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Use of Formative Research and Social Network Theory to Develop a Group Walking Intervention: *Sumter County on the Move!*

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Abstract

Although social support is a frequently cited enabler of physical activity, few studies have examined how to harness social support in interventions. This paper describes community-based formative research to design a walking program for mobilizing naturally occurring social networks to support increases in walking behavior. Focus group methods were used to engage community members in discussions about desired walking program features. The research was conducted with underserved communities in Sumter County, South Carolina. The majority of focus group participants were women (76%) and African American (92%). Several important themes emerged from the focus group results regarding attitudes toward walking, facilitators of and barriers to walking, ideal walking program characteristics, and strategies for encouraging community members to walk. Most noteably, the role of existing social networks as a supportive influence on physical activity was a recurring theme in our formative research and a gap in the existing evidence base. The resulting walking program focused on strategies for mobilizing, supporting and reinforcing existing social networks as mechanisms for increasing walking. Our approach to linking theory, empirical evidence and community-based formative research for the development of a walking intervention offers an example for practitioners developing intervention strategies for a wide range of behaviors.

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Keywords

Physical activity; walking; health behavior; social networks; social support; self-efficacy; intervention

INTRODUCTION

Less than half of adults in the U.S. report engaging in recommended levels of physical activity (PA) (U.S. Department of Health and Human Services, Centers for Disaese Control and Prevention, 2014). Social support for physical activity within social networks is one of the most consistently reported enablers of PA (Sallis & Owen, 1999; Trost, Owen, Bauman, Sallis, & Brown, 2002), yet there has been limited intervention research to directly test such mechanisms. This paper describes how community-based formative research informed the design of a physical activity intervention aimed at mobilizing social networks to support increases in walking behavior.

The health benefits of PA for preventing obesity and reducing the risk of a wide range of health problems are well-established (Troiano et al., 2008; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2008). Among the various forms of PA, walking ranks among the most popular, convenient, and sustainable method of engaging in leisure-time PA (Ainsworth et al., 2000). Regardless of age, fitness level, or knowledge, most individuals can engage in walking without face-to-face supervision, special equipment, or special physician clearance. Moreover, when performed with sufficient frequency and duration, walking at a moderate pace of five kilometers per hour (three miles per hour) is of adequate intensity to deliver health benefits (Ainsworth et al., 2000).

CORRELATES OF WALKING BEHAVIOR

Previous research on mechanisms for promoting health behaviors reveals a tension between approaches that target individual behavior change and those that focus on community-level change. The disconnect between public health recommendations for U.S. adults regarding health behaviors such as walking and observed rates of walking behavior is attributed to variations in health beliefs (Kontos, Emmons, Puleo, & Viswanath, 2011), social and cultural norms (Caperchione, Mummery, & Duncan, 2011; Castro, Pruitt, Buman, & King, 2011; Leahey et al., 2010), social networks (Beenackers, Kamphuis, Mackenbach, Burdorf, & Van Lenthe, 2013; Cavallo et al., 2014; Jackson, Steptoe, & Wardle, 2015; Janssen, Dugan, Karavolos, Lynch, & Powell, 2014; Quist, Christensen, Carneiro, Hansen, & Bjorner, 2014), and community environments (Boone-Heinonen et al., 2015). Despite limited evidence that walking interventions can produce sustained increases in walking behavior (Alfonzo, 2005; Williams, Matthews, Rutt, Napolitano, & Marcus, 2008), an often cited multi-faceted community study involving rural residents did not demonstrate significant changes in walking following several months of intervention, leading investigators to call for renewed attention to the role of social environments in walking (Brownson et al., 2005). The mixed outcomes of previous studies underscore the need for additional research to refine intervention approaches, particularly for some population subgroups in which rates of PA are lowest. Indeed, a review by Ogilvie et al. (Ogilvie,

Foster, & Rothnie, 2007) of 19 randomized controlled trials and 29 quasi-experimental walking studies by concluded that interventions tailored to participants' preferences and social context were most effective.

