



An Ecological Childhood Obesity Intervention and the Built Environment

A case study on how “Communities Preventing Childhood Obesity” has affected the built environment, the political atmosphere surrounding it, and how citizens interact with their physical environments

ROSS DANIELS

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Wisconsin Project Director: Ann Keim

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Executive Summary

As metabolic illness interventions continue to focus on the relationships between behaviors and broader, environmental contexts, there is an opportunity for urban planners to explore the changes or enhancements such interventions have on the built environment. This paper examines the effects of a social-ecological model (SEM)-based childhood obesity intervention on the built environment and political landscapes of two rural Wisconsin communities. It also explores the intervention's effects on how community residents interact with the built environment, and the effects the coalition has had in the political arena. The method of analysis used is ripple effect mapping (REM), a qualitative mind-mapping exercise. The first ripples represent overarching themes, and are coded based on SEM. Subsequent ripples reflect more granular changes and specific activities, and are coded based on the community capitals framework (CCF). Through an examination of built capital, political capital, and social capital, it was discovered that, although no major changes to the built environment have been completed, there are discussions in the political arenas of both communities that may lead to enhanced infrastructure (e.g., walking, jogging, bicycling). Additionally, coalitions from both communities have undertaken activities that make use of existing infrastructure, such as parks and trails. It was also discovered during data collection that the one coalition includes a planner. This coalition's work in the built environment has been more tangible, and has more momentum, than its counterpart. It is recommended that public health interventions continue to focus on upstream determinants of health; that planners and public health professionals continue to work together on such interventions, and that the coalition is a good platform for doing so; that planning departments provide high-functioning and aesthetically pleasing active transportation infrastructure; and that more research be done on the effects of community coaching on coalitions. It should be noted that this project is part of a seven-state intervention that explores the effects of community coaching (a form of community building) on outcomes within the coalitions and the communities. Because this paper explores only a subset of activities undertaken in one state, conclusions about the effects of community coaching are not discussed. This paper is not experimental in nature, but rather a case study.

1. Introduction

Metabolic illness, a group of diseases that includes coronary heart disease, diabetes, and stroke (NIH, 2015), has reached an epidemic level in the United States. Data from the National Health and Nutrition Examination Survey (NHANES), indicate that 34% of American adults have at least three risk factors for metabolic illness (Aguilar, et al. 2015), which can be seen as the result from a combination of genetic traits and environmental factors.

The built environment has been shown to influence metabolic health, especially in young people. Dengel, et al. (2009), for instance, showed a negative association between adolescent metabolic illness and proximity to parks. Through a multidisciplinary literature review, Rahman, Cushing, and Jackson (2011) — focusing on childhood obesity specifically — concluded that “(i)nterventions that are designed to provide safe, walkable neighborhoods with access to necessary destinations will be effective in combating the epidemic of obesity” (49). These interventions are especially important for rural children. In a cross-sectional analysis of middle school children, Moore and colleagues (2013) found that urban children engaged in 19.2 minutes of moderate-to-vigorous physical activity, as opposed to 15.9 in rural children. Similarly, National Survey of Children's Health data suggest that rural children are at significantly greater risk of overweight and obesity than urban children (Lutifyya, et al. 2007). The development of active transportation infrastructure has shown promise in closing these disparities, particularly in low-income areas. A cross-sectional study of rural communities in Missouri, for example, showed that “(w)alking trails may be beneficial in promoting physical activity among segments of the

