COMMUNITY GARDENS AS INSTRUMENTS OF GROUP AND NEIGHBORHOOD COHESION: A MIXED METHODS CASE STUDY

by

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Abstract

A mixed methods case study, which investigated whether community gardens can foster a sense of community within its members and whether that engenders a deeper sense of community about the neighborhood. Using SEM-based path analysis on survey generated data, the hypothesis was tested that variables connected to cohesion and norms of healthy eating would influence a participant's neighborhood psychological sense of community (NPSOC). Though an SEM model containing both paths yielded mixed results, two smaller sub-models separately representing the two paths of cohesion and norms of healthy eating were both found to be well-fitting, affirming the research question. The qualitative data confirmed and offered additional insights into the quantitative data. Interviews confirmed gardeners had a sense of community in the garden and that it was associated with variables connected to cohesion. However, what was termed "outward signs of community" were also found to be influential on the sense of community. Examples of "outward signs of community" were evidence of plots being tended and other changes in the garden space performed in gardeners' absence. Interviews also revealed the power of the garden to increase NPSOC through "emblematic association"; that is, the garden was seen as an emblem or extension of the neighborhood.

Keywords: Neighborhood Cohesion, Community Gardens, Social Cohesion, Community and Urban Sociology, Organizational Sociology, Social Psychology, Social Capital

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INTRODUCTION

The American Community Garden Association estimates there are about 18,000 community gardens in the United States and Canada (ACGA 2016). A community garden is land that is gardened or cultivated by a group of people, using either individual plots or some type of shared plot system (CDC Community Gardens 2017; Marin Community Gardens 2017). Some community gardens focus on growing fruits; others primarily grow vegetables; others are dedicated to ornamentals; of course, many gardens grow a combination of these types (Marin Community Gardens 2017). Community gardens are often implemented or supported by non-profit or faith-based organizations, schools, hospitals, and local governments and are located in neighborhood, residential, or institutional locations (CDC Community Gardens 2017; Marin Community Gardens 2017).

However, community gardens are not just about gardening. Common goals of community gardens are the desire to encourage healthy eating habits and promote physical activity; neighborhood gardens in urban areas also seek to create green space and revitalize communities (CDC Community Gardens 2016). Community garden organizers seek to promote social interaction and create a sense of community (CDC Community Gardens 2016, LGC 2016). While more localized gardens within institutions focus on building community within the garden, neighborhood community gardens often seek to build community beyond the garden itself, hoping to foster a stronger sense of connection to the larger neighborhood in which the garden is situated. Focusing on these neighborhood community gardens, resulting questions include whether they actually foster a sense of community in participants and does this translate into a stronger sense of community about the neighborhood? If so, how does this occur?

A review of the existing literature on community gardens demonstrates that such questions have not yet been fully answered.

COMMUNITY GARDENS IN THE LITERATURE

Many previous studies in the literature addressed health issues, rather than the social aspects of community gardening. Health-related studies focused on fruit and vegetable consumption and tended to be more quantitative in focus. Most used established survey instruments, such as the Medical Outcomes Study Short Form Survey (SF-36 2016), National Health and Nutrition Examination Survey (NHANES 2016), and the Behavioral Risk Factor Surveillance System (BRFSS 2016). In these studies, the aggregated results of the chosen survey were then compared to similar populations that were not participating in the community gardens (van den Berg, van Winsum-Westra, de Vries, and van Dillen 2010; Alaimo, Packnett, Miles, and Kruger 2008; Blair, Giesecke, and Sherman 1991). While it was rare to use a qualitative approach to health, two case studies of gardens did, using focus groups and in-depth interviews to look at health benefits like nutrition and physical activity (Allen, Alaimo, Elam, and Perry 2008; Wakefield, Yeudall, Taron, Reynolds, and Skinner 2008)

Contrary to the health-related studies of community gardening, studies of the social aspects tended to rely on more qualitative techniques, using in-depth interviews and participant observation. While use of social theory tended to be absent in the quantitative/descriptive health-related studies, social theory was used in studies focusing on the social aspects of gardens. The dominant theory used for exploration of the qualitative data was social capital or the related concept of social cohesion (Wakefield et al. 2008; Allen et al. 2008; Glover 2004; Glover, Parry and Shinew 2005; Kingsley and Townsend 2006; Alaimo, Reischl, and Allen 2010; Firth, Maye and Pearson 2011; Teig, Amulya, Bardwell, Buchenau, Marshall, and Litt 2009).

However, studies dedicated to the social aspects of community gardening tended to focus on social effects within the garden and not on whether those effects somehow extended to the neighborhood. As previously stated, gardens often not only set out to "build community" in the garden, but within the neighborhood as well. Yet, of the studies focused on social features of community gardening, only two centered on the neighborhood aspect. In the first study, Alaimo et al. (2010) looked for a relationship between participating in community gardening and other neighborhood projects and the development of social capital. The study collected data via a survey and found that participation in community gardening had the strongest individual-level effect on resident's view of various types of social capital in the neighborhood.

In the other study, Firth, et al. (2011) looked at the connection between "community" in community gardens and benefits to the local communities. The study showed that community gardens help to build social capital and cohesion in a community. However, they noted that there is not agreement in the literature as to whether social processes in the garden benefit the neighborhood and if so, to what degree. They advocated for studies looking at whether the social processes of gardens extended to the neighborhood, particularly using a mixed methods approach, which they noted was lacking. This is the void this study sought to fill.

SITE OF STUDY

The site that was selected for the study was the Deep Ellum Urban Gardens (DUG) located in Dallas, Texas. DUG is an all-volunteer organization that provides a large gardening space for residents of the urban areas of Deep Ellum and Downtown Dallas. The DUG garden space exists in what was previously a large unused median space on the border of Deep Ellum and Downtown Dallas. It offers plot-based gardening, where garden members lease and tend to a plot provided for their individual use. The plots are a part of a raised bed system that has been

segmented into four-by-four sections for gardening, with built-in irrigation. A four-by-four plot could be leased by a member at the cost of $75 a year, and experienced gardeners could lease larger plots.

At the time of study, the garden had 63 registered gardeners, though plots were often shared with other members of the registered gardener's household. Demographic information was obtained from 43 of the registered gardeners (68.2 percent). Of those surveyed, the median age was 36 years old, with the majority of respondents being female (62.5 percent). The most reported race was white (89 percent). Filipino was the next most commonly reported race (4.4 percent), followed by Asian, Black, and Indian (India) with 2.2 percent each. The percentage of respondents who ethnically identified as Hispanic (Mexican American/Puerto Rican/Cuban/ Other) was 11.1 percent. The most frequently reported marital status was "never married" (44.7 percent). Of the 59.6 percent respondents who were not currently married, the majority of them did not live with a partner (64.3 percent). No one identified as being a part of a domestic union or partnership. Families of any size were unusual and the majority of respondents did not have any children (72.3 percent).

The majority of respondents had attained at least a bachelor's degree (93.5 percent), with 39.1 percent having a graduate degree. There was a tie for the most frequently selected household income range: the lowest most frequently reported household income range was "$80,000-$99,000" and the highest was "$150,000 or more." Together, these two income categories comprised 35.8 percent of the responses (17.9 percent each). Overall, 58.9 percent of respondents had a household income of $80,000 or more. Because the number of people per household was not collected, it is difficult to say whether any of the respondents were below the poverty line. However, it seems unlikely because the lowest household income range reported

was "$30,000-$34,999," which is more than twice the poverty level for a single person.

REASONS FOR SITE SELECTION

DUG was of interest because it had stated outcomes related to both health and community and its outcomes closely matched those identified by the Center for Disease Control (CDC Community Gardens 2016): “DUG’s mission is to grow food, health, knowledge, beauty, community” (DUG 2015). The community and social oriented aspects of DUG were not secondary or unintended, they were in fact central to the concept of the garden. DUG’s parent organization, the Deep Ellum Community Association, is more broadly focused on community in the neighborhood as a whole and their mission is to "protect and promote Deep Ellum as a diverse, urban, sustainable walking neighborhood…" (DECA 2015).

Ease of access was another factor in site selection. The researcher has ties with the DUG organization that extend back to its inception in 2011, and these ties helped to enable his research on the project. At the time of the research he served as the volunteer organizational ombudsperson, fostering social relations in the organization and neutrally and impartially intervening in conflict. As organizational ombudsperson, he was appointed by the garden committee, but was not a member of the committee and was independent of it and the leadership. The independence of an organizational ombudsmen is designed to enable him to critically evaluate the organization. The researcher’s independent position, his ties with the organization, and his experience with the surrounding neighborhood not only aided in research, it added an extra dimension of insight.

DATA GENERATION

The data for the study were generated and analyzed in a series of smaller projects. The data generation was designed in such a way that it could be used for a program evaluation, while

still allowing for later analysis that was geared towards a broader understanding of the social aspects of community gardening at a later date. Therefore, in addition to capturing data relevant to an evaluation, data were also captured relevant to cohesion in the garden and neighborhood.

Quantitative Data Generation

The quantitative data were generated using a garden-wide survey. Using a list provided by the gardening organization, all 63 gardeners were invited to take part in an electronic survey, which took approximately 20 minutes to complete. Of those contacted, 17 did not respond, two opted out, one was removed due to incomplete data, and two were removed because they lived outside of the neighborhood where the garden was located. Therefore, approximately 65 percent of the qualified registered gardeners responded (n=41).

The survey focused on several areas that were useful in evaluating the garden and also understanding social aspects of the garden and the neighborhood. Beyond the measures mentioned in this section, the survey contained questions related to a variety of other variables that were thought to be of future potential interest, later (see Appendix E). While introducing the measures used in this section, descriptive statistics related to each measure will be discussed. There were no significant differences found by gender and not enough data to consider differences by race.

Health-related measures. Like many community gardens, this community garden had specified health-related outcomes. Therefore, to quantify both diet and exercise, existing questions from the CDC's BRFSS survey (BRFSS 2016) were used. The data indicated that respondents consumed slightly more vegetables (0.72 cups more) and fruits (0.24 cups more) per day than other Texas residents. The number of respondents who met the CDC weekly aerobic recommendations exceeded the general Texas population by 13.1 percent. The number of

respondents meeting CDC strength activity exceeded Texas residents by 8.6 percent.

Cohesion-related measures. Based on a review of the literature, cohesion was identified as the formal concept connected to the more informal term "community." While the literature contains many definitions of cohesion, there is overlap between some of these definitions. Cohesion can be seen as "the total field of forces which act on members to remain in the group" (Festinger, Schachter, and Back 1950:164) or as "*the result* of the total field of forces…[emphasis mine]" (Festinger 1950:274). Friedkin (2004) notes that many theorists agree that cohesion is related to attraction to membership in a group and retention of members (Back 1951:9; McPherson & Smith-Lovin 2002). Along with attraction to membership, Friedkin described several other concepts linked to social cohesion: the group's ability to produce consensus and to act in a collective manner, as well as members' tendency to identify with the group and categorize themselves as part of it.

Several variables in the garden data could be seen as connected to cohesion. Group identification, which was measured using the ACGIS, has a long history in the social sciences and is connected to group cohesion (Friedkin 2004; Henry et al. 1999). The ACGIS uses a tripartite model of group identification, based on earlier work in the field—particularly that of Hinkle, Taylor, Fox-Cardamone, and Crook (1989). ACGIS emerged from Henry et al.'s work, which measured group identification using three dimensions: self-categorization (cognitive), interpersonal attraction (affective), and interdependence (behavioral). Friedkin also recognized these three dimensions as essential to cohesion. However, unlike the concept of cohesion, Henry et al.'s group identification is viewed as an individual level construct rather than a group level characteristic. Therefore, the ACGIS was designed as an individual level measure.

That being said, it is still of interest to note the median group identification score in the garden,

which, at a level of 33 (possible range of 6 to 42), could be described as strong (see Appendix E for scale questions).

A measure of network ties was also utilized, and network ties have been used as indicators of social capital and cohesion. Ties can be divided into three categories: strong, weak, and absent (Granovetter 1983; Friedkin 2004). Strong ties involve intimate relations like those found in primary groups such as close friends and family. Weak ties involve people generally regarded as acquaintances. Absent ties exist between people who would recognize each other's faces and would acknowledge one another, but would have little interaction otherwise. Weak ties relate to cohesion in larger networks where not everyone can be connected through strong ties. A simple measure of weak ties was used when generating the data by determining how many fellow gardeners a participant knew by first name.

