

# COMMUNITY GARDENING, NEIGHBORHOOD MEETINGS, AND SOCIAL CAPITAL

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*This study examined associations between participation in community gardening/beautification projects and neighborhood meetings with perceptions of social capital at both the individual and neighborhood levels. Data were analyzed from a cross-sectional stratified random telephone survey conducted in Flint, Michigan (N=1916). Hierarchical linear and logistic regression analyses were used to study associations, controlling for individual and Census block group-level confounders. At the individual level, household involvement in community gardening/beautification activities and in neighborhood meetings were associated with residents' perceptions of bonding social capital, linking social capital, and neighborhood norms and values. Household involvement in gardening/beautification and meetings had stronger associations with residents' perceptions of social capital than did neighborhood-level involvement measures. Results suggest involvement in neighborhood meetings augment the individual and neighborhood-wide perceptions of social capital associated with community gardening and beautification projects. Neighborhood community gardens' impact on neighborhood residents' perceptions of social capital can be enhanced by neighborhood-wide meetings. © 2010 Wiley Periodicals, Inc.*

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## INTRODUCTION

Measures of social capital at the national, state, local, and neighborhood levels have been associated with various measures of health including mortality, overall health status, teen births, and crime rates (Gold, Kennedy, Connell, & Kawachi, 2002; Lochner, Kawachi, & Kennedy, 1999). Although the evidence regarding the benefits of social capital is growing, researchers are engaged in a lively debate regarding the nature of social capital, its theoretical base, and the level of its effect. Some scholars describe a “network” understanding that characterizes social capital as investments people make in relationships that can bring about tangible returns for individuals (Bourdieu, 1985; Burt, 1984; Coleman, 1988; Lin, 1999; Portes, 1998). Other scholars emphasize a “communitarian” understanding of social capital that emphasizes features of social life—networks, norms, and trust—that can improve the efficiency of society by facilitating coordinated actions (Putnam, 1993). One distinction between these two conceptualizations of social capital centers on whether resources may be available to *individuals* through linkages accessible through their own social relationships and networks (network perspective) or to *everyone* within a social milieu including both those who do and do not invest in maintaining social relationships (communitarian perspective; Kawachi, 2006; Kawachi, Kim, Coutts, & Subramanian, 2004).

A clear definition of social capital and an understanding of the level of its effects (individual or community) are important for the development of effective programs seeking to improve health by increasing social capital. A related question, however, is an understanding of how to generate social capital, and also how social capital spreads within geographical areas, particularly in low-resource neighborhoods. If neighborhood social capital is generated by individuals for their own potential benefit, then neighborhood community development projects designed to increase social capital should focus on promoting the development of individual social networks and attracting large numbers of neighborhood residents to get involved in activities that increase networking, norms, and trust. If, alternatively, social capital is a community or neighborhood-wide construct, this suggests that simply having neighborhood organizations, events, or activities in which at least some residents participate is enough to generate neighborhood-wide networks, norms, and trust whose benefits would, in fact, spillover to nonparticipating neighbors.

Community gardens are public health promotion enterprises that can simultaneously promote good nutrition and physical activity within neighborhoods, especially in areas with economic or structural barriers to accessing fresh produce and recreation opportunities (Alaimo, Packnett, Miles, & Kruger, 2007; Blair, Giesecke, & Sherman, 1991; Patel, 1991). Community gardens are also thought to generate social benefits, such as social capital; however, only a few empirical studies on this topic have been conducted (Alaimo, Reischl, Atkinson, & Hutchison, 2005; Glover, 2004; Glover, Shinew, & Parry, 2005; Saldivar-Tanaka & Krasny, 2004; Schmelzkopf, 1996). Wakefield, Yeudall, Taron, Reynolds, and Skinner (2007) conducted surveys, participant observation, and focus groups with community gardeners in Toronto; they found that participation in the gardens elicited pride and provided a positive place for social interaction and sharing. In a study of Latino gardens in New York City, Saldivar-Tanaka and Krasny (2004) found that community gardens were sites of frequent socializing and community organizing and that gardeners viewed their gardens “more as social and cultural gathering places than as agricultural production sites” (p. 407). A survey of community garden program coordinators in upstate New

York found that 51% of coordinators reported that the garden improved residents' attitudes toward their neighborhood (Armstrong, 2000). Glover and colleagues' work with community gardeners in St. Louis, Missouri, describes community gardens as social contexts for the production and use of social capital and for accessing resources such as ideas, water, labor, and tools (Glover, 2004; Glover, Parry, & Shinew, 2005).

Neighborhood organizations and block clubs are also widely cited as mechanisms for generating social capital, although research on the topic is relatively sparse, particularly for studies examining social capital as an outcome. In a study of neighbors prior to and after block organizations were formed, Unger and Wandersman (1983) found that participation in block organizations was associated with an increase in members' social interactions with their neighbors. In another study, they found that participation in civic organizations, including block organizations, was associated with *neighboring*, a measure similar to social capital (Unger & Wandersman, 1982). Analysis of survey data from 413 low-income neighborhoods in 10 cities found that neighborhood participation, defined as serving as an officer for a local community group, volunteering or attending a community festival, was a strong predictor of individual-level bonding social capital (Brissou & Usher, 2005). Citizen participation in neighborhood organizations (participation level and participation in decision making) in four low-income Pittsburgh, Pennsylvania neighborhoods was associated with organizational collective efficacy, but not neighborhood collective efficacy, defined as a combination of informal social control and neighborhood trust (Ohmer & Beck, 2006). Arai and Pendlar (1997) completed a qualitative study with participants in a community visioning process and found that participation was associated with perceptions of group accomplishment, ability to influence change, and development of community, including development of camaraderie and connectedness to the community. Finally, Semenza, March, and Bontempo (2007) implemented an intervention involving community participation in an urban renewal project, i.e., design, approval, and construction of community art spaces. Analysis of pre- and postsurveys of residents living within a two-block radius indicated that measures of sense of community, social capital, and two measures of social interaction (study participants had talked to neighbors about personal problems or asked their neighbors over to their houses to socialize) displayed statistically significant increases after the intervention.

