THE ROLE OF SOCIAL CAPITAL IN CHANGING DIETARY BEHAVIOR
IN A LOW-INCOME MULTI-ETHNIC COMMUNITY

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DEDICATION

This dissertation is dedicated to my beloved husband, Steven, and my two children, Emma and Robin, who allowed me to turn their lives upside-down in order to make the work happen.
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ABSTRACT

Poor dietary quality contributes to health disparities experienced by low-income populations. Although prior studies have examined factors shaping dietary behavior among individual ethnic groups, there is little knowledge about structural factors shaping dietary decisions within multi-ethnic low-income communities. Low-income households have fewer resources for purchasing healthy food, and greater demands on the economic, time and labor resources required for meal preparation. With limited economic resources, families may rely on social capital resources to manage food within the household. However, social capital structures within a multi-ethnic community are likely to be complex.

This dissertation explores the role of social capital in shaping dietary behavior in a multi-ethnic low-income Asian and Pacific Islander community in Hawai‘i. The first study presents findings from a systematic literature review on the operationalization of social capital theory in nutrition research. This review identifies the primary theories of social capital underlying nutrition research, and the measures of social capital commonly used in this research.

The second and third studies report on empirical research conducted in Kalihi, a low-income multi-ethnic neighborhood of Honolulu, Hawaiʻi. The second study uses qualitative methods to understand the dimensions of social capital within the community, and the ways that social capital affects household nutrition behaviors. The third study uses network analysis to assesses linkages between community organizations, mapping the structure of institutional social capital within the community.

Together, these studies suggest that families in low-income multi-ethnic communities rely on social capital to provide resource for nutrition, and this reliance shapes dietary behavior. Social capital structures within this community, however, do not fit the theory and measures of social capital most commonly used in nutrition research. Improved theory and measure selection would strengthen the utility of social capital theory as a tool for understanding nutrition behavior. Individual social capital operates through extended family and ethnic group ties, not neighborhood geography. Access to bridging capital was primarily through family connections with childcare and faith-based institutions, but churches were poorly connected in the nutrition network. Building institutional social capital through increasing linkage between these organizations could provide support for improved nutrition across the community.
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CHAPTER 1: INTRODUCTION

Problem Statement

Poor dietary quality contributes to obesity in both children and adults, and to chronic conditions such as diabetes, stroke, and cardiovascular disease\(^1\). Poor nutrition and obesity are closely linked with poverty and food insecurity\(^2\), and contribute to existing disparities in life expectancy between populations\(^3\). While health disparities have complex causes, the combination of over-nutrition and malnutrition found in the dietary patterns of very low-income individuals in the U.S. may contribute substantially to the disproportionate burden of diabetes, heart disease, stroke, and other chronic conditions in these populations\(^4\).

Consuming a healthy diet can be difficult for any household, but for low-income families, making “the healthy choice” can require more time, resources, and skills than are readily available\(^5,6\). Low-income parents often have less time, more responsibilities, and more life stressors and constraints than middle- or higher-income families\(^6\). The cost of fruits and vegetables is a substantial barrier for those with limited resources\(^7\).

Concerns about food insecurity place additional challenges on household nutrition. When people are worried about hunger, they typically manage this concern through increased reliance on low-cost foods with high satiation values – foods that are typically high in sugar, fat, and salt, and associated with a high likelihood of caloric overconsumption\(^4\). This phenomenon appears to be particularly concentrated among families with children, and among individuals who regularly experience food insecurity.

In Hawai’i, health disparities research has tended to focus on racial and ethnic disparities in health. There is evidence to suggest, however, that disparities in income and socioeconomic status (SES) between ethnic groups may be a substantial contributor to the link between ethnicity and health disparities\(^8,9\).

In Hawai’i, both poverty and food insecurity are disproportionately concentrated among Native Hawaiians, Filipinos, and Pacific Islanders\(^10\). These same populations bear a disproportionate burden of diabetes and heart disease in Hawai’i\(^11,12\). Hawai’i also has the highest proportion of multi-racial, multiethnic individuals in the U.S., and in Hawai’i individuals who self-identify as ethnically “mixed” show higher levels of poverty and greater health disparities than the general population\(^13\).

In the State of Hawai’i, it has been estimated that 19.2% of the overall population is food insecure, including 4.7% who are experiencing hunger\(^10\). The highest levels of food insecurity are found in households below 100% of the federal poverty limit, representing the poorest Hawai’i residents, and those who are most likely to be receiving federal food assistance. Individuals below 130% of the federal poverty level in Hawai’i consume significantly fewer fruits and vegetables, are less likely to use low-fat milk, and are more likely to be consuming a high-fat diet than the average Hawai’i resident\(^14\).
While there has been substantial research on developing diabetes-prevention and nutrition interventions for specific populations in Hawai‘i, there is little information to inform the design of an effective campaign for reducing diet-related health disparities among low-income multi-ethnic communities in Hawai‘i.

**Literature Review**

Substantial research has been conducted on the issues involved in promoting healthier dietary behavior among specific low-income ethnic minority communities in the continental United States. This research suggests that a community-based, rather than individual approach, may be the most effective way to reduce nutrition-related health disparities among Hawai‘i’s low-income, multiethnic communities. There is also a growing emphasis on developing programs that work within the social setting, and that take into account the role of social connections between individuals.

Dietary choices are often conceptualized as personal, individual-level behaviors. However individual dietary choices can be shaped by social, cultural, and economic forces disseminated through a community’s social network. Food preparation and consumption behaviors are laden with social and cultural meaning, and are part of normative role performance within social groups. The sharing of food and meal preparation is a form of resource-sharing within social groups. In addition to its social values, food is also an economic good, and access to healthy food is closely linked to access to other economic resources.

Thus, efforts to change nutrition behaviors within a community must take into account both food as an economic good, and the construction of food consumption and food access behaviors within social networks.

One theoretical paradigm that links these two concepts is that of social capital. While social capital has been defined in a number of different ways, the simplest definition of social capital is “the resources that are accessible to an individual through their social networks.”

This definition of social capital emerges from post-structuralist sociological theory, and is closely linked with the work of Pierre Bourdieu. Bourdieu, building upon Weber, hypothesizes that capital, which provides access to resources within a social system, takes three different forms -- economic, cultural, and social. These three forms are closely interrelated. For example, economic capital increases opportunities for social connections to individuals who control economic resources (social capital). These increased connections can be converted into knowledge about how to affect legislation (cultural capital), or into access to jobs, contracts, or other economic resources (economic capital).

This construction of social capital offers some interesting possibilities for assessing nutrition behavior within communities. This definition of social capital is goal-specific rather than general, which allows individual components of social capital formation and use to be identified, measured, and linked to specific health behaviors.
Because social capital operates through social networks, it can be studied as a network-level resource as well as an individual characteristic. This invites into the analysis the ways in which communities are linked both horizontally and vertically – horizontally between individuals at the same social level, and vertically through linkages with individual who have greater and lesser access to resources (either social, cultural, or economic). These linkages are important; social capital research suggests that it is the weaker vertical and horizontal linkages in a network, found between individuals who are only lightly connected ("weak ties"), that allow resources to be accessed across different status levels and social groups.

Because this perspective explicitly acknowledges that social systems tend to perpetuate existing power and resource disparities within communities it underlines the importance of examining the ways in which resources travel through social networks, and the role that community structures or organizations can play in increasing access to these resources for less-powerful individuals. This theoretical paradigm argues for a network or systems approach to addressing health disparities in a population, rather than focusing the lens on individual-level behavior.

Social capital theory also suggests ways in which the linkage between community, social norms, and resources can shape behavior, and views community cohesion as an asset that can be mobilized to improve health behavior in a population experiencing health disparities. It thus links multiple levels of the socioecological model, showing the ways in which individual, intrapersonal, community, environmental and institutional factors work together to shape health behavior.

**Conceptual Framework**

The conceptual framework for this dissertation is grounded in social capital theory. Within this framework, both economic forces and social network factors are assessed to suggest the ways in which they work together to influence dietary behavior. This linkage highlights the impact of social capital and social network factors in shaping dietary behavior within low-income multi-ethnic communities, and suggests possible assets and resources for community-based intervention to reduce health disparities.

A model of the factors that is shown in Figure 1; the specific components of this model were identified through a substantive literature review.
Figure 1. Conceptual model
Components of the Model

Household Resources for Fruit and Vegetable Consumption

Household resources, for the purposes of this study, are the economic resources that a family has available to spend on food preparation and consumption. Money is the most obvious economic asset, and cost concerns have been documented as a barrier to fruit and vegetable consumption among low-income populations both nationally\(^7,\,34\), and in Hawai‘i\(^35\). Time is also an economic resource. Time needed to prepare, and clean up after “healthy” meals competes with other urgent priorities among low-wage working parents\(^5\), and has been shown to affect household food decisions in low-income populations\(^36\)-\(^40\).

Community Resources

Community resources can be defined as the resources existing within a community or neighborhood that support household fruit and vegetable consumption. These resources include supermarkets, grocery stores, farmers markets or food banks\(^41\); they also include individuals and organizations possessing knowledge, social connections or other resources that could help to increase access to fruits and vegetables in the community\(^42\).

Household Structure

Household structure is the number, demographic characteristics, and relationships of individuals residing within a particular household. The presence of children, grandparents, extended family members, additional working or nonworking adults contributing to the household are all likely to impact both household resources and social support for dietary change. These impacts are complex, and can operate in both a positive and negative direction\(^43\)-\(^46\).

Household structure may be particularly important to assess in Hawai‘i households, which have a larger proportion of extended-family households than elsewhere\(^47\). Immigration adds an additional layer of complexity to this picture\(^43\).

Social Support

Social support can be defined as the emotional support and encouragement (or discouragement) that an individual receives from significant others for practicing a particular behavior. Social support has been demonstrated to affect fruit/vegetable intake\(^48\)-\(^51\). The involvement of family, community, and church has been found to be particularly important for helping Native Hawai‘ians\(^34,\,35,\,52\) and Pacific Islanders\(^19,\,53\) adhere to dietary recommendations for diabetes prevention. Social support does not always correlate positively with health behavior, however; social norms can have a negative impact on dietary behavior\(^54,\,55\). As with household structure, this is a complex factor that needs further exploration.

Availability of Fruits and Vegetables to the Household
Availability of fruits and vegetables to the household is the result of the interplay between household resources and community resources. This factor reflects a realistic assessment of a household’s options for including fruits and vegetables in their meal planning, given their particular neighborhood, income and time constraints.

**Social Leveraging**

Social leveraging is the use of social connections, reciprocation, and favors to increase a household’s ability to access more fruits and vegetables than they would have been able to purchase on their own. Leveraging includes meal sharing with family or friends when food resources are short, a gift of mangoes from a neighbor’s tree, a friend letting you know about the availability of a plot in a community garden, or getting advice from someone in your church about how to apply for food benefits. This leveraging of social assets to gain economic goods is a core component of social capital theory.

The use of social leveraging to offset limited economic capital is a growing area of research in community development and economic research. While social leveraging has not been studied in respect to household food management, the leveraging of social ties has been documented in research on job seeking and occupational status, in the development of entrepreneurial networks among women in Africa, and in increasing access to employment among women in welfare-to-work programs.

**Access To Fruits And Vegetables Within The Household**

Access reflects the actual presence within the household of fruits and vegetables available for consumption as snacks or inclusion in meals. Access is shaped by the availability of fruits and vegetables within a community, household resources available for food purchasing and preparation, along with additional household food assets gained through social leveraging.

**Community Connection and Involvement**

Community connection, a core element of social capital theory, consists of the network of reciprocal links between an individual and other individuals or organizations within a community. Community connections provide the link between resources circulating within a community and the individual household. Community connections can be as informal as friendship or “neighborly” exchanges of favors, or they can reflect active engagement in schools, churches, or other organizations within a community. These connections help to create the channels through which both social influence and social capital can operate in a community.

**Social Control**

Social control reflects the ways in which social groups affect the dietary behavior of individuals through both subtle and overt pressure to conform to the behavioral norms of their
community. Social control operates through the links that an individual has with others in their community, and thus is closely linked with community connections and involvement. In more communally-oriented cultures, such as in Asian and Pacific Islander communities, these family and social group influences can be important determinants of individual health behavior34,37,60,61.
Linkages Between Constructs

As can be seen from Figure 1, the different constructs of social capital are all interrelated. Household structure, social support, social leveraging, community connections and community social control all interact with each other. Taken together, these social factors work with economic resources to determine the availability of fruits and vegetables within the household. I hypothesize that it is this combination of availability and social norms about food preparation/consumption that shapes actual household fruit and vegetable consumption.

Purpose and Research Questions

While this review of the literature has identified the critical constructs in this model, it raises a number of questions that need to be explored. The goal of this dissertation is to answer the following three questions:

Question 1. How are the theoretical constructs of social capital and social networks currently being used to study health behavior in communities, and what does this suggest for further directions in research on household dietary behavior?

This question is answered in Study 1, a structured literature review following PRISMA guidelines, which examines the current use of social capital theory in nutrition research in public health, and identifies both methodological and theoretical issues involved in measuring social capital constructs in nutrition research.

Question 2. How do community connections, family structure, and community cultural norms about food affect household dietary choices?

This question is answered in Study 2, an exploratory, qualitative study of household nutrition behavior within a specific low-income multi-ethnic community, the Kalihi-Palama neighborhood of Honolulu. Kalihi-Palama contains the largest number of low-income census tracts in the state, and is a true multi-ethnic community – a neighborhood with a high level of ethnic diversity, and no single dominant ethnic group. Study 2 explores how specific variables related to social capital and network structure -- household structure, household resources, community connections and involvement, social support, and social leveraging are related to dietary behavior.

The goal of Study 2 is to develop a more nuanced understanding of the social factors shaping the behavior of the family’s primary caregiver. The result of this study should provide an understanding of how individuals access resources within their social networks, and negotiate the constellation of family expectations, social norms, and community roles that shape their sense of their behavioral options.
Question 3. What community assets, resources and organizational linkages could be involved in supporting efforts to increase fruit and vegetable consumption within a low-income mixed-ethnicity community in Hawaii?

This question is answered in Study 3, a network analysis mapping the current linkages between community agencies involved in nutrition activities in the Kalihi area. Network analysis allows the researcher to identify key agencies, influential organizations, and community gatekeepers that could serve as resources for a community-based nutrition campaign within the Kalihi-Palama community. Although the results of this network study will be specific to the Kalihi community, it will also provide a model for identifying the types of agencies, and the linkages between organizations serving different ethnic populations, in interventions targeting low-income multiethnic communities.

Community Buy-In

This research was conducted in partnership with the Hawai‘i Department of Health (DOH) Nutrition Education Network (NEN), who provided substantial funding and other resources for the research, and assisted in the development of partnerships with Kalihi community organizations for the conduct of the research. Research results were presented to all participating community organizations; the results of this research was used to provide groundwork for the development of a community-based social marketing campaign aimed at improving nutrition among low-income households in the Kalihi area.
CHAPTER 2: STUDY 1
THE OPERATIONALIZATION OF SOCIAL CAPITAL THEORY
IN PUBLIC HEALTH NUTRITION RESEARCH

Abstract

Social capital is an evolving area of social science theory, one with potential for contributing to applied research on social factors shaping health behavior. Three distinct theoretical paradigms—those of Robert Putnam, Robert Coleman, and Pierre Bourdieu—underlie current work in social capital. Each of these paradigms defines social capital differently, and each has different implications for health behavior research.

A structured literature review was undertaken, using PRISMA guidelines, to assess the operationalization of social capital theories within a defined field of applied public health research. Nutrition research, which assesses individual, social, and environmental influences on individual dietary behavior, is a particularly appropriate field for the application of social capital theory, and was selected as the focus area for the review. A search of four public health and social science databases identified 36 peer-reviewed studies that assessed nutrition behavior and included social capital or social networks in the study analysis.

Results show Putnam’s communitarian framework predominated in applied nutrition research. This framework was used in 60% of all studies, and 80% of those archived in the Pub Med database. Results also suggested limited awareness of the full range of social capital theory within applied nutrition research: 37% of studies did not define social capital at all, nearly half (47%) did not identify the theoretical framework used, and 47% did not discuss alternate conceptualizations of social capital. Definition and measurement of constructs varied widely, with overlap between variables associated with social capital, social cohesion, and social support. There was little assessment of social network structures, and no studies linking social capital and social network analysis were found.

Results suggest that increasing clarity in theory selection and broadening the range of social capital theories used would improve the utility of social capital theory for applied public health research. It is important that assessments of social capital in nutrition research move beyond the individual, or bonding level of social capital, and include assessments of community social capital and the bridging and bonding connections between individuals, groups, and institutions.

Introduction

Rationale

The role of social capital in shaping health behavior has been an emerging area of public health research in the last fifteen years.21,62-66 There have been a flurry of exploratory research studies attempting to define and map the constructs of social capital and to link these constructs...
to individual health behavior\textsuperscript{62,63}. However, there has been little consensus over either the definition or the measurement of social capital in health research\textsuperscript{67}, and some researchers have found little or no impact after controlling for social support or social cohesion, leading some to conclude that the construction of social capital has become muddled\textsuperscript{65}, or that it is an ineffective theory for use in health research.

In part, this confusion reflects the multiple theoretical origins of social capital theory. There are at least three distinctly different theoretical frameworks of social capital current in social science research, grounded in the theoretical works of Pierre Bourdieu, Robert Coleman, and Robert Putnam, along with perspectives that blend portions of the different approaches together\textsuperscript{64}. While these theories have some overlaps, as may be seen in Table 1, there are distinct differences between these theoretical frameworks.