Two theoretical frameworks can inform tailoring of interventions to social environments – Social Cognitive Theory and Social Network Theory. Social Cognitive Theory (SCT) highlights the reciprocal interactions among personal factors, environment influences (physical and social), and behavior, and a wide range of behavior modification interventions have arisen from this theory (Sallis & Owen, 1999). Tenets of this theory include observational learning, goal setting to guide behavior change, self-directed behavior, and indirect effects of reinforcement on behavior. In Bandura's SCT (Bandura, 1986), self-efficacy is proposed as the most powerful determinant of behavior. In PA, self-efficacy is a person's confidence in the ability to do specific activities in specific circumstances. Indeed, across studies of determinants of PA, self-efficacy has been shown to be one of the most enduring correlates of PA (Sallis & Owen, 1999).

Social Network Theory rests on the notion that the social structure and functioning of the network may influence individual behavior and attitudes by shaping access to opportunities and constraints on behavior (Berkman & Glass, 2000; Christakis, N. A., & Fowler, 2008; Valente & Fosados, 2006). Networks are believed to operate at the behavioral level through four primary pathways: social support, social influence, social engagement and attachment, and access to resources and material goods (Berkman & Glass, 2000). Social support interventions help change behavior through building, strengthening, and maintaining social networks that provide supportive relationships for behavior change. Social support for PA from friends and family is the most consistently reported enabler of PA (Sallis & Owen, 1999; Trost et al., 2002). Several cross-sectional studies have found positive associations between having supportive family and friends or coworkers and PA, but efforts to mobilize naturally occurring social networks for increases in PA are still somewhat rare. Underscoring the promise of social network-based approaches to increasing PA, recent studies provide evidence that patterns of health behaviors "spread" or are diffused within populations through individuals' social networks (Christakis, N. A., & Fowler, 2008). These findings suggest that intervention effectiveness at the community or population level may be enhanced by mobilizing the influence of social networks on individual health behaviors.

To address gaps identified in previous research, we conducted community-based formative research aimed at identifying characteristics and features that would make a walking program appealing to residents of a central South Carolina county. This paper reports the methods and results of that formative research and describes how it informed the development of a social network-driven walking intervention.

METHODS

In light of evidence from previous studies about the importance of tailoring interventions to the social and physical environments in which they will be implemented, we used focus group methods to engage community members in discussions about walking program features.

Setting

The research was conducted with underserved communities in Sumter County, South Carolina, in which members of the research team have been involved in community-based prevention research for more than 12 years. Compared with the U.S. population, South Carolina has a higher proportion of Black/African American residents (28.0% vs. 13.1%) and a higher proportion of residents living below the federal povery level (17.0% vs. 14.3%) (U.S. Census Bureau, 2015). Also, the state's population is characterized by severe health disparities across a variety of chronic conditions, and the state ranks 38th in the country for leisure-time PA ("South Carolina | State public health statistics | America's Health Rankings," n.d.).

As a whole, Sumter County has been designated a medically underserved area (U.S. Department of Health and Human Services., 1995). Four of the five communities with whom we conducted our research have a greater than average prevalence of families living below poverty (20% or greater) (U.S. Census Bureau, 2015), and a high proportion of Black/African American residents (35%−78%) (U.S. Census Bureau, 2015). Individually and collectively, these communities have conditions that place their residents at high risk for unhealthy lifestyles and poor health. Given national trends toward increasing diversity with respect to both race/ethnicity and socioeconomic status (U.S. Census Bureau, 2015). Sumter County represents a bellwether for understanding how to protect population health in the face of growing population diversity, pervasive health disparities, and persistent economic challenges – a natural milieu with very high likelihood of generalizability to other underserved communities.

Participants

Focus group participants were recruited from each of five communities through channels used successfully by the research team in previous research with those communities. These included: flyers distributed through partnering organizations, a write-up in a monthly newspaper column, and live interviews with local radio and television news programs. To participate, individuals needed to be older than 18 years of age and willing and able to participate in a focus group. Focus groups were held at community centers located throughout the county; participants were not required to be active users of those community centers in order to participate. Our research protocol was approved by the University of South Carolina's Institutional Review Board. All participants signed informed consent forms prior to participating in focus groups.

