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Leader behaviors, group cohesion, and participation in a walking group program

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Abstract

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Background—Fewer than half of all U.S. adults meet the 2008 Physical Activity Guidelines. Leader behaviors and group cohesion have been associated with increased participation or adherence in sports team and exercise class settings. Physical activity interventions in community settings that encompass these factors may enhance intervention adherence.

Purpose—To examine the impact of Community Health Promoter leader behaviors and group cohesion on participation in a walking group intervention among racially/ethnically diverse adults in low-to-moderate income communities in Detroit, Mich.

Design—Data for the current study were drawn from the Walk Your Heart to Health (WYHH) data set. WYHH was a multi-site cluster randomized controlled study with a lagged intervention and outcome measurements at baseline, four, eight, and 32 weeks. Pooled survey data from both intervention arms is used for the current study. Data were analyzed between August 2013 and October 2014.

Setting/participants—A total of 603 non-Hispanic Black, non-Hispanic White, and Hispanic adults across five cohorts that began the 32-week WYHH intervention between March 2009 and October 2011.

Intervention—A 32-week long walking group program hosted by community- and faith-based organizations and facilitated by Community Health Promoters. Walking groups met three times per week for 90-minutes per session. To promote participation in or adherence to WYHH, Community Health Promoters used evidence-based strategies to facilitate group cohesion. Group members assumed increasing leadership responsibility for facilitating sessions over time.

Main outcome measures—Participation in WYHH as measured by consistency of attendance.

Results—Community Health Promoter leader behaviors were positively associated with participation in WYHH. Social but not task cohesion was significantly associated with consistent participation. Social cohesion may mediate the relationship between leader behaviors and walking group participation.

Conclusions—Providing leaders with training to build socially cohesive groups may help motivate individuals to continue participation in community-based physical activity programs.

INTRODUCTION

The health benefits associated with regular physical activity include reduced risk for chronic diseases such as cardiovascular disease, type 2 diabetes, metabolic syndrome, and some cancers.[1–6] Yet fewer than half of all adults meet the 2008 Physical Activity Guidelines,[7] which include at least 150 minutes per week of aerobic (e.g. brisk walking) and muscle-strengthening activities that involve all major muscle groups, on two or more days per week. Furthermore, rates of physical activity and inactivity vary across race/ethnicity. Studies focusing primarily on leisure-time activity have found that more non-Hispanic white adults meeting physical activity guidelines than non-Hispanic Black and Hispanic adults.[8–10] In addition, adults with more education and whose family incomes are above the poverty level are more likely to meet physical activity guidelines than those with less education and whose family incomes are at or below the poverty level.[5, 11] To date, physical activity

intervention research among such underserved populations has been limited.[12] Therefore, effective programs that reach low-income and racially/ethnically diverse groups are needed.

Over the past two decades, interventions based on group dynamics principles have successfully been used to promote physical activity among adults.[13, 14] Such interventions have used a wide range of strategies to influence the group environment, process, and structure to increase cohesion among members. While the mechanisms underlying intervention effectiveness are poorly understood, studies have shown that group cohesion is positively associated with physical activity outcomes, including intervention adherence,[15–19] physical activity,[20–22] and cardio respiratory fitness.[23] Group cohesion in the physical activity context has been defined as a construct that includes the following dimensions: individual attraction to the group task (e.g. walking); individual attraction to the social dimensions of the group (e.g. opportunities to interact with others); perception of integration of the group around its task (e.g. shared commitment to walking); and perception of integration of the group around social concerns (e.g. social bonding within the group).[13, 24]

A small body of research suggests that group leader behaviors may be crucial factors for developing and maintaining group cohesion in physical activity interventions.[25–29] Recently, for example, Caperchione and colleagues[28] reported that in women's walking groups, participant perceptions of leader enthusiasm, ability to motivate, and availability outside of the group were positively related to task and social dimensions of group cohesion. In a qualitative study of adults in a Danish community-based intervention, Christensen and colleagues[29] found that, in addition to the exercise activity itself and the composition of the group, the teaching ability of the instructor was critical for forming cohesive groups.