### Table 1. Three major frameworks in social capital theory

<table>
<thead>
<tr>
<th>Author</th>
<th>Definition of Social Capital</th>
<th>Components of Social Capital</th>
<th>Measures suggested by this theoretical framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pierre Bourdieu</td>
<td>“the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition”\textsuperscript{60}</td>
<td>Individual/group social networks&lt;br&gt;Resources that flow through social sources&lt;br&gt;Power structures within and between social networks</td>
<td>Network linkages&lt;br&gt;Types and quantity of resources exchanged through networks&lt;br&gt;Differences in access to network resources between individuals/groups</td>
</tr>
<tr>
<td>Robert Coleman</td>
<td>“a variety of entities with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors – whether persons or corporate actors—within the structure”\textsuperscript{68}</td>
<td>Trust&lt;br&gt;Norms of reciprocity&lt;br&gt;Social networks involving both individual and institutional actors&lt;br&gt;Group action for common good</td>
<td>Generalized trust in others&lt;br&gt;Trust in institutions&lt;br&gt;Cooperative actions&lt;br&gt;Shared or traded favors&lt;br&gt;Linkages between individuals&lt;br&gt;Involvement with organizations&lt;br&gt;Linkages between organizations&lt;br&gt;Contribution of resources to activities promoting common good</td>
</tr>
<tr>
<td>Robert Putnam</td>
<td>features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit\textsuperscript{69}</td>
<td>Trust&lt;br&gt;Norms of reciprocity&lt;br&gt;Civic participation</td>
<td>Generalized trust in others&lt;br&gt;Neighborhood safety&lt;br&gt;“Neighborliness”&lt;br&gt;Shared or traded favors&lt;br&gt;Voting&lt;br&gt;Newspaper subscription&lt;br&gt;Club/team participation&lt;br&gt;Church attendance&lt;br&gt;Socializing with friends</td>
</tr>
</tbody>
</table>
In addition to these three dominant frameworks, the World Bank’s Social Capital Initiative has been working for the past decade to expand the definition of social capital through the integration of macroeconomic and development theory with Putnam’s and Coleman’s theoretical understanding of household and community social capital. The definition of social capital emerging from this effort differs from that used by researchers focused more closely on individual health behavior, and is intended to strengthen research and policy initiatives in international health and development.

A related area of active theory development in social capital is the attempt to define the level at which social capital operates. Is social capital a property of individuals or of communities? Does it affect the wellbeing of individuals based on their personal level of social capital, or does social capital operate on a neighborhood or community level to affect the health and wellbeing of all? Is social capital something that can be measured through individual patterns of engagement and perceptions of community connection/functioning? Or does it involve an examination of an individual's social networks, or of the social networks within a community? Are community organizations and political structures part of these networks of study? What are the specific constructs of social capital, and how should these constructs be measured?

The answers to these questions will depend on the theoretical construction of social capital that the researcher selects. Thus, it is important for researchers who include social capital in their analysis of health behavior to be explicit about the theoretical perspective they are using to frame their research questions, constructs, and measure development.

As an applied social science field, public health researchers translate the ongoing developments of social science theory into a practical understanding of the determinants of health behavior. However, this translation can sometimes occur in an erratic manner, potentially affecting the utility of a particular theoretical stream within health research.

A recent study of citation practices in public health found that the broad range of social capital theory development in the social sciences has been skewed towards one particular paradigm – the “communitarian” definition of social capital, as grounded in the works of Robert Putnam and propounded through the work of Kawachi et al. Numerous studies, scales, and measures have been developed that assess social capital as individual participation in community organizations, or feelings of trust in others. Corresponding interventions have been developed to reduce individual isolation and boost social connections.

However, this reliance on the communitarian perspective of social capital in public health research has come under substantial scrutiny. Critics argue that the communitarian definition of social capital ignores power differentials in the distribution of social capital within a community. Social capital research within public health in general also has been criticized as under-theorized and descriptive, with problems identified in both definitions and measures.
Another active area of sociological research, social network analysis, is emerging as a new area of inquiry among public health practitioners. Network analysis has recently been used to assess the structure of tobacco control efforts within states, the development of coalitions for physical activity promotion, the linkages between providers, and other organizational capacity-building efforts. This work appears to be concentrated primarily in organizational and coalition studies, and has not been well-implemented in prevention studies.

In public health research, social network analysis appears to have had little involvement with research on social capital. This disconnect may be easily seen by searching the databases in the relevant fields. A simple Boolean search conducted within Pub Med in January 2011 on "social capital AND social network analysis" yielded only 8 citations. The same search, conducted in Sociological Abstracts on the same day, identified 366 papers that involved both social capital theory and social network analysis. In sociology, economics, and anthropology, these two fields of inquiry are closely linked, with social network analysis used as a critical tool for mapping the horizontal and vertical linkages between people and organizations that are used to obtain resources through social channels.

The lack of linkage between social capital research and social network analysis in public health practice may be one impact of the limited translation of social capital theory into public health research. This reflects one way in which a skewed translation of social capital theory may limit effective research on the both individual and community health.

While concerns about the use of social capital theory in applied health behavior research have been expressed, there are few data on how public health researchers are actually using these constructs to study health problems. Understanding the impact of this translation of social capital theory into public health on the practice of health researchers is important. What happens if an emerging field of theoretical development in the social sciences becomes attenuated when it enters an applied field like public health? How does this affect research questions, the design of studies, the development of constructs and measures, and ultimately the utility of this theory for understanding health behavior?

Objectives

The objectives of this study are to: 1) assess the translation, implementation, and operationalization of social capital theories within applied public health research; and 2) identify divergences between research on the links between social capital and health reported in the applied public health literature vs. the broader social science literature.

Methods

Because public health is an extremely diverse research area, a single field of health behavior research – nutrition-related behavior – was selected in order to ensure comparability between studies. Nutrition-related behavior is a mature and active area of interdisciplinary public
health research, one that involves assessment of the individual, social group, and environmental determinants of behavior relevant to the constructs used in social capital theory. Thus, dietary behavior provides a large but bounded field of applied health behavior studies that could be used to examine the implementation of social capital theory and social network analysis in research practice.

A literature review was conducted in both public health and social science databases, following the PRISMA protocol for a structured literature review.

**Review Protocol**

**Database Selection**

The search was conducted sequentially in four online reference databases between June 2011 and December 2011. Databases were selected to ensure covering a broad range of nutrition-related research involving either social capital or social networks, and included:

1. PubMed, the primary database for public health research,
2. ERIC, to capture health education research that may have been published in education-related journals,
3. Sociology Abstracts, to ensure the inclusion of social capital/social network research with nutrition components published in social-sciences journals not indexed within PubMed, and
4. Academic Search Premier, a large, multidisciplinary database covering all fields of academic endeavor, to ensure coverage of social capital/social network studies emerging in other fields.

**Hand-Searching**

In addition to the online searches, the citation lists of published review articles and included studies retrieved were hand-searched to identify any additional relevant studies cited. After the search was completed, all papers included in the review that were not initially retrieved through PubMed were searched by title within the PubMed database, to ensure that they had not been missed due to differences in identifying terms between the databases. If a paper was found within PubMed in this second search, it was recorded as having been included in the PubMed database.

**Search Terms**

Search terms used were developed through a review of MESH database terms, and the review of identifying terms linked to relevant studies in each of the databases. Searches were limited to English language. Because this study was intended to look at the public record of research within a field of study, it was limited to peer-reviewed literature. The search was
conducted as an iterative Boolean search, linking each of the theoretical/methodological terms to terms indicating nutrition-specific research, as shown in Table 2.

<table>
<thead>
<tr>
<th>Theoretical/methodological approach</th>
<th>Specific research topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>social capital</td>
<td>nutrition</td>
</tr>
<tr>
<td>social networks</td>
<td>nutritional status</td>
</tr>
<tr>
<td>social network analysis</td>
<td>nutritional sciences</td>
</tr>
<tr>
<td>network analysis</td>
<td>dietary behavior</td>
</tr>
<tr>
<td>AND</td>
<td>food habits</td>
</tr>
<tr>
<td></td>
<td>food consumption</td>
</tr>
<tr>
<td></td>
<td>food insecurity</td>
</tr>
<tr>
<td></td>
<td>hunger</td>
</tr>
</tbody>
</table>

Table 2. Terms used in the database searches

This search identified 384 references to peer-reviewed research papers. These 384 references represented 338 individual papers, along with 46 duplicate references to papers already identified in the search.

Study Screening

The title and abstract of all 338 papers were retrieved and reviewed to determine if they met the following inclusion criterion:

(1) The paper reported on a research study or studies involving nutrition or dietary behavior, and

(2) The authors used elements of social capital theory or social network analysis methods in their research design, study measures, or in the framing and analysis of their study findings.

This screening eliminated 261 papers. The full-text of the remaining 77 articles was retrieved, and screened to exclude the following types of articles:

- Eleven studies where the phrase "social capital" was briefly mentioned in the background section, but social capital constructs were not included in the study measures, and social capital constructs were not included in the analysis and discussion of the study's findings.
- Three studies that involved network analysis only in terms of geographic information system (GIS) network mapping or the statistical analysis of computer social networking sites.
- Fourteen studies of obesity or physical activity with no assessment of nutritional intake or food consumption.
• Four studies of anorexia, bulimia, or other forms of extreme weight-loss behaviors or disordered eating that focused on psychological constructs and contained no measures of nutrition or dietary intake.

• Nine literature reviews or theoretical papers that did not include either research involving social capital constructs, or research on social capital measure construction and validation.

This screening eliminated an additional 41 journal articles. The remaining 36 articles were included in the structured literature review. In two cases, there were two articles analyzing the same data set, using the same understanding of social capital. These two articles were considered one study for the purposes of this analysis. In one case, three separate papers related to a single large multinational study of social capital. Although all three studies had the same lead author, each study had a unique data set, and the framework and focus of the social capital analysis differed in each study. These papers were considered three unique studies. This resulted in 34 unique studies retained for analysis. The details of this process may be seen in Figure 2.

384 articles identified through database and citation searching

46 duplicates eliminated

338 articles underwent title and abstract review

261 eliminated as not meeting review parameters

77 articles underwent full-text review

18 eliminated: not nutrition research

14 eliminated: not social capital or social network research

9 eliminated: not research studies

36 papers retained, covering 34 unique studies

28 papers involving social capital alone

2 papers involving both social capital and assessment of social networks

4 papers involving social network analysis alone

Figure 2. Results of the study screening

Data extraction
The 34 studies chosen for inclusion were examined to identify the following:

• Was the study included in the PubMed database, or could it only be retrieved by searching databases outside of the public health research record?

• Did the study involve social capital, social networks, or both?

• What was the methodology and sample size?
What populations were included?

What were the findings and limitations of the study?

The six social network studies were assessed to identify the specific social network constructs used in the study and identify any overlap in variable construction or analysis with social network constructs used in studies of social capital. At this point, the four papers that pertained only to social network analysis and contained no discussion of social capital variables were excluded from further analysis.

The remaining 30 unique studies all involved some aspect of social capital theory in nutrition research. These studies were then assessed to determine the following parameters:

1. How did the authors define social capital?
2. Which theoretical framework for social capital underlied the research?
3. Did the authors acknowledge or discuss more than one theoretical perspective on social capital?
4. What types of social capital were addressed in the study’s design?
5. Which constructs, instruments, or measures were used to assess social capital?
6. Were other behavioral theories or constructs (such as social support, social exclusion, or social cohesion) blended into the definition of social capital?
7. How did the study define the field (neighborhood, community, social network) within which social capital was hypothesized to operate?

Determining items (2) and (3), the theoretical framework for social capital recognized and used in each article, proved more challenging than initially anticipated. In some cases, authors did not clearly cite a specific theoretical framework, or simply used the term ‘social capital’ without defining it. An algorithm was developed to determine whether the author discussed the varying definitions of social capital currently in operation, and to assign each paper to one of the core theoretical frameworks for social capital. This algorithm incorporated the definitions of social capital if provided in the article and a review of the social capital citations included in the article. If necessary, any review papers on social capital cited by the authors were retrieved and assessed using the same algorithm. If none of these sources provided a clear link to a single theorist, the specific measures of social capital used in the study were assessed, and mapped against the measures that are distinct to each of the four theoretical perspectives, to determine where the study best fit. This algorithm may be seen in Figure 3.
Did the authors mention more than one social capital theorist or perspective?

No

Record as having recognized only one perspective on social capital

Did they cite a specific theorist?

Yes

Record as having recognized multiple perspectives on social capital

Did they cite one theorist’s work as shaping their study’s definition of social capital?

Yes

Record as grounded in this theorist’s perspective

No

Record as grounded in this theorist’s perspective

Identify the specific social capital constructs used in the study measures and/or discussed in the analysis

Do they involve an assessment of national and international political structures with local social capital?

Yes

Do they involve assessment of access to economic resources through social networks?

Yes

Record as World Bank

SCI

No

Record as Bourdieu

No

Record as Coleman

No

Record as Putnam

Are they focused only on neighborhood, social cohesion, or civic participation?

Yes

No

No

No

Yes

Figure 3. Algorithm used to assign theoretical social capital framework to each article
Once the assessment was completed for each paper, these data were pooled and examined to identify the definitions of social capital most current in nutrition research and to assess the impact of particular theories of social capital and constructions on research questions, the development of research methods, and measurement tools.

An analysis was conducted to identify differences in methods, measures, or theoretical grounding between research on nutrition and social capital that were contained in literature indexed within PubMed, and those studies only indexed in other social science databases.

**Results**

The structured review identified 34 unique studies, 30 of which involved an assessment of the impact of social capital on dietary behavior, and six of which involved an assessment of the role of social networks in shaping dietary behavior. Twenty-one (70%) of these studies were retrievable within the PubMed database; an additional 9 (30%) could only be accessed by searching social science databases. A matrix listing included studies may be seen in Appendix A.

**Social Capital Frameworks Used In Nutrition Research**

As can be seen in Table 3, the 30 nutrition research studies varied widely in the theoretical roots of their social capital constructs, in the clarity with which they identified the theoretical perspective used in their research, and in the depth and content of their discussion of social capital theory.

**Table 3. Type and clarity of social capital theory used in nutrition studies**

<table>
<thead>
<tr>
<th>Primary social capital framework used</th>
<th>Number of all studies grounded in this framework</th>
<th>Number of studies grounded in this framework that:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Bourdieu</td>
<td>4 13%</td>
<td>2 50%</td>
<td>3 75%</td>
</tr>
<tr>
<td>Coleman</td>
<td>4 13%</td>
<td>2 50%</td>
<td>3 75%</td>
</tr>
<tr>
<td>Putnam</td>
<td>18 60%</td>
<td>12 66%</td>
<td>7 39%</td>
</tr>
<tr>
<td>World Bank Social Capital Initiative</td>
<td>3 10%</td>
<td>3 100%</td>
<td>3 100%</td>
</tr>
<tr>
<td>Not Identifiable</td>
<td>1 3%</td>
<td>0 0%</td>
<td>0 0%</td>
</tr>
<tr>
<td>Total</td>
<td>30 100%</td>
<td>19 63%</td>
<td>16 53%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provided a clear definition of social capital</th>
<th>Identified the source of their definition of social capital</th>
<th>Discussed other social capital theories or perspectives</th>
<th>Incorporated measures from other social capital theories into the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Bourdieu</td>
<td>2 50%</td>
<td>3 75%</td>
<td>3 75%</td>
</tr>
<tr>
<td>Coleman</td>
<td>2 50%</td>
<td>3 75%</td>
<td>3 75%</td>
</tr>
<tr>
<td>Putnam</td>
<td>12 66%</td>
<td>7 39%</td>
<td>9 50%</td>
</tr>
<tr>
<td>World Bank Social Capital Initiative</td>
<td>3 100%</td>
<td>3 100%</td>
<td>1 33%</td>
</tr>
<tr>
<td>Not Identifiable</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
</tr>
<tr>
<td>Total</td>
<td>19 63%</td>
<td>16 53%</td>
<td>7 23%</td>
</tr>
</tbody>
</table>
Almost two-thirds (60%) of these studies’ social capital components were based, either directly or indirectly, in the definition of social capital developed by Robert Putnam. This differed between PubMed and the social science databases. Among the 21 articles cited in the PubMed database, 80% could be traced, either directly or through secondary citations, to Putnam’s construction of social capital. By contrast, only 22% of the nine articles indexed in the social science databases were based in the work of Robert Putnam.

Only half (53%) of all nutrition studies clearly identified the specific social capital framework used in the study. In many cases the study’s theoretical framework could be determined only through an extensive search of the article’s citations, examining the theoretical orientation of review articles cited by the authors, and the citations of the articles from which the study’s social capital instruments, measures, and constructs were developed. Less than half (39%) of the studies grounded in the work of Robert Putnam clearly identified their theoretical framework, as compared to 75% of the studies using the frameworks developed by Pierre Bourdieu or Robert Coleman.

Two-thirds (63%) of all studies included a nuanced discussion of social capital, acknowledging the multiple perspectives within the field. This again appeared to vary by the study’s theoretical perspective. Half (50%) of those who adopted Robert Putnam’s definition of social capital provided a discussion of other theoretical frameworks in their papers, while 75% those who used Bourdieu or Coleman’s definitions did so. Of the three studies that cited theorists involved in the World Bank’s social capital initiative, only one discussed other definitions of social capital theory.

Nineteen (66%) of the studies provided the study authors’ working definition of social capital in the text of the paper, while the remainder used the term “social capital” without providing a definition. This also appeared to differ by theoretical perspective. Only half (50%) of the authors whose studies were grounded in Putnam’s construction of social capital defined “social capital” in their papers. By contrast, clear definitions of social capital were provided in the majority of studies that were grounded in the work of Pierre Bourdieu (75%), Robert Coleman (75%), and the work originating with the World Bank (66%).

Seven (23%) of the studies, while clearly linking their definition of social capital to one theorist, also integrated measures from other theoretical frameworks into the measures of social capital used in their research design. Half (50%) of the studies using Bourdieu’s definition of social capital also included other measures of social capital, as did 27% of the studies using Putnam’s definition.

Definitions Of Social Capital Used In Nutrition Studies

As might be expected given the uncertain nature of the field, the definitions of social capital provided by study authors varied widely, ranging from “family and community support,
churchgoing and civic participation\textsuperscript{82}, to “public resources accessible to individuals through their engagement in various community and social structures that can be drawn upon to provide some beneficial outcome\textsuperscript{83}.” The specific dimensions of social capital included in the authors’ definitions may be seen in Table 4.

