The Relationship between Health and Social Capital in the Austin Area: Evidence, Disparities, and Recommendations

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A project of the Austin Area Sustainability Indicators

Executive Summary

Within the past several years, a considerable body of research on social capital has emerged that links social capital to a number of beneficial outcomes, including health. Using survey data collected in August 2018 as part of the Austin Area Sustainability Indicators project, we tested this relationship in the Austin MSA. Results indicate strong correlations between health and reported dimensions of social capital – trust, bonding networks, and neighborhood cohesion – and the second-order latent construct, social capital. This research also explored the relationship between social risk factors and health, as well as between social risk factors and social capital. Some key results include:

- A strong correlation between social capital and all of the health measures (Figure 3)
- Statistically significant effects of social capital across all health models (Table 7)
- Specifically, a one standard deviation in social capital equates to 1.3 days per month of better physical health
- Important social risk factors that influence health, including: Hispanic (positive), low income (negative), high income (positive), 65+ age category (mixed)
- Large disparities in social capital, including:
    - African American (negative)
    - Hispanic (negative)
    - Age 45-55 & 65+ (positive)
    - Income <$55,000 (negative); >$125,000 (positive)
- We found no statistical differences between the counties in the MSA
- Education was only statistically significant as a predictor for dental health
- The effects of residential context were varied

Table of Contents

Introduction

Within the past several years, a considerable body of research on social capital has emerged in public health. The rationale is that social capital – including features such as interpersonal trust, norms of reciprocity, social connectedness, and social networks – foster community and social participation and can be used to impact a number of beneficial outcomes, including health. Although many definitions, a frequently cited definition refers to social capital as "features of social organization, such as networks, norms, and social trust, that facilitate coordination and cooperation for mutual benefit" (R. D. Putnam, 1995, p.67). The amount of social capital in a community (e.g., neighborhood, city, state, nation) has implications for a multitude of beneficial outcomes for that community. Essentially, the more social capital a community has, the better off it is reasoned to be.

In the following, we report on research that measures social capital in the Austin area, using empirical data generated from the Austin Area Sustainability Indicators project. First, we describe the background to this inquiry, relevant literature, and the applicable research methods. In the results, we first demonstrate that social capital has a significant effect on reported health. We then describe the disparities in social capital that exist between different socio-demographic profiles in the Austin area. We suggest that interventions focused on growing social capital (including philanthropic, policy, and practice-oriented interventions) can positively impact the social determinants of health and health outcomes in Central Texas.

Background

St. David's Foundation aims to build the healthiest community in the world. Building the healthiest community requires investments that positively influence the social determinants that lead to healthy communities. Research on the social determinants of health, such as social capital, implies an equity perspective that compares more and less advantaged social groups across social factors and health outcomes. This literature explores the conditions in which people are born, grow, live, work, and how these patterns influence health outcomes like healthy behaviors, illnesses, and life expectancy (Ferrer, 2018a; Marmot M., 2005).

This report focuses on two particular social determinants that partially explain health disparities between residents in the Austin-Round Rock MSA: Social risk factors and social capital. First, social risk factors are socio-economic characteristics of individuals such as income, race, and education. These variables are drivers of social stratification in society and an individual's socio-economic position (also known as socio-economic status) is strongly correlated with health. Second, social capital is the

cumulative resources that individuals and groups have access to through their networks (Bourdieu, 1986; Carpiano, 2006; Moore & Kawachi, 2017). Together, these factors play a significant role in explaining differences in health outcomes.

Social Determinant	Definition	Variables (considered in this study)
Social risk factors	• Socio-economic status and position within social stratification in society	Age, education, income, gender, race, and residential context
Social capital	• Interpersonal trust, norms of reciprocity, and social engagement that foster community and social participation • Actual or potential resources that inhere within social networks or groups for personal benefit	Trust, bonding networks, neighborhood cohesion

Table 1- Social Determinants of health

Through analyzing survey data collected across the Austin Metropolitan Statistical Area (MSA), we explore the relationships between the social determinants (outlined in Table 1) and health outcomes. The results and implications are relevant to public health practitioners in the design of interventions that seek to address the disparities in social capital in the Austin area.

Relevant Literature

Social Risk Factors

In a 2016 report to Congress, the U.S. Department of Health and Human Services demonstrated a strong relationship between poverty and poor health. The report outlined social risk factors of socioeconomic status: income, insurance, education, and occupation; race and ethnicity, gender and sexual orientation, social relationships and support, and residential context (urban-rural). These factors are thought to influence health through a variety of mechanisms, including health literacy, healthcare use, costs, and how individuals access their healthcare systems (Ferrer, 2018; U.S. Department of Health and Human Services, 2016). For instance, higher income is often associated with better health behaviors that increase longevity (Chetty et al., 2016). Also, people who self-identity as racial or ethnic minorities are at higher risk of readmission following hospitalization (*ibid*). Hispanic and Black individuals have lower longevity and experience higher rates of chronic diseases than white individuals (Betancourt, Green, Carrillo, & Ananeh-Firempong, 2003; U.S. Department of Health and Human Services, 2016).

The impact of social risk factors on health in the Austin area is well documented. For example, obesity rates in African American communities are twice as high compared to white obesity rates and

black infant mortality rates are twice as high as white infant mortality rates. Black individuals also have disproportionately higher rates of HIV and STDs than white individuals (Austin Public Health, 2017). Gender and income are also relevant risk factors. Males comprise 51% of the city of Austin population, yet they make up 74% of deaths by suicide. Adults with lower income have higher rates of smoking in Travis county. Between 2011 and 2015, the percentage of smokers among individuals who make less than $25,000 was 20% compared to 7% among individuals who make more than $75,000 (Austin Public Health, 2017; Community Advancement Network, 2017).

Understanding the demographic makeup of a population therefore helps guide interventions and investment decisions towards mechanisms that may be associated with a certain risk factor. In our study we explore the differences between county of residence, income, education, age, race, gender, and residential context as relevant social risk factors that may cause disparities in self-rated health.