Additionally, cohesion is connected to positive experiences and satisfying interaction within a group (Shaw 1983; Friedkin 2004). Since the garden provided a service to its members, satisfaction was measured using an abbreviated form of the American Customer Satisfaction Index (ACSI) by Fornell et al. (1996). With a median score of 25 (possible range of 3 to 30), the respondents could be described as having a strong level of satisfaction with their experience in the garden (see Appendix E for scale questions).

Finally, a participant's sense of community in the neighborhood was evaluated using an abbreviated form of the Neighborhood Cohesion Index or NCI (Buckner 1998). The NCI measures neighborhood cohesion at an aggregate level, while measuring a person's neighborhood psychological sense of community (NPSOC) at the individual level. Respondents displayed a strong neighborhood psychological sense of community, with the median score being 57 (possible range of 10 to 70, see Appendix E for scale questions).

Qualitative Data Generation

The qualitative data was generated in a separate phase from the quantitative. This paper will use the qualitative data to explain and further elaborate on the quantitative findings. Therefore, a description of the qualitative data and how it was generated will be saved until after the quantitative analysis.

HYPOTHESES

Based on the literature and the data captured, the fundamental research question that started to develop was whether a participant's sense of community in the garden affected their sense of community about the neighborhood, and if so, what might be the causal mechanism? The two basic mechanisms considered as potentially influencing a gardener's sense of community in the neighborhood were cohesion and norm conformity within the garden.

Because it was thought that social dynamics within the gardening group could affect a participant's NPSOC, two assertions were investigated. First, it was hypothesized that higher levels in the three variables connected to cohesion (group identification, garden satisfaction, and number of ties) would be associated with higher levels of a participant's NPSOC.

Next, it was hypothesized that gardeners who demonstrated stronger compliance with norms of healthy eating, by eating more fruits and vegetables, would better "fit in" with the group and therefore have increased levels of NPSOC as well. That there are norms of healthy eating in community gardens can be generally supported by the fact that community gardens tend to have stated outcomes related to that goal (CDC Community Gardens 2016). Additionally, this specific garden said that "growing health" was part of its mission (DUG 2015) and in the many observed social activities, members were heard spending much of their time talking about issues related to diet and health.

SELECTING A METHOD OF QUANTITATIVE ANALYSIS

To investigate the research hypotheses, a linear regression was originally proposed. The dependent variable that was selected was NPSOC. The independent variables were garden satisfaction, group identification, number of ties in the garden, and mean daily fruit and vegetable consumption. Unfortunately, once bivariate correlations were reviewed (Table 1), a simple regression was not possible, because the initial bivariate correlations demonstrated there was not a direct relationship between the dependent variable and each of the independent variables. That is not to say that the variables were unrelated; in fact, all the variables were related, but in a much more complex web of connections that included indirect relationships.

Table 1. Significant Bivariate Correlations (n=41, $p < 0.05$)

Variable 1	Variable 2	Pearson's r
Garden Satisfaction	Group Identification	0.430
Group Identification	Number of Ties in Garden	0.331
Daily Fruit Consumption	Daily Vegetable Consumption	0.578
Daily Vegetable Consumption	Number of Ties in Garden	0.344
Number of Ties in Garden	Neighborhood Psychological Sense of Community	0.438

Because the correlations demonstrated so many indirect relationships, the choice of technique to explore the conceptual model proposed moved from regression to path analysis. With path analysis, there were two basic options when hypothesizing causality: performing a linear regression for each hypothesized causal relationship or using structural equation modeling (SEM) to test the hypothesized causal relations along with overall model fit. While both approaches would yield path coefficients that indicate the strength of the relationships, the regression approach had some appeal with a sample size of 41, because this sample size is small and SEM is generally regarded as a large sample technique.

On the other hand, SEM would yield the same path coefficients as regression, while also actually being less complicated to perform with SPSS's AMOS, and would yield more information by providing overall model fit indices. Regardless of sample size, if model fit indices and parameter estimates in SEM "hold up," then it certainly suggests a proposed model has some merit. Even if the overall model fit could be questioned because of sample size, it seemed better to use a technique that includes model fit, rather than avoid it altogether.

Moreover, Kline (1998) pointed out that there is no hard-and-fast rule for sample size with SEM. Kline has said that while SEM is generally regarded as a large sample technique, the actual sample size needed is relative to the number of parameters in the model. Kline recommended somewhere between a 20:1 or 10:1 ratio between parameters and number of cases. However, Kenny (2015) noted that some analysts think even those ratios are high and Bentler & Chou (1987) indicated that a ratio of 5:1 is acceptable. Therefore, because a series of regressions would yield the same coefficients, but would be more complicated to execute, and less descriptive (no overall fit indices), the chosen method was path analysis using SEM.

INITIAL PATH MODEL

Using the pattern of bivariate correlations, the original research hypothesis, previously generated qualitative data, and relevant theories, an initial hypothesized path model was constructed (Figure 1). The top half of Figure 1 contains the variables concerned with cohesion (garden sense of community). The bottom half contains variables regarding fruit and vegetable consumption, which are connected to the idea of norms of healthy eating in the garden.

In the top of Figure 1, it is being proposed that members of the garden with higher levels of satisfaction would more strongly identify with the group, and therefore know more people in the group; this combined effect occurring within a neighborhood-sponsored project would lead to

a stronger NPSOC. While both the data of this project and the previously cited literature regarding cohesion supports the idea that satisfaction, identification, and ties should be related, the literature did not provide much guidance as to the hypothesized causal directions of the relationships in this scenario. The reasoning behind the proposed causal directions (indicated by single-headed arrows) is that it would be difficult to imagine members would strongly identify with a group with which they were dissatisfied, and a strong sense of satisfaction and identification with the group should lead to more ties within the group.

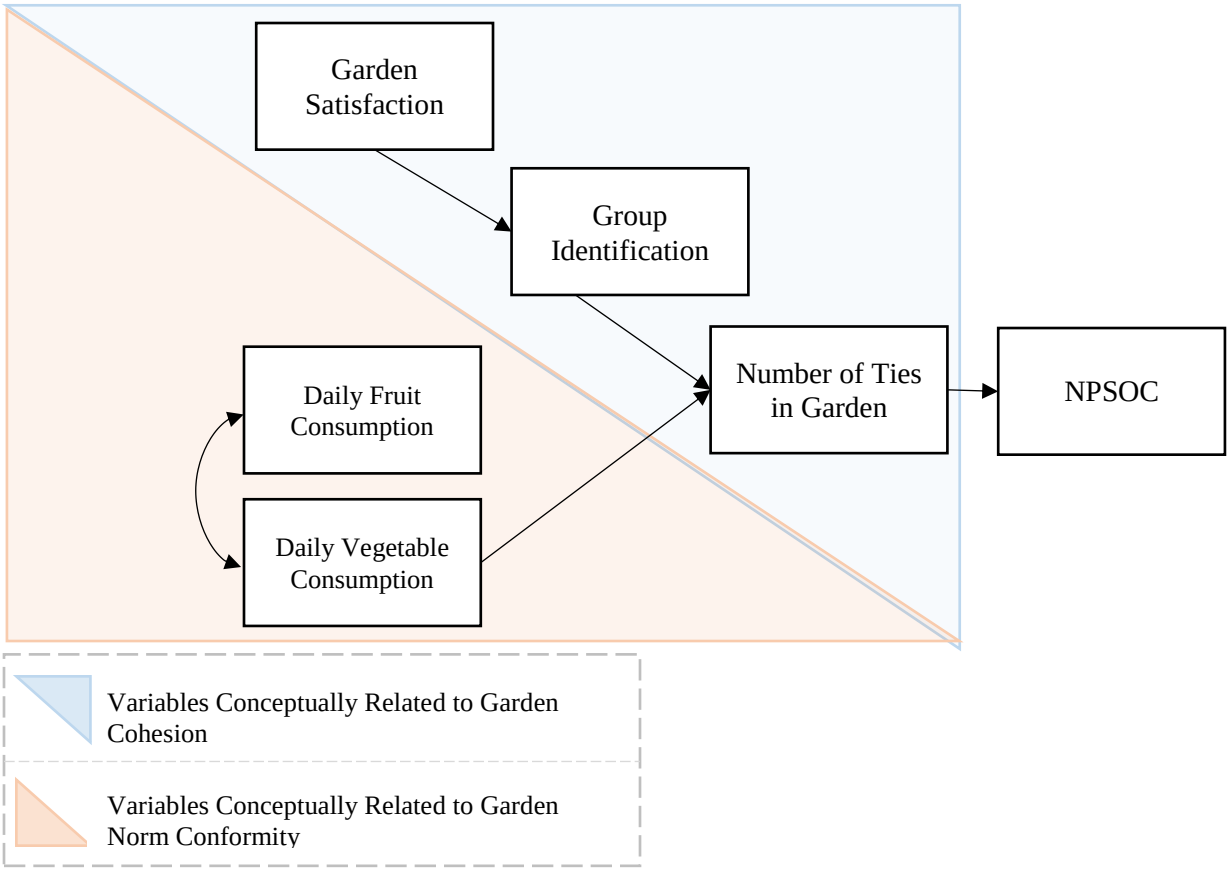

Figure 1. Initial Path Model

The bottom portion of Figure 1, relates to the norms of healthy eating in the garden. The idea is that members who eat more fruits and vegetables would likely “fit in” better with the

group and know more people, which is expected to lead to a stronger NPSOC in a neighborhood-sponsored project. (Double-headed arrows indicate covariance rather than causality.)

MODEL ANALYSIS

Selected Model Fit Indices

There are "literally hundreds of measures of fit" (Kenny 2015) available for SEM, which means the choice of potential fit indices had to be narrowed. Therefore, the indices selected to assess model fit and the rationale for choosing them will be discussed before the analysis of the model. The literature contains a lot of advice about which indices to use: Hooper et al. (2008), Kline (1998), Boomsma (2000), Hu and Bentler (1999)—just to name a few. However, after an extensive literature review, my inclination is towards Hooper et al.'s (2008) approach. Hooper et al. (2008) noted that the indices they have selected "have been found to be the most insensitive to sample size, model misspecification and parameter estimates" (p. 56), based on their extensive literature review.

Consequently, the following model fit indices have been selected: chi-square; Root Mean Square Error Approximation (RMSEA) with its confidence interval (CI) and PCLOSE value; Standardized Root Mean Square Residual (SRMR); Comparative Fit Index (CFI); Parsimony Comparative Fit Index (PCFI). Hoelter's Critical N (CN) will be added to the list, because it is a rough measure of whether the sample size is adequate for the chi-square measure of the model. Hooper et al's (2008) selection closely matches my review of the SEM literature (Appendix A and B). This selection of indices also offers broad coverage of the categories of indices (absolute, relative, and parsimony) and balances the use of more "classic" or "traditional" measures with more recent ones.

The one caveat would be regarding RMSEA (with CI and PCLOSE). RMSEA tends to

more actively reject models with a small sample size (Chen et al. 2008, Hu and Bentler 1999, Kenny, Kaniskan, and McCoach 2015) and models with few degrees of freedom (Chen et al. 2008, Kenny et al. 2015). In fact, Kenny et al. (2015) say RMSEA should not be calculated at all in small sample size/few degrees of freedom scenarios. Yet, RMSEA has become one of the most popular indices to report (Byrne 2001; Diamantopoulos and Siguaw 2000:85) and there is concern that readers might find it suspect if omitted. Should RMSEA yield any inconsistencies, another absolute fit index, such as the Adjusted Goodness of Fit Index (AGFI) will be examined. For a general overview of model fit indices (even ones not included), see Appendix A. For a more detailed discussion of the indices selected for this paper and inclusion rationale, see Appendix B.