<table>
<thead>
<tr>
<th>Social capital dimension</th>
<th>Number of articles including this dimension*</th>
<th>Percentage of all studies that included this dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social cohesion (general social relations, norms of reciprocity and trust, sense of inclusion and belonging)</td>
<td>11</td>
<td>58%</td>
</tr>
<tr>
<td>Access to resources through social networks</td>
<td>7</td>
<td>37%</td>
</tr>
<tr>
<td>Social norms</td>
<td>5</td>
<td>26%</td>
</tr>
<tr>
<td>Structures that promote collective or coordinated action to benefit the community</td>
<td>5</td>
<td>26%</td>
</tr>
<tr>
<td>Connectedness, social linkage or social networks</td>
<td>4</td>
<td>21%</td>
</tr>
<tr>
<td>Social support</td>
<td>2</td>
<td>11%</td>
</tr>
<tr>
<td>Civic or religious participation</td>
<td>2</td>
<td>11%</td>
</tr>
<tr>
<td>Access to resources through community institutions</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

*19 studies provided a definition of social capital. Because most definitions included multiple dimensions, the total is greater than 19

Types Of Social Capital Identified

Those authors who provided a more nuanced discussion of social capital detailed their understanding of the levels or types of social capital. These definitions varied widely, but three general groupings emerged:

1. Structural/Instrumental (civic structures and networks, access to resources) vs. Cognitive (social norms, feelings, connectedness)
2. Level of operation (individual, neighborhood, community, institutional)
3. Type of linkage between individuals or groups. These linkages were generally defined as bonding (close connections to others in your immediate social group), linking (connections to people in other social groups that have similar levels of economic resources), and bridging (connections to people with greater access to economic resources)

As may be seen in Table 5, there was no consistency in definition within these groupings, with subcategorizations varying substantially between studies.
Table 5. Types and dimensions of social capital included in studies

<table>
<thead>
<tr>
<th>Types of Social Capital Identified</th>
<th>Specific constructs identified</th>
<th>N</th>
<th>Percent of all studies using this definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural vs. cognitive</td>
<td>Structural/instrumental</td>
<td>7</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Cognitive</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Level of Operation</td>
<td>Individual, family, or household</td>
<td>9</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Neighborhood</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Community or group</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Institutional</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Type of Linkage</td>
<td>Bonding</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Linking</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Bridging</td>
<td>3</td>
<td>10%</td>
</tr>
</tbody>
</table>

N=30

Measures Used To Assess Constructs Of Social Capital

The overwhelming majority of nutrition studies that included an assessment of social capital factors in nutrition or dietary behavior developed their own idiosyncratic measures of social capital. Fourteen studies included scales of social capital; these studies may be seen in Table 6. The measures of structural factors and civic participation varied widely, but the majority of social cohesion/social support scales were grounded in the standardized scales for the measurement of social cohesion developed by Buckner and Sampson.

Three of these studies used a social capital scale developed by Martin et al; this scale also drew heavily from the work of Sampson. Harpham et al adapted a large social capital index into an 18 item scale that integrated both structural and cognitive factors; this scale was later adapted and validated by DeSilva et al as a 7-item scale designed for use in multinational health studies.
<table>
<thead>
<tr>
<th>Study</th>
<th>Scale name</th>
<th>Adapted from</th>
<th>Scales measured</th>
<th>Validation reported</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christian</td>
<td>(none)</td>
<td>Buckner</td>
<td>Social cohesion</td>
<td>No</td>
<td>Not clear</td>
</tr>
<tr>
<td>Dean</td>
<td>(none)</td>
<td>Sampson</td>
<td>Social cohesion</td>
<td>No</td>
<td>7 items</td>
</tr>
<tr>
<td>Locher</td>
<td>(none)</td>
<td>Not clear</td>
<td>Civic participation</td>
<td>No</td>
<td>5 items</td>
</tr>
<tr>
<td>Kanan</td>
<td>(none)</td>
<td>Social cohesion</td>
<td>Social support</td>
<td>No</td>
<td>9 items</td>
</tr>
<tr>
<td>Martin, Kirkpatrick, Walker</td>
<td>Social capital scale (adapted by Martin)</td>
<td>Sampson</td>
<td>Social cohesion</td>
<td>No</td>
<td>7 items</td>
</tr>
<tr>
<td>Kanan</td>
<td>(none)</td>
<td>Not clear</td>
<td>Civic participation</td>
<td>No</td>
<td>9 items</td>
</tr>
<tr>
<td>Morton</td>
<td>(none)</td>
<td>Not clear</td>
<td>Institutional efficacy</td>
<td>No</td>
<td>7 items</td>
</tr>
<tr>
<td>Cohen, Osypuk</td>
<td>(none)</td>
<td>Sampson</td>
<td>Social cohesion</td>
<td>No</td>
<td>9 items</td>
</tr>
<tr>
<td>Santana</td>
<td>(none)</td>
<td>unclear</td>
<td>Civic participation</td>
<td>No</td>
<td>3 items</td>
</tr>
<tr>
<td>Harpham</td>
<td>A-SCAT</td>
<td>Sampson</td>
<td>Membership, Civic participation</td>
<td>No</td>
<td>18 items</td>
</tr>
<tr>
<td>DeSilva</td>
<td>SASCAT, SASCAT-II</td>
<td>Harpham</td>
<td>Membership, Civic participation, Social support, Social cohesion</td>
<td>Yes</td>
<td>8 items</td>
</tr>
</tbody>
</table>
Across all studies, the specific constructs of social capital measured in the surveys also varied widely, as can be seen in Table 7.

### Table 7. Social capital constructs assessed in nutrition studies

<table>
<thead>
<tr>
<th>Construct</th>
<th>Number of studies</th>
<th>% of studies using this construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td>Civic participation</td>
<td>10</td>
<td>33%</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>10</td>
<td>33%</td>
</tr>
<tr>
<td>Access to resources through social network</td>
<td>10</td>
<td>33%</td>
</tr>
<tr>
<td>Social support</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Collective social functioning</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>Empowerment / bridging</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Social norms / social control</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Neighborhood disorder/crime</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Access to resources in geographic neighborhood</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Social inclusion</td>
<td>1</td>
<td>3%</td>
</tr>
</tbody>
</table>

N=30

### Definitions Of The Environment Within Which Social Capital Operates

Studies varied widely in their definition of the environment in which social capital operated to affect dietary behavior. As may be seen in Table 8, most (57%) defined social capital as operating within a geographically bounded area, such as a neighborhood, census tract or zip code, or a village or township. A few studies (14%) defined social capital as operating within social networks or ethnic communities, and 10% suggested that the field in which social capital operates is variable. Fully twenty percent did not define the field within which they thought social capital operated.

### Table 8. Environment within which social capital was hypothesized to operate

<table>
<thead>
<tr>
<th>Environment</th>
<th># of studies using this definition</th>
<th>% of all studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood, village, or township</td>
<td>17</td>
<td>57%</td>
</tr>
<tr>
<td>Social network</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Ethnic group</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Varies, or depends on individual factors</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>No area defined</td>
<td>6</td>
<td>20%</td>
</tr>
</tbody>
</table>

N=30
Study Findings

Twenty of the studies included in this literature review were quantitative studies that assessed the statistical significance of the relationship between social capital and nutrition outcomes. The remainder of the studies were qualitative research, or studies that assessed social capital scale and measure construction in the context of nutrition research.

The measures of social capital used in these 20 quantitative studies varied widely, even within the individual theoretical frameworks. One consistent difference, however, was seen between those studies that measured social capital solely from a public-good perspective (civic participation, social cohesion, and generalized trust), and those studies that included measures of pathways that linked individuals to resources within their social networks (norms of reciprocity, social support received from others, access to resources within networks, bridging or linkage to community organizations). Half (50%) of the studies that measured social capital as a civic participation or social cohesion found no relationship between social capital and nutrition outcomes. Only 20% of the studies that included pathways to resources as social capital variables found no relationship between social capital and nutrition outcomes.

Table 9. Study findings on social capital and nutrition outcomes

<table>
<thead>
<tr>
<th>Measures of social capital used in study</th>
<th>Significant relationship (p&lt;.05) between social capital variables and nutrition outcomes</th>
<th>No significant relationship between social capital variables and nutrition outcomes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Included only civic participation, social cohesion, generalized trust</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Included measures of social capital pathways that linked individuals to resources within networks</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>7</td>
<td>20</td>
</tr>
</tbody>
</table>

Discussion

In 2005, Moore’s study of citation practices suggested that the broad range of social capital theory was becoming attenuated as it entered public health practice, with articles influenced by Putnam’s communitarian understanding of social capital attaining dominance, while the more structural conceptualizations of social capital developed by Robert Coleman and Pierre Bourdieu appeared to be marginalized in the field of public health.

This attenuation suggests that, as social capital theory is becoming translated into public health research, it is being impacted by trends within health behavior and lifestyle research towards what Froelich describes as “methodological individualism” – methods that emphasize the role of individual factors and agency in shaping health behavior, and neglect the structural and contextual factors that can shape health behavior.

The emphasis across these studies in defining social capital in terms of individual perception and behavior, and the lack of focus on structural assessments of social capital, may
also reflect an overall bias within health promotion research towards framing health behavior in terms of individual lifestyle choices, and the underuse of theoretical approaches that address the complex relationship between social structures and individual agency\textsuperscript{100}.

The impact of this theoretical attenuation and emphasis on individual choice can clearly be seen on the way that social capital theory is being used in nutrition research. In this review of the operationalization of social capital within nutrition research, the communitarian perspective dominates. Sixty percent of all studies identified, and 80\% of those identified through Pub Med, showed clear linkage to Putnam’s communitarian perspective.

More concerning than the selection of a particular paradigm is the low awareness of other conceptualizations of social capital within the field of nutrition research. More than a third (37\%) of the nutrition research papers assessed did not define social capital clearly, almost half (47\%) did not identify the theoretical perspective that they were working from, and 47\% did not show an awareness of alternate conceptualizations of social capital. This lack of awareness occurred far more commonly in studies published in journals from the PubMed database than with those that were indexed only in other social science databases, and far more common in studies using Robert Putnam’s communitarian perspective of social capital. This lack of theoretical clarity may to be contributing to the selection of idiosyncratic measures of social capital in public health.

Among those nutrition studies that clearly defined the authors’ usage of social capital, substantial blending occurred between the constructs of social capital, social cohesion, and social support. This muddling of different social capital models and constructs within nutrition research is not surprising, it reflects a similar muddling of social capital theory identified in public health research in general\textsuperscript{65}.

Within nutrition research, there also appears to be limited consensus on the level at which social capital is hypothesized to operate. Two out of ten studies did not specify the level at which social capital was hypothesized to operate. One third (30\%) of studies looked at social capital in terms of individuals, while a smaller number considered social capital at the neighborhood (13\%), community (13\%) or institutional (10\%) levels. Consideration of social capital structures beyond the immediate neighborhood or community level were found only in the international development literature.

Very few studies assessed the content or structure of individual social networks, and there was a lack of consensus on the role of social networks in social capital research, with some authors specifically excluding social networks from consideration\textsuperscript{88}.

Less than 15\% of studies included a discussion of structural elements such as bonding, linking, or bridging social capital. Thus, most studies did not examine structural pathways through which social capital could be strengthened to support improved nutrition or reduced food insecurity within a community. Since community agencies have been hypothesized to be important sources of linking and bridging social capital for low-income communities\textsuperscript{80}, the
absence of these measures reduces the utility of this research for practitioners attempting to build access to social capital within communities.

When the results of quantitative studies were assessed, those studies that looked only at communitarian measures (civic engagement, social cohesion) were less successful than studies that included measures of social networks and network resources at identifying connections between social capital and nutrition outcomes. This emphasis on individual measures of social engagement and social cohesion in nutrition research stands in striking contrast to social capital research occurring in other fields, where social networks are viewed as critical mechanisms for achieving economic and social resources.

This review shows that there is limited commonality in measures used to assessing social capital in nutrition research. There are no agreed-upon criterion for measuring social capital. Most researchers developed or adapted their own instruments, and measures showed a high level of idiosyncrasy. Social capital was variously operationalized as individual levels of trust and civic participation, as the number and circulation of newspapers within a community, as church attendance and marital status, and as the number of sports clubs and fitness centers in a neighborhood. The only clear area of consensus was reliance on an established sequence of social cohesion measures.

Social cohesion was the most common construct of social capital defined in these studies, and the majority of measures (57%) used to assess social capital in these studies appeared drawn from social cohesion scales; measuring issues such as trust, reciprocity, and social inclusion. Only 37% of these nutrition studies examined social capital as a factor in determining access to resources, and less than a quarter looked at the role of community structures or collaborative action in increasing access to nutrition resources within a community.

Construct validity was another area of concern. Social capital, as a function of the relationships between individuals, operates in culture-specific terms. DeSilva’s validation research on the SASCAT-II suggested that the specific wording of social capital concepts may not be transferrable from community to community; validation and cultural tailoring may be required for each study. Very little cultural tailoring was observed in the social capital scales used in most of these studies. Of particular concern were the measures that asked about the participants’ “neighborhood” or “community.” Qualitative research suggests that defining community by a circumscribed geography is problematic, and that participants understanding of community is likely to be multilayered and not based on geographic proximity.

As an applied field, nutrition research can require compromises in the measurement of individual variables. Nutrition researchers do not have the luxury of incorporating the extensive assessments used when social capital, rather than a specific health concern, is the primary focus of the research. For nutrition researchers, social capital measures are only one element of a
larger survey, and must be brief, but carefully chosen in order to capture the different dimensions of social capital.

Three scales, the social capital scale developed by Martin et al, and the A-SCAT and SASCAT II developed by Harpham and DeSilva appear to be well-designed for nutrition research. DeSilva’s adaptation of Harpham’s scale is particularly promising, as it has undergone extensive validation and integrates both cognitive and structural aspects of social capital.

Only two studies were identified that involved both social networks and social capital, and in both of these studies the assessment of network content was qualitative in nature. The complete absence of social network analysis in nutrition-related social capital research was surprising. While network analysis is not being used to assess social capital, it is widely used to study the social transmission of attitudes towards dietary behaviors in the eating disorder literature. Since the publication of Christakis’ seminal study using social network analysis to map the social transmission of obesity, network analysis is increasingly being used to assess social influences on dietary behavior in the general population. At present, social network analysis is an underused tool, one that shows particular promise both for developing an understanding of the individual and institutional linkages that shape dietary behavior, and for strengthening the structural resources for healthy nutrition within communities.

Limitations

Literature reviews are subject to inherent limitations. While care was taken to identify a broad range of search terms, and to search multiple databases, it is possible that studies involving social capital and dietary behavior were not indexed under the terms included in the study. The assessment of constructs and measures was based on the instruments provided for review; while this was done deliberately to assess emerging patterns related to social capital constructs within the published record in a field of health behavior, additional constructs or measures may have been used that were not included in the authors’ publications.

Conclusion

Social capital theory is still an evolving field, with a broad, and sometimes conflicting, range of theoretical constructions. Because of this, it is critical that applied researchers clearly specify the definition and the theoretical basis for the operationalization of social capital within their studies. Without this clarity, the translation of social capital theory into an applied field like health public health risks becoming overly reliant on a limited subset of social capital theory, affecting the usefulness of the theory for developing an understanding of health behavior.

The impact of this can clearly be seen in the way that social capital constructs have moved into applied nutrition research. Nutrition is a broad, well-established field of health behavior research; patterns seen in the use of social capital theory within this field are likely to be occurring in other areas of health behavior research.
Given the heavy reliance on social cohesion and civic participation as measures of social capital in the nutrition research found in this review, it is not surprising that a number of these studies found that the social capital variables did not predict nutritional status or dietary behavior. It is important that assessments of social capital in nutrition research move beyond the individual, or bonding level of social capital, and include assessments of community social capital and the bridging and bonding connections between individuals, groups, and institutions. There are multiple methodologies to do this, for example by using network analysis studies that identify the links existing within communities or using multilevel modeling that permits the aggregation of individual-level social capital variables to assess community and national levels.

Froehlich suggests that social epidemiology, and specifically prevention research, should develop a more nuanced understanding of contextual behavior, one that reflects the interrelationship between individual agency and social structures. Broadening social capital research in health behavior to include assessments of social networks and social structures could help to achieve this more nuanced picture. The development of simple, easily implemented scales that assess structural as well as individual aspects of social capital, and the inclusion of social network analysis methods in assessments of the impact of community social capital on nutrition, would strengthen these areas.

Shifting the focus of social capital research from social cohesion to include social networks and community structures opens up a range of areas for fruitful investigation. How do community organizations contribute to social capital within their communities, and what impact does that have on food resources, food insecurity, and dietary behavior within a community? What types of resources are available to individuals through their social networks? How do networks differ? What implications does the need of an individual to rely on social networks for resources have on health promotion efforts aimed at changing social norms within a community?

There is evidence to suggest, for example, that the ability to access resources through networks is a gendered phenomenon. Immigrants and individuals in ethnic enclaves may have stronger and more bounded social networks within their communities, but with correspondingly fewer links to access resources outside their community. Research on network structures suggests that the shape of networks themselves affects the ability of individuals to access knowledge and goods through their social connections. All of these factors are likely to influence the success of both health promotion and community development efforts, and are promising areas for further research.
CHAPTER 3: STUDY 2

"YOU JUST LIKE THE GINGER, BORROW IT THEN LEND"

THE ROLE OF SOCIAL CAPITAL IN SHAPING DIETARY BEHAVIOR AMONG LOW-INCOME FAMILIES IN A MULTI-ETHNIC COMMUNITY

Abstract

Households with limited economic may rely on resources obtained through their social networks (social capital) to manage food insecurity. However, social networks in low-income multiethnic neighborhoods are complex. There has been little research on the ways in which social capital is used to manage household food behavior in low-income multiethnic neighborhoods or in communities with high numbers of extended-family households.

Eight focus groups were conducted with 78 low-income Native Hawaiian, Filipino, Micronesian, and Samoan caregivers in a low-income multiethnic neighborhood of Honolulu. The goal was to explore how families in this complex community use social capital to manage their family’s diet. Household composition and food insecurity level were assessed. Discussions explored participants’ definitions of neighborhood and community, social norms about food-sharing within extended family and community, and methods used to manage family food resources.

Participants relied heavily on social capital to manage food insecurity and access resources for their households. Social capital networks did not reflect “neighborhood” social capital, but instead were a complex construction of family, friendship, and ethnic community across geographic areas. Extended-family households and bonding social capital within kinship, ethnic, and church connections were the primary support structures for these social capital networks. Social norms affected dietary behavior in both positive and negative ways. Strong social norms of sharing existed across all of the ethnic groups included in this study, although specific norms about sharing differed between ethnic groups, and between kin and non-kin networks. Both social networks and linkages to community agencies were ethnically bounded, although these communities were geographically intermixed and some linkage occurred within community organizations.