We recently completed a qualitative study in Flint, Michigan, with four diverse low-income neighborhoods with community gardens to identify the range of the benefits and limitations of community gardens for building social capital and how social capital is generated in neighborhoods (Alaimo, Allen, Reischl, Hutchinson, & Atkinson, 2009; Alaimo et al., 2005; Allen, Alaimo, Elam, & Perry, 2008). Results suggested that community gardening and beautification activities created opportunities for the development of bonding, bridging, and linking social capital. In addition, some gardens propagated neighborhood norms and beliefs, including reciprocity, helping others, neighborhood involvement, collective efficacy, sense of community, and neighborhood pride and morale. A particularly salient finding was the facilitating role existing neighborhood organizations played, ensuring that collective action on community gardens or beautification led to increased social capital. This qualitative study, however, focused primarily on gathering insight from the individuals who were themselves participating in neighborhood activities. Our findings evoked additional questions that we could not answer with our qualitative data.

## THE PRESENT STUDY

The purpose of the present study was to use data collected from a telephone survey of a random sample of Flint residents (collected during the same period as our qualitative study) to confirm our hypothesis that participation in community gardens, beautification activities, and neighborhood meetings was positively associated with perceptions of social capital. There were four main objectives of this paper through which we examined associations between household and neighborhood-level participation in gardening/beautification and neighborhood meetings with individual and neighborhood-level perceptions of social capital.

For Objective 1 (conducted at the individual level), we examined whether residents with a household member who participated in a community garden/beautification project or neighborhood association meeting had stronger perceptions of social capital than their neighbors who did not participate. We explored this by comparing perceptions of social capital among residents with household members who (a) did not engage in community gardening, beautification, or neighborhood meetings; (b) participated in community gardens or beautification projects; and (c) attended meetings of a block or neighborhood group.

For Objective 2 (also at the individual level), we tested whether residents with household members who participated in both community garden/beautification projects and neighborhood meetings (a fourth group, d) reported stronger perceptions of social capital than those whose household members only participated in one of these activities.

For Objective 3, we explored the same relationships at the Census block group neighborhood level. Using individual-level data aggregated to the Census block group level, we examined whether Census block groups in which more people participated in gardening/beautification, neighborhood meetings, or both had higher collective perceptions of social capital than those Census block groups with fewer people participating.

Finally, for Objective 4, we were interested in exploring whether having a higher percentage of people within a neighborhood participating in community gardening/beautification and/or neighborhood meetings (at the Census block group level) was associated with higher individual-level perceptions of social capital among residents, and how this may have differed for members of involved and uninvolved households. In other words, did participation levels affect the social fabric of the neighborhood enough to influence perceptions of social capital among uninvolved individuals as well as those who were involved in these activities?.

## METHOD

This study was part of a larger evaluation of the Neighborhood Violence Prevention Collaborative (NVPC), a neighborhood development program designed to increase social capital and decrease violence in Flint neighborhoods. The NVPC provided small grants to neighborhood organizations and block groups to engage neighbors in a variety of neighborhood development activities including community gardens and beautification. The present study employed a community-based participatory research (CBPR) approach focusing on community gardens and beautification. Key partner organizations included the Prevention Research Center of Michigan (PRC/MI),

Flint Urban Gardening and Land Use Corporation, and the NVPC. All aspects of the research project were guided by an 18-member committee composed of representatives from these organizations and a diverse group of community leaders, community gardeners, and neighborhood residents.

This study reports on results from analyses of a cross-sectional telephone survey administered in 2001 to a sample of Flint residents 18 years and older who had lived at their current address for the previous 12 months. Quota sampling of 143 Census block groups (defined for the 1990 decennial Census) in Flint with a random selection of phone numbers helped ensure adequate representation from all neighborhoods in Flint. The sampling goal of surveying 15 residents in each census tract was achieved for 83 Census block groups, and at least 80% of the quota was reached for 107 Census block groups. A final sample of 1,916 (63.6%) eligible respondents reached by phone agreed to be interviewed.

### ***Neighborhood Participation Variables***

Household participation in community gardening, neighborhood beautification, and neighborhood meetings was assessed using a series of interview questions designed to elicit participation in a variety of neighborhood activities. These items were administered with the following introduction: "Sometimes people in a neighborhood do things to take care of a local problem or to make the neighborhood a better place to live. Please tell me if you or any member of your household has been involved in the following activities in the last year to improve the conditions of your neighborhood." Response options included, "Participated in a neighborhood or community garden project," "Participated in a neighborhood clean up or beautification project," and "Attended a meeting of a block or neighborhood group about a neighborhood problem or a neighborhood improvement." Because the initial cross-tabulation of these items revealed a high concordance (82%) of those participating in community gardening and in beautification activities, we combined responses on these two items. It is important to note that at the time of this study, most of the community gardening occurring in Flint was not gardening on allotment plots as is seen in most cities, whereby gardeners pay a fee to garden a small parcel within a larger lot, but collective gardening and beautification of neighborhood vacant lots and/or other types of property (such as flower boxes and street corners) by neighbors (Alaimo et al., 2005).

