven women, with an average age of 44 years and an average BMI of 34.1 ± 9.4 kg/m$^2$, participated in the study. Findings suggest that participants are concerned about a variety of factors at multiple levels of influence that impact their quality of life including economic status and job and educational issues, as well as their health. Intervention interests include participating in a supportive, empowering program that assists them not only in improving their health, but also in improving their social determinants of health, including income, education, and occupational opportunities.

IV.B. Introduction

Two-thirds of Americans are considered overweight or obese, and attention to this epidemic is urgently needed (NCHS, 2007). Even higher rates of obesity can be found in the
Southern United States as compared to other parts of the country, supporting the need for intervention in these locales (Ezzati et al., 2006). Trends within the state of North Carolina are particularly alarming with more than half of the state’s adults considered overweight, following a 27.3% increase in obesity from 1995-1999 to 2002-2003 (Healthy Carolinians, 2005).

Overweight and obesity are caused by a multitude of factors, including environment, genetics, behavior, and culture, and are associated with numerous health problems (Wellman & Friedberg, 2002). Adverse effects associated with overweight include type 2 diabetes, cardiovascular disease, and certain types of cancers, which are high in North Carolina as compared to the rest of the country (Healthy Carolinians, 2000; USDHHS, 2000). Moreover, obesity is among the top 10 causes of death in the United States (Sturm & Wells, 2001).

Socioeconomic status (SES) is one of the strongest predictors of health with social determinants, including income, education, occupation, and neighborhood and community characteristics, playing a greater role in health than individual behaviors or access to health care (CDC, 2002; Syme, 1998). As in much of the world and other regions of the US, health disparities in the South often accompany economic disparities; within the state of North Carolina, these lines tend to be even more pronounced between the metropolitan and rural areas (NCREDC, 2007b). Income disparity, or the gap between those at the highest and lowest economic levels, also predicts health and is increasing within North Carolina (BEA, 2006; Syme, 1998). Whereas North Carolina per capita income increased between 1994 and 2004, several rural counties in the eastern part of the state, such as Duplin and Sampson, experienced relatively flat income growth, leading to greater income disparities. Compared to
the NC state average, the average income disparity for Duplin and Sampson counties was -$2225 in 1994, -$2694 in 1997 and -$5661 in 2004 (BEA, 2006).

Social support can be an important factor in the effectiveness of public health interventions (Hurdle, 2001). It can play a significant role in helping people cope with serious medical conditions, and it is important in the maintenance of health and in disease prevention (Glass et al., 2000). A variety of interventions, addressing health issues from smoking cessation to encouraging breast self-examinations, have demonstrated the value of this concept (Kviz et al., 1994; Mayer et al., 1991; West et al., 1998). Within obesity-related interventions, social support can be helpful to monitor one another’s weight, provide encouragement, discourage behaviors that would hinder progress, and may be useful for long-term change and maintenance (Elfhag & Rossner, 2005; Kelsey et al., 1997).

The HOPE Works (Health, Opportunities, Partnerships, Empowerment) project recognizes the importance of social support through the use of HOPE Circles. Hope Circles bring project participants together for bi-weekly meetings over the course of six months, in groups of 8-12 women, to work on health and life/empowerment goals that each woman identifies as important. The idea for gathering women together in “HOPE Circles” grew out of loan circle models and micro-enterprise programs for women in developing countries such as Bangladesh (Esim et al., 2001; Nanda, 1999). Integrating health and economic empowerment together into programs for women has potential as an effective method of addressing both issues. In Hope Circles participants learn, share information, practice new skills, and support one another in their efforts to achieve identified goals.

HOPE Works builds on more than 10 years of community based participatory research (CBPR) involving the University of North Carolina at Chapel Hill and two counties
(Duplin and Sampson) in rural, eastern North Carolina. Throughout the last decade, members of these communities have been involved in all phases of a variety of projects that have been undertaken, from development to implementation to evaluation (AHRQ, 2003). Involving community members in the research process increases researchers’ ability to be culturally sensitive, exposes all involved to existing assets in the community and among its members, and increases community trust, all of which contribute to improving the chances of success for the intervention (Minkler, 2004).

The current qualitative study was conceived and planned by the project’s Community Advisory Committee (CAC), consisting of representatives from local health and community organizations, along with researchers. Qualitative research provides meaningful insights and is often the basis for creating interventions within specific populations. Prior to beginning the HOPE Works project, focus groups were conducted with women from these two counties to determine what needs and interests could be addressed in HOPE Circles as part of a program to empower participants to improve their lives and promote weight loss. These focus group discussions served to obtain information and insight through the group interaction of individuals who are representative of the project’s target population.

IV.C. Methods

A total of eight focus groups were conducted in 2004 for this study. Approval from the University of North Carolina’s Institutional Review Board was obtained prior to beginning this study.

Focus groups were conducted with homogenous groups in the community; two each with white women, African American women, and Native American women of the Coharie
Tribe of Sampson County; an additional two Spanish language focus groups for Latinas were conducted by bilingual moderators. Participants were recruited through community contacts with workplaces, churches, health clinics, domestic violence agencies, and other organizations. We also advertised for participants using local newspaper inserts, Public Service Announcements (PSAs), church and workplace contacts, and fliers/booths at supermarkets, public libraries, community colleges, employment security offices, local health departments, and selected community events. Focus groups lasted approximately 1½ - 2 hours and were held in convenient community settings such as public libraries or community centers. Participants provided informed consent and completed a questionnaire providing demographic information at the start of each group, and were paid $15 for their attendance.

Members of the CAC were trained in focus group methodology by one of the authors (AM), a qualitative research specialist. Subsequently, they led groups matched to their respective race or ethnicity (Gearin & Kahle, 2001). Each group had a focus group leader and note taker who debriefed following the completion of the group. All groups were tape recorded, transcribed, and analyzed using software for qualitative textual analysis (Muhr, 2004). Content and thematic analysis was conducted. Two independent coders read and coded the transcripts. Common codes were agreed upon and were entered into Atlas.ti. In keeping with the CBPR approach of the HOPE Works project, community members assisted in the interpretation (KB and PP) and write-up (KB) of the findings. Descriptive statistics were used to summarize group characteristics.

IV.D. Results

Participant characteristics:
A total of 67 women, with an average age of 44 years, participated in the focus groups used in this analysis (See Table 4.1). Participants of Hispanic descent tended to be the youngest of our participants while those of Native American descent tended to be older (average age: 34 vs. 61). From the total group of participants, 37.9% were Black, 28.8% were Native American, 19.7% were Hispanic, and 9.1% were white. A little more than half of participants (53.7%) were married. Forty-two percent had a high school education or less. The median household income range for participants was $10,000-$19,999/yr.

Focus group participants reported that, while they recognized the importance of losing weight and/or maintaining a healthy weight, being able to achieve this goal was often difficult due to challenges they faced at several levels. On a personal level, they faced multiple sources of stress in their daily lives which often led to depression and other health issues which presented their own stressors. Further, strain that the multiple demands of life put on their time and inadequate support from family presented even further challenges for addressing their weight concerns. Participants also described macro-level challenges, such as the costliness of food and joining exercise facilities, and rural infrastructure issues, as having a negative impact on their weight loss success. Discussion of the major findings and themes related to these challenges is below, listed by level of influence (See Table 4.2).

**Intrapersonal Issues**

Focus group participants said they frequently found themselves overwhelmed by the stressful nature of life in an economically poor, rural area. Stress was often brought on by events out of their control. The anxiety brought on by these stressors played a strong role in
various facets of participants’ lives, such as health issues and self-esteem. Having a low household income added burdens to their already demanding lives.

**Stress**

Stress came up in a variety of different contexts in all eight of the groups. The stress of dealing with the aftermath of a large natural disaster, Hurricane Floyd, had a destructive and sometimes traumatic effect in the lives of many of the women. In the fall of 1999, Hurricane Floyd, a category-two storm, hit the east coast of North Carolina, dropping more than 15 inches of rain on an area already soaked from a storm that had hit two weeks earlier (Moore *et al.*, 2004). Sixty-six counties, including Sampson and Duplin, were declared federal disaster counties. In spite of the storm’s occurrence several years prior to our discussion, the topic still invoked a strong reaction amongst group members. The storm had caused damage both directly and indirectly; both tangibly and intangibly. As described by one participant, the storm damage caused unforeseen effects, leaving her to deal with the financial repercussions as well as the physical damage: “My insurance dropped me because I filed a claim for the roof of my house.”

The difficult economic times were in and of themselves a challenge, but they were further exacerbated by the devastation experienced as a result of Hurricane Floyd.

*I think that it has affected people’s health and affected their nerves because we are always afraid another storm was gonna come. And, you know, it was a very devastating time for me because of the storm, and the ceiling of my house got messed up… and then, my mother got sick right after that and passed*
away right after that. So, it had a devastating effect on me and I may relate those two together. It was bad, really bad.

This hurricane-induced financial stress sometimes led to decisions that many would have considered unthinkable. Women discussed that the added financial burden brought on by the storm could mean “…an extra expense come…then they’ve got to make the decision as to whether do I buy my medicine or do I eat….” For others still, their stress was unrelated to the storm, and instead was due to health problems of their own or another family member; “I started gaining mine [weight] when my husband had emphysema, and it worried him that I’d get up and move around, so I just sat to please him, and ate like a horse right along with him.”

Depression

Mental health issues were discussed in all eight groups. Depression, the most common concern, was discussed in seven of the groups. They linked depression to a myriad of situations and challenges. For some, financial strain and job insecurity were thought to cause “…situational depression that comes from the fact that you can’t pay your bills or the fact that you’ve been laid off; worrying whether your children are going to eat or not because you are out of work during that time.”

Discussion about depression with these women brought about a “chicken or the egg” type of debate. Some explained that “obesity is what brings us depression and sickness” whereas others felt that “…depression cause[s] people to overeat.” Either way, they noted
that depression could perpetuate weight issues because “…when you are depressed, you feel like doing nothing”, including exercise.

Health issues

As discussed earlier, weight gain could either be the cause or the result of the health issues these women faced, causing a vicious cycle between disease and weight. Overweight and obesity were very relevant issues among focus group participants. The average Body Mass Index (BMI) for the focus group participants was 34.1 ± 9.4 kg/m²; 81% were overweight or obese. Some women discussed having been successful at losing weight at some point during their lives, though more often than not, they had regained their weight. For that reason, one older woman warned the younger women in her group, “You’d better watch it now while you are young, ‘cause when you get old, it is about three times harder to level it down as it is when you are younger.”

Weight in turn was thought to be the cause of a variety of the women’s health issues. Discussion in six of the groups focused on various aches, from head to toe and places in between. The women recognized that their weight played a role in their pain; “I gained twenty pounds since last summer and since then my back’s been hurting me.” They also understood that “…if I did lose maybe 20lbs, 25lbs, there would be less stress on my knees…” and therefore, less pain. Some of the other health issues that the women were contending with included diabetes (mentioned in 3 of 8 groups), cancer (3 of 8), shortness of breath (3 of 8), and high cholesterol (2 of 8).

Losing weight
With over 80% of focus group participants being overweight or obese, a good portion of the discussions focused on difficulty with weight loss. Most of the women recognized that they were overweight and they often knew the reasons why. As one participant stated, “I’m overweight. I gained ten pounds years ago, and I can’t lose them. I get older, I lost some pounds and I gained them right back. I sit down and eat, I exercise all day, but I love to eat.” The women recognized that losing weight would be beneficial for their health; they also knew how to go about it. One woman did a very good job summing it up: “Have a balanced diet. Eat a variety of vegetables and fruits. Eat three times a day but moderated portions, not going over. Drink a lot of water. Exercise, have a routine maybe on the weekends. Go to the park to play. I have heard that house chores help too. If you just watch TV and do nothing, you are not going to lose weight.” Still, most found it difficult to lose.

One of the most significant reasons identified for why the women had difficulty losing weight was time; it takes “…time to cook nutritional meals”, “children…need time if they are little; they need to be watched”, and it takes “…double the time when you go through the grocery store looking at those labels versus just going in there and grabbing up.” Not only does it take time to exercise and make efforts to eat and cook more healthfully, but the women also expressed that they often do not make these activities a priority. As one participant stated, “so much going on in our lives, so many activities, that I want to schedule in some time to do some exercises, but by the end of the day, I’m so tired because I’m up at 5 in the morning. All I want to do is lay down, forget the exercise.”

Another frequently identified obstacle to losing weight was motivation. The women talked about a variety of methods they had tried in order to motivate themselves, including hanging reminder notes “…in my bathroom; it’s been there five years and I cannot do it! I
look at it every morning and I will not... it just don’t work.” The most significant motivation, though, was thought to come from external sources. While some women felt that “self-discipline” and “will-power” were important for achieving successful weight loss, and for some even “…seeing changes in myself, it makes me want to do more”, more than anything, having an external motivator, such as a buddy, and getting “…motivated with other people” is what they felt was needed.

Weight, self-image, and clothing

Discussion about weight led to conversations about self-image and how women’s body weight affected how they felt about themselves. Many of the women in the groups had negative self-images. A common theme across groups was that “I think I’d feel better about myself as a person, and I’d feel better about my body [if I lost weight].” One participant even tied being able to “… get a boyfriend” with weight loss. Participants also felt that they “can’t go to the beach” if they were overweight. Some women tried to compensate for their poor self image by using cosmetics; “I wear lots of make up so that I can come out in public because if I don’t do that, I can’t come out because I’m fat.”

Participants agreed that having clothes that fit well and looked good was a positive influence on their self-image. Women in four of the groups discussed clothing as both a reason to not want to gain more weight and as a motivator for losing weight. As one participant noted, “Nobody wants to wear 18 W.” Regardless of the size, many commented that “…the clothes don’t fit right and that causes depression too.” Among the benefits of losing weight they cited not “[having] to throw away all those pretty things I had when I
was smaller”. For others, losing weight meant that they could “…get rid of those clothes” and buy new ones.