Nutrition programs should consider extended-family relationships, the social role of food in the community, and community social capital structures when assessing dietary behavior and food insecurity issues. Building bridges between community members from different ethnic groups, and strengthening linkages across churches, health centers, and social service agencies that serve specific ethnic communities could be effective methods to help address food insecurity and dietary behavior in multiethnic communities.
Introduction

Rationale

Low-income individuals have unique challenges in providing a healthy diet for their families. Concerns about health and nutrition for these families need to be weighed with time constraints, access problems, competition for other resources, and concerns about hunger and food insufficiency.6,107

In addition, food is not just a matter of sustenance. The sharing of food and the providing of food are part of role performance in many cultures, and thus important for maintaining linkages to others.108 Social connections with others help to shape dietary behavior24; the social aspects of food sharing may be particularly important in households where economic resources for food are limited.86 The ability to access resources through social networks is also a key element of social capital.30 If food insecurity is managed in part through reliance on social capital networks, social norms about food, role performance, and food-sharing may take on increased salience for food-insecure families. These social norms may be directly related to how a family copes with food insecurity, and may shape dietary behavior.

However, little information exists about the role of social networks in supporting access to food resources among food-insecure families in the United States. In addition, there has been little research on the complex structure of social networks within low-income multi-ethnic neighborhoods, or the ways in which resources may be shared through these networks.

The purpose of this study was to begin to identify the ways in which low-income family caregivers in a multi-ethnic community manage resource scarcity and access food resources within their social networks, and to identify how they negotiate the constellation of resource limitations, social norms, family and community roles that shape their dietary choices. The findings should contribute to a more nuanced understanding of the ways in which social capital operates in complex, multi-ethnic communities, and identify the social factors shaping the dietary behavior of low-income families in these areas.

The study was conducted in the Kalihi neighborhood within the city of Honolulu, Hawaii. Originally a Native Hawaiian community, Kalihi has served for generations as an entry point for immigrant populations in Hawaii. As a result, Kalihi contains a very diverse mixture of cultures. Within the census tracts that cover Kalihi, residents are predominantly Filipino (42%), full or part-Native Hawaiian (22%), Micronesian (6%) and Samoan (5%). The Kalihi neighborhood serves as a focal point for newly arrived Pacific Islander migrants from Chuuk, the Marshall Islands, and other Compact of Free Association (COFA) nations. Residents in the Kalihi census tract are in the lowest quartile of income for the state. Overall, the Kalihi area shows higher unemployment, higher reliance of aid programs such as welfare and food stamps, and a lower prevalence of home ownership than the state average.9 This complex neighborhood is home to nine low-income
public housing projects, four senior housing facilities, three community health centers, and a
diverse group of community agencies. Many households contain multigenerational or extended
family members, resulting in a high population density throughout the valley.

Methods

Study Design

This study employed qualitative methods (specifically focus groups) to gain an
understanding of people’s social resources and assets, their understanding of their choices and
options about food, and the behavioral norms around food within the community of Kalihi.

Community Partnership

This research was conducted in partnership with the State Department of Health (DOH),
which desired information to help with the design of a community-based social marketing
campaign to support increased consumption of fruits and vegetables among Supplemental
Nutrition Assistance Program (SNAP)-eligible families in the area. SNAP, formerly known as the
Food Stamp Program, is funded by the United States Department of Agriculture and administered
by state agencies, who also provide education related to healthy eating and budgeting to SNAP
participants. The Hawaii DOH SNAP-Ed program provided the funding and support for a series of
eight focus groups involving low-income family caregivers from the diverse ethnic communities in
the Kalihi area, and these focus groups providing the data for this study. The research team
consisted of individuals from the University of Hawaii, the DOH, and Hawaii Pacific University,
along with three representatives from the First to Work program at St. Elizabeth’s church, who
assisted with the translation and moderation of the Chuukese-language groups. The University of
Hawaii’s Committee for Human Subjects Institutional Review Board reviewed and approved the
study protocol.

Sample

Eight 1.5-hour focus groups were conducted, involving 78 Native Hawaiian, Micronesian,
Filipino and Samoan participants. Participants were qualified to participate if they were adult
residents of Kalihi, were responsible for purchasing or preparing food for their family, and had
household income was below 185% of the federal poverty level.

To assess ethnic differences, six of the eight groups were mono-ethnic. Three were
conducted with recent Chuukese migrants, two with Native Hawaiians, and one with Filipino
immigrants. Two groups were mixed-ethnicity, consisting of lifetime or long-term residents of
Hawaii of any ethnicity. One of these mixed group contained Samoan and Native Hawaiian
participants, the second contained Filipino and Micronesian participants. Group size ranged from
6-12 participants.
Because traditional Chuukese culture prescribes gender-based differences in social and household roles, Chuukese groups were limited to women. All other groups were open to both genders, although only one mixed-ethnicity group had male participants.

Chuukese groups were conducted in both Chuukese and English, using bilingual Chuukese/English speaking moderators trained by the lead investigator. All other groups were conducted in English only.

Recruitment Protocol

Recruitment was conducted in partnership with the Hawaii DOH and seven community organizations serving the Kalihi area. These organizations included St. Elizabeth’s Episcopal Church (Chuukese), Solid Rock Fellowship Samoan Church (Mixed: Samoan/Native Hawaiian); Ke Ola Mamo Native Hawaiian Health Care Center (Native Hawaiian); Kalihi Palama Health Care Center (Filipino); the Kalihi YMCA (all groups); Keiki O Ka Aina Family Learning Centers (Native Hawaiian), and the DOH’s Lanakila Public Health Nursing office (all groups).

Community partners identified their preferred populations and recruitment methods. In general, however, recruitment was conducted across social groups, i.e., participants were encouraged to recruit eligible family members, friends, or neighbors to participate. The research team provided recruitment and screening materials, and participated in recruitment outreach for three of the groups. All focus groups were conducted at, or near, the location of the organization conducting the recruitment.

Community partners were told that focus group recruitment would have no impact on the organization’s opportunity to receive funding from the DOH, and that the results of the focus groups would be made available to each of the participating agencies for their own use in program planning.

Focus Group Protocol and Measures

Four moderators were used for the project, including the lead investigator, a second moderator affiliated with the SNAP-Ed program, and two bilingual Chuukese/English-speaking moderators. All moderators were trained by the lead investigator. Two additional individuals served as note-takers, including a DOH staff member and a graduate assistant, also trained by the lead investigator. The Chuukese groups were moderated by a team consisting of the bilingual Chuukese-English speaking moderator and an English-speaking moderator.

Each group began with the moderator explaining the purpose of the study. Informed consent was obtained in both written and oral form. For the Chuukese groups the informed consent form was orally translated into Chuukese by the Chuukese moderator.

After consent was obtained, group members completed a brief written survey that assessed household composition and household experience of food insecurity using a screening measure recommended for differentiating food-secure from food-insecure households in survey.
research\textsuperscript{111}. For the Chuukese groups this form was verbally translated, and participants were provided with assistance in completing the survey. The survey instrument is shown in Appendix B. A copy of the focus group interview guide is included may be seen in Appendix C.

To initiate the focus group discussion, a map of Kalihi was provided, and participants were asked to identify their neighborhood – “the blocks or area that you think of as your place, where you are most comfortable.” This was initially conducted both as a mapping activity and a group discussion. The mapping activity proved difficult for many participants, and was discontinued after four groups.

Participants were then asked to describe their community, and to identify similarities or differences from “neighborhood.” The discussion moved into the role of food in their community, including what participants felt was “good to bring to potlucks or parties,” and when and how they shared food within their community or neighborhood. The discussion then focused on how participants shared, prepared, and managed food within their own households.

Approximately 40 minutes into the interview, after rapport was well-established, the topic of food insecurity coping methods was introduced using the following prompt: “In states like Hawaii, food is very expensive. Sometimes it’s hard to have enough to get through the month, or you worry that you are going to run out. People have very creative ways of managing this for their families. What do you do to help your family make it through the month?” After coping stratagems were discussed, participants were asked if there were ever times when these coping techniques were not enough, and what they did if they actually ran out of food. The conversation was brought back to a less sensitive topic, sources of information about programs, to conclude the session.

Participants were provided with a $20 gift certificate for their participation, along with a cutting board, produce knife, and re-usable grocery bag.

**Adaptations To Study Protocol**

Two adaptations were made to the initial study protocol after being in the field. Specifically, the initial study protocol called for groups to be segregated by age as well as ethnicity. We found that separating household members by generation was not culturally appropriate for these populations, and would impose excessive transportation burdens on participants. Second, the original study protocol called for the six mono-ethnic groups with two groups each of Native Hawaiian, Chuukese, and Filipino participants. However, 23 individuals arrived for one Chuukese group, including multiple members of the same family. We learned that attending activities as a group is customary in Chuukese culture. We were able to divide the attendees and conduct two focus groups in this session, resulting in three Chuukese groups in total. At the conclusion of eight groups, Filipino participants had been involved in two groups, one mono-ethnic and one mixed-ethnicity, and the representation of Filipinos in the study was
proportionate to that of Native Hawaiians and Samoans. The second Filipino-only group was eliminated in order to stay within the resource limitations of the study.

Data Analysis

Quantitative Survey Analysis
The pre-group survey was analyzed using SPSS Version 19.0. Descriptive statistics were generated, and differences in household size and food insecurity levels between ethnic groups were assessed using one-way ANOVA and Tukey’s HSD post-hoc tests. Levene’s test was performed to verify the assumption of homogeneity of variance for the ANOVA analysis.

Focus Group Transcription
Two tape recorders were used to record six of the groups. Discussions were transcribed using the first tape, and the transcriber then reviewed the transcript against the second tape. However, because the large Chuukese group had to be divided into two separate focus groups, only one tape recorder was available for each group. Due to the high noise level in the room, lack of a second recorder, and the challenges posed by the multilingual nature of the interview, these tapes were of poor quality. Translator and moderator voices could be heard, including the direct translation, repetition and summarization of participant remarks, but some participant voices were inaudible. Both English-speaking moderators produced field notes immediately after these groups; these field notes were reviewed with the Chuukese moderators and several participants to ensure that all key components of the discussion were retained.

Qualitative Coding
Transcripts were coded and analyzed using nVivo 9.0 qualitative software to identify core themes and constructs related to the research questions. Moderator field notes from the first two Chuukese groups were included in the analytical coding, to ensure completeness of the data. Coding was performed by the lead investigator, and conducted in a constant-comparative manner, moving recursively across transcripts from the different ethnic groups to ensure consistency between groups as the codes developed. First-pass coding was conducted using a grounded approach, in order to ensure that initial coding categories emerged from the data rather than being structured using a predefined theory\textsuperscript{112}. Coding began with line-by-line coding, in which every line of the transcript was examined and coded. Both in-vivo codes and process codes were used in this pass, using the participants’ own words and perspectives to define the coding schema\textsuperscript{113}. Using this technique, codes were allowed to emerge organically from the data, without filtering or structuring by the analyst. Once this was completed, a second coding pass was conducted through the data to identify coping strategies and social norms, using trigger phrases such as “we have to,” “you always,” “our group does,” “it’s just that you need to…” to identify participants’ normative understandings about their behavioral options.
These initial codes were then reviewed and consolidated using focused coding as themes and structures emerged within the data. A theoretical coding pass was then conducted to identify the uses and types of social capital described by participants, and descriptions of resource movement through social networks.

During the second phase of analysis, the codes were grouped and woven together into themes, and analysis was then conducted using a phenomenological perspective, focusing on the ways in which participants constructed their understanding of their community, made sense of their resources and options, and define their community’s social norms and their social universe. A code book detailing the final coding schema used for analysis is provided in Appendix D.

It should be noted that while the number of Chuukese participants predominated in the study, because of language challenges the Chuukese focus group discussions reflected negotiated understandings among groups of participants, rather than a wide range of individual opinions. As a result, although there were more Chuukese participants and groups, the number of individual segments coded and specific codes identified for the Chuukese groups were comparable to the data coded and analyzed from the other groups.

**Results**

**Demographic Profile of Participants**

While only three of the focus groups were Chuukese, as can be seen in Table 10, the large size of the Chuukese groups, combined with two additional participants in the mixed groups who identified their ethnicity only as “Micronesian,” resulted in fully half of all participants being of either Chuukese or another Micronesian ethnicity. The mean household size for the entire sample was 5.9, with 3.2 adults and 2.7 children. This is twice the norm for both Hawaii (2.92) and the nation (2.59), and is larger than the mean household size for the Kalihi valley as a whole (4.42). Household sizes ranged widely, and the maximum household size was large (10-16) for all groups. A one-way ANOVA found that household size varied significantly by ethnicity (F_{3,73}=6.187, P=.001); post-hoc testing using Tukey’s HSD showed that average household size for the Filipino participants (mean=3.5) was significantly smaller than the average household sizes of both the Micronesian (mean=6.5, p=.02) and Samoan (mean=8.6, p=.001) participants. More than half (59.7%) of participants reported living in an extended-family household. There were no significant differences by ethnicity on this variable (X^2=5.475, p=.145).
Table 10. Demographic profile of participants

<table>
<thead>
<tr>
<th></th>
<th>Native Hawaiian</th>
<th>Filipino</th>
<th>Samoan</th>
<th>Chuukese/Micronesian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Participants</td>
<td>13</td>
<td>15</td>
<td>11</td>
<td>37/2</td>
</tr>
<tr>
<td>Average Household Size (SD)</td>
<td>4.7 (3.8)</td>
<td>3.5 (2.6)*</td>
<td>8.6 (3.6)*</td>
<td>6.5 (3.1)*</td>
</tr>
<tr>
<td>Household Size (Range)</td>
<td>2-16</td>
<td>1-10</td>
<td>4-15</td>
<td>2-15</td>
</tr>
<tr>
<td>Number (percent) residing in extended family households</td>
<td>5 (39%)</td>
<td>7 (46%)</td>
<td>8 (73%)</td>
<td>26 (64%)</td>
</tr>
<tr>
<td>Food Insecurity Level</td>
<td>6.5 (1.8)**</td>
<td>5.0 (1.7)**</td>
<td>8.7 (2.7)**</td>
<td>9.6 (2.0)**</td>
</tr>
<tr>
<td>N for food insecurity measure</td>
<td>13</td>
<td>13</td>
<td>11</td>
<td>31</td>
</tr>
</tbody>
</table>

*Differences between the Samoan/Chuukese group and the Filipino group significant at p<.05
**Differences between all subgroups are significant at p<.05.

Responses to the four food insecurity questions were summed; a score of 5 or greater on this scale indicates that the participants’ household is experiencing at least some level of food insecurity. As may be seen in Table 4.1, the mean scores for all groups fell into the food-insecure range. A one-way ANOVA found that food insecurity level was significantly related to ethnicity ($F_{3,64}=18.361, p<.001$). Post-hoc testing using Tukey’s HSD showed that both Micronesian and Samoan participants had significantly higher levels of food insecurity than Filipinos ($p<.001$) or Native Hawaiians ($p<.05$).

Themes Emerging from the Focus Groups

Six interrelated themes emerged from the focus groups to describe the structure of social networks within Kalihi, and to show how these social networks are tapped to manage food resources and alleviate food insecurity. This section presents the themes and provides quotes illustrative of participants’ voices and perspectives.

Extended families are the core of our social networks. Extended-family households were perceived as normative for all groups, and appeared to be a foundational structure for both social networks and access to social capital resources. Household size and composition was complex, influenced by age, ethnicity, immigration status, and residence in private vs. public housing (e.g., the latter may restrict the number of residents allowed in each unit).

In addition to extended-family households that shared living space, several participants described cross-household structures that merged multiple households into an extended-family unit that shared resources for food preparation and childcare. One Native Hawaiian participant described her household as consisting of close to 20 people, only seven of whom lived with her:

“I have my mom, my dad, I have the twins with their brother, and I have my nephew and my niece, and every now and then throughout the week, probably four times a week I have my brother’s two daughters. My house is a kid house. And then I have my oldest brother, probably
Once or twice a week his kids come to my house and he has four. Some house is the house for everybody to come.”

Both Samoan and Chuukese participants described these cross-household linkages as a way to adapt cultural norms about extended families living together to public housing regulations.

**Our neighborhood is not our community.** One participant summed up the consensus among all groups: “Community is different from neighborhood. Very different.” Community was described by one woman as, “Bigger. Like I don’t know everybody in my community.” Specific definitions of community varied by ethnic group. Among Chuukese, Samoan, and older Filipino immigrants, community was defined around ethnic group and church linkages. Both Native Hawaiians and “local” or long-term residents discussed being connected to multiple, overlapping communities defined by shared concerns. As one woman noted: “I have like friends, like I have exercise friends, and I have my high school friends, and I have my hula friends, and I’ve got my girlfriends, so I guess it’s all different groups, but everybody lives all over the island.”

Most indicated that they thought of their “neighborhood” in very small units – the immediate block, or their housing project, rather than in areas of contiguous city blocks. One woman noted that, “Our kids don’t go outside of the lane, which the lane has about 8 houses.” Neighbors were defined as people who lived in their apartment building, housing project, or on their block. Many described relationships with neighbors as “neighborly” but distant: “I’ve neighbors that are always just “hi” or “hello”, but never did have a close relationship. But they always say hi. It seems like everybody look out for everybody, we don’t know everybody personally, but they look up for each other.”

Filipino, Native Hawaiian, and Chuukese participants described language and cultural barriers between themselves and neighbors, and some expressed reservations about getting too closely involved with neighbors. As one commented, “…My neighbor, I worry my neighbors -- sometimes they have a, they got problems. We don’t bother them.”

While most Chuukese and Samoan participants identified family living nearby, many in the Native Hawaiian and Filipino groups reported few or no connections in their immediate neighborhood. Several of these participants identified a neighborhood other than where they resided as where they felt “at home.” Many of these participants commented that they had little choice about where they lived; one described deliberately avoiding being connected with her neighborhood as a way to dissociate from the stigma of living in public housing.