For the individual-level analyses (Objectives 1 and 2), we computed a four-group variable describing how individual respondents were engaged in neighborhood activities: (a) no household participation in garden/beautification or neighborhood meetings, (b) household participation in a community garden and/or beautification only, (c) household participation in a neighborhood meeting only, and (d) household participation in gardening/beautification and neighborhood meetings.

For the Census block group-level analyses (Objectives 3 and 4), three variables were created based on aggregated data from individual respondents: (a) the percentage of respondents within a Census block group reporting household participation in a community garden/beautification only; (b) the percentage of respondents within a Census block group reporting household participation in a neighborhood meeting only, and (c) the percentage of respondents within a Census block group reporting household participation in both a community garden/beautification and a neighborhood meeting.

### **Outcome Measures**

For the survey, we chose to measure perceptions of individual constructs identified as making up the central character of the concept of social capital rather than using a composite measure, as tends to be more common in social capital research. We did this to assess how diverse social capital constructs may be differentially associated with community garden and neighborhood organization participation. Specifically, we explored perceptions of constructs associated with both the communitarian and the social network perspectives of social capital (Carpiano, 2006, 2007; Kawachi, Kim, Coutts, & Subramanian, 2004; Moore, Shiell, Hawe, & Haines, 2005; Szreter & Woolcock, 2004). For the purposes of this study, social capital was defined as features of the social structure, including social interactions, networks, norms, and values, that act as resources for people and/or enable people to work together for mutual benefit.

Social capital components examined (see Table 1) included perceptions of bonding social capital, defined by Szreter and Woolcock (2004) as “trusting and co-operative relations between members of a network who see themselves as being similar, in terms of their shared social identity”; linking social capital, defined as “norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalized power or authority gradients in society”; and neighborhood norms and values (pp. 5–6). Specific descriptions of outcome variables associated with each of these social capital components and reliability statistics are displayed in Table 1.

We explored the patterns of divergent and convergent validity of these measures by examining the matrix of 78 correlations among all outcome variables. Not surprising, all correlations were positive and the neighborhood satisfaction rating had the highest correlations with other outcome measures including two correlations greater than .70 (with trust and reciprocity and with agreeing that neighbors get along). Only four other correlations were greater than .50 (all associated with either neighborhood satisfaction or the trust and reciprocity measures) suggesting that most of these measures were assessing distinct constructs.

For the Census block group-level analyses, each variable was aggregated at the block group level by averaging the score or by determining the percentage of respondents who answered affirmatively to each outcome variable within each Census block group.

### **Control Variables**

*Individual-level variables.* Interview respondents reported their age, gender, race, marital status, number of children in the household, home ownership, education, employment status, numbers of years lived in neighborhood, neighborhood stability, and family income. Because fewer than 4% of respondents reported their race as other than White or African American, race was categorized as White or African American/other. Perceived neighborhood stability was measured by the respondents' level of agreement with the phrase, “There are many people who move in and out of the neighborhood.”

Although family income is an important control variable, almost half of the sample (48%) did not report income. All data analyses were completed with and without family income as a control variable using the sample with family income data. Because results were not appreciably different, family income was not used as a control variable in the final analyses with the full sample.

**Table 1. Description of Outcome Variables**

<i>Outcomes</i>	<i>Questionnaire items</i>	<i>Number of items</i>	<i>Cronbach's alpha</i>
<i>Bonding social capital</i>			
Trust and reciprocity scale	People are willing to help neighbors; people can be trusted	2	0.82
Know neighbors scale	How well recognizes neighbors; how well neighbors know respondent	2	0.48
Neighborhood people get along, % agree	People in this neighborhood get along with each other	1	
Intergenerational relationships scale	How much time spent with teenagers and young children in neighborhood	2	0.75
Social support scale	How often neighbors provide assistance to one another and how often neighbors gather for social events	5	0.76
<i>Linking social capital</i>			
Neighborhood people have connections, % agree	People in neighborhood have connections to people who can influence what happens in the neighborhood	1	
Get to know police, % agree	Made an effort to get to know the police in your neighborhood	1	
Aware of neighborhood organization, %	Could name a block club or neighborhood organization working in neighborhood	1	
<i>Neighborhood norms and values</i>			
Feel responsible for neighborhood scale	Feel responsible for making neighborhood properties look good; have an active part in neighborhood	2	0.59
Neighborhood involvement scale	Number of neighbors who are active in neighborhood; number who would stand up and say something about a neighborhood issue	2	0.81
Informal social control scale	Likelihood neighbors would take action to stop a burglary, drug sale to children, an assault, or children getting into trouble	4	0.77
Collective efficacy, % agree	If there is a problem in this neighborhood, people who live here can get it solved	1	
Neighborhood influence, % agree	I have influence over what this neighborhood is like	1	
Neighborhood satisfaction scale	Satisfaction with quality of life; neighborhood is good place to live; feel at home in neighborhood; neighborhood good place for kids to grow up	4	0.86

*Census block group-level variables.* Individuals were asked to respond to a series of questions about whether or not specific neighborhood crimes and characteristics of disordered physical environments were present in their neighborhoods to create two scales. Seven questions were aggregated and then scaled at the U.S. Census Block group level to form a physical environment disorder scale (Cronbach's alpha = 0.82),

and six were aggregated and scaled to form a neighborhood crime scale (Cronbach's  $\alpha = 0.78$ ). Examples of items included questions about the presence of abandoned cars or buildings and illegal public drinking or public drug use; higher scores meant worse crime and environmental disorder. The 2000 Census data were also aggregated at the block group level; these items included percentage of owner-occupied housing units, percentage of vacant housing units, and poverty rate.

