International Journal of Community Well-Being (2022) 5:571–585
https://doi.org/10.1007/s42413-022-00170-w

ORIGINAL RESEARCH ARTICLE

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Community Food Security: The Multi-Level Association Between Social Capital, Economic Capital, and Diet Quality

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Received: 29 September 2021 / Accepted: 5 May 2022 / Published online: 7 June 2022

Abstract

Diet quality varies widely across geographic areas in the United States and is a critical component of community well-being. Community food security (CFS) relates to the availability, stability, and access to food at the community level, and how these issues connect to the community food production system. This study explores the joint relationship between community social capital, economic capital, and individual diet quality. Hierarchical generalized linear mixed model regression using publicly available data from 2005–2009. The sample consisted of 216,381 adult respondents nested within 283 micro/metropolitan counties. After controlling for individual level factors, social network density was significantly associated fruit and vegetable consumption (FVC), but not obesity. However, income inequality was associated with greater rates of FVC and lower likelihood of obesity. County-level poverty rates were not associated with FVC but had a negative relationship with probability of obesity. Household size, a proxy for household social capital, was positively associated with FVC and negatively related to probability of obesity. Findings from this study suggest a strong role for social capital and economic factors in CFS. This study also reinforces the importance of strengthening theoretical explanations of the role social capital at the community and household levels play in CFS to guide practice and evaluation for community well-being initiatives.

Keywords Community food security · Social capital · Economic capital · Food systems · Multi-level model

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Impact Statement

The interplay between environmental and individual characteristics demands an empirical assessment that simultaneously considers both contextual and individual factors affecting CFS. Although previous research indicates a role for social capital in household food security (Chen et al., 2015), fruit and vegetable consumption (Lindstrom et al., 2001; Litt et al., 2011; Mackenbach et al., 2016; Poortinga, 2006), and obesity (Bjornstrom, 2011; Kim et al., 2006; Mackenbach et al., 2016), critical gaps remain. This study addresses the gap in two important ways. It is the first study to the authors' knowledge that assesses the joint effect of social capital and economic context on diet quality using hierarchical generalized linear mixed models with a national sample. It also operationalizes community at the county-level to account for the socio-economic ties that occur within a political-economic unit. Findings from this study illustrate the different ways in which social capital at the county-level and household level may influence aspects of nutrition, and thus, community food security. Implications for community well-being policy and program evaluation are discussed.

Introduction

The environments in which people live, work, and play influence food availability, accessibility, dietary behaviors, and well-being. Reciprocally, individual characteristics and routines continually re-create the social, economic, and institutional systems that characterize local food environments (Bernard et al., 2007; Giddens, 1984). The dynamic relationship between individuals and systems encourages examination of how food environments shape diet patterns and underpins the place-based community food security (CFS) movement. CFS strategies aim to ensure "safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance, social justice, and democratic decision-making" (Hamm & Bellows, 2003, 37). In practice, CFS focuses on place-based interventions including community supported agriculture (CSA) models, programs to accept federal food assistance at farmers' markets, community gardens, urban agriculture, and healthy food retail environments.

Poor diet quality is widespread among households across socio-economic strata and varies widely across geographic areas (Allcott et al., 2017; Grimm et al., 2012; Hiza et al., 2013). Although household poverty is a factor that contributes to food insecurity and poor diet quality, county-level prevalence of food insecurity does not always overlap geographically with poverty rates (Leonard et al., 2018). Therefore, while food security is a necessary condition for improving diet quality, it is not sufficient for ensuring nutritionally adequate diets across communities. The broader vision of CFS implies a community that is not just free from hunger but also adequately nourished. Characteristics of CFS include levels of food and nutrition knowledge and skills; food availability, accessibility, quality, and sustainability; socio-economic systems that affect the capacity for change in the food system; and social capital, as it relates to the food system (Anderson & Cook, 1999).

