

# Translating research into practice: Using concept mapping to determine locally relevant intervention strategies to increase physical activity

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## Abstract

**Purpose:** To translate intervention strategies to increase physical activity interventions recommended by the Community Guide for higher and lower income African-American adults living in an urban, Midwestern community.

**Method:** Structured interviews were conducted with a stratified random sample of African-American men and women from high- and low-income groups. Data were analyzed using concept mapping, a six-step process that incorporates qualitative and quantitative analysis.

**Results:** The results suggest differences among men and women, high and low income, in the conceptualization of factors associated with physical activity behavior. The different conceptualizations suggest different intervention strategies and action steps may be necessary for subgroups of a population.

**Conclusion:** Concept mapping is a participatory method that community members and health practitioners can use to develop locally defined intervention strategies. From the strategies and action steps identified, evidence-based interventions can be developed in light of the optimal characteristics necessary within a community.

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**Keywords:** Physical activity interventions; Community-based participatory method

## 1. Introduction

Translating research findings into practice is a critical step along the path to improving population health (Agency for Healthcare Research and Quality, 2003). Programs and policies need to be developed based on the best underlying scientific evidence that demonstrates effectiveness (Brownson, Baker, Leet, & Gillespie, 2003). Brownson and colleagues have identified a pathway for translating and disseminating research into public health action that includes four stages: discovery, translation, dissemination and change stages (Brownson, Kreuter, Arrington, & True, 2006). The discovery stage involves investigating the determinants of a group of individuals' behavior, either through formative research, qualitative

research designs or experimental research designs, and evaluating the effectiveness of interventions to alter these determinants. During this stage, most research is done in an 'ideal' world as opposed to the 'real' world. During the translation stage, the focus switches from efficacy to effectiveness and the context of the intervention becomes important. It is at this stage the evidence is translated for the target population. During the dissemination and change stages, the evidence that has been translated is communicated back to the target population in a way that is meaningful for the community in the hopes of creating long-term changes.

In the case of physical activity interventions, there is considerable evidence that has been gathered within the discovery stage (Heroux, 2005), including the recommendations from the Centers for Disease Control and Prevention's Guide to Community Preventive Services (i.e. the Community Guide). The Community Guide evaluated the effectiveness of physical activity interventions

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and presented systematic reviews and evidence-based recommendations regarding population-based interventions to promote physical activity.

Despite the well-known benefits of physical activity, approximately 24% of adults report no physical activity during their leisure time (defined as a ‘no’ response when asked, ‘during the past month, other than your regular job, did you participate in any physical activities or exercise, such as running, calisthenics, golf, gardening or walking’) (Centers for Disease Control and Prevention, 2003). Physical activity rates also vary by gender, race and income. For example, physical inactivity is more prevalent among women. National data (2003 BRFSS) indicate 50% of adult men do not meet recommendations, compared to 55% of adult women (Centers for Disease Control and Prevention, 2005). Differences also exist between African-American and white adults, with 57% of African-Americans not meeting recommendations, compared to 50% of whites (Centers for Disease Control and Prevention, 2005).

These trends are consistent for both genders, with more African-American men (27%) than white men (18%) reporting no leisure-time physical activity, and more African-American women (34%) than white women (22%) reporting no leisure time physical activity (Centers for Disease Control and Prevention, 2005). Physical activity rates also vary by income level, with 61% of persons in the lowest income group (annual income <\$15,000/year) not meeting recommendations, compared to 46% of persons in the highest income group (annual income ≥\$50,000) (Centers for Disease Control and Prevention, 2005).

While the Community Guide provides direction in terms of interventions that have been previously successful in increasing physical activity, we now must translate the recommendations for local communities. Given the existing disparities in rates of physical activity (Barnes & Schoenborn, 2003; Centers for Disease Control and Prevention, 1999) assessing local needs and resources as well as characteristics of the physical and social environment is particularly important when translating intervention strategies. Community-based participatory research (CBPR) provides a set of principles that can guide population-wide changes by using participatory methods to define and develop locally relevant intervention strategies (Baker & Brownson, 2001; Brownson, Baker, & Novick, 1999; Israel, Eng, Schulz, & Parker, 2005; Minkler & Wallerstein, 2003). CBPR is not simply a method for gathering community input; rather, it is a process that equitably engages and invests community members in all stages of program development, implementation and dissemination. Using a CBPR method, when developing and implementing intervention activities ensures that local resources and needs are identified and allows a community to operationalize and state the importance of strategies used to address physical activity behavior.

The purpose of this study was to use a participatory method, concept mapping, to translate intervention strategies to increase rates of physical activity recommended by

the Community Guide into proposals for practice for higher- and lower-income African-American adults living in an urban, Midwestern community.

## 2. Methods

This study was part of a 3-year, Centers for Disease Control and Prevention funded project, the Garden of Eden (Baker et al., 2006). The Garden of Eden project is a community-based program to create a grocery-like facility selling fresh fruits and vegetables and offering group exercise classes in an urban, African-American community. Health advocates who had relationships with other organizations and informal groups were hired from four participating churches. The health advocates were trained to deliver nutrition and physical activity education messages through monthly newsletters, cooking demonstrations at the store and doing oral presentations throughout the community.