**Interpersonal Issues**

*Attitudes of and support from family and friends*

The women in all of our focus groups recognized the beneficial impact that support from family and friends could have on one’s success at losing weight and maintaining a healthy weight. While those around us can say and do things they consider supportive, this ‘support’ is not always conveyed with sensitivity. Participants in three groups discussed the comments they received from their family and friends. While loved ones might think that they are being helpful with comments such as, “Well you’re getting fatter, aren’t you?”, these remarks were sometimes interpreted as, “Well go to that table and then eat some more.” For others, having “…people always tell you: you need to lose weight, you need to lose weight, you need to lose weight; you’re too big, you’re too big…” didn’t make them want to go out and lose the weight. Sometimes these admonitions had unintended consequences. One woman commented that she got “…to the point where, I don’t care.” Some women described how family members who don’t want to change their own diets make it more likely that the one trying to be healthier would backslide. For instance, one woman’s husband was “…a big eater; he likes to go out and eat everyday.” But by accommodating her husband’s preferences and not attending to her healthier eating pattern, she “…just slipped right back into my old eating habits.”

*Family legacies in the kitchen*
As in many cultures, family recipes and food traditions are passed down from generation to generation. The women in our focus groups were no different. Many of them had grown up in the same rural counties where they were living at the time of our groups. Participants in four groups discussed the influence of traditional southern cooking. Southern cooking and eating practices such as “…eating that fatback…” often hindered them from creating healthier eating habits. They also often passed along these less-healthy cooking methods by sharing them with their families. Despite knowing that the traditional recipes were often not very healthy, many women felt as one participant said: “…I know I’m guilty of that. I try to cook the meals that I raised them on. Seasoning with pork and stuff….“ At times, their desire to carry on these family traditions stood at odds with their intention to improve their health. Similarly, Hispanic participants also discussed how their traditional meals and cooking methods were not the healthiest. The women also acknowledged that they live in a section of the country famous for its pork barbecue and plenty of “high sugar, high fat” foods.

In six out of eight groups, participants discussed the negative impact of fast food on a healthy diet. Several women admitted to consuming fast food because “…the grandchildren, they want to go to McDonalds, Taco Bell, somewhere like that, so you eat with them, or pizza. So there you go again, out of routine.”

*Multiple life demands and their impact on time*

Women from five of the focus groups acknowledged that they subordinated their desires to lead healthier lives to the competing demands on their time, especially the needs of their family members. With “…family obligations, like they have to go home and cook or
clean, or take care of their children or take them somewhere…by that time they’re tired and
don’t feel like doing any exercise or something like that.” Participants often attributed their
hectic schedules to the multiple roles they played, which often resulted in their giving
priority to another’s needs. One woman explained, “I have three children and I’m a single
parent and it’s hard for me to do things because I do work…I’m always so busy with them in
sports and everything. It’s just so hard for me to have time to actually stop and do stuff for
myself, ‘cause I don’t ever have any time.”

Public perception of weight

In the conversation about body image, there was also discussion about how others see
and treat people who are overweight. Many of the women in the groups discussed having
been hurt by another’s treatment that was related to their weight. While it can feel good to
have other’s notice your weight when they’re making comments like “‘you sure have lost a
lot of weight”, the majority of women had experiences where people “…talk about you
behind your back…[like] she’s got a disease or something” instead. The role of media in
perpetuating stereotypes toward overweight people was discussed in one group. In many
cases, images of and stories about overweight people were thought to be unkind and
unflattering because in “…TV, magazines, you don’t see heavy people. If you see heavy
people, they make fat jokes about being fat.”

Organizational Issues

The primary organizational level issue that emerged was related to women’s need for
additional education. In this context, education included diverse learning activities ranging
from learning English to obtaining a GED to learning how to meet one’s child’s nutritional needs.

Education

The educational level of participants was relatively low. Approximately 12% of participants had less than a high school education and only 3% of participants held a graduate degree. With one-third of the Hispanic participants not even having a high school education, it wasn’t surprising that the women who participated in these groups were most vocal about their need for more training and education. Opportunities and encouragement for pursuing education were mentioned in all groups, even for older women, who “…might be 45 years old and not have a GED…” Women expressed their desire to learn job skills so that they could take on such jobs as secretaries and hairdressers. The women in the Hispanic groups also wanted to “…learn English; to speak it.” As they knew of people who might be in the country illegally, the groups might offer an option for those who couldn’t attend community college classes.

Environmental Issues

A variety of environmental level challenges, from climate to infrastructure, impact participants’ ability to develop healthy lifestyles.

Natural Disasters and Pollution
As previously mentioned, participants in our groups recalled Hurricane Floyd as having had a negative impact on their homes. They also discussed the impact of the storm on their environment, and indirectly on their health.

Participants in three of the groups talked about the challenge of dealing with unsafe water that resulted from the flooding as well as the increased run-off from the chemically treated fields in the area. Some participants felt that because they drank “…a lot of water from the well, well not everyone has water filters and there are many infections caused by the water.” Also, because many people were on septic tanks, “the water overflows and it gets full and the water starts coming out and all that contaminates because the rain also goes to the [place] where the wells are.” Another result of the floods was the increased presence of mosquitoes. The “mosquito bites” were thought to both cause people to be sick and cause “…everybody not to want to even go outside. So, if you don’t want to go outside, you can’t get the proper exercise you need.”

Economic Challenges

Cost was identified as an obstacle to creating and making healthier choices for themselves as well as their families.

Food Cost

Participants in six out of the eight groups talked about the influence of finances on making healthier food choices. Many discussed the fact that “…it costs more money to eat healthy than it is to eat junk…”, and that “…unhealthy food is the cheapest, and the healthy food is the most expensive.” With approximately 50% of the focus group participants having
a yearly income of less than $20,000, (approximately 2/3 of the median income for each county) getting “...a hamburger for 99 cents” often felt like their best choice for a meal. Even for food items like bread, “...get the seven-grain bread or the whole wheat bread, it’s two dollars where like the other [white] bread, it might be on sale for a dollar.”

Exercise Cost

As discussed earlier, participants recognized the role of physical activity in a healthy lifestyle and understood the need for more physical activity. Unfortunately, many were faced with the fact that limited funds restricted their ability to participate in physical activities and join facilities. Participants in more than half of the groups discussed the role that cost played in limiting access to physical activity for the women and their families. Starting in childhood, participants talked about the availability of youth programs, such as baseball teams. One woman talked about the difficulty of paying for such programs: “I only have my daughter. And even sometimes, it’s hard then just to afford for her to participate, and I think to myself how about families that have four or three kids? And you know, you are talking about twenty bucks, and you are saying four counts. That’s a lot of money for a family if they have to watch their budget.” For adults, while there is no YMCA in either county, there are a couple of local workout facilities/gyms that they could join. Unfortunately, paying monthly dues and memberships was also identified as a challenge because “…the prices are extremely high.”

Rural Living Challenges
Women identified living in a rural environment as presenting challenges for keeping physically active. While at first glance one might think that the open space would create numerous opportunities to be physically active out of doors, the lack of infrastructure may inhibit physical activity. With “…everything [being] drive thru, everything; you don’t have to get out of your car to go even into the drugstore” and the “…fear of getting hit by a big old tractor trailer, or a dog, or see a big old snake come around there”, using ‘foot power’ is discouraged. Several women discussed the lack of sidewalks and walking trails as a hindrance to being physically active without the worry of cost.

Recommendations for Intervention:

The theoretical basis for HOPE Works is that social determinants, such as education, employment, and poverty, influence health, which ultimately impacts one’s hope and empowerment to make improvements in their lives (Syme, 1998). In other words, while losing weight and/or maintaining a healthy weight is a valid and important goal, and one that women in our study were concerned with, weight was often not a high priority due to other competing demands taking precedence, such as raising a family or the loss of a job. With this in mind, participants were asked specifically about what they would like a group for women, concerning weight, health, hope, and future goals, to look like; what they’d like to talk about; what kinds of activities they’d like to do in the groups; what would make them want to join; and what would make it possible for them to attend.

The women discussed a variety of group characteristics that would be necessary for them to want to participate in a program. Among the most commonly discussed traits were: comfort, trust/confidentiality, friendship, and fun. Women in four of the groups discussed the
need to feel comfortable with one another; comfortable enough to “…joke about things…and [know] it’s a joke”. This comfort would come, in part, through the development of trusting relationships where “…no one will be discriminated; to know that we are all the same and we need help.” It would also come through knowing that other participants wouldn’t “…get all back bitey and gossipy.” Participants also wanted the groups to be opportunities to “get to know each other…so it’s not like you don’t know this person from day or night.” This would be especially beneficial as it’s “…important for people to feel comfortable with each other so they’ll talk more freely.” One of the ways to create these friendships is through ‘fun’ activities.

Women in six of the groups expressed that the support of a group was very important. Women were interested in gaining support both for and from each other. For some, support came in the form of “just being there for each other…” and “friendship”, whereas others felt that group support would be beneficial because “…some people are more self-motivated, and some people need somebody else to help them be motivated.” While some people may be very self-motivated, many of the women expressed the need for an external source of motivation, such as “…a leader that would motivate us very much…a person that is very convincing so that she can keep us rolling” or not wanting to “re-shop” for new clothes.

The women also discussed using the groups as venues and opportunities to be able to serve as role models for their children, the younger generation, and each other. Participants discussed having looked up to role models in their community when they were younger. Particularly among the Coharie participants, it was felt that “…we, as Elders, can be a role model in handling difficult situations in the younger people’s lives.” Even amongst themselves, the women felt that they could model good behavior for each other, for instance
“…when we come in and we see you’re not eating all this food anymore…and then when I go to lunch, we’re like “Ms. Eliza, what are you having for lunch?’ and you’re like “well, I’m on my diet,” you know. So it encourages us to continue, to try to change.”

One of the most popular recommendations for topics to cover in the groups was healthy eating. With respect to cooking and nutrition, many of these women had grown up with “hog lard and that grease that we use to cook; frying instead of boiling or baking or steaming; cooking in ways that aren’t healthy for us.” Recognizing that healthier ways to make some of their favorite foods do exist, women in five of the groups talked about modifying family recipes to make healthier dishes. To help them do this, “nutrition sessions”, including education on “healthy recipes or ways of eating or changing your eating habits”, “going out to eat and showing us how to order…maybe, you know, talking about different ways to shop healthy, making the food taste better” were suggested.

Life issues other than health and weight, from “how to manage time better” and “how to raise children” to “[raising] self-esteem so that people will feel more comfortable with…who they are until they reach the goal they’re trying to achieve” were brought up in seven out of the eight groups as topics they’d like to explore. Support for improving one’s education or skill set was mentioned also. The women in three of the groups talked about bettering oneself by returning to school for their GED or learning basic skills like “…computing…because I do want to learn. I can only look at it at home because I can’t turn it on.” Among the Hispanic participants, who, as a group, expressed the greatest interest in educational topics, learning English was also mentioned as a desired topic and/or activity.

Recognizing that exercise is an important component of weight loss, women in all eight focus groups expressed an interest in making physical activity part of the intervention.
Exercising in the Circles would address some barriers to exercising that these women mentioned, such as gyms being “basically for the males” and the lack of “…activities around here for the grownups.” Further, the support and companionship of exercising, or even just walking, together would be especially beneficial for those who “…don’t like to go by myself.” A variety of activities were mentioned by focus group participants, including walking, aerobics, and calisthenics. Dancing was also mentioned as a fun and creative way to be active. One participant stated that she likes to “Listen to my DVD music… [while] I dance and yell to let out stress.”

Aside from learning about health, nutrition, and exercise, participants expressed interest in activities such as crafts, sewing, and gardening. Notably, they mentioned several times that these could be opportunities for “…the ones who can do it [to] teach the basics to the ones who do not know.” This type of mutual learning would be a way to support each other and encourage one another to better themselves.

As one would expect when participating in a weight loss program, seeing results from one’s efforts was mentioned as an expectation and a motivator for attending the group. As one participant stated, “five pounds would make me come.” Interestingly though, the expectation of weight loss was only mentioned in three of the eight groups. Mentioned more often was the fact that groups could provide an avenue “…to see if we can help each other lose weight.”

In terms of logistical needs, childcare was mentioned in six out of eight groups, and transportation was mentioned in three out of eight. Furthering the idea that these groups should be supportive for their members, the women offered ideas to address these logistical needs such as “…a different person is assigned to look after the kids [each week] so that she
can bring the kids…” and “…somebody in the group that does drive, whoever lives the farthest away, just take turns going to pick that person up.” Another important factor was that the program be free or not too costly.

IV.E. Discussion:

We used qualitative methods to help determine knowledge, activity interests, and needs of women living in our two study counties to help design the HOPE Works intervention. Our findings indicated that these women liked the idea of getting together to learn, exercise, grow, and become more hopeful about their futures. At the same time, they were dealing with many stressors, including concerns about their own and their families’ health as well as finances. Each of these issues constituted an obstacle to leading a healthy life. While 80% of the participants in our groups were considered overweight or obese, participants in all eight groups commented that losing weight was a challenge. Economic constraints, time, and family obligations often interfered with doing what they knew needed to be done to take care of their health.

This historically poor region has suffered additional hardships due to hurricanes and floods, loss of manufacturing and the national economic downturn. Many women often felt that they were hanging on by a thread; just doing what they could to keep the status quo. The economic challenges they faced limited their ability to purchase healthy food, whether it was an actual or a perceived challenge. As discussed by Drewnowski et al, high calorie-dense foods are often more affordable than those which are healthier and nutrient dense (2004). Participants’ also thought that economic difficulties made it difficult for them to participate in physical activity programs.
Other commonly identified obstacles to losing weight were lack of motivation, family and cultural traditions, and lack of support. Specifically, getting motivated to start and to maintain the habits that contribute to weight loss was seen as one of the most significant obstacles. Depression was identified as an issue among many participants, suggesting an association between these two concerns. Interestingly, throughout our projects, women have expressed the belief that weight and depression are related; that if one is depressed, weight gain follows. Setse and colleagues found that women experiencing post-partum depression may experience a similar lack of motivation to exercise and eat right (2008). The connection between depression and obesity should be recognized as an issue in planning interventions.