Social Capital

Research on social capital has grown tremendously over the past three decades. The occurrence of "social capital" in published literature increased fourfold from 1980 to 1990, while the increase from 1980 to 2008 is eightfold (Friesen, 2018). Public and occupational health has not only been a part of this growth, but public health is the most frequent venue for social capital research over the past twenty years (*ibid*). Within this research, social capital has been conceptualized primarily in two ways (Carpiano, 2006):

- Interpersonal trust, norms of reciprocity, and social engagement that foster community and social participation (R. Putnam, 2000);
- Actual or potential resources that inhere within social networks or groups for personal benefit (Carpiano, 2006; Kawachi, Subramanian, & Kim, 2008; Lin, 1999).

Both conceptualizations have effectively explained disparities in health outcomes, albeit through different mechanisms. For instance, when social capital is conceptualized as a property of the network, it has been argued that it improves health through social connectedness and cohesiveness. A more socially cohesive community helps to collectively sanction deviant health behaviors, or lobby for better local health services and green spaces. It has also been argued that more social cohesiveness makes for improved health through psychobiological positive feelings of belonging to a friendly community (Mohnen, Völker, Flap, Subramanian, & Groenewegen, 2015; Poortinga, 2006).

Alternatively, social capital conceptualized as a resource embedded in networks is thought to help individuals deal with stressful situations and promote health through information, advice, and financial resources. It has also been argued that an individual's social network may directly or indirectly encourage healthy behaviors. Some have integrated both types of social capital into one model, as illustrated in figure 1 below (Carpiano, 2006; Kim, Subramanian, & Kawachi, 2006; Mohnen et al., 2015).

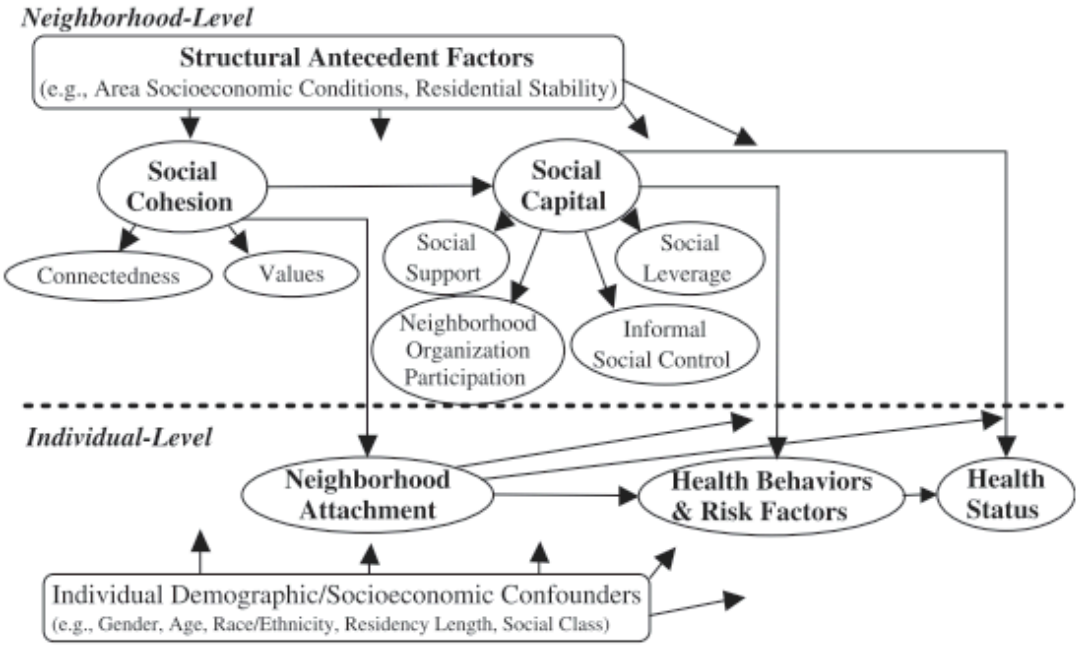

Figure 1 - Conceptual model of neighborhood social capital processes on individual health outcomes

A review of the literature also shows that studies often explore associations between specific social capital indicators such as generalized trust, associational memberships, neighborhood, social relationships ties with specific health outcomes. A meta-analysis of 148 studies exploring data across 308,849 individuals showed that socially connected individuals have 50% greater likelihood of survival compared to those who had insufficient social relationships. This size of this effect on mortality rates makes social capital comparable to other risk-factors such as smoking and obesity (Holt-Lunstad, Smith, & Layton, 2010). In other reviews, lower social capital in several forms was associated with higher risk of cardiovascular disease, obesity rates, and infectious disease while trust was particularly associated with better self-rated health (Kawachi et al., 2008).

There is also ample evidence for a relationship between social capital and mental health in youth, adults, and senior citizens. For instance, youth studies show that social cohesion and informal social control translate into a sense of freedom and safety that is conducive to healthy cognitive and emotional

development and socialization in children and adolescents. In adults, balanced levels of bonding (close ties) and bridging (across social groups) relationships were essential for improved mental health (Kawachi et al., 2008). In terms of health behavior, Samuel, Commodore-Mensah, & Dennison Himmelfarb (2014) reviewed 53 studies to identify a conceptual framework integrating several community social capital-related concepts that predict health behaviors. Another study finds that social capital factors, such as social and institutional trust, are significantly related to perceived ease of use and usefulness of telehealth systems within a framework for technology acceptance models (Tsai, 2014).

This potential relationship between social outcomes and health is relevant to health decision-makers as they think of how to design interventions that improve population health. A positive relationship between social capital and health outcomes in a community potentially indicates that interventions and policies that leverage community bonding and bridging social capital might serve as means of population health improvement.

Methodology

Study Sample

The Austin Area Community Survey is a telephone survey conducted as part of the Austin Area Sustainability Indicators project at the University of Texas at Austin. The geographic focus of the survey is the 6-county region including and surrounding Austin, Texas: Travis County, Bastrop County, Burnet County, Caldwell County, Hays County, and Williamson County. For the purposes of this study, we excluded Burnet County and only focused on the counties that constitute the Austin MSA.