To date, few studies have applied group dynamics principles to physical activity interventions outside of exercise class or sports team settings or in community-based settings that reach individuals from diverse racial/ethnic and socioeconomic backgrounds. Furthermore, while research has shown that both leader behaviors and group cohesion are related to positive outcomes, only one study has considered their joint effects on physical activity.[30] In that study, Loughead and colleagues[30] found that, among older adults involved in exercise classes (e.g. tai chi, line dancing) for one to 120 months, the relationship between leader behaviors and exercise program attendance or perceived exertion was mediated by task but not social dimensions of group cohesion.[30] Thus, while group dynamics-based interventions have been associated with positive physical activity outcomes, further research on the mechanisms underlying intervention effectiveness is warranted. The current study examined the impact of a group dynamics-based intervention on walking group participation (i.e. physical activity adherence) among predominantly non-Hispanic Black and Hispanic adults participating in Walk Your Heart to Health (WYHH), a walking group program in low-to-moderate income communities in Detroit, Mich. WYHH is part of a larger study, Community Approaches to Cardiovascular Health, designed to increase active living and improve heart health among Detroit residents at increased risk for cardiovascular disease.[31, 32] This study was conducted by the Healthy Environments Partnership (HEP), a community-based participatory research partnership established in 2000 to examine and develop interventions to reduce cardiovascular inequities in Detroit. HEP is overseen by a Steering Committee, which meets monthly and is responsible for oversight of all aspects of

the Partnership's work (see Acknowledgements for a list of partner organizations) Previously published results from the WYHH intervention have demonstrated its effectiveness in increasing physical activity and reducing multiple indicators of cardiovascular risk.[32] The current study investigates the role of leader behaviors and group cohesion in shaping adherence to the WYHH intervention. Specifically, the hypotheses that group leader behaviors and group cohesion were positively associated with participation in WYHH, and that associations between group leader behaviors and participation in WYHH were mediated by group cohesion, were tested.

METHODS

Design and Setting

Data for the current study were drawn from the WYHH data set.[32] The WYHH intervention was a multi-site cluster randomized controlled study with a lagged intervention group. It was conducted in Detroit, Mich. where residents experience excess mortality due to cardiovascular disease compared to the state and the nation.[33, 34] The sample consisted of 603 participants, enrolled across five cohorts that began the 32-week WYHH intervention between March 2009 and October 2011. Individuals were recruited by HEP Steering Committee members, staff, and the Community Health Promoters who facilitated the walking groups. Individuals interested in participating in WYHH were given a flier describing the intervention and completed an interviewer-administered modified version of the Physical Activity Readiness Questionnaire[35] to determine eligibility. Those who were eligible completed the baseline Health Risk Assessment, and were randomly assigned into one of two groups: intervention or lagged intervention (control). Those enrolling with one or more friends or family members were randomized as clusters to ensure that they were in the same walking group. Walking groups were facilitated by Community Health Promoters. Following tests for statistical differences, the data from the intervention and the lagged intervention groups were pooled for the current study. Data were analyzed between August 2013 and October 2014. The University of Michigan Institutional Review Board approved all study procedures on January 31, 2008. The Clinical Trials registration number is NCT02036593. For further detail on the WYHH intervention, see Schulz AJ et al.[32]

Intervention

WYHH was a 32-week long walking group program facilitated by Community Health Promoters and hosted by community- and faith-based organizations located in Detroit neighborhoods. The organizations received a rental fee for use of their space, which included a room large enough for warm-up and cool-down exercises and for indoor walking in the case of inclement weather. The Community Health Promoters were paid staff members who were also residents of Detroit.

In spring 2009, the health promoters received 60 hours of initial training, which focused on study procedures (e.g. recruitment, data collection), walking group facilitation, benefits of physical activity, nutrition for heart health, and strategies to promote group cohesion. Throughout the study period, the health promoters met weekly for additional training and for technical and social support.