Family and cultural traditions also prevented women from achieving weight loss goals. Ingrained family eating habits and recipes that get passed on from generation to generation are difficult to change. Finally, participants in our groups identified the lack of support from family members as a significant obstacle to weight loss. A number of studies have found that social support is critical to being successful in losing and maintaining weight loss (Elfhag & Rossner, 2005; Kelsey et al., 1997). As stated earlier, participants recognized the need for social support, but some were not receiving such support from their families. They felt that the groups could provide social support and help raise their self-esteem.

Education was highly valued by participants in all groups. In particular, participants valued learning that could enable them to better themselves in order to better their jobs. Participants felt that learning should encompass taking advantage of the knowledge that other group members already possessed; learning from and teaching each other was seen as an opportunity to work collaboratively and effectively. In addition to seeing groups as an opportunity to learn and improve one’s education, participants saw the HOPE Circles as an
opportunity to serve as role models for other group members as well as for younger community and family members.

We conducted ethnically-similar groups in order to be able to better determine what, if any, differences in program interests and needs existed between the different groups of women. We found that, overall, the groups were more similar than different. This similarity across ethnic groups argued for one overall intervention approach. That being said, there were a few differences noted, primarily among the Spanish-speaking participants. Because the Hispanic women tended to be younger (primarily between 18 and 30 years old), some of their logistical interests and needs were different from groups that tended to have more older participants (i.e. most of the Coharie participants were 61+ years old). For instance, being younger, the Hispanic women often had children at home and so child care and the need to provide more care for their families was identified as a potential obstacle to participation. On the other hand, discussions in the Coharie groups involved discussion of faith and religion more often than in the other groups.

There are several strengths to this study. Through the last 10+ years, researchers at the University of North Carolina Center for Health Promotion and Disease Prevention have worked closely with community members to promote health in two rural NC communities. In addition to health, project goals have included increasing skills, education, and the creation of jobs. By having community members lead the focus groups analyzed for this study, community capacity is being built. Further, because group participants were often already familiar with the leaders of the groups, they may have felt more comfortable and willing to be open about their responses. There are also some weaknesses to having community members conduct the groups. Due to the inexperience of the group leaders, we noticed a lack
of expertise in asking follow-up and probing questions in many of the focus groups. As is true with most qualitative research, recruitment was based on a convenience sample, and therefore our results are potentially not generalizable to all women. Because this study was conducted in a limited geographic area, its implications may not be relevant outside of this region. Further, within this region, because the median income of our participants was approximately 2/3 of the median for these counties in the year 2000 (Duplin: $29,890; Sampson: $31,793), there may be segments of higher SES women from these communities who are not represented in this work (NCREDC, 2007a). Finally, because not all race/ethnic groups were equally represented, we were not able to complete a thorough comparison between the four groups identified in this study.

Despite these limitations, implications include the need for supportive health and empowerment interventions for women in this area. Because dealing with life’s stressors, including economic issues, often takes precedence over one’s health, incorporating components to address these concerns in a health intervention creates a more conducive environment for the success of that intervention. It also allows for the betterment of the person as a whole. We anticipate that by taking the results of this qualitative work into consideration when planning the HOPE Works intervention, participants will not only experience weight loss; they’ll also improve their self-esteem, educational and economic standing, and hope for the future.
Table IV.1  Focus Group Demographics

<table>
<thead>
<tr>
<th></th>
<th>All groups</th>
<th>%</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (n=64)</td>
<td></td>
<td></td>
<td>44.2</td>
<td>18.1</td>
</tr>
<tr>
<td></td>
<td>N=67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(unless otherwise stated)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race (n=66)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American/Black</td>
<td>25</td>
<td>37.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>19</td>
<td>28.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>13</td>
<td>19.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>6</td>
<td>9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed race</td>
<td>3</td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>16</td>
<td>23.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently married</td>
<td>36</td>
<td>53.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>7</td>
<td>10.4</td>
<td></td>
<td></td>
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<tr>
<td>Widowed</td>
<td>8</td>
<td>11.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Education (n=66)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>8</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school graduate/GED</td>
<td>20</td>
<td>30.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>23</td>
<td>34.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associates degree</td>
<td>8</td>
<td>12.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors degree or more</td>
<td>7</td>
<td>10.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment Status (n=65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>12</td>
<td>18.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>24</td>
<td>36.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed/looking for a job</td>
<td>19</td>
<td>29.2</td>
<td></td>
<td></td>
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<tr>
<td>Student</td>
<td>5</td>
<td>7.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>5</td>
<td>7.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household incomes (n=61)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>20</td>
<td>32.8</td>
<td></td>
<td></td>
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<tr>
<td>$10,000-$19,999</td>
<td>11</td>
<td>18.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$20,000-$29,999</td>
<td>15</td>
<td>24.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,000-$49,999</td>
<td>13</td>
<td>21.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000 or above</td>
<td>2</td>
<td>3.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (n=60)</td>
<td></td>
<td></td>
<td>34.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Category</td>
<td>Count</td>
<td>Percentage</td>
<td></td>
<td></td>
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<tr>
<td>--------------------------</td>
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<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18.5)</td>
<td>1</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal weight (18.5-24.9)</td>
<td>11</td>
<td>18.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight (25.0-29.9)</td>
<td>7</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese (≥ 30)</td>
<td>41</td>
<td>68.3</td>
<td></td>
<td></td>
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</tbody>
</table>
Table IV.2. Socio-ecologic Model of Issues and Challenges Facing Women

<table>
<thead>
<tr>
<th>Level</th>
<th>Issue</th>
<th>Issue Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapersonal</td>
<td>Stress</td>
<td>“…when things are stressful you seem like you want to overdo a lot of things that may not be good for you, you know like eating and stuff like that. Stress on your finances and everything.” [Black group]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I had financial stress, and to this day when I hear them talking about a hurricane…that is the first thing it actually comes to my mind is - I am going to lose a lot of work, because I am a single parent….” [White group]</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>“Well I can always find something in the store. But if you want to get depressed, take your great big fat behind in the store and try to find something in the store that looks decent. And then, you’ll look in the 2X’s, and those things look fairly good. But now when you go and look in the 3 and 4X, you can go on and dig you a hole in feeling depressed and stuff.” [Coharie group]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Many people tend to isolate themselves, and in other instances maybe in their own house or with their own husband even people close to them mistreat them...”</td>
</tr>
<tr>
<td>Health Issues</td>
<td>“I think of that every day of my life, and I get so angry at myself every day of my life because my daughter. She just turned twelve, and I keep thinking of myself, if you don’t do something about your weight before you have a heart attack or before your diabetes causes you to start losing your toes or something… Well, I won’t be around when my daughter grows up, and that scares me.”  [White group] “I mean I’m concerned for one because I personally stay in and out of the doctor’s office. If it ain’t a migraine headache, it’s a backache, a knee ache, or some kind of, something aching or congested, something’s wrong. I feel my heart skipping beats, racing. I mean I find, I sit back and I wonder, is it because I am overweight? Or I’m heavy?”  [Black group]</td>
<td></td>
</tr>
<tr>
<td>Losing weight</td>
<td>“Sometimes, some people are more self-motivated, and some people need somebody else to help them be motivated.”  [Black group]</td>
<td></td>
</tr>
</tbody>
</table>
“Personally, now what happens, well one we don’t have the time and I don’t have the time with work and school, time to cook myself and I have to depend much on my partner to cook and when I get home he has already cooked and he asks me to eat, eat. Even though it is not something healthy, and I don’t like it, and I know it is not good for me, he convinces me to eat with him and many times are fast things and high in fat or they are not healthy.”  [Hispanic group]

| Weight, self-image, and clothing | “When you look on TV, whenever they talk about obesity in people, they always try look at the bottom of the person. I guess so that you can’t see the top of them. I guess they don’t want to embarrass the person, but they don’t understand it hurts people’s feelings when you are trying to help somebody. You are still embarrassing them.”  [White group] |
| Interpersonal | “We can wear loose clothing and even then, there comes the wind or you snug on something and there are the ‘spare tires’.”  [Hispanic group] |
| Attitudes of and support from family and friends | “When you’ve constantly got somebody in your ear, every time that you see them you hate to go anywhere. Because a lot of people tell you, you need to lose weight, |
you need to do this, why don’t you try to do this?” [Black group]

…I have the type of husband who teases me with food. He just [says] wouldn’t you love to have a fried chicken breast, you know, things that just….” [Coharie group]

“…The way we were taught to cook when we were young, and what our body needs now should be two different things.” [Coharie group]

“Well, we in our families are used to eat things that won’t help anyone lose weight. We eat carbohydrates, tortilla, bread, rice and that makes us gain weight and since we don’t have the appropriate exercise, that makes us gain weight.” [Hispanic group]

“Working long hours. Because actually, I’ve already paid up for a whole year at Curves. So it’s not like I can’t go, because it’s paid for. But it’s working these long hours that keeps me from being able to go.” [Coharie group]

“So much going on in our lives. So many activities, that I want to schedule in some
<table>
<thead>
<tr>
<th>Organization</th>
<th>Education</th>
<th>“Learn computing, to handle the computer. Because I do want to learn. I can only look at it at home because I can’t turn it on.”</th>
<th>[Hispanic group]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public perception of weight</td>
<td>“When you look on TV, whenever they talk about obesity in people, they always try look at the bottom of the person. I guess so that you can’t see the top of them. I guess they don’t want to embarrass the person, but they don’t understand it hurts people’s feelings....”</td>
<td>[White Group]</td>
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<td></td>
<td>“Well, that could make a women want to lose weight, comparing herself with others and trying to look like other people and that causes harm because some women don’t know how to lose weight and that could harm their health.”</td>
<td>[Hispanic group]</td>
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<tr>
<td>time to do some exercises, but by the end of the day, I’m so tired because I’m up at 5 in the morning. All I want to do is lay down, forget the exercise.”</td>
<td>[Black group]</td>
<td></td>
<td></td>
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<tr>
<td>Environmental</td>
<td>Natural disasters and pollution</td>
<td>“I’m thinking of with the hurricane stuff, all the ... from the animals and stuff and waste mixing into all the water, making the water bad.”</td>
<td>[White group]</td>
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<tr>
<td></td>
<td></td>
<td>“It affects in the sense that sometimes the water has diseases. Sometimes the people don’t feel good, because it brings many things that sometimes we can’t feel good because there are many things about the hurricane and all that.... All that is harmful and the air and all that.”</td>
<td>[Hispanic group]</td>
</tr>
<tr>
<td>Economic Challenges: Food Cost</td>
<td>“It’s hard, especially when you are looking at diet things for that. When you have a budget to go by, and you have small children so you have to get certain things. And sometimes you can’t get what you want, only what you can afford.”</td>
<td>[White group]</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>“It’s actually cheaper to eat unhealthy than it is to eat healthy.”</td>
<td>[Coharie group]</td>
</tr>
<tr>
<td>Economic Challenges: Exercise Cost</td>
<td>“You’ve got to make appointments for here and there. And then you get in and there are so many people that are in there.... And then the prices are extremely</td>
<td></td>
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<tr>
<td>Rural living Challenges</td>
<td>“Sidewalks, just build sidewalks. I can’t understand why not.” [Black group]</td>
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<tr>
<td></td>
<td>“I noticed down here, from being in the South, everything is drive thru, everything. You don’t have to get out of your car to go even into the drugstore.” [White group]</td>
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</tbody>
</table>
CHAPTER V

REACHING YOUNG WOMEN WITH HOPE: GETTING YOUNG WOMEN INVOLVED IN PREVENTION RESEARCH

Styles Zuercher JL, Samuel-Hodge CD, Bulik CM, DeVellis BM, Campbell MK

V.A. Abstract

Young adulthood is a singular crossroad in life for women. While desiring to increase their self-sufficiency, young women are also dealing with multiple life changes, resulting in many failing to attend to their own health needs. We have developed a comprehensive health promotion program for women (HOPE Works) that has been well attended by older women, but less well attended by younger women. Formative research methods were used to determine the health and weight-related issues of concern, as well as the barriers that exist/need to be overcome in order for young women to become involved in the HOPE Works program. Four focus groups (each comprised of young women ages 18 to 33) in two rural counties, were conducted to identify their health- and weight-related concerns, as well as perceived barriers to becoming involved in traditional health promotion programs. Content and thematic analyses were conducted using Atlas.ti. Twenty-eight women participated. Findings showed that young women were concerned about their health, with the primary concerns being stress and weight. Barriers to participating in a health promotion program included financial strain, lack of access to affordable healthy food and exercise facilities, and time demands, including family obligations. Young women are concerned about their health,
yet life stressors and competing priorities limit their ability to attend to their own needs. Strategies that address these barriers and create support systems that facilitate behavior change are needed.

**V.B. Introduction**

Because young adulthood (18-30 years old) is a time of transitions, it may also be an ideal time to promote positive health-related behaviors. This is especially true for behaviors that are associated with chronic disease risk (Millstein et al., 1993). Young adults are rarely provided with adequate skills training to manage the flood of life-changes that may occur during this time. Unfortunately, many of the choices they make do not promote health, but rather increase risk for illness (Prevention, 1997; Steptoe & Wardle, 2001; Steptoe et al., 2002).

Many people become overweight or obese in young adulthood (Mokdad et al., 1999). Between 1991 and 1997, obesity among 18-29 year olds increased from 7.1% to 12.1%. By 2001, the rate had risen to 14% (Mokdad et al., 2003). Many young adults also consume fewer fruits and vegetables and exercise less frequently than recommended (Grace, 1997). Leaving home and assuming personal responsibility for food consumption and physical activity plays a role for college students, more than one-third of whom are overweight (ACHA, 2006). College health practitioners have noted that many former high school athletes do not continue to participate in sports at the college level, significantly reducing their physical activity levels (Litt, 2005). Other events common to this period of life, such as getting married, are also associated with weight gain among women (Sobal et al., 2003).