The most notable cross-ethnic links for community were workplaces and children’s schools. An exception to this was PILI Ohana, a university-run weight-loss intervention research program that was culturally tailored for Native Hawaiian, Filipino, and Pacific Islander groups. PILI was mentioned in both Native Hawaiian focus groups, with one participant commenting that it allowed her to “go outside” – to share information with people from different cultures and communities.
**Our level of civic participation is high, but informal.** Most participants had few connections to formal organizations other than churches. Participation in informal community activities, however, was widespread, and participants in the Native Hawaiian groups described connection to a wide range of both formal and informal organizations. Keiki o Ka Aina (a family education and preschool program) and PILI Ohana were mentioned as focal points for community linkage, and both organizations were described as being "like family."

Sharing resources for community projects was widely reported by all groups; this was participants’ primary form of community participation. For some, this sharing was simply defined as being part of local culture. "I think because it’s Hawai‘i, right? Everybody just pitch in, right.” Sharing was defined as part of being friends: “Yeh, we’re friends with each other and we share.” In many cases, sharing was simply described as the right thing to do socially. "When you go somebody’s house, you always take something, you always take along something… We grew up like that. We don’t go to other people’s house without bringing anything. We prepare something.”

Sharing food with close friends and family was viewed differently from sharing food with other community members. Sharing with family was viewed as a way to provide necessary caring and social support. The social exchange of food with neighbors and co-workers was viewed from a functional perspective, as a way to avoid the waste of food, to ensure that community resources (such as food obtained from churches and food pantries) were used efficiently, and as a way to build community bonds. Among both Filipino and Native Hawaiian participants, the social exchanges of food with friends and neighbors were specifically used to increase access to fruits and vegetables in the diet, primarily through the exchange of homegrown fruits and vegetables.

The social role of sharing extended well beyond food exchanges. Providing instrumental help for others was a strong social norm in all groups. Many described having friends, family, or neighbors that they “kept an eye on,” shared things with, or helped out. Sharing information with others was particularly important for social bonding, and was described as one of the primary benefits of participating in group health promotion programs. Information shared by others had greater salience. As one participant commented, “We hear from one another and check out the places that they find exciting.”

**We share food to build community connections.** The sharing of food appeared to be a key element of social connection among family, close friends, and neighbors. Sharing food with visitors was described as a critical element of social role performance for all groups. As one Micronesian participant described it: “If it’s not time for meal, when they come in, we always offer them food. Because if they’re hungry, they eat. And that’s part of our culture too.” Others reported strong social norms about food-sharing within their communities, such as never arriving at someone’s house without a gift of food, never allowing a guest to depart from a social get-together without pressing them to “make plate” or take food with them, and “never returning the Tupperware empty.”
Sharing with others appeared to be an important part of community role performance in all groups, and reciprocation was expected. This was so important that participants reported that they sometimes “borrowed from next week,” destabilizing their food budgets to provide what was expected. This reciprocity was particularly important in the day-to-day exchanges with neighbors and other community members; as one woman pointed out when talking of her neighbors: “I don’t just give. You just like the ginger, borrow it and then lend.” The ability to reciprocate is so important that some participants stated that they would avoid community activities if they could not provide what was expected.

Our need to manage food insecurity underlies how we feed our families. During the focus group discussion, almost all participants described some level of food insecurity in their households: “sometimes we have you know, enough food, sometimes we don’t.” Among the Chuukese households, concerns about running out of food were particularly high. Participants in both the Chuukese groups and in the Filipino group made comments describing the end of the month as a time when you eat less for a few days. Several made jokes about the end of the month being “the time when you can make a diet.” Even among those that did not report actually running out of food, concerns about food insecurity shaped shopping and budgeting behaviors, “I have to buy the foods that are cheaper so I can save other money.” Fruit and vegetable consumption was particularly affected by the need to manage budgets to avoid running out of food: “If I buy a lot fruit and vegetable…. Not enough money, because it’s expensive.”

Participants had a variety of concrete methods to manage concerns about food insecurity. Participants reported that their families relied on purchasing or cooking in bulk, relied on foods that could be stretched or that were perceived as “filling,” stocking their pantries and freezers with low-cost starches and meats, planning meals or dividing and freezing foods for later in the month, and using up what they had. Participants also reported relying heavily on social networks to obtain the resources needed to feed their families and manage their household budgets.

In addition to these commonalities, there were some differences between Chuukese and the other ethnic groups in their ability to manage food insecurity. Chuukese participants appeared to have the most limited access to environmental resources to lower the cost of food. Without access to cars, and with transit company policies that limit shopping bags, shopping was often conducted at the corner markets, which were viewed as “expensive, but convenient.” Food planning was reported as a day-by-day or week-by-week process, with phone calls and sharing between family members as household staples ran out. Chuukese participants discussed prioritizing the purchasing of rice, packaged ramen, pancake mix, cereal and canned meats, to make sure that there was always something available to feed the children.

We obtain important food resources through our social networks. Participants relied on both economic and food resources obtained through their social networks to increase dietary
variety, manage periods of scarcity and avoid hunger. Many also relied on social networks for the labor, transportation, and access to institutional and informational resources that allowed them to lower the cost of household food purchases. Sharing the tasks associated with food preparation was used to manage time conflicts between work, family, and community obligations.

Extended-family households varied in how they shared food resources. Most pooled resources, with budgeting, shopping and meal preparation overseen by the female head of household. In other extended-family households, individual nuclear family units or small groups managed budgets and meal preparation separately, with informal sharing across family units.

Participants in nuclear-family households also reported substantial transfer of food resources between households containing grandparents, adult siblings, cousins, and other family members. Meal preparation, transportation, access to low-cost bulk stores like Costco or the military commissary, and the care and feeding of children were often shared across multiple linked households. Participants reported borrowing or sharing as critical methods used to increase dietary variety, supplement food budgets, and to avoid hunger when resources ran out.

Pacific Islanders (Native Hawaiians, Samoans and Micronesians) and Filipino households in these groups differed on this dimension, with sharing extending across siblings and cousins among Pacific Islanders, and more tightly focused on lineal (parent-child-grandchild) connections for the Filipino participants. For some Native Hawaiian and Pacific Islander households, this sharing of resources extended to pooling SNAP resources within the extended family to take advantage of bulk shopping opportunities or to provide for group meals. Some reported using their SNAP benefits to purchase foods for other family members, with the assumption that family members would reciprocate by sharing their own resources later in the month. This type of sharing was only reported between mother-daughter and sister-sister dyads.

Discussion

For these Kalihi residents, providing food for their families was not just a matter of maximizing nutrition on the table. Concerns about health frequently took a back seat to practical concerns about resource limitations and hunger, activities required to maintain family and community connections, to meet community and cultural norms for sharing, and the need to juggle food preparation with the demands of jobs and other family responsibilities. Almost all participants in this study reported at least a mild level of food insecurity, and meal planning and food budgeting often involved making nutritional compromises to avoid running out of food. These compromises closely resemble the patterns found in other studies of food-insecure households both nationally and in Hawaii.

Access to social capital resources had a direct economic impact on these families, well beyond traditional measures of social cohesion and social support. Bonding social capital was the dominant form of social capital used to manage food insecurity, with most reporting social connections and resource sharing within their kinship group and ethnic community.
While social networks were widely used to increase access to foods within the household, and to increase the ability to access sources of low-cost food, these were simply two aspects of a wider range of resources disseminated through social networks in this community. Participants relied on their networks for social support, for assistance with housing, transportation, and childcare, for learning about new programs, and for deciding which programs and activities to undertake. This heavy use of social capital bears little resemblance to that predicted by theories of social isolation within low-income communities\textsuperscript{118}.

The reliance on social networks for food resources within the Kalihi community was supported by social norms of sharing and interdependence. Reciprocated sharing was viewed as a key element in role performance within the community. Participants across all groups described sharing of food as a way of building social connections with others, and expressing their social identity. This was viewed as fundamental to Hawaii’s culture, as well as to each of the individual ethnic communities. People would avoid social participation if they could not do their part in the exchange; at times the expectation of participation was seen as a strain on family food resources.

This pattern of reciprocal exchange, and of differences in exchange patterns between kin and non-kin, has been found in prior research on the uses of social capital in French households\textsuperscript{56}. DeGenne et al found economic differences on this dimension, with lower-income families less able to access social capital through non-kin networks. In our study, the low-income households relied on kin differently from non-kin, but the ability to access resources from neighbors, friends, church members and others in their ethnic communities was high overall. Our study also found a strong social mandate to help non-kin among Pacific Islanders, whereas DeGenne’s study suggested that one of the key differences between kin and non-kin was the voluntary nature of the exchange with non-kin. It may be that these Pacific Islander community networks more closely resembled extended kinship networks. Because we did not have higher-income participants to contrast these findings with, this remains an area for further study.

As hypothesized might be the case in a community with high reliance on social capital for survival, adherence to community social norms was strong, and social mediation of information was prevalent. These social norms affected food choices and household food budgets in both positive and negative manners, supporting theories suggesting that high levels of social capital may have both positive and negative effects on health behavior\textsuperscript{74}. Social norms discouraged fruit and vegetable consumption among Chuukese participants, who viewed this as not culturally normative, and among Filipino children who wanted to identify as “local.” Norms about resource sharing sometimes destabilized household budgets, and resulted in SNAP benefits being shared with non-SNAP participants. However, others reported being motivated to adopt healthier eating habits by observing others, and by messages that growing and/or consuming fruits and vegetables was part of their ethnic group’s identity. Messages about programs or health issues
received through valued social sources were perceived as having greater salience, and greater likelihood of action.

While social capital is heavily used as a coping mechanism by resident in the Kalihi community, the structure of this capital reflects the complex multi-ethnic nature of the community. Participants’ community was socially, rather than geographically, constructed, and they often went outside of the Kalihi area for shopping, employment, and other resources. Participants described their “community” as multifaceted, and identified primarily by ethnic group and shared social or institutional ties. Social network connections based on geographic neighborhood and “neighbors” were limited. This pattern resembles behavioral patterns found in assessments of social networks and social behavior in communities in Brazil, Peru, New Zealand, and the United States. Studies of social capital that use geography as a proxy for social connection in measuring “neighborhood social capital” may be particularly challenged in capturing the complex social relationships within low-income multi-ethnic communities.

Because Kalihi’s residential areas exhibit a high level of ethnic intermixing, it may be that neighbor-to-neighbor social exchanges in a mixed-ethnicity community more closely resemble linking, rather than bonding social capital. Linking social capital provides “weak ties,” connections that circulate new resources and ideas between social groups. The linkage of individuals from different social groups with similar levels of resources occurred primarily through informal exchanges with immediate neighbors, or with connections built in the workplace, church, schools, and PILI Ohana, a diabetes prevention program that encourages family participation.

Participants’ ability to access bridging social capital, or to link with individuals from groups that could provide access to greater economic or social resources, appeared to occur primarily through the involvement of individuals with Keiki o ka Aina (a childcare/family education program with a social service mission), or churches that linked with food pantries or social service organizations. Faith-based food pantries appeared to be effective at linking participants to both economic and social support; this linkage was also seen in a recent study of food-insecure African-American women. These forms of informal food supports may be particularly important for cushioning food insufficiency in vulnerable households.

Dominguez suggests that community agencies are uniquely qualified to serve as integrative bridges (individuals “who act as bridges by connecting two ethnically differentiated populations in a given neighborhood or community”), and that this bridging function is a critical role for community agencies, allowing low-income individuals to access and leverage resources from the larger community. Interventions strengthening the horizontal and vertical links between community organizations serving low-income individuals have been shown to improve access to job training and employment resources. Because churches, schools, and childcare centers appear to be the primary sources of bridging social capital within this population, strengthening
social capital linkages and bonds between the diverse organizations serving this community may help to reduce food insecurity and increase nutrition overall.

Limitations
Focus group research is subject to a number of biases and limitations. Individuals participating in the group were not selected randomly, and may not be representative of their larger community. Because the interview was conducted in a social setting, social response bias may be present. These group interviews contained clusters of individuals who were members of the same family or social group, which may further increase the likelihood of social response bias. Because recruitment for the group was conducted through community organizations and social groups, it may be that individuals with stronger social networks were more likely to be recruited than those who were more isolated from the community. However, because multiple household or social group members were present, the focus groups brought in individuals who themselves might not have been reached through one-on-one recruitment conducted through flyers or community agency outreach. Because the Chuukese groups were conducted in English and Chuukese with the assistance of a translator, individual perspectives may have been muted, and the findings in the Chuukese groups may be more reflective of negotiated social norms than of the full range of individually constructed behaviors. While care was taken to build rapport through the community-participatory nature of the recruitment and the structure of the focus group discussions, participants may have been reluctant to fully disclose sensitive information about hunger and resource management within their households in these group discussions.

Conclusion
The results of this study suggest that families in this low-income, multi-ethnic community rely heavily on social capital to manage food insecurity and access resources for their households. These social capital networks do not reflect "neighborhood" capital, however, but instead reflect a complex construction of community that spans across geographic areas. Extended-family households and bonding social capital within kinship, ethnic, and church connections are the primary support structures for these social capital networks. Social norms within these communities affect dietary behavior in both positive and negative ways. Strong social norms of sharing exist across all of the ethnic groups included in this study, although specific norms about sharing differ between ethnic groups, and between kin and non-kin networks. Both social networks and linkages to community agencies are ethnically bound, although these communities are geographically intermixed and some linking occurs within neighborhoods. Community development efforts that involve strengthening linkages across the churches, health centers, and social service agencies that serve specific ethnic communities could be effective methods for addressing food insecurity and dietary behavior in this complex multi-ethnic community.
CHAPTER 4: STUDY 3
INTER-AGENCY COMMUNICATION AND COLLABORATION PATTERNS FOR NUTRITION PROMOTION IN A LOW-INCOME MULTI-ETHNIC COMMUNITY

Abstract
Community agencies play an important role in health promotion for individuals in low-income communities, providing them with access to information and resources that may not be available within their own social networks. Networks of communication and collaboration among these agencies help shape the capacity of the community as a whole to address health concerns. In multi-ethnic neighborhoods, these linkages may be affected by both differences in agencies’ core missions and ethnic populations served. A network analysis was conducted of 27 organizations important to improving nutrition within the low-income multi-ethnic community of Kalihi, Hawai‘i. Results showed that while community organizations engage in similar activities, linkages are affected by agency mission, location, and ethnic focus. Communication between agencies was diffuse and uncentralized, and collaboration limited. Childcare/youth development organizations and community health centers provided the central links within the network. Religious organizations were isolated from each other and from the larger network. Although faith-based organizations were involved in providing social services to their community and expressed a high level of interest in nutrition activities, they were not identified as potential partners by other organizations in the network. Results suggest that efforts to promote collaboration and partnership may be effective at reducing duplication of services and increasing access to nutrition resources for residents of these communities. These collaborative efforts can be an effective tool for reducing nutrition disparities within communities.

Introduction
Community organizations can provide important forms of social capital – linking and bridging capital – that allow individuals access to information and resources not contained within their own immediate social network.122 Linking social capital increases the variety of information and resources circulating within a community through linkages between social groups who have different members, but the same general level of access to economic resources. Bridging social capital allows individuals to tap into the social networks of people with greater access to power or resources, encouraging the flow of resources downward through a social system. However, bridging social capital has been shown to be more accessible to individuals in higher-income communities than in lower-income communities, reinforcing existing inequities in social systems.67 Increasing the effectiveness of agencies serving low-income communities at linking and bridging is an effective method for increasing access to resources for low-income households.42

Community institutions play a particularly important role in providing resources for improved nutrition among low-income families. Although nutrition has often been framed as an
individual or interpersonal concern, community structures provide the frame within which these nutrition decisions are made. Within communities, faith-based institutions, schools, and childcare centers have been identified as effective sources for linking individuals with institutional social capital, and faith-based organizations can be important elements of community support for improved nutrition. Involving these broader community organizations in nutrition outreach has been shown to be effective in changing nutrition behavior among African American, Latino, and Pacific Islander communities.

Programs that build on the strengths of a community's existing social networks and incorporate cultural and social aspects of behavior can be effective at helping individuals sustain long-term changes in health behavior. Within Filipino, Native Hawaiian and Pacific Islander communities, the strength of the communities' connections and the high level of interconnection between individuals and community groups have been identified as assets for community efforts to reduce chronic disease. However, research suggests that community agencies serving low-income immigrant populations may be over-taxed and underfunded, leading to limited capacity to address health issues within these community. Community capacity-building efforts that work to link agencies to shared resources may help to strengthen these agencies' ability to serve as supports for behavior change.

By strengthening communication and collaboration on nutrition issues between community organizations, increasing supports for nutrition education within these organizations, and increasing the ability of diverse community organizations to disseminate common messages about nutrition issues, it may be possible to increase the capacity of the community as a whole to adopt healthier dietary behaviors.

Within a multi-ethnic community, the network of connections is not likely to be a simple map, and it is unlikely that any one agency within the network is aware of all of the opportunities for collaboration that may exist. There are currently no data on linkage patterns between community organizations in a multi-ethnic community.

Social network analysis is an analytical tool that may be used to assess the structure and characteristics of links between organizations. By mapping the connections between individuals or agencies, network analysis identifies the pathways through which information and resources flow within a community. Network analysis may be used to uncover the existing connections and linkages between groups, to map communication pathways, and to identify opportunities for improving collaboration within a community.

The Kalihi community in Honolulu is a low-income, multi-ethnic neighborhood on the western side of Honolulu. Kalihi, originally a predominantly Native Hawaiian neighborhood, has for generations served as a point-of-arrival for new immigrants from the Pacific Rim. The current population of Kalihi is a complex mixture of established Native Hawaiian, Filipino and Samoan families, recent immigrants from the Philippines, China and other Pacific Rim nations,
and Pacific Islander migrants. Many of these populations experience disparate levels of risk for obesity, diabetes, and cardiovascular disease. Consequently, agencies within the Kalihi area have become increasingly concerned with addressing nutrition disparities.

This study employed social network analysis to map the existing assets for nutrition within Kalihi’s diverse communities and to identify current communication and collaboration patterns. While the exact agencies involved are unique to the Kalihi, the results of this study may suggest patterns of collaboration and partnership existing within the growing number of multi-ethnic communities in the United States.

Methods

This study consisted of two phases: community interviews to identify the organizations important to community-wide efforts to change nutrition behavior in the Kalihi area, and a network analysis to map communication and collaboration patterns between these organizations.