Each Community Health Promoter facilitated two walking groups (intervention and lagged intervention groups) per cohort. The average group size was 15 members. For the first eight weeks of each group, the health promoter facilitated three 90-minute sessions per week. Each session included a warm-up, 50-minutes of walking in the neighborhood, and a cool-down period. The health promoters used evidence-based strategies[13, 14, 36–39] to influence the group environment, processes, and structure to promote group cohesion (Table 1). In addition to promoting group cohesion, these strategies also encouraged group members to assume increasing responsibility for facilitating the sessions. Over the initial eight week period, the health promoters gradually reduced their roles and encouraged group members to assume more responsibility for session facilitation. This process was tailored to the group: In some groups, by the end of eight weeks, group members had assumed most of the responsibility for facilitating the sessions, including identifying walking routes, taking attendance, leading warm-up and cool-down exercises. In other groups, the process unfolded over a longer period of time with, for example, the health promoter attending the first 30 minutes during two sessions per week while group members assumed responsibility for facilitating the third session.

Measures

Demographic Controls—Items assessing age (years), gender, self-reported race or ethnicity (Hispanic, non-Hispanic Black, non-Hispanic White), education, and annual household income were drawn from the Health Risk Assessment.

Group Cohesion—A modified version of the Physical Activity Group Environment Questionnaire (PAGE-Q)[40] was used to measure group cohesion. The 21-item PAGE-Q measures four dimensions of group cohesion: 1) attraction to group task (ATG-T), 2) attraction to group as a social unit (ATG-S), 3) perception of group integration around task factors (GI-T), and 4) perception of group integration around social factors (GI-S). All 21 items were modified for use in the current study by replacing “physical activity group” and “program” with “walking group program.” The items were rated on a five-point Likert-type scale with 1 = strongly disagree and 5 = strongly agree. The modified items were included in a self-administered survey completed at week four and interviewer-administered surveys completed at weeks eight and 32. The possibility of reducing the dimensionality of the cohesion measure using exploratory factor analysis techniques was investigated. Two factors were identified: task cohesion (ATG-T, GI-T; Cronbach’s $\alpha = 0.87$) and social cohesion (ATG-S, GI-S; Cronbach’s $\alpha = 0.85$). Models were subsequently run using these factors for task and social cohesion. Table 2 provides examples of survey items used to measure task and social cohesion.

Leader Behavior—A 21-item survey was developed to measure group members’ perceptions of community health promoters’ leader behaviors. The development of the survey was iterative and involved several steps, including: reviewing relevant literature and tools,[25, 41] conducting key informant interviews with HEP Steering Committee members, pre-testing measures, and consulting experts. Four dimensions of leader behaviors were assessed in the survey, including three proposed by Chemers[41] and applied to the physical activity context by Estabrooks[25]: image management (i.e. leader qualities that result in trust

and credibility to facilitate walking groups); relationship development (i.e. ability of leader to develop relationships with individual members); and resource deployment (i.e. ability to use knowledge, skills, and resources within the group to achieve group goals). A fourth dimension, community commitment was added to reflect the importance of community health and community improvement, themes identified by members of the HEP Steering Committee. All items were rated on a five-point Likert-type scale with 1 = strongly disagree and 5 = strongly agree. The leader behavior survey was self-administered at week four and interviewer-administered at weeks eight and 32. Using similar dimension reduction techniques as those described above for group cohesion, one leader behaviors factor was identified (Cronbach's $\alpha = 0.88$). Models were subsequently run using this factor for leader behaviors. Table 2 provides examples of survey items used to measure leader behaviors.

Walking Group Participation—The dependent variable used in these analyses was walking group participation, as a measure of intervention adherence. Walking group participation was defined as the number of weeks in which the participant attended at least one walking group session (i.e. consistency of participation). Attendance was obtained from records kept by Community Health Promoters.