An additional aim of this larger project was to identify factors that influenced physical activity among this population and to use these findings to develop priorities for intervention activities. Concept mapping was used as the method to identify specific factors within an urban, African-American community that influence physical activity.

### 2.1. Participant recruitment

Participants were recruited from four Garden of Eden church congregations and the surrounding neighborhoods. During their first visit to the store, participants were asked to participate in a survey to assess their behavior and the determinants of behavior. At the end of this survey, they were asked if they would be willing to be contacted to take part in individual and/or group qualitative interviews (i.e. this study).

A stratified random sampling approach was used to select male and female participants (who responded that they would be willing to be contacted) that could be classified as lower income, as well as those who could be classified as higher income, African-Americans. This sampling technique ensured we selected individuals from each subgroup of the population, thus allowing for comparison across subgroups. For purposes of this study, participants were assigned to either high income (>\$25,000) or low income (≤\$25,000) based on their self-reported annual household income from all sources. Median income of the population was used as the cut-off instead of the national poverty level because we recognized that our participants did not reflect the full range of incomes and because our purpose was to look at individuals from the Garden of Eden community. All participants received a \$20 gift card to shop at the Garden of Eden store for their participation in each of the concept-mapping data collection processes (brainstorming and structuring task, as described below). Each participant

completed a written consent form to participate in the study and a brief demographic questionnaire.

## 2.2. Concept mapping

Concept mapping is a method that can help communities develop locally relevant interventions. The process uses structured interviews and an analysis that engages community members in the definition, operationalization and identification of salient factors influencing behavior (Trochim, 1989). In addition, it provides participants with the opportunity to develop a conceptual framework demonstrating how the factors relate to each other. This process is considered particularly appropriate for two reasons: (1) it obtains information regarding group level definitions and perceptions as opposed to individual conceptualizations and (2) it obtains information on social and structural influences on outcomes (Trochim, 1989).

Concept-mapping techniques were used in the present study to identify the factors related to physical activity and the salience of groups of factors for different subgroups (i.e. gender and income) within an urban, African-American community. There are six steps involved in the concept-mapping process: preparation, brainstorming, structuring, representation, interpretation and utilization.

### 2.2.1. Step one: preparation

The preparation step involves defining the focus statement and determining the appropriate sample. A focus statement is an open-ended prompt that participants are asked to complete. The focus statement was decided through a collaborative process with the health advocates and pilot tested with staff from the Garden of Eden store to ensure it was understood in the intended way. The focus statement for this project was: “One challenge African-American women [men] living in St. Louis face in participating in physical activity is...”. Physical activity was defined as any movement that increases an individual’s heart rate. The movement can be for recreational purposes (e.g., playing basketball), transportation (e.g., walking to a grocery), house work (e.g., gardening) or job related activity (e.g. manual labor jobs). Selected participants were grouped first by gender and then within gender by income to devise four different groups of participants: men, women, low income and high income.

### 2.2.2. Step two: brainstorming

The second step consists of brainstorming sessions in the form of structured group meetings. The brainstorming sessions are designed to generate a large set of statements related to the focus statement from step one. Participants were asked to generate statements or ideas in response to the identified focus statement with a couple of words or a short phrase, without providing comment or conversation about the statements. This is unlike traditional focus groups where participants are asked to discuss the

statements. In addition to tape recording each session, notes were taken on a flip chart and reviewed with the participants to ensure that summary statements captured on the flip chart were accurate. Only statements from the participants were included (i.e. the research team did not contribute to the list of statements).

### 2.2.3. Step three: structuring

The statements collected from each group brainstorming session were compiled into one list. Two hundred and twenty-three statements were compiled from all of the brainstorming sessions. After stratifying by key word and eliminating duplicates, the final list included 150 unique statements (see Appendix A). Similar statements were deleted. Each statement was printed on a 3 × 5 index card.

A new group of participants was asked to engage in the sorting and rating process. This is consistent with prior work using concept mapping that has shown that while there are benefits to overlapping participants, adding new participants to the process can add new insight to the topic (Johnsen, Biegel, & Shafran, 2000). The same sampling technique (i.e. stratified, random sampling) was used to select men and women as well as low-income and high-income individuals to participate.

Participants were asked to individually sort (or group) the statements on the 3 × 5 cards into piles in a way that made sense to them based on the similarity of the statements. When participants finished sorting all of the cards, they were asked to complete a survey that listed each statement they just finished sorting. Participants were asked to rate each statement on its importance as a barrier to physical activity (ranging from 1, relatively unimportant to 5, extremely important). During this step, they were encouraged to think about the statements in relation to their own barriers and challenges to participating in physical activity.

### 2.2.4. Step four: representation

Data from the sorted and rated statements were entered into the Concept Systems software (see [www.conceptsystems.com](http://www.conceptsystems.com)) (Trochim, 1989). The software takes the data and performs cluster analysis and multidimensional scaling (MDS) to allow for visual representation of the data in the form of clusters. This analysis groups or partitions the statements (or points) on the map as they were placed by the MDS into clusters of statements located in contiguous areas of the map. Each point on the map represents one statement. Items that were sorted together by several participants appear closer together on the map than those items that were not frequently sorted together by participants. The final “concept map” presents an arrangement of these clusters of statements as well as “ladders” indicating the average importance of the items according to the participants’ rankings. To allow for comparisons of group similarities and differences, a separate map was created for each of the four groups (women, men, high income and low income).