We conducted five focus groups before achieving theoretical saturation (Morse, 2004). Although recruitment efforts were directed at both males and females, no males volunteered to participate in the five focus groups. Thus, we carried out additional recruitment efforts to elicit participants for one additional focus group exclusively for males. This males-only focus group enabled us to make comparisons with the insights gleaned from the female focus group participants and explore the role of gender differences in strategies to promote walking.

Discussion Guide

Our focus group guide (Table 1) was developed through collaboration between academic researchers and community partners. The guide addressed four areas: walking experiences; barriers and facilitators of walking behavior; attitudes toward walking intervention features; and recommendations for promoting walking.

Procedures

Six 90–120 minute sessions were held over a six-month period and co-moderated by one of two members of our research staff and a community partner. The number of participants in these sessions ranged from 6 to 15 participants, depending on participant scheduling preferences and varying no-show rates. To ensure consistency across groups, the same community partner co-moderated each group and the same focus group guide was used for each group. A moderator opened each group with a description of the purpose of the discussion and procedures for maintaining confidentiality of participant identities. Then, the moderator(s) posed open-ended questions from the focus group guide, along with probes where needed for clarification and/or to stimulate further discussion. Participants were asked to provide sociodemographic information via a brief form. Group discussions were audio-taped, then transcribed by a professional transcriptionist.

Analysis

Transcripts for each focus group were entered into NVivo© qualitative data analysis software, allowing for thematic coding -- the exploration and analysis of words or phrases that were either common or notable in the discussions. Prior to coding, the data analyst read the transcription twice. She then coded each transcript with the creation of nodes that were assigned to words and phrases. After all of the transcripts were coded, some nodes were collapsed while others stood alone or even subdivided into what are called child nodes. Nodes with more content typically indicated an emerging theme. Focus group results were reviewed with the community partner who co-moderated the focus groups and with an advisory board of community representatives, in order to identify priorities for the design of the intervention. These discussions led to intial plans related to program design, including a Walk Leader Manual, a Walk Group Member Handbook, and content for a series of education sessions. Intervention plans were then presented for feedback to a larger community group, and the feedback received was used to further develop and finalize the program’s design.

RESULTS

Table 2 displays the demographic characteristics of the 62 focus group participants. The majority of participants were women (76%) and African American (92%). Based upon our previous experience, this sample is fairly representative of participants in other public health initiatives in the community; nonetheless, these proportions highlight the challenges inherent in engaging men in such programs. Clearly, recruitment of males was more successful for the session reserved for males only; nonetheless, it is not clear whether this was due to recruitment efforts directed toward males or a preference for a gender-segregated forum for discussion. Analysis of the transcripts revealed several important themes regarding attitudes

toward walking, facilitators of and barriers to walking, ideal walking program characteristics, and strategies for encouraging community members to walk.

Attitudes Toward Walking

Walking was the most commonly form of physical activity for women; however, sporting activities and jobs that included high levels of physical activity (e.g., construction work) were mentioned more frequently in the one group that included men. Many participants noted a preference of walking with others in order to receive social support and maximize safety. Men did not view walking for exercise as a primary form of physical activity, nor were the health benefits of walking a motivating factor. However, they did express a willingness to walk with female friends and family members to provide support and safety. For example, one male participant noted, *"Kids are a great motivator for men to walk. If you involve a child and be specific about the activity, that in itself will promote a lot of men – a lot of fathers to walk."* In contrast, female participants cited the importance of increasing awareness of the health benefits of walking for exercise and the accessibility of walking for all members of the community. These results led to the intervention's focus on walking.