DATA ANALYSES

Exploratory data analyses techniques were used to assess the distribution of adherence to WYHH. Q-Q plots and histograms were constructed to confirm the normal assumptions and thus, Gaussian models were used to assess the research questions. Statistics including frequencies, means, and standard deviations were used to identify basic characteristics of potential predictors. Independent and joint effects of leader behaviors, task cohesion, and social cohesion on physical activity were assessed using Generalized Estimating Equation models, controlling for race/ethnicity, age, gender, education, and household income. The GEE approach with normal distribution and identity link with exchangeable correlation structure was used to account for the clustering and imbalance of the longitudinal data. Initial models test for the individual effect of the leader behaviors factor and the two group cohesion factors on walking group participation. Next, two models to assess the joint effects of the leader behaviors factor with each of the group cohesion factors on physical activity participation were run. Due to high correlations between the group cohesion factors, a model to assess the effect of the leader behaviors factor and the two group cohesion factors on physical activity participation was not run. A formal mediation test[42] was run to confirm the extent to which group cohesion factors mediated associations between leader behaviors and participation. Female-specific analyses were also conducted to assess sensitivity of the models. Similar patterns were found. Models presented include the full sample.

RESULTS

The average age of participants was 47.5 years; 90% were female. Approximately 35.5% of participants were Hispanic and 61.2% were Non-Hispanic Black; 54.7% had more than 12 years of education; and 42.6 had a mean annual income of less than $20,000. Retention among those who attended one or more sessions per week was 91% at 8 weeks and 65% at 32 weeks. Those who remained active in WYHH at eight and 32 weeks were older, 48.6 and

49.6 years respectively, compared to 47.5 years at baseline (p<.05) (Table 3). Week four means and standard deviations (SD) for leader behaviors, task cohesion, and social cohesion were 4.8 (0.4), 4.7 (4.7), and 4.3 (0.6), respectively. At 8 weeks, on average, participants had attended at least one walking group session in 6.6 (SD=2.1) of the 8 weeks. At 32 weeks, on average, participants had attended at least one walking group session in 19.6 (SD=9.4) of the 32 weeks.

As shown in Table 4, leader behaviors was positively associated with walking group participation (β=2.71, p< 0.001) (model 1). Individual effects of task and social cohesion on walking group participation are shown in models 2 and 3, respectively. Task cohesion was not significantly associated with walking group participation (β=0.28, p=0.63). However, social cohesion was positively and significantly associated with walking group participation (β=1.53, p< 0.001). When task cohesion was added to model 1, the association between leader behaviors and walking group participation was strengthened (β=3.83, p< 0.001) (model 4). When social cohesion was added to model 1, associations between leader behaviors and walking group participation were attenuated but remained significant (β=1.81, p=0.02) (model 5). Results from a formal mediation test (results not shown) are suggestive of a partial mediation effect of social cohesion on the association between leader behaviors and walking group participation (c-c′/se = 1.622, p-value=0.083); the effect of task cohesion on the association between leader behaviors and walking group participation was not significant (c-c′/se = −1.748, p-value=0.983).

DISCUSSION

There are three main findings from the results presented here. First, participants who perceived that their Community Health Promoters developed relationships with individual group members and harnessed the group's knowledge, skills, and resources to achieve group goals, had more consistent participation in WYHH. To date, few quantitative studies have tested the effect of leader behaviors on adherence in community-based interventions to promote physical activity.[28, 30, 43] Loughead and colleagues[30] reported that among older adults participating in group exercise classes, leader motivation, availability, and enthusiasm were related to adherence. In a study of university students enrolled in exercise classes for course credit, Remers and colleagues[43] found that instructor behavior did not influence adherence. In both studies, leader behavior was measured using four statements assessing participants' perceptions of their exercise instructors' enthusiasm, ability to motivate, availability outside class, and ability to provide personal instruction.[30, 43] Neither study included measures of leader ability to develop relationships with individual group members and to mobilize resources within the group. As described in qualitative studies however, effective physical activity leaders also show personal interest in and concern for participants and facilitate opportunities for participants to make contributions to the group.[25, 29] In addition to personally recruiting neighborhood residents to participate in WYHH, Community Health Promoters showed an interest in and concern for their group members by, for example, calling participants to remind and encourage them to come to walking group sessions; facilitating carpools to attend walking group sessions for participants with transportation issues; and creating walking routes for participants with varying levels of fitness. Community Health Promoters also drew on group member knowledge, skills, and

interests as an important strategy to sustain their walking groups beyond the initial eight weeks of the intervention period.