Community Partnership

This research was conducted in partnership with the Department of Health (DOH), which desired information to help with the design of a community-based social marketing campaign to support increased consumption of fruits and vegetables among Supplemental Nutrition Assistance Program (SNAP)-eligible families in the area. A first step for this project was to identify the Kalihi community’s existing assets for nutrition activities, and to determine the degree to which organizations within the community were communicating or collaborating on nutrition issues. The research team, consisting of staff from the University of Hawai‘i, Hawai‘i Pacific University, and the DOH, conducted a series of interviews with individuals representative of organizations across the Kalihi neighborhood. These interviews provided the information for the network sample.

Sample Development

One of the key methodological issues in network research design is the decision to use either fixed-list or expanding-list sampling methodology. A fixed-list sample is one in which the researcher pre-defines the boundaries and components of the network. In this type of study, each respondent is asked to provide information about dimensions of their relationship with specified others, and a map is developed that identifies patterns of communication and collaboration between these entities.

A fixed-list analysis is customarily used in assessments of coalitions, because it prompts participants to recall agencies that they may and may not currently work with, and provides comprehensive data to identify both strong and weak links in the network. One drawback, however, is that it restricts participant responses to only those agencies already listed (hence the term “fixed-list”). Care must be taken to ensure that the agencies selected are an accurate representation of universe of possible connection.
An expanding-list methodology is often used to study the social connections between individuals. With this type of network sample, potential connections are not defined by the researcher, but instead are developed through the participants’ responses to open-ended questions about their connections. This methodology accurately reflect participants’ most active social connections, and reduces sampling bias. However, participants may not think to report weaker connections with others, resulting in a loss of information about weaker ties.

For this study a combination of the two approaches was used. Because there is no coalition linking organizations involved in nutrition activities in Kalihi, we used a reputational snowball sampling method to identify organizations working within the community. The reputational snowball methodology was based in the idea that the key organizations and professionals working within a field tend to be known to each other. This technique has been used in developing network maps of organizations involved in tobacco control efforts, physical activity promotion, and HIV risk reduction.

The snowball sample for this study began with six informants – three DOH employees working in the Kalihi community and three University of Hawai‘i researchers with nutrition research experience in Kalihi. Each of these individuals was asked to list all organizations working in nutrition in the Kalihi area, or those that they felt it would be important to involve in a nutrition campaign for Kalihi. Individuals at each organization listed were contacted and interviewed about their organization’s current nutrition activities in the Kalihi area, and their interest in participating in a Kalihi-based nutrition campaign. Each individual was then asked to identify additional organizations and contact individuals who should be involved in the study. The snowball sample continued until saturation was achieved, with no new organizations identified. The number of informants and types of organizations involved in the sample development interviews is shown in Table 11.

<table>
<thead>
<tr>
<th>Organization type</th>
<th>Number of informants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious Institutions/Churches</td>
<td>9</td>
</tr>
<tr>
<td>Community health centers</td>
<td>7</td>
</tr>
<tr>
<td>Social service agencies</td>
<td>6</td>
</tr>
<tr>
<td>State or county government agencies</td>
<td>6</td>
</tr>
<tr>
<td>Nonprofit or voluntary community organizations</td>
<td>4</td>
</tr>
<tr>
<td>Childcare or youth development</td>
<td>3</td>
</tr>
<tr>
<td>Public housing</td>
<td>3</td>
</tr>
<tr>
<td>Community-based research partnerships</td>
<td>3</td>
</tr>
<tr>
<td>Education</td>
<td>2</td>
</tr>
</tbody>
</table>
Network Survey Procedures

Survey Recruitment and Administration

The key informant interviews provided a sample of 28 organizations, along with the name of the person at each organization viewed as most likely to be knowledgeable about the organization’s nutrition activities. Each participant was contacted by telephone and email, and provided with a link to the online survey, designed with Qualtrics survey software, version 2009 (Qualtrics Labs, Inc., Provo, UT). At least six follow-up contacts were made over the course of four weeks to encourage survey completion.

During follow-up, the contact at one church indicated that her institution did not see itself as serving the Kalihi community, and had no interest in nutrition. This church was removed from the sample, resulting in a final sample size of 27. Four organizations did not respond within the 6-week time frame of the survey, resulting in 23 participants, and a response rate of 85%.

Survey Measures

The survey assessed each organization’s activities, populations served, frequency of communication and level of integration with other organizations in the study, degree to which the respondent felt that the other organizations in the study shared goals with their organization, and the organization’s level of interest in participating in a community-based nutrition campaign in Kalihi. A final question asked participants to identify any organizations not included in the survey that they felt were critical to nutrition activities in their community. This served as a check on the validity of the study sample. The survey instrument may be seen in Appendix E.

Two measures, communication and level of integration, were matrix questions used to provide the data for the network construction.

Communication. Each participant was shown the full list of 27 organizations and asked, “In the past year, how often did your agency have contact (such as, meetings, phone calls, or emails) with [Agency]?” Six possible responses were provided: never, annually, quarterly, monthly, weekly, and daily. In analysis these data were dichotomized as “less than once a quarter,” or “once a quarter or more,” a definition of “connected” that is consistent with definitions used in other studies of communication networks.

Level of Integration. The network integration measure used was adapted from the work of Slonim, et al. Each participant was presented with the list of 27 agencies, and asked to “Please choose the response that best describes the current relationship between your agency and [AGENCY].” Seven possible levels of integration, based on the definitions of agency integration shown in Table 12, were provided for the respondents to select from. Two network analyses were developed using the data from this measure. The first looked at the connections between all agencies linked at the cooperation level or above. The second looked only at the connection patterns of agencies currently involved in collaboration with each other.
Table 12. Definitions of agency integration

<table>
<thead>
<tr>
<th>Fully linked or integrated</th>
<th>We mutually plan, share staff and/or funding resources and evaluate activities to accomplish our common goals.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partnership</strong></td>
<td>We work together as a formal team with specified responsibilities to achieve common program goals (i.e., have formally identified common goals and areas of responsibility for each organization, usually outlined in a Memorandum of Understanding or other agreement).</td>
</tr>
<tr>
<td><strong>Collaboration</strong></td>
<td>We work side-by-side and actively pursue opportunities to work together as an informal team (i.e., attempt to find ways to work together but do not establish a formal agreement or contract; “in the spirit of collaboration”).</td>
</tr>
<tr>
<td><strong>Coordination</strong></td>
<td>We work side-by-side as separate organizations to achieve common program goals (i.e., efforts are organized to prevent overlap, but tasks are performed as separate organizations).</td>
</tr>
<tr>
<td><strong>Cooperation</strong></td>
<td>We share information and work together when any opportunity arises.</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>We share information only when it is advantageous to either or both programs.</td>
</tr>
<tr>
<td><strong>Not linked or integrated</strong></td>
<td>We do not work together at all and have separate program goals.</td>
</tr>
</tbody>
</table>

**Data Analysis**

*Data cleaning and resolution of missing values*

Survey data were exported to SPSS 20.0 Statistical Package for cleaning and initial data exploration. Network data is dyadic; because each agency evaluates their relationship with every other agency, paired responses are generated for each relationship. Responses from both halves of the dyad were used to create a single value representing the relationship between the agencies. Two techniques were used to reconcile divergent response pairs: reconstruction and averaging.

Reconstruction was used when only one agency in the dyad provided a valid response to a question. Reconstruction involves using the value provided by the one agency in the dyad to replace the missing response from the other agency. In network analysis, reconstruction has been shown to preserve commonly used descriptive statistics when less than 20% of data is missing. This study had a response rate of 85%, and all of those who completed the survey completed all questions. This led to an overall rate of 15% for missing data, suggesting that reconstruction was an appropriate tool for this data set.

Averaging was used to resolve small rating discrepancies between the two agencies in a
rating dyad. When the discrepancy was large (defined as a difference of more than three points on the response scale), respondents were recontacted by telephone in order to reconcile their responses.

As shown in Table 13, the overall level of concordance between partners in the rating dyads ranged from 68.4% in the cooperation network to 88.4% in the collaboration network.

Table 13. Rating concordance within dyads for network survey items

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>% of concordant responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>73.9%</td>
</tr>
<tr>
<td>Cooperation</td>
<td>68.4%</td>
</tr>
<tr>
<td>Collaboration</td>
<td>88.4%</td>
</tr>
</tbody>
</table>

*Data Analysis*

Descriptive statistics were run on all measures. Responses to agency’s primary activities were integrated with information about the agency’s mission, and used to assign each agency to an agency type. State and county agencies were grouped together as “state/county agencies” regardless of primary mission. The University of Hawai‘i’s Center for Tropical Agriculture and Human Resources (CTAHR) was grouped with the state agencies because it was affiliated with the Hawai‘i Department of Human Services, and served as a primary state implementing agency for both EFNEP and SNAP-Ed. After consultation with PILI ‘Ohana staff, the University of Hawai‘i’s PILI ‘Ohana project, a community-based participatory research project involving collaboration between university researchers and community agencies on the translation of the Diabetes Prevention Project for Native Hawaiian and Pacific Islander populations, was grouped with the education agencies as a university-based program.

*Network Generation*

Communication and integration matrices were created from the communication and agency integration items. These matrices were imported into network analysis software (Pajek v1.13), to determine network statistics and visualize network contact and integration.

Pajek maps and analyzes networks using four primary data structures: vertices, lines, vectors and partitions. Vertices are the entities being mapped in the network – individuals, agencies, countries, airports, publications, etcetera. Lines are the connections between vertices – they may be drawn either as directional arcs from one vertex to another, or as bidirectional edges connecting the two vertices. Lines can be entered into Pajek as binary 0,1 data (no connection vs. connection), or they can be given values that reflect the relative strength of the connection between the two vertices. Partitions and vectors are used to integrate information about individual vertices into the network analysis. Partitions are used to store categorical data linked to vertices,
allowing vertices to be grouped or displayed by type. Vectors store quantitative information linked to vertices, allowing for the examination of how measurable differences between vertices affect the placement of individual vertices and shape the overall structure of the network.

For this study, each individual organization was defined as a network vertex, and a partition was created that assigned each organization to an agency type.

A communication network was created by importing the communication matrix into Pajek, with the value of the line between each pair of agency vertices defined as the frequency of communication between the two agencies. All lines with communication values below 2.5 were dropped, resulting in a network showing the connections between organizations that communicated at least once a quarter.

Next, the agency integration matrix was imported and used to create a network where the value of the line between each pair of agency vertices was defined as their response on the agency integration item.

These data were then used to create two different integration networks. In the cooperation network, all edges with values below 2.5 were dropped, resulting in a network showing linkages between agencies that regularly share information with each other and sometimes work cooperatively to achieve shared goals. Next, a collaboration network was developed by dropping all lines with values below 4.5, resulting in a network showing linkages between agencies that reported informal or formal partnerships with each other.

The following measures were calculated for all networks:

1. **Overall network density**

   Network density assesses the degree to which the agencies in a network are interconnected. Its value ranges from 0-1 (completely unconnected to completely connected), and is calculated as:
   
   $\frac{\text{# of connections between agencies in the network}}{\text{total # of all possible connections} (n - 1)}$

2. **Network betweenness centralization**

   Betweenness is a measure of the degree to which individual agencies serve as brokers, or the key connecting link, between other organizations within a network. Again, this is calculated for both the individual agencies (betweenness centrality) and for the network as a whole (betweenness centralization).

   *Betweenness centrality* identifies the degree to which an individual vertex in a network lies on the shortest paths between other units. Organizations with high betweenness centrality have the potential to control connections between other organizations. Betweenness centrality is calculated as:
3. **Agency betweenness centralization**

*Betweenness centralization* reflects the degree to which connections within a network are controlled by a small number of “gatekeepers” -- organizations with very high centrality. Betweenness centralization is calculated as:

\[
\sum_{y < z} \frac{\text{# of shortest paths between } y \text{ and } z \text{ through unit } x}{\text{# of shortest paths between } y \text{ and } z}
\]

**Development of Network Maps**

Each network was visualized by developing maps using the Fruchterman-Rheingold energy protocol, which calculates the network layout that uses the least energy to balance the links between agencies. Agency node size was determined using agency’s betweenness centrality, allowing for the identification of brokers within the network. Agency node colors were defined by the agency type, allowing for visual assessment of the distribution of agency types within each network. Following the generation of the network maps showing linkage between individual organizations, networks were collapsed by agency type, and maps generated that show the role that each type of organization plays in the network.

**Results**

**Profile of participating organizations**

The organizations selected represented eight different types of agencies, from small religious organizations to departments within large state agencies. While each type had a distinct primary mission, as may be seen in Table 14, there was substantial overlap in activities between organizations. Most organizations reported engaging in education (74%), social services (61%), voluntary/community service activities (57%), and almost half reported engaging in youth development (48%). Churches, health care centers, and childcare/youth development agencies showed the widest range of activities. Almost all organizations viewed themselves as serving multiple ethnic groups; for example, 96% reported serving Native Hawaiians, 91% reported serving Samoans, 91% Filipino, 87% Micronesian, 87% Chinese. Also, 91% reported serving children and 78% reported serving elderly. Less than half reported serving military populations (48%) or community business owners (39%).
Table 14. Profile of agencies involved in the nutrition network

<table>
<thead>
<tr>
<th>Primary mission</th>
<th>Health Center</th>
<th>Education</th>
<th>Social service</th>
<th>State/county government</th>
<th>Childcare/youth development</th>
<th>Nonprofit/voluntary</th>
<th>Public housing</th>
<th>Church</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>80%</td>
<td>80%</td>
<td>50%</td>
<td>0%</td>
<td>67%</td>
<td>74%</td>
</tr>
<tr>
<td>Social Service</td>
<td>67%</td>
<td>0%</td>
<td>100%</td>
<td>20%</td>
<td>80%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>61%</td>
</tr>
<tr>
<td>Volunteer/Community Svc</td>
<td>33%</td>
<td>50%</td>
<td>100%</td>
<td>20%</td>
<td>60%</td>
<td>100%</td>
<td>100%</td>
<td>67%</td>
<td>57%</td>
</tr>
<tr>
<td>Youth Development</td>
<td>33%</td>
<td>0%</td>
<td>50%</td>
<td>40%</td>
<td>80%</td>
<td>50%</td>
<td>0%</td>
<td>67%</td>
<td>48%</td>
</tr>
<tr>
<td>Ethnic Community</td>
<td>67%</td>
<td>50%</td>
<td>0%</td>
<td>40%</td>
<td>60%</td>
<td>0%</td>
<td>100%</td>
<td>33%</td>
<td>43%</td>
</tr>
<tr>
<td>Religious</td>
<td>0%</td>
<td>0%</td>
<td>50%</td>
<td>0%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>26%</td>
</tr>
<tr>
<td>Health Care</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>60%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Professional/Business</td>
<td>67%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>50%</td>
<td>100%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Recreation</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
<td>40%</td>
<td>40%</td>
<td>0%</td>
<td>0%</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>Childcare</td>
<td>33%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>60%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
</tr>
<tr>
<td>Homeless</td>
<td>67%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>83%</td>
</tr>
<tr>
<td>Low income</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>New immigrants</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>78%</td>
</tr>
<tr>
<td>Business/Professional</td>
<td>33%</td>
<td>50%</td>
<td>50%</td>
<td>40%</td>
<td>20%</td>
<td>50%</td>
<td>0%</td>
<td>67%</td>
<td>39%</td>
</tr>
<tr>
<td>Military</td>
<td>33%</td>
<td>50%</td>
<td>100%</td>
<td>40%</td>
<td>40%</td>
<td>50%</td>
<td>0%</td>
<td>67%</td>
<td>48%</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>96%</td>
</tr>
<tr>
<td>Filipino</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>Samoan</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>Micronesian</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>87%</td>
</tr>
<tr>
<td>Chinese</td>
<td>67%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>87%</td>
</tr>
<tr>
<td>Japanese</td>
<td>67%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>0%</td>
<td>67%</td>
<td>74%</td>
</tr>
<tr>
<td>Other ethnic</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>100%</td>
<td>50%</td>
<td>100%</td>
<td>67%</td>
<td>83%</td>
</tr>
<tr>
<td>Children</td>
<td>67%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>Seniors</td>
<td>67%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>78%</td>
</tr>
</tbody>
</table>

*Two social service agencies and two churches did not provide data, resulting in a total N of 23 for these measures.
Sense of Shared Goals

On average, organizations in the network felt that two-thirds (62%) of the other organizations in the study shared at least some goals with their own agency. However, in some cases, the group’s rating of an individual organization did not reflect either the organization’s own perceptions, the scope of their activities, or interest in being part of a nutrition collaborative. As shown in Table 15, there were substantial discrepancies on these measures for religious organizations, childcare/youth programs, and state and county agencies.

Table 15. Perceptions of common goals among organizations

<table>
<thead>
<tr>
<th>Primary Mission Category</th>
<th>Organization</th>
<th>% in network that share goals</th>
<th>Interest in community nutrition campaign (1=none, 10=high)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>As perceived by organization</td>
<td>As perceived by others</td>
</tr>
<tr>
<td>Religious</td>
<td>St. Elizabeth Church</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>St. Teresa Church</td>
<td>92%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Kaumakapili Church</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Solid Rock Church</td>
<td>*</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>Word of Life Church</td>
<td>*</td>
<td>52%</td>
</tr>
<tr>
<td>Education</td>
<td>Honolulu PCNC (DOE)</td>
<td>62%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>UH Manoa Plili ‘Ohana</td>
<td>58%</td>
<td>64%</td>
</tr>
<tr>
<td>Health care</td>
<td>Ke Ola Mamo</td>
<td>65%</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Kokua Kalihi Valley (KKV)</td>
<td>100%</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>Kalihi Palama Health Care Center (KPHC)</td>
<td>100%</td>
<td>91%</td>
</tr>
<tr>
<td>Housing</td>
<td>Kuhio Park Terraces (KPT)</td>
<td>85%</td>
<td>77%</td>
</tr>
<tr>
<td>Nonprofit/ Voluntary</td>
<td>Aloha United Way (AUW)</td>
<td>65%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Rotary Club</td>
<td>46%</td>
<td>82%</td>
</tr>
<tr>
<td>Social services</td>
<td>Catholic Charities</td>
<td>85%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td>Salvation Army</td>
<td>100%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Child and Family Services (CFS)</td>
<td>*</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>Queen Liliuokalani Children’s Center (QLCC)</td>
<td>*</td>
<td>78%</td>
</tr>
<tr>
<td>State or county agencies</td>
<td>UH-EFNEP (CTAHR)</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>DOH-NEN</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Public Health Nurses (PHN)</td>
<td>100%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>DOH Chronic Disease Branch (CDB)</td>
<td>46%</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Honolulu Parks &amp; Rec</td>
<td>12%</td>
<td>82%</td>
</tr>
<tr>
<td>Childcare or youth programs</td>
<td>Keiki o ka Aina (KOKA)</td>
<td>100%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td>YMCA</td>
<td>62%</td>
<td>91%</td>
</tr>
<tr>
<td></td>
<td>Parents and Children</td>
<td>42%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Together (PACT)</td>
<td>46%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Palama Settlement</td>
<td>88%</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Susannah Wesley</td>
<td>88%</td>
<td>82%</td>
</tr>
</tbody>
</table>

*Organization did not participate in survey
Network Structures

As may be seen in Table 16, both the communication and cooperation networks were moderately connected, with approximately one-third of all possible links between agencies in place, and the average agency having at least 8 connections with other organizations. The collaboration network was weakly connected, with only 10% of all possible connections in place, and organizations having an average of 2.7 connections with other organizations in the network.