Facilitators of and Barriers to PA

When asked about factors that encourage physical activity and walking, in particular, participants cited social support, motivation, feeling better, relieving stress, and the satisfaction that came from the knowledge that PA is good for one's health. For example, one female participant indicated that she would recruit a friend by saying something like, *"…just come out and get in the group. You'll enjoy it. You'll look forward to doing it."* Another participant highlighted the instrumental role played by family members, such as a granddaughter who might say, *"Come on Grandma, let's walk. You know you're supposed to walk. Now come on, let's go."* Yet another participant emphasized the social benefits of walking with others – *"Quality time with my companion is another thing. And we socialize when we do it."* Several participants noted the value of being part of a group to motivate walking. For example, one female participant said, *"cause for instance I sit home and I wouldn't walk, but if somebody called me and I know I'm in a group and we walkin' today, I'll try to walk….cause you don't wanna let anybody down."*

When asked about barriers to walking, participants mentioned hot weather, lack of physical amenities such as sidewalks, concerns about convenient access to safe walking areas, and fatigue from time spent at work. For participants who lived in areas where there were not safe walking routes readily available, resources to support walking in other locations were emphasized. For example, *"Close to my house, there are no sidewalks. And I feel like I don't want to get in the car and drive somewhere and get out and walk and get back in the car….I used to walk a lot, but I lived somewhere else so it made it very simple."* Another participant, a single mother, discussed competing demands on her time as a barrier, *"my son has football practice so after work it's like I don't have no time, just runnin' to go get him. But I should drop him off and go walk, but once I get home he's hungry. Everything takes over."*

Ideal Walking Program Characteristics

Participants had very diverse views of preferred times and formats for the progam, expressing a strong sense that flexibility and convenience would be critical to program participation. Participants displayed a consensus view that the ideal walking program would include a leader who could serve as a role model and motivator. For example, one participant said, *"…you first have to get it organized and you have to have some people, some people that wille encourage, keep it going."* Additionally, such a program would provide health information, including information about nutrition, and offer opportunities for friendly competition. Participants described a program leader who would help in these areas. One expressed a desire for such a person *"to motivate us or have the knowledge, but both would be good."* Another described this role as *"It's somebody that will enhance the group to walk. We don't want nobody that is gonna be there just to be there, but do the purpose they're there for. And maybe have knowledge of calories and how fast you need to go….give ya' a little push."* Participants also recommended that the program include some opportunities for more didactic learning about health in the form of classes. These results informed our decision to design the program around walking groups with group leaders selected by group members who were then trained to motivate, support, and address barriers to walking.

Strategies for Encouraging Walking

Participants in both women-only and men-only groups recommended a mixed-gender, family-oriented program. They cited emphasized the relevance of social networks in a range of settings, including family, co-workers, neighbors, and friends from church.When asked about recommended strategies for encouraging a friend to walk, participants emphasized social support in the form of direct encouragement (e.g., "you can make it"), serving as a role model, and offering to walk with the friend. They also mentioned the value of accountability that comes with belonging to a group – for example, *"What happened to you the other day? Why didn't you come walking? And it's kind of – its sort of an accountability where if you've got that moral support from saying 'What's up? You missed two days."* In terms of information, they recommended an emphasis on the health benefits of walking and promoting the positive feelings that come from being active (e.g., more energy, breathing, stress release). They also discussed walking with members of their existing social networks as an opportunity to socialize and/or combine PA with family time. These results informed the development of the handbooks for walking group members and leaders as well as the content covered in sessions for success.

INTERVENTION DESIGN

Collectively, these results informed our intervention's focus on walking groups formed from naturally occurring social networks and the development of informational materials aimed at helping participants overcome barriers to walking. Since the role of existing social networks was a recurring theme in our formative research and a gap in the existing evidence base, we designed our walking program *Sumter County on the Move!* around strategies aimed at mobilizing, supporting and reinforcing social networks as mechanisms for increasing walking among residents of our partner communities. The intervention began with support for formation of walking teams with members drawn from existing social networks. Then,

after walking teams were formed and leaders identified by the team members, we provided leadership training for walking team leaders, informational materials about walking resources and tips for increasing physical activity, follow-up communication by staff to support the teams, and recognition of team accomplishments through work sites, community/neighborhood centers, and local media. After six months of participation in the program, participants were honored as "graduates" from the program. Program components are described below, and linkages between theoretical constructs, health promotion methods, program strategies and the previous literature are summarized in Table 3.