Initial Model Analysis Results

The initial model was analyzed using SPSS AMOS (version 23). The sample size for the model was 41 with 13 model parameters reported by AMOS. Table 2 displays chi-square for the model as 19.924 with 15 degrees of freedom (df). The significance is greater than 0.05, indicating it might be possible to reject the idea that no model is better than the hypothesized model, suggesting the initial model might be well-fitting. However, chi-square is sensitive to sample size, and more frequently accepts inadequate SEM models in smaller sample sizes. Moreover, Table 2 also demonstrates that Hoelter's CN is less than 200, which would suggest that the sample size is too small to trust the value of chi-square (Hoelter 1983). Collectively, the rest of the model fit indices are either ambiguous or suggest that the initial model is not well-fitting. For a more detailed interpretation of the initial model fit indices, see Appendix F.

Table 2. Initial Model's Chi Squared Related Values

Chi-square	Degrees of Freedom	Significance	Hoelter's Critical N
19.924	15	0.175	51

Table 3. Initial Model's Root Mean Square Error Approximation Values

RMSEA	CI Low	CI High	PCLOSE
0.091	< 0.001	0.186	0.256

Table 4. Initial Model's Other Fit Indices

Fit Index	Value
Standardized Root Mean Square Residual (SRMR)	0.096
Comparative Fit Index (CFI)	0.891
Parsimony Comparative Fit Index (PCFI)	0.637

Based on the fit indices for the initial model, either the model truly does not fit or the sample size of 41 with 15 df is not adequate to establish model fit. As it was pointed out earlier, there are no absolute rules about sample size with SEM and exceptions to the sample size rules of thumb can be found. However, presently, the way the model is specified, with its sample size to parameter ratio of about 3:1, it is well beyond the limits of even the most generously proposed acceptable ratio of 5:1.

Model Trimming

Because the sample size to model parameter ratio is so low, trimming the model will increase the ratio. While AMOS modification indices are one place to start, it might be wise to look at path estimates first and identify weaker relationships. Looking at Table 5, two listed relationships are not statistically significant: the relationship between group identification and number of ties in the garden as well as the relationship between daily vegetable consumption and number of ties in the garden. These posited connections make a reasonable place to begin trimming that is also conceptually meaningful. In the initial model presented in Figure 1, the relationships now appearing as nonsignificant divide the model into two sections: variables connected to the concept of cohesion and variables connected to the concept of norm conformity. Figures 2 and 3 show two proposed splits that can be tested.

Table 5. Initial Model's Path Coefficients

Variable 1	Causal Direction	Variable 2	Standard. Coefficient	Coefficient	Std. Error	Sig.	R Sq.
Garden Satisfaction	---->	Group Identification	0.430	9.290	3.080	0.003*	0.185
Group Identification	---->	Number of Ties in Garden	0.260	0.053	0.030	0.075	0.146
Daily Fruit Consumption	<--->	Daily Vegetable Consumption	0.577	0.115	0.035	0.001*	--
Daily Vegetable Consumption	---->	Number of Ties in Garden	0.279	0.340	0.178	0.056	0.146
Number of Ties in Garden	---->	NPSOC	0.431	6.363	2.104	0.002*	0.186

* Indicates significant correlations.
Note: "<--->" does not indicate a reciprocal effect; rather indicates covariance, as opposed to a hypothesized causal relation

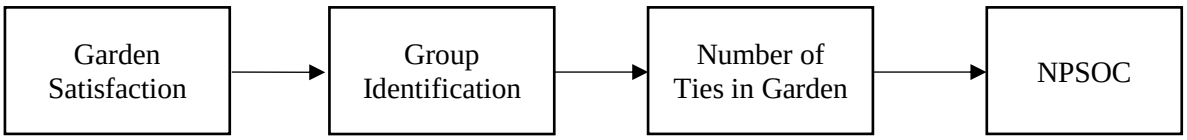

Figure 2. Sub-Model Based on Variables Conceptually Connected to Garden Cohesion

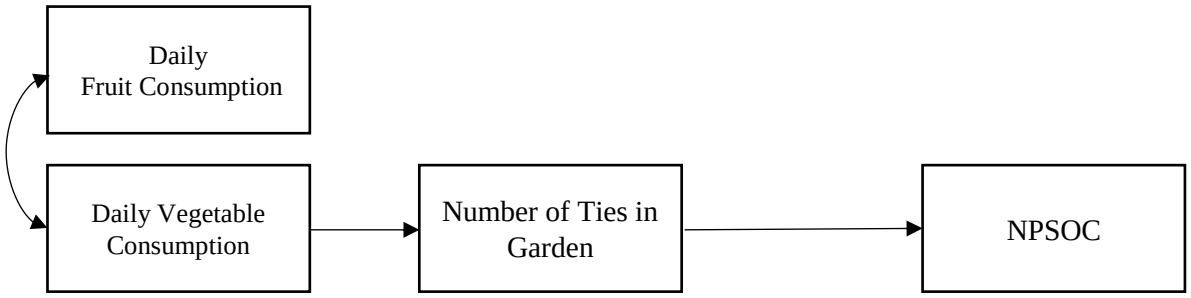

Figure 3. Sub-Model Based on Variable Conceptually Connected to Garden Norm Conformity

Cohesion Sub-Model Analysis Results

The sample size for the model was 41 with seven model parameters specified (five variables with three error terms), which yielded an almost 6:1 ratio between sample size and parameters. Table 6 displays chi-square for the model as 0.874 with 3 degrees of freedom (df). The significance value of 0.832 is greater than 0.05, indicating it might be possible to reject the idea that no model is better than the specified model, suggesting the specified model might be well-fitting. However, since chi-square is sensitive to sample size, and more frequently accepts inadequate models in smaller sample sizes, Hoelter's CN was checked. The value for Hoelter's

CN was 358 which exceeds 200, suggesting that the sample size is adequate for chi-square to be accurate (Hoelter 1983).

Table 6. Cohesion Sub-Model's Chi Squared Related Values

Chi-square	**Degrees** of Freedom	**Significance**	**Hoelter's Critical N**
0.874	3	0.832	358

Table 7. Cohesion Sub-Model's Root Mean Square Error Approximation Values

RMSEA	**CI Low**	**CI High**	**PCLOSE**
< 0.001	< 0.001	0.155	0.851

Table 8. Cohesion Sub-Model's Other Fit Indices

Fit Index	**Value**
Standardized Root Mean Square Residual (SRMR)	0.030
Comparative Fit Index (CFI)	1.000
Parsimony Comparative Fit Index (PCFI)	0.500

In Table 7, RMSEA was specified as < 0.001, which surpasses even the most stringent recommendations of < 0.05, suggesting the possibility of a well-fitting model. However, the RMSEA 90 percent confidence interval (CI) is rather wide. The low end of the CI being reported as 0, while the high end was 0.155, which means that in ninety out of one hundred samples, the point estimate would be between 0 and 0.155; that is, it could either be extremely significant or nonsignificant. That being said, the PCLOSE value of 0.851 is greater than 0.05, which indicates that the RMSEA is likely less than 0.05 (Kenny 2015). Here once again, the value of the RMSEA point estimate, taken with the CI range and the PCLOSE value becomes difficult to interpret meaningfully. However, while RMSEA values for the original model were ambiguous, but leaning towards rejection, these RMSEA values are ambiguously leaning towards acceptance.

In Table 8, the remaining fit indices are displayed. The reported value of SRMR was 0.030, which is less than even the strictest limit of 0.05, which could indicate a good fit. The next index in the table is the CFI and the reported value was 1.0, which could be interpreted as a perfect fit.

At first glance, this value seems suspicious because perfection is always suspicious. However, the CFI is a normed index whose value can technically exceed 1.0, but any value over 1.0 is always rounded-down (Kenny 2015). This rounding was confirmed by consulting the similar TLI (Trucker-Lewis Index), which is a non-normed index and revealed a value of 1.262 (not displayed). For additional confirmation, the NFI value (on which the CFI is based) was checked, revealing 0.961. The value of PCFI was reported at 0.50, which demonstrates the penalty that this parsimony index places on the CFI based on degrees of freedom. As previously noted, this value might seem low, but parsimony fit indices can hover near the 0.50's, with other fit indices in the 0.90's.

When considered together, the reported fit indices seem to indicate a well-fitting model especially when you consider the sample size and few degrees of freedom. Chi-square is acceptable and Hoelter's CN suggests that the sample size is large enough to trust chi-square. While RMSEA remained somewhat ambiguous because of the wide CI, the point estimate of less than 0.05 and PCLOSE value lean toward confirming model fit. The value of the RMSR strongly suggests a well-fitting model, because RMSR tends to more actively reject models with a smaller sample size and fewer degrees of freedom. The NFI and TLI back the report of a strong fit from CFI —which is particularly meaningful because the NFI also tends to reject models with a small sample size (Hooper et al. 2008). Although the AGFI is not listed in any table, it will be reported just as an extra confirmation of possibly conflicted RMSEA values: the AGFI is 0.965, which once again suggests model fit (> 0.95).

Cohesion Sub-Model's Path Coefficients

Table 9 shows that all paths in the model were significant ($p < 0.05$). The effect of a participant's satisfaction with the garden on their identification with the group was significant at 0.003 and moderately strong at 0.430, with a participant's satisfaction explaining 18.5 percent of

the variation in their identification with the group. The effect of a participant's identification with the group on the number of ties they had with other gardeners was significant at 0.027 and moderately strong at 0.331, with a participant's identification with the group explaining 10.9 percent of the variation in the number of ties they had with other members of the garden. Finally, the effect of a participant's number of ties on the participant's NPSOC score was significant at 0.002 and moderately strong at 0.438, with a participant's number of ties explaining 19.2 percent of the variation in the score indicating the participant's NPSOC.

Table 9. Cohesion Sub-Model's Path Coefficients

Variable 1	Causal Direction	Variable 2	Standard. Coefficient	Coefficient	Std. Error	Sig.	R Sq.
Garden Satisfaction	---->	Group Identification	0.430	9.290	3.080	0.003*	0.185
Group Identification	---->	Number of Ties in Garden	0.331	0.068	0.031	0.027*	0.109
Number of Ties in Garden	---->	NPSOC	0.438	6.363	2.063	0.002*	0.192

* Indicates significant correlations.

The scores indicating garden satisfaction and values for number of gardener ties were transformed using the natural log for the sake of multivariate normality (an assumption of regression and SEM); consequently, slopes displayed in Table 9 are not useful in predicting changes in the outcome variables. However, prior to transformation, the relationships appeared to be linear; therefore, the slopes corrected by the inverse operation of the natural log will be used.

How these slopes would be interpreted would depend on whether the transformed variable was the predictor or outcome (Yang 2012). In "garden satisfaction → group identification", because garden satisfaction was the predictor and was transformed (corrected slope of 0.092), it means that for every percentage increase in a participant's score on satisfaction, a 0.092-point increase would be predicted for their scores on group identification. However, in "group identification → number of ties," since the outcome variable was transformed (corrected slope of

0.070) the interpretation would be for every one-point increase in a participant's score of group identification, a 7.037 percent increase would be predicted in the number of ties they had with other gardeners. Finally, in the relationship "number of ties → NPSOC," since the predictor variable was transformed (corrected slope of 0.063), it would indicate that for each percentage increase in a participant's number of ties, a 0.063-point increase would be predicted for the scores of their NPSOC. See Appendix C for details of how log transformed variables were handled.