One possible explanation for weight gain during young adulthood is the pursuit of life goals such as starting a family. Women who are overweight prior to pregnancy may be less
likely to pursue weight loss after pregnancy, having added motherhood to their already stressful lives (Devine et al., 2000). In general, the prevention of chronic disease risk is not salient for this age group, and effective education and interventions are lacking (McCracken et al., 2007). To understand how to best assist this age group in adopting health-promoting behaviors, we need a better understanding of their health priorities.

Eating well and being physically active can be particularly challenging in rural areas where opportunities are often limited. For instance, Liese et al. found that rural areas often have fewer supermarkets and more convenience stores with fewer healthy options (2007). Physical activity can be hampered by the lack of sidewalks and gyms (Gatz et al., 2004). The dual challenges of time-of-life and location present considerable obstacles, but also provide unique opportunities for developing meaningful health interventions for young people.

To learn how to intervene effectively with young, rural women, we interviewed women in two rural counties in eastern North Carolina. These two counties have been the site of several collaborative intervention efforts with the University of North Carolina at Chapel Hill’s Prevention Research Center (PRC). The purpose of the current community-based participatory research (CBPR) project, HOPE (Health, Opportunities, Partnership, Empowerment) Works, is to “develop, implement and evaluate a community-based obesity and empowerment program for overweight and obese, low-income and minority women in two rural counties….“ The project is based in the concept of hope from the field of positive psychology, defined as “a positive motivational state that is based on an interactively derived sense of successful a) agency (goal-directed energy) and b) pathways (planning to meet goals)” (Snyder et al., 1991). Multiple studies have shown that greater hope facilitates preventive behaviors and strategies for dealing with life’s many obstacles (Affleck &
Tennen, 1996; Barnum et al., 1998; Elliott et al., 1991; Irving et al., 1998; Taylor, 2000). In this project, groups of 8-12 women meet every other week over six months to discuss health, economic, and educational goals that each person sets for herself. The number of young women participating in the project has been low, with the majority of women between the ages of 35 and 60.

V.C. Methods

Four focus groups were conducted in two rural counties in eastern North Carolina between March and May 2007. Approval from the University of North Carolina’s Institutional Review Board was obtained prior to beginning this study.

Participants

Focus group participants were recruited from each county’s community college and the community at large. Advertisements at the local community colleges and other community settings, such as grocery stores, were used. Administrators at each community college, as well as a student at one of them, assisted in recruitment. All groups were conducted in English and were held on the community college campuses.

Focus Group Protocol and Procedures

The focus group guide (See Appendix 1) was a modified version of the moderator’s guide used in prior focus groups with older women (mean age: 44.2 years) living in the same two counties. The earlier focus groups were conducted prior to the start of the HOPE Works project to assist in the design of the intervention [manuscript in progress]. Focus group discussions began with the impact of the local economic situation on health, followed by participants’ perceptions of the relation between health and weight. The young women were also asked to name issues they felt were important to women in their age group living in their
communities. Issues were written down on a large white board. Participants were then asked to select their top three concerns from the list. The next question was, “If there were a group just for women your age where you could talk and learn about weight, health, hope, and future goals, what would you want it to be like?” The discussion concluded with questions about the relationship between hope and health.

Before each focus group, participants provided informed consent and completed brief demographic questions and a brief hope scale (Snyder et al., 2002). All focus groups were conducted by a trained moderator, and an assistant facilitator took detailed notes (Gearin & Kahle). After each group, the moderator and assistant facilitator debriefed and summarized their observations. Focus groups lasted 1½ to 2 hours and were recorded using digital voice recorders. All participants received $20 as an incentive. Sessions were transcribed and reviewed a minimum of three times for accuracy and reliability (Ratcliff, 2001).

Analysis

Content and thematic analyses of qualitative data were conducted using Atlas.ti (Muhr, 2004). Analyses focused on thematic responses related to the economic and health concerns and challenges facing the respondents. To minimize potential bias from using a single coder and to help clarify issues arising during analysis, in-depth interviews were conducted with two participants early in the analysis and recurrent themes and their underlying meanings were agreed upon (Ratcliff, 2001). The final document was re-submitted to the two participants for final review prior to submission.

V.D. Results

Socio-demographic characteristics
A total of 28 women participated (See Table 5.1) with an average age of 23.9 years (Range: 18 to 33). Seventy-one percent of participants classified themselves as African American or Black, 21% as Caucasian or white, and 7% as Hispanic. The average BMI of participants was 29.4 (Range: 17.3-53.8), with 65.4% of participants classified as overweight or obese (BMI > 25.0) (Kuczmarski et al., 1994). Most participants had never been married (70%). Most participants (64.3%) were employed either full- or part-time. Only six participants (21%) indicated that they were students, though information from the administrators assisting with recruitment indicated a higher number. Median household income range was $20,000-$29,999/year, with nearly 20% of participants having an annual income of less than $10,000.

**Challenges to maintaining health**

Participants identified a variety of obstacles that made it more difficult for them to maintain good health. Some of these challenges were external, such as the economic situation of the communities in which they lived, while others were more individual, such as their personal day-to-day stressors (see Table 5.2).

**Economic Challenges**

Initial questions concerned the impact of the closure of numerous area factories and the subsequent layoffs of thousands.

**Food and Exercise Costs**

Participants in all four groups felt that “it’s expensive” to eat right and exercise, and “…easy to buy food that’s not so good for you ‘cause it’s a lot cheaper.” Also, the most readily available food options tend to be unhealthy. Fast food was referred to as a readily
available option by all groups, although the availability of pork, one of the region’s primary agricultural staples, was also identified as a hindrance to healthy eating habits. In one county, some (but not all) participants were aware of a gym where they could work out, but it was also recognized that “…it’s expensive to go.” For the second county, options were apparently even more limited.

Medical Costs

An issue identified in three of the four groups was the lack of “…economic means to have medical care [or] medical insurance.” The demographic questionnaire asked participants if they currently had health insurance. Sixty-eight percent responded that they did have health insurance, yet 71.5% of participants listed their health as only good or fair. Despite limited resources, some of the young women did not qualify for Medicaid. For those who had (or whose children had) pre-existing health conditions, loss of jobs and therefore health insurance decreased the likelihood of regaining health coverage in the future. Further, a lack of trust in the medical community was identified by participants in two of the groups. Because they felt that dentists were just “…drilling holes in your teeth” and doctors were “…prescribing you stuff…that you don’t even need,” participants were often reluctant to use the medical care that was available. Participants also recognized that the stress of being “broke,” hindered their ability to create healthy lives for themselves.

Health Challenges

The next set of questions focused on the relation between health and body weight. Participants were asked “What concerns you about your health?” and this was followed by a more general discussion.

Top Health Concerns
Participants’ health concerns included overweight, poor eating habits, lack of exercise, and family health history. Participants identified their top three health concerns as stress, mentioned by 21 of the 28 participants, followed by weight (11 of 28), and cancer (8 of 28; including breast, cervical, and cancer in general). Some concerns named less often included headaches, diabetes, and sexually transmitted diseases.

**Stress**

Stress was attributed to a variety of causes, including economic difficulties. Family demands and the challenge of “juggling” the multiple demands of life were cited as contributing to the high level of stress. Even those without children recognized that “…just having children…I know children are stressful enough” and that parents, mothers in particular, “…need a mental break….”

**Weight Challenges**

Approximately two-thirds of group participants were overweight or obese. Participants recognized the importance of “…get[ting] my weight under control…” while at the same time conceding that it is “…a lot easier to buy the double cheeseburger” than to eat healthfully. Many participants noted the importance of healthy eating and exercise habits for reaching and maintaining a healthy weight. Several participants had previously dieted and exercised to lose weight, but had returned to their old habits, such as “drinking soda” or “[eating] more” and eliminating their “workout,” causing them to regain their lost weight. Participants also tied weight concerns to stress, stating “…whenever women get stressed out, a lot of times they eat….”

**Cancer**
Cancer was mentioned as an important health concern by participants in two of the four groups. Among those with a family history of cancer, some were “…already going to a specialist to…try to monitor any changes.” The recent media campaign for HPV vaccination and a cancer awareness campaign at one of the community colleges had increased some respondents’ awareness of cancer risks.

**Program Suggestions**

To assist in developing acceptable and effective programs, we questioned participants about factors that could influence their interest and willingness to participate in interventions (See Table 5.3).

**Acceptable terms for weight**

Many pejorative labels for high weight exist, and people who are overweight can be sensitive to labels—even those applied by health care professionals. To increase our sensitivity to this issue, we asked the question, “There are many terms for describing someone who weighs too much—overweight, fat, heavy, obese, large, etc. What word(s) do you prefer and why?” There was no consensus for a preferred word or words, although terms such as unhealthy, plus-sized, weight-challenged, and thick were mentioned on several occasions. In contrast, there was a strong consensus in all groups that the word ‘obese’ was definitely derogatory and unacceptable. Participants felt that this word “hurt their feelings” and sounded like “…the grim reaper’s coming up right behind you.”

**Mode of intervention**

Because younger women had not been participating in the group-based *HOPE Works* program, we wondered whether groups were the best way to reach this age group.
Participants were questioned about a variety approaches to intervention, including groups, one-on-one meetings, and technology-based contacts.

**Group vs. one-on-one**

Probing questions were asked about the best format for young women to receive health- and weight-related information: groups vs. one-on-one with a peer or one-on-one with an ‘expert’. Although some benefits of one-on-one contacts were noted, groups were identified as the preferred method of contact. One-on-one meetings were thought best for shy people or “…someone that’s in a group that they don’t like to talk….” One-on-one with a peer was preferred as long as “…there was another person that you could go to for answers.” Participants in two groups felt that one-on-one with an “expert” would be good because they could specifically “point out” where improvements in lifestyle were needed. Further, if an expert were not involved and “…we both got that same question, that’d be bad.”

The benefits of group interaction seemed to outweigh the potential for individualized attention. Participants in all four groups strongly supported group meetings for providing the greatest benefits. The design of the *HOPE Works* program was described to participants prior to asking the question, “What do you think young women like you would get out of being part of this kind of group?” Among the potential group benefits were support and encouragement, “…feel[ing] better about yourself”, and “…get[ting] more input on situations….” Additionally, participants in two of the groups thought that meeting with other women would bring more laughter and fun into their lives.

As we already have a group-format program in place that these women could participate in, we wanted to know what specifically would entice young women to join a group. The top considerations included convenient locations, “like the school” [where the
focus group was held] (mentioned in 4 of 4 groups), childcare (3 of 4), and a supportive environment (3 of 4). Session activities they would be interested in included group exercise, including some friendly competition (3 of 4), and education on healthy living (including cooking classes and sharing of recipes) (3 of 4).

**Use of Technology**

Various types of media have been used and tested in health-related research to date. With the younger generation particularly attuned to advances in technology, we hypothesized that its use would be an appropriate and desired addition to interventions. We asked the question, “Besides coming together as a group, what do you think of using any one or more of these methods: Phone – calls/text messaging, Computer/internet, TV/video”.

**TV/Video**

When asked how they would feel about an intervention that could include TV programming or videos, participants in all four groups expressed dislike of this mode of intervention, citing that “I don’t have a lot of time to watch too much TV.” Further, with so much already going on at home, “we’re home trying to watch the video, we’re doing, we’re cooking, washing clothes, still doing everything else besides watching the video.”

**Computer/Internet**

Participants in two of the groups reported that the internet would be a good intervention option for them, while participants in one of those groups plus two others made comments to the contrary. Although some participants stated that they had computers at home, others only had access at work or school. Even when there were computers at home, one participant stated that “I don’t always check my email.”

**Phone calls/Text messaging**
Participants were asked how they felt about the use of phone calls or text messaging as a means of providing support. Participants in three out of the four groups supported these avenues for brief interactions, while those in the fourth group stated that they preferred to “…talk to a person face-to-face.” Most respondents focused on the use of text messaging. A few participants in three of the four groups felt that texting was not a good option because “everybody [doesn’t have a] phone,” and in one of the groups the majority of participants strongly opposed the use of texting. Although 89% of participants owned phones themselves, additional concerns about texting included cost and time: “it’s time consuming.” Participants who favored texting felt that it was a good way to provide motivation, and it’s helpful when “…you need to talk to the person, like, right then, but …in certain situations you can’t talk out loud, but texting, no one has to know.” Participants felt that texting was “better than email.”

**V.E. Discussion**

We hoped that the focus group results would provide insight about HOPE Works program adaptations that might appeal to young women. Interestingly, many of the health concerns and intervention preferences expressed by the young women were already being addressed through the program.

In prior focus groups with primarily older women, similar concerns associated with the cost of healthcare and healthy foods were reported. The older women also identified stress as a significant health issue, although they tied it primarily to economics alone, rather than both economics and competing time demands, as reported by the younger women.

The older women also expressed an interest in participating in a supportive, positive group where they could talk to one another about the issues and challenges they were facing.
The finding that the younger women would welcome such an option is noteworthy and supports the idea that our HOPE Circles could be an acceptable intervention method. Social support can be used to monitor weight and provide encouragement, and may be useful for long-term change and maintenance (Elfhag & Rossner, 2005; Kelsey et al., 1997).

The older women identified desired activities such as group exercise and education on healthy living, both of which were incorporated into the intervention. They also expressed the need to hold the groups in convenient locations. Each of these items was endorsed by the younger women, leaving us to wonder why the number of younger women participating in the program is not higher.

The additional challenges of juggling the demands of a young family, jobs, and school, and the subsequent stress they experience, puts young women at a disadvantage and often prevents the creation of a healthier way of life. Several young women expressed knowing “…a lot of women…they go to work, they go home, take care of the kids. They don’t really do for themselves.” The significant level of stress in the lives of these young women is not surprising and echoes other observations (Hildingh et al., 2006). Nonetheless, it is alarming that those who are just beginning their adult lives experience so many demands on their time and limited resources that they are often not able to address their own health concerns. Furthermore, stress itself can lead to other unhealthy behaviors including overeating, which can further impact weight, creating an unhealthy cycle.