Walking Teams.

Residents of partner communities received messages announcing the walking program and promoting the formation of teams from within their existing social networks (e.g., friends, family, co-workers, and neighbors). Group members "registered" with the walking program and participated in a preliminary screening to ensure eligibility for the program. Then, they identified a leader to participate in training sessions and/or serve as point of contact for distribution of information/materials. Recommended team size was 4–8 members. In order to allow for variable schedules, teams were not necessarily expected to walk as a group, but they were expected to have regular contact in order to serve as motivational resources and walking partners for group members as their schedules permitted. These strategies enabled group leaders to serve as role models for their groups and to facilitate exchanges of support among walking group members (Aikaterini Kassavou, Turner, Hamborg, & French, 2014).

Leadership Training for Team Leaders.

A Walk Leader Manual served as the basis for leadership training for team leaders. Topics included walking resources in the community, strategies for staying motivated and keeping team members motivated, tips for overcoming common barriers, and health and safety information. Orientation sessions for new team leaders were offered on a rolling basis. These sessions provided leaders with an introduction to the program as well as tips for facilitating support among walking group members.

Sessions for Success.

Brief informational and skill-building workshops covered a range of topics that included orientation for new team leaders as well as specific strategies such as planning for success, mobilizing friends and family for support, and tips for safe walking in hot weather. Walking leaders were strongly encouraged to attend these sessions, and they were open to all program participants. These sessions were offered on a rolling basis approximately twice per month, with care to schedule all topics 1–2 times every six months, to ensure that it was possible for each walking group to gain exposure to the full range of topics during their six-month involvement in the program.

Informational Materials.

Focus group participants' recommendations regarding ways to provide concrete information about walking resources in the community were consistent with previous evidence that interpersonal sources can serve as important vehicles for sharing of health information

(Kontos et al., 2011). All participants received a Walk Member Handbook with community trail maps and other information sheets about issues of interest. Team leaders received the Walk Leader Manual and tips for facilitating group members' use of their Walk Member Handbook and other program materials. Electronic mail and social media such as Facebook and Twitter were used as communication vehicles to share information about upcoming Sessions for Success, community resources and events, and other information about walking.

Follow-up Communication.

Staff contacted team leaders on a monthly basis throughout the 6-month program to answer any questions that arose with the coordination of the group and provide tips for overcoming any barriers encountered. This approach provided support tailored to the current needs of the group (Beenackers et al., 2013).

Recognition.

Staff worked with local community/neighborhood centers and work sites to publicize and recognize the achievements of program participants. This aspect of the program responded to focus group participants' requests for public attention to accomplishments for both recognition and accountability. Participants received certificates of achievement and induction to the "Honor Roll" for remaining involved through the 6-month "graduation" from the program. Lists of new honor roll inductees were published in the local newspaper periodically, and a complete honor roll listing was maintained on the program's website. Not only did this approach provide recognition for the participants themselves, but it also served as a source of behavioral journalism to influence the norms of the community in general (Caperchione et al., 2011; Castro et al., 2011).

Using a quasi-experimental design, we are evaluating the effects of the resulting 6-month community-based walking intervention study on changes in physical activity over the 12 months following enrollment in the program. These results will be reported elsewhere.

DISCUSSION

The development of the *Sumter County on the Move!* walking program illustrates an approach to linking theory, empirical evidence and community-based formative research to develop interventions tailored to the social environments of target participants. We conducted formative research with communities who have a high need for efforts to improve preventive health indicators. Community members recommended an intervention approach that enabled them to capitalize on their existing social resources to increase physical activity, rather than manufacture new social resources, consistent with both SCT and social network theory as well as previous empirical evidence. We designed an intervention that attempted to weave together our formative research results, theory and empirical evidence for a resulting program that was theory and evidence-based, yet tailored to the immediate social context.