A review of recent evidence points to a role for social capital in protecting against food security in the US, particularly among low-income households (Chen et al., 2015). Social capital, defined as the norms and networks that facilitate collaborative action and shared cultural values, such as degrees of trustworthiness, reciprocity, and tolerance, has a rich foundation in the community development literature that shapes CFS thinking (Putnam, 1995; Woolcock, 2001). An outcome of social capital is that people secure social services or other material benefits by virtue of their membership in networks or other social structures (Portes, 1998). Community level social capital suggests that individuals may still benefit from communal resources through their membership in a community even if their personal social capital is limited. For instance, an elderly individual living alone may have limited social capital of their own yet still have access to food assistance programs that exist because of community level social capital.

In critique of the communitarian explanation of social capital, Bourdieu (1986) argued that social capital arises from, and is organized around, economic capital and is available as a resource to those in society with the power to leverage it toward goals that may not benefit society as a whole. If access to community material resources is a mediator between individual socio-economic status and health (Lynch et al., 2000), social capital may serve to either improve or suppress an individual's access to these material resources. This perspective highlights the influence economic capital and power disparities have on social connections, access to material resources, and health outcomes (Barone & Mocetti, 2016; Kawachi et al., 1997; Wakefield & Poland, 2005; Woolcock, 1998).

CFS places the concepts of food security and diet quality directly in a community context. It's emphasis on placemaking shares philosophical roots with the broader goals of community well-being initiatives aiming to improve the quality of a public place and the lives of its community simultaneously (Ellery et al., 2017). The interplay between environmental and individual characteristics demands an empirical assessment that simultaneously considers both contextual and individual factors affecting CFS. Although previous research indicates a role for social capital in household food security (Chen et al., 2015), fruit and vegetable consumption (Lindstrom et al., 2001; Litt et al., 2011; Mackenbach et al., 2016; Poortinga, 2006), and obesity (Bjornstrom, 2011; Kim et al., 2006; Mackenbach et al., 2016), critical gaps remain. Many of these studies use a neighborhood unit of analysis, providing only a partial understanding of the socio-economic relationships involved in CFS. For instance, governmental offices for public health, agriculture, and economic development typically serve entire counties and people regularly travel outside of their residential neighborhood for work and shopping. Moreover, these analyses typically consider a single metropolitan area (e.g., Los Angeles, Denver) so results may not generalize across the United States. This study contributes to the development of CFS theory and evaluation methods by exploring the joint relationship between social capital, economic context, and individual diet quality using a multi-level analysis with national datasets.

Methods

Using cross-sectional data from publicly available databases this study seeks to answer the following questions: 1) what is the influence of county-level social capital on diet quality? And 2) does income inequality and poverty at the county-level influence diet quality?

Measures and Data Sources

Diet Quality This study uses fruit and vegetable consumption (FVC) and obesity status from the 2009 Behavioral Risk Factor Surveillance System (BRFSS) survey as indicators of diet quality. The BRFSS survey completes more than 400,000 adult interviews each year, making it the largest health survey system in the world, and the nation's premier system of health-related surveys collecting data on health-related risk behaviors, chronic health conditions, and the use of preventative services by U.S. residents. The data set used consists of 216,381 survey respondents nested within 283 micro/metropolitan[1] counties. Individual FVC was measured with six questions regarding the typical number of consumption occurrences per day, week, or month for fruits, fruit juice, green vegetables, red–orange vegetables, beans (legumes), and other vegetables. Obesity is a dichotomous measure defined as a body-mass index ≥ 30.

Community This study operationalizes community as a political-economic unit using micro/metropolitan county-level data based upon Bourdeiu's (1986) conceptualization of social capital as institutionalized relationships that confer benefits to those in a group. We argue that many of these institutionalized relationships occur within political units, such as counties. County-based models are appropriate for understanding macro-social capital since governmental offices for public health, agriculture, and economic development typically serve entire counties and people regularly travel outside of their residential neighborhoods for work and social activities (Bailey et al., 2018). A second premise of social capital is that it facilitates economic and social development (Rupasingha, et al., 2006), which occurs in part through tax collection and re-distribution in the form of public services.