### *Analysis*

Analyses were completed using Stata (Statacorp, 2005). Data were weighted to account for nonresponse, unequal selection probability, and age and gender differences between survey respondents and the City of Flint population, using the 2000 U.S. Census population estimates by Census block group. Prevalence and mean estimates were conducted using the complex sampling module (svy) to perform weighted analyses. Hierarchical linear and logistic regression analyses were unweighted and were used to take into account variation within and between Census block groups.

Regression analysis followed three stages. First, we examined whether household participation in neighborhood activities was associated with individual perceptions of social capital after adjusting for the control variables listed above. Next, we analyzed the association between neighborhood rates of participation (percentage of respondent households within a Census block group who participated in neighborhood activities) with neighborhood-level aggregated ratings of social capital, controlling for Census block group level controls. Three rates of neighborhood participation were examined: (a) participation in community gardening/beautification only, (b) participation in neighborhood organization meetings only, and (c) participation in both community gardening/beautification and meetings. Finally, we examined whether these same neighborhood rates of participation were associated with individual-level perceptions of social capital for households who did (involved households) and did not (uninvolved households) have a member participating in neighborhood activities, while controlling for individual and neighborhood level controls. Analyses examining violations of collinearity, nonnormality, and heteroskedasticity in the regression models noted no extreme violations of these assumptions.

## **RESULTS**

### *Individual-Level Analysis*

The percentage of Flint residents with household member(s) who participated in community gardening or beautification projects (only) was 15.3% (*SE*: 1.0). An additional 5.8% (*SE*: 0.6) of residents reported that their household member(s) participated in a neighborhood meeting (only). Nearly 15% (14.7%; *SE*: 1.0) of residents reported household participation in both community gardens/beautification projects and in neighborhood organization meetings. Table 2 displays the individual-level and Census block group-level demographic information of the study population.

Results of the hierarchical linear and logistic regression analysis investigating whether household-level participation in neighborhood activities was associated with



**Table 2. Demographic Information of Study Population**

	<i>Did not participate</i>	<i>Participated in a community garden/beautification</i>	<i>Attended neighborhood meeting</i>	<i>Both gardening &amp; neighborhood meeting</i>
	<i>M or % (SE)</i>	<i>M or % (SE)</i>	<i>M or % (SE)</i>	<i>M or % (SE)</i>
	<i>N = 1,224</i>	<i>N = 271</i>	<i>N = 129</i>	<i>N = 292</i>
<i>Individual-level variables</i>				
Age, mean	43.53 (0.62)	40.72 (1.28)	45.86 (1.84)	43.81 (1.31)
Gender, %				
Male	43.30 (1.79)	45.73 (3.68)	46.69 (5.14)	52.27 (3.63)
Female	56.70 (1.79)	54.27 (3.68)	47.73 (3.63)	47.73 (3.63)
Race, %				
White	52.88 (1.44)	54.82 (3.62)	46.98 (5.11)	43.58 (3.62)
African American	42.68 (1.42)	43.77 (3.60)	49.08 (5.07)	44.31 (1.02)
Other	4.44 (0.89) <sup>a</sup>	1.41 (0.65) <sup>b</sup>	3.93 (1.73)	4.23 (0.69)
Education, %				
<High school	12.25 (1.09)	15.60 (3.02)	6.15 (1.98) <sup>b</sup>	10.17 (2.17)
High school graduate	58.67 (1.72)	57.99 (3.71)	63.20 (4.79)	48.80 (3.73)
>High school	29.08 (1.57) <sup>a</sup>	26.41 (2.98) <sup>a</sup>	30.65 (4.56) <sup>a</sup>	41.03 (3.62) <sup>b</sup>
Marital status, %				
Single	63.70 (1.65)	63.94 (3.43)	51.30 (5.14)	55.73 (3.71)
Married	36.30 (1.65)	36.06 (3.43)	48.70 (5.14)	44.27 (3.71)
Children, %				
Household without children	55.63 (1.74)	49.08 (3.69)	50.71 (5.12)	51.97 (3.66)
Household with children	44.37 (1.74)	50.92 (3.69)	49.29 (48.03)	46.22 (1.39)
Home ownership, %	69.65 (1.56) <sup>a</sup>	62.62 (3.76) <sup>a</sup>	84.16 (3.68) <sup>b</sup>	71.55 (3.41)
Years lived in neighborhood, mean	15.47 (0.44)	14.07 (0.82)	17.07 (1.34)	16.05 (0.92)
<i>Census block group-level variables</i>				
Owner occupied, %	58.36 (0.49)	55.76 (1.82) <sup>a</sup>	62.97 (1.64) <sup>b</sup>	60.40 (1.39)
Poverty rate, %	26.7 (0.3)	28.4 (1.3)	25.3 (1.4)	26.5 (1.0)
Neighborhood Crime Scale, mean (0-1)	0.28 (0.00)	0.29 (0.01)	0.25 (0.02)	0.28 (0.01)
Nghbrhd Phys Environ. Scale, mean (0-1)	0.35 (0.00)	0.36 (0.01)	0.34 (0.02)	0.36 (0.01)