The survey was conducted in August of 2018 and it adheres to methodological procedures and definitions from the American Association for Public Opinion Research (AAPOR, 2015). The interviews were conducted using a computer-assisted telephone interviewing software to minimize questioning errors and implement survey skip patterns. Dialing errors were also minimized through software which streamlined the dialing process. Similar surveys were conducted in 2006, 2006, 2008, 2010, and 2015. The sample for this study consists of 936 respondents that live in the Austin MSA. Table 2 describes the sample.

General Population

```
##         County             Gender          Race
##  Bastrop   :162   Male       :409   White   :603
##  Caldwell  :159   Female     :512   Black   : 52
##  Hays      :132   Transgender:  2   Hispanic:173
##  Travis    :346   NA's       : 11   Other   : 71
##  Williamson:135                     NA's    : 35
##
##
##                                Education             Age
##  Less than HS diploma              : 56   18-24       : 85
##  HS grad no college                :152   25-34       :102
##  Some college or associates degree:243   35-44       :155
##  College graduate                  :297   45-54       :168
##  Advanced degree                   :178   55-64       :158
##  NA's                              :  8   65 and older:242
##                                           NA's        : 24
##                  Income                          Residence   lowincome
##  $35,000-$55,000    :143   Urban                     :202   No  :629
##  $55,000-$75,000    :140   Suburban                  :356   Yes :195
##  $75,000-$95,000    :119   Rural changing to Suburban:119   NA's:110
##  $95,000-$125,000   :133   Rural                     :227
##  Less than $35,000  :132   NA's                      : 30
##  More than $125,000:157
##  NA's               :110
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Table 2- Sample Demographic Characteristics

Variables

Social Risk Factors

The demographic variables we considered for analysis were county, income, education, age, race, gender, and residential context. Age was coded for 6 ordinal categories: (1)18-24, (2) 25-34, (3) 35-44, (4) 45-54, (5) 55-64, (6) More than 64. Family income was also coded for 6 ordinal categories: (1) less than $35,000, (2) $35,000-$55,000, (3) $55,000-$75,000, (4) $75,000-$95,000, (5) $95,000-$125,000, (6) More than $125,000. Education was coded as an ordinal variable with five categories: (1) Less than High School Diploma, (2) HS grad no college, (3) Some college or associates degree', (4) College Graduate, (5) Advanced Degree. Race/ethnicity was coded: (1) White, (2) Black, (3) Hispanic, (4) Asian, (5) Other. Finally, residence, referring to the urban-rural designation of the area the respondent lives in, was coded for 4 categories: (1) Urban, (2) Rural, (3) Suburban, (4) Rural Changing to Suburban. For a breakdown of these demographics see descriptive statistics in Table 2.

Social Capital Measurement Model

We operationalize social capital as a latent individual-level construct that can be inferred from an individual's self-reports on trust, social relationships, and attitudes towards their neighborhoods. This results in three hypothesized dimensions for social capital, each validated with several questions through confirmatory factor analysis. Confirmatory factor analysis is statistical method that validates our conceptualization of social capital as the linear combination of three underlying latent variables: Social trust, bonding, networks, and neighborhood cohesion.

Social Capital Dimension	Question No	Survey Question	Factor Loading
Trust	Q6_1A	I have a lot in common with the neighbors who live around me	0.63
	Q6_1B	Most people in this neighborhood get along with one another	0.77
	Q6_1C	Generally speaking, I can trust people who live in my neighborhood	0.77
	Q6_1D	People in my neighborhood are willing to help each other	0.84
	Q6_2E	I feel at home in this neighborhood	0.66
	Q9_1D	My neighbors would help in case of emergency	0.63
Bonding Networks	Q7_2B	My social relationships are supportive and rewarding	0.47
	Q7_5C	I often receive the social and emotional support that I need to facilitate good mental health	0.37
	Q7_5A	I often feel alone in my neighborhood	0.67
Neighborhood Cohesion	Q6_2A	I often visit my neighbors in their homes	0.65
	Q6_2B	My neighbors visit me on my birthday	0.54

	Q6_2C	I borrow / lend things to/from my neighbors	0.72
	Q6_2D	I always ask my neighbors if I need advice	0.79

Table 3- Social Capital Items and Factor Loadings

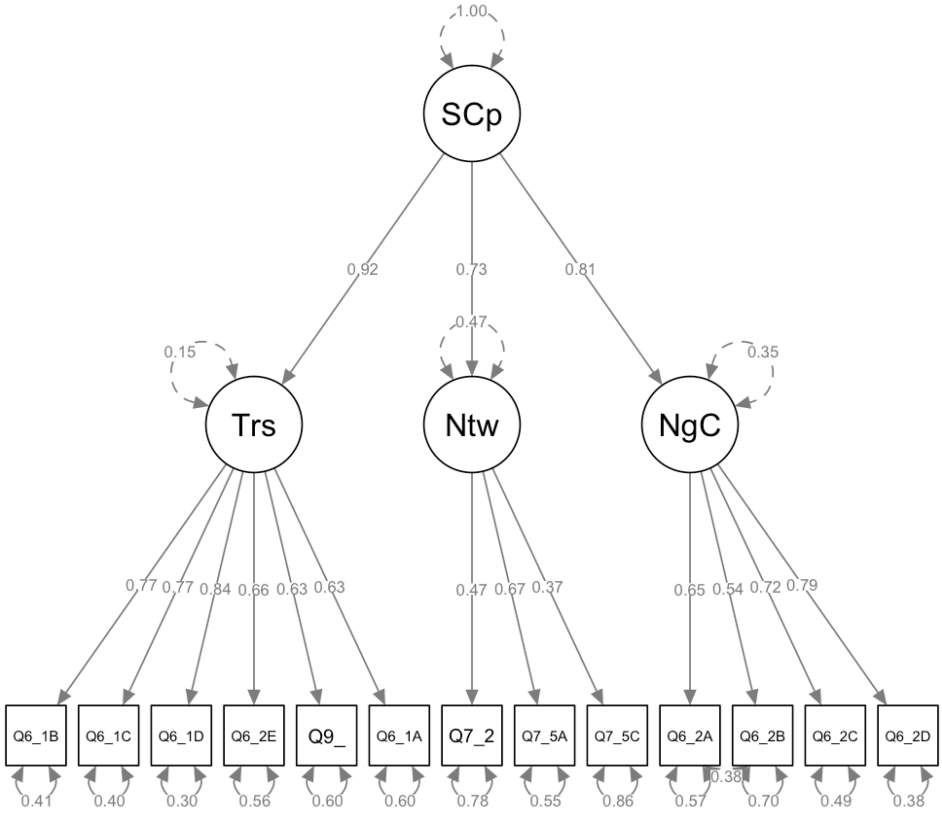


Figure 2 - Social Capital Factor Structure

The Cronbach's alpha reliability coefficient for all the social capital items was 0.87. This indicates good internal consistency between the items, or how much they reliably measure one unilateral latent construct. The proposition that this construct is a measure of social capital is validated by the adequacy of the factor structure measurement model (fit indices and factor loadings) we tested for using confirmatory factor analysis. Table 3 and Figure 2 show the items in the survey that were used for each of the social capital underlying variables, along with their corresponding factor loadings. Factor loadings

greater than or equal to 0.4 indicate that the item adequately loads on the construct, with higher loadings being better (Abell, Springer, & Kamata, 2009).