Social Capital Social capital is operationalized as county-level network density and household size. Network density is a standardized index, derived from the 2005 County Business Patterns (CBP) data that includes density of religious organizations, social and political organizations, business associations, professional association, labor associations, bowling centers, recreational centers, golf courses, and sport teams for each county (Rupasingha et al., 2006). Household size is included as a

[1] The U.S. office of Management and Budget delineates metropolitan and micropolitan statistical areas according to published standards applied to Census data. Metropolitan areas have at least one urbanized area of 50,000 or more people and Micropolitan areas have at least one urban cluster of at least 10,000 but less than 50,000 people.

proxy for household social capital since they represent joint social obligations. Marriage (especially if the household includes children) is associated with greater social capital (Putnam, 1995). Provided by the Census Bureau, the County Business Patterns (CBP) data provide the only annual source of complete and consistent county-level economic data by industry for the entire U.S. These data are often used by businesses and government agencies to analyze the economic activity of small areas, track economic changes over time, and for administration and planning.

Economic Capital CFS models propose that economic and social system variables affect the capacity for change in the food system (Anderson & Cook, 1999). This study operationalized economic capital across dimensions of income inequality and poverty. The GINI coefficient for income inequality allows investigation of the spread of income distribution in a county, and poverty rates identify concentrations of residents below a fixed cut-off point applied across all income distributions. These data were sourced from the 2005–2009 estimates of the American Community Survey (ACS). The ACS is an ongoing survey that provides vital information about the US and its people on a yearly basis and is used to determine how more than $600 billion in federal and state funds are distributed (Manson et al., 2018).

Data Analysis

This study uses a hierarchical generalized linear mixed modeling approach to investigate the influence of social capital and economic indicators on FVC of individuals nested within counties. Our modeling approach is appropriate for studying questions related to the influence of community characteristics on individuals within that community, this approach addresses the lack of independence among observations. We used random intercept models with three levels (state, county, person) with fixed effects for covariates at the individual and county-level. A state-level random effect was included only as a control for unobserved state-level variation. Our modeling approach allows us to accurately and reliably account for the nature of the data and distribution of the variables used as dependent variables.

The first group of models for FVC were fit using a negative binomial distribution to account for the count nature of the variable (i.e., times per day) (Cameron & Trivedi, 2001). FVC occurrences greater than 25 ($n=85$) were re-coded to 25 since values greater than 25 per day are considered unrealistic and likely due to measurement error (Grimm et al., 2012; Litt et al., 2011). The second set of models for obesity were fit using a probit distribution since obesity is a binary variable. Categorical predictors for sex and race were dummy coded. Ordinal variables for general health, income, and education were treated as continuous covariates for this analysis (Pasta, 2009). Since descriptive data analysis revealed missing data greater than 5% for income (13%, $n=28{,}710$), missing data were imputed using expectation maximization. All continuous measures, except the social association index (which has a mean of zero), were grand-mean centered.

Models were fit using SAS 9.4 PROC GLIMMIX with Laplace estimation. For each of the two dependent variables, we estimated 1) an unconditional model that included only the intercept; 2) a model that included only county-level variables to investigate the associations between these factors and diet quality; 3) a model that included all county-level and individual characteristics to assess the extent to which county-level associations changed after the inclusion of individual factors, 4) a model including social network density by income moderator, and 5) a model including social network density by household size moderator.

Results

Basic descriptive statistics are presented in Table 1. Average FVC for the sample was 392 (3.92 times per day). Nearly two-thirds of the sample were women (62%), and the racial/ethnic composition was primarily White, non-Hispanic (77%). Over 80% of the sample rated their general health as good to excellent, with 17% perceiving themselves as having fair or poor health. Nearly 40% of respondents were college graduates, 26% had some college background, and only 8% had less than a high school diploma. The average age of respondents was 55 years and households had an average of 2.4 people. In the sample, most respondents were categorized as not obese (73%) with the remaining (27%) categorized as obese.