Another possible explanation may be related directly to age. Although interest in groups was expressed, some participants reported that they “won’t talk in front of a lot of people” and would feel uncomfortable discussing their health and life concerns in groups. Perhaps, for some, technology-based interventions could be the best answer. While a variety
of technologies, such as personal digital assistants (PDAs), have been used previously in interventions, participants in our groups expressed more support for text messaging. Mobile phones have already proven to be useful tools for interventions among young adults, such as smoking cessation and support for patients recovering from bulimia (Bauer et al., 2003; Rodgers et al., 2005). Approximately 75% of American households own at least one mobile phone (Wright, 2006). Even among low income populations, trend surveys show an increase in cell phone use (Stutts et al., 2002). Furthermore, large numbers of young adults in both high- and middle-income countries own mobile phones (Rodgers et al., 2005).

Although young women have not readily participated in HOPE Works thus far, it does seem possible that some relatively minor modifications could improve their participation. First, we should change the location and time of meetings. The current program is designed for group leaders to determine these details. Assisting young women in creating groups at their place of work or school may reduce the barrier of adding yet another commitment to their day. Meetings that occur directly after or as part of the work or school day would a) reduce commute time and costs, and b) provide or eliminate the need for additional childcare. Colleges might be willing to provide space for childcare. For community colleges with Early Childhood Education programs, this might be an opportunity for students to receive hands-on experience working with children.

Modifications to program content are suggested as well. In addition to the weight management and empowerment components in the HOPE Works program, specific emphasis on stress management should be added. Providing young women with techniques for managing stress would not only help them with stress itself, but because when “…women get stressed out, a lot of times they eat… [and that] causes a lot of their health problems,” their
weight and overall health could be impacted. The inclusion of information related to stress has been recognized as an important component in weight management for young women by Crawford and Ball (2007).

While cancer was recognized among the top three health concerns for these young women, it is important to note that one of the community colleges had held a cancer awareness campaign within a few weeks of the focus groups. Although this is an important health topic for young women, its significance in this context may have been exaggerated.

There are several limitations to this research. Generalizability outside of our given community is difficult, due to sample size and sampling methods. Further, because we experienced some recruitment issues in one county, opinions from young women could have been biased toward the other county. Lastly, there is a relatively large Hispanic population in each of these two counties (19% & 15%), yet because groups were conducted only in English, we most likely missed differences in opinions and concerns held by non-English speakers (U.S. Census Bureau, 2005). We did have a few English-speaking Hispanic young women participate in our groups, so we hope that they were able to provide a modest representation for this group.

By modifying the current HOPE Works program to address the specific stressors, health concerns, and interests identified by the younger women in these communities, we hope to increase their participation rates and make an impact on their lives. Moreover, by improving the habits of young women at a time when many of them are or soon will be new mothers, we hope that they will, in turn, be enabled to help their own children learn to be healthy.
Table V.1 Demographics

<table>
<thead>
<tr>
<th>All groups</th>
<th>%</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=28 (unless otherwise stated)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td>23.9</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range 18-33</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American/Black</td>
<td>20</td>
<td>71.4</td>
<td></td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>6</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td><strong>Number of children &lt; 18 in family</strong> (includes siblings)</td>
<td>1.4</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>19</td>
<td>67.9</td>
<td></td>
</tr>
<tr>
<td>Currently married</td>
<td>7</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>7.1</td>
<td></td>
</tr>
<tr>
<td><strong>Level of Education</strong> (n=26)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>3</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>High school graduate/GED</td>
<td>7</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>7</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>Associates degree</td>
<td>5</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td>Bachelors degree or more</td>
<td>4</td>
<td>15.4</td>
<td></td>
</tr>
<tr>
<td><strong>Employment Status</strong> (some participants selected &gt; 1 option for this question)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>14</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>8</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>Unemployed/looking for a job</td>
<td>4</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>6</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td><strong>Household incomes</strong> (n=25)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>$10,000-$19,999</td>
<td>7</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>$20,000-$49,999</td>
<td>8</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>$50,000 or more</td>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>BMI</strong> (n=26)</td>
<td></td>
<td>29.6</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Count</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18.5)</td>
<td>2</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>Normal weight (18.5-24.9)</td>
<td>7</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>Overweight (25.0-29.9)</td>
<td>8</td>
<td>30.8</td>
<td></td>
</tr>
<tr>
<td>Obese (≥ 30)</td>
<td>9</td>
<td>34.6</td>
<td></td>
</tr>
</tbody>
</table>

**Health Insurance**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>64.3</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>35.7</td>
</tr>
</tbody>
</table>

*Note.* Values vary slightly because of missing data.
Table V.2  Obstacles to Maintaining Good Health

<table>
<thead>
<tr>
<th>Issue</th>
<th>Issue Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Challenges</td>
<td></td>
</tr>
<tr>
<td>Food and Exercise Costs</td>
<td>“…people buy foods that [are] cheaper than buying, you know, healthy food.”</td>
</tr>
<tr>
<td></td>
<td>“And you can get a double cheeseburger from McDonald’s for a dollar. Maybe you’re broke and you’re hungry....”</td>
</tr>
<tr>
<td></td>
<td>“There’s a exercise gym, but you have to pay so much money…you can’t afford it cause you have family and the little bit that you get, you can’t go to the gym because you got a light bill due or you’ve got a water bill due....”</td>
</tr>
<tr>
<td></td>
<td>“…it’s harder to pay for going to places like Curves when I’m still, like, on a part-time, you know, salary or whatever.”</td>
</tr>
<tr>
<td>Medical Costs</td>
<td>“…with economic hardship, more like, you know to, as far as health-wise, it’s expensive to be able to afford health care, to go to the doctors and things like that…I think it’s easier for people not to”</td>
</tr>
</tbody>
</table>
“People that are not upper class, not middle class; they fall between the middle and the lower, they don’t qualify [for Medicaid]. Children that don’t get dental care, same reasons.”

“And recently, we’ve had a lot of, um, of the factories and plants layoffs and for that, there was a lot of people that was out of health insurance, so that really affected a lot of people as far as having money to take care of your health.”

<table>
<thead>
<tr>
<th>Health Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stress</strong></td>
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<tr>
<td>“Well, I…that’s what, what’s wrong with this age group. You know, between this age group you’ve got, you have students and then you have adults who have families and sometimes you have both or you have students who are full-time, part-time workers…and I think that kind of stress, you know, causes a lot more health problems than many other age groups.”</td>
</tr>
<tr>
<td>“Especially stress. It, it…it will put you there.”</td>
</tr>
</tbody>
</table>
| “I believe that the stress that I put in my life…caused me to be overweight…. And I don’t think my
<table>
<thead>
<tr>
<th>Topic</th>
<th>Quote</th>
</tr>
</thead>
</table>
| **Weight** | “I think it’s important that we watch our weight and I don’t know how true the ideal weight things are, where they say your height is supposed to be...they say I’m probably supposed to be like a hundred and twenty-six pounds and I’m like ‘Oh my God! I’m so over, outside.’”

“...it’s easy to gain weight and it’s hard to lose weight, and I would think any girl would say the same thing.”

“I think that’s where I gained all my weight back, was with me drinking soda...and then I just started just going crazy with the fast food, going from school, going to work, and not having any time....”

Barb: “And on TV when they, on TV when they’re talking about people being overweight, you don’t see their face; all you see is their rear end walking down the street or something.... They’re picking on ‘em. That’s my opinion; they’re picking on ‘em.”

Liz: “You know nobody cares about picking on fat people.”

<p>| <strong>Cancer</strong> | “And...the cervical cancer...that just seems like it’s kind of like a plague going around cause we...” |</p>
<table>
<thead>
<tr>
<th>“I want to say not only just breast cancer, but cancer in general.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>hear more about it.”</td>
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<tr>
<td>Acceptable Terms for Weight</td>
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<td>----------------------------</td>
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<tr>
<td>Mode of intervention</td>
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<tr>
<td>Group vs. one-on-one</td>
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<td></td>
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<tr>
<td>Use of Technology</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><strong>TV/Video</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Computer/Internet</strong></td>
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<td><strong>Phone – calls, text messaging</strong></td>
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CHAPTER VI
TEXTING FOR HEALTH: ENCOURAGING HEALTHY BEHAVIORS WITH TEXT MESSAGES

Zuercher JL, Bulik CM, Bowling JM, Samuel Hodge CD, DeVellis BM, Campbell MK

VI. A. Abstract

Objective: To test the feasibility and acceptability of using text messaging to promote positive health behavior change among young women. We hypothesized that text messaging would be an acceptable means of intervention and would be associated with improved health behaviors (increased daily steps, decreased consumption of sugar sweetened beverages, decreased minutes of screen time).

Design: Participants were randomized either to daily text messaging (SMS) monitoring with feedback or control (C) for one month.

Participants: 177 young women (age 18-30) participated; 163 completed (SMS: 83/88; C: 80/89).

Intervention: Participants in the SMS group monitored behaviors daily, inputting answers to three questions into their phones and receiving feedback regarding these answers immediately based on how close they were to achieving their goal for each behavior that day and how they had done in relation to these goals on the previous day. Additionally, all SMS and C participants were called on five random days throughout the study month and asked the same three questions about the previous day behaviors.
Main Outcome Measures: Treatment acceptability and self-monitoring behavioral outcomes.

Analysis: Descriptive statistics, nonparametric tests, and HLM were used to analyze differences across time and between groups.

Results: 163 (92%) young women completed the study (SMS: 83/88; C: 80/89). The SMS intervention was generally well accepted. Participants in both the SMS and the Control groups experienced a decrease in the number of SSB consumed per day although there was no significant difference between groups. No significant differences were found in physical activity between the control and SMS groups or from the beginning to the end of the study. Participants in both groups experienced a significant decrease in the amount of screen time over the course of the study with a greater decrease found in the SMS group.

Conclusions and Implications: SMS may be an acceptable means for promoting and monitoring behavior change among young women although behaviors and messages of interest to young women need to be teased out further.

VI. B. Introduction

Evidence suggests that those who are overweight as children will remain so as adults (Guo & Chumlea, 1999). Additionally, individuals who are overweight as young adults are at even greater risk of being overweight later in life. Application of behavioral techniques in diet- and/or exercise-related weight-loss interventions is considered the most effective method for treating obesity (Smith & Wing, 2000). Because young people are experiencing a variety of competing life-events during this time period, innovative methods of intervention to both reach and engage those in this age group need to be explored.
Various types of media have been used and tested in health-related research to date among young adults. The fast pace and variety of commitments of modern life make ease, accessibility, and portability important considerations when determining the type of media to use in an intervention, especially for young adults. Cellular technology is a relatively recent development, but already, approximately 81% of households own at least one mobile phone (Wike, 2007). Even among the low income population, trend surveys demonstrate increasing use of cell phones (Stutts et al., 2002). Furthermore, large numbers of young adults in both high- and middle-income countries own mobile phones (Rodgers et al., 2005). More specifically, young adults are heavy users of text messaging. This mode of communication gets around the obstacles of time and space as text messages can be sent and received wherever a person is (Tachakra et al., 2003). Also, text messaging is an inexpensive method of communication; cellular phones are far cheaper to purchase than many other electronic devices and unlimited service plans can be purchased to minimize cost per text message.

Mobile phones have proven to be useful tools for multiple intervention issues, such as improving outpatient attendance at medical appointments (Downer et al., 2005). Text messaging can also be effective in providing feedback for both participants and investigators or medical personnel. In a study to improve asthma control, text-messaging was used by participants as a means for submitting their peak expiratory flow (PEF) measurements to medical personnel who could then respond with therapy and follow-up recommendations in a timely manner, also via text messaging (Ostojic et al., 2005). Results indicated that text messaging was a convenient, reliable, and affordable method to improve control of asthma symptoms. Text messaging interventions have shown positive results for interventions specifically among young adults. Rodgers et al used personalized text messages to provide
support and advice for quitting, and to distract participants from thinking about smoking (Rodgers et al., 2005). The program resulted in improved quit rates which remained high at six months follow-up among those in the intervention vs. those in the control group.

Regular, tailored feedback is also feasible in interventions that use text messaging. Bauer et al. (2003) assessed the use of text messaging as a means of providing aftercare support for patients with bulimia nervosa. The program asked patients to provide answers to three specific questions as numbers in a standardized form and in turn, they received an automated message generated from an existing databank (Bauer et al., 2003). The pilot study based using this system suggested that it was well accepted by participants (Bauer et al., in press).

Shapiro et al. conducted an investigation using text message-based self-monitoring and automated feedback aimed at childhood overweight prevention in the context of the family (2008). This clinical trial compared the acceptability, feasibility, and adherence to text messaging-based monitoring with traditional paper and pencil self-monitoring and usual care (control) for overweight children ages 5-13 and their parents. They found that those in the SMS monitoring group had greater adherence to self-monitoring than those in the pencil and paper group (43% vs. 19%, \( P < .02 \)) and relatively lower attrition (28%) compared to both the paper and pencil and usual care groups (61% and 50%, respectively). A significant improvement in screen time (reduction in minutes) among those in the SMS group compared to the other two groups was also found. The text messaging portion of this childhood overweight study formed the basis for the present intervention.

For both the study by Shapiro et al. and the present study, three particular behaviors were identified and targeted for improvement; steps, screen time (television), and sugar
sweetened beverages (SSB). These behaviors were chosen as they have already been proven to be related to overweight.