Note. Terms with superscripts <sup>a</sup> and <sup>b</sup> are significantly different from each other ( $P < .05$ ).

individual perceptions of social capital (Objectives 1 and 2) are displayed in Table 3. Controlling for individual and Census block group-level demographic and neighborhood information, household participation in only community garden/beautification, only a neighborhood meeting, and both activities were significantly associated with most outcomes when compared to nonparticipants, with a few exceptions: participation in neighborhood meetings only was not associated with trust and reciprocity or neighborhood satisfaction; and there were no significant associations between any of the groups and perceptions of whether neighborhood people got along. For several social capital variables (knowing neighbors, intergenerational relationships, social support, neighborhood people have connections, being aware of a neighborhood organization, and feeling responsible for the neighborhood), the associations with participation in both gardening and meetings were significantly higher than for participation in only one of these activities.

**Table 3. Associations Between Individual-Level Participation in Neighborhood Activities and Perceptions of Social Capital, Adjusting for the Control Variables**

	Participated in a community garden/beautification			Attended neighborhood meeting			Both gardening & neighborhood meeting		
	Coeff or OR <sup>a</sup> (95% CI)	P Value		Coeff or OR <sup>a</sup> (95% CI)	P Value		Coeff or OR <sup>a</sup> (95% CI)	P Values	
<i>Bonding social capital</i>									
Trust and reciprocity scale, coefficient	0.10 (0.02–0.18)	0.01		0.08 (–0.03–0.19)	0.14		0.20 (0.12–0.28)	0.00	
Know neighbors scale, coefficient <sup>d</sup>	0.14 (0.07–0.22)	0.00		0.20 (0.12–0.33)	0.00		0.30 (0.22–0.37)	0.00	
Neighborhood people get along, OR	1.32 (0.84–2.10)	0.23		1.20 (0.64–2.24)	0.57		1.31 (0.83–2.06)	0.25	
Intergenerational relationships scale, coefficient <sup>c,d</sup>	0.47 (0.34–0.61)	0.00		0.47 (0.29–0.65)	0.00		0.80 (0.67–0.93)	0.00	
Social support scale, coefficient <sup>c,d</sup>	0.42 (0.33–0.51)	0.00		0.32 (0.20–0.44)	0.00		0.68 (0.59–0.77)	0.00	
<i>Linking social capital</i>									
Neighborhood people have connections, OR <sup>c,d</sup>	3.52 (2.48–4.98)	0.00		2.32 (1.51–3.57)	0.00		9.21 (5.95–14.24)	0.00	
Get to know police, OR	2.31 (1.70–4.14)	0.00		2.39 (1.17–3.57)	0.00		4.72 (3.49–6.37)	0.00	
Aware of neighborhood organization, OR <sup>b,d</sup>	2.18 (1.61–2.95)	0.00		6.44 (4.20–9.89)	0.00		8.49 (6.11–11.79)	0.00	
<i>Neighborhood norms and values</i>									
Feel responsible for neighborhood scale, coefficient <sup>c,d</sup>	0.21 (0.13–0.29)	0.00		0.24 (0.14–0.35)	0.00		0.50 (0.43–0.58)	0.00	
Neighborhood involvement scale, coefficient	0.32 (0.21–0.43)	0.00		0.33 (0.18–0.48)	0.00		0.47 (0.36–0.58)	0.00	
Informal social control scale, coefficient	0.22 (0.18–0.33)	0.00		0.23 (0.09–0.37)	0.00		0.36 (0.25–0.46)	0.00	
Collective efficacy, OR	1.69 (1.20–2.39)	0.00		2.66 (1.61–4.41)	0.00		2.34 (1.64–3.35)	0.00	
Neighborhood influence, OR	1.76 (1.30–2.37)	0.00		1.68 (1.11–2.52)	0.01		2.32 (1.71–3.15)	0.00	
Neighborhood satisfaction scale, coefficient	0.10 (0.03–0.18)	0.01		0.10 (–0.01–0.20)	0.07		0.19 (0.11–0.27)	0.00	

Note: Coeff = Coefficient for linear regression analyses; OR = odds ratio for logistic regression analyses; CI = confidence interval.  
<sup>a</sup>The reference group for all analysis = “Did not participate.” Coefficients and odds ratios are adjusted for age, gender, race, marital status, number of children present in the household, home ownership, education, employment status, numbers of years lived in neighborhood, and socioeconomic status, neighborhood stability, percent housing units owner occupied, percent vacant housing units, and poverty rate.  
<sup>b</sup>Significant difference between column 1 and column 2.  
<sup>c</sup>Significant difference between column 2 and column 3.  
<sup>d</sup>Significant difference between column 1 and column 3.

### *Neighborhood-Level Analysis*

We were interested in exploring associations, if any, between the percentages of neighbors' participation in gardening/beautification, neighborhood meetings, or both and perceptions of social capital at both the neighborhood and individual levels. To do this, we calculated (separately): (a) the percentage of respondent households within a Census block group that participated in garden/beautification projects only (range: 0–77.8%; 4.2% of Census block groups had 0% participation in gardening/beautification), (b) the percentage that participated neighborhood meetings only (range: 0–61.5%; 10.5% of Census block groups had 0% participation in neighborhood meetings), and (c) the percentage that participated in both garden/beautification projects and meetings (range: 0–57.1%; 21.7% of Census block groups had 0% of residents participating in both activities).