Fruit & Vegetable Consumption

Table 2 presents incidence rate ratios (IRR), confidence intervals, variance components, and model fit statistics for FVC. Model 1 is an unconditional model that estimates county and state-level variance in FVC. Average FVC for the typical micro/metropolitan county is 388, or 3–4 times per day. Computation of individual residual variance, and hence an intraclass correlation coefficient, in negative binomial models is not meaningful, so we do not report one. Given the covariance parameter estimates, there is variation at both the county and state-level ($Z < 0.001$). The subsequent conditional models assess whether socio-economic factors reduce this unexplained variance. Model 2 assesses the influence of social network density, income inequality, and poverty rates on FVC. A one unit increase from the average social network density (IRR = 1.02, $p < 0.001$) predicts a 2% increase in FVC rate and a one standard deviation (0.04) increase in GINI predicts a 2% increase in the rate of FVC (IRR = 1.02, $p < 0.001$). A one standard deviation (5 percentage points) increase in poverty rate is associated with a less than 1% decrease in the rate of FVC (IRR = 0.99, $p < 0.001$).

Model 3 assesses county-level variables while controlling for individual level factors. Social network density (IRR = 1.01, $p < 0.01$) and income inequality (IRR = 1.01, $p < 0.01$) remain significant positive predictors of average county consumption occurrences. Poverty rate (IRR = 1.00, $p = 0.66$) was no longer significant. In this model, age (IRR = 1.00, $p < 0.001$), education (IRR = 1.07, $p < 0.001$), income (IRR = 1.01, $p < 0.001$), household size (IRR = 1.02, $p < 0.001$), general health (IRR = 1.05, $p < 0.001$) were all positively associated with FVC consumption. Being white (IRR = 0.97, p < 001) or men (IRR = 0.87, $p < 0.001$) are associated

Table 1 Demographic characteristics

Individual			County		
	Mean or Percent	Standard Deviation		Mean or Percent	Standard Deviation
BMI			Network Density	-0.32	1.0
Obese	27		Poverty	12%	5%
Not obese	73		GINI	0.45	0.04
Education					
Never attended	0.1				
Elementary	2.5				
Some high school	5.2				
High school graduate	26.1				
Some college	26.4				
College graduate	39.7				
Income					
Less than $10,000	4.7				
$10,000 to less than $15,000	5.2				
$15,000 to less than $20,000	6.9				
$20,000 to less than $25,000	8.6				
$25,000 to less than $35,000	11				
$35,000 to less than $50,000	14.6				
$50,000 to less than $75,000	16.6				
$75,000 or more	32.6				
General Health					
Poor	4.8				
Fair	12.4				
Good	30.1				
Very Good	32.9				
Excellent	19.8				
Sex					
Female	62				
Male	38				
Race					
White (non-Hispanic)	76.5				
Minority	23.5				
Age	55	16.5			
Household size	2.44	1.43			
Fruit/Veg Consumption	392	222			

Table 2 Incidence rate ratios with 95% confidence interval, variance components, and model fit statistics for FVC