Next, average importance ratings were calculated. The average importance ratings (ranging from 1, relatively unimportant to 5, extremely important) are presented for each statement in a cluster based on the average rating given to a particular statement by participants. Average ratings are depicted as blue ladders on the final concept maps. The taller the ladder, the more important that statement is to the participants.

After computing separate concept maps for each participant group, we determined the cluster of statements that was rated most important by each group (based on the average ratings of each statement). To determine the degree of difference between two clusters, 95% confidence intervals (95% CI) were computed for each cluster.

### 2.2.5. Steps five and six: interpretation and utilization

Steps five and six brought together health advocates working on the Garden of Eden project to review the statements in each of the clusters. Three health advocates and a community partner reviewed the statements and clusters and selected the most important statements and clusters to be presented back to the community in the form of a community forum.

The purpose of the community forum was to create small groups to review the statements identified by the community and develop action steps to address some of the particular barriers or challenges to being physically active that were identified in the concept-mapping process. The forum itself was organized into two parts. The first part included presentation of the data to the group, highlighting the themes and barriers identified. The second part of the forum included breaking into small groups with a facilitator and note taker to identify specific recommendations and strategies to address the theme.

## 3. Results

### 3.1. Participants

Forty-two individuals participated in a total of five brainstorming sessions (Table 1). Twenty-three females participated in one of three all-female sessions consisting of 5–10 participants each. All of the female participants were African-American adults with 39% of the adults reporting higher household incomes (>\$25,000) and 48% reporting lower incomes (≤\$25,000) (based on self-reported data at the time of the brainstorming session). Nineteen males participated in one of two all-male sessions consisting of 9 and 10 participants each. All of the male participants were African-American adults with 53% reporting higher incomes (>\$25,000) and 32% reporting lower incomes (≤\$25,000).

A new group of participants was gathered to engage in step 3, structuring the statements (i.e. there was no overlap between participants). The demographic characteristics of the individuals who participated in the structuring task are similar to the characteristics of the individuals taking part

in the brainstorming sessions. Thirty-two adults (17 females and 15 males) participated in sorting and rating each of the statements identified through the brainstorming sessions (Table 1). All of the participants were African-American adults with 47% reporting higher incomes and 23% reporting lower incomes.

### 3.2. Overall group results

The final concept map for all participants included six different clusters, with the smallest cluster containing 11 statements and the largest containing 35 statements (Fig. 1). A standardized, systematic process is applied to identify the most useful cluster number by considering the range of issues represented, the purpose and intended uses of the resulting map and the observed coherence of clusters at different levels (Southern et al., 1999). This process was used to identify the number of clusters for each map by subgroups (e.g. men, low income). The number of clusters for each subgroup may vary, but the final arrangement of clusters represents the conceptual coherence of statements for that particular group of participants.

The cluster of statements rated on average as the most important group of barriers to being physically active is physical health road blocks (cluster #3) (Fig. 1), with a mean importance rating of 4.1 and ratings ranging from 3.0 to 4.5. The most important statements (as indicated by the taller blue ladders in Fig. 1) in this cluster include “physical health concerns” (statement # 28), “shortness of breath” (#30), “vision problems” (#29) and “disease” (#24). The second cluster of statements rated on average as the most important group of barriers to being physically active is neighborhood safety (cluster #4) with a mean importance rating of 4.0 and ratings ranging from 3.3 to 4.6. The most important statements in this cluster include “safety issues” (#112), “young men hang out on the corner—women are afraid to walk by them” (#114), “parks are not safe” (#96) and “there are gangs on the street” (#60).

### 3.3. Subgroup results

#### 3.3.1. Women

The final concept map for women included seven unique clusters, with the smallest cluster containing 11 statements and the largest containing 33 statements (Table 2). The cluster of statements rated on average as the most important group of barriers to being physically active by the women is physical health road blocks (Table 2). The statements rated most important include “physical health concerns,” “knee problems,” “disease” and “shortness of breath”. The second cluster of statements rated on average as most important is neighborhood safety. The statements rated most important in this cluster include “safety issues,” “there are speeders and cars on the street,” “people snatch people’s children” and “stray dogs.”

When comparing the cluster means to each other, several CI do not overlap suggesting the difference between the

Table 1  
Demographic characteristics of individuals participating in the brainstorming and the structuring sessions (N = 74)

	Brainstorming		Structuring	
	Female (n = 23) (%)	Male (n = 19) (%)	Female (n = 17) (%)	Male (n = 15) (%)
Age group (years)				
18–25	0	5	6	0
26–45	13	42	12	40
46–65	17	42	47	47
66+	61	11	35	13
Marital status				
Never married	4	37	18	27
Married or living with partner	26	53	35	53
Divorced or separated	13	11	24	20
Widowed	35	0	24	0
Education				
Less than high school	4	0	0	0
High school or GED	26	32	12	20
Some college or technical/vocational school	26	53	53	47
College or university graduate	17	5	18	20
Graduate or professional school	13	11	12	13
Currently employed				
Yes	26	63	29	60
No	48	32	65	40
Household income				
High (> \$25,000)	39	53	47	47
Low (≤\$25,000)	48	32	35	20
Number of children in household less than age 16				
Zero	57	58	77	60
1–2	17	32	18	27
More than 2	0	11	0	13