Betweenness centralization was low in all three networks. No agencies showed high betweenness centrality. KKV and Catholic Charities had the highest level of betweenness in both the communication and cooperation networks. Three of the five agencies with the highest betweenness centrality in the collaboration network—Aloha United Way, PILI ‘Ohana, and the DOH-NEN—provided funding to other agencies. Both KKV and the YMCA had stronger betweenness centrality in the collaboration network than they did in the cooperation or communication networks.

Table 16. Network density and centralization

<table>
<thead>
<tr>
<th></th>
<th>Communication network</th>
<th>Cooperation network</th>
<th>Collaboration network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Density</td>
<td>0.32</td>
<td>0.36</td>
<td>0.10</td>
</tr>
<tr>
<td>Average connections</td>
<td>8.2</td>
<td>9.4</td>
<td>2.7</td>
</tr>
<tr>
<td>per agency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Betweenness</td>
<td>0.14</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>Centralization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agencies with highest</td>
<td>KKV 0.17</td>
<td>KKV 0.14</td>
<td>Aloha United</td>
</tr>
<tr>
<td>betweenness centrality</td>
<td>Catholic Charities 0.12</td>
<td>Catholic Charities 0.13</td>
<td>Way 0.22</td>
</tr>
<tr>
<td></td>
<td>Keiki O ka Aina 0.08</td>
<td>YMCA 0.05</td>
<td>Pili ‘Ohana 0.18</td>
</tr>
<tr>
<td></td>
<td>Susannah Wesley 0.04</td>
<td>Keiki O Ka Aina 0.05</td>
<td>DOH-NEN 0.13</td>
</tr>
<tr>
<td></td>
<td>KPHC 0.04</td>
<td>KPHC 0.04</td>
<td>YMCA 0.12</td>
</tr>
</tbody>
</table>

Communication Network

The communication network, seen in Figure 4, showed a dense cluster of highly connected organizations, linked primarily through KKV, Catholic Charities, and Keiki o ka Aina, with additional linkage clusters through PACT, the Palama Settlement, and Susannah Wesley. However, there was no central core, and within the network there were many long walks, or
connections that travel through intermediary points, between organizations. This suggests that information frequently had to travel through 4 or more agencies to move across the network. There were few direct links between the organizations located along the perimeter of the network. While other types of organizations were scattered throughout the network, religious organizations were only found along the perimeter.

*Node size reflects betweenness centrality. Color reflects agency type (light green=health care, dark green=state agencies, pink=social services, light blue=childcare/youth, dark blue=education, gold=community, orange=public housing)*

![Communication Network](image)

**Figure 3. Communication Network**

*Communication patterns by agency type*

When communication patterns were collapsed by agency type, a star-shaped network appears, as shown in Figure 5. A central axis linked the child-care and social service agencies. Strong communication triads branched off of this axis to social service agencies, and state/county agencies. Weaker triangular links were seen to the religious institutions, education, and housing. Most links between the organizational types on the outer edges of the star were weak.
Cooperation Network

The cooperation network, shown in Figure 6, mapped links between agencies that share some common goals and sometimes work together. This network showed a binodal pattern, but was only weakly centralized. Catholic Charities served as the central linking point for one side of the network, and KKV was the central linking point for the other side. Close inspection of the network showed multiple star-shaped connections between smaller clusters of organizations. These star patterns showed small groups of organizations with multiple reinforcing connections but no focal agency serving as a common link or broker between groups.

A diffuse link between the two sides of the network was formed by childcare/youth development agencies connected to both sides. Native Hawaiian institutions were clustered on the KKV side of the network, and churches were scattered around the perimeter, as were Parks and Recreation and the Rotary Club. While organizations in the middle of the network were well-connected, institutions around the perimeter showed few connections with each other, or with the rest of the network. There were many long paths, requiring walks through 3 or 4 intermediaries to connect two organizations.
Cooperation patterns by agency type

When the cooperation network was collapsed by agency type, as shown in Figure 7, the core of the network became a triangle of childcare/youth development, social services, and health centers. State/county government agencies and nonprofit/voluntary organizations had the strongest connection to this triangle, with weaker connections seen to churches, educational institutions, and public housing.
Collaboration Network

Figure 8 displays the network of connections between agencies that have formed informal or formal partnerships towards shared goals. This map shows three distinct clusters—Native Hawaiian institutions clustered around KKV, social service organizations clustered around Aloha United Way, and state/county agencies loosely linked with each other. These three separate clusters were connected by their shared linkages to a cluster of childcare/youth organizations. Churches were either fully disconnected or only peripherally connected to this network. Both Honolulu Parks/Recreation and the Rotary Club were unconnected.

![Collaboration network](image)

*Node size reflects betweenness centrality. Color reflects agency type*

**Figure 7. Collaboration network**

Collaboration by agency type

When the collaboration network was collapsed by agency type, as shown in Figure 9, childcare/youth organizations emerged as a central link in the network. Secondary connections occurred through health centers, social services, and education. Churches, housing, and state/county government agencies were peripheral to the network.
Discussion

This study identified a loose network of organizations in the Kalihi area concerned with improving nutrition for low-income families. Many of these agencies operated in the same geographic area, and shared a set of common activities and at least some goals.

However, as we hypothesized might be the case in a complex multi-ethnic community, this network showed very low centralization, with many small clusters and very long pathways between organizations located in different parts of the network. Communication about issues, activities, or opportunities is likely to be slow in disseminating through the network, and opportunities for collaboration may not be easily identified. The diffuse structure and lack of centralization suggests limited coordination in planning and conducting nutrition activities within this multi-ethnic community.

The networks of communication and collaboration seen in this study were very different from those found in prior assessments of state health-department supported collaborations. For example, tobacco control networks have been shown to reflect a mature form of collaboration between states, counties, and nonprofit or voluntary networks, and state health departments have been shown to play a strong centralizing and brokering role in these network structures, with median collaboration network density of .48-.45, and median betweenness centralization of .20. A similar level of state agency centralization has also been seen in newly developed physical activity promotion networks in Hawai‘i, where density was .42 and betweenness centralization was 17.

The communication and cooperation networks seen in our study more closely resemble the low centralization and diffuse webs of connection found in a study of multinational agency collaborations for physical activity promotion in South America, where network density was 0.31, and betweenness centralization was 0.08. Similar diffuse communication and sparse
collaboration networks have also been found in assessments of linkage between community agencies working on HIV and chronic disease concerns. This may be the structure that interagency collaboration takes when there are shared concerns among agencies with different missions, but no concerted effort to build connections. The collaboration network found in our study, with its pattern of centralized clusters connected by links between a few key agencies, bears a strong similarity to the collaboration patterns found by Cross et. al in the early stages of the development of a community-based interagency collaborative for youth development. The results of that long-term study showed that targeted efforts to build connections were effective in building significantly increased partnership around shared concerns among these organizations.

Examination of the network structures in this study suggests multiple opportunities for strengthening both communication and collaboration for improved nutrition within the Kalihi community.

Although no single childcare agency played a major brokerage role in the nutrition map, childcare/youth development agencies as a group appear as a key connector in all three networks. Agencies providing services to children appear to be natural bridges for linkage on nutrition activities with other organizations within this multi-ethnic community, an assessment supported by the high perception of shared goals that other agencies reported with childcare/youth organizations. Other studies have found that childcare agencies play an important role in connecting low-income individuals to community resources. The central placement of the childcare agencies within our network maps suggests that it is the brokerage role that these organizations play with other community agencies that underlies their effectiveness in helping their families to access resources. Thus, childcare organizations provide a natural starting point not just for strengthening the collaborative network in Kalihi for nutrition messaging, but for linking this network with individuals and families within the community.

While cooperative links within the nutrition network initially appear diffuse, a closer inspection of the cooperative network map shows a network with many small clusters of interconnected agencies, and three key brokerage points. As discussed above, childcare organizations as a group provided a key link within the collaboration network. KKV serves as an important broker within the network for the cluster of Native Hawaiian organizations, and for organizations located in Kalihi Uka (the Kalihi Valley). The brokerage role played by Catholic Charities in this network was unexpected. Catholic Charities appears to be the common link between organizations located on the Kalihi Kai side of the community, and with social service agencies whose core missions extend statewide. Further exploration of the role that Catholic Charities plays may identify opportunities for improved linkage on nutrition issues between statewide agencies and organizations located in the Kalihi-Palama area.

The peripheral position of the religious organizations within all the nutrition network maps is concerning, as is the discrepancy between churches’ own rating of shared goals with other
organizations, the high level of overlap between church activities and those conducted by other organizations, and the low perception of shared-goals provided by the churches. This suggests that there may be a disconnect between churches’ perceptions of their role in meeting the nutrition needs of their community, and other organizations’ perceptions of churches’ activities and goals. Involving faith-based communities has been shown to be particularly effective not just at initiating dietary change among participants\textsuperscript{16}, but in promoting community social norms that enable individuals to sustain behavior change over time\textsuperscript{15}. Faith-based institutions have been found to provide social capital resources to support nutrition within a community\textsuperscript{127}, and have been shown to be associated with increased access to food resources for low-income individuals.\textsuperscript{83,86,145} Churches may be an overlooked resource for nutrition activities within the Kalihi community. Several churches in this study indicated a strong interest in participating in a community-based nutrition campaign. Increasing the level of communication and partnership between these churches and organizations could result in substantial strengthening of the nutrition network, and in the increased diffusion of nutrition resources to individuals.

This study included representation of several different church types in the community – two established Protestant churches (Episcopalian and Congregationalist), one Catholic church, two large evangelical fellowships, and one smaller Samoan evangelical church. Our results suggest that faith-based institutions are not a uniform group. The highest levels of interest in participating in a Kalihi community nutrition campaign were seen in the Episcopalian and Catholic churches. Lesser interest was seen in the Congregationalist church; however this church is already linked into the network, and actively involved in nutrition and health promotion activities. The two evangelical churches in the sample did not respond to the survey, however both of these churches have been involved in nutrition activities with the larger community. Lack of participation in this study may reflect a lack of interest in participating in this community-wide campaign, or it may simply reflect the limitations of volunteer resources within the churches.

Robert Putnam, in his seminal study of civic involvement in the United States, found that “mainline” Protestant, Catholic, and Jewish congregations were more likely than evangelical congregations to engage in community service beyond congregational or religious boundaries\textsuperscript{69}. While the results of our study neither confirm nor disprove this, they do suggest that the picture may be more complex than Putnam suggested. The mainline churches in our study showed higher interest in becoming involved with a formal community collaboration for nutrition, but two of the three evangelical churches were already actively involved in providing nutrition-related services to Pacific Islander populations living in public housing projects.
Limitations

There are several limitations to this study. While a broad snowball sample was used to identify the key organizations for the sample, some community organizations important for smaller groups may have been missed. A validity check on the sample was, however, included as a final question in the survey, while a few additional organizations were mentioned, there was no pattern of response suggesting important missing agencies.

The key informants for the development of the snowball sample were asked to identify a single individual at each agency that they felt would be most likely to know that agency’s involvement in community nutrition activities. For small organizations, this individual was likely to be aware of all connections. But for larger agencies there may have been inter-agency connections with which the respondent was unaware. The duplication of data by interviewing both halves of the dyad, along with reconciliation of divergent responses, helped to control for this factor. However, the possibility exists that there are connections that are not accurately reflected in the network maps. This may be particularly true for the four organizations that did not participate in the survey.

The use of network analysis for the assessment of community collaboration is a new field. At this point, measures of network density and brokerage vary between studies, and there are no established standards for what constitutes a strong or a weak network structure. In addition, some network measures, such as density, are affected by network size and may not be directly comparable across networks with substantially different structures.

Conclusion

Building partnerships for health promotion within a multiethnic community is a complex task. The results of this study suggest that organizations working on nutrition within a multi-ethnic community like Kalihi may be fragmented along both ethnic and agency mission lines. While many organizations share similar activities, inter-agency communication and collaboration appear diffuse and uncentralized.

As a result, opportunities for collaboration may go unnoticed, and duplication of services can occur. Within low-income communities this is of particular concern, since low-income communities have been shown to have lesser access to community resources overall\textsuperscript{67}. While each agency has its own particular mission and concerns, strengthening the network of connections between agencies with shared nutrition concerns should help to build community capacity to access resources and increase the community’s efficacy at mobilizing resources for improved health. State agencies, because of their broad responsibilities and connection to funding resources, may be able to play an important role in promoting the building of this collaborative nutrition network.

Particularly notable in this fledgling nutrition network was the strong linking role played by childcare and youth organizations, and the marginalization of faith-based institutions on the
perimeter of the network. Both of these organizational types serve as critical points for linking low-income families with community resources, and both showed a strong interest in participating in activities to address community health concerns. These organizations may be under-recognized community assets, not just for nutrition activities, but for wider efforts at improving communication and building linkages between community organizations.
CHAPTER 5: CONCLUSION

How Findings Compare and Extend the Literature

The results of these three studies show that social capital can be a useful tool for understanding the factors that shape dietary behavior among families in low-income communities. However, these studies also illuminated three overarching issues related to the use of social capital theory to understand nutrition behavior in low-income multi-ethnic communities.

1. **The version of social capital theory most commonly used in nutrition research may not be the best model for understanding how social capital affects dietary behavior in low-income multi-ethnic communities.**

   There are three fundamentally different theoretical models of social capital in use today. The social capital framework that Chapter 2 showed to be most commonly used in nutrition research, Putnam’s “communitarian” model, did not fit the results of the empirical studies described in Chapters 3 and 4.

   Studies attempting to assess social capital using only communitarian variables found fewer significant connections between nutrition outcomes and social capital than studies that included measures of social networks and social network resources.

   The study shown in Chapter 3 documented families’ reliance on resources obtained through their social networks to reduce food insecurity, increase dietary variety, and lower the overall cost of food purchasing and preparation. The operation of social capital in this study more closely resembles the structural models of social capital defined by both Bourdieu and Coleman.

2. **Measures of social capital currently used in nutrition research do not adequately measure the types and elements of social capital used by participants in these studies.**

   Community participation is integral to most theories of social capital, and as such is a common measure used in social capital research. The results of Chapter 3 confirmed that community participation was an important element of social capital, affecting both participants’ ability to leverage resources for food, and the strength of social norms about dietary behavior. This study found that norms of community engagement were strong, and focused around the provision of food and labor resources for family, church, and community events. However, these types of community engagement bore little relationship to the most measurement items for community engagement found in the systematic literature review in Chapter 2. Voter registration, club membership, newspaper subscriptions, perceptions belonging in the neighborhood, ratings of generalized trust in neighbors – these items did not accurately identify either the level of community connection, community participation, type or amount of social capital available to the low-
income families in this study. Measures of informal participation, such as preparing food for potlucks, “checking on” friends and neighbors, or providing labor for group parties and children’s activities, would provide more accurate estimates of community engagement in this low-income community.

Most nutrition studies included in Chapter 2 did not include family size or structure as measures of individual social capital. The few that did so assessed only marital status, and did not measure other kin supports. The study in Chapter 3, however, found that household structure is a critical element of family’s social capital, and affects both the availability of food within the household and social support for specific dietary behaviors. Participants reported relying on resources obtained through extended kinship and friendship networks in order to manage hunger, increase dietary variety, and lower their households’ food costs. In low-income Asian and Pacific Islander communities like Kalihi, family size and structure may be important measures of a household’s nutrition-related social capital resources.

Most studies of social capital included in the review in Chapter 2 used geographic boundaries to define the field within which social capital operates. However, “neighborhoods” were not meaningful boundaries for social capital networks among the participants in the focus groups in Chapter 3, and geographic proximity had little influence on the institutional social capital linkages shown in the network analysis in Chapter 4. These results reflect concerns that other studies have found with defining social capital strictly in terms of physical or political geographic boundaries.

Social norms are identified as an important element of social capital in all versions of social capital theory. However, few of the studies found in Chapter 2 measured social norms related to social capital. The results of Chapter 3 suggested that community social norms about group participation, sharing and reciprocation are related to ability to access nutrition resources through social networks, and that these should be included as measures of community social capital. These social norms of informal collaboration directly contributed to individual’s ability to access nutrition resources through their social networks, and provide a useful measure of community social capital.

3. **Churches and family/youth organizations are important elements of both individual and community social capital for nutrition.**

Both Putnam and Coleman’s theories of social capital identify church participation as a form of community engagement, and a number of the nutrition studies in Chapter 2 included church participation as a measure of social capital. However, the results of the studies in Chapter 3 and 4 suggest that the role of churches extends beyond simply “community engagement.”
In the focus group study, both churches and child-care organizations were viewed by many participants as "like family." Participants reported obligations of participatory labor, food sharing, and assistance-seeking behaviors that resembled their connections within family and friendship networks.

In the network study in Chapter 4, organizations involved in childcare and youth development formed the central connecting bonds between organizations with different missions, providing for communication and resource sharing around nutrition concerns. Childcare organizations served as a critical element of community social capital, and provided a linkage point between individual social capital networks and community social capital resources.