These percentages were regressed separately against average scores by Census block group for each of the social capital variables (Objective 3). Results (data not shown) indicated that all associations for Census block group-level participation in garden/beautification projects only, neighborhood meetings only, and both with social capital constructs were positive and significant (coefficients ranged from 0.25 to 0.81;  $p$  values ranged from .00 to .05), except for the scales indicating neighborhood involvement and that neighborhood people got along. In addition, the percentage of people in a Census block group who stated that they had gotten to know the police was not significantly associated with Census block group percentage of households participating in gardening/beautification (coefficient: 0.27;  $p = .12$ ), but was significantly associated with Census block group percentage of households participating in a neighborhood meeting (coefficient: 0.56;  $p = .00$ ) and in both activities (coefficient: 0.55;  $p = .01$ ).

The final analysis (Objective 4) sought to determine if neighborhood levels of participation in community gardening/beautification only, neighborhood meetings only, or both were associated with individual-level perceptions of social capital for members of households who (a) were involved in at least one of these neighborhood activities (involved households), and (b) were not involved in any neighborhood activities (uninvolved households). Table 4 shows the results of hierarchical logistic and linear regression looking at the relationships between perceptions of social capital and levels of participation in community gardening/beautification, neighborhood meetings, or both of these activities among survey respondents from involved households. Table 5 shows the results of the same analyses for respondents residing in uninvolved households.

Among respondents from involved households (Table 4), there was only one significant association between neighborhood levels of participation in gardening/beautification and household members' perceptions of social capital constructs, i.e., neighborhood people have connections. The percentage of Census block group residents participating in a neighborhood meeting was significantly and positively associated with perceptions of 6 of the 14 social capital constructs (know neighbors, neighborhood people have connections, get to know police, aware of neighborhood organization, feel responsible for neighborhood, and neighborhood satisfaction) among members of involved households. The percentage of Census block group residents participating in both gardening and neighborhood meetings was significantly associated with perceptions of 5 of the 14 social capital constructs (neighborhood people have connections, get to know police, aware of neighborhood organization, feel responsible for neighborhood, and neighborhood satisfaction) among members of involved households.

**Table 4. Associations Between Neighborhood-Level Participation in Neighborhood Activities and Perceptions of Social Capital Among Members of Involved Households (N = 591)**

	<i>Neighborhood-level participation in beautification/ community garden (% participate in census block group)</i>		<i>Neighborhood-level participation in a BC/NO meeting (% participate in census block group)</i>		<i>Neighborhood-level participation in gardening AND a neighborhood meeting (% participate in census block group)</i>	
	<i>Coeff or OR (95% CI)</i>		<i>Coeff or OR (95% CI)</i>		<i>Coeff or OR (95% CI)</i>	
<i>Bonding social capital</i>						
Trust and reciprocity scale, coefficient	-0.04	(-0.32-0.23)	0.16	(-0.14-0.46)	0.18	(-0.16-0.53)
Know neighbors scale, coefficient	0.05	(-0.27-0.37)	<b>0.34</b>	<b>(0.01-0.68)</b>	0.31	(-0.08-0.70)
Neighborhood people get along, OR	1.08	(0.90-1.30)	0.99	(0.81-1.20)	0.98	(0.78-1.22)
Intergenerational relationships scale, coefficient	-0.13	(-0.65-0.40)	-0.16	(-0.72-0.40)	0.08	(-0.56-0.72)
Social support scale, coefficient	-0.24	(-0.59-0.11)	-0.04	(-0.43-0.34)	0.07	(-0.37-0.50)
<i>Linking social capital</i>						
Neighborhood people have connections, OR	<b>1.20</b>	<b>(1.03-1.40)</b>	<b>1.19</b>	<b>(1.01-1.41)</b>	<b>1.41</b>	<b>(1.15-1.73)</b>
Get to know police, OR	1.02	(0.91-1.14)	<b>1.14</b>	<b>(1.01-1.28)</b>	<b>1.19</b>	<b>(1.04-1.36)</b>
Aware of neighborhood organization, OR	1.13	(0.99-1.29)	<b>1.48</b>	<b>(1.28-1.71)</b>	<b>1.57</b>	<b>(1.32-1.86)</b>
<i>Neighborhood norms and values</i>						
Feel responsible for neighborhood scale, coefficient	0.21	(-0.11-0.53)	<b>0.44</b>	<b>(0.10-0.78)</b>	<b>0.70</b>	<b>(0.33-1.08)</b>
Neighborhood involvement scale, coefficient	-0.13	(-0.54-0.29)	0.05	(-0.39-0.50)	0.09	(-0.42-0.59)
Informal social control scale, coefficient	0.09	(-0.24-0.42)	0.10	(-0.25-0.45)	0.16	(-0.25-0.57)
Collective efficacy, OR	1.02	(0.91-1.16)	1.01	(0.99-1.28)	1.13	(0.96-1.33)
Neighborhood influence, OR	1.04	(0.93-1.16)	1.04	(0.92-1.17)	1.07	(0.93-1.23)
Neighborhood satisfaction scale, coefficient	0.17	(-0.12-0.47)	<b>0.42</b>	<b>(0.11-0.73)</b>	<b>0.52</b>	<b>(0.16-0.87)</b>

*Note.* Coeff = Coefficient; OR = odds ratio; CI = confidence interval. Coefficients and odds ratios are adjusted for: age, gender, race, marital status, number of children present in the household, home ownership, education, employment status, numbers of years lived in neighborhood, socioeconomic status, neighborhood stability, percent housing units owner occupied, percent vacant housing units and poverty rate. Coefficients for linear regression are interpreted as the individual outcome scale score changes associated with an increase in the percentage of residents participating in neighborhood activities increasing from 0 to 100%. Odds ratios for the logistic analysis are interpreted as the odds likelihood of a respondent agreeing with the outcome statement for every 10% increase in residents participating in neighborhood activities. **Boldface** indicates significant findings,  $P < .05$ .