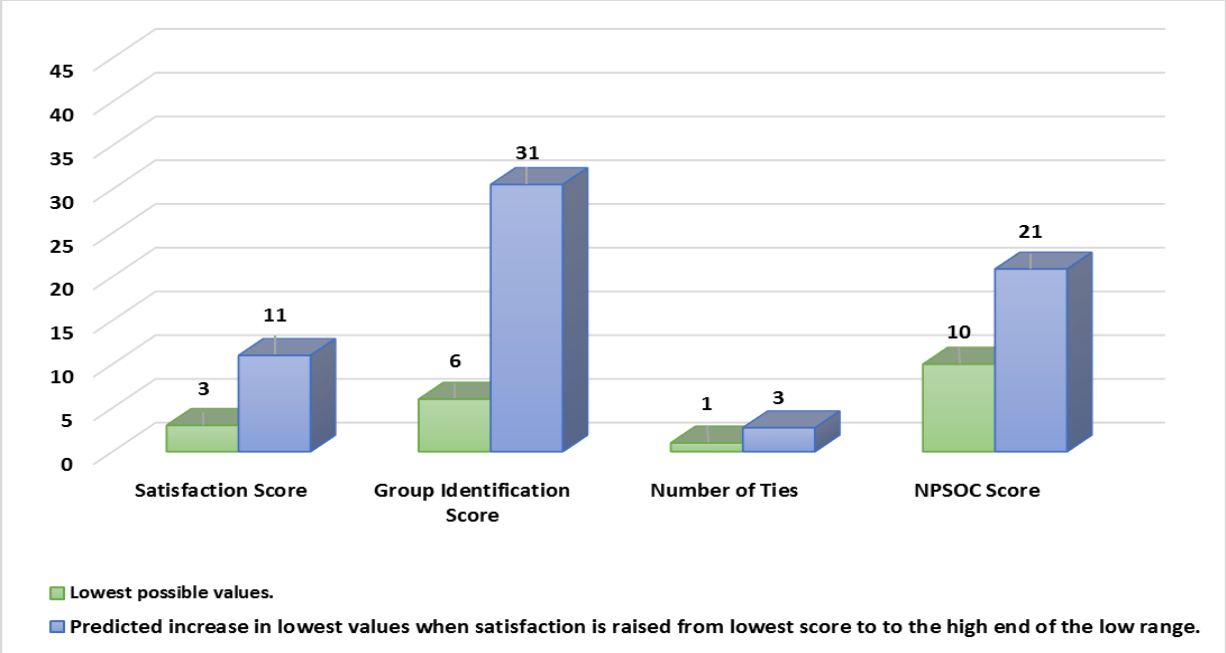

Figure 4. Increase in Lowest Values When Satisfaction is Raised to the Upper End of Low Range

Figure 4 uses hypothetical example data to demonstrate the impact this chain of variables would have on each other. For instance, suppose a gardener had the lowest possible values on each of the variables related to cohesion (green columns in Figure 4), including the lowest possible satisfaction score (3 out of 30). If their satisfaction score could be raised by eight points--to the high end of the low range—that would increase their group identification score by 25 points, which would triple their number of ties in the garden, and more than double their NPSOC score (blue columns in Figure 4).

Norm Conformity Sub-Model Analysis Results

Moving from the cohesion sub-model, the norm conformity sub-model was analyzed next. The sample size for the model was 41 with nine model parameters specified, which included the endogenous observed variables' error terms with constraints. The ratio between sample size and parameters was nearly 5:1. Table 10 displays chi-square for the model as 1.702 with six degrees of freedom (df). The significance value of 0.945 is greater than 0.05, indicating it might be possible to reject the idea that no model is better than the specified model, suggesting the specified model could be well-fitting. However, since chi-square is sensitive to sample size, and more frequently accepts inadequate models in smaller sample sizes, Hoelter's CN was checked. The value for Hoelter's CN was 296 which exceeds 200, suggesting that the sample size is adequate for chi-square to be accurate (Hoelter 1983).

Table 10. Norm Conformity Sub-Model's Chi-Square Related Values

Chi-square	Degrees of Freedom	Significance	Hoelter's Critical N
1.702	6	0.945	296

Table 11. Norm Conformity Sub-Model's Root Mean Square Error Approximation Values

RMSEA	CI Low	CI High	PCLOSE
< 0.001	0.00	0.032	0.957

Table 12. Norm Conformity Sub-Model's Other Fit Indices

Fit Index	Value
Standardized Root Mean Square Residual	0.064
Comparative Fit Index	1.000
Parsimony Comparative Fit Index	0.600

In Table 11, RMSEA was specified as < 0.001, which surpasses even the most stringent recommendations of < 0.05, suggesting the possibility of a well-fitting model. The 90 percent CI for RMSEA is between 0 and 0.032, which is narrow with the upper bound still being below 0.05. Therefore, in ninety out of one hundred samples, the point estimate would be between 0 and 0.032,

which means the RMSEA point estimate would always be below the suggested 0.05 cutoff. Consequently, both the point estimate and CI suggests this is a well-fitting model. The PCLOSE value of 0.957 is greater than 0.05, which indicates that the RMSEA is likely less than 0.05. The value for PCLOSE further supports the RMSEA and CI in suggesting this is a well-fitting model.

In Table 12, the remaining fit indices are displayed. The reported value of SRMR was 0.064, which is greater than the 0.05 limit often recommended, but still within the 0.08 limit for which Hu and Bentler (1999) advocate. The next index in the table is the CFI and the reported value was 1.0, which could be interpreted as a perfect fit (but, actually is not). As previously mentioned, while a "perfect" value may seem suspicious, the CFI is a normed index whose value can technically exceed 1.0, but then is always rounded to 1.0. The related TLI value of 1.265 demonstrates that the original CFI was likely rounded. The NFI value (on which the CFI is based) revealed a 0.961, further reassuring the initial CFI value of 1.0 was not an anomaly. The value of PCFI was 0.600, which demonstrates the penalty that this parsimony index places on the CFI based on degrees of freedom. This value is not ominous since other indices suggest a well-fitting model.

Taken as a whole, the fit indices seem to indicate a well-fitting model, especially when the sample size and low degrees of freedom are considered. Chi-square is acceptable and Hoelter's CN suggests that the sample size is large enough to trust chi-square. The value of the RMSEA, with the associated CI and PCLOSE, clearly supports the idea of a well-fitting model. The value of the RMSR exceeds one of the commonly suggested cutoffs, but is within the range of the more lenient cutoff. Because the RMSR is less than ideal, it could be construed as ambiguous, but it helps to remember that the RMSR tends to more actively reject models with a smaller sample size and fewer degrees of freedom. The NFI and TLI back the report of a strong fit from CFI —which again is particularly meaningful, because the NFI tends to reject models with a small sample size.

Although the AGFI is not listed, it will be reported because of the weaker score on RMSR, since both are absolute fit indices. The AGFI value is 0.958, which again suggests model fit (> 0.95).

Norm Conformity Sub-Model's Path Coefficients

Table 13 shows that all paths in the model were significant ($p < 0.05$). The relationship between daily fruit consumption and daily vegetable consumption was expressed in terms of covariance and was significant at 0.001 and was moderate (nearing the border of strong) at 0.577. The point of showing these relationships is to help support the idea that there are norms of healthy eating and exercise in the garden. Correlations, rather than regressions, were used because there is simply not enough data to support a hypothesis about whether diet predicts exercise or vice versa.

Table 13. Norm Conformity Sub-Model's Path Coefficients

Variable 1	Causal Direction	Variable 2	Standard. Coefficient	Coefficient	Std. Error	Sig.	R Sq.
Daily Fruit Consumption	<--->	Daily Vegetable Consumption	0.577	0.050	0.015	0.001*	--
Daily Vegetable Consumption	---->	Number of Ties in Garden	0.344	0.428	0.185	0.020*	0.118
Number of Ties in Garden	---->	NPSOC	0.438	6.363	2.063	0.002*	0.192

* Indicates significant correlations.

Note: "<--->" does not indicate a reciprocal effect; rather indicates covariance, as opposed to a hypothesized causal relation.

The effect of the amount of vegetables consumed per day on a participant's number of ties they had with other gardeners was significant at 0.020 and moderately strong at 0.344, with a participant's number of vegetables consumed daily explaining 11.8 percent of the variation in the number of ties they had with other members of the garden. The coefficients between ties and NPSOC remain the same as the previous model.

The values indicating the number of vegetables consumed and number of gardener ties were transformed using the natural log for the sake of multivariate normality (an assumption of regression and SEM); consequently, the slope displayed in Table 13 is not useful in predicting

changes in the outcome variable. However, prior to transformation the relationship appeared to be linear; therefore, the slope corrected by the inverse operation of the natural log will be used. Because both the predictor and outcome variable were transformed, the prediction (using the corrected slope of 0.004) would be every percentage increase in vegetables consumed per day would increase the number of ties by 0.427 percent.

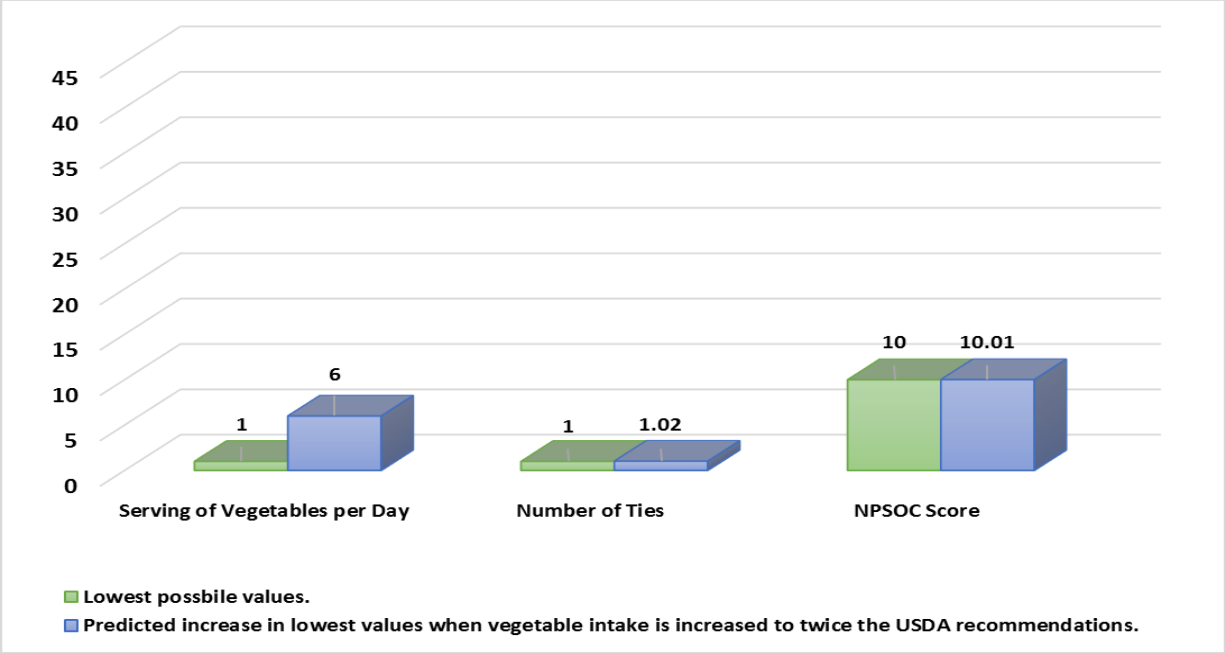

Figure 5. Increase in Lowest Values When Vegetable Intake is Increased to Twice USDA Recommendations

Figure 5 uses hypothetical example data to demonstrate the impact this chain of variables would have on each other. For instance, suppose a gardener had the lowest possible values on each of the measured variables (green columns in Figure 5), including eating the bare amount of vegetables (one serving per day). If that gardener's vegetable intake was increased to twice the USDA recommendations of six servings a day, it would negligibly increase their number of ties by 2 percent of a person, which would negligibly increase their NPSOC score by one percent of a point (blue columns in Figure 5). In other words, it would be near futile to try to increase NPSOC through focusing on compliance to norms of healthy eating.

QUALITATIVE DATA: WHAT THE GARDENERS SAY

The qualitative data was focused more on the social aspects of the garden and neighborhood and used an inductive approach. In other words, the interview guide asked general questions about a participant's sense of community in the garden and neighborhood, without any driving theory and avoided eliciting specific responses related to the quantitative survey. The desire was to capture individual views and attitudes regarding community, the garden, and the neighborhood, without forcing preconceived notions on participants.

Six participants were interviewed, with the shortest interview around 30 minutes and the longest interview just over an hour-and-a-half. The interview guide consisted of 11 questions, over six topics related to community, the neighborhood, and gardening (Appendix D). A list of eligible participants was generated from a list of registered gardeners provided by the gardening organization. A person was eligible if they were 18 or older, currently had a plot to which they tended, had participated in the garden for one full growing season, lived in one of the contiguous residential areas, and had never served as a member of the garden's administrative committee.