The response categories for the social capital items resembled a Likert scale with five response categories that indicate a respondent's level of agreement with the statement. In addition to the five response options, a "Don't know/No Response" category was provided as a response option. This category was considered as missing data and treated with the mean imputation method (Gelman & Hill, 2007). Finally, item Q7_5A was reverse coded so that a higher response indicates higher social capital.

Health Outcomes

The health outcomes used in the analysis include self-reports about several aspects of health, such as general health, physical health, mental health, and access to medical and dental care (see Table 4).

Survey Question No	Variable name	Survey Question
Q7_3	Physical health days	Now thinking about your physical health, which includes physical illness and injury, how many days during the past 30 days was your physical health not good (0-30)
Q7_4A	General health	In the past 12 months, my general health has been good
Q7_4B	Cost of care	In the past 12 months, I did not get medical care when I needed it because of the cost of care.
Q7_4C	Availability of care	In the past 12 months, I did not get medical care when I needed it because of the availability of care (e.g. office wasn't open, couldn't get time off work, etc.)
Q7_4D	Accessibility of care	In the past 12 months, I did not get medical care when I needed it because of the accessibility of care (e.g. language barriers, distance, cultural competency, etc.)
Q7_4E	Specialty care	In the past 12 months, I did not get specialty medical care because of cost, availability, or accessibility.
Q7_4F	Dental care	In the past 12 months, I did not get dental care because of cost, availability, or accessibility.
Q7_5B	Mental health	In the past 30 days, there have been 14 or more days when my mental health was not good.

Table 4- Health Outcome Items from the 2018 AACS

For all the questions except Q7_3, response options resembled a Likert Scale were [1] indicates "Strongly Agree" and [5] indicates "Strongly Disagree". The questions were worded so that answering

"strongly disagree", or a 5 on the Likert scale, is indicative of better health. Q7_3 was left as a continuous variable indicating the number of days the respondent's physical health was not good. Item Q7_4A were reverse coded so that higher response indicates a positive general health.

Linear Regression Modeling

A linear regression model is a statistical method to test the null hypothesis that an independent variable is not correlated with a corresponding dependent variable. A significant correlation with a probability value less than 0.1, indicates that we fail to reject the null hypothesis for the correlation, and thus find evidence for a relationship between the independent and dependent variable. Our hypotheses regarding the relationships between social risk factors, social capital, and health outcomes were the following:

- We expect higher social capital, income, and educational level to be correlated with positive health outcomes across the survey health items.
- We expect health disparities in African Americans, Hispanics, older individuals, and more rural residents.
- We expect males to perform worse than females on mental health.

To test the hypotheses, we ran 11 linear regression models where the dependent variables are respective health outcome items, and independent variables as the social-risk factors and social capital constructs.

To examine whether social capital operates differently in low income populations, we partitioned a "low-income" population in our survey and ran the same models on this new population. Low-income designation was computed in the following manner: If household size was below 2 people and household income was below $35,000, or household size was above 2 people and household income was below $55,000. This resulted in a sample size of 195 respondents (for descriptive statistics see Appendix 2).

Results and Discussion

Results from our analysis confirm the effect of social capital on health outcomes, as well as disparities in social capital among socio-demographic groups in the Austin area. This results and discussion section will begin by discussing social capital in the general population and its relationship to health outcomes. We will then discuss disparities in social capital among socio-demographic subgroups.

Social capital and health in the Central Texas general population

As previously outlined, social capital as measured in the survey includes three dimensions: trust, networks, and neighborhood cohesion. For analytical and discussion purposes, we centered the measures so that the mean score is 0 and the scores were standardized around the mean of 0. Table 5 reports the descriptive statistics of the social capital measures. For the second order latent social capital construct, we report a mean of 0, standard deviation of .905, a minimum score of -3.741 and a maximum score of 1.932.

Social capital measure	N	Mean	Standard Deviation	Minimum	25th Percentile	75th Percentile	Maximum
Trust	936	0.000	2.470	-11.264	-0.829	0.977	4.763
Networks	936	0.000	1.221	-5.054	-0.554	0.708	2.536
Neighborhood Cohesion	936	0.000	1.526	-4.501	-1.148	1.107	3.536
Social Capital	**936**	**0.000**	**0.905**	**-3.741**	**-0.398**	**0.437**	**1.932**

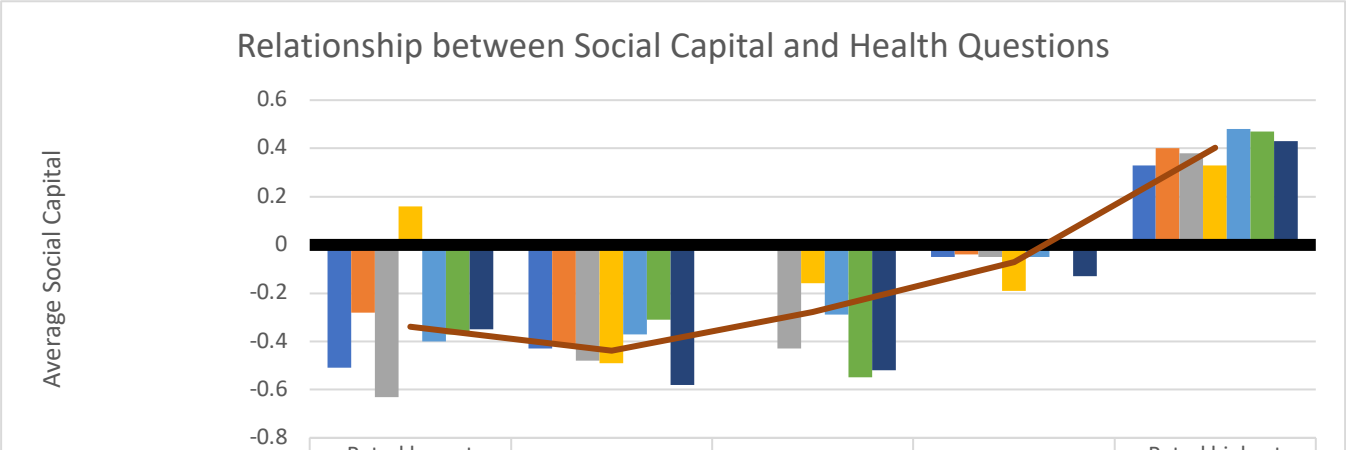
Table 5- Distributions for Social Capital Variables

After assigning a score for each social capital dimension, as well as a social capital score, to each survey respondent we looked for a relationship between social capital and health. The descriptive statistics of the health questions we explored in the analysis are in Table 6.

Question #	Health Indicator	N	Mean	Standard Deviation	Minimum	25th Percentile	75th Percentile	Maximum
Q7_3	Physical health days	936	3.774	7.680	0	0	3	30