Second, social but not task cohesion was associated with more consistent participation in WYHH. This finding is somewhat inconsistent with sport psychology research in which task dimensions of cohesion have been most strongly associated with physical activity adherence.[18, 44, 45] However, the nature of the relationship between group cohesion and physical activity outcomes may be situation-specific and differ across settings.[45] Most group cohesion studies have been conducted in settings, such as fitness classes, in which individuals typically have little structured opportunity to interact with others. It may be that in such settings, task cohesion motivates physical activity participation. In WYHH, participants had multiple opportunities to socialize with their peers during each of the 90-minute sessions. In addition, the neighborhood-specific location of the walking groups and faith- and community-based host organizations may have facilitated interaction between participants outside of the sessions, and contributed to the importance of social cohesion in facilitating participation.

Finally, the findings presented here suggest that Community Health Promoters fostered social cohesion within their groups, which in turn led to more consistent participation in the walking groups. This result differs from findings reported by Loughead and colleagues[30] in which task, but not social cohesion mediated the relationship between leader behaviors and exercise class adherence. The inconsistent findings between the current study and the study conducted by Loughead and colleagues[30] may reflect the design of the WYHH intervention, which directed Community Health Promoters to use their leadership positions to implement strategies aimed at building cohesive groups. In the study conducted by Loughead and colleagues,[30] it is unclear whether or to what degree such strategies were used. Further research on the mediational role of social cohesion in community-based physical activity interventions is needed.

Limitations and Strengths

Several limitations of this study should be noted. First, the focus of this study was on associations between leader behaviors and group cohesion on consistent participation in walking groups. The association between consistent participation and increases in pedometer steps over time as an indicator of physical activity has been demonstrated elsewhere.[32] In the current study, associations between leader behaviors and group cohesion on steps were not examined. Future studies should investigate the impact of leader behaviors and group cohesion on physical activity outcomes, including, for example, changes in steps or other indicators of physical activity. Second, this study did not assess the impact of weather on walking group participation. Sensitivity analyses conducted to evaluate seasonal effects on walking group adherence found no significant differences in participation across seasons. In addition, sensitivity analyses to determine effects of indoor versus outdoor walking on walking group adherence also found no significant differences in participation. Further research to better understand how weather and walking locations affect participation in walking group interventions would be useful for assessing factors that influence adherence. Finally, this study analyzed participation in a walking group program designed to promote

physical activity. The implications of the findings presented here for interventions designed to promote muscle strengthening exercises, as another important component of overall physical activity, were not assessed.

There are also a number of strengths associated with this study. First, WYHH is among few community-based physical activity interventions based on group dynamics principles. Of particular importance is identification of strategies that may be used to promote physical activity among racially/ethnically diverse adults in low- to moderate-income urban settings. Some of these strategies include collaborating with faith- and community-based organizations to increase opportunities for participants to develop and strengthen social bonds outside of walking group sessions; peer sharing and problem solving to overcome challenges associated with consistent walking; and facilitating opportunities for members to contribute to group goals. Second, the cluster randomization allowed us to maintain social support between friends and family who enrolled in the study together while simultaneously using a randomized study design. Third, the community-based process used to develop and implement WYHH increased the relevance of the intervention and the likelihood of identifying and addressing challenges (e.g. identifying safe walking routes) that may erect barriers to meeting physical activity recommendation in urban areas.

