A Solution for Senior Solutions:

How Social Connectedness Can Influence Aging Adults' Health

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Socy 11: Research Methods

Dartmouth College

March 17, 2021

LITERATURE REVIEW

For several decades, scholars have characterized old age as a time of social isolation. For example, Cumming and Henry (1961) framed old age as a time of voluntary disengagement, withdrawal, and reduced social integration. Understanding the social connectedness of older adults is important since there are many implications for its impact on the mental and physical wellbeing of older adults. Previous research has revealed that aging leads to decreased social connectedness among aging populations, leading to negative health effects (Cornwell and Waite 2009). Notably, social isolation has been shown to be a significant predictor of mortality and serious morbidity on the same level as cigarette smoking and other major biomedical risk factors such as obesity (House 2001).

Until now, research on social connectedness and health of older adults has primarily been driven by analysis of national longitudinal surveys such as data from the National Social Life, Health, and Aging Project (NSHAP). However, these surveys do not capture the nuanced impact of local intervention programs, such as area agencies on aging. Our goal is to provide greater understanding of the impact of intervention programs on the social connectedness and physical and mental health of aging adults.

Social Disconnectedness among Older Adults

Previous literature has characterized social isolation as being both objective and subjective. Cornwell and Waite (2009) define social isolation as encompassing both *social disconnectedness* and *perceived isolation*. *Social disconnectedness* is an objective measure that includes characteristics such as a small social network, infrequent social interaction, and lack of participation in group activities. *Perceived isolation* is defined by the subjective experience of a shortfall of resources such as companionship and support (Cornwall and Waite 2009).

Sociologists have also included *loneliness* as an aspect of *perceived isolation* (van Baarsen et al. 2001). *Loneliness* is defined as a "subjective state that reflects the distance one feels between self and others" (Russell 2009).

A large body of research has shown that both objective and subjective measures of social disconnectedness are strongly linked to health factors for aging adults. It is important to consider both dimensions simultaneously, as the presence of one does not automatically indicate the presence of another. For example, scholars have found no evidence that living alone was self-selecting, or that single people had worse health, even though the individuals were more socially disconnected than peers who lived with others (Hughes and Gove 1981).

Why are older adults socially isolated?

Many factors potentially contribute to the social isolation of older adults. Classical social theory states that older adults' experience a gradual and irreversible abandonment of social roles, weakening of social bonds, and voluntary disengagement (Cumming and Henry 1961). Theories of modernization attribute social isolation to the breakdown of traditional family structure and subsequent decline in the status of older adults. These classical social theories have contributed to a certain narrative that characterizes older adults as disengaged. This sentiment towards older adults has manifested in modern public policy through age limits for hiring, early retirement, and lack of accessibility (Townsend 