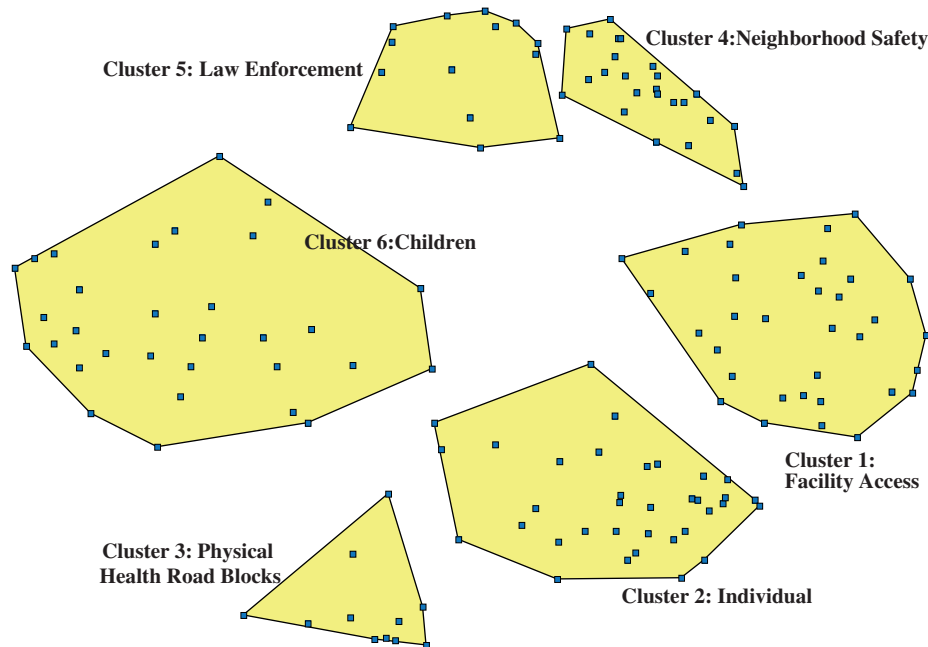


Fig. 1. Concept map, all participants.

two cluster means is large enough to conclude that the means are statistically significantly different from each other ( $p < 0.05$ ). The top three clusters (physical health

road blocks, neighborhood safety and law enforcement) were not rated significantly more important than each other. The physical health road blocks cluster was rated

Table 2  
Clusters for women and men with mean importance rating

Women		Men	
Cluster name	Mean (95% CI)	Cluster name	Mean (95% CI)
Physical health road blocks	4.1 (3.7–4.5)	Physical health road blocks	4.0 (3.6–4.5)
Neighborhood safety	4.0 (3.8–4.2)	Safety and law enforcement	4.0 (3.9–4.1)
Law enforcement	3.7 (3.4–4.0)	Individual barriers	3.6 (3.4–3.8)
Children	3.5 (3.3–3.8)	Children	3.6 (3.3–3.9)
Facility access	3.5 (3.3–3.7)	Neighborhoods	3.5 (3.3–3.7)
Individual barriers	3.4 (3.2–3.6)	Facility access	3.3 (3.1–3.5)
Social support	3.3 (3.0–3.5)	Family and social support	3.2 (3.0–3.5)

\*Clusters are listed in order of importance based on mean rating; CI: confidence interval.

Table 3  
Clusters for low-income and high-income adults with mean importance rating

Low-income adults		High-income adults	
Cluster name	Mean (95% CI)	Cluster name	Mean (95% CI)
Physical health road blocks	4.2 (3.8–4.5)	Law enforcement	4.1 (3.9–4.3)
Safety and law enforcement	4.1 (4.0–4.2)	Physical health road blocks	3.9 (3.5–4.3)
Children	3.6 (3.4–3.8)	Neighborhood safety	3.9 (3.7–4.0)
Facilities and financial support	3.5 (3.4–3.6)	Individual barriers	3.4 (3.2–3.7)
Individual barriers	3.4 (3.3–3.6)	Children and family	3.4 (3.0–3.8)
		Children and schools	3.4 (3.1–3.7)
		Facilities and social support	3.4 (3.1–3.6)
		Facility access	3.2 (3.1–3.4)

\*Clusters are listed in order of importance based on mean rating; CI: confidence interval.

significantly more important from facility access, individual barriers and social support. Neighborhood safety was also rated significantly more important from these clusters, in addition to being rated significantly more important from children.

### 3.3.2. Men

The final concept map for men includes seven clusters, with the smallest cluster containing 10 statements and the largest containing 36 statements. Two clusters of statements were rated on average as the most important group of barriers to being physically active by the men, physical health road blocks and safety and law enforcement (Table 2). Ratings in the physical health road block cluster and the safety and law enforcement cluster had a mean of 4.0, ranging from 2.6 to 4.6 and 3.2 to 4.6, respectively. The statements rated most important in the physical health road blocks cluster include “vision problems,” “physical health concerns” and “disease”. The statements in the safety and law enforcement cluster rated on average as most important include “crime,” “young men hang out on corner, women are afraid to walk by them,” “parks are not safe” and “there are gangs on the street.”

