Systems Thinking in Communities:

Understanding the Causes of Inactivity, Poor Diet/Nutrition, and Childhood Obesity in Omaha, Nebraska

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Introduction

Live Well Omaha is one of 49 community partnerships participating in the national *Healthy Kids, Healthy Communities* program of the Robert Wood Johnson Foundation (www.healthykidshealthycommunities.org). The purpose of this *Live Well Omaha* project was to introduce systems thinking at the community level by identifying the essential parts of the Live Well Omaha system and how the system influences policy and environmental changes to promote healthy eating and active living as well as to prevent childhood obesity. To accomplish this goal, community partners and residents participated in a group model building session and discussions. The group model building exercises were designed by staff from Transtria LLC and the Social System Design Lab at Washington University in St. Louis, Missouri as part of the *Evaluation of Healthy Kids, Healthy Communities* funded by the Robert Wood Johnson Foundation. These exercises actively involved a wide range of participants in modeling complex systems and provided a way for different representatives (e.g., government agencies, universities, and community-based organizations) to better understand the systems (i.e., dynamics and structures) in the community (see the *Healthy Kids, Healthy Communities Group Model Building Facilitation Handbook*, www.transtria.com/hkhc). Overall, the evaluation was designed to assess policy, system, and environmental changes as a result of the community partnerships' efforts to increase healthy eating and active living in order to reduce childhood obesity.

Omaha, Nebraska: Background and Local Participation

Omaha, Nebraska is the 42nd largest city in the United States, with a population of 408,958 and a metropolitan area of more than 813,000. Omaha and Douglas Counties have a strong history of involvement in healthy eating and active living initiatives, including Active Living by Design, Pioneering Healthy Communities, Communities Putting Prevention to Work, and Community Transformation Grant.

The partnership focused its efforts on the eastern most portion of the City of Omaha, following approximately 42nd Street north to State Street and south to Harrison Street. This area boasts a population of over 121,000, and 25% (30,470) are children between the ages of 3 and 18. Fifty-three percent of project area residents are White, 25% are Black, 18% are Hispanic, 4% are other ethnicities. These statistics differ significantly from demographics of Omaha at large (73% White, 14% Black, 13% Hispanic or Latino, 7% Other). Forty-one percent of children aged 12 to 19 in the project report having an unhealthy BMI.

Live Well Omaha (LWO) served as the lead agency for the partnership, and both LWO and the Douglas County Health Department (DCHD) coordinated the partnership's efforts. Originally named the Our Healthy Community Partnership, LWO was established in 1995 as a result of the vision of the Director of the Douglas County Health Department to have local health systems work together to improve community health. The partnership was comprised of over 52 public and private members and organizations, including city and county governments, nonprofits, federally qualified health centers and major insurance companies. Member organizations participated in the Collaborating Council, which met quarterly to inform and be informed by the efforts of the initiatives, participate in organization planning, and network with other members. The main purpose of the LWO partnership was to improve the health of the community through a collaborative process. LWO brought people and organizations together to advocate for change and address health issues in the city of Omaha and greater Douglas County.

Live Well Omaha's Priorities and Strategies

The partnership and capacity building strategies of *Live Well Omaha* included:

- **Community Garden Network:** DCHD created and facilitated a Community Garden Network. The network was a grassroots, informal association of local food advocates who maintain and support a growing network of over 60 community gardens.
- **Food Policy Council:** The council sought to develop policy recommendations and implementation strategies, educate the public and key stakeholders, and promote collaboration around developing and supporting a sustainable local food system.

The healthy eating and active living strategies of *Live Well Omaha* included:

- **Comprehensive Planning:** The partnership collaborated to provide input and recommendations for the City of Omaha's update to the Omaha Master Plan.
- **Farmers' Markets:** The partnership collaborated to create new farmers' markets, expand existing produce stands, and establish acceptance of Supplemental Nutrition Assistance Program and Electronic Benefit Transfer (SNAP/EBT) at area markets.
- **Community Gardens:** Douglas County Health Department collaborated with the Community Garden Network to support community gardens and expand the Community Garden Network. The network supported 66 gardens, up from 9 in 2009.The partnership was successful in securing a written policy for lease agreements with the City of Omaha for community gardeners.
- **Active Transportation:** The partnership collaborated to implement policy and environmental changes throughout Omaha and Omaha Public Schools. LWO developed and supported a Safe Routes to School initiative to establish policies and implement environmental changes for safe, active transportation to school.

For more information on the partnership, please refer to the Omaha case report (www.transtria.com/hkhc).

Systems Thinking in Communities: Omaha, Nebraska

"Systems thinking" represents a range of methods, tools, and approaches for observing the behaviors of a system (e.g., family, community, organization) and how these behaviors change over time; changes may occur in the past, present, or future. Figure 1 illustrates a system of policies, environments, local collaborations, and social determinants in Omaha, Nebraska that influence healthy eating, active living, and, ultimately, childhood obesity. This system and the dynamics within the system are complicated with many different elements interacting.

Models, such as Figure 1, provide a way to visualize all the elements of the system and their interactions, with a focus on causal relationships as opposed to associations. Through the model, specific types of causal relationships, or feedback loops, underlying the behavior of the dynamic system, can be identified to provide insights into what is working or not working in the system to support the intended outcomes (in this case, increases in healthy eating and active living, and decreases in childhood overweight and obesity). In system dynamics, the goal is to identify and understand the system feedback loops, or the cause-effect relationships that form a circuit where the effects "feed back" to influence the causes.

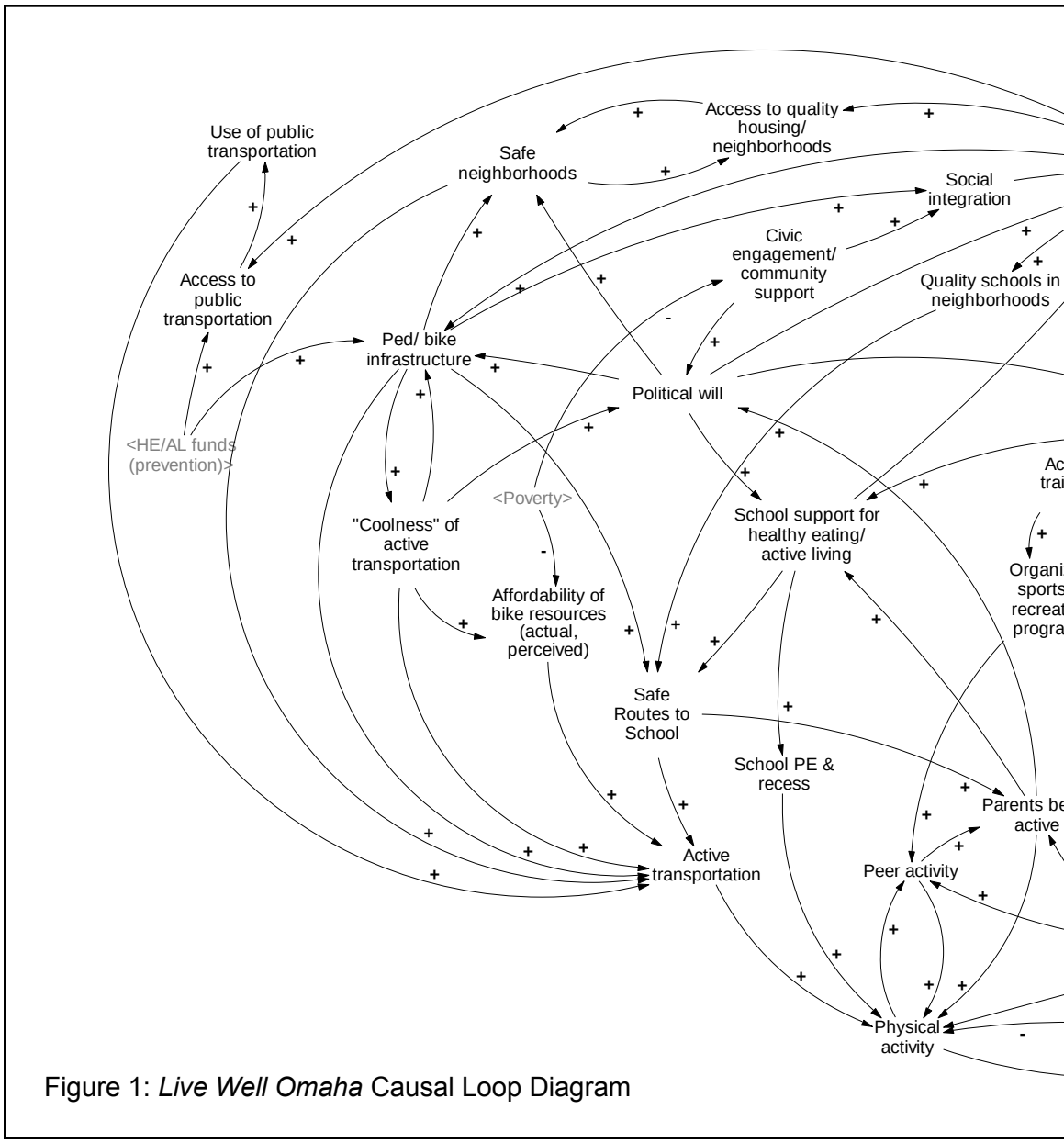
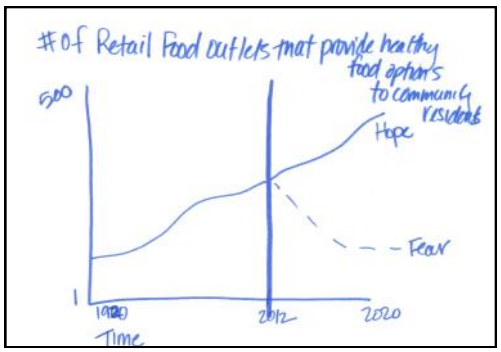