Churches, however, while identified as a key element for connecting individuals to institutional resources in Chapter 3, were found to be poorly connected into the linking and bridging structures of community social capital for nutrition identified in Chapter 4. The institutions – which individual focus group participants reported as most influential in terms of helping them change behavior, and the places where they are most likely to seek advice and resources for nutrition available outside of their immediate kinship networks – are poorly linked to other community resources for nutrition. Many churches operate food pantries, and most reported high levels of interest in working to improve the overall nutritional health of the community, but Chapter 4 showed that many other institutions do not identify these organizations as part of the nutrition infrastructure within the community. Faith-based institutions may be an under-utilized community social capital asset within this community.

Limitations
This study reflects social capital as it operates only within nutrition research, and specifically, within a single low-income multi-ethnic community. In communities with greater access to economic capital, it may be that theories of social capital that emphasize social cohesion and community participation would be more strongly supported.

The use of network analysis to measure community collaboration is a new field. While the calculation and meaning of specific network measures is well-defined, there are no agreed-upon benchmarks for interpreting either overall network structure or individual measures of cohesion and brokerage within networks, adding some uncertainty to the interpretation of network results.

Directions for future research
Social capital is not a simple construct, but instead is both community- and issue-specific. The results of these studies suggest that current measures of social capital do not adequately measure nutrition-related social capital within low-income communities. Further work is needed in developing a valid tool for measuring the aspects of social capital that affect nutrition within low-income communities. The results of this study suggest specific measures to include; I intend to
follow up on this research with the development and testing of social capital measures designed for this purpose.

Moving beyond nutrition, I plan to look more closely at norms of informal collaboration and resource sharing as a social capital asset within low-income communities, and the potential role of these community assets to support health communication messaging.

Community development efforts that strengthen collaborative linkages between organizations can also be effective in building social capital assets for both individuals and communities. The network analysis completed for this study is a promising tool for this type of work, one that needs further refinement. There are no common standards for measures or common understandings of optimal network characteristics. I plan to conduct more work in this area, beginning with a review of network studies from other fields and at the network structures found in the evaluation of collaborations, to identify potential standards and structures for using network analysis to measure community collaboration.

Finally, already planned is a follow-on study to the network study discussed in Chapter 4. This study will assess changes in the nutrition network structure within the community resulting from efforts to increase institutional social capital linkages for nutrition work across the differing agency missions and ethnic communities within the Kalihi community.

Conclusion

Social capital is a useful theory for understanding the forces that shape health behavior within low-income multi-ethnic communities – but it is important to specify which theory of social capital is being used, because the specific social capital theory used in the research matters. Which specific theory of social capital is being used will drive appropriate measure selection and the interpretation of study results. The results also suggest that measures of social capital need to reflect the kinship and friendship linkages and types of civic engagement common within low-income multi-ethnic communities, in order to provide a more accurate assessment of the influence of social capital factors on both access to nutrition resources and social norms about dietary behavior within these communities.

By using a structural definition of social capital informed by Bourdieu and Coleman, this assessment of social capital influences in dietary behavior identified a complex system with multiple intervention points for improving nutrition in this population. Nutrition interventions that aim to produce long-term change in individual behavior in low-income communities need to take into account participants’ reliance on their extended families and “church families,” and their need to conform to community social norms in order to maintain access to important nutrition resources through their social networks.
### APPENDIX A: STUDY 1 DATA EXTRACTION MATRIX

<table>
<thead>
<tr>
<th>Study #</th>
<th>Authors</th>
<th>Database</th>
<th>Social Capital, Network, or Both?</th>
<th>Methods</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Christian, Giles-Corti et al, (2011)</td>
<td>PubMed</td>
<td>SC</td>
<td>Survey N=1151, linear regression, DV BMI, IVs include demographic, environmental (including SC) and health behaviors (including FV)</td>
<td>Australian homebuyers</td>
</tr>
<tr>
<td>4</td>
<td>De Silva (2007)</td>
<td>PubMed</td>
<td>SC</td>
<td>N=20 in-depth interviews plus literature review -- looked at function of community organizations and activities in relation to social capital</td>
<td>Primary caregivers of children &lt;1 in Peru</td>
</tr>
<tr>
<td>7</td>
<td>Kelleher, Lynch et al (2004)</td>
<td>PubMed</td>
<td>SC</td>
<td>Reviewed historical epidemiological databases to establish excess CVD mortality among Irish immigrants, reviewed immigration data and contemporary records to support argument that Irish had high social capital</td>
<td>Irish immigrants to US, 1890-1960</td>
</tr>
<tr>
<td>8</td>
<td>Locher, Ritchie et al (2005)</td>
<td>PubMed</td>
<td>SC</td>
<td>Random sample of Medicare beneficiaries, survey N=1000 DV=nutritional risk (screening instrument), multivariate regression to assess predictors of nutritional risk, including social capital</td>
<td>Community-dwelling older adults in 5 Alabama counties</td>
</tr>
<tr>
<td>Study #</td>
<td>Authors</td>
<td>Database</td>
<td>SC</td>
<td>Methods</td>
<td>Population</td>
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<tr>
<td>10</td>
<td>Kirkpatrick and Tarasuk (2010)</td>
<td>PubMed</td>
<td>SC</td>
<td>Survey N=501, multivariate analysis with food insecurity as DV, neighborhood food access, neighborhood social capital as IV, adjusting for household sociodemographics as control.</td>
<td>Low-income family caregivers in high-poverty neighborhoods in Ontario, Canada</td>
</tr>
<tr>
<td>12</td>
<td>Payet, Gilles et al (2005)</td>
<td>PubMed</td>
<td>SC</td>
<td>Survey of 100 farmers market attendees and 28 vendors, assessing impact of farmers market on community pride, sense of neighborliness, building community social capital</td>
<td>Adult participants in a farmers market</td>
</tr>
<tr>
<td>13</td>
<td>Schurmann and Johnston 2009</td>
<td>PubMed</td>
<td>SC</td>
<td>Assessment of the impact of microbusiness and other interventions aimed at improving nutrition through increasing access to resources and social capital among low-income rural women</td>
<td>Low-income rural women in Bangladesh</td>
</tr>
<tr>
<td>Study #</td>
<td>Authors</td>
<td>Database</td>
<td>Social Capital, Network, or Both?</td>
<td>Methods</td>
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<tr>
<td>17</td>
<td>Kerr (2005)</td>
<td>Academic Search Premier</td>
<td>SC</td>
<td>Qualitative study: 30 semi-structured interviews, participant observation and secondary material, to look at impact of ganyu [labor exchange] on food insecurity, and assess whether ganyu is social capital or an embedded social relationship</td>
<td>Households in Malawi</td>
</tr>
<tr>
<td>18</td>
<td>De Marco and De Marco, (2009)</td>
<td>Sociological Abstracts</td>
<td>SC</td>
<td>Survey N=1712 ; multivariate analysis DV=access to public services including food stamps, WIC, food banks; iv=demographics, individual social support, neighborhood social control, cohesion/trust, disorder</td>
<td>Low-income female caregivers in Boston, Chicago, San Antonio</td>
</tr>
<tr>
<td>Study #</td>
<td>Authors</td>
<td>Database</td>
<td>Social Capital, Network, or Both?</td>
<td>Methods</td>
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<tr>
<td>25</td>
<td>Harpham, Grant et al (2002)</td>
<td>PubMed</td>
<td>SC</td>
<td>Reporting the adaptation and face validation of a social capital scale developed for nutrition research</td>
<td>None</td>
</tr>
<tr>
<td>26</td>
<td>Small (2006)</td>
<td>Sociological Abstracts</td>
<td>BOTH</td>
<td>In-depth interviews and observations at 16 childcare centers in high poverty neighborhoods in NYC, assessing potential for institutional social capital to increase access to nutrition and other resources</td>
<td>Low income families</td>
</tr>
<tr>
<td>28</td>
<td>Gregson, Sowa et al (2011)</td>
<td>SS-ASP</td>
<td>NET</td>
<td>Data drawn from annual progress reports of NHC-network analysis and time-series regression analysis</td>
<td>Agencies involved in California SNAP-Ed</td>
</tr>
<tr>
<td>29</td>
<td>Ramanadhan, Wiecha et al (2010)</td>
<td>SS-ASP</td>
<td>NET</td>
<td>Network analysis of staff (N=80) in YMCA afterschool health promotion, assessing knowledge/skill transfer among peers within social networks. Also regressed level of skill gained on network connection data plus demographic control variables</td>
<td>YMCA staff</td>
</tr>
<tr>
<td>30</td>
<td>Reyes-Garcia, Vadez et al (2009)</td>
<td>Academic Search Premier</td>
<td>SC</td>
<td>DV=likelihood of practicing crop diversity (a food security behavior), IV=household ethnobotanical knowledge. SC included as a potential confounder in the relationship</td>
<td>Tsimine villagers in Brazil</td>
</tr>
<tr>
<td>31</td>
<td>DeMarco, Thorburn et al (2009)</td>
<td>PubMed</td>
<td>SC</td>
<td>Qualitative semi-structured interviews, N=25, looks at household reliance on social networks to manage food insecurity. Social capital included in the analysis</td>
<td>Low-income, food insecure Oregon adults</td>
</tr>
</tbody>
</table>
### APPENDIX A: STUDY 1 DATA EXTRACTION MATRIX

<table>
<thead>
<tr>
<th>Study #</th>
<th>Authors</th>
<th>Database</th>
<th>Social Capital, Network, or Both?</th>
<th>Methods</th>
<th>Population</th>
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<tbody>
<tr>
<td>32</td>
<td>Dhokarh, Himmelgreen et al (2011)</td>
<td>ERIC</td>
<td>BOTH</td>
<td>Survey N=200, stepwise logistic regression DV=food insecurity, IV=demographics, socioeconomic, acculturation, social networks, reciprocity, food stamp management indicators</td>
<td>Low-income female Puerto Rican caregivers in Hartford CT</td>
</tr>
</tbody>
</table>
**APPENDIX A: STUDY 1 DATA EXTRACTION MATRIX (Sample page for detailed extraction)**

<table>
<thead>
<tr>
<th>#</th>
<th>Author</th>
<th>Definition of SC</th>
<th>Primary Theorist</th>
<th>Clear link to theorist</th>
<th>Multiple theories assessed</th>
<th>Definition of Community</th>
<th>Types of SC discussed</th>
<th>Social Capital Constructs Measured</th>
<th>Social Capital Instrument Used</th>
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</table>
APPENDIX B: STUDY 2 FOCUS GROUP SURVEY

Thank you for participating in our focus group.

In order for us to better understand people’s answers, it would be helpful for us to know something about your household.

1. How many adults (over age 18) live in your household?

________________

2. How many children under age 18 live in your household?

________________

3. Many people in Hawai‘i live with other family members. Which of the following types of people live in your household? (Check all that apply)

☐ My grandparents or great-grandparents
☐ My parents
☐ My adult children (over age 18)
☐ My children (under 18)
☐ Other family members (aunts, uncles, cousins, etc.)
☐ Other adults (friends, room-mates)

4. For the following questions, please think about the last 12 months, and tell me whether the statement was often, sometimes, or never true for you:

| I worried that our food would run out before we got money to buy more | □ Often true □ Sometimes true □ Never true |
| The food we bought just didn’t last, and we didn’t have money to get more | □ Often true □ Sometimes true □ Never true |
| We couldn’t afford to eat balanced meals | □ Often true □ Sometimes true □ Never true |
| We relied on only a few kinds of low-cost food to feed the children because we were running out of money to buy food | □ Often true □ Sometimes true □ Never true |
APPENDIX C: STUDY 2 FOCUS GROUP INTERVIEW GUIDE

First, I'd like to know what you all think of as "your community".

1. Could you show me what you consider "your neighborhood?"
   
   Probe: Where do you buy food in your neighborhood?
   How much of your food shopping do you do here?
   What else do you do in your neighborhood?
   Do most of your family and friends live in your neighborhood?

2. What do you think of as "your community?" Is it the neighborhood we just talked about, or do you define it some other way?

   Food is often a big part of getting together with others in the community – parties and barbecues, potlucks, community events. I’d like to ask some questions about how food is shared in your community…

3. What kinds of events do people bring food to in your community?

4. What sorts of food is it best to bring for potlucks or sharing? Why?

5. Do people usually bring fruit or vegetable dishes to parties or potlucks? Why/why not?

Now I’d like to ask you some questions about food in your own household – who prepares the food in your household or decides what’s for dinner, what your family likes to eat, and about how you share food, both within your household and your community…

6. What kind of foods does your family like you to serve at home? What do they really like?

7. Who decides what’s for dinner in your household?
   
   Probe: What are (you/they) thinking about when making that decision?
   How does that affect what you all eat?

8. Who usually helps with the cooking in your household?

9. Who does most of the grocery shopping for your household?

10. Who usually eats meals with you?

   Sometimes money for food starts to get tight at the end of the month, especially for families here in Hawai’i. People have very creative ways of managing this.

11. How does your family manage their food budget when money gets tight, or you need to spend less money on food?
   
   Probe for changes in diet/purchasing patterns
   Probe for resources obtained through families and friends
   Probe for resources obtained through community institutions – churches, social groups, local food pantries

12. Is there anyone that you usually share with if money for food runs short (either for you or for them)? (Probe for what is shared, with whom, how)

13. Where do you get information about events or activities?
   
   Probe for newspaper, radio, computer, websites, word of mouth
APPENDIX D: STUDY 3 NETWORK SURVEY INSTRUMENT

Thank you very much for agreeing to participate in the University of Hawai'i Kalihi Nutrition Network Survey.

For this study, we have identified 28 organizations that people have told us are important to improving nutrition in the Kalihi area, and we are assessing the connections and collaborations existing between them. Your organization is included in this small group, and your participation in this survey is truly critical to us.

This survey should only take about 10 minutes to complete.
First, we’d like to ask you some questions about your own organization. This information will allow us to assess how different types of organizations link with each other.

**Question 1 of 8**
What would you say are your organization’s main activities?

Drag your most important activities to the box marked "Primary Activity", and all other significant activities for your organization in the box marked "Other Important Activities".

<table>
<thead>
<tr>
<th>Items</th>
<th>Primary Activity</th>
<th>Other Important Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religious</td>
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<tr>
<td>Health care</td>
<td></td>
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<tr>
<td>Education</td>
<td></td>
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<tr>
<td>Professional/business activities</td>
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<tr>
<td>Social services</td>
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<tr>
<td>Volunteering or community service</td>
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<tr>
<td>Services for a specific ethnic community</td>
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<tr>
<td>Recreation</td>
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<td>Youth development</td>
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<td>Childcare</td>
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<tr>
<td>Other</td>
<td></td>
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</tr>
</tbody>
</table>
Question 2 of 8

Which of the following populations does your organization serve? (Check all that apply)

- Homeless
- Low-income individuals
- New immigrants
- Business owners or professionals
- Military
- Native Hawaiian
- Filipino
- Samoan
- Micronesian
- Chinese
- Japanese
- Other ethnic minority groups
- Children
- Seniors
Now, we'd like to ask about your organization's connections to other groups working in the Kalihi area.

**Question 3 of 8**

In the past year, how often did your organization have contact (such as meetings, phone calls, or emails) with each of the following organizations or groups?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Yearly</th>
<th>Quarterly</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
<th>(This is my agency)</th>
</tr>
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<tbody>
<tr>
<td>Ke Ola Mamo</td>
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</table>
**Question 4 of 8**

What is the relationship between your organization and each of these other organizations? Choose the response that best describes your understanding of this relationship.

<table>
<thead>
<tr>
<th>Organization</th>
<th>We do not interact</th>
<th>We share information sometimes</th>
<th>We work together if an opportunity arises</th>
<th>We work side by side towards some common goals</th>
<th>We work as an informal team</th>
<th>We have a formal partnership with contracts and responsibilities</th>
<th>We plan together, share staff and funding</th>
<th>(This is my agency)</th>
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</thead>
<tbody>
<tr>
<td>Ke Ola Mamo</td>
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**Question 5 of 8**

How much would you say that your organization’s overall goals are shared with each of the following organizations?

<table>
<thead>
<tr>
<th>Organization</th>
<th>We do not have any goals in common</th>
<th>We share some of the same goals</th>
<th>We share most of the same goals</th>
<th>(This is my agency)</th>
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</thead>
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<tr>
<td>Ke Ola Mamo</td>
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Question 6 of 8

Do you work with individual schools in the Kalihi area?

- Yes
- No
Question 6 of 8

We would like to know the schools that your organization currently works with.

Drag the ones you work with most frequently into the top box, and the ones you work with occasionally into the second box.

<table>
<thead>
<tr>
<th>Items</th>
<th>Work with most frequently</th>
<th>Work with occasionally</th>
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<tbody>
<tr>
<td>Fem El</td>
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<td>Kaahumanu El</td>
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<td>Kalihi El</td>
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<td>Kalihi Kae El</td>
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<td>Kalihi Uka El</td>
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<td>Kalihi-Waena El</td>
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<td>Ke'awal El</td>
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<td>Kauulani El</td>
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<td>Linapuni El</td>
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<td>Puuhale El</td>
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<td>Royal El</td>
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<td>Haalau Lokahi Charter School</td>
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<td>Dole Middle School</td>
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<td>Central Middle School</td>
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<td>Farrington High School</td>
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<tr>
<td>McKinley High School</td>
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Question 7 of 8

How interested would your organization be in becoming involved with a community-wide campaign to improve nutrition in the Kalihi area?

Not at all interested  Somewhat interested  Very interested

0  1  2  3  4  5  6  7  8  9  10

(Move the bar to the point that reflects your level of interest)

Question 8 of 8

Are there any agencies or organizations that we did not list, that you feel it would be important to include in the development of a community campaign to improve nutrition in the Kalihi area?

- Yes
- No
Please give us the names of the organizations not listed in this survey that you feel it would be important to involve in the development of a community campaign to improve nutrition in the Kalihi area.

<table>
<thead>
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<th>Name:</th>
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<td>Name:</td>
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Survey Powered By Qualtrics


Harris PM, Jones NA. *We the People*: Pacific Islanders in the United States US Census Burea;2005.


117. DeMarco M, Thorburn S, Kue J. "In a country as affluent as America, people should be eating": Experiences with and perceptions of food insecurity among rural and urban oregonians. *Qual. Health Res.* 2009;19(7):1010-1024.