Existing recommendations by the Centers for Disease Control (CDC) suggest that adults spend at least 150 minutes per week in moderate-intensity aerobic activities (CDC, 2008). Currently, only approximately 49% of American adults are meeting this recommendation (Carlson et al., 2008). One way to reach this goal is through walking. In fact, over 76% of weight maintainers on the National Weight Control Registry reported walking as important for weight loss and maintenance of weight loss (Wing & Hill, 2001). Walking can be an especially effective mode of activity as 1) it does not require specialized equipment; 2) just about everyone can do it; and 3) it places little stress and strain on the body due to its low impact nature. Further, according to ACSM/CDC guidelines, walking 10,000 steps per day is sufficient for meeting these recommendations, with an additional 2,000-5,000 steps per day recommended for weight loss. Yet, according to a study by Wyatt et al (2005), people are not coming close to 10,000 steps daily, many not even achieving half of this number.

The average American watches more than 4 hours of television each day, not including leisure computer use or video game play time which could significantly increase the amount of time spent on sedentary behaviors (TV-Turnoff Network, n.d.). Numerous studies have demonstrated the association between time spent watching television and overweight and obesity (Jakes et al., 2003; Jeffery & French, 1998; Tucker & Friedman, 1989, 1991). Not only is the amount of energy spent while watching television considered only slightly higher than while sleeping (Ainsworth et al., 1993), watching television is also associated with increased snacking on energy dense foods and increased portion size (Gore et
al., 2003; Stroebele & de Castro, 2004). Advertising of high fat and sugar foods is prevalent, and has been shown to promote eating in adults, especially among obese women (Falciglia & Gussow, 1980). To date, little has been done to intervene with adults, although interventions targeting families have shown decreases in adult screen time (Robinson & Borzekowski, 2006).

Reduction of SSB, which provide little, if any, nutritional benefit, is one relatively easy dietary change that could potentially result in many positive health outcomes. A systematic review by Malik et al. provides strong evidence that intake of SSB is positively associated with both overweight and obesity (2006). By minimizing SSB intake, it is possible that obesity rates could decrease in the population.

The goal of the present study is to assess the feasibility and acceptability of text messaging as a means of support for promoting positive health behavior changes among young women (ages 18-30 years). Previous formative research showed that time was a barrier to participating in group-based support for weight loss (Styles et al., [Submitted 2008]). We hypothesized that text messaging would provide a unique and accessible avenue for young women to receive support; that support provided via automated text message feedback would be an acceptable mode of support and be associated with an increase in self-efficacy for meeting the goal behavior; and that the automated feedback would also be associated with improved health behaviors, namely an increase in number of steps taken per day, a decrease in number of minutes of screen time per day, and a decrease in the number of sugar-sweetened beverages consumed per day. Given the short duration of the intervention, however, we did not anticipate significant changes in weight.

VI. C. Methods
Study participants

Young women between the ages of 18 and 30 were recruited from three community colleges (two in eastern and one in central North Carolina) and two universities (both in central North Carolina), as well as various local community agencies (i.e. libraries, health centers) through campus listservs, media advertisements, and flyers placed in strategic locations on the campuses and throughout the communities. All participants had to be living in North Carolina at the time of recruitment and own a cell phone with text messaging capability. Exclusion criteria included an inability to speak English fluently.

Procedure

All participants attended an initial, individual meeting where they provided informed consent, completed a baseline questionnaire, and received instruction on the study protocol. All participants were randomized using a random number generator to either the intervention or control condition at baseline. The study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill.

Intervention

At the initial meeting, participants received instructions on and equipment for the intervention. Participants in both arms of the study received a pedometer for tracking their daily steps and as an incentive for participating in the study. Participants were also entered into a drawing for a $50 gift card; the recipient was chosen randomly at the completion of the study.

Treatment Conditions
**Text messaging with automated daily feedback (SMS):** After providing informed consent and completing the baseline questionnaire, SMS participants received instruction on how to use their cell phones to send messages to the data center and how to use the pedometer to track their daily step count. For the SMS monitoring, participants inputted answers to three questions into their phones daily before they went to sleep. The three questions answered were: 1) How many steps did you take today (or What is the number on your pedometer)?; 2) How many (non-school or -work related) minutes did you spend in front of the TV or computer today?; and 3) How many SSB did you drink today? Participants received feedback regarding these answers immediately which varied, depending on how close the participant was to achieving their goal for each behavior that day and how they had done in relation to these goals on the previous day. Participants in the SMS group were given goals for each of the three behaviors of interest. The target goal for screen time was one hour per day. The target goal for steps was 10,000 per day. For SSB, the target goal was zero per day. Attainment of or failure to attain goals was determined based on participants’ text/phone call self-reported responses. Additionally, participants were called on five random days throughout the study month and asked these same three questions about the previous day (i.e., How many SSB did you drink yesterday?). The informational handouts that participants received provided them with information about the three behaviors of interest (sugar-sweetened beverages, steps, and screen time), including how to monitor the behaviors and strategies to promote the desired behaviors. Participants in the SMS arm also received $5.00 cash to help cover the cost of text messaging during the study.
**Control (C):** At the initial in-person meeting, control group participants completed a baseline questionnaire. Control participants received information about stress management, and a squeezable ‘stress ball’ as a potential method to help alleviate stress. A brief handout, providing instruction on wearing the pedometer, as well as a brief explanation about the three behaviors of interest, were given to control participants although no specific goals were provided for any of the behaviors. Over the course of the study month, control participants were called on five random days and asked these same three questions as SMS participants about the previous day (e.g., How many SSB did you drink yesterday?)

At the end of the study, all participants were sent a follow-up questionnaire with an addressed/stamped envelope to increase the likelihood that the questionnaire would be returned. Upon receipt of their post-intervention surveys, participants were sent a $10 gift card for participating in the study.

**Measures**

**Weight/BMI:** Participant height and weight was provided by self-report. The Quetelet Index (kg/m²) was used to compute body mass index (BMI) as a continuous variable (“BMI”). This measure was conducted both pre- and post-intervention to assess change.

**Psychosocial measures:** Psychosocial measures included self-directedness, behavior-specific self-efficacy, social support, and elaboration likelihood.

*Self-directedness:* Self-directedness is a dimension of the Temperament and Character Inventory (TCI) developed by the Center for Well-Being at Washington University
in St. Louis (Cloninger et al., 1994). Higher scores on self-directedness reflect responsibility and resourcefulness and is associated with greater ability to set and pursue goals.

*Self-efficacy:* Participant self-efficacy for meeting the PA goal both at pre-intervention and follow-up was measured with questions based on Sallis et al.’s *Self Efficacy for Physical Activity Survey* (1988). Participants answered questions related to “How confident you are that you can…” with response options ranging from 1 (I know I cannot) to 5 (I know I can). Using the same response options, self-efficacy to make dietary change was measured with questions based upon Sallis et al.’s *Self-Efficacy for Eating Habits Scale*. Items included “How confident are you that you can…” a) Go a whole day without drinking any soda or other sweetened beverage?; b) Avoid soda or other sugar sweetened beverages when you go out to eat?; c) Avoid soda or other sugar sweetened beverages when they are available at the vending machine?; and d) Avoid soda or other sugar sweetened beverages when there is no one watching? This same format was used to assess self-efficacy for changing television viewing habits by asking questions such as “How confident are you that you can…” a) Go a whole day without watching any television? and b) Find something to do other than watching television?

*Social Support:* Social support was measured post-intervention with the SMS group only. After a thorough search of the literature, we were unable to find a sufficient existing measure to assess support provided by an unrelated source (non-friend or –family member). Therefore, we created a measure based upon Sallis et al.’s *Social Support for Physical Activity Scale* (1987). Response options ranged from 1 (none) to 5 (very often). This twelve question scale (4 questions of each of the three behaviors) asked how often during the past month the participant felt the intervention: Provided helpful reminders to (exercise/avoid...
soda/avoid television); Encouraged the participant to (exercise/avoid soda/avoid television); Rewarded/commended the participant for their improvements related to (exercise/soda consumption/television); Criticized/made fun of the participant for not making improvements related to their (exercise/soda consumption/television viewing). Twenty-three additional questions measuring participants’ perceptions of advice based on work by MacGeorge et al., were assessed with a 5-point scale from 1 (strongly disagree) to 5 (strongly agree) (MacGeorge et al., 2004). Sample questions include I understood the advice; I was able to make sense of the advice, the advice given was something I could do; and the advice recommended an action that was impossible for me to do.

*Elaboration Likelihood:* Elaboration likelihood was measured in the SMS group using a modified version of a scale developed by Heppner et al. to evaluate rape prevention programming (Heppner et al., 1995; Marks, 2005). Heppner’s scale contains 12 questions measuring motivation, ability, and favorable thoughts. Response options followed a 4-point Likert scale (1 = not at all to 4 = a lot) for all questions except the last, in which case the 4-point scale was as follows: 1 = poor to 4 = excellent.

**Behaviors:** Participants provided information on the three behaviors of interest in a variety of ways. Participants in both groups answered questions on the pre- and post-intervention surveys regarding their average daily minutes of PA, minutes of screen time, and number of SSB consumed per day. We realized after recruitment had begun that the question to assess screen time on our pre-intervention survey did not accurately assess all screen time (including computer, video games, and TV). Thus, we changed the question for the post intervention survey.
Participants in the SMS condition provided answers to three questions via daily text messages sent to the data center: 1) What was the number on your pedometer at bed time?; 2) How many hours did you spend watching TV today?; and 3) How many SSB did you drink today? Participants in both groups received a phone call on five random days throughout the study, asking them to provide answers to these same three questions about the previous day (i.e. How many SSB did you drink yesterday?).

**Intervention Acceptability:** Participants in the SMS group were asked a series of questions to assess the perceived acceptability and ease of use of the intervention components. All question responses were based on a 0-10 scale.

**Process measures:** We also assessed participation in and satisfaction with the intervention (e.g., exposure and reactions to the introductory session, text interactions, and other aspects of the project).

**Data Analysis**

Demographic, health, behavioral, psychosocial, and anthropometric factors were assessed at baseline to compare study groups. T-tests were used to assess continuous variables and chi square tests were conducted to assess categorical variables. Demographics are displayed in Table 6.1. No significant differences were found between the two groups.

Drop outs (n=14) were compared to study completers (n=163) on sociodemographic characteristics, baseline health behaviors, and selected cognitive and psychosocial measures using independent-samples t-tests. There were no significant differences found between
completers and dropouts related to the 3 behaviors of interest (PA, SSB, Screen time), race, marital status, or employment at baseline. There was, however, a significant difference in education level and BMI at baseline. Those who dropped out of the study had significantly less education and had significantly higher BMIs (30.0 ± 5.1 vs. 26.3 ± 6.5, P=.02, equal variances not assumed) than those who chose to complete the study. Final analyses were conducted using intention-to-treat analysis, bringing baseline values forward for participants who did not complete the study.

Hierarchical Linear Modeling (HLM) was used to assess the effect of the intervention on the three behavioral outcomes (Screen Time, Steps, SSB). HLM, originally developed within the educational research domain, allows for the examination of relationships between predictors at two or more levels and an outcome at a single level, as well as the assessment of within-subject and between-subject effects (Bryk & Raudenbush, 1992; Burnstein, 1980). Most significant in this study, HLM allows for variation in time and number of observations. The five random phone calls throughout the study month provide the multiple data points for each of the three outcome variables for each participant. We ran the HLM analysis 3 times, once for each outcome variable (SCREENTIME, STEPS, SSB). At Level 1, the outcome variable was viewed as varying as a function of individual change across time (TIME) and random error. At Level 2, group membership (Control=0, SMS=1) served as the predictor variable. Random error (ε) will serve as the final component of this model. The within-subject (Level 1) model \[1\] is defined as:

\[ f(Y_{it}) = \beta_0i + \beta_1tT_{it} + \varepsilon_{it} \]  

\[1\]
where $Y_{it}$ is the outcome for the $i^{th}$ person on occasion $t$, $T_{it}$ is the “age” of individual $i$ at time $t$, the $\beta$s are the individual level specific effects, $\beta_{0i}$ is the intercept, and $\epsilon_{it}$ is the residual error.

For the Level 2 model [2], the $\beta$ parameters from the Level 1 model become the outcome variables. This between-subjects model is defined as:

$$B_{0i} = \gamma_{00} + \gamma_{01}X_{it} + U_{0t}$$  \[2\]

with the $\gamma_{00}, \gamma_{10}, \ldots, \gamma_{p0}$ parameters (fixed effects) represent the average effect of variable $X$ for all individuals, and $U_{0t}$ represents random error.

By substitution, our final fixed effect random intercept model [3] looks like:

$$f(Y_{it}) = \gamma_{00} + \gamma_{01}X_{zt} + \beta_{10}T_{zit} + U_{0t} + \epsilon_{it}$$  \[3\]

ANOVA was used to determine the intervention effect on secondary outcome variables (self-efficacy, self-directedness, and acceptability) between the SMS intervention group and control participants. Social support was assessed for those in the SMS group only. Elaboration Likelihood was assessed among those in the SMS group using factor analysis. All analyses were prepared using SPSS Version 14 for Windows ("SPSS for windows", 2005).

VI. D. Results
One hundred seventy-eight young women between the ages of 18 and 30 were recruited for this study between April and October 2007. Of these, 163 completed the study. One participant was immediately excluded upon the recognition that she was under 18 years of age, and therefore did not meet the criteria for study participation. The mean age of participants was 24 years.

**Weight/BMI:** All changes in weight greater than 16 pounds (n=5) were excluded from this analysis. While general recommendations for weight loss are to lose no more than one to two pounds per week, which translates to a maximum weight change of eight pounds over the course of the study, we elected to set the cut-off for unreasonable weight loss at twice that amount. Self-reported weights, as these were, often lack reliability and as such, we attributed these large weight changes as being an artifact of this. There was no significant difference in weight or BMI between the two groups at follow up (see Table 6.2).

**Psychosocial measures:**

*Self-directedness:* ANOVA was conducted to evaluate the effects of the SMS intervention on self-directedness using a reduced, 5-question scale based on Cloninger’s Temperament and Character Inventory (Cloninger et al., 1994). The ANOVA indicated no significant effect for group, time or interaction between group and time.

*Self-efficacy:* Self-efficacy questions were broken down by behavior: a) exercise (12 questions); b) SSB (4 questions); and c) TV (2 questions). No significant change or difference between groups was found for any of the three behaviors.