Figure 1: *Live Well Omaha* Causal Loop Diagram

Group Model Building

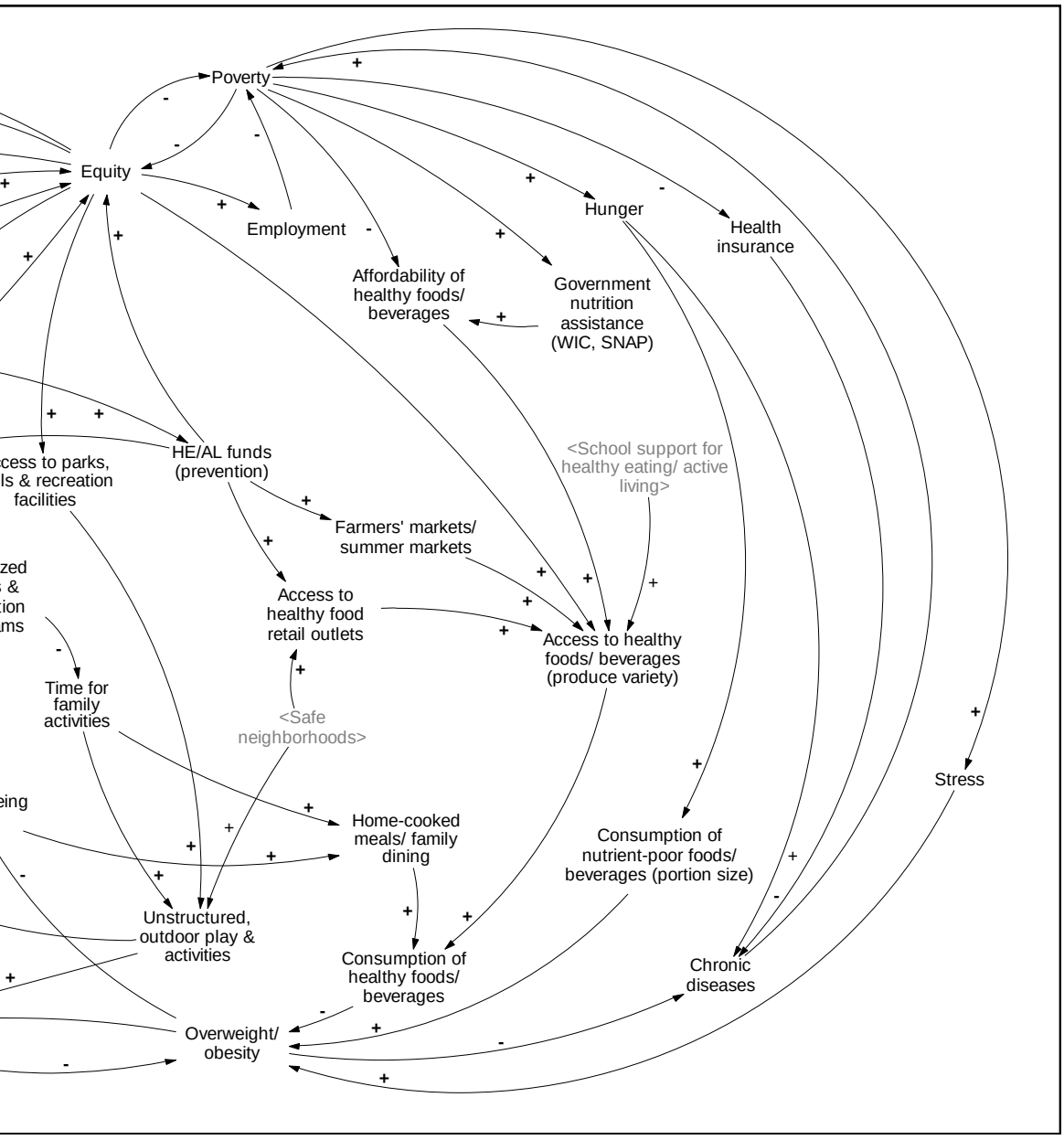
Members of the *Live Well Omaha* partnership participated in a group model building session in April, 2012 and generated this system. also referred to as a causal loop diagram (Figure 1). Participants in the group model building session included representatives from government agencies, universities, and community-based organizations, and advocates. The group model building session had two primary activities: 1) a Behavior Over Time Graph exercise; and 2) a Causal Loop Diagram (or structural elicitation) exercise.



Behavior Over Time Graphs

To identify the range of things that affect or are affected by policy, system, and environmental changes in Omaha related to healthy eating, active living, and childhood obesity, participants designed graphs to name the influences and to illustrate how the influences have changed over time (past, present, and future). In this illustration for healthy food retail outlets, the number of outlets with healthy good options has increased over time and the participant hopes

that this increase will continue into the future. Each graph is a tool to increase the use of common, specific language to describe *what* is changing in the community as well as *when*, *where*, and *how* it is changing. The graphs capture participants' perceptions of the influence, or variable, and through the graph, the participant tells their story. These perceptions are based on actual data or evidence, or they are part of the participants' lived experience.



Causal Loop Diagram

To examine the relationships among the variables from the behavior over time graphs, participants worked together and with facilitators to develop a causal loop diagram. In Figure 1, the words represent variables of quantities that can increase and decrease over time (i.e., the behavior over time graphs). These variables are influenced by other variables as indicated by the lines with arrows. The lines with arrows represent causal relationships - this is what is known about the system and how it behaves.

One feedback loop is: parents being active → physical activity → peer activity → parents being active.

What is important to notice is that there are other feedback loops interacting simultaneously to influence or to be influenced by parents being active . Some variables may increase parents being active while other variables limit it. Determining the feedback loop or loops that dominate the system's behavior at any given time is a more challenging problem to figure out, and ultimately, requires the use of computer simulations.

Based on this preliminary work by the *Live Well Omaha* partnership, this "storybook" ties together the behavior over time graphs, the participants' stories and dialogue, and feedback loops from the causal loop diagram to understand the behavior of the system affecting health in Omaha, Nebraska and to stimulate greater conversation related to Omaha's theory of change, including places to intervene in the system and opportunities to reinforce what is working. Each section builds on the previous sections by introducing concepts and notation from systems science.

Causal Loop Diagram for the Childhood Obesity System

The causal loop diagram (CLD) represents a holistic system and several subsystems interacting in Omaha, Nebraska. In order to digest the depth and complexity of the diagram, it is helpful to examine the CLD in terms of the subsystems of influence. Because of this project's focus on healthy eating, active living, and childhood obesity, this system draws attention to a number of corresponding subsystems, including: healthy eating policies and environments (red), active living policies and environments (blue), health and health behaviors (orange), partnership and community capacity (purple), and social determinants (green).

From the group model building exercises, several variables and causal relationships illustrated in Figure 2 were identified within and across subsystems. This section describes the subsystems in the CLD.

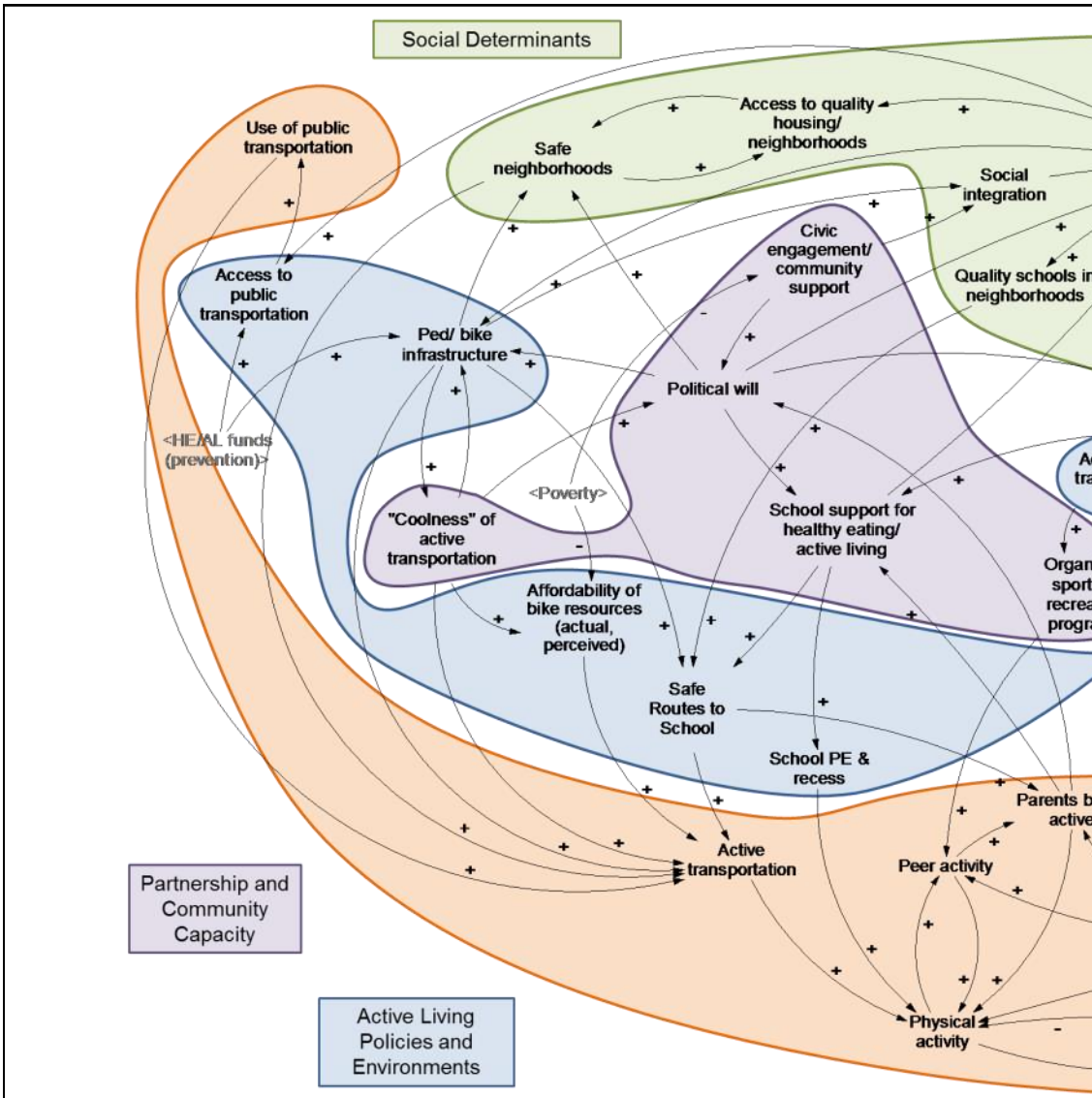


Figure 2: Subsystems in the *Live Well Omaha* Causal Loop Diagram

Healthy Eating Policies and Environments (Red)

The healthy eating policy and environmental subsystem includes food production, food distribution and procurement, and food retail. During the behavior over time graphs exercise, the participants generated eleven graphs related to policy or environmental strategies (e.g., farmers' markets or summer markets) or contexts (e.g., government nutrition assistance) that affected or were affected by the work of *Live Well Omaha*. The variables represent participants' conversations from the behavior over time graph and causal loop diagram exercises.