Q7_4A	General health	936	3.956	0.906	1	4	4	5
Q7_4B	Cost of care	936	3.777	1.115	1	4	4	5
Q7_4C	Availability of care	936	3.962	0.957	1	4	5	5
Q7_4D	Accessibility of care	936	4.079	0.844	1	4	5	5
Q7_4E	Specialty care	936	3.760	1.114	1	4	4	5
Q7_4F	Dental care	936	3.550	1.237	1	2	4	5
Q7_5B	Mental Health	936	4.116	0.829	1	4	5	5

Table 6- Distributions for the Health Outcome Items

Examining the relationship between social capital and the range of health questions analyzed, a clear pattern emerges (see Figure 3). This figure demonstrates a strong relationship between social capital scores and ratings on health questions. Although important differences among questions exist, we see the general relationship by following the average line in Figure 3, which represents the average social capital score across all of the health questions. Ratings 1-3 have below average social capital, rating of 4 is about average social capital, and then a rating of 5 is positive social capital across all questions.



	Rated lowest				Rated highest
General health	-0.51	-0.43	0	-0.05	0.33
Cost of care	-0.28	-0.41	0	-0.04	0.4
Availability of care	-0.63	-0.48	-0.43	-0.05	0.38
Accessibility of care	0.16	-0.49	-0.16	-0.19	0.33
Specialty care	-0.4	-0.37	-0.29	-0.05	0.48
Dental care	-0.37	-0.31	-0.55	0.01	0.47
Mental Health	-0.35	-0.58	-0.52	-0.13	0.43
Average	-0.34	-0.44	-0.28	-0.07	0.40

Figure 3- Relationships between Social Capital and Health Items

As Figure 3 demonstrates, there is a strong relationship and correlation between social capital scores and health questions. Using linear regression, the next step was to establish whether or not the differences between these groups were statistically significant. Table 7 reports the results of the eight different linear regression models that were analyzed that use social determinants as independent variables (social capital, plus the social risk socio-demographic variables). The results of the models illustrate statistically significant relationships among both social capital and social risk factors. Statistically significant coefficients are in bold, as are social determinant variables that had significant effects across a wide variety of models. Important to note that the sample size for the regression analysis

is 722. Within the sample of 934, there were respondents who did not report some of their demographic information, which resulted a reduction of the sample size to those that we had complete information for (see demographic breakdown for this sample in Appendix 2).

	Regression Models with the following dependent variables							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Social Determinants (independent variables)	Physical health days	General health	Cost of care	Availability of care	Accessibility of care	Specialty Care	Dental care	Mental Health
Social Capital	**-1.320*****	**0.181*****	**0.166*****	**0.183*****	**0.131*****	**0.172*****	**0.180*****	**0.200*****
Race/Ethnicity (Reference is White)								
Race-Black	0.804	-0.086	-0.083	**-0.258***	-0.153	0.006	-0.083	-0.010
Race-Hispanic	**-1.937*****	-0.025	0.009	-0.126	-0.062	0.034	0.113	0.065
Race-Other	0.356	-0.103	**-0.270***	**-0.430*****	-0.130	**-0.268***	-0.148	-0.035
Education (Reference is College Degree)								
Less than HS Diploma	0.595	0.057	0.201	-0.127	**-0.287****	0.105	-0.191	-0.004
HS Grad no College	-0.868	0.106	-0.036	-0.146	-0.127	0.037	**-0.365*****	-0.023
Some College/Associates	0.112	0.017	-0.036	-0.013	-0.006	-0.057	**-0.242****	-0.093
Advanced Degree	0.119	**0.165***	0.032	0.095	0.059	-0.073	-0.018	0.047
Age (Reference is 25-34)								
18-24	-0.005	0.062	**0.483*****	0.157	0.203	0.268	**0.342***	0.138
35-44	1.410	-0.099	0.105	-0.008	-0.125	0.020	0.176	**0.196***
45-54	**2.434****	**-0.241****	0.207	0.176	-0.079	0.213	0.204	**0.241****
55-64	**2.872*****	**-0.205***	**0.375****	0.147	-0.008	**0.311****	0.240	0.169
65 and Older	**2.891*****	-0.184	**0.661*****	**0.411*****	0.154	**0.691*****	**0.635*****	**0.351*****
Income (Reference is $55,000-$75,000)								
Less than $35,000	**2.543*****	**-0.348*****	**-0.526*****	**-0.238****	**-0.232****	**-0.436*****	**-0.489*****	**-0.401*****

$35,000-$55,000	**1.483***	**-0.207****	-0.005	**-0.255****	**-0.223****	**-0.232***	-0.133	**-0.066**
$75,000-$95,000	-0.212	-0.109	**0.267***	0.059	0.147	0.193	**0.300****	0.034
$95,000-$125,000	-0.396	-0.009	0.193	0.134	0.066	0.199	**0.295****	-0.054
More than $125,000	**-1.684***	0.120	**0.452*****	**0.238****	**0.198***	**0.482*****	**0.661*****	**0.176***
Residential Context (Reference is Urban)								
Residence-Suburban	-0.091	0.077	0.066	-0.021	0.069	0.030	0.131	**0.247*****
Residence-Rural to Suburban	-0.453	**0.207***	0.005	-0.014	0.089	-0.077	0.055	**0.225****
Residence-Rural	1.024	**-0.192****	-0.183	-0.087	0.005	**-0.247****	0.117	0.032
Constant	1.436	4.249***	3.306***	3.695***	3.846***	3.425***	3.022***	3.871***
Observations	772	772	772	772	772	772	772	772
R^2	0.107	0.138	0.191	0.196	0.157	0.195	0.220	0.177
Adjusted R^2	0.075	0.107	0.162	0.167	0.126	0.166	0.192	0.147
Residual Std. Error	7.112 (df = 744)	0.835 (df = 744)	1.039 (df = 744)	0.898 (df = 744)	0.791 (df = 744)	1.036 (df = 744)	1.129 (df = 744)	0.778 (df = 744)
F Statistic	3.317***(df = 27; 744)	4.425***(df = 27; 744)	6.500***(df = 27; 744)	6.720***(df = 27; 744)	5.114***(df = 27; 744)	6.674***(df = 27; 744)	7.777***(df = 27; 744)	5.920***(df = 27; 744)

Table 7- Results of Linear Regression with Health as Dependent Variable