Once ineligible people were removed, the list was randomized using a free service provided by Random.org. The use of randomization was not an attempt to create a representative sample, but an effort to offset the researcher's familiarity with the gardening organization. The desire was to avoid the tendency or perception of selecting participants that might reinforce any pre-conceived point of view of the researcher. Of the six interviews, there is the possibility that the researcher had previously met one participant briefly, but there was not a single participant that the researcher knew by first name. All interview participants were assigned pseudonyms to help preserve anonymity and maintain confidentiality.

Though interview participants were not asked to speak to the concepts or hypotheses in

the quantitative portion of the study, much of what they said fits well with the quantitative findings. Additionally, their words offer a unique light on details about the sense of community in the garden and neighborhood that survey questions could not capture. When analyzing the interview data, the focus was once again on understanding whether community gardens foster a sense of community within the garden and does this translate into a stronger sense of community about the neighborhood? If so, how does this occur?

When talking about social aspects of the garden and neighborhood with interview participants, the everyday idea of "community" was discussed rather than abstract terms, such as cohesion, identification, ties, and norms. While the term "community" somewhat lacks specificity, based on the participants' responses it is related to the more formal terms and was perceived as an important aspect of the garden. As an example of how much importance and consideration the concept "community" had in this garden, the mission statement explicitly identified "community" as one of its primary goals. The garden's mission was to "GROW: food, health, knowledge, beauty, community" (DUG 2015).

One of the garden leaders, Cathy, spoke about the importance of community in the garden. Cathy is a former schoolteacher, in her early thirties and married to her high school sweetheart, and she has spent countless hours involved with community organizations in the neighborhood for almost a decade. She not only was an active leader on the community garden project, she was a member of the committee for the garden's parent neighborhood organization, while also being a full-time mother to her five-year-old daughter. In Cathy's words, "the garden is more about building community through gardening, rather than the emphasis being on gardening."

Community Abstractly Defined

The gardeners who were interviewed were asked about what the word "community" meant to them and they each expressed somewhat differing, yet overlapping, sentiments about it. Gretchen, a working professional who moved to a downtown high-rise apartment with her husband, after her two children went off to college, simply described "community" as when "you feel like you belong to something that is important." While the basic ideas of belonging and importance may seem simplistic, that theme was echoed in other participants' descriptions too.

Helen previously lived in Los Angeles and had since moved with her boyfriend and toddler son into a high-rise located west of the garden. She spoke about the concept of community as "coming together…and having a passion." Karrie characterized this sense of "importance" or "passion" as "pride." Karrie, who was in her early thirties, moved from the mid-cities and lives and works in the downtown area near the garden. She said community was about "a sense of pride in a group of people…that were comfortable with each other." In these general descriptions of the concept of "community," it is easy to see the ideas of belonging, identification, and attraction to membership that are often described in the cohesion literature.

Community in the Garden

As participants described community in an abstract way, they tended to eventually shift their description of community towards the garden. After talking about her idea regarding passion being important in community, Helen extended that to the garden by saying "Everybody in that garden has to have passion—like, true passion—especially, the people that started it. You know, 'cause it was kind of an uphill battle. So, there is probably a lot of pride." In the last word of her statement, Helen moved from "passion" to "pride," echoing Karrie's previous words on community.

Gretchen extended her notion that a sense of importance was necessary to community by saying the garden was a place where you "…have this spot, that you can say I'm a member of this thing, that is important. It's important because its green, it's important because, not only do we grow and nurture ourselves, we supply a multitude of other things." With the words "nurture" and "supply," Gretchen seems to be saying that what is important in the garden (and community) is that you show care or contribute somehow.

Theresa was in her late twenties and working on completing a master's degree. She lived with her boyfriend just outside of the main neighborhood and talked about "enriching the area." Her words seem to tie into this concept of contribution: "You know like with the garden…I don't know what the stated purpose of the garden is, to me it seems like multiple purposes, but to have a group of people involved in enriching the area's physical surroundings."

What seems to emerge in these descriptions of working together to build, create, or improve something is the notion of collective work, which is interesting, but unexpected. Although much of the literature about cohesion focuses on the concept of collective work, it was not expected to be a feature of this garden because of the use of individual plots rather than community plots.

Outward Signs of Community

However, collective work in this garden does seem to be more socially detached; that is, there appears to be almost "a sense of collective work" rather than people actually frequently working together. In the descriptions offered so far, it can be seen that there was not much discussion of actual people, but more about improving the environment.

When Gretchen was asked how she knew she was part of a community in the garden, she said "by the way they [other gardeners] take care of plots. You know what I mean? It's like uh,

it's just the little things." Karrie echoed this sentiment about the plots, and elaborated:

> I guess it is when I am in the garden and I see, you know, all of these plots around me with different things being grown, and I can see how the vegetables develop over the season. I know that people are coming in and doing what they need to do, and I guess it is just the physical garden itself. I am not seeing the people, but I am seeing the results of their actions.

These statements seem to indicate an awareness of community through what I call "outward signs of community," which is the "residue" of the work of other individuals, without direct interaction with those individuals.

Lamenting the Lack of Social Interaction

There seemed to be a general awareness of this dearth of daily social interaction. Though every participant interviewed talked at length about the importance of the garden and their satisfaction with it, they nevertheless lamented the lack of interaction and longed for more.

Theresa summed this sentiment up best when she said: "I guess I have been somewhat disappointed…it's not like the very first season we started…uhmm, I saw more people in the garden…tending their gardens. I guess it felt more like a group or a community." Helen also indicated she rarely saw people in the garden when she tended her plot: "It's pretty quiet…Maybe a few here and there, but it's pretty quiet." Theresa said that she saw people in the garden "Occasionally, maybe once a week. Uhmm, yeah, maybe once a week." When asked why they thought there was so little interaction in the garden, Helen and Karrie seemed to both agree that it was often just a matter of everyone having their own plots, with different schedules.

The Nature of the Interaction, not Necessarily the Amount

Karrie goes on to acknowledge that there is not a complete lack of social interaction. She said, "...more people come in every season. And people show up at the work days." It seems that the lack of social interaction was largely in the daily activities of caring for plots, but in other

garden activities there was contact with other gardeners. “You see people show up for the meetings and workdays,” said Helen.

As a participant observer, I can attest that there was social activity within the gardening community, even if people were sparse in the daily activities of the garden. Both in the spring and fall, the garden had one or two workdays where a majority of the plot owners came to work together in the garden performing repair and maintenance of the areas outside their plot. Typically, there is also a garden-wide potluck that occurred once in the spring and fall. Also, there were monthly committee meetings for committee members, which were also open to non-committee members. Additionally, there was a planned monthly social gathering that took place at local restaurants, with about a half-dozen to dozen members generally attending. So, social interaction occurred, just not so much on a daily basis.

A Little Bit Goes a Long Way

What is amazing is the impact that even a minimal amount of social interaction had on the gardeners who experienced it. Theresa’s first experience in helping build the garden with other gardeners sounded pretty powerful, “I felt like a group or a community. Like ‘we're in this together!’ like ‘we're making *our* garden!’" Gretchen described her connection with other people in the garden as being like:

> a member of a sorority—only with a higher purpose…you go out [in the neighborhood] and you’re hanging out and, “I saw you at the garden!” and “Oh, you're a member!” Like you got this in common and you live here and you got that. It’s a connector—uhmm, with a purpose.”

Gary, was in his forties and lived in the main neighborhood. He was planning to open a new business in the neighborhood and--like Gretchen—experienced the power of the garden to build ties with other people in the neighborhood. He said, “the garden allowed me to really start connecting the dots. And, I felt like it is easier to talk to people because of the garden.”

Later, he continued:

> now we are seeing more and more people walking [in the neighborhood]; and now I am actually seeing people on the street. But, it was interesting. If I hadn't had a plot in the community garden, I wouldn't have connected the dots or vice versa. So, I think that the purpose and what plays in the community garden is a reason for people to come together. And, thus, because they come together, a community naturally forms that might not.

Beyond Ties: "Emblematic Association"

Yet it was not just through ties that the garden seemed to improve the sense of neighborhood community. Gardeners saw the garden as a proxy or emblem of the neighborhood. Theresa introduces this idea by saying, "I feel there is like a battle to be won in the neighborhood and like being a part of the garden and contributing to the garden--it feels like there's something to fight for." Gretchen further drives home the concept I have termed "emblematic association" between the garden and the neighborhood:

> …[being a part of the garden] is sort of like a bumper sticker on your car…bumper stickers are ways of people shouting out at other people about what they think, about what they believe in, or what they are mad at. And that is what I feel like being a member of the urban garden is, it's your little bumper sticker, I belong to the community garden…it's just that little thing that says I'm a part of my community, that I care about my community.

Theresa points out that the "emblematic association" between the community garden and a broader community in the neighborhood might extend beyond those who participate in the garden:

> I like the murals. the log [benches], and I like driving by and seeing things growing out of the planters...so many people—even though I was just there watering my plants—would go they would drive by and roll down the window…and say "what is this?" I'm like "oh, this is the community garden" and they would be like "oh that's really cool."

So, even people outside the garden were showing up and taking notice of it, and perhaps getting a sense of the community that underlies the neighborhood through seeing it.

Additionally, this "emblematic association" not only seemed to increase the neighborhood psychological sense of community for participants, it also seemed to have the potential to inspire members to participate more in the neighborhood, as Karrie pointed out:

> …being a part of the garden would make me more apt to be involved with something else in this area as far as, if there was any community effort like if there was a cleanup or something, or if someone wanted to organize another art show…I would be more apt to be involved since I am involved with the garden…. It is just going back to that community thing. I am already helping with the garden, so I feel like it would be a good thing to help with the bigger neighborhood if there would be something that was needed.

Being involved in the garden is emblematic of being involved in the neighborhood and creates interest in further participating in the neighborhood through a completely different avenue, apart from increasing ties in the neighborhood.

LIMITATIONS OF STUDY

This study had several limitations. This was a case study of a single community garden, in a particular neighborhood; therefore, the findings cannot necessarily be generalized to other community gardens or neighborhoods. Groups and communities are highly unique entities and can contain wide variation in structure and form making it difficult to control and account for that variation. Additionally, the sample size was small and notably lacking in diversity in regard to race, ethnicity, and socioeconomic status.

The study relied on self-report data via surveys and interviews, which could not be independently verified and were dependent on the recall of subjective experiences by participants. Additionally, there can be several types of response bias that effect survey responses. Although the survey used existing scales that were tested for validity and reliability, the reliability and validity of those scales could have been affected by using shortened forms of the scale. There was the potential for selection bias in the study. Although a complete census of

registered gardeners was attempted, some gardeners chose to participate and others decided to refrain, which means that the sample might not be representative of the garden.

Although efforts were made to employ appropriate statistical techniques, the sample size was small, which could affect the results and accuracy of the statistical techniques employed. While causal direction was hypothesized in the quantitative portion of the study, which was supported by both data and theory and appropriate to the technique utilized, the study design cannot conclusively establish causation, only correlation. While every effort was made to be as rigorous as the data and methods would allow, this is a small exploratory study.

SUMMARY OF FINDINGS

The goal of this study was to investigate whether community gardens can foster a sense of community within the gardening group. If so, does that sense of community in the garden engender a deeper sense of community about the neighborhood. Using both quantitative and qualitative data, the study affirmatively answered this question, in this particular garden, and found multiple mechanisms through which this occurs (outlined below).

Quantitative Findings

Using SEM, the hypothesis was tested that variables connected to cohesion and norms of healthy eating in the community garden would be related to a participant's neighborhood psychological sense of community and would influence it. Originally, a single model containing two paths representing cohesion and the norm of healthy eating was constructed. With the cohesion path, it was hypothesized that increased levels of satisfaction with the garden would lead to a stronger identification with the group, which would increase the number of people known in the group (ties), thereby increasing a participant's NPSOC. With the path focused on the norm of healthy eating, it was thought that gardeners who complied with the garden's norms

of healthy eating as indicated by consuming more fruits and vegetables, would know more people (have more ties) and thereby also have a stronger NPSOC.

A comprehensive model containing both paths was tested using SEM-based path analysis. The results of chi-square suggested possible model fit, but Hoelter's CN suggested that the sample size was too small to trust chi-square. Additionally, the other model fit indices were conflicted, leading to rejection that the initial combined model was well-fitting. While it would have been ideal to confirm this larger combined model, the fact that SEM was unable to confirm a model with 13 parameters using data with a sample size of 41 is hardly surprising.