Active Living Policies and Environments (Blue)

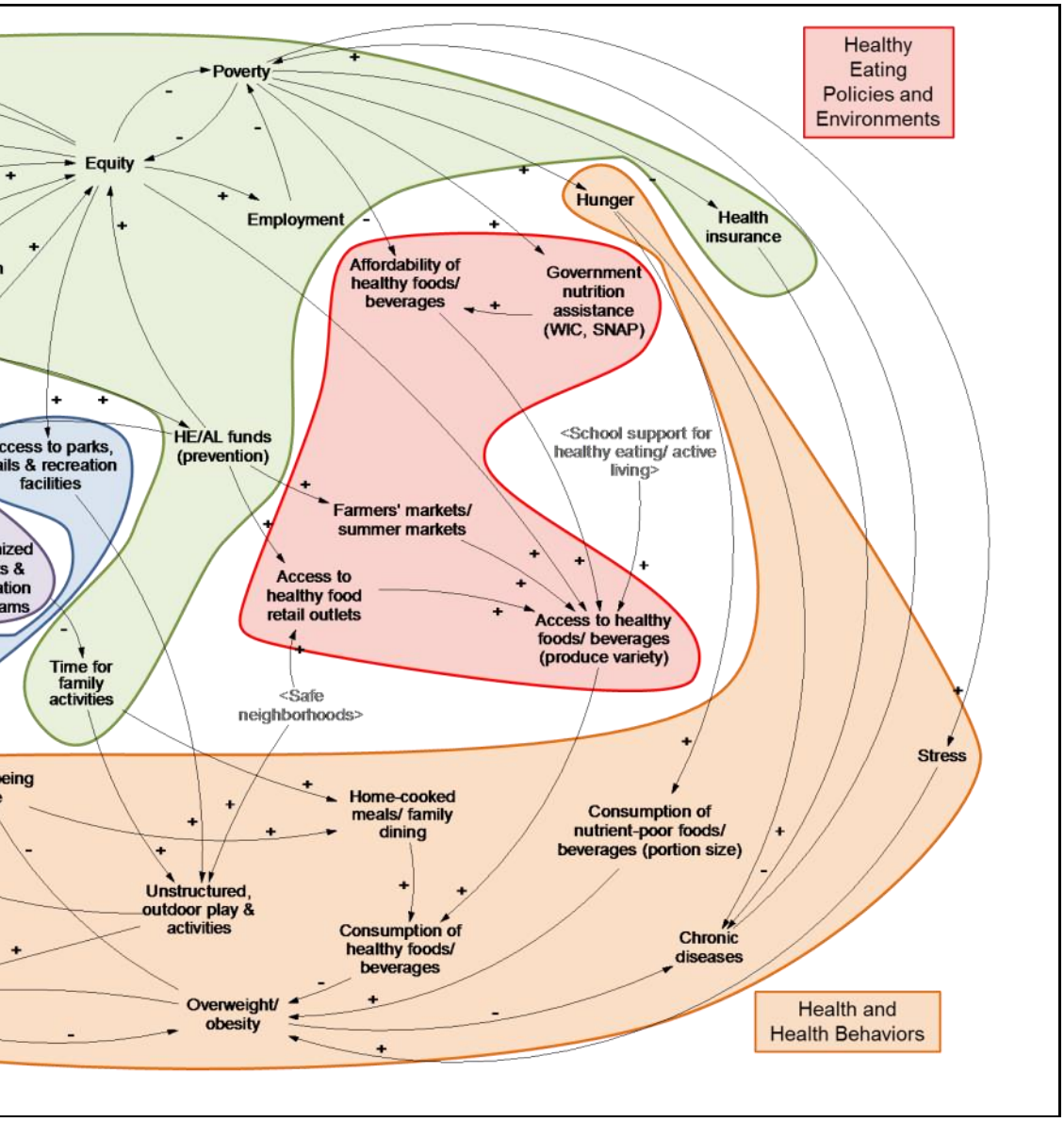
The active living policy and environmental subsystem includes design, planning, construction, and enforcement or maintenance related to access to opportunities for active transportation and recreation. For this topic, the group model building participants developed three graphs related to policy or environmental strategies (e.g., Safe Routes to School) or contexts (e.g., affordability of bike resources) that affected or were affected by the partnership's work.

Health and Health Behaviors (Orange)

The subsystem for health and health behaviors includes health outcomes (e.g., obesity), health behaviors (e.g., healthy eating, physical activity), and behavioral proxies or context-specific behaviors (e.g., active transportation, unstructured play and activities, home-cooked meals and family dining).

Partnership and Community Capacity

The partnership and community capacity subsystem refers to the ways communities organized and rallied for changes to the healthy eating and active living subsystems. For instance, *Live Well Omaha* worked to build political will for healthy eating in the community through a food policy council. This subsystem also includes community factors outside the partnership that may influence or be influenced by their efforts, such as the "coolness" of active transportation.



Social Determinants

Finally, the social determinants subsystem denotes societal conditions (e.g., poverty, social integration) and psychosocial influences (e.g., perceptions of neighborhood safety) in the community that impact health beyond the healthy eating and active living subsystems. In order to achieve health equity, populations and subgroups within the community must have equitable access to these resources and services.

Each one of these subsystems has many more variables, causal relationships (arrows), and feedback loops that can be explored in greater depth by the *Live Well Omaha* partners or by other representatives in Omaha, Nebraska. Using this CLD as a starting place, community conversations about different theories of change within subsystems may continue to take place.

The next sections begin to examine the feedback loops central to the work of *Live Well Omaha*. In these sections, causal relationships and notations (i.e., arrows, "+" signs, "-" signs) from Figure 2 will be described to increase understanding about how systems thinking and modeling tools can work in communities to increase understanding of complex problems that are continuously changing over time, such as childhood obesity. At the end of this CLD storybook, references to other resources will be provided for those interested in more advanced systems science methods and analytic approaches.

Farmers' Markets Feedback Loop

To simplify the discussion about feedback loops, several loops drawn from the *Live Well Omaha* CLD (see Figures 1 and 2) are shown in Figure 3. While the CLD provides a theory of change for the childhood obesity prevention movement in Omaha, Nebraska, each feedback loop tells a story about a more specific change process.