Of the eight models, physical health (model 1) is the only model where a negative number indicates a positive effect since the coefficient represents an estimate of number of days that physical health was not good. The mean response to this question was 6.3 days of "physical health not being good during the past month." The regression results indicate that social capital significantly reduces the number of days physical health was not good. ***One standard deviation increase in social capital score equates to 1.3 days a month of better physical health.*** Social capital positively affected responses in all health models. For mental health, respondents were asked: In the past 30 days, there have been 14 or more days when my mental health was not good. Social capital had a significant positive effect on this question, meaning respondents were more likely to disagree with the question. Social capital had a significant positive effect mitigating the challenges of cost, availability, and accessibility of care; also, specialty care and dental care.

The results also point to a number of social risk factors that influence health. Age and income were the variables with the most effects across the eight models. For example, lower income individuals had more days where physical health was not good. They were also more likely to report cost, accessibility, availability, etc. of health care as problems. Income category <$35,000 had a statistically

significant effect across all models. Relatedly, the individuals in the highest income category had fewer days where physical health was not good. They were also less likely to report that cost, accessibility, availability, etc. of health care as problems. ***One interesting finding is the effect of being Hispanic on physical health, which is positive, with a reported two days of better physical health compared to the reference white category***. Finally, we found a ***significant negative effect for education on dental health*** - for the two lowest education categories – in model 7 (dental health). Rural transitioning to suburban residential contexts had a positive effect on health, whereas rural residential context had a negative effect on model 2 (general) and model 6 (specialty).

Disparities in Social capital in the Central Texas General Population

In the general population, social capital scores resemble a distribution close to a normal distribution with some left skewness. The percentage of individuals within one standard deviation of the social capital mean are around 73% (68% in a normal distribution). This significant variation

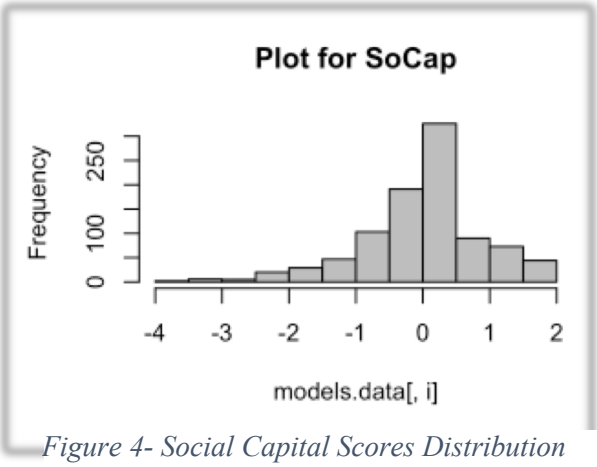


Figure 4- Social Capital Scores Distribution

individuals' social capital is driven by 3 socio-demographic variables: race/ethnicity, age, and income. We found no significant effects for education levels, county, or place of residence (e.g., urban, rural, etc.). These results are summarized in Figure 4.

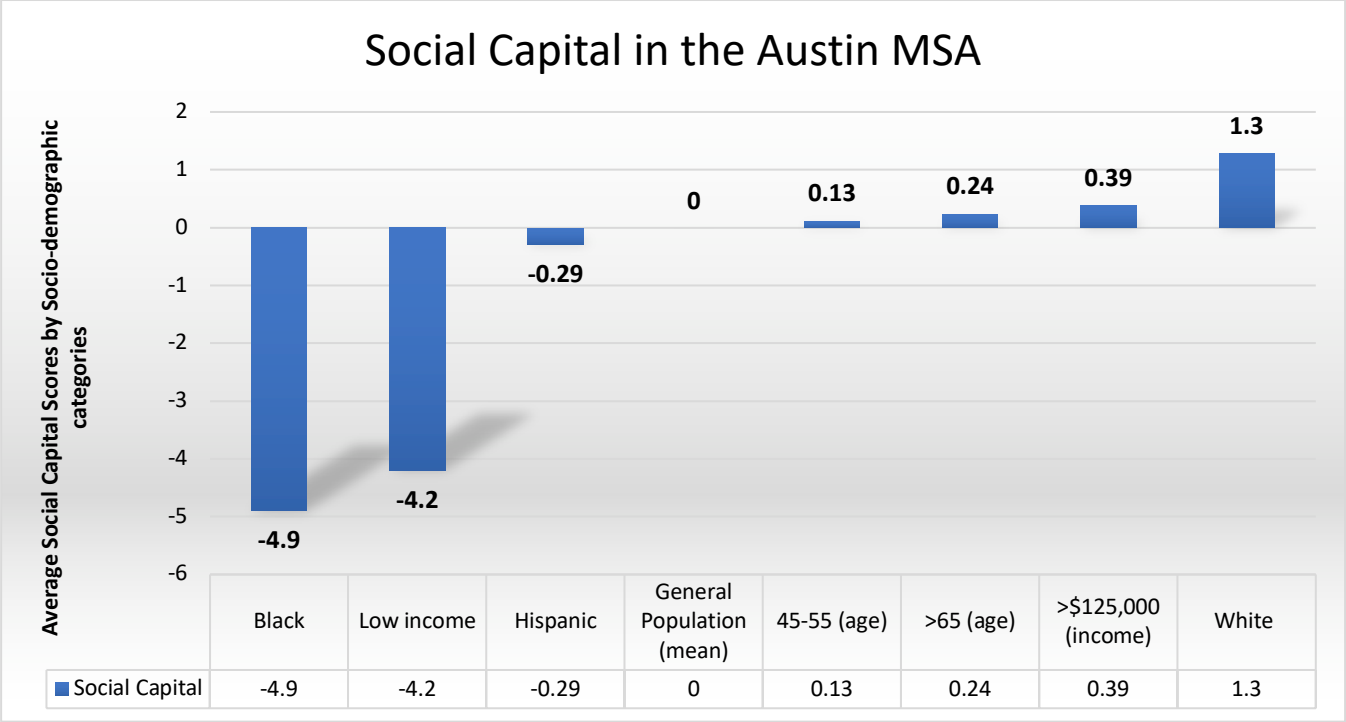


Figure 5- Social Capital in the Austin MSA

Figure 4 illustrates a general population mean centered at zero and disparities across different categories. In sum:

- Average social capital for African Americans was -4.9, as compared to that of Hispanics, -0.29, and Whites, 1.3.
- Low income resident's average social capital was -4.2 while residents with income >$125,000 had an average social capital equal to 0.39 (low income defined as household size < 2 people, income <$35,000; or household size >2 people, household income was <$55,000).
- Residents in the age category "45-55" had an average social capital of 0.13, which is slightly lower than those in the "65 and older" category, 0.24

This demonstrates the interaction between social risk factors and social capital and highlights the disparities that exist in the social capital of different socio-demographic groups. These disparities are proven to be significant through running a regression for the effect of being in a socio-demographic group on social capital.

Dependent variables	(1) Social Capital	(2) Trust	(3) Bonding Networks	(4) Neighborhood Cohesion
Race/ethnicity (Reference is Race-White)				
Race-Black	**-0.586*** **	**-1.454*** **	**-0.732*** **	**-1.097*** **
Race-Hispanic	**-0.223*** **	**-0.603** **	**-0.200***	**-0.392*** **
Race-Other	-0.087	-0.176	-0.150	-0.200
Age (Reference is 25-34)				
18-24	0.024	0.246	0.026	-0.286
35-44	0.162	0.516	0.136	0.154
45-54	**0.328*** **	**0.964*** **	**0.347** **	**0.392** **
55-64	0.161	0.499	0.121	0.188
65 and Older	**0.521*** **	**1.470*** **	**0.618*** **	**0.684*** **
Income (Reference is $55,000-$75,000)				
Less than $35,000	**-0.459*** **	**-1.217*** **	**-0.796*** **	**-0.543*** **
$35,000-$55,000	**-0.279*** **	**-0.833*** **	**-0.292** **	**-0.315***
$75,000-$95,000	-0.086	-0.322	-0.062	-0.003
$95,000-$125,000	0.117	0.186	**0.260***	**0.318***
More than $125,000	**0.319*** **	**0.719** **	**0.588*** **	**0.579*** **
Residential context (Reference is Urban)				
Residence-Suburban	-0.106	-0.303	-0.153	-0.114
Residence-Rural to Suburban	-0.122	-0.397	-0.046	-0.146
Residence-Rural	-0.086	-0.175	**-0.242***	-0.126
Constant	-0.059	-0.220	0.015	-0.048
Observations	772	772	772	772

R^2	0.183	0.166	0.215	0.161
Adjusted R^2	0.154	0.137	0.188	0.132
Residual Std. Error	0.840 (df = 745)	2.330 (df = 745)	1.098 (df = 745)	1.435 (df = 745)
F Statistic	6.415^{***}(df = 26; 745)	5.703^{***}(df = 26; 745)	7.859^{***}(df = 26; 745)	5.503^{***} (df = 26; 745)

Table 8- Results of Linear Regression with Social Capital as a Dependent Variables

The results in Table 8 illustrate the effects of different socio-demographic factors on social capital and the three dimensions. ***Significant negative effects of race/ethnicity, both Hispanic and black, are found across all dimensions of social capital as compared to white category***. While controlling for race/ethnicity, there are also significant effects in the lower income categories, compared to the reference category of $55,000-$75-000, and positive effects of the higher income categories. ***When controlling for other socio-demographic variables, we didn't find significant effects of education.*** There were no significant differences between counties or gender.