When comparing the cluster means to each other, physical health road blocks were not rated significantly more important than safety and law enforcement, but were rated significantly more important than all of the other

clusters. The safety and law enforcement cluster was rated significantly more important than facility access and family and social support.

### 3.3.3. Low income

The final concept map for participants reporting lower incomes includes five clusters, with the smallest cluster containing 17 statements and the largest containing 45 statements (Table 3). The cluster of statements rated on average as the most important group of barriers is the physical health road blocks with a mean importance rating of 4.2 and ratings ranging from 2.5 to 4.9. The statements rated as most important include statements such as “vision problems,” “disease” and “physical health concerns.” The second cluster of statements rated on average as the most important group of barriers is safety and law enforcement, with a mean importance rating of 4.1 and ratings ranging from 3.5 to 4.8. The statements rated as most important include “safety issues,” “there are speeders and cars on the street” and “crime.”

When comparing the cluster means to each other, physical health road blocks cluster was not rated significantly more important than safety and law enforcement; however, both clusters were rated significantly more important than children, facilities and financial support and individual barriers.

### 3.3.4. High income

The final concept map for participants reporting higher incomes includes eight clusters, with the smallest cluster containing 12 statements and the largest containing 28 statements (Table 3).

The cluster of statements rated on average as the most important group of barriers is law enforcement with a mean importance rating of 4.1 and ratings ranging from 3.4 to 4.6. The most important statements in this cluster include “safety issues,” “crime” and “people snatch people’s children.” Two clusters were rated on average as the second most important group of barriers, neighborhood safety and physical health road blocks, both with a mean importance rating of 3.9. The statements rated as the most important in the neighborhood safety cluster include “parks are not safe,” “stopped going to parks, schools, etc. because people there with guns” and “there is nothing in the neighborhood.” The statements rated as the most important in the physical health road blocks group include “shortness of breath,” “physical health concerns,” and “disease.”

When comparing the cluster means to each other, several CI do not overlap suggesting the difference between the two cluster means is large enough to conclude that the means are statistically significantly different from each other ( $p < 0.05$ ). The three clusters (law enforcement, physical health road blocks and neighborhood safety) rated on average as most important were not rated statistically more important than each other; however, law enforcement was rated significantly more important than the other five clusters. Physical health road blocks cluster was rated significantly more important than one cluster, facility access; while neighborhood safety was rated significantly more important than the remaining clusters, with the exception of children.

### 3.4. Utilization of concept maps

The second part of this study involved bringing together community members and leaders to review the results and create action steps. Three health advocates and one community partner from the Garden of Eden project reviewed the clusters and the statements within each cluster for all of the subgroups. At this time, some of the clusters were renamed to reflect a positive action (e.g., ‘law enforcement’ was changed to ‘change social norms around physical activity’) and some were separated to allow for groups to be focused when developing action steps (Table 4). From this information, seven themes were selected to present back to the community in the form of a community forum. The themes represented the results from all subgroups, not only the overall participants. The seven themes included: changing social norms around physical activity, creating safe and inviting environments, changing access to facilities, improving parks, involving the faith community, getting to know your neighbor and improving transportation. The most important barriers identified through the concept-mapping process were presented within each of these themes during the community forum. The one group of important barriers we did not address was physical health road blocks. The purpose of the community forum was to encourage individuals to come together to make changes within their community that would enable people to be more active. While we do not want to ignore physical health concerns as a real priority for this community, the Garden of Eden was focused on creating infrastructures to enable individuals to make healthy choices, regardless of physical health status. Therefore, the forum focused on opportunities to create such infrastructures.

Over 500 community members and residents, local business owners, public officials, community leaders (e.g.

Table 4  
Community forum themes, recommendations and action steps

Theme	Cluster	Top action step	Recommended strategies (examples)
1. Creating safe and inviting environments	Neighborhoods and safety	Encourage neighborhood involvement (positive neighborhood activity)	Communicate with block captains and make church a substation for police to increase their presence in neighborhoods
2. Improve parks	Neighborhoods and safety	Clean up parks and get churches and schools involved	Identify parks in most need, clean up events at parks, partner with service organizations to clean up parks, schools use parks as a service learning project
3. Involve the faith community		Strengthen faith-based efforts to improve health	Contact interdenominational organizations, go for a cause, agree on a central issue
4. Change access to facilities	Facility access	Inform citizens about what is already available	Mailing to everyone in the city, create partnerships, each center make own flyer on what is offered
5. Improve transportation	Neighborhoods	Identify existing resources	Identify special stops for seniors, contact organizations for list of services, locate church transport programs
6. Change social norms around physical activity	Law enforcement	Encourage people to get to know each other	Use the strength of well-organized groups, start with high-need areas, use men’s leagues as foundation for community transition
7. Get to know your neighbor	Neighborhood and social support	Plan activities with people and organizations in neighborhood	Build on existing activities and opportunities for natural interaction, involve police district, job training for gang members

block captains), local health department staff and health care providers were invited to participate in a community forum. Letters were mailed requesting each individual (or another individual from their organization or agency) to participate in a community forum to address physical inactivity in the St. Louis area. Follow-up phone calls were made 1 week later to encourage individuals to participate. A total of 50 individuals participated in the community forum which lasted 3 h. Following a brief presentation, the overall results from the concept mapping, participants were allowed to select one of seven different tables, representing each of the seven themes identified by the Garden of Eden Health Advocates. Each of the small groups reviewed the barriers identified within the theme for that table and identified what they thought were the some concrete actions they could take to address some of the barriers. Participants were next asked to vote on the actions they thought should be addressed first by writing it down on an index card. The note taker tallied all of the votes and presented the top-recommended actions to the group. Next, as a group, they developed strategies to address the top recommendation. The note taker recorded all of the comments and notes on a flip chart and frequently confirmed with the participants that what was written on the chart was accurate.