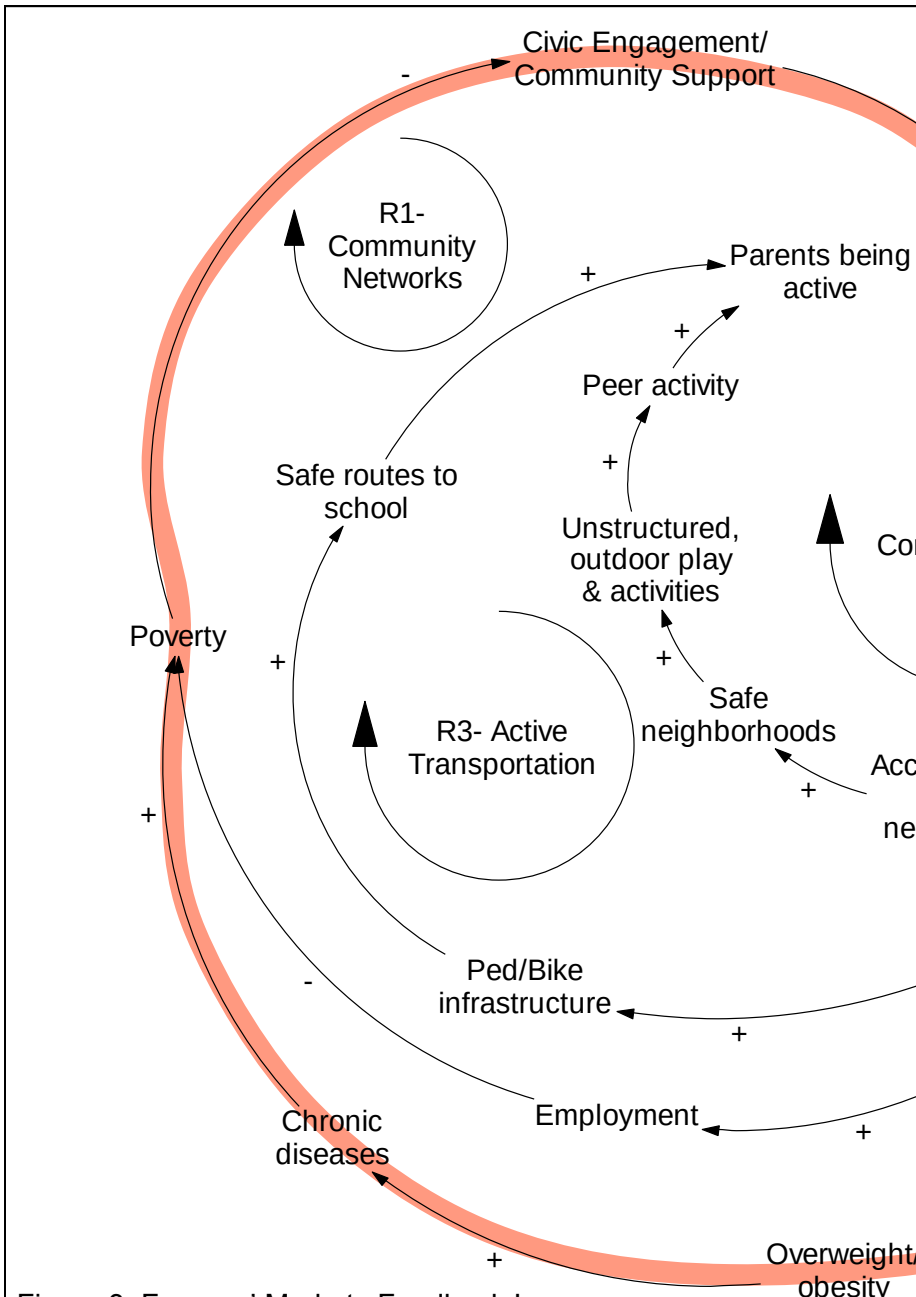


Figure 3: Farmers' Markets Feedback Loop

Causal Story for Feedback Loop

Story A: In this case , the story is about farmers' markets (red highlighted loop in Figure 3). Omaha, Nebraska partners created new farmers' markets, expanded existing produce stands, and established acceptance of Supplemental Nutrition Assistance Program using Electronic Benefit Transfer (SNAP/EBT) machines at area markets. Participants described how farmers' markets improve access to healthy foods and beverages, increasing consumption of these foods and beverages and reducing overweight, obesity, and associated chronic diseases. In turn, less chronic disease morbidity and mortality decreases poverty (e.g., burden of health care costs). With less poverty, there is greater civic engagement and community support to develop the political will to invest funds in healthy eating initiatives that support farmers' markets.

Story B: While the preceding story reflected a positive scenario for Omaha, Nebraska, the same feedback loop also tells the opposite story. A lack of farmers' markets reduces access to fresh produce, particularly in food deserts. As a result, residents consume less healthy foods and beverages and rates of overweight and obesity increase, contributing to higher rates of chronic diseases. Poorer health increases poverty and, consequently, reduces the civic engagement and community support necessary to build political will to increase funds for healthy eating initiatives that support farmers' markets.

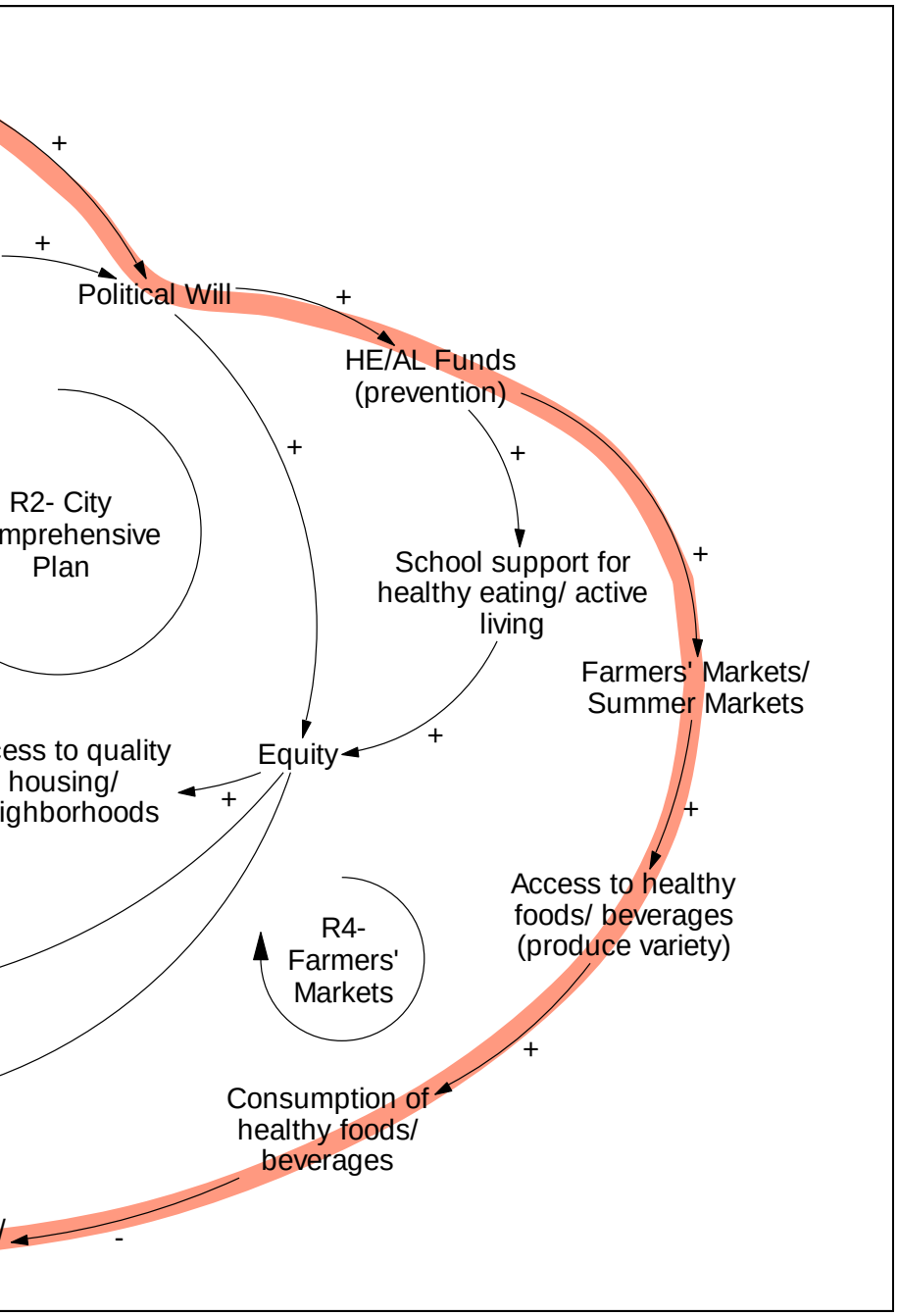
Reinforcing Loop and Notation

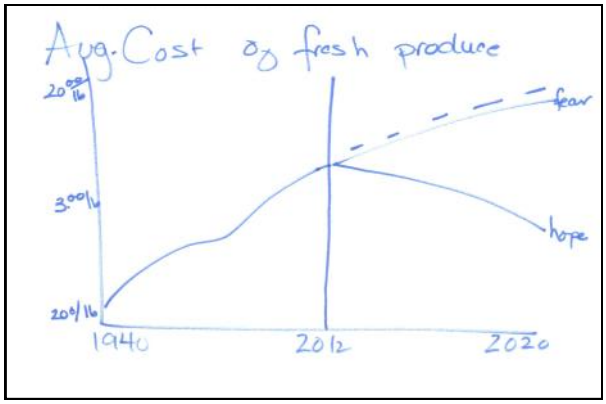
These stories represent a reinforcing loop, and the notation in the feedback loop identifies it as a reinforcing loop (see "R4 — Farmers' Markets" and red highlighted loop in Figure 3). The words represent variables of quantities that increase and decrease as illustrated in the stories above. These variables change over time and are influenced by other variables as indicated by the arrows. Each arrow represents a causal relationship, and the plus and minus signs on the arrows indicate whether or not the influence of one variable on another variable (1) increases/adds to (plus or

"Poverty also leads to a… lack of access to healthy foods… and, arguably, hunger. You can be hungry and not have enough to eat and not have access to healthy foods, but because you are hungry you might have to eat foods that are unhealthy [and not nutrient-dense]. And, the consumption of nutrient poor foods is then the link to obesity." (Participant)

"+" sign), or (2) decreases/removes from the other variable (minus or "-" sign). These signs are referred to as polarities.

In a reinforcing loop, the effect of an increase or decrease in a variable continues through the cycle and returns an increase or decrease to the same variable, respectively.





Looking specifically at the "+" or "-" notation, a feedback loop that has zero or an even number of "-" signs, or polarities, is considered a reinforcing loop. Balancing loops, with an odd number of "-" signs in the loop, are another type of feedback loop.

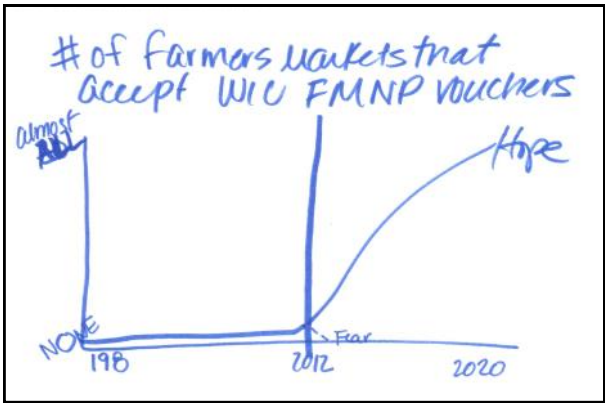
In isolation, this reinforcing loop represents the influence of farmers' markets on consumption of healthy food and beverages and overweight and obesity. To understand other influences on these variables, it is important to remember that this reinforcing loop is only one part of the larger CLD (see Figures 1 and 2), and the other loops and causal relationships can have an impact on the variables in this loop.