There seemed to be only few instances were being part of a socio-demographic group had significant effect on a certain type of social capital, but not another. For instance, being in the "$95,000-$125,000" income category was correlated with higher network bonding social capital, but not higher perceptions of trust, neighborhood cohesion, or overall social capital. Also, being a rural resident was correlated with lower network bonding only. This lack of divergent effects on social capital sub-constructs is likely due to the high correlations between the three sub-constructs. Conversely, although it would be interesting to explore the potential effects of trust, bonding networks, neighborhood cohesion on health outcomes, these relationships are also not discernable due to the high correlation between the sub-constructs in our sample.

Finally, the results for the models we ran on the low-income population to explore whether the social capital affects health-outcomes differently in that population did not verify that hypothesis. The salient features in these models were that social capital was not correlated with some of the health outcomes when (Q7_4B, Q7_4D, Q7_4E), and that being female was correlated with lower general health. Complete results can be seen in Appendix 1.

Conclusion and Recommendations

The data and analysis for this report confirm that social capital and social-risk factors are significant factors in health outcomes. Particularly our analysis finds that self-reported social capital is correlated with better self-reported health outcomes such as general health, physical health, mental health, and access to healthcare. Race and income are also salient factors correlated with both

divergences in social capital scores and health outcomes. Therefore, our results indicate that improving social connectedness in the Austin area could improve health outcomes, particularly within disadvantaged black and low-income communities.

Although interventions to raise social capital are scarce, there are some implications we can infer. First, the mechanism linking social capital to health communication and behavior, supports the importance of community outreach programs that revolve around the discussion of health issues. Other than bringing people together, such programs support the diffusion of information pertinent to health, which may improve health outcomes.

Second, the relationships between social capital and health outcomes is evidence for the need to support organizations that improve social cohesion. For instance, social clubs, neighborhood associations, as well as volunteering and community service organizations, bring people together towards joint goals which improves their connectedness. These organizations maybe targeted for improving a community's bonding social capital. However, a healthy society requires a balanced distribution of bonding, bridging, and linking capital (Poortinga, 2006). This emphasizes the importance of organizations that bring together dissimilar groups in society such as interfaith groups, and justice advocacy groups. Moreover, supporting social advocacy organizations may improve a community's capacity to advocate for better outcomes of which maybe local health services (e.g. paid-sick leave).

Third, the results indicate that interventions might be delivered differently across groups. For instance, groups that have lower social capital across income and race maybe more specifically targeted. The relationship between social capital and health through social support, is also evidence for the importance of social organizations that target mental health of certain groups like refugee groups, AA groups, and other recovery groups, not just as organizations that improve mental health through their therapy, but as organizations that improve health through keeping people connected.

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Appendix 1: Descriptive Statistics and Demographic Breakdown

Descriptive statistics-General Population

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Q7_1	934	7.863	1.644	1	7	9	10
Q7_3	934	3.852	7.833	0	0	3	30
Q7_4A	934	3.956	0.906	1	4	4	5
Q7_4B	934	3.774	1.112	1	4	4	5
Q7_4C	934	3.959	0.956	1	4	5	5
Q7_4D	934	4.076	0.843	1	4	5	5
Q7_4E	934	3.757	1.112	1	4	4	5
Q7_4F	934	3.550	1.234	1	2	4	5
Q7_5B	934	4.113	0.830	1	4	5	5
Q7_5D	934	2.230	1.080	1	2	2	5
Q7_5E	934	1.693	0.694	1	1	2	5
Trust	934	0.000	2.253	-10.362	-0.745	0.867	4.321
Networks	934	-0.000	1.194	-4.931	-0.562	0.686	2.483
NeighbCoh	934	0.000	1.553	-4.543	-1.171	1.135	3.587
SoCap	934	0.000	0.898	-3.668	-0.416	0.449	1.942
SoCap.For	934	0.000	1.560	-6.020	-0.754	0.819	3.464

Descriptive statistics-Low Income

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Q7_1	195	7.113	1.955	1	6	8	10
Q7_3	195	6.354	9.753	0	0	9	30
Q7_4A	195	3.656	0.995	1	4	4	5
Q7_4B	195	3.190	1.243	1	2	4	5
Q7_4C	195	3.508	1.123	1	2	4	5
Q7_4D	195	3.718	0.967	1	4	4	5
Q7_4E	195	3.246	1.236	1	2	4	5
Q7_4F	195	2.815	1.291	1	2	4	5
Q7_5B	195	3.697	1.048	1	4	4	5
Q7_5D	195	2.636	1.187	1	2	4	5
Q7_5E	195	1.872	0.710	1	1	2	5
Trust	195	-0.963	2.547	-10.362	-2.393	0.464	4.123
Networks	195	-0.689	1.287	-4.931	-1.621	0.130	2.340
NeighbCoh	195	-0.597	1.601	-4.543	-1.775	0.630	3.416
SoCap	195	-0.417	0.986	-3.668	-1.072	0.223	1.728
SoCap.For	195	-0.749	1.697	-6.020	-1.917	0.419	3.041

Low Income category