*Social Support:* Participants in the SMS group completed questions related to social support and perceptions of the advice given in the texts following the intervention. Social
support messages were broken down by behavior (Exercise, TV, SSB). In general, participants felt that the advice was supportive and positive more often than not.

*Elaboration Likelihood:* Internal consistency reliability for the Elaboration Likelihood scale was calculated ($\alpha=0.85$), which was comparable to two previous studies among adolescents ($\alpha=0.85$) and university students ($\alpha=0.83$) (Heppner et al., 1995; Marks, 2005). Exploratory factor analysis revealed a three factor solution for this sample; Heppner et al reported a one factor solution for the scale (Heppner et al., 1995). Seven factors loaded on the first item, five items loaded on the second, and four loaded on the third (see Table 6.3).

Elaboration Likelihood was further assessed to determine if a composite score (comprised of all general and behavior specific ELM questions except removed items) or particular components of ELM correlated with behavior change among SMS participants (see Table 6.4). Change in SSB intake was not correlated significantly with the composite ELM-SSB score ($r= -.088, p=.453$). Change in PA was not correlated with the Composite ELM-PA score either ($r=.216, p .063$) though PA change did correlate significantly with the question “How difficult to understand was the information in the text messages?” ($r=.239, p=.038$).

Because we were unable to compute a change score for screen time, we assessed the correlation between the Post-intervention Total Screen Time (TV time + non-TV screen time) and ELM. The composite ELM-Screen Time score was not significantly correlated with Screen Time ($r= -.062, p=.597$). The question, “How difficult to understand was the information in the text messages?” was significantly correlated ($r=.327, p=.004$).

*Behaviors:* A one way analysis of variance was conducted to evaluate the relation from pre- to post-intervention among control and SMS participants between the change in physical activity and SSB (see Table 6.2). While PA did increase and SSB consumption
decreased slightly more among SMS than among control participants, these improvements were not statistically significant.

We were unable to directly compute differences in screen time between pre- and post-intervention due to the change in the way the question was asked from pre- to post-intervention, therefore we were only able to compare the two groups at the two time points, not the change over time. Comparison between groups revealed no significant differences at either time point.

**Self-monitoring:** Analysis for self-monitoring of the 3 behaviors was based on the 5 phone calls participants received over the course of the study. HLM analysis of the three behaviors revealed that over the course of the study, both groups experienced a decrease in the number of SSB consumed per day although there was no significant difference between groups. Due to mechanical and/or participant error, participants reported several inaccurate pedometer readings, with counts as low as 76 steps and as high as 73,000 steps per day. Research by Tudor-Locke and Bassett suggests that a step count of <5,000 steps per day qualifies as ‘sedentary’ and >12,500 steps per day as ‘highly active’ (Tudor-Locke & Bassett Jr, 2004). We decided to set our lower boundary at 500 steps per day (excluding 14 data points) as some of participants did verify that they extremely sedentary on particular days, and our upper boundary at 30,000 steps per day (excluding 6 data points) as some participants were participating in sports that required extreme levels of activity. No significant differences were found in physical activity between the control and SMS groups. Further, the number of steps per day was not significantly different for phone call #1 (Day 5) than for phone call #5 (Day 30). On the other hand, participants in both groups experienced a
significant decrease in the amount of screen time over the course of the study with participants in the SMS group reporting a greater decrease than those in the control group.

**Intervention acceptability and process measures:** The particular behaviors of interest, as well as the goal for each of these behaviors, were pre-determined before the study began for several reasons. First and foremost, as described earlier, there is evidence that each of the behaviors is associated with weight (i.e., weight loss and weight management). Secondly, we were adopting a program that had already been tested with a different population and had feedback messages already programmed. Our goal was to assess the acceptability of using text messaging in the young adult, female population. As the behaviors we studied are common among people of all ages, we felt it appropriate to apply this program. Young adult participants felt that the topic of physical activity was quite important to them personally whereas the topics of SSB consumption and TV time were only of moderate importance (see Table 6.5).

Overall, participants in the SMS group felt that it was easy to send and receive the text messages (see Table 6.6). In spite of the ease of the program, participants were only moderately likely to recommend it to a friend or to participate in a similar program again. A few participants expressed that “…a more criticizing message would have encouraged [them] more…” than the positive messages they received. Still others felt that the messages were too “generic” and “predictable”. Also, several participants commented that they would have liked to have selected their own behavioral goals. For example, one participant “…did Pilates as exercise and this isn't reflected in steps” while another felt it would have been helpful if she could have chosen “…the food item monitored.” Still, participants were more positive than negative towards the SMS program overall.
Participants in both groups found the initial meeting and the handouts provided to be helpful, although those in the SMS group were far more likely to find them very helpful (Handout: 59% vs. 29%; Meeting: 62% vs. 39%). This is most likely attributable to the fact that the SMS procedures were more involved and required more instruction in general.

VI. E. Discussion

This study attempted to assess the acceptability and efficacy of using text messaging as a means to improve health behaviors related to weight loss/maintenance among young women. To this point, four other studies using text messaging in relation to weight loss have been published, one of which is the precursor to the current study (Gerber, B.S., 2009; Joo & Kim, 2007; Patrick et al., 2009; Shapiro et al., 2008).

We hypothesized that SMS participants would improve in the three behaviors being addressed through the text messages. We also anticipated that participants in the SMS group would experience improvements in mediators, such as self-efficacy for making the behavior changes addressed in the messages. Significant improvements, however, were not found in this study. Qualitative evaluation post-intervention revealed that many participants did not consider the behaviors being monitored important for improving their health. The fact that participants did or did not think certain behaviors were important was evidenced by their wanting to select particular behaviors to be monitored (as well as particular goals for those behaviors). Had participants been able to select the behaviors being monitored and/or goals to strive for, as demonstrated in a study by Estabrooks et al., perhaps they would have found the messages more beneficial and perhaps we would have seen more behavior change (2005).
As a means of intervention, text messaging appears to be a generally well-accepted means of reaching young women. Most of the concerns about the text messages focused on the actual behaviors and goals being monitored, rather than the use of texting itself. Again, had participants been able to select the behaviors they chose to monitor and set their own goals, an even more positive perception of the study may have been found.

There were several strengths of the present study, including the randomized design and an intention-to-treat analysis, which allows for examination of all participants regardless of study compliance or withdrawal. Further, the results of this study are applicable outside the research setting because participants were able to participate in the study with minimal face-to-face interaction.

There were also several limitations to this study. Self-reported weights are known to be less reliable than directly measured weights (Gorber et al., 2007). In this study, several participants reported weight changes between pre- and post-intervention that were greater than 16 lbs (n=5; range: -50 to +19 lbs), amounts that are unrealistic given the time frame of the study. Whereas we assume that the rest of the participants’ responses are accurate, we are aware that the potential for self-report bias exists among them as well.

Participants were only able to account for physical activity in terms of steps. There are methods to account for activity other than walking (i.e., swimming, Pilates) so that these activities can count toward PA for the day, but we were unaware of other devices to monitor physical activity that would be feasible at the time of intervention ("Activity conversion chart", 2006). Further, the measurement of steps was somewhat unreliable due to the quality of the pedometers used in this study. Funds were limited, so while we purchased the best pedometers possible, we were not able to use the highest quality devices. Several participants
had difficulty with the pedometers; some participants experienced either a gross overestimation or underestimation of the number of steps taken. We tried to work with participants to adjust the placement of the pedometer on the waistband so as to have the most accurate reading reflected, but corrections weren’t always able to be made.

Aside from the pedometer-related step-count issues, step counts could also have been impacted by the nature of college schedules as well as the time of year. Students’ schedules tend to be flexible, providing them with more opportunities to be active regardless of the encouragement or support they receive. Also, students have to walk from class to class each day, increasing their required daily activity. Further, this study was primarily conducted in the late spring, summer and early fall. During this time, the days are longer and the weather is pleasant, possibly encouraging people in both study groups to spend more time being active outside than perhaps they might during the cooler, winter months.

Also, although text messaging is convenient and cheap, the amount of information that can be included in a message and the degree of tailoring that can be provided is limited. Short messages may be perceived as less interesting and more generic than longer tailored feedback. Further, the text messages were based on three simple behaviors, and were not tailored based on psychosocial factors or participants’ selected goals. These factors may reflect limitations of the present study, but also of the technology itself, at least as it was used in this research. More recent advances in cell phone technology, including bigger screens and newer messaging applications, may render this medium more effective.

Finally, participants in both the SMS group and the control group received the five phone calls over the course of the study. Just knowing that they would be contacted and receiving
reminders about the three behaviors throughout the month may have prompted those in the control group to make positive changes as well.

This preliminary study provides a starting point for developing behavior change interventions for young women. This study reinforces the importance of personal-value of behaviors for improvement. In addition, it shows that text messaging can be a feasible means of reaching young women with messages about behavioral changes. The next step is to determine those behaviors in particular that young women deem important and then develop a databank of messages to apply to a text messaging intervention so that we can reach this population in a more effective manner.
Table VI.1: Baseline demographic data for control and SMS group participants

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<th>Control Group</th>
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<td>n</td>
<td>88</td>
<td>89</td>
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<tr>
<td>Age (years) (mean ± SD)</td>
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<td>24.0 ± 3.4</td>
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<tr>
<td>Race, ethnicity [ N (%) ]</td>
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<td></td>
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<tr>
<td>Black</td>
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<td>20 (22.5)</td>
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<td>White</td>
<td>54 (61.4)</td>
<td>55 (61.8)</td>
</tr>
<tr>
<td>Other</td>
<td>12 (13.6)</td>
<td>14 (15.7)</td>
</tr>
<tr>
<td>Marital status [ N (%) ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>73 (83.0)</td>
<td>66 (74.2)</td>
</tr>
<tr>
<td>Married</td>
<td>10 (11.4)</td>
<td>19 (21.3)</td>
</tr>
<tr>
<td>Separated/divorced</td>
<td>5 (5.7)</td>
<td>4 (4.5)</td>
</tr>
<tr>
<td>Education [ N (%) ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school, partial or graduate</td>
<td>11 (12.5)</td>
<td>6 (6.7)</td>
</tr>
<tr>
<td>College, partial or graduate</td>
<td>64 (72.7)</td>
<td>72 (80.9)</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>13 (14.8)</td>
<td>11 (12.4)</td>
</tr>
<tr>
<td>Occupation [ N (%) ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>3 (3.4)</td>
<td>1 (1.1)</td>
</tr>
<tr>
<td>Employed part-time</td>
<td>16 (18.2)</td>
<td>12 (13.5)</td>
</tr>
<tr>
<td>Employed full-time</td>
<td>28 (31.8)</td>
<td>23 (25.8)</td>
</tr>
<tr>
<td>Student</td>
<td>23 (26.1)</td>
<td>39 (43.8)</td>
</tr>
<tr>
<td>Working Student</td>
<td>18 (20.5)</td>
<td>14 (15.7)</td>
</tr>
</tbody>
</table>
Table VI.2: Differences between groups in weight and BMI changes, self-directedness, physical activity, and knowledge during study period

<table>
<thead>
<tr>
<th></th>
<th>Intervention group (n=87)</th>
<th>Control group (n=88)</th>
<th>P-value for Dif. Between Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>4-weeks</td>
<td>Dif.</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>72.5 ±</td>
<td>72.0 ±</td>
<td>-0.5 ±</td>
</tr>
<tr>
<td></td>
<td>15.6</td>
<td>15.4</td>
<td>2.5</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>26.1 ±</td>
<td>25.9 ±</td>
<td>-0.2 ±</td>
</tr>
<tr>
<td></td>
<td>5.2</td>
<td>5.1</td>
<td>0.9</td>
</tr>
<tr>
<td>SSB (bev/d)</td>
<td>1.5 ± 1.8</td>
<td>1.0 ± 1.4</td>
<td>-0.6 ±</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Daily PA (min)</td>
<td>77.0 ± 87.2</td>
<td>96.4 ± 94.5</td>
<td>18.7 ± 99.7</td>
</tr>
<tr>
<td>Screen Time Pre (min)</td>
<td>108.4 ± 85.9</td>
<td>117.2 ± 107.2</td>
<td></td>
</tr>
<tr>
<td>Post non-TV screen time (min)</td>
<td>93.2 ± 119.1</td>
<td>83.9 ± 78.7</td>
<td></td>
</tr>
<tr>
<td>Post TV time</td>
<td>75.1 ±</td>
<td>90.9 ±</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All screen time (min)</td>
<td>Post All screen time (min)</td>
<td>Self-directed-ness</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------</td>
<td>---------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>70.7&lt;sup&gt;c&lt;/sup&gt;</td>
<td>84.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>169.1 ± 154.8</td>
</tr>
<tr>
<td>Exer&lt;sup&gt;b&lt;/sup&gt;</td>
<td>43.9 ± 7.2</td>
<td>43.9 ± 9.0</td>
<td>-0.02 ± 7.8</td>
</tr>
<tr>
<td>SSB&lt;sup&gt;f&lt;/sup&gt;</td>
<td>18.8 ± 2.7</td>
<td>18.5 ± 3.9</td>
<td>-0.27 ± 3.7</td>
</tr>
<tr>
<td>TV&lt;sup&gt;k&lt;/sup&gt;</td>
<td>9.2 ± 1.5</td>
<td>9.1 ± 2.0</td>
<td>-0.1 ± 2.0</td>
</tr>
</tbody>
</table>