<u>System Insights for *Live Well Omaha*</u>

Participants identified a relatively steady increase in the average cost of fresh produce since the 1940s, and, at the same time, an absence of farmers' markets that accept Women, Infant, and Children (WIC) Farmers' Market Nutrition Program (FMNP) vouchers to help offset these costs in Omaha, Nebraska (see behavior over time graphs).

From the systems thinking exercises, several insights can inform partners' farmers' market strategy. For instance, efforts to reach out to people in poverty to increase their civic engagement in order to build political will for funding to support farmers' markets can have the dual benefit of reducing poverty and increasing health.

In addition to these insights, systems thinking can also help to pose key questions for assessment and evaluation, including evaluating relationships between chronic diseases and poverty as well as poverty and civic engagement, or assessing the long -term cost savings associated with investing in WIC FMNP vouchers in order to improve health and reduce disease.



Opportunities for Systems Thinking in Omaha, Nebraska

This storybook provided an introduction to some basic concepts and methods for systems thinking at the community level, including: causal loop diagrams, variables, causal relationships and polarities, reinforcing feedback loops, and balancing feedback loops, among others. For the *Live Well Omaha* partners, this storybook also summarized the healthy eating, active living, partnership and community capacity, social determinants, and health and health behaviors subsystems in the Omaha causal loop diagram as well as an example feedback loop corresponding to the partnership's primary strategies.

This causal loop diagram reflects a series of conversations among partners and residents from 2011 to 2013. Some discussions probed more deeply into different variables through the behavior over time graphs exercise, or causal relationships through the causal loop diagram exercise.

This represented a first attempt to collectively examine the range of things that affect or are affected by policy, system, and environmental changes in Omaha, Nebraska to promote healthy eating and active living as well as preventing childhood overweight and obesity.

Yet, there are several limitations to this storybook, including:

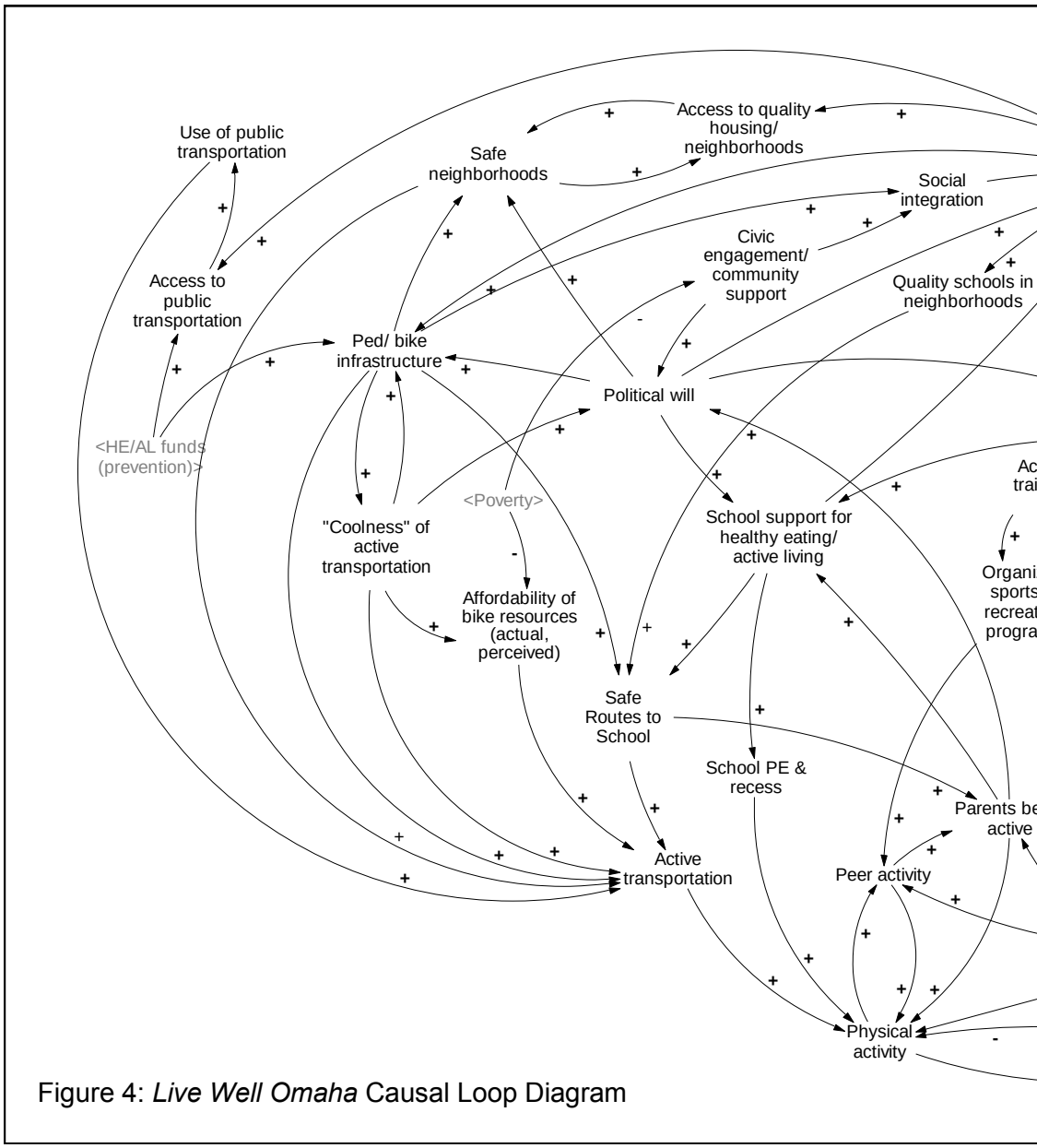
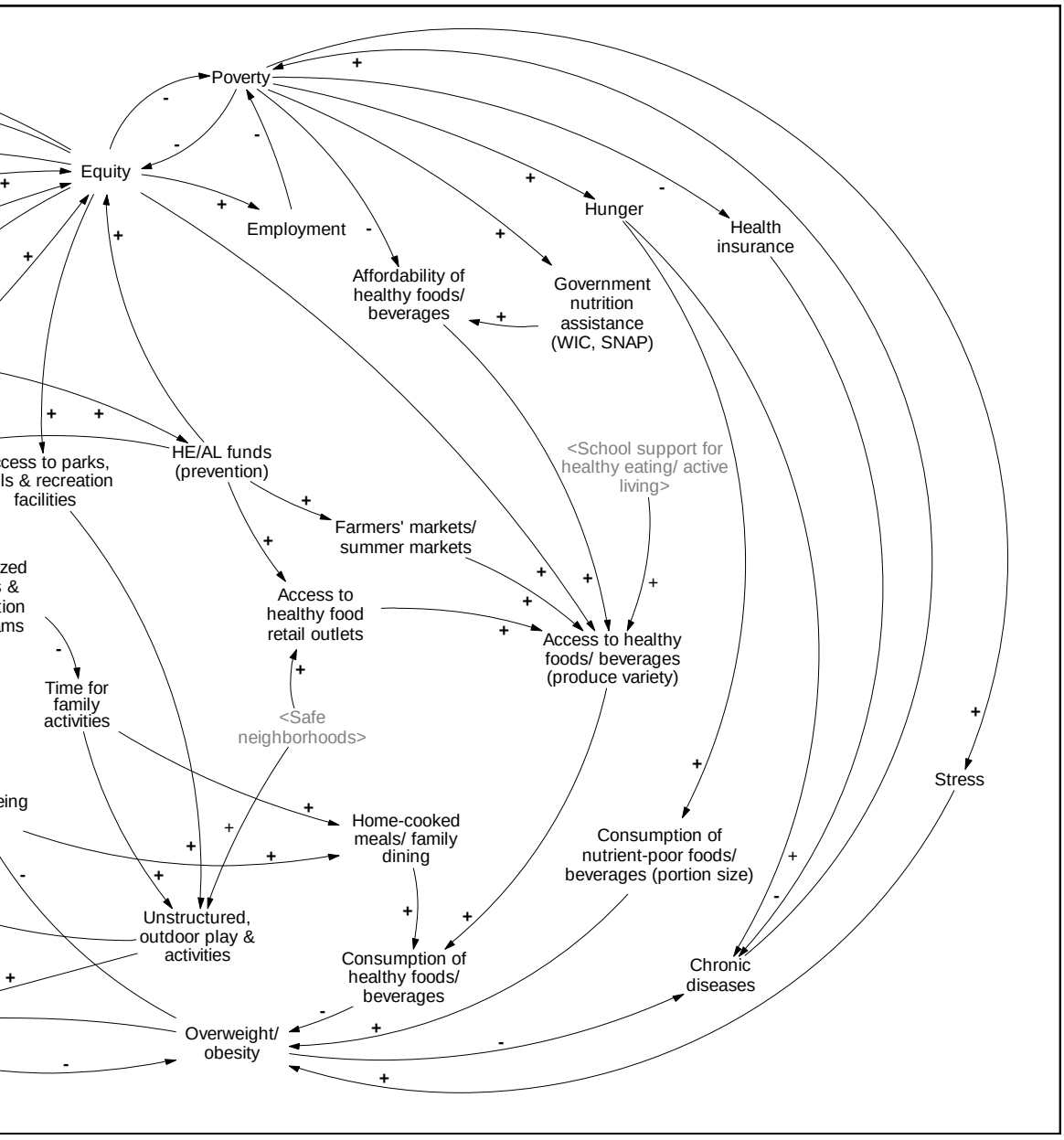


Figure 4: *Live Well Omaha* Causal Loop Diagram

- the participants represent a sample of the *Live Well Omaha* partners (organizations and residents) as opposed to a representative snapshot of government agencies, community organizations, businesses, and community residents;
- the behavior over time graphs and the causal loop diagram represent perceptions of the participants in these exercises (similar to a survey or an interview representing perceptions of the respondents);
- the exercises and associated dialogue took place in brief one- to two-hour sessions, compromising the group's capacity to spend too much time on any one variable, relationship, or feedback loop; and
- the responses represent a moment in time so the underlying structure of the diagram and the types of feedback represented may reflect "hot button" issues of the time.