However, when the larger model was split into two small sub-models representing the two paths of cohesion and norm conformity to healthy eating both were found to be unambiguously well-fitting. While the sub-model centered on the norm of healthy eating had a similar statistical impact on NPSOC as the cohesion sub-model, the hypothetical concrete data plugged into each sub-model, demonstrated a significant difference in the practical impact of each model.

For instance, suppose gardeners did not comply with the healthy eating norms in the garden because they consumed only one serving of vegetables per day. If those gardeners' vegetable consumption was increased to twice the USDA recommendations (six servings), surpassing expectations of healthy eating, it would have a negligible impact on their social experience in the garden; that is, it would not even increase their number of ties by 2 percent of a person (i.e., less than one person) and would only increase their NPSOC score by one percent of a point.

In contrast to the small practical impact on NPSOC of complying with the norms of healthy eating, NPSOC was more likely to be influenced by variables connected to garden cohesion. For

example, if the satisfaction of a gardener with the lowest possible satisfaction score could be raised by eight points--to the high end of the low range--that would increase his or her group identification score by 25 points, which would triple her or his number of ties in the garden and more than double the NPSOC score. In other words, focusing on satisfaction, identification, or ties could have a dramatic impact on a participant's NSPOC, while it would be near futile to try to increase NPSOC through focusing on compliance to norms of healthy eating. I could speculate that such a compliance-based focus on compliance might even damage satisfaction, which could have a dramatically negative impact on NPSOC.

Qualitative Findings

The qualitative data helped to explain the quantitative data while also offering new ideas about how the garden influences a participants' NPSOC. Interviews with gardeners, indeed, confirmed that they had a sense of community in the garden and that ideas related to satisfaction, identification, and ties were part of their sense of community in the garden.

What was not captured in the quantitative data was the fact that gardeners derived a significant sense of community from what was termed "outward signs of community" in the garden. In these "outward signs of community," participants saw evidence of participation in plots being tended, compost being turned, and changes to the gardening space, which had been completed in their absence by an unseen force. When asked to identify how they knew they were a part of a community, participants identified these "outward signs of community" more often than their ties. That is not to say that ties were not important to their sense of community in the garden; in fact, participants valued ties so much that the lament that there were not enough opportunities to develop them was near universal.

The interviews also provided examples of ties in the garden helping to connect

participants to other people and places in the neighborhood outside the garden and participants reported a stronger sense of community in the neighborhood because of those connections. Beyond ties, the interviews revealed the power of the garden to increase participants' sense of community through what was termed "emblematic association"; that is, the community garden was seen as an emblem of the neighborhood. Therefore, because they were involved with something so representative of the neighborhood, some participants felt more deeply connected to the neighborhood and more likely to be involved in other aspects of the neighborhood. For these participants, a stake in the garden translated to more of a stake in the neighborhood.

DISCUSSION AND IMPLICATIONS

While this study is not strictly generalizable to other community gardens or neighborhoods, it is relevant to those interested in studying or implementing community gardens or for those that are interested in fostering a sense of community within gardens or neighborhoods. For researchers studying the social aspects of community within a garden, this study adds to the literature and identifies additional theoretical areas to pursue. While many previous studies focused on social capital as an explanatory framework in interpreting qualitative data, this study provided quantitative evidence that individual variables connected to the group construct of cohesion, such as group satisfaction, group identification, and ties are all important aspects in a garden.

From a methods perspective, this study points to a different path for researching social aspects of community gardens. Because this study quantitatively captured variables connected to cohesion, other researchers could attempt to replicate this study in other gardens. Other researchers might improve on the methods outlined here by focusing on cohesion from the outset of their research. Another related approach might be for researchers to look at the group level

construct of cohesion rather than at the individual-level variables connected to cohesion.

For those wanting to create a neighborhood community garden or maintain an existing one, there are several things to be learned from this study. If you want to create a sense of community in a community garden, then satisfaction and group identification matter and this study offers concrete ways to measure both. While satisfaction seems a near "self-evident" concept, group identification is a bit more "murky"—how exactly do you increase group identification?

Henry et al.'s research answers this question: self-categorization, interpersonal attraction, and a sense of interdependence. These three attributes were being measured by the subscales of the ACGIS that was used in this research (Henry et al.). This means that if you want members to have a strong sense of identification with the garden, then you want them to strongly see themselves as part of the group (self-categorization). Additionally, you want gardeners to have a strong desire to engage with and stay a member of the group (interpersonal attraction), and you want members to have the sense that they need to depend on each other for the group to function (interdependence). A concrete example of groups that usually score high on the ACGIS is church groups, which was one of the kinds of groups that Henry et al. used to test the instrument validity.

For those interested in helping to foster a sense of community in a neighborhood through community gardening, several points in this study are important. First, to foster a sense of community in the neighborhood through a community garden, you will have to first foster a sense of community in the garden, and satisfaction and group identification are key in this area (see previous paragraph). However, the larger (yet deceptively simple) revelation of this study, is that knowing people in the garden matters when it comes to increasing their neighborhood sense

of community. This does not discount the role of satisfaction and group identification, but it should be noted that their effect on the neighborhood psychological sense of community was mediated through the number of ties a participant had in the garden. Therefore, when considering how to create a stronger sense of community in a neighborhood through a community garden, increasing a gardener's number of ties warrants considerable attention. However, while satisfaction and identification are variables that influence ties in a garden, there are many variables that were not measured in this study that could influence ties as well.

Anything that might increase contact between gardeners, thereby increasing their number of ties, should be considered as a potential source of increasing the neighborhood sense of community for gardeners. It might be noted that the measure of ties in this study was how many people the participant knew by first name, which would typically indicate at least a weak tie. This gives some idea of the contact that might be necessary to create these ties. While the use of name tags might help create these ties, it is more likely that the experiences that lead people to know someone well enough to remember the person's first name is what is responsible for the creation of the tie and its effect.

Norm conformity might be worth mentioning when considering creating a sense of community in the garden, and thereby the neighborhood as well. Gardens often have health-related goals, such as healthy eating. And while this study did indicate that gardeners who eat more fruits and vegetables would have more ties in the garden, and a higher NPSOC score, the influence was modest at best. Increasing vegetable consumption by six times the lowest amount, did not even increase the number of ties a gardener had by one person, and only increased their NPSOC score by one percent of a point. Another thought to consider, is that methods that might increase fruit and vegetable consumption might be deleterious to other cohesion-related

variables. The methods that support compliance, a form of influence, do not necessarily support identification or internalization (Kelman 1958). Therefore, if people had the sense that fruit and vegetable consumption was a "forced" priority, they might identify less with the group and might be less satisfied. This might also apply to other areas of norm conformity.

The physical structure of the garden and the social structure of the gardening organization should also be considered when looking at the formation of ties in relation to developing a stronger neighborhood psychological sense of community. Obviously, social contact is necessary in forming ties, even weak ones. Therefore, tie formation is probably influenced by the amount of contact that is afforded by the gardening experience. Consequently, gardens that are based around a communal plot system or that use a combination of individual and communal plots, could potentially have an advantage in developing ties. However, it should be noted that even with the minimal amount of contact in this particular garden, gardeners were able to develop enough ties to have relatively high NPSOC scores.

Another reason this particular garden might have been successful at developing a strong sense of neighborhood community was because it was created and sponsored by a community organization that was representative of the larger neighborhood. Moreover, the neighborhood community organization was not a top-down city-planned organization, but a grassroots collective of neighborhood residents and supporters. This is not to criticize city or urban planning, but only to point to the fact that a garden "by the people, for the people, and of the people" might have more of an ability to affect participants' sense of community. The grassroots origins of the community organization and the garden also might help to explain the effect of what was termed "emblematic association." A garden that was built by the hands of residents and neighborhood supporters would seem to be more likely to be seen as an emblem or extension of

the neighborhood as a whole.

At this juncture, one might still question the significance of neighborhood cohesion. It could be asked, “So, what if community gardens can foster cohesion in neighborhoods? What is the actual value of cohesion?” Coming from a background in conflict and peace studies, the interest in social cohesion is because social cohesion is viewed as the opposite of social conflict (Siddique 1999). Therefore, there is an inverse relationship between social cohesion and social conflict: as social cohesion increases, social conflict decreases. Accordingly, anything that could be used to increase social cohesion, would potentially be a valuable tool in reducing social conflict.

Finally, related to the interests of conflict and peace, community gardens and other community projects have the potential to be places where Allport’s (1954) contact hypothesis could be implemented. The contact hypothesis states that groups who are experiencing intergroup conflict can see a reduction in that conflict when they are brought into contact with each other, through activities that feature “positive” interpersonal interaction and cooperation in working towards common goals on projects that have institutional or structural support.

Community gardens often contain all the necessary elements of the contact hypothesis and therefore seem to have the potential to be one tool of intervention in social conflict, among many. While this particular community garden did indeed bring two residential areas together by being well-placed on their border, the two areas studied were not particularly diverse; that is, they were largely homogenous from a racial and socio-economic perspective. However, it would be interesting to see the effect a community garden or similar community project would have in bringing more diverse areas together, where there is a greater potential for social conflict.

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Appendix A. Discussion of Available Model Fit Indices

There are an overwhelming number of structural equation modeling (SEM) model fit indices available in SPSS AMOS and other SEM packages. It would be impossible to cover all fit indices when analyzing a model in a paper; therefore, it is necessary to decide which indices will be used and the rationale for selecting them. The next appendix will discuss in-depth the indices selected for this project. However, before discussing the selected indices, this appendix will give a brief overview of some of the more common indices and their associated categories: absolute, relative, and parsimony fit indices (Hooper, Coughlan, and Mullen 2008).

ABSOLUTE FIT INDICES

Absolute fit indices indicate how well a model fits the data, when compared to no model at all (Hooper et al. 2008). Chi-square, Root Mean Square Error Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Residual (RMR), and Standardized Root Mean Square Residual (SRMR) are all examples of absolute fit indices. There is also "relative chi squared," which is chi squared divided by the degrees of freedom (AMOS labels it as "CMIN/DF").

RELATIVE FIT INDICES (ALSO CALLED INCREMENTAL OR COMPARATIVE).

Hooper et al. (2008) note that relative fit indices also use chi-square to evaluate the model; however, rather than comparing the model to no model at all, the model is compared to a baseline model where the null hypothesis is that all variables are uncorrelated. The classic example of this type of index is Bentler and Bonett's (1980) Normed Fit Index (NFI). Since that time, the Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI) have all been developed.

PARSIMONY FIT INDICES

Parsimony is desirable in a model and Hooper et al. (2008) state that parsimony fit indices penalize a model for saturation (model complexity). A more parsimonious model achieves the desired outcome of explanation or prediction with as few predictor variables as possible. Byrne (2001) notes that one of the earliest parsimony indices was the PRATIO (James, Mulaik, and Brett 1982). Since that time, the Parsimony Goodness-of-Fit Index (PGFI) and Parsimonious Normed Fit Index (PNFI) have been developed by Mulaik et al. (1989). In 1990, Bentler created the Parsimonious Comparative Fit Index PCFI (CFI). As might be evident, the PGFI is based on the GFI, PFNI based on the NFI, and the PCFI is based on the CFI. All of these indices use the original index on which they were based and adjust for the loss of degrees of freedom (Hooper et al. 2008).

OTHER FIT INDICES

In the literature reviewed, the indices previously described were the ones most often found. However, Byrne (2001) notes AMOS offers several other indices. The Noncentrality Parameter (NCP) is a "fixed parameter with associated degrees of freedom…and can be regarded as a 'population badness-of-fit'" (Byrne 2001:84). There are also values related to the population discrepancy (labeled "FO") and discrepancy function (labeled "FMIN"). AMOS has several indices based on Akaike's Information Criterion (AIC): Consistent Akaike's Information Criterion (CAIC), Browne-Cudeck Criterion (BCC), and the Bayes Information Criterion (BIC). All of these AIC-based indices are lesser-used measures of parsimony. The Expected Cross-Valuation Index (ECVI) and the related MEVCI (exact abbreviation unknown) are "related to the likelihood that the model cross-validates across similar-sized samples from the same population" (Byrne 2001:86). Finally, Hoelter's Critical N (1983) focuses on whether the sample size was adequate.