**Table 5. Associations Between Neighborhood-Level Participation in Neighborhood Activities and Perceptions of Social Capital Among Members of Uninvolved Households (N = 957)**

	<i>Neighborhood-level participation in beautification/community garden (% participate in census block group)</i>		<i>Neighborhood-level participation in a BC/NO meeting (% participate in census block group)</i>		<i>Neighborhood-level participation in gardening AND a neighborhood meeting (% participate in census block group)</i>	
	<i>Coeff or OR (95% CI)</i>		<i>Coeff or OR (95% CI)</i>		<i>Coeff or OR (95% CI)</i>	
<i>Bonding social capital</i>						
Trust and reciprocity scale, coefficient	0.01	(-0.26-0.28)	0.13	(-0.17-0.43)	-0.08	(-0.43-0.26)
Know neighbors scale, coefficient	0.00	(-0.24-0.25)	0.07	(-0.19-0.34)	0.03	(-0.28-0.34)
Neighborhood people get along, OR	1.00	(0.84-1.09)	1.02	(0.87-1.19)	1.01	(0.85-1.20)
Intergenerational relationships scale, coefficient	-0.05	(-0.49-0.39)	-0.16	(-0.65-0.32)	-0.09	(-0.65-0.47)
Social support scale, coefficient	0.18	(-0.12-0.48)	0.25	(-0.07-0.58)	0.22	(-0.16-0.60)
<i>Linking social capital</i>						
Neighborhood people have connections, OR	1.01	(0.90-1.12)	<b>1.24</b>	<b>(1.10-1.39)</b>	<b>1.17</b>	<b>(1.02-1.34)</b>
Get to know police, OR	0.89	(0.78-1.00)	0.93	(0.81-1.07)	0.90	(0.77-1.05)
Aware of neighborhood organization, OR	1.08	(0.97-1.22)	<b>1.18</b>	<b>(1.04-1.34)</b>	1.11	(0.96-1.29)
<i>Neighborhood norms and values</i>						
Feel responsible for neighborhood scale, coefficient	-0.07	(-0.32-0.17)	-0.04	(-0.31-0.23)	-0.13	(-0.45-0.18)
Neighborhood involvement scale, coefficient	-0.17	(-0.54-0.20)	-0.12	(-0.53-0.28)	-0.24	(-0.71-0.22)
Informal social control scale, coefficient	-0.26	(-0.60-0.07)	-0.09	(-0.46-0.27)	-0.22	(-0.65-0.21)
Collective efficacy, OR	1.08	(0.97-1.20)	1.07	(0.95-1.21)	1.08	(0.95-1.24)
Neighborhood influence, OR	1.07	(0.97-1.18)	1.11	(1.00-1.24)	<b>1.15</b>	<b>(1.01-1.31)</b>
Neighborhood satisfaction scale, coefficient	0.20	(-0.06-0.45)	0.13	(-0.14-0.41)	0.11	(-0.22-0.43)

*Note.* Coeff = Coefficient; OR = odds ratio; CI = confidence interval. Coefficients and odds ratios are adjusted for age, gender, race, marital status, number of children present in the household, home ownership, education, employment status, numbers of years lived in neighborhood, socioeconomic status, neighborhood stability, percent housing units owner occupied, percent vacant housing units and poverty rate. Coefficients for linear regression are interpreted as the individual outcome scale score changes associated with an increase in the percentage of residents participating in neighborhood activities increasing from 0 to 100%. Odds ratios for the logistic analysis are interpreted as the odds likelihood of a respondent agreeing with the outcome statement for every 10% increase in residents participating in neighborhood activities. **Boldface** indicates significant findings,  $P < .05$ .

Among uninvolved households (Table 5), there were no significant associations between neighborhood levels of participation in gardening/beautification and perceptions of social capital constructs. There were, however, significant positive associations

between neighborhood-level participation in neighborhood meetings and perceptions of two linking social capital outcomes (neighborhood people have connections and aware of neighborhood organization) for members of uninvolved households. Neighborhood rates of participation in both gardening and meetings was also associated with perceptions of two social capital constructs (neighborhood people have connections and neighborhood influence) among members of uninvolved households.

## DISCUSSION

The results of this study affirm the importance of individual and neighborhood rates of participation in neighborhood activities for the development of different types of social capital. Knowing how to generate social capital may be especially valuable for distressed urban neighborhoods, such as where this study was conducted, as they are more likely to have the needs of the community inadequately met and/or to experience neighborhood problems, such as crime and disorder. Having a household member participate in community gardening/beautification and/or neighborhood meetings was associated with more positive perceptions of bonding social capital, linking social capital, and the existence of positive neighborhood norms and values. Household participation in either gardening/beautification or in neighborhood meetings had generally the same level of association with perceptions of social capital, but participating in both types of neighborhood activities was a stronger predictor of bonding social capital, linking social capital, and feeling responsibility for the neighborhood.