	Model 1 IRR (CI)	Model 2 IRR (CI)	Model 3 IRR (CI)	Model 4 IRR (CI)	Model 5 IRR (CI)
Intercept	388 (382–394)	389 (383–395)	418 (412–424)	418 (412–424)	418 (412–424)
Network Density		1.02*** (1.01–1.03)	1.01** (1.00–1.01)	1.01** (1.00–1.02)	1.01** (1.00–1.01)
GINI		1.02*** (1.01–1.02)	1.01** (1.00–1.01)	1.01** (1.00–1.01)	1.01** (1.00–1.01)
Percent Poverty		0.99*** (0.98–0.99)	1.00 (0.99–1.00)	1.00 (0.99–1.00)	1.00 (0.99–1.00)
Age			1.00*** (1.00–1.00)	1.00*** (1.00–1.00)	1.00*** (1.00–1.00)
Education			1.07*** (1.06–1.07)	1.07*** (1.06–1.07)	1.07*** (1.06–1.07)
General Health			1.05*** (1.04–1.05)	1.05*** (1.04–1.05)	1.05*** (1.04–1.05)
Income			1.01*** (1.01–1.01)	1.01*** (1.01–1.01)	1.01*** (1.01–1.01)
Household Size			1.02*** (1.01–1.02)	1.01*** (1.01–1.02)	1.02*** (1.01–1.02)
Male			0.87*** (0.87–0.88)	0.87*** (0.87–0.88)	0.87*** (0.87–0.88)
White (Non-Hispanic)			0.97*** (0.96–0.98)	0.97*** (0.96–0.98)	0.97*** (0.96–0.98)
Network Density*Income				1.00*** (1.00–1.00)	
Network Density*HHSIZE					1.00 (1.00–1.00)
Variance Components					
County σ^2	0.001163	0.000554	0.000311	0.000305	0.000306
State σ^2	0.002294	0.00247	0.001897	0.001885	0.001874
Model Summary					
-2 Log Likelihood	2,901,671	2,901,570	2,838,493	2,838,476	2,838,491
BIC	2,901,687	2,901,597	2,838,547	2,838,534	2,838,550
Chi-Square/DF	0.99	0.99	1.04	1.04	1.04

$^{*}p < .05$

$^{**}p < .01$

$^{***}p < .001$

with significantly lower rates of FVC compare to ethnic minorities and women, respectively. The addition of all county-level and individual covariates reduce the unexplained county variance by 73% from the unconditional model.

To examine interactions between social network density and income, Model 4 included a cross-level interaction. The interaction was significant ($p < 0.001$), indicating a stronger relationship between income and FVC in counties with greater social network density. In other words, social network density has a different influence on high-income individuals than low-income individuals. Model 5 assessed the interaction of social network density and household size. The association strength of household size and FVC does not significantly vary in counties with different social network densities (IRR = 1.00, $p = 0.21$).

Obesity

Obesity models were estimated using a hierarchical generalized linear mixed model with a probit link function. The probit model assumes the underlying latent variable follows a normal distribution which more accurately accounts for the continuous nature of BMI. Table 3 presents model coefficients, average marginal effects, variance components, and model fit statistics for obesity. In Model 1, the county and state-level variance in obesity is significant ($Z < 0.001$), which we attempt to explain in conditional models that include contextual and individual factors. Model 2 assesses the influence of social network density, income inequality, and poverty rates on obesity. A one unit increase from the average social network density predicts 1% decreased probability of obesity ($p = 0.04$). Similarly, a one standard deviation (0.04) increase in GINI is associated with a 3% decrease in the probability of obesity ($p < 0.001$). A one standard deviation (5 percentage points) increase in poverty rate is associated 3% greater probability of obesity ($p < 0.001$).

Model 3 assesses county-level variables while controlling for individual level factors, including FVC. Social network density is no longer significantly associated with obesity ($p = 0.45$). Income inequality predicts a 3% decrease in the probability of obesity ($p < 0.001$) while poverty rates are associated with a 3% increase in the probability of obesity ($p < 0.001$). In this model, age (AME = < -1%, $p < 0.001$), education (AME = -2%, $p < 0.001$), income (AME = -1%, $p < 0.001$), household size (AME = < 1%, $p < 0.001$), FVC (AME = -1%, $p < 0.001$), and White (AME = -7%, $p < 0.001$) were associated with lower probability of obesity. Men had 2% greater probability of obesity than women ($p < 0.001$). The addition of all county-level and individual covariates reduce the unexplained county variance by 70% from the unconditional model.