Appendix B. Fit Indices Selected for This Paper

In selecting the appropriate fit indices for a project, Hooper et al. (2008) point out there is a lot of advice about which indices to report. Kline (1998) advises chi squared, RMSEA, the CFI, and SRMR be used. Similarly, Boomsma (2000) recommends the same as Kline, but says to also report squared multiple correlations of each equation. However, Hu and Bentler (1999) recommend a two-index format: the first index they always include is the SRMR, with either the TLI, RMSEA or CFI chosen as the second index. Based on Hooper et al.'s (2008) extensive review of the literature, they recommend the use of chi-square (with p value and degrees of freedom), RMSEA with confidence interval, SRMR, CFI, and one of the more well-known parsimony fit indices.

Based on the review of the literature for this paper, Hooper et al.'s (2008) approach seems well thought out. Hooper et al. (2008) note that the indices they selected "have been found to be the most insensitive to sample size, model misspecification and parameter estimates" (p. 56). Additionally, their approach offers broad coverage of the categories of indices (absolute, relative, and parsimony), as well as balances the use of more "classic/traditional" indices with more recent ones. Therefore, chi-square, RMSEA, SRMR, CFI, and PCFI have been selected for this project and will be explored further. Because of issues related to small sample size Hoelter's CN will also be used and explored and caveats about sample size for the RMSEA will be addressed.

SELECTED ABSOLUTE FIT INDEX: CHI-SQUARE

Chi-square still seems to be the most commonly cited absolute fit statistic in the literature; for this reason alone, it seems prudent to include it. Chi-square is useful in assessing model fit, but it is not definitive by itself. It is particularly sensitive to sample size: large samples can cause chi-square to reject an adequate model and small samples can cause it to accept an inadequate model

(Hooper et al. 2008). Therefore, desirable chi-square values do not automatically indicate a well-fitting model; however, chi-square rejection of a model with a small sample size would be a more definitive and ominous sign. When considering model fit, a non-significant p value is desired ($p \geq 0.05$), indicating that the proposed model is an improvement over no model at all (Hooper et al. 2008).

SELECTED ABSOLUTE FIT INDEX: RMSEA

RMSEA is another absolute fit index proposed by Steiger and Lind (1980) and has become regarded as one of the most informative and popular fit indices (Byrne 2001, Diamantopoulos and Siguaw 2000: 85). RMSEA is sensitive to the number of parameters in the model and tells us how "…well the model, with unknown but optimally-chosen parameter values, [would] fit the population covariance matrix" (Brown and Cudeck 1993: 137-138). Byrne (2001) notes that several cutoff values have been proposed. In the past, values less than 0.05 or 0.06 were considered a good fit (Brown and Cudeck 1993, Hu and Bentler 1999), with values up to 0.10 still considered a weaker indication of fit (MacCallum, Browne, and Sugawara 1996). However, Steiger (2007) staunchly said the upper limit should be 0.07.

When using RMSEA it is recommended that not only the point estimate be checked for a significant value, but also the confidence interval (CI) be discussed (Byrne 2001, Hooper et al. 2008, Steiger 1990). A significant RMSEA value makes little difference if that value is not very precise. In a model that fits well, typically, the lower limit of the CI will be close to 0, with the upper limit less than 0.08 (Hooper et al. 2008). The last value that is to be used with RMSEA is the close-fit p value or PCLOSE value, which tests whether the model is "close-fitting." A nonsignificant PCLOSE value is desired: a value greater than 0.05 indicates that the RMSEA value is likely less than 0.05 (Kenny 2015).

However, despite its popularity and Hooper et al.'s (2008) sentiment, RMSEA tends to be overly aggressive in rejecting models with a small sample size (Chen et al. 2008, Hu and Bentler 1999, Kenny, Kaniskan, and McCoach 2015) It is not just sample size that can cause the RMSEA to falsely indicate a poor fit, but also models that have few degrees of freedom (Chen et al. 2008, Kenny et al. 2015). Using both a theoretical model and a Monte Carlo simulation, Kenny et al. (2015) replicated and extended Chen et al.'s (2008) work and found that when both a model's degrees of freedom and sample size were large, RMSEA rarely exceeded the 0.05 cutoff value. However, small sample sizes and few degrees of freedom both independently artificially elevated RMSEA; that is, RMSEA was inflated in small sample sizes, regardless of the degrees of freedom, but also elevated regardless of sample size when there were few degrees of freedom. Kenny et al. (2015) found this bias not just with RMSEA, but also with RMSEA's confidence interval and PCLOSE value.

SELECTED ABSOLUTE FIT INDEX: SRMR

SRMR is the standardized value of the RMR. Both values "are the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model" (Hooper et al. 2008:54). However, because residuals are relative, RMR is difficult to interpret and SRMR is typically used, which ranges from 0 to 1.00 (Hooper et al. 2008). Models that have a value of less than 0.05 are typically considered well-fitting (Byrne, 1998; Diamantopoulos and Siguaw, 2000, Hooper et al. 2008). However, Hu and Bentler (1999) have said that values up to 0.08 are acceptable. The SRMR is another index that can be skewed based on sample size and degrees of freedom (Kenny 2015, Hooper et al. 2008). The SRMR tends to be higher in small samples and also in samples with few degrees of freedom (Kenny 2015).

SELECTED RELATIVE FIT INDEX: CFI

The CFI is derived from Bentler and Bonett's (1990) NFI. The NFI was the "criterion of choice" for many years as evidenced by its frequent use in studies (Byrne 2001). It was later shown that the NFI can underestimate fit in small sample sizes, so Bentler (1990) revised the index to account for sample size and called the revision the CFI. Due to its lack of sensitivity to sample size, the CFI is now one of the most popular indices to report (Fan, Thompson, and Wang 1999). Bentler (1990) now says the CFI should be preferred over the NFI. Reported values of the CFI are between 0 and 1.0; in actuality, values can be greater than 1.0, but such values are "normed" and set to 1.0 (Kenny 2015). Values greater than 0.90 were originally considered an indication of a well-fitting model (Bentler 1992). Since that time, values closer to 0.95 or above have been advocated (Hu and Bentler 1999). While the CFI is not necessarily sensitive to sample size, Kenny (2015) notes that both CFI and TLI are sensitive to the size of correlations in the data. Smaller average correlations will yield smaller TLI/CFI. Kenny (2015) says, because the sensitivity to the average size of the correlation, CFI/TLI should not be calculated if RMSEA for the null model ("independence model") is smaller than 0.158.

Selected Parsimony Fit Index: PCFI

The PCFI is based on CFI and because CFI is the relative fit index chosen for this paper, PCFI will be used as well. When evaluating parsimony indices, Hooper et al. (2008) and Byrne (2001) point out that the values for these parsimony indices are substantially lower than the fit indices on which they are based. It is also not recommended that a parsimony fit index be interpreted alone and there is not much of a guideline for a recommended cutoff. Hooper et al. (2008) and Byrne (2001) point to Mulaik et al's (1989) work which states that it is entirely possible to see parsimony fit indices near 0.50 with other model fit indices in the .90's.

SELECTED SAMPLE SIZE FIT INDEX: HOELTER'S CRITICAL N (CN).

On this particular project, because the sample size is small, Hoelter's CN will also be used. While a power analysis or a Monte Carlo study can be used to determine the proper sample size for a particular model, Hoelter's is a quick rough way to check sample size. Specifically, it is designed to test for adequate sample size in regard to accuracy of the chi squared model fit statistic (Byrne 2001). CN values can be calculated for 0.01 and 0.05, with CN values greater than 200 indicating an adequate sample size (Hoelter 1983).

SELECTION SUMMARY

In summary, the selected indices that this paper will use are chi squared, RMSEA (with CI and PCLOSE), SRMR, CFI, PCFI, and Hoelter's CN. The choice of fit indices for this paper are based on an extensive review of the literature, other researchers' literature reviews, and the unique considerations of the project. This selection of indices, also offers broad coverage of the categories of indices (absolute, relative, and parsimony) and balances the use of more "classic" or "traditional" measures with more recent ones.

The decision to include RMSEA (with CI and PCLOSE) was a tough choice because of its bias in underestimating model fit with small sample size and low degrees of freedom, which is the predicament of the data in this paper. In fact, Kenny et al. (2015) outright say that RMSEA and associated statistics should not be calculated at all in these scenarios. However, based on RMSEA's popularity, readers might find it suspect if it was omitted. Any inconsistencies found using RMSEA-related statistics will be investigated using another absolute fit index, such as the AGFI. The AGFI has a biased tendency to increase with larger samples and to decrease with large degrees of freedom (Hooper et al. 2008).

Appendix C. Interpreting Log-Transformed Coefficients

The following method was used to interpret a logged transformed (ln) coefficient (Yang 2012) when the original underlying relationship was linear.

1. When the dependent variable was transformed, this formula was applied to the slope coefficient (β):

$$\text{\% change in Y} = 100(e^{\beta} - 1)$$

   Interpreted as "for each unit increase in x, % change in y occurs."

2. When the independent variable was transformed, this formula was applied to the slope coefficient (β):

$$\text{unit change in Y} = \beta \ln\left(\frac{101}{100}\right)$$

   Interpreted as "for each percentage point change in x, unit change in Y occurs."

3. When both the independent variable and dependent variable were transformed, this formula was applied to the slope coefficient (β):

$$\text{\% change in Y} = [(1.01)^{\beta} - 1] * 100$$

   Interpreted as "for each percentage point change in x, % change in Y occurs."

Appendix D. Qualitative Interview Guide

The researcher followed this interview guide. Of course, during the interview, new questions arose based on the varying responses of participants. All new questions appropriately maintained the focus of the study.

INTERVIEW QUESTIONS

Expectations of Experience as a Garden Member

1. *Tell me about when you joined the garden and what was your initial attraction to the garden?*

   Explanation. This question is designed to ground the participant's experience in time and to focus their attention on the beginning of their experience with the garden. It will also serve as a lead-in to the next question.

2. *What did you imagine being a part of the garden would be like before you joined?*

   Explanation. It can be useful to establish a baseline of what the participant thought the community garden experience would be like. An individual's pre-conceived expectations regarding experience can dramatically affect the tone of their actual experience.

3. *Has being a member of the garden been like you imagined so far? (In what ways has or hasn't it been)*

   Explanation. Having a clear sense of whether the participant's actual experience of the garden is congruent with their pre-conceptions will aid in better understanding the rest of their experience.

Actual Experience of the Garden

4. *What do you like to do at the garden? Tell me about your last trip there and what you did.*

    Explanation. Trying to get a sense of what the participant actually does in the garden in their own words, without in anyway "leading." Since the interest is in what the participant actually does at the garden, the question asks about a specific trip to the garden. The question could be framed as "what is a typical day at the garden"? Yet the concern is that, without grounding their memory to an actual experience, they will describe some abstract composite experience that never really occurs.

5. *Are there other times you do different things at the garden? Tell me about another time.*

    Explanation. Trying to get a sense of the similarity or diversity of their actual experience in the garden, by once again exploring concrete instances.

Personal Impact of Being a Garden Member

6. *Tell me about any changes you've noticed in your life as a result of being a part of the community garden?*

    Explanation. Since the study is interested in the impact community gardens have on the individual, the purpose of this question is to get the participants themselves to reflect on that question and offer their own ideas, without "leading" them in a particular direction.

Social and Community Aspects of the Garden

7. *When you're at the garden do you hang out with people there? Tell me about what you do together.*

    Explanation. This topic may be covered in previous questions. If the participant

has not mentioned social activity on their own at this point, then we will draw the participant's attention to it, since social activity in the garden is of particular interest to the study. Once again, the choice is to focus their attention on concrete activities or behavior.

8. *It's called a "community" garden…I'm wondering how would you describe your sense of community with other members of the garden?*

Explanation. This topic may be covered in the previous questions. If it was not, then the purpose of this question is to change their focus from the specifics of their interaction with other members, to a broader perspective about the issue of community and their perception of it and how they see it exhibited in interactions in the garden.