```
##         County           Gender          Race
##  Bastrop   :43   Male       : 71   White   :94
##  Caldwell  :46   Female     :123   Black   :14
##  Hays      :23   Transgender:  0   Hispanic:64
##  Travis    :68   NA's       :  1   Other   :17
##  Williamson:15                     NA's    : 6
##
##                              Education            Age
##  Less than HS diploma              :29   18-24       :32
##  HS grad no college                :44   25-34       :29
##  Some college or associates degree:67   35-44       :35
##  College graduate                  :40   45-54       :31
##  Advanced degree                   :15   55-64       :30
##                                          65 and older:38
##                 Income                          Residence  lowincome
##  Less than $35,000 :132   Urban                      :52   No :  0
##  $35,000-$55,000   : 63   Suburban                   :54   Yes:195
##  $55,000-$75,000   :  0   Rural changing to Suburban:18
##  $75,000-$95,000   :  0   Rural                      :63
##  $95,000-$125,000  :  0   NA's                       : 8
##  More than $125,000:  0
```

Demographic Breakdown for General Population (Model Sample)

```
##         County            Gender          Race
##  Bastrop   :135   Male       :348   White   :512
##  Caldwell  :133   Female     :422   Black   : 47
##  Hays      :110   Transgender:  2   Hispanic:155
##  Travis    :285                     Other   : 58
##  Williamson:109
##
##                              Education             Age
##  Less than HS diploma              : 46   18-24       : 75
##  HS grad no college                :122   25-34       : 90
##  Some college or associates degree:201   35-44       :142
##  College graduate                  :252   45-54       :149
##  Advanced degree                   :151   55-64       :129
##                                           65 and older:187
##                 Income                          Residence   lowincome
##  Less than $35,000 :121   Urban                      :174   No :592
##  $35,000-$55,000   :132   Suburban                   :300   Yes:180
##  $55,000-$75,000   :130   Rural changing to Suburban:100
##  $75,000-$95,000   :111   Rural                      :198
##  $95,000-$125,000  :128
##  More than $125,000:150
```