Models 4 and 5 included a cross-level interactions for social network density and income or household size, respectively. The interaction between social network density and income was significant ($p < 0.001$), indicating a weaker relationship between income and obesity in counties with greater social network density. In other words, social network density has a different influence on high-income individuals than low-income individuals. The association strength of household size and obesity

Table 3 Model coefficients, average marginal effects (AME), variance components, and model fit statistics for obesity

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	AME	B	AME	B	AME	B	AME	B	AME
Intercept	-0.61		-0.62		-0.51		-0.51		-0.51	
Network Density			-0.02*	-1%	-0.01	-0.40%	-0.01	-0.40%	-0.01	-0.40%
GINI			-0.08***	-3%	-0.07***	-3%	-0.07***	-3%	-0.07***	-3%
Percent Poverty			0.08***	3%	0.05***	2%	0.05***	2%	0.05***	2%
Age					-0.002***	-0.10%	-0.003***	-0.10%	-0.003***	-0.10%
Education					-0.06***	-2%	-0.06***	-2%	-0.06***	-2%
Income					-0.03***	-1%	-0.04***	-2%	-0.03***	-1%
Fruit/Veg Consumption					-0.03***	-1%	-0.03***	-1%	-0.03***	-1%
Household size					-0.01***	-0.40%	-0.01***	-0.40%	-0.01***	-0.40%
Male					0.05***	2%	0.05***	2%	0.05***	2%
White (Non-Hispanic)					-0.18***	-7%	-0.18***	-7%	-0.18***	-7%
Network Density*Income							-0.01***	-0.40%		
Network Density*HHSIZE									-0.01*	-0.40%
Variance Components										
County σ^2	0.01372		0.006191		0.004063		0.003957		0.004066	
State σ^2	0.006722		0.007643		0.006876		0.006818		0.006835	
Model Summary										
-2 Log Likelihood	237,108.7		236,973.5		231,380.3		231,335.3		231,374.7	
BIC	237,120.5		236,997		231,431.1		231,390		231,429.5	
Chi-Square/DF	1.00		1.00		1.00		1.00		1.00	

$^{*}p < .05$

$^{**}p < .01$

$^{***}p < .001$

was also significant ($p = 0.02$), indicating that the relationship between household size and obesity is weaker in counties with higher social network density.

Discussion

This research examined the relationship between county-level social capital and two measures of diet quality: FVC and obesity. Despite the theoretical importance of social capital to CFS, there has been a critical gap in empirical investigation of its relationship with diet quality. This study addresses the gap in two important ways. It is the first study to the authors' knowledge that assesses the joint effect of social capital and economic context on diet quality using hierarchical generalized linear mixed models with a national sample. It also operationalizes community at the county-level to account for the socio-economic ties that occur within a political-economic unit. This study observed significant variation in both FVC and probability of obesity across counties, which was partially explained by social network density, economic factors, and individual characteristics. However, social network density had a greater influence on diet quality for households in higher income brackets.

The findings from this study are consistent with other research find a significant relationship between social capital and FVC or obesity (Kim, et al., 2006; Litt et al., 2011; Mackenbach et al., 2016). This study also supports our hypothesis that household size (as a proxy for social connections and obligations) is significantly associated with better diet quality. This finding suggests that these joint social obligations are a protective factor for diet quality rather than a barrier (after controlling for socio-economic influences). Larger households may have greater capacity for food acquisition and production tasks. Our analysis also shows that the relationship between income and FVC is significantly stronger in counties with greater social network density. The negative relationship between income, as well as household size, and probability of obesity are also significantly reduced in counties with greater social network density.

This study demonstrated that income inequality is significantly associated diet quality. In the obesity model, county-level poverty rates also had a significant positive association with the rate of obesity. Our analysis is consistent with previous research in that economic inequality is associated with better nutrition-related outcomes, such as BMI, at the neighborhood and metropolitan level after controlling for poverty rates or median household income (Bjornstrom, 2011; Blakely et al., 2002; Chang & Christakis, 2005). Increasing racial and class segregation resulting in areas of concentrated disadvantage, where everyone in a community has equally low incomes (Massey & Denton, 1993), may help explain the positive relationship. Moreover, economically heterogeneous counties may be characterized by greater extra-county networks, economic development, urbanization, and increased tax base needed for public service investments compared to economically homogeneous counties (Bjornstrom, 2011; Moller et al., 2009; Woolcock, 1998).