The results reported here suggest benefits of physical activity interventions based on group dynamics principles. Given high rates of physical inactivity among underserved populations, interventions facilitated by leaders trained to use group dynamics strategies to build group cohesion may be may be particularly effective in socioeconomically and racially/ethnically diverse areas.

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Table 1

Examples of evidence-based strategies used to facilitate group cohesion in Walk Your Heart to Health[32]

	Components	Strategies
Group environment	Distinctiveness	• Encourage members to wear Walk Your Heart to Health t-shirts and use Walk Your Heart to Health water bottles[14] • Identify group name[14]
Group processes	Collective goals	• Set group goals for number of steps walked[38]
	Cooperation	• Organize carpools for members to travel to and from walking group location[37]
	Interaction	• Facilitate peer sharing and problem solving on topics related to nutrition and physical activity[39] • Encourage members to attend events (e.g. Thanksgiving dinner, concert) organized by other members
Group structure	Roles	• Request volunteers to assume responsibility for walking group facilitation tasks (e.g. attendance, warm-up, cool-down)[36]
	Norms	• Establish group norms (e.g. arrive on-time) [14]

Table 2

Items used to measure group cohesion and leader behaviors in Walk Your Heart to Health.[32]

Measure	Item	Factor loading
Task cohesion	I like how much physical activity I get in this walking group.	0.70645
	This walking group provides me with a good opportunity to improve my health in areas that are important to me.	0.99421
	I am happy with the intensity of the physical activities in this program.	0.99175
	I like the different types of physical activities done in this walking group.	0.70561
	I feel safe walking on the routes.	0.72311
Social cohesion	This walking group is an important social group for me.	0.73401
	I enjoy my social interactions within this walking group.	0.77318
	I like meeting the people who come to this walking group.	0.74925
	If this walking group was to end, I would miss my contact with the other members	0.79841
	In terms of the social experiences in my life, this walking group is very important.	0.70225
	The social interactions I have in this walking group are important to me.	0.73869
	Our community health promoter creates opportunities for us to help out with organizing our group sessions.	
Leader behaviors	Our community health promoter creates walking routes that match my abilities.	0.70704
	Our community health promoter is committed to helping our group achieve our goals.	0.66704
	Our community health promoter gives public recognition when group members help out with the sessions.	0.77677
	Our community health promoter cares about my well-being.	0.60722
	Our community health promoter encourages everyone to participate in our discussions.	0.77425
	Our community health promoter encourages discussion between group members when there is conflict.	0.77196
	Our community health promoter finds creative ways to solve problems.	0.63566
	Our community health promoter motivates us to work hard to achieve our goals.	0.63673
	Our community health promoter has taken the time to get to know me.	0.77258
	Our community health promoter would understand if I had to miss a session.	0.62993

Table 3

Demographic characteristics of Walk Your Heart to Health[32] study participants (n=603) at baseline

Characteristics	
Age, mean (SD)	47.5 (13.6)
Female (%)	90.0
Race/ethnicity (%)	
Hispanic	35.5
Non-Hispanic Black	61.2
Non-Hispanic White	3.3
Education >12 years (%)	54.7
Annual household income (%)	
≤$9,999	18.0
$10,000 to $19,999	24.6
$20,000 to $34,999	25.2
≥35,000	32.2
Employed (%)	28.0

Table 4

Walking group participation regressed on leader behaviors, task and social cohesion, adjusting for individual characteristics[a]

	Model 1		Model 2		Model 3		Model 4		Model 5	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	−7.04	3.28	4.74	2.88	−0.79	1.80	−5.70	3.28	**−7.43***	3.24
Leader behaviors	**2.71*****	0.60					**3.83*****	0.91	**1.81***	0.76
Task cohesion			0.28	0.58			−1.42	0.72		
Social cohesion					**1.53*****	0.37			**1.05***	0.42

[a] Individual characteristics include race/ethnicity, age, gender, education, household income

* p<.05

** p<.01

*** p<.001