Household participation measures had stronger associations with perceptions of social capital than did neighborhood-level participation measures. For members of households that were involved in one or more of these activities, in addition to the effect of their own household participation, having higher levels of participation in neighborhood activities was associated with their perceptions of linking social capital, feeling responsibility for and satisfaction with their neighborhood, and knowing their neighbors. For people from uninvolved households, only having more people attending neighborhood meetings (or both meetings and gardening) was associated with higher perceptions of linking social capital and neighborhood influence.

Although there are some variations with specific social capital constructs assessed, previous research supports our findings of an increase in social interactions due to community gardening (Glover, 2004, 2005; Saldivar-Tanaka, 2004; Schmelzkopf, 1996; Wakefield et al., 2007) and participation in neighborhood organizations, or community visioning or construction projects (Arai & Pedlar, 1997; Brisson & Usher, 2005; Ohmer & Beck, 2006; Semenza et al., 2007; Unger & Wandersman, 1982, 1983). In addition, there is research linking “green common spaces” with social capital constructs; the presence of vegetation in urban residential neighborhoods has been shown to increase use of outdoor public spaces by community members when compared to more barren locales (Coley, Kuo, & Sullivan, 1997; Kuo, Bacaicoa, & Sullivan, 1998; Taylor, Wiley, & Kuo, 1998). Kuo, Sullivan, and Coley (1998) found that higher levels of common space vegetation were closely associated with more social ties with neighbors, and this relationship was mediated by use of the green space.

There are several implications that can be drawn from this research. First, it speaks to the current debate on the communitarian and network views of social capital. Social interactions, networks, norms, values, and beliefs are characteristics of individuals and

only become characteristics of neighborhoods when enough residents share the same perceptions of the social structure. “Stocks” of social capital do vary between neighborhoods, but even among high social capital neighborhoods, there will likely not be uniformity among neighbors as to how well they know their neighbors and ascribe to common values and beliefs. Even if social capital is only operating at neighborhood or community levels, as the communitarian view proposes, most studies utilize individual-level responses to social capital questions aggregated at a neighborhood, state, or other community level. Therefore, it is important to investigate what influences individual-level social capital even within the communitarian context. As Gatrell, Popay, and Thomas (2004) have noted, “mere co-location in geographical space does not mean that individuals have near-identical stocks of social and material capital” (p. 255). Our study demonstrated that levels of participation in neighborhood activities can at least partially explain differences in social capital perceptions found among neighbors residing within the same neighborhood. The findings of this study also support the hypothesis that within neighborhoods in distressed cities, household experiences and networks are more important at influencing residents’ perceptions of social capital than what their neighbors are doing.

Another benefit of this study was the diversity of social capital measures available in our survey, which enabled us to unpack the various constructs that have been linked to social capital and investigate them separately. Current definitions of social capital make a distinction between bonding, bridging, and linking social capital (Szreter & Woolcock, 2004). We believe that researchers should investigate neighborhood norms and values separately as well. Differential measurement of these broad categories, as well as indicators within each category will enable further development of the concept of social capital and how it may be differentially generated in different contexts and among different people.

Finally, designers of community garden interventions intended to improve neighborhood social capital should be aware that social capital is likely built neighbor by neighbor through investments that individual residents make in spending time with their neighbors and improving their neighborhood. As this study shows, to influence many forms of social capital, the best approach may be to encourage neighbors to create and participate in neighborhood organizations in addition to gardening, beautification, and other neighborhood activities. The percentage of residents participating in a neighborhood meeting is likely a proxy for the level of functioning of the neighborhood organization, and it can be further proposed that a functioning neighborhood organization may be more likely to have spill-over effects on nonparticipants. Many block clubs in Flint, for example, collect contact information for every block resident, distribute flyers announcing meetings and events to every house in the neighborhood, and hold well-attended summer block parties that people who do not participate in meetings attend (Reischl, Alaimo, & Hutchison, 2002). These may be ways that nonparticipating residents become engaged. Neighborhood community gardens that do not have the support of a neighborhood organization may enhance their impact on the neighborhood by forming a block club or taking the time to engage neighbors in these types of activities.

There are several limitations to this study. The study occurred in one community (Flint, MI), and the results may not generalize to other communities. The data were collected by randomly calling households, which may not adequately represent the population of interest. Research on survey response rates have noted a steady decline in response rates for telephone surveys since the mid-1970s (Curtin, Presser, & Singer,

2005) due to increasing refusal rates and increasing numbers of noncontacts (i.e., “no answer” calls). Also, there is growing concern that more people (especially younger adults) are using cell phones exclusively, eliminating them from the sampling frame for telephone surveys using landline numbers (Tucker, Brick, & Meekins, 2007). This study attempted to correct potential sample bias by weighting the data to account for nonresponse, unequal selection probability, and age and gender differences, but this is not a perfect correction. The survey also relied on self-reports of key psychosocial constructs. All constructs were assessed using single-item measures or measures with only two to four items. The internal consistency indices were adequate, but did not indicate high rates of reliability. The appropriate cautions should be used when interpreting the final results.

Community development projects intended to promote the health benefits associated with social capital necessitate an understanding of how social interactions, relationships, values, and norms are developed and propagated at the neighborhood level. This research suggests that organizing neighborhoods for gardening and beautification can improve perceptions of social capital among those who participate, and that more people attending neighborhood meetings within a neighborhood improves the perceptions of linking social capital even among those who do not participate. For community garden and neighborhood beautification organizers, the implications of this may be that community gardening and beautification projects may have the most impact on social capital and related health outcomes when supported by an organizational structure such as a block club or neighborhood organization; attention to broad organizing of the neighborhood may be as valuable as creating beautiful, productive spaces.

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