The results are summarized in Table 4. Overall, participants recommended strategies that build on existing resources while highlighting the need to enhance various forms of social cohesion throughout communities. The forum participants emphasized the importance of increasing neighborhood social cohesion and using existing resources and networks as a way to increase physical activity. Policy briefs are currently being developed to disseminate the recommended strategies back to the community in an effort to stimulate change.

#### 4. Discussion

While it is recognized that to effectively implement community-level interventions, it is necessary to understand the conceptualizations of these factors for the targeted population and their importance within the context of other factors associated with the behavior of interest. Few studies have used systematic and rigorous methods that allow for community members to identify the different conceptualizations of these factors and their relationship to physical activity and health within their community (Judge & Paterson, 2000; Lynch, Davey Smith, Kaplan, & House, 2000; Marmot & Wilkinson, 2001; Sallis, Bauman, & Pratt, 1998). This study builds on previous work to address these issues by using concept mapping as a participatory approach that enables community members to operationalize various factors associated with physical activity within their communities and to develop priorities and action steps to create change. The use of this approach to design interventions allows community members to be involved in translating research.

A major strength of concept mapping is the ability for groups to engage in joint meaning and consensus (Trochim, 1989). Communities wishing to implement intervention strategies recommended by the Community Guide or other systematic reviews may need to consider how the local social, environmental and demographic characteristics may influence the implementation of programs and policies.

##### 4.1. Lessons learned: recommendations for intervention planning

Based on the results of this study, several of the Community Guide recommended strategies for increasing physical activity could be adapted for this community. The results suggest, for example, the importance of changing the physical environment as well as addressing policies influencing the social environment. As such, individuals wishing to develop and implement an intervention must consider how and under what conditions such an intervention should be implemented.

For example, the Community Guide recommends creating or improving access to places to be physically active by creating walking trails or providing better access to facilities (e.g. nonresidents using facilities nearby) (Heath et al., 2006; Kahn et al., 2002; Task Force on Community Preventive Services, 2002). However, neighborhood, safety and law enforcement were conceptualized differently by subgroups. For women and higher-income adults, neighborhood safety and law enforcement were two separate clusters; while for men and adults reporting lower incomes, safety and law enforcement formed one cluster leaving neighborhood issues in a separate cluster. This suggests that for women and higher income adults simply creating a walking trail (one way to implement the Community Guide recommended strategy of creating access to places to be active) will not increase physical activity; rather, creation of a walking trail will need to be combined with an intervention to ensure that the environment provides women with a safe place to be physically active. To address this, the community members who participated in the community forum suggested improving neighborhood sense of community by utilizing existing resources, such as block captains and other neighborhood organizations. The results of the forum suggest that women within the participating community would be more likely to walk in their neighborhood (and therefore use a walking trail) if they knew their neighbors and knew that people were looking out for one another.

Similarly, for men and adults reporting lower incomes, simply providing access to facilities such as parks and walking trails may not substantially increase physical activity. For these groups, safety and law enforcement are two factors that need to be considered prior to improving access. Men and lower-income adults in this community identified a lack of trust between community members and police officers and feel as if police officers

misinterpret African-American men when they are engaging in various activities outside. Increasing police presence on streets to address safety concerns may not reduce these concerns for men because they may not trust the police officers in their community. Therefore, for these groups, prior to creating walking trails or improving the condition of parks, policies or programs need to be developed to address current social norms. Changing social norms requires communication between law officers and the community and an understanding of different behaviors. One way to address this issue before changing access is to provide information and an opportunity for conversations between community groups and law officers.

The Community Guide also recommends providing social support in community settings, a barrier that was identified by most groups. The Guide recommends building, strengthening and maintaining social networks that support physical activity. Most of the social support barriers identified in this community are related to getting to know your neighborhoods and changing social norms. The small groups at the forum identified several strategies that could be used to address these issues. By using the strength of well-organized groups and building on already existing activities and opportunities, participants felt they could provide support for engaging in particular behaviors and begin to make it the norm to be outside engaging in physical activity.

Based on these recommendations, the next steps are to disseminate these strategies to create change. According to Brownson and colleagues' model, now that the evidence has been translated, it needs to be disseminated back to the target population in a way that is meaningful for the community in the hopes of creating long-term changes. Through concept mapping, we have now identified specific strategies to address physical inactivity in this community. The community forum was a first step in disseminating the results in the hopes of creating change. These strategies are currently being used to develop policy briefs for the community.

#### 4.2. *Limitations and strengths*

Concept mapping is a useful method of canvassing for views about a local issue. This method can be time consuming and somewhat labor intensive; therefore, the use of it in the context of community–academic or community–agency partnerships may be more realistic. The resulting conceptual framework and intervention strategies may help these types of partnerships secure funding by providing evidence of the needs of a community and subsequently, develop and implement interventions that will be successful.