All data is mean ± SD
<sup>a</sup>n=84; <sup>b</sup>n=85; <sup>c</sup>n=79; <sup>d</sup>n=89; <sup>e</sup>n=86; <sup>f</sup>n=74; <sup>g</sup>n=82; <sup>h</sup>possible score range 9-25; <sup>i</sup>possible score range 12-60, n=177; <sup>j</sup>possible score range 4-20, n=177; <sup>k</sup>possible score range 2-10, n=177
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Dimension</th>
<th>Factor loadings (Comp 1)</th>
<th>Factor loadings (Comp 2)</th>
<th>Factor loadings (Comp 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent would you say the text messages made good points about television time?</td>
<td>Favorable thoughts</td>
<td>0.88</td>
<td>0.16</td>
<td>0.10</td>
</tr>
<tr>
<td>To what extent would you say the text messages made good points about soda consumption?</td>
<td>Favorable thoughts</td>
<td>0.86</td>
<td>0.16</td>
<td>0.11</td>
</tr>
<tr>
<td>To what extent would you say the text messages made good points about physical activity?</td>
<td>Favorable thoughts</td>
<td>0.77</td>
<td>0.28</td>
<td>0.15</td>
</tr>
<tr>
<td>How would you rate the quality of the information in the text messages? (D)**</td>
<td>Favorable thoughts</td>
<td>0.69</td>
<td>0.53</td>
<td>0.10</td>
</tr>
<tr>
<td>How important is the topic of soda consumption to you personally?</td>
<td>Motiv.</td>
<td>0.66</td>
<td>0.10</td>
<td>-0.26</td>
</tr>
<tr>
<td>How important is the topic of television time to you personally?</td>
<td>Motiv.</td>
<td>0.59</td>
<td>0.04</td>
<td>-0.21</td>
</tr>
<tr>
<td>In your opinion, how logical and accurate was the information presented?</td>
<td>Favorable thoughts</td>
<td>0.57</td>
<td>0.38</td>
<td>0.20</td>
</tr>
<tr>
<td>How much would you say the information held your attention?</td>
<td>Motiv.</td>
<td>0.13</td>
<td>0.89</td>
<td>-0.06</td>
</tr>
<tr>
<td>How motivated were you by the text messages?</td>
<td>Motiv.</td>
<td>0.24</td>
<td>0.86</td>
<td>-0.10</td>
</tr>
<tr>
<td>How much effort would you say you gave to evaluating the information from the text messages?</td>
<td>Motiv.</td>
<td>0.13</td>
<td>0.82</td>
<td>-0.19</td>
</tr>
<tr>
<td>To what extent did you try hard to think about the information from the text messages? (R)*</td>
<td>Motiv.</td>
<td>0.18</td>
<td>0.79</td>
<td>-0.19</td>
</tr>
<tr>
<td>To what extent did you feel distracted from thinking about soda consumption when reading the text messages? (R)*</td>
<td>Motiv.</td>
<td>-0.11</td>
<td>-0.09</td>
<td>0.88</td>
</tr>
<tr>
<td>To what extent did you feel distracted from thinking about television time when reading the text messages? (R)*</td>
<td>Motiv.</td>
<td>-0.07</td>
<td>-0.15</td>
<td>0.87</td>
</tr>
<tr>
<td>Item</td>
<td>Motiv.</td>
<td>Ability</td>
<td>(R)</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------</td>
<td>---------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>To what extent did you feel distracted from thinking about physical activity when reading the text messages?</td>
<td></td>
<td></td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>How difficult to understand was the information in the text messages? (R)*</td>
<td></td>
<td></td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td>Items removed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How important is the topic of physical activity to you personally?</td>
<td></td>
<td></td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>To what extent did you feel you had enough time to think about the information given in the text messages?</td>
<td></td>
<td></td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>To what extent did you find the information from the text messages well organized and easy to follow?</td>
<td></td>
<td></td>
<td>0.49</td>
<td></td>
</tr>
</tbody>
</table>

*(R) = Reverse Scored  
**(D) = Different Response Category (poor = 1 to excellent = 4)
Table VI.4: Correlation of Elaboration Likelihood Scale with behavioral outcomes

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Person Correlation Coefficient (r)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB Δ – SSB ELM composite score</td>
<td>-0.09</td>
<td>0.45</td>
</tr>
<tr>
<td>PA Δ – PA ELM composite score</td>
<td>0.22</td>
<td>0.06</td>
</tr>
<tr>
<td>Post Total Screen Time – Screen Time ELM composite score</td>
<td>-0.01</td>
<td>0.95</td>
</tr>
</tbody>
</table>
Table VI.5: Behavior Importance among SMS group participants

<table>
<thead>
<tr>
<th>Likert-Scale Item</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
</tr>
<tr>
<td>(n = 78)</td>
<td></td>
</tr>
</tbody>
</table>

1. How important is the topic of physical activity to you personally? 3.4 (0.73)  
2.0 – 4.0

2. How important is the topic of soda consumption to you personally? 2.67 (1.04)  
1.0 – 4.0

3. How important is the topic of television time to you personally? 2.49 (0.92)  
1.0 – 4.0

Anchors for items included: 1 = not at all; 4 = a lot.
Table VI.6: Intervention Acceptability

<table>
<thead>
<tr>
<th>How much did the SMS monitoring meet your expectations?</th>
<th>Mean ± SD (range) n=79</th>
<th>Strongly Positive</th>
<th>Positive</th>
<th>Positive overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>How likely would you be to recommend the SMS monitoring to a friend?</td>
<td>5.4 ± 3.1 (0-10)</td>
<td>34.2%</td>
<td>24.1%</td>
<td>58.3%</td>
</tr>
<tr>
<td>How likely would you be to participate in the SMS monitoring again if necessary?</td>
<td>6.2 ± 3.3 (0-10)</td>
<td>43.1%</td>
<td>20.3%</td>
<td>63.4%</td>
</tr>
<tr>
<td>How easy was it for you to send the SMS message?*</td>
<td>8.3 ± 2.1 (2-10)</td>
<td>74.4%</td>
<td>10.2%</td>
<td>84.6%</td>
</tr>
<tr>
<td>How easy was it for you to receive the SMS message?*</td>
<td>8.7 ± 1.8 (4-10)</td>
<td>79.5%</td>
<td>10.2%</td>
<td>89.7%</td>
</tr>
<tr>
<td>How easy was it to understand the SMS instructions?*</td>
<td>8.9 ± 1.9 (1-10)</td>
<td>86.0%</td>
<td>1.3%</td>
<td>87.3%</td>
</tr>
</tbody>
</table>

Responses of 8, 9, or 10 were categorized to mean that the participant felt “strongly positive”; responses of 6 or 7 were categorized to mean that the participant felt “positively”; a response of 5 was regarded as neutral; responses of 3 or 4 were categorized to mean that the participant felt “negatively”; and responses of 0, 1, or 2 were categorized to mean that the participant felt “strongly negative”.

*n=78
VII. CHAPTER VII
SUMMARY AND RECOMMENDATIONS

VII.A. Summary of findings

The research conducted as part of this dissertation provides insight into the health concerns and intervention interests of women, particularly those under 30 years of age. We drew upon both qualitative and quantitative methods to assess these concerns and interests. This research contributes to our understanding of specific age groups of women and intervention mediums by: (1) exploring the health and weight related issues of concern and intervention interest among primarily older women; (2) exploring the health and weight related issues of interest and concern, and obstacles to participating in programs that address these issues among primarily younger women; and (3) assessing the acceptability of using new technology to provide monitoring and support for behavior change among younger women.

The first aim of this research, as discussed in Chapter four, was to explore the health and weight interests and concerns of women living in Sampson and Duplin Counties in North Carolina. Eight focus groups were conducted and revealed that women’s concerns went well beyond their health and included economic issues, such as job loss brought about by living in a rural, economically depressed region, and education. In fact, though these were not explicitly health-related issues, they indirectly impacted participants’ health. The women were looking for a supportive environment in which to pursue both life and healthy lifestyle
goals. Not only could this environment open them up to opportunities that they might not otherwise have, but it could also encourage success toward meeting individual goals. The ethnically homogenous groups allowed us to determine what, if any, differences exist among ethnicities. Primarily, we found that age played more of a role than race or ethnicity. Younger women tended to have more logistical obstacles to participating in program groups than older women. While this primarily manifested in the Hispanic groups, it is important to note that the women in these groups tended to be younger than women in the other groups. This research also made it more evident that multiple components play a role in health; weight should not be the only focus. Women are as complex as the issue of healthful living, so addressing the problem at multiple levels seems both important and welcomed. Also, as previously recognized by women participating in projects in this region, there again seems to be the recognition that weight and depression are tied. The interplay of these two issues needs to be further untangled. Another facet brought out in these groups is that participants valued not only supporting each other, but learning from and teaching each other as well. This suggests the promise of sustainability for the program and supports the community-participatory methods already being implemented in this project.

For the second aim of this research, presented in chapter five, four additional focus groups were conducted with women living in Sampson and Duplin Counties, although this time all of the women were between the ages of 18 and 33 years old. Questions posed to these women were similar to those asked of the women in Aim one. We set out to, again, determine the health interests and needs of the women, but primarily wanted to assess if these factors were similar or different than the older participants. We also hoped to determine how the challenges and obstacles to participating matched up to those of the primarily older
women who participated in the earlier groups. Through this study, we determined that young women are concerned about their health, and are often concerned about things similar to the older women living in this community. And, just as was found in the Hispanic groups conducted in the earlier round of discussions, additional barriers of having young families and less financial and educational stability often get in the way of participating in, and take precedence over their own, health promoting activities. This study provides evidence that ways to support and promote health among young women need to be introduced ‘closer to home’.

In the final aim of this research, discussed in chapter six, we set out to test the feasibility and acceptability of using text messaging to promote positive health behavior change among young women. We hypothesized that text messaging would be associated with improved health behaviors, namely an increase in the number of steps taken daily, a decrease in the number of sugar sweetened beverages consumed, and a decrease in screen time minutes. Self-reported data on pre-/post-intervention surveys revealed no significant changes in physical activity or SSB consumption, but responses trended toward those in the text messaging group making slightly more improvements than those in the control group. Results of five random phone calls throughout the study revealed no significant changes in physical activity or SSB consumption, although both groups decreased their intake of SSB slightly over the course of the study. Further, both groups experienced a significant decrease in screen time over the course of the study. This study was the first to test text messaging as a means to promoting and supporting positive behavior change specifically among young women. We learned not only about the acceptability of this intervention, but also about ways
that we can make this type of intervention more effective (and therefore, hopefully, more successful) among women in this age group.

The results of this research have both immediate and future implications. As the HOPE Works project is currently being implemented, information gleaned from the younger women’s focus groups can be used to encourage younger women to participate. Remaining questions about the use of text messaging as a means of intervening with younger women to improve health behaviors bring up several possibilities for future research.

VII.B. Recommendations

Several recommendations can be made based on this research:

(1) When planning research involving women, where the goal is to appeal to all potential female participants, in addition to race and ethnicity, age/stage in the life-cycle needs to be considered and addressed as well.

(2) When conducting a program that promotes physical activity among young women, multiple forms of physical activity need be accounted for as activity interest and participation varies

(3) Personalization and relevance of the content for text messages for young women need to be further assessed so that more acceptable intervention can be attempted/implemented.

VII.C. Future research

This dissertation suggests several possible avenues for future research:
(1) Adapting the current HOPE Works intervention to address the logistical issues discussed among the young women in our focus groups may help to deal with the lack of younger women participating in the project currently and encourage them to participate. Strategies may include holding groups at the workplace/school, during work/school hours to reduce the number of hours spent away from home, and providing childcare as part of the group so that younger mothers may be more likely to participate. Additionally, program content should be adapted to address the interests/needs of young women. This would include incorporating stress management strategies into the curriculum.

(2) In our focus groups with young women, they stated that they would be interested in the use of text messaging as a means of support for improving health behaviors. Unfortunately, for logistical reasons, we were unable to conduct the text messaging intervention strictly in the two eastern North Carolina counties as we had hoped and originally intended. When recruitment began in May 2007, classes at the community colleges had just let out for the term. Relatively few students attend summer classes at these schools which significantly impacted our ability to reach large numbers of young women. In spite of multiple attempts, employing a variety of methods to recruit young women (including posting fliers and setting up recruitment tables at the community colleges, local libraries, and the Coharie Tribal Center, announcements in the few classes that were being held during the summer months, as well as ads in the local newspapers), we were only able to recruit approximately 15-20 young women from these communities before deciding that that we were not making the best use of our time and resources for conducting this pilot study. In order to assess text messaging as a means of reaching
young, rural women, we suggest replicating this study in the HOPE Works communities.
In doing so, stronger recruitment efforts will need to be used, including making sure that
recruitment occurs during the academic year, and even more cooperation with the
community colleges and local health and community facilities will need to be sought.

(3) In order to better assess the specific weight management behaviors that young women
may be interested in monitoring and receiving support via text messages on, we need to
take a step back. Focus group discussions should first be conducted to decipher the
specific behaviors that young women would be interested in. Upon completion of these
groups, messages would be developed and tested, again using qualitative methods. From
here, an intervention similar to the text messaging intervention conducted in this
dissertation would be carried out.

(4) Another possible avenue for research could assess the effectiveness and acceptability of
expert vs. self-selected behavioral target. This would assist us in determining the degree
to which personal relevance of the goal influences weight loss success. Using the
messages created and tested as described in recommendation (2), another short, month-
long pilot study conducted with two groups (those who select their own behaviors and
goals vs. those monitoring goals/striving for goals selected by an expert) would provide
insight into how behavioral goals should be selected.

(5) Upon completion of recommendations (2) and (3), a longer study should be conducted; a
minimum-four month intervention assessing the use of daily vs. weekly text messages
vs. control would provide insight into a) the acceptability of this mode of monitoring and
support; b) the effectiveness of the regular monitoring and support in weight loss; and c)
acceptable frequency of support and monitoring. Additionally, the phone calls
throughout the duration of the study should be eliminated in order to reduce the potential intervention effects that regular contact with control group participants might produce.

This research provides insight into the weight-related health concerns of women and tests an innovative method for providing support for improving behaviors. The particular focus on young women offers some insight into the kinds of topics and techniques that might be welcomed at an early stage of life, potentially helping to stave off some of the health problems they may otherwise encounter later in life. Results of these studies open the door for several further questions and areas of research. Future directions will provide an even better view into how to make a lasting impact.
REFERENCES