There is evidence of the importance of tailoring interventions to social contexts and that social networks may be particularly important for promoting health behaviors. However, few, if any, interventions have been focused on mobilizing existing social networks.

This paper highlights a process for balancing theory, evidence and community-based research in intervention development. The methods used in our research offer an example that may be helpful to practitioners developing intervention strategies for a wide range of behaviors. The specific content of our intervention offers a model for address walking behavior in other communities, particularly rural or semi-rural communities with large proportions of African American and/or low income residents.

Our work provides a model for linking theory, evidence and community-based research in intervention development and for practical intervention strategies for mobilizing social networks to promote physical activity.

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List of abbreviations

PA	physical activity
SCT	Social Cognitive Theory

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TABLE 1.

Focus group guide.

FOCUS GROUP GUIDE
1. What types of physical activities do you like to do?
2. If you ever take a walk, describe your walk.
3. List all the places to walk in the [name] community.
4. What makes it difficult to walk regularly?
5. What makes it easy to walk regularly?
6. What would you like a walking program to look like in your community?
7. We would like to promote a walking program in your community. What are your recommendations or ideas on how to do that?
8. What would you tell a friend to get him or her to take a walk regularly?
9. If there was a walking program designed for the [name] community; how could we overcome some of the barriers we talked about earlier like (list the barriers mentioned in the discussion)?

TABLE 2

FOCUS GROUP PARTICIPANT CHARACTERISTICS (N=62)

Variable	Number (%)
Sex	
Male	15 (24%)
Female	47 (76%)
Age	
Mean (range)	49 (18–55)
Refused	5 (8%)
Race	
White	4 (6%)
African American	57 (92%)
Other	1 (2%)
Education	
Less than high school	6 (10%)
High school graduate	19 (30%
Some college/college graduate	37 (60%)
Household Income	
Under $30,000	27 (44%)
$30,001-$50,000	24 (39%)
$50,001 or more	7 (11%)
Refused	4 (6%)

Table 3

Overview of *Sumter County on the Move!* (SCOTM) Walking Intervention

Theoretical Constructs	Health Promotion Methods	SCOTM Strategies	Relevant Previous Studies
Awareness of Walking Benefits	Tailored information about personal risk Information about gains from walking	Walking Handbook	Kontos et al (2011)(Kontos et al., 2011)
Awareness of Walking Resources	Information about resources	Sumter County Active Lifestyles Walk Map Indoor Walking Resources	Kontos et al (2011)(Kontos et al., 2011)
Attitudes Toward Walking	Direct experience with rewarding outcomes and reframing of any negatives Guided practice	Group walking sessions Coaching from team leaders Recognition through community centers, work sites, churches, local media, etc.	Kontos et al (2011)(Kontos et al., 2011)
Barriers	Tailoring information Modeling	Walking Handbook -- Tips Coaching from team leaders Reinforcement from program staff	Beenackers et al (2013)(Beenackers et al., 2013)
Social Influence	Visible expectations Modeling and reinforcement Mobilizing social support	Emphasis on existing resources and recognition of positive practices Walking teams (identified from existing social networks) Leadership development with team leaders Team walking sessions Involvement of social network and commitment to participate	Kassavou et al (2013)(A Kassavou, Turner, & French, 2013) Caperchione et al (2011)(Caperchione et al., 2011) Leahey et al (2010)(Leahey et al., 2010) Redmond et al (2010)(Leahey et al., 2010)
Social Norms	Mass media portrayals Mobilizing organizations Behavioral journalism Mobilizing social networks	Advocacy with local newspaper, local radio, TV, etc. Outreach to work sites, churches, neighborhood associations/community-based organizations Training team leaders to support team members	Caperchione et al (2011)(Caperchione et al., 2011) Castro et al (2011)(Castro et al., 2011) Leahey et al (2010)(Leahey et al., 2010)
Self-Efficacy	Guided practice Enactment Verbal persuasion Goal setting Planned coping responses	Team walking sessions Coaching from team leaders Walking handbook & pedometer for charting progress	Kassavou et al (2013)(A Kassavou et al., 2013)