There are several limitations of this study. First, while the results suggest different conceptualizations of barriers to being physically active by subgroups, we do not know the behavioral characteristics of the participants of this study nor do we have enough participants to determine the

effect of age. For example, we do not know if the results would have been different for active versus inactive persons, normal weight versus obese persons or older versus younger persons. We cannot ascertain within-group differences based on these characteristics (e.g. physically active women versus nonphysically active women).

Second, there is a possible bias in who participated in this process. The Garden of Eden is a produce market and it is possible that individuals who shopped at the store to buy fruits and vegetables are different from those who did not come to the store. Individuals going out of their way to buy fresh produce and participate in an exercise class are likely motivated individuals and probably more health conscious.

Last, the external validity of the results is limited. The participants in this study were urban, African-American adults living a medium-sized Midwestern city. Therefore, the results cannot be generalized to other communities, such as rural communities or larger cities. However, the methods and principles used in this project can be used across locales and geographies to implement recommendations provided by the Community Guide and develop locally relevant, evidence-based interventions across a range of risk factors.

There are several strengths to this study that should be highlighted. First, this study was based on a CBPR that allowed community members to create frameworks demonstrating conceptualizations of factors associated with physical activity. CBPR methods delve deeper into a community to understand how to adapt best practices (e.g. the Community Guide recommendations) to the community's needs and begin to translate knowledge produced through traditional research ([Agency for Healthcare Research and Quality, 2003](#)).

Second, using a participatory approach allowed the community to define top action strategies and next steps for intervention activities, therefore, increasing the applicability of the results for this particular community. CBPR principles suggest that the external world cannot be understood without understanding people's perceptions of that world ([Wallerstein & Duran, 2002](#)). This project was based on this principle and as such the strategies and next steps are grounded in community members' perceptions of the factors associated with physical activity. The strategies and next steps will form the basis of future work within these communities to plan and evaluate evidence-based interventions to increase physical activity.

#### 4.3. *Conclusion*

In summary, this study used a systematic process to understand the local context for physical activity interventions. The use of a participatory approach like concept mapping allowed community members to not only identify the important factors associated with physical activity for their community but also to suggest intervention strategies and activities appropriate for this particular community

based on the findings, an important component in an evidence-based decision making process. This unique approach can be used to develop and implement evidence-based interventions that may lead to more effective and efficacious interventions.

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**Appendix A**

For statements by cluster with average ratings, all participants (*N* = 32) see Table A1.

Table A1  
Statements by cluster with average ratings, all participants (*N* = 32)

Statement no.	Statement	Importance rating
<i>Cluster 1: facility access</i>		
48	Some facilities require checking accounts and/or credit card	2.94
41	You need to join a gym to exercise	2.94
53	Times facilities are open are not good	2.94
43	There is no facility to exercise where you can go fewer times	2.97
45	There is no place to go unless you are a member	2.97
47	Too many people for facilities	2.97
149	It is too cold in winter months	3.16
40	Lack of space	3.16
50	Places require year contracts	3.19
49	No longer have free access anytime you want	3.19
126	Do not like exercising alone	3.25
19	Times for classes at facilities are geared to people who are retired or can go at night	3.28
127	It is hard to find a friend to walk with	3.28
44	No place to go to exercise	3.29
135	Want to share rides and pick other people up-so use cars instead of walking	3.31
13	There are no gardens anymore	3.34
139	Walking on concrete is hard on body	3.34
42	Not adequate facilities in every area	3.41
52	YMCA is not free	3.41
3	All the swimming pools have closed down	3.45
141	There is a lack of competitive activities for adults	3.47

Table A1 (continued)

Statement no.	Statement	Importance rating
37	Gyms not open to all ages	3.48
145	Lack of transportation to places to exercise	3.53
14	Churches do not even interact with other churches as much	3.58
38	There is not access to recreational activities	3.58
51	It is too expensive to join the gym	3.59
1	There is a lack of organizations offering activities	3.63
39	Lack of convenient facilities	3.68
31	Distance to get to some places to walk is too far	3.71
8	Cannot get to exercise classes (often no car)	3.72
105	Do not know what resources are available	3.72
17	Classes are not available for morbidly obese individuals	3.97
123	Seniors have no transportation	4.07
21	There are fewer and fewer programs for people in poverty	4.25
Average values:		3.4
<i>Cluster 2: Individual barriers</i>		
63	Hair	2.23
58	Wives keep men busy	2.47
83	We have paid our dues	2.75
78	Feel silly	2.78
146	Television	2.88
88	Stop watching weight when one finds a mate	2.90
81	Mindset—when it is cold you want to stay inside and eat	3.00
129	No motivation from other people	3.06
128	Lack of support	3.09
90	When have a free day want to rest	3.16
59	Bills to pay—no money for physical activity	3.19
75	As you get older you lose the desire to look good	3.19
150	Jobs get in the way	3.19
12	It is more acceptable in society to be larger	3.22
89	They think they are too old	3.22
130	Need someone to exercise with who makes you accountable	3.22
80	Too lazy	3.28
131	People used to know have passed away	3.28
144	Too tired	3.38
85	People so down cannot get out of comfort zone and get and exercise	3.44
87	We are set in our ways	3.44
79	Lack of motivation	3.50
77	Do not like to exercise	3.53
143	Schedules are too busy	3.53
142	There is not enough time	3.56
82	Not a priority	3.58
86	When we retire, we get lazy and lose routine	3.59
140	Stress is depressing—makes you give up on life	3.65