Much work is yet to be done to ensure that this causal loop diagram is accurate and comprehensive, for example:

- having conversations to discuss existing feedback loops to ensure that the appropriate variables and relationships are represented accurately;
- reviewing the behavior over time graphs (see also Appendix E) to confirm that the trends reflect common perceptions among residents and compare these trends to actual data;



- revisiting variables removed because they were not part of feedback loops, including active neighborhood design, urban density, pollution, automobile use, locally grown produce, demand for nutrient-poor foods/ beverages, public transportation stigma, suburban sprawl, government subsidies for produce, fast food restaurants, advertising & marketing for unhealthy foods/beverages, screen time, racial or SES segregation; and
- starting new conversations about other variables (behavior over time graphs exercise) or relationships (causal loop diagram exercise) to add to this diagram.

In addition, different subgroups in Omaha may use this causal loop diagram to delve in deeper into some of the subsectors (e.g., healthy eating, active living) or feedback loops, creating new, more focused causal loop diagrams with more specific variables and causal relationships.

Use of more advanced systems science methods and analytic approaches to create computer simulation models is another way to take this early work to the next level. The references section includes citations for resources on these methods and analytic approaches, and it is necessary to engage professional systems scientists in these activities. Please refer to the Appendices for more information, including:

- Appendix A: Behavior over time graphs generated during site visit
- Appendix B: Photograph of the original version of the *Live Well Omaha* Causal Loop Diagram
- Appendix C: Original translation of the causal loop diagram into Vensim PLE
- Appendix D: Transcript translation of the causal loop diagram into Vensim PLE
- Appendix E: Behavior over time graphs not represented in the storybook

References for Systems Thinking in Communities:

Group model building handbook:
Hovmand, P., Brennan L., & Kemner, A. (2013). Healthy Kids, Healthy Communities Group Model Building Facilitation Handbook. Retrieved from http://www.transtria.com/hkhc.

Vensim PLE software for causal loop diagram creation and modification:
Ventana Systems. (2010). Vensim Personal Learning Edition (Version 5.11A) [Software]. Available from http://vensim.com/vensim-personal-learning-edition/

System dynamics modeling resources and support:
Andersen, D. F. and G. P. Richardson (1997). "Scripts for group model building." System Dynamics Review 13(2): 107-129.

Hovmand, P. (2013). Community Based System Dynamics. New York, NY: Springer.

Hovmand, P. S., et al. (2012). "Group model building "scripts" as a collaborative tool." Systems Research and Behavioral Science 29: 179-193.

Institute of Medicine (2012). An integrated framework for assessing the value of community-based prevention. Washington, DC, The National Academies Press.

Meadows, D. (1999). Leverage points: places to intervene in a system. Retrieved from http://www.donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/

Richardson, G. P. (2011). "Reflections on the foundations of system dynamics." System Dynamics Review 27 (3): 219-243.

Rouwette, E., et al. (2006). "Group model building effectiveness: A review of assessment studies." System Dynamics Review 18(1): 5-45.

Sterman, J. D. (2000). Business dynamics: Systems thinking and modeling for a complex world. New York, NY: Irwin McGraw-Hill.

System Dynamics in Education Project. (1994). Road maps: A guide to learning system dynamics. Retrieved from http://www.clexchange.org/curriculum/roadmaps/

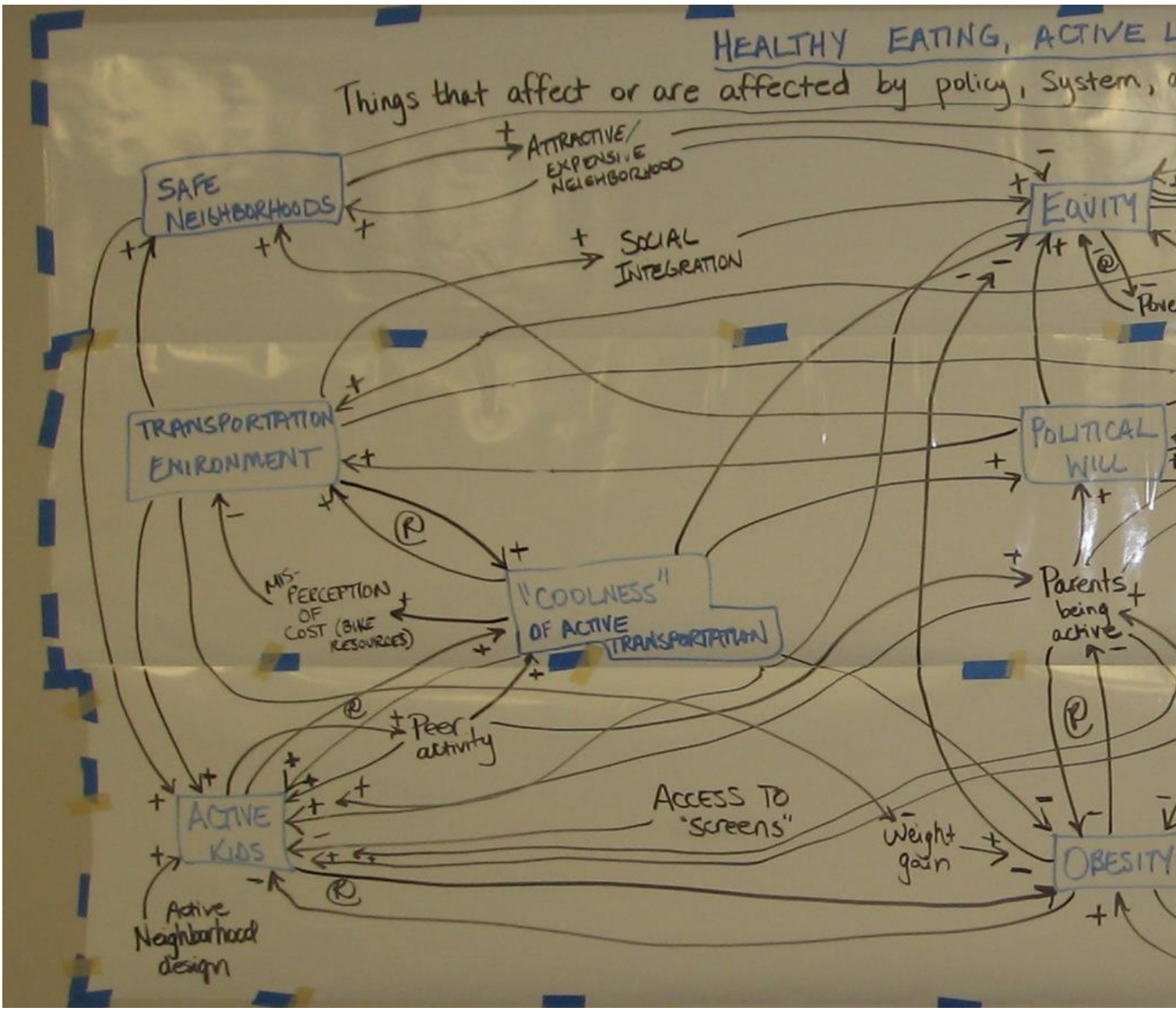
Vennix, J. (1996). Group model building. New York, John Wiley & Sons.

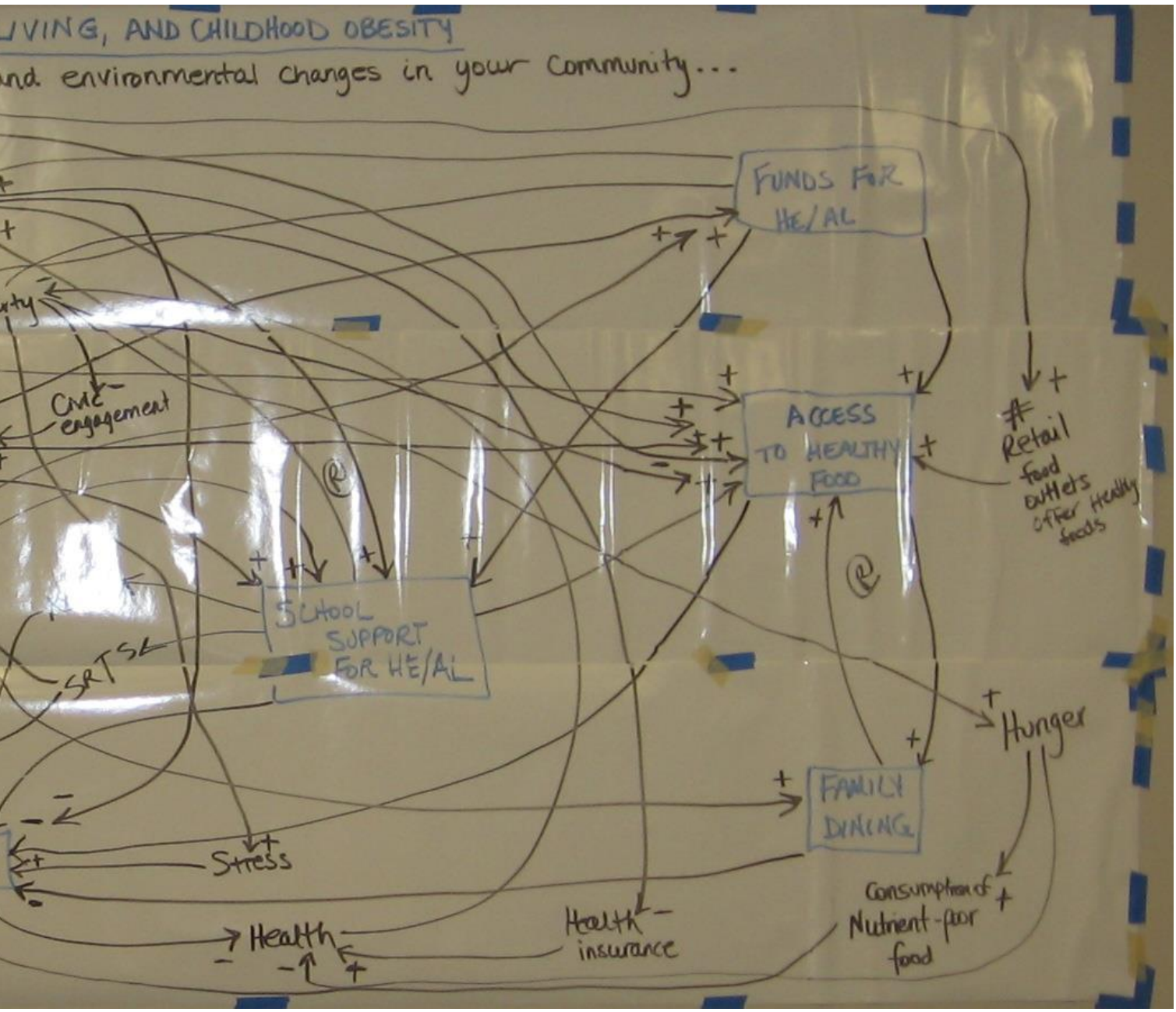
Zagonel, A. and J. Rohrbaugh (2008). Using group model building to inform public policy making and implementation. Complex Decision Making. H. Qudart-Ullah, J. M. Spector and P. I. Davidsen, Springer-Verlag: 113-138.