Neighborhood Experiences

9. *How would you describe your experience of community with the rest of the neighborhood?*

Explanation. In addition to being interested in descriptions about social experiences of members within the garden, there is interest in their social experiences of the larger context of the neighborhood in which the garden is situated. In previous questions, the subject has been asked about their interaction with people in the garden and separately they have been asked about their experience of "community" in the garden. When asking about the neighborhood, it has been decided to just ask about community and leave it up to the participant to decide how—or if—they connect the abstract idea of community with other people in the neighborhood.

10. *What are some things you really enjoy doing in the neighborhood? (ask for specific instances)*

Explanation. This may be covered in the previous question. The previous question was more about how they experience the abstract concept of community in the neighborhood. This question directs them to more specific activities and what they like to do in the neighborhood.

11. *Is there anything else you really want to share about your experience with the garden or the neighborhood that we didn't talk about?*

Explanation. This question is an invitation to the participant to step outside of the framing of the questions and convey information that might have been overlooked or hindered by the questions in the interview.

Appendix E. Existing Scale Questions Utilized

ARROW-CARINI GROUP IDENTIFICATION SCALE (ACGIS)

The Arrow-Carini Group Identification Scale 2.0 (ACGIS) (Henry et al., 1999), uses twelve questions evenly distributed over three subscales. The three subscales on the ACGIS measure the cognitive, affective, and behavioral aspects of group identification. Out of concern regarding respondent fatigue, the number of questions from the scale was reduced. When selecting the questions that would be utilized, factor loadings and feedback from pre-test participants was considered.

Reliability and Validity

Henry et al. (1999) tested the validity of the scale with 290 students and demonstrated it was able to reliably discriminate well between groups the students regarded as important and groups the students did not regard as important. Henry et al. (1999) also tested the scale with two college student populations located in different regions of the United States, with different types of small groups, and were satisfied that it demonstrated reasonable stability across populations. However, the reliability of the scale could be affected by the reduction of the number of questions used in each subscale.

Complete List ACGIS 2.0 Questions

Affective Subscale:

1. I would prefer to be in a different group.
2. **Members of this group like one another.**
3. I enjoy interacting with the members of this group.
4. **I don’t like many of the other people in this group.**

Behavioral Subscale:

1. In this group, members don't have to rely on one another

2. All members need to contribute to achieve the group's goals

3. This group accomplishes things that no single member could achieve

4. In this group, members do not need to cooperate to complete group Tasks.

Cognitive Subscale:

1. I think of this group as part of who I am.

2. I see myself as quite different from other members of the group.

3. I don't think of this group as part of who I am.

4. I see myself as quite similar to other members of the group.

(**Bolded** questions were used in this study.)

NEIGHBORHOOD COHESION INDEX (NCI/NPSOC)

The Neighborhood Cohesion Index (NCI) developed by Buckner (1988) is a unidimensional scale that consists of eighteen questions used to measure neighborhood cohesion at a group level and the psychological sense of community at the individual level. Out of concern for respondent fatigue, the number of questions from the scale has been reduced. Ten questions were selected, ensuring that there were two questions for each of the underlying concepts of attraction to neighborhood, neighboring, and the neighborhood psychological sense of community (NPSOC), even though those concepts are no longer strictly represented as subscales in the NCI. Additionally, the strength of the question's correlation coefficient was factored into the decision, as well as feedback from pre-testing.

Reliability and Validity

Buckner (1988) tested the NCI and found at an individual level and group level it was capable of predicting differences between neighborhoods. However, as a group level measurement it needed more testing due to the small number of neighborhoods with which it was tested. In a separate study, Robinson and Wilkinson (1995) also verified its validity. That being said, the reliability of the scale could be affected by the reduction of the number of questions.

Selected NCI Questions

1. Overall, I am very attracted to living in this neighborhood.

2. I feel like I belong to this neighborhood.

3. I socialize with my neighbors in their homes or at other places in the neighborhood in which I live.*

4. The friendships and associations I have with other people in my neighborhood mean a lot to me.

5. Given the opportunity, I would like to move out of this neighborhood.

6. If the people in my neighborhood were planning something I'd think of it as something "we" were doing rather than "they" were doing.

7. If I needed advice about something I could go to someone in my neighborhood.

8. I think I agree with most people in my neighborhood about what is important in life.

9. I believe my neighbors would help me in an emergency.

10. 1 feel loyal to the people in my neighborhood.

11. I borrow things and exchange favors with my neighbors.

12. I would be willing to work together with others on something to improve my neighborhood.

13. I plan to remain a resident of this neighborhood for a number of years.

14. I like to think of myself as similar to the people who live in this neighborhood.

15. I rarely have neighbors over to my house to visit.

16. A feeling of fellowship runs deep between me and other people in this neighborhood.

17. I regularly stop and talk with people in my neighborhood.

18. Living in this neighborhood gives me a sense of community.

**Question altered to reflect the fact that this was used in an urban neighborhood with a large number of public social locations where people gather.*

(**Bolded** questions were used in this study.)

AMERICAN CUSTOMER SATISFACTION INDEX (ACSI)

Fornell et al. (1996) created twenty different measures for the components of the ACSI model, including the antecedents or drivers of satisfaction, as well as the outcomes of satisfaction. Fornell et al. (1996) use three of those measures for overall customer satisfaction, which is the central feature of the model.

Reliability and Validity

The ACSI has been tested for validity and reliability at the macro-level and individual organizational level as well in several studies (Anderson et al., 2004; Fornell et al., 2006; Gruca and Rego, 2005; Mithas et al., 2005; Mittal et al., 2005; Luo and Bhattacharya, 2006).

Overall Satisfaction Questions Used in The Community Garden, Based on the ACSI Model

1. What is your overall satisfaction with your experience at the garden?

   1 (very dissatisfied) – 7 (very satisfied)

2. To what extent has your experience at the garden met your expectations?

   1 (falls short) – 7 (exceeds)

3. How close has your experience at the garden compared with your ideal one?

1 (not very close) – 7 (very close)

DEMOGRAPHIC QUESTIONS

The questions used were based on questions in the Census Bureau's American Community Survey: Population Questions (2013) and American Community Survey: Housing Questions (2013). By utilizing these questions, data collected from the study could be compared to data from the census, if desired. Additionally, other researchers frequently collect data based on census questions, so there is more opportunity to compare data to other research.

A few modifications have been made to the questions. For example, questions 4a and 4b are not contained in the census. These are new questions that attempt to collect data about people who are not traditionally married. These questions have undergone testing by census researchers, but may not be finalized yet (Lewis 2012; DeMaio and Bates 2014). Some form of these questions will appear on the next census.

Additionally, on the census survey, the question regarding salary (question #8), is usually an open-ended question. However, feedback from pre-testing of the survey utilized in this same neighborhood, indicated that an open-ended question regarding salary was too personal. Therefore, the format for question #8 was changed to a fixed-response question.

Questions Used

1.What is your sex? (select one)

_Female _Male _No Response

2. As of today's date, what is your age? ____

3. How many children do you have? _____

4. What is your marital status? (select one)

_Married _Widowed _Divorced _Separated _Never Married

_No Response

If you responded that you are not currently married, please provide some additional information regarding your relationship and living situation.

4a. Are you currently living in a registered domestic partnership or civil union? (select one)

_Yes _No _Not Sure _No Response

If you responded that you are not currently married and are not in a registered domestic partnership or civil union, please provide some additional information regarding your relationship and living situation.

4b. Are you currently living with a boyfriend / girlfriend or partner in your household? (select one)

_Yes _No _No Response

5. Are you of Hispanic, Latino, or Spanish origin? (select one)

_No _Yes, Mexican, Mexican American, or Chicano _Yes, Puerto Rican

_Yes, Cuban _Other Hispanic, Latino, or Spanish origin (Specify) _____

_No Response

6. What is your race? (Select all that apply)

_White _Black, African American, Negro _Asian _Indian

_American Indian or Alaska Native _Japanese _Native Hawaiian _Chinese

_Korean _Guamanian or Chamorro _Filipino

_No Response Some other race (specify)_____

7. What is the highest level of education completed? (select one)

_Did not Graduate High School or Did not Complete GED

_Graduated High School (or GED/High School Equivalent) _Some College

_Associate's Degree _Bachelor's Degree

_Graduate Degree (Master's, Doctorate, or Professional) _No Response

8. What range would you estimate your total household income to have been from all income sources, before taxes and deductions last year (gross income) (select one)

_Less than $10,000 _$10,000 to $14,999 _$15,000 to $19,999

_$20,000 to $24,999 _$25,000 to $29,999 _$30,000 to $34,999

_$35,000 to $39,999 _$40,000 to $44,999 _$45,000 to $54,999

_$55,000 to $64,999 _$65,000 to $79,999 _$80,000 to $99,999

_$100,000 to $124,999 _$125,000 to $149,999 _More than $150,000

_No Response

Appendix F. Detailed Description of Initial Model Analysis

In Table 3, RMSEA is specified at 0.091. While some have suggested that values up to 0.10 might still be indicative of model fit (MacCallum, Browne, and Sugawara 1996), others have said that 0.07 should be the absolute cutoff limit (Steiger 2007), with levels below 0.06 or 0.05 indicative of a better fitting model (Brown and Cudeck 1993; Hu and Bentler 1999). In addition to RMSEA being near the upper most limit of even the most tolerant cutoff point, the RMSEA 90 percent confidence interval (CI) is rather wide. The low end of the CI being reported as 0, while the high end was 0.186, which means that in ninety out of one-hundred samples, the point estimate would be between 0 and 0.186; that is, it could either be highly significant or highly nonsignificant. However, the PCLOSE value is greater than 0.05, which suggests that the RMSEA is likely less than 0.05 (Kenny 2015). Taking the value of the RMSEA point estimate with the CI range and the PCLOSE value, it becomes difficult to interpret RMSEA in a meaningful way.

Moving on to Table 4, the remaining fit indices are displayed. The reported value of SRMR was 0.096. Typically, values less than 0.05 indicate a well-fitting model (Byrne 1998; Diamantopoulos and Siguaw 2000; Hooper et al. 2008), but some have suggested that values up to 0.08 are tolerable (Hu and Bentler 1999). Either way, the RMSR value exceeds both. In the same table, the CFI was reported as 0.891. Originally values greater than 0.90 were considered adequate (Bentler 1992), but more recently values near or above 0.95 have been advocated (Hu and Bentler 1999). Either way, once again the model falls short of even the most lenient cutoff value. The PCFI was reported as 0.637. The PCFI is a parsimony index which adjusts the CFI for the degrees of freedom and the PCFI severely penalizes for model complexity. There are not many recommendations for a PCFI cutoff value, however it has been noted that parsimony fit indices can hover near the 0.50's while other model fit indices are in the 0.90's (Mulaik et al's 1989,

Hooper et al. 2008, and Byrne 2001). Therefore, the observed PCFI of 0.637 could be tolerable if the other model fitting indices indicated a well-fitting model.

Collectively, the reported fit indices do not seem to indicate a well-fitting model. Chi-square is acceptable, but Hoelter's CN suggests that the sample size is not large enough to trust chi-square. The RMSEA interpretation is ambiguous at best, but with its point value nearing 0.10, it too seems the model is not well-fitting--though it is difficult to tell because the CI is wide and the PCLOSE value contradicts it. The RMSR value of 0.96 exceeds even the most generous upper limit of 0.08. The CFI being below even the lenient value of greater than 0.90 keeps with the trend that the model does not fit well. Although the AGFI is not listed in any table, it will be reported because RMSEA related values seemed conflicted: the AGFI is 0.804, which once again places it well below even the most lenient value indicating model fit (> 0.90) (Hooper et al. 2008).

Therefore, either the model truly does not fit or the sample size of 41 with 15 df is not adequate to establish model fit. As it was pointed out earlier, there are no absolute rules about sample size with SEM and exceptions to the sample size rules of thumb can be found. However, presently, the way the model is specified, with its sample size to parameter ratio of about 3:1, it is well beyond the limits of even the most generously proposed acceptable ratio of 5:1. Additionally, two of the measures that used (RMSEA and RMSR) are biased against small sample sizes with few degrees of freedom, so it becomes difficult to trust those numbers.