Table A1 (continued)

Statement no.	Statement	Importance rating
10	Health care professionals no longer tell women to get more activity	3.78
76	Do not know how to get in mindset for exercise AND stay there	3.78
36	Eating habits—heavy meals, not want to go exercise	3.94
7	Do not think benefits apply to us	4.13
4	Do not know why physical activity is important	4.25
6	Do not see a purpose in being active	4.59
5	Do not realize exercise will make them feel better	4.78
Average values:		3.39
<i>Cluster 3: Physical health road blocks</i>		
18	Obese individuals do not want to be around opposite sex	3.03
56	Partners/husband/wife gets in way of physical activity	3.16
35	Some people are on drugs and not interested	3.91
23	Arthritis	4.19
26	Obesity	4.19
27	Pain in the legs	4.28
25	Knee problem	4.41
24	Disease	4.44
29	Vision problems	4.44
30	Shortness of breath	4.47
28	Physical health concerns	4.53
Average values:		4.09
<i>Cluster 4: Neighborhood safety</i>		
92	Ninety percent of black men in this neighborhood do not know alderman to get parks cleaned up	3.28
109	There are no sidewalks	3.48
108	There are no businesses in neighborhood—so no one to watch you or see you walking	3.50
133	Rules apply in one neighborhood and not the other	3.55
110	There are no walking trails	3.59
134	Social unrest	3.59
132	People used to look out for each other	3.84
124	Cannot walk through a neighborhood do not know	3.86
95	Parks are pathetic	3.88
137	Sidewalks are not in good condition	3.88
94	Frustrating when want to practice in neighborhood and parks have trash and glass that city does not clean up	4.00
125	Do not know neighbors as well any more	4.00
34	Dogs make the streets less safe	4.03
32	Dogs (pit bulls, Rottweilers) get in the way	4.06
33	Stray dogs	4.06
136	Abandoned houses	4.09
62	Stopped going to parks, schools, etc. because people there with guns	4.16
11	Men use to monitor the neighborhood—not happening now	4.19
138	Some blocks do not have lights	4.19
2	There is nothing in the neighborhood	4.22
113	There are speeders and cars on the street	4.28

Table A1 (continued)

Statement no.	Statement	Importance rating
60	There are gangs on the street	4.31
96	Parks are not safe	4.31
114	Young men hang out on corner, women are afraid to walk by them	4.34
112	Safety issues	4.59
Average values:		3.97
<i>Cluster 5: Law enforcement</i>		
107	There are no bike lanes	3.38
97	When we run we are accused of running from something	3.53
98	Arrested when play outside	3.56
99	Metal detectors and police can make you not want to go in	3.59
100	Police harassing people in the community	3.75
69	“Once kids go outside, parents cannot protect them”	3.91
93	Cannot play in parks (loitering)	3.94
101	Police misjudge if African-American men outside—assume getting into trouble	3.94
102	Police not as friendly in black neighborhoods (white police in black neighborhoods)	3.97
103	Police not as honest in some areas	4.00
104	Air quality in St. Louis is bad at times	4.03
61	Got color zones (different gangs)—cannot go over them	4.19
111	People snatch peoples children	4.32
106	Crime	4.56
Average values:		3.90
<i>Cluster 6: Children</i>		
91	Nails	2.25
70	Kids have too much homework	2.42
71	Young people have too many responsibilities as children	2.59
72	Youth peers do not see one another out there	2.77
147	Video games instead of physical activity	2.84
57	Single-parent homes	2.97
46	Too crowded in gyms at schools to get exercise	3.09
116	Got to have right clothes to exercise in school	3.10
9	Do not walk to school anymore	3.16
55	Need babysitting/child care	3.16
148	Climate	3.22
67	Kids do not know how to get teams going	3.28
6	Kids do not care as much about weight because you can still get stylish clothes that are larger	3.32
16	Middle-class children have bicycles and other things for physical activity	3.41
73	Kids do not do the chores (cleaning, scrubbing) anymore	3.53
68	Kids games/activities	3.56
118	Kids do not go to same school as neighbors, so they do not know each other to play together	3.62
20	Computers	3.63

Table A1 (continued)

Statement no.	Statement	Importance rating
64	Both parents work, so kids come home to no parent and that takes away from doing things together which used to be more active	3.63
22	Not all parents can afford to send kids to soccer, gymnastics, etc.	3.69
65	Children in poverty do not have access to things so they get less physical activity	3.69
117	Integrated schools have more activities than segregated schools	3.71
121	No outside recess	3.82
54	Family responsibilities	3.84
122	Recess or gym is not required for young people	3.86
115	Public schools have eliminated physical activity	3.90
15	Lower-income children qualify for scholarships for day camp and activities and rich kids' parents have money but middle-income children do not qualify and cannot afford the same	3.97
119	Many neighborhood schools are gone	4.00
74	Parents do not monitor kids activities anymore	4.06
120	No more outside sports for schools	4.11
84	Parents do not motivate children	4.13
Average values:		3.43

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