Appendix A: Behavior Over Time Graphs Generated during Site Visit

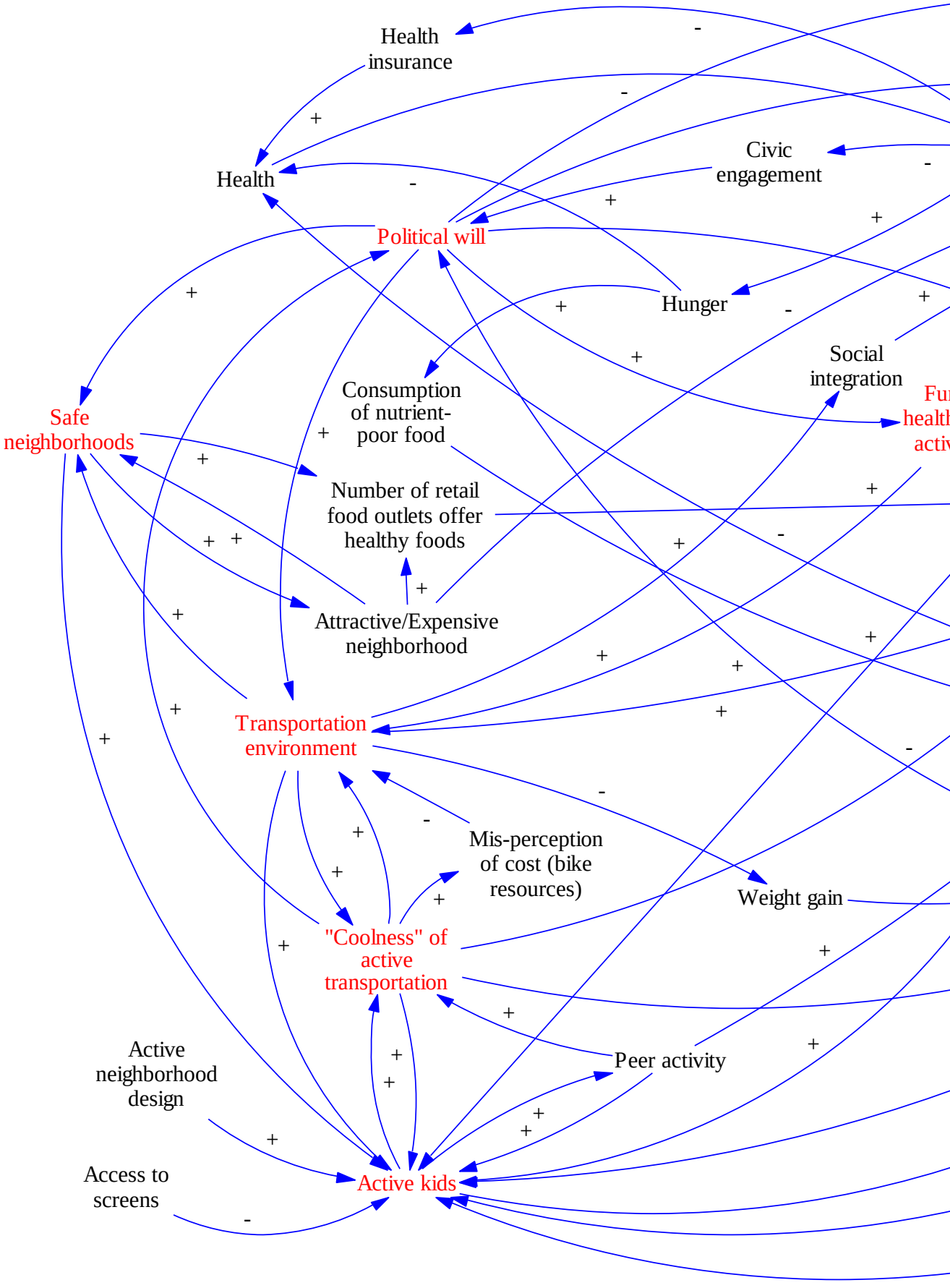
Omaha, Nebraska: *Live Well Omaha*	
Categories	**Number of Graphs**
Active Living Behavior	0
Active Living Environments	3
Funding	0
Healthy Eating Behavior	4
Healthy Eating Environments	7
Marketing and Media Coverage	0
Obesity and Long Term Outcomes	4
Partnership & Community Capacity	0
Policies	0
Programs & Promotions (Education and Awareness)	0
Social Determinants of Health	3
Total Graphs	**21**

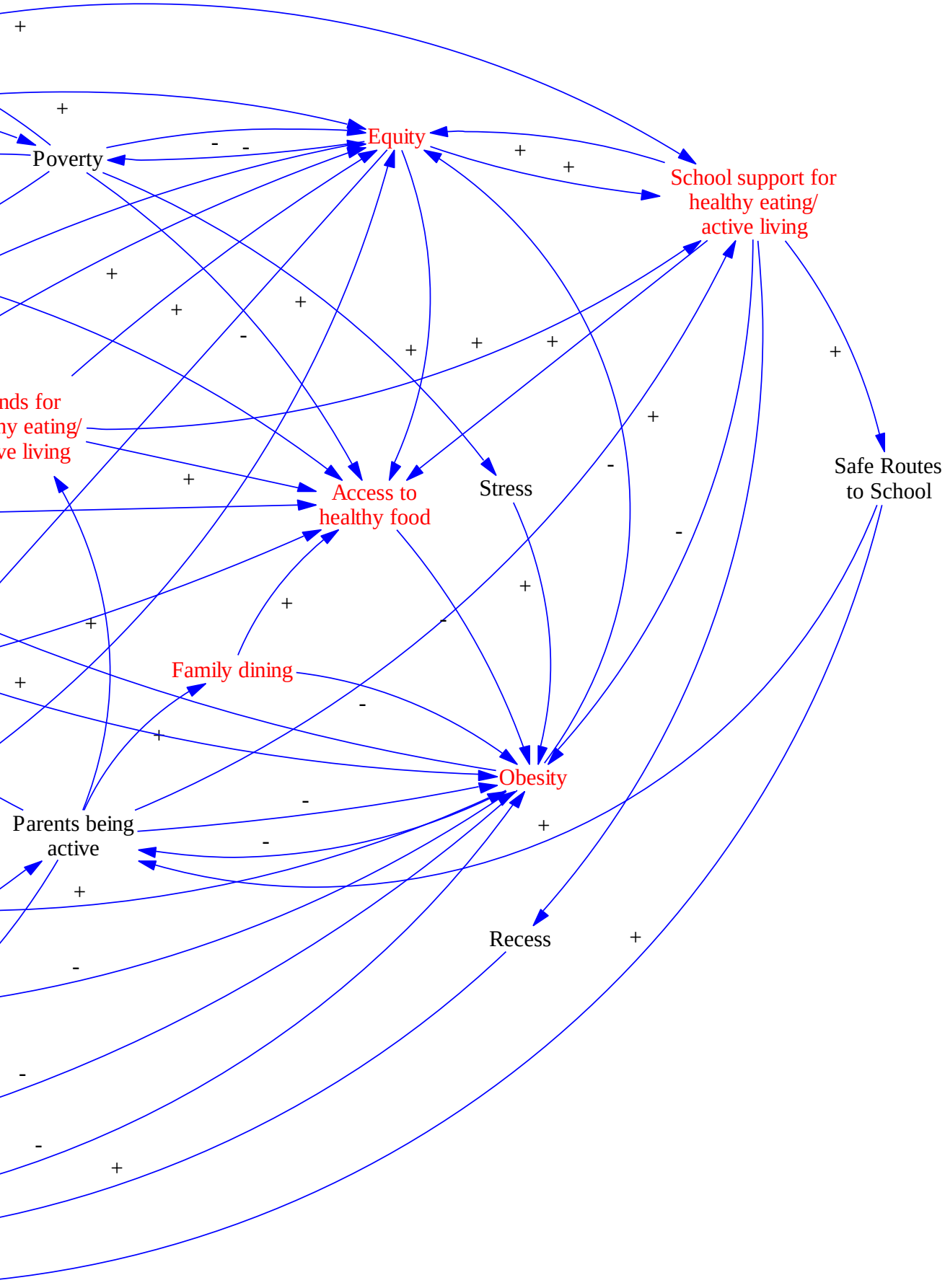
Appendix B: Photograph of the Original Version of the *Live Well Omaha* Causal Loop Diagram