Finally, substantial variation in diet quality was associated with individual demographic factors. We find that educational differences among individuals exposed to the same county-level factors are associated with variation in FVC and obesity which is consistent with prior research identifying relationships between education levels and diet quality (Hiza et al., 2013). Aside from biological traits, education was associated with the largest rate of FVC and lowest probability of obesity. As a form of cultural capital and source of social capital (Bourdieu, 1986), this finding contributes to the understanding of how social capital may influence CFS.

Limitations

Several limitations must be noted before reading general conclusions about these findings. First, only micro/metropolitan counties from the BRFSS were analyzed, so results may not reflect the dynamics of rural counties. Second, changing dietary preferences is typically a long-term process, and it may be argued that a five-year time lag between social capital and diet quality is not sufficient to allow for the type of structural changes required to impact diet patterns. However, longer time lags introduce additional complexity in parsing out the effects of social capital from other contextual processes occurring over time that may also influence diet patterns. Third, the social network dimension of social capital used in this study measure within-county network density. This overlooks the role that between-county linkages (i.e., bridging social capital) and trust may play in diet quality. Fourth, the analysis was completed with data from 2006–2009 and may be considered dated. However, we do not expect the relationship between social capital and diet quality to be time dependent. In other words, the nature of this relationship should be valid regardless of data collection year. Finally, this study uses a cross-sectional approach, so all observed relationships are correlational and should not be inferred as causal.

Implications

The Community Food Security model build on the themes identified by Ellery et al. (2017) for adding place-led, person-driven approaches to community well-being initiatives. Yet, although CFS continues to provide a vision for a just and sustainable food system, its utility as a theory or model for practice remains contentious. Evidence for the role of community social network density in improving diet quality is mixed. While household size may be a suitable proxy for household social capital, its utility for CFS research and evaluation is weak since it is unlikely to be a target outcome for interventions. Thus, more work is needed to identify useful social capital indicators for CFS evaluation. These findings also provide further support the role of CFS policies and educational programs aimed changing household preferences for healthy foods. Since access to quality educational opportunities depends on socio-economic characteristics of the county, it is critically important to simultaneously address capacity for investment in community resources as a means of improving public education and nutrition literacy.

Important areas for future research extend from this study. CFS is a dynamic process that cannot be fully understood using cross-sectional models. Investigation of the stability and resiliency of diet patterns in a community over time with longitudinal models would add depth to the theoretical understanding of the factors that characterize CFS. It could be argued that communities with greater social capital exhibit greater stability in diet patterns in the face of recession. Although the current study straddles time points both before and during the 2008 recession by using 2005 social capital measures to assess 2009 diet quality, additional longitudinal studies are needed. Furthermore, counties characterized by greater population growth may also be developing economically and becoming more attractive places to live, which is often associated with increases in income inequality. Since changes in the racial and economic composition of residents often occur in conjunction with economic development, additional research is needed to fully capture equity implications of gentrification on CFS.

Conclusion

Community food security is a place-based initiative aimed at improving community well-being. Within this framework, there is widespread recognition that a myopic focus on food does not address the root causes of food insecurity. Social capital, economic heterogeneity within counties, and poverty rates are important contextual factors related to diet quality. However, social capital and poverty rates are differently related to FVC and probability of obesity. Results of this study lead us to conclude that household economic capital is related to their ability to access social capital in the community that improves diet quality, as Bourdieu would predict. Social capital, and the capacity to achieve CFS goals that benefit stakeholders of lower socio-economic status, is often deeply connected to economic capital and social power such that powerful interests may champion CFS agendas that fail to address economic and social inequities (Bourdieu, 1986; McCullum et al., 2004).

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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