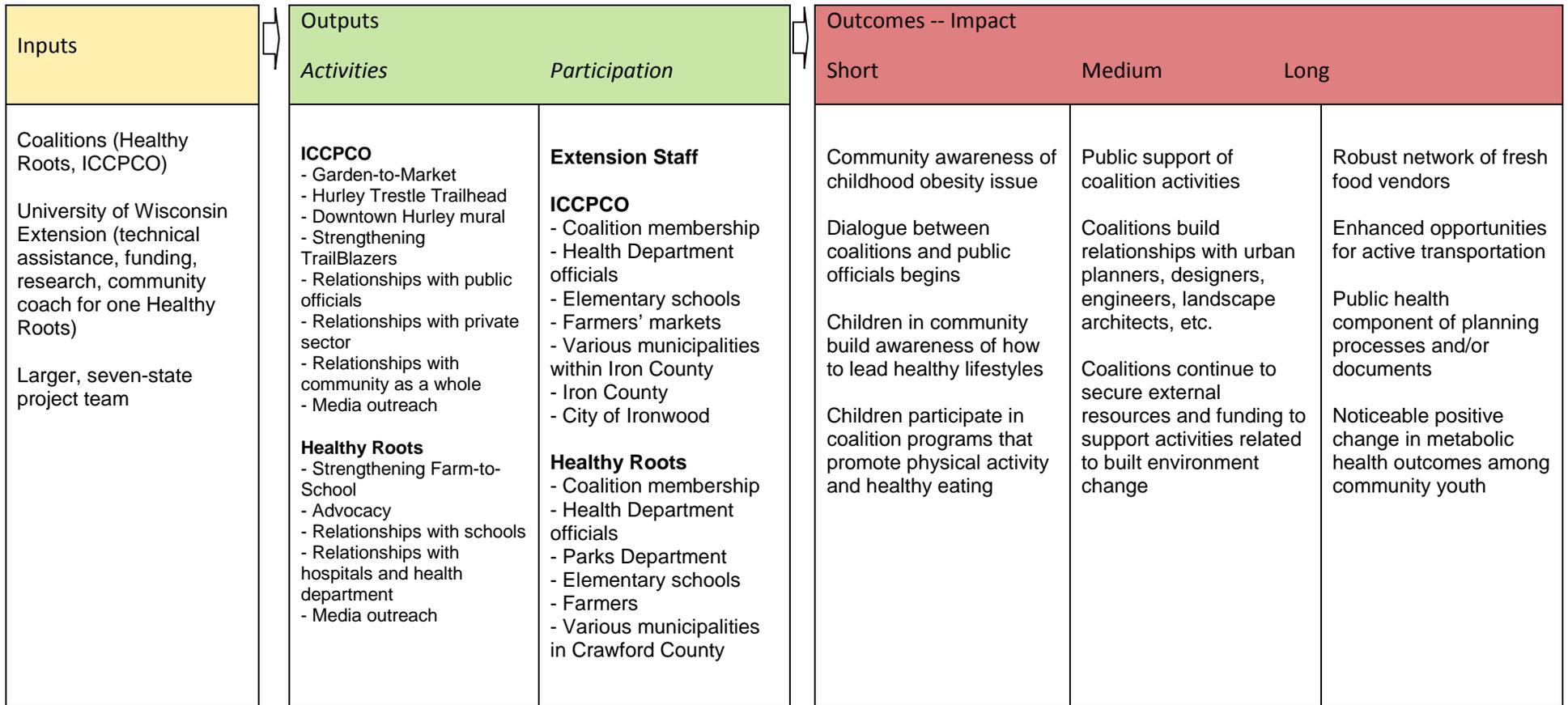
population at highest risk for inactivity, in particular ... persons in lower socioeconomic groups” (Brownson, et al. 2000, 235).

Obesity is a strong predictor of most metabolic illness (Masuzaki, et al. 2001). With 17% of American children obese (Ogden, et al. 2014) and the high likelihood that obese children will continue to be obese into adulthood (Field, Cook and Gillman 2005), it is imperative for early-age interventions that consider environmental inputs. This paper focuses on the implications of one such intervention for the built environment. The primary objective of this project was to answer the following question: Does an ecological childhood obesity intervention affect the local built environment, the political landscape surrounding the built environment, and human interaction with the built environment? Here, “built environment” assumes the definition of Sallis and Glanz (2006): “neighborhoods, roads, buildings, food sources, and recreational facilities in which people live, work, are educated, eat, and play” (90). The political landscape represents the relationships between coalitions and public agencies.

This paper uses the Center for Disease Control and Prevention (CDC) definition of childhood obesity: a body mass index (BMI) at or above the 95th percentile for children and teens of the same age and sex (CDC, 2015). BMI is calculated by dividing a person's weight in kilograms by the square of height in meters.

A logic model outlining the general framework of this paper is shown in Figure 1. The context of this work is Communities Preventing Childhood Obesity (CPCO), a federally funded longitudinal project that explores a wealth of environmental factors on childhood obesity in communities in seven states. This paper focuses on Wisconsin’s communities, based in Crawford and Iron Counties. These counties are predominantly rural, according to the United States Census Bureau (2010), and have median household incomes well below the state average (United States Census Bureau 2015a, b, c). The county-based coalitions that applied for CPCO assistance were also considered by CPCO to have sufficient capacity and knowledge to function effectively. Iron County's coalition (Iron County CPCO, or “ICCPCO”) consisted of members who identified as mainly associated with community organizations, UWEX, higher education, youth organizations, and a ski club. Crawford County's coalition (“Healthy Roots”) has members from community organizations, higher education, youth organizations, a hospital, a local health department, elementary school education, and human services. Most of the work discussed here targeted elementary school-aged children.

Figure 1 – CPCO Wisconsin Built Environment Logic Model



Assumptions

- Coalitions at high capacity before start of project
- Evaluation exercise captures vast majority of programming and changes that have occurred thanks to CPCO

External Factors

- Political turnover
- Change in coalition membership
- Change in whether community receives coaching (Healthy Roots losing coach, ICCPCO is gaining one)

2. Methods

During the five-year course of the project (2011-2016), the University of Wisconsin Extension (UWEX) provided financial support and technical assistance to ICCPCO Healthy Roots. Coalitions selected evidence-based activities they wanted to pursue through their own research or UWEX recommendations, and UWEX approved these activities based on whether they aligned with CPCO’s mission on targeting environmental determinants of health, rather than individual behavioral changes.

In keeping with CPCO’s experimental design, Healthy Roots received the support of a community coach. Community coaches are trained to help coalitions focus conversation during meetings, explore possibilities for action, identify potential partners, solidify goals and objectives, and develop action plans. CPCO coaches attended coalition meetings, recalled experiences from past group-work they encountered that might guide coalition activities, communicated potential partners whenever an idea for a program arose, and reflected situations back to coalitions, often translating negative situations to positive ones (e.g. “what new practices can you adopt?” as a response to “we can’t get anything done”).

Community coaching is a relatively new form of community building that is currently being actively evaluated for its efficacy in a host of spheres, particularly community and economic development. Its effects this project will be explored in the context of the overarching, seven-state intervention. In just one case study, it is not possible to explore patterns or themes that emerged in coached versus un-coached communities.

To explore CPCO’s impacts on communities, ripple effect mapping (REM) exercises were conducted in 2015-16. Like community coaching, REM is a new method, and evaluation of its efficacy is ongoing in academic circles. The Minnesota Social Innovation Lab describes REM as a way to “reflect upon and visually map the intended and unintended changes produced by a complex program or collaboration” (Minnesota Social Innovation Lab n.d.). REM consists of four evaluation methods: one-on-one interviews, group interviewing, mind mapping, and reflection. Coalitions broke into groups of two to three people and discussed the following statement for roughly ten minutes: “Think back and remember a time when you felt most energized/proud to be a part of your coalition.” It was communicated to the coalitions, which work with multiple grants, that their answers should be only include CPCO projects, or projects they felt CPCO made possible. The ensuing group discussions prompted other memories and insights. These “ripples” were written in the form of a spider map on a large piece of poster paper. This map was then cleaned and entered into mind-mapping software XMind 6 (XMind Ltd., Hong Kong).

During REM, it is common practice to identify a few broad overarching themes, and use these themes as the first ripples. Subsequent ripples reflect more specific actions and changes that expand upon these themes. Here, first-level ripples were coded based on the social-ecological model (SEM) of childhood overweight status (Figure 2).

Table 1 – REM codes

1A. Social-Ecological Model (First-level ripples)	
Cod	Definition and examples
S1	Intrapersonal: knowledge, behaviors, attitudes, skills, and self-concept.
S2	Interpersonal: family, friends, provider, work groups, social support groups.
S3	Organizational: schools, daycares, early care and learning, professional groups, work, healthcare clinics, public health departments, social services.
S4	Community: relationships among organizations, institutions, and informational networks within the community area
S5	Public Policy: local, state, national and global laws and policies

1B. Community Capitals Framework (Second- and beyond-level ripples)	
Co	Definition and examples
C1	Natural Capital: assets that are in the location
C2	Cultural Capital: the people’s traditions and language
C3	Human Capital: skills and abilities of people to develop and enhance their resources and to access outside resources and knowledge in order to increase
C4	Social Capital: connections among people and organizations to make things, positive or negative, happen
C5	Political Capital: access to power, organizations, connection to resources and
C6	Financial Capital: financial resources available to invest in community capacity-
C7	Built Capital: the infrastructure supporting the community activities

Developed in 2008 by sociologists at Iowa State University, CCF holds that a community’s level of function is a result of seven “capitals” (Image 2) (ISU Dept. Soc.). CCF is becoming a popular tool for childhood obesity interventions (e.g., Flora & Gillespie, 2009; Valko, et al., 2011).

From the outset, it was determined that political capital and built capital would be explored. When conducting REM, it became evident that social capital often had ramifications for the built environment as well, because these ripples highlight children’s interactions with the built environment. All of these capitals were explored for their implications for planners, and those that were deemed relevant to planning are discussed in depth below.

3. Results

The map for Healthy Roots is shown in Figures 4a-c. The three overarching themes were identified as “increased engagement with public officials” (4a), “greater sense of community connection” (4b), and “increased knowledge and understanding of health” (4c). There were 69 CCF-coded ripples, of which 44 (63.8%) were reflective of social capital, 13 (17.4%) human capital, 5 (7.2%) political capital, 5 (7.2%) financial capital, and 3 (4.4%) built capital. Natural capital and cultural capital were not represented in Healthy Roots’ map.

ICCPCO (Figures 5a-d) uncovered four themes: “youth empowerment” (5a), “capacity in coalition increased” (5b), “elimination of barriers” (5c), and “more comprehensive view of health in the community” (5d). Sixty-four CCF-coded ripples emerged from these themes. Of these, 34 (53.1%) reflected an activity or theme in the sphere of social capital, 9 (14.1%) are coded human capital, 6 (9.4%) political capital, 6 (9.4%) built capital, 5 (7.8%) financial capital, and 4 (6.3%) natural capital. No ripples reflected cultural capital.

4. Analysis and Discussion

With three and five ripples, respectively, built capital and political capital represent only modest portions of Healthy Roots' map. The majority of its interventions targeted social capital, and most of these occurred in schools. The most discussed intervention was Active Schools, a federally promoted program targeting physical education and activity, as well as the involvement of family, community, and designated staff. Healthy Roots members educated area students and teachers on the importance of such an intervention, in addition to providing indoor recess kits (Frisbees, balls, jump ropes, etc.), outdoor recess equipment, and other resources described on Crawford County's UWEX website (Healthy Roots 2014). Schools submitted their own plans on how they would utilize the resources Healthy Roots provided them.

The interplay of the political and built environments is evident in Healthy Roots' map. One of Healthy Roots' ripples coded as "built capital" was titled "built environment," and was an offshoot of the first-level ripple "increased engagement with public officials." Discussed in two ripples, Crawford County's 2014 Community Needs Assessment and Community Health Improvement Plan included Healthy Roots in the context of the county public health department's goal of partnering with local initiatives in order to increase the usage of facilities friendly to physical activity (Crawford County Public Health 2014). To this end, Healthy Roots members spoke about their use of existing infrastructure in the county, particularly parks. Among their most successful programs have been Family Fun Nights and Summer Family Fun Challenge, which take place in community parks. Family Fun Nights include hikes and obstacle courses, while the Summer Family Fun Challenge combines a series of tasks to be undertaken in local parks. For example, children are challenged to "Climb the rock wall, cross the bridge or drive the fire truck! Can you go down all the slides? How many are there?" at a specific park.

Healthy Roots members have spoken to the city of Prairie du Chien's common council about building a pedestrian overpass on the city's busiest thoroughfare. They have done the same regarding a local crosswalk they consider to be unsafe. They have also advocated for a walking/bicycling path in the village of Wauzeka. They indicated that this path is currently under development, and while no action has yet been taken on overpass and crosswalk initiatives, the coalition hopes that a continued dialogue will lead to these improvements.

Through CPCO, Healthy Roots has also addressed food systems through contributing to Crawford County's preexisting Farm-to-School program, which exposes elementary school children to fresh local food at a young age through various programs. "Harvest of the Month," for instance, is a program spearheaded by a coalition dietitian, which distributes a newsletter and healthy recipes to schools, libraries, grocery stores, and libraries.

Similar to Healthy Roots, direct implications for the built environment did not populate the map to the same extent that social capital did. Of the six ripples coded as "built environment," one reflected a garden trellis, and one a set of picnic tables. Also affecting the built landscape was a mural painted by students in downtown Hurley.

The coalition also took advantage of public infrastructure in their programming. The Iron County TrailBlazers program (coded as "social capital"), which ICCPCO members indicate was strengthened as a result of CPCO support, sees children bicycling along county trails to various waterfalls.

ICCPCO derived significant pride in their focus on food. One ripple, under the umbrella of "elimination of barriers," involves a local awareness of gardening. ICCPCO launched Garden-to-Market at Hurley's elementary school. In this program, ICCPCO created a garden at the school, where children grow fruits and vegetables that

they sell at the farmers' market less than a mile away. ICCPCO emphasized that this program not only rejuvenated Hurley's farmers' market, but that its success inspired new farmer's markets throughout the county.

ICCPO has been heavily involved with expanding the Hurley Trestle Trailhead, a non-motorized trail to connect ski trails in Montreal, WI, and Sunday Lake in Wakefield, WI, a distance of over fifteen very scenic miles. This expansion has not yet been fully realized; however, a countywide Regional Trail Committee has partnered with Iron County to submit a grant application (this partnership represents a third-level ripple coded "political capital") that would allow ICCPCO to purchase a portion of a railroad running through the county. ICCPCO indicates that this trail has received buy-in from Iron County Health Department, local business, and youth.

Notably, ICCPCO contains an individual with an educational and professional background in community planning. Because the discussion that produces REM does not single out individuals, instead framing programs as collective efforts, ICCPCO's work was not directly attributed to this individual. However, it is striking how much of ICCPCO's work suggests a knowledge of rural planning mechanisms and framing devices. For example, Iron County UWEX advertises the natural resources the Hurley Trestle Trailhead project as one that "will support tourism in the community by encouraging visitors to stop and enjoy our nature-based outdoor recreation" (Iron County UWEX 2013, 4). It takes advantage of local natural resources and relates it to economic development. Another example is the mural in downtown Hurley, which echoes public art activities that are adopted in formal plans in rural areas like Oil City, PA, and Starksboro, VT (Engh 2013).

The social capital dimension of this intervention provided lessons about the built environment that are just as important as political or infrastructural changes. For both coalitions, changes to the built environment that have already come as a result of CPCO were not large infrastructural projects such as new sidewalks or parks. These changes will require a longer period of time, and perhaps more financial or technical resources, than CPCO had at its disposal. However, items such as playground equipment, picnic tables in parks, and bicycle racks on local buildings became a reality. These changes are not insignificant. Playground equipment and picnic tables make playgrounds and parks more attractive destinations, while new bicycle racks provide free incentive for children to bike. Ripples that speak to the changes brought about by such infrastructure are coded as "social capital." They reflect the utilization of resources, rather than the creation of the resource itself.

Also reflective of social capital is the degree to which each coalition — and by extension community children — made substantial use of existing local infrastructure in its projects. Healthy Roots' use of parks and ICCPO's use of trails and natural features demonstrate that coalitions are seizing upon existing assets in the community that have come about or are preserved thanks to planning. Making use of existing spaces like these can also generate immediate results related to fostering healthy habits, whereas the creation of new spaces for such activities requires time. Because the duration of the project was too short to expect substantial changes to the physical environment, it was seen as important to uncover advances made in the political arena that could potentially advance built environment in the future. This was evident in Healthy Roots' crosswalk and overpass advocacy, as well as in ICCPCO's partnerships with public agencies to advance the Hurley Trestle Trailhead project.

5. Conclusions and Limitations

This case study shows promise for built environment change through an ecological childhood obesity intervention. While no major such changes have yet occurred in the two counties, in large part due to the project's brevity, each coalition has engaged in public dialogue surrounding such changes, and hopes to

accomplish them in the future. The presence of a planner has elevated this dialogue in one community, to the point where a trail project is close to coming to fruition.

This study provides evidence that interventions targeting upstream determinants of health can affect the physical environment, and that these interventions benefit from collaborations between planners and public health professionals. Given the confluence of existing evidence regarding the built environment's relationship with metabolic health and the results from this study, planners are encouraged to collaborate with public health departments in developing and maintaining infrastructure conducive to active transportation and healthy eating. This study also suggests that the coalition structure would be a good avenue for this work. Coalitions, which are distinct from organizations in that they are populated primarily by community members with a unified goal (as opposed to organizations, defined by common interests but not necessarily common goals), have proven sustainable over long timespans (Pluye, Potvin and Denis 2004). Although CPCO assistance concludes in 2016, Healthy Roots and ICCPCO will continue into the future, with funding and technical assistance to support their work.

These coalitions value parks and trails in their work, and they indicate that the community has reacted well. Improving and maintaining existing infrastructure, and advocating for more such features, is important for ensuring the long-term viability of projects targeting environmental determinants of health.

There are several limitations to this work. First, it represents only one part of a study spanning seven states. Observations are encouraging and useful, but no definitive conclusions can yet be derived. Similarly, the scope of this project did not allow for an exploration of community health outcomes (e.g. pre-/posttest BMI). Only environmental conditions were measured. Third, no two coalitions are the same, not just in composition but in readiness and capacity. This is hard to quantify, and it is difficult to say how much differences in outcomes are a result of differences in the composition of the coalitions. Two additional limitations are specific to REM. First, REM heavily emphasizes successes at the expense of failures. Second, in such a brief and fast-paced exercise, it is very possible for coalition members simply to forget about certain accomplishments.

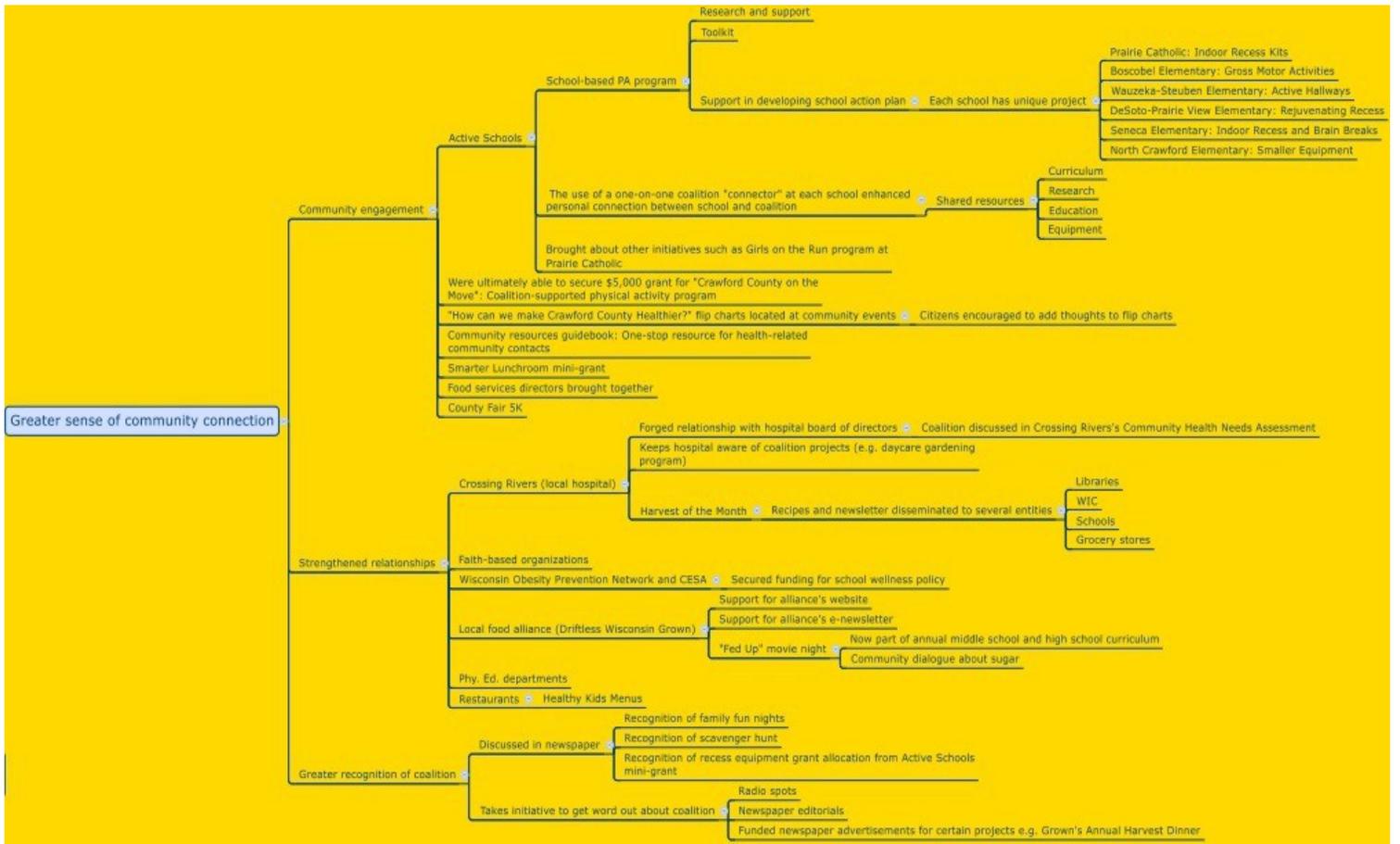
This study is part of a broader dialogue between planning and public health. Projects with an emphasis on community-driven change can help bolster our understanding of how planning and public health can collaborate to create healthy communities. This study demonstrates that, by targeting a certain sphere of health (metabolic illness, specifically childhood obesity), such projects can change the local physical and political landscapes to accommodate healthy behaviors. Planners bring to the table an understanding of what is doable in their communities. If a coalition wants to create a new park, will the local zoning code allow for it? Does a local zoning code need to be created? Will a new trail require an easement? Will the city or county need to obtain any property through purchase or eminent domain? Planners can answer these questions, and in doing so transcend a project beyond an idea. Additionally, the public recognition of such projects might create the opportunity to devise and develop official local parks plans or transportation plans in locations where perhaps none exist. If a project (e.g. a trail project) crosses counties, it might also provide an opportunity to tap into regional planning resources. The ramifications for communities are far-reaching. Public spaces can be rejuvenated, food systems enhanced, and opportunities for active transportation can exist where they never have before.

Figure 4 – Healthy Roots REM

4a. Increased engagement with public officials



4b. Greater sense of community connection



4c. Increased knowledge and understanding of health

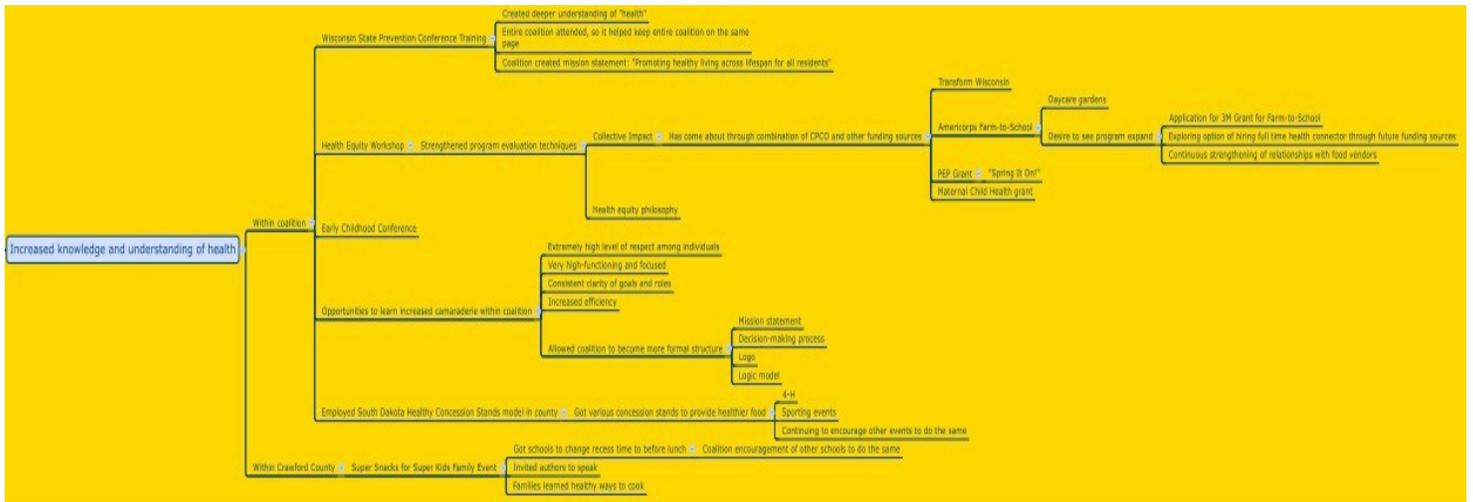
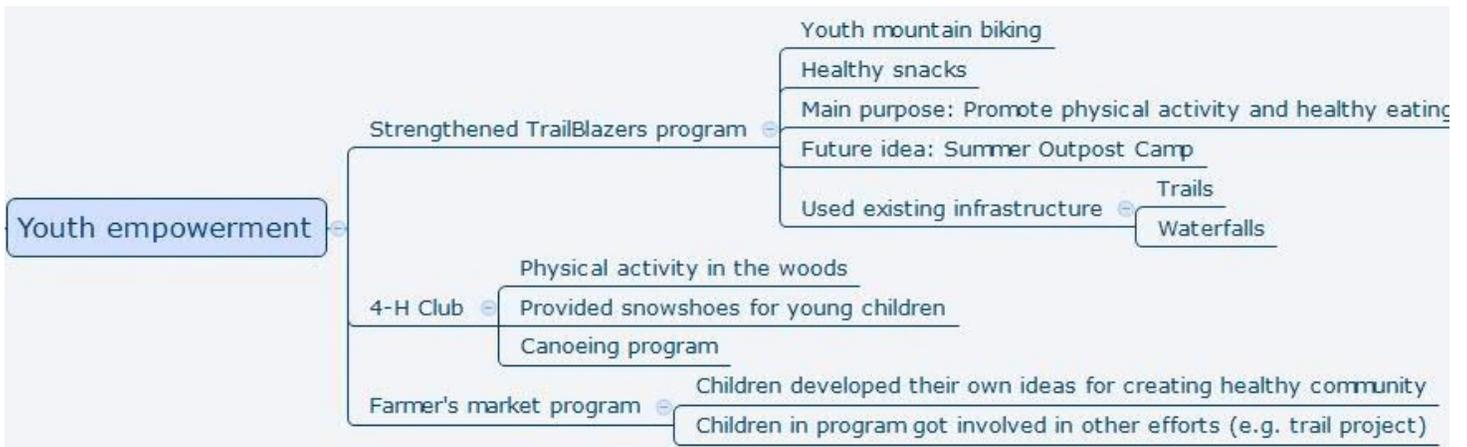
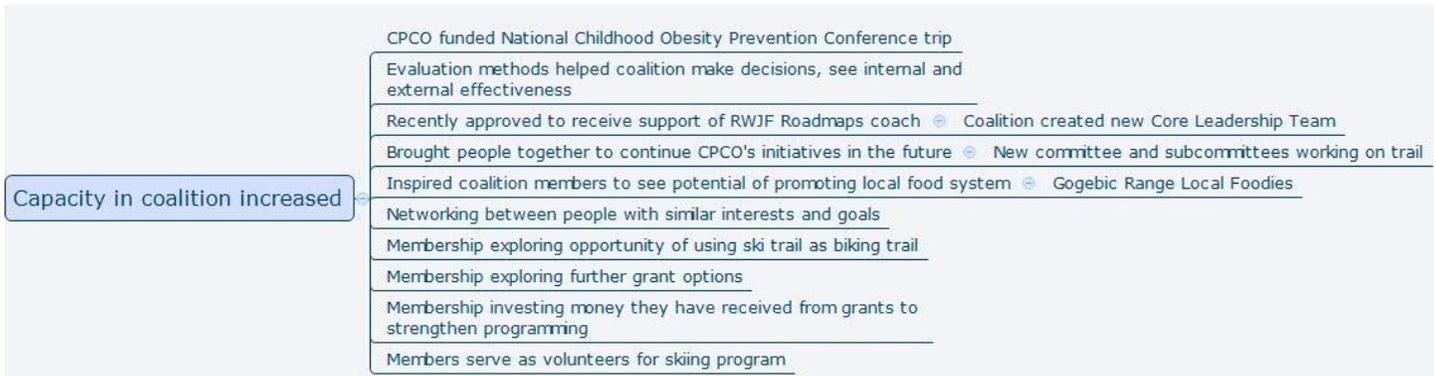


Figure 5 – ICCPCO REM

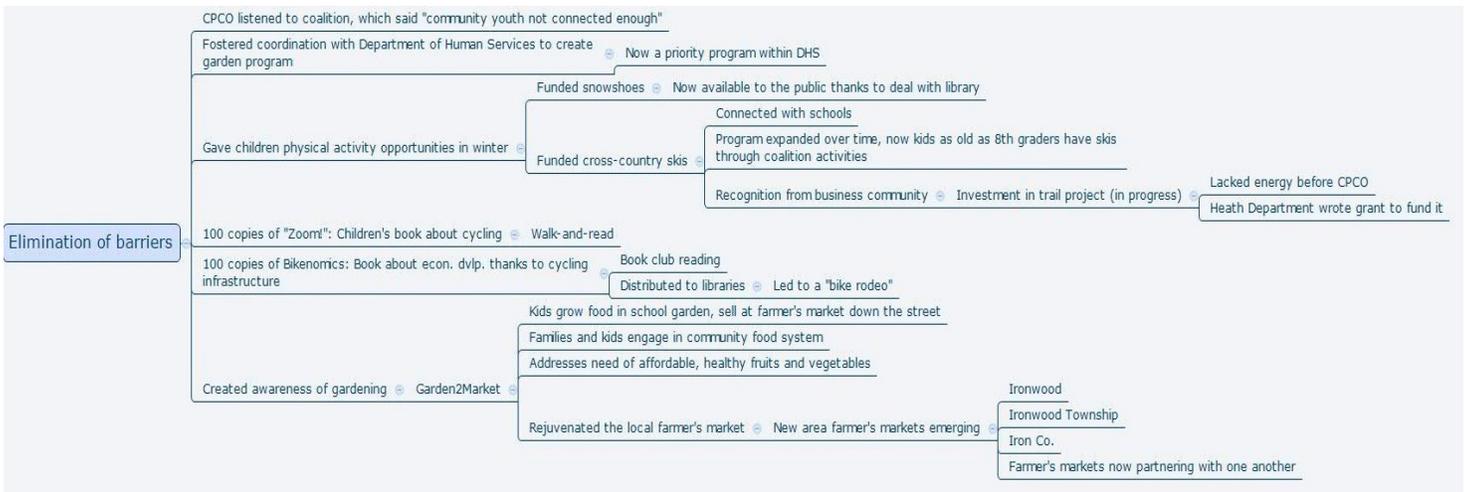
5a. Youth empowerment



5b. Capacity in coalition increased



5c. Elimination of barriers



5d. More comprehensive view of health in the community



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