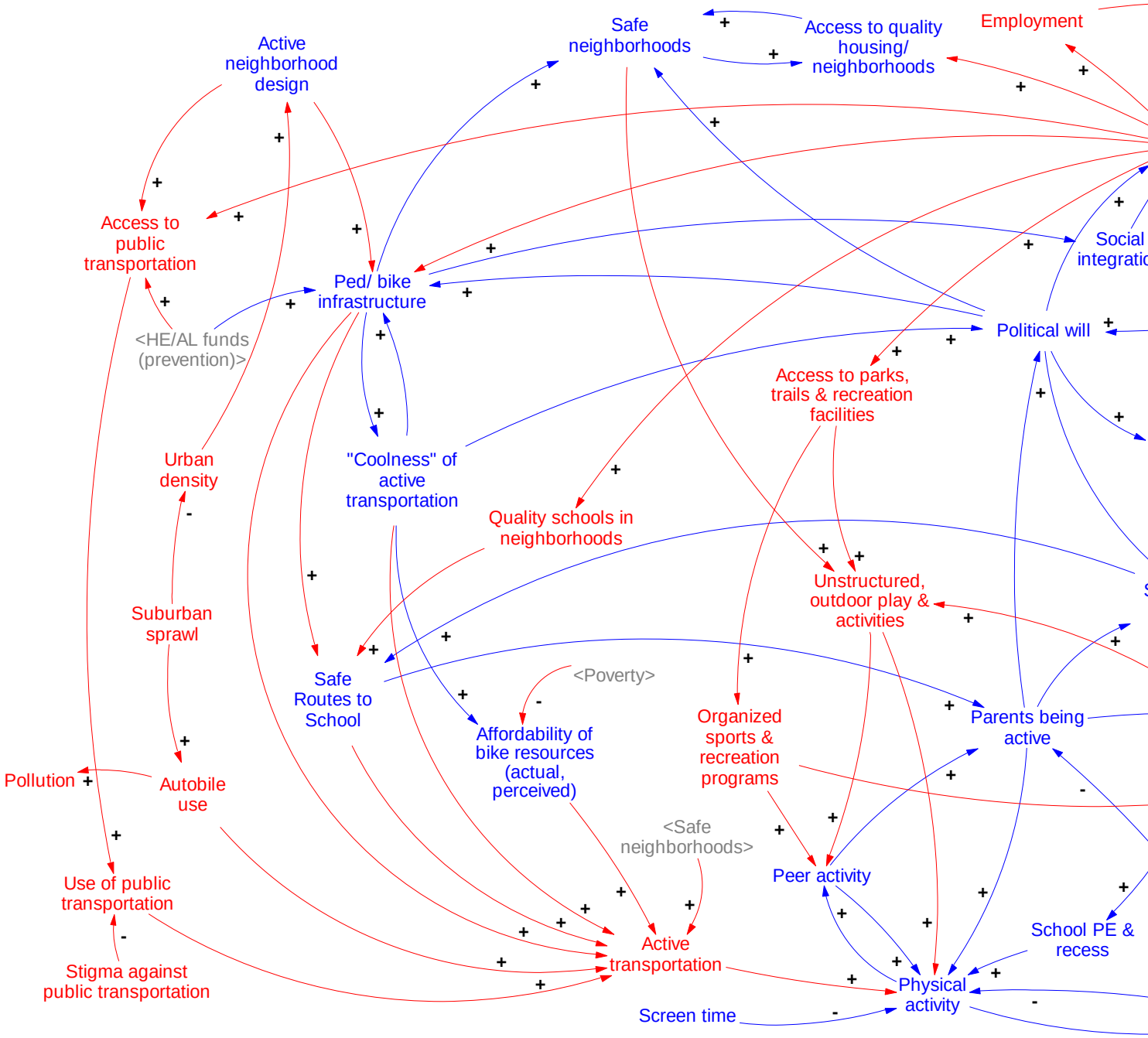

LIVING, AND CHILDHOOD OBESITY
and environmental changes in your community...
FUNDS FOR HE/AL
Civic engagement
ACCESS TO HEALTHY FOOD
Retail food outlets offer Healthy foods
SCHOOL SUPPORT FOR HE/AL
SRTS
Hunger
FAMILY DINING
Stress
Health
Health insurance
Consumption of Nutrient-poor food

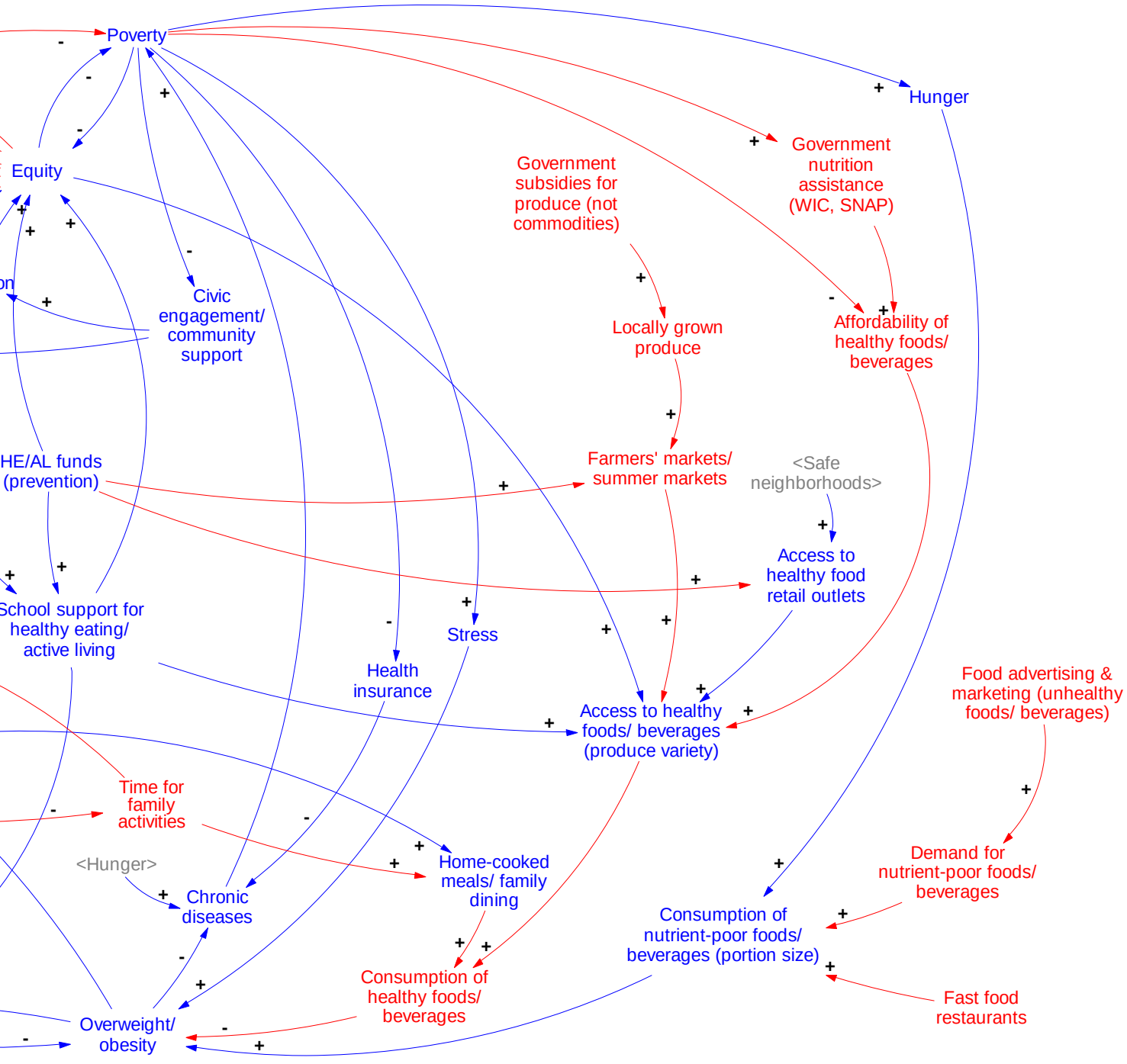
Appendix C: Original Translation of the Causal Loop Diagram into Vensim PLE




Equity
Poverty
School support for
healthy eating/
active living
nds for
ny eating/
ve living
Access to
healthy food
Stress
Safe Routes
to School
Family dining
Obesity
Parents being
active
Recess

Appendix D: Transcript Translation of the Causal Loop Diagram into Vensim PLE




Poverty
Hunger
Equity
Government nutrition assistance (WIC, SNAP)
Government subsidies for produce (not commodities)
Civic engagement/ community support
Locally grown produce
Affordability of healthy foods/ beverages
HE/AL funds (prevention)
Farmers' markets/ summer markets
<Safe neighborhoods>
Access to healthy food retail outlets
School support for healthy eating/ active living
Stress
Health insurance
Food advertising & marketing (unhealthy foods/ beverages)
Access to healthy foods/ beverages (produce variety)
Time for family activities
Demand for nutrient-poor foods/ beverages
<Hunger>
Home-cooked meals/ family dining
Chronic diseases
Consumption of nutrient-poor foods/ beverages (portion size)
Consumption of healthy foods/ beverages
Fast food restaurants
Overweight/ obesity

Appendix E: Behavior Over Time Graphs not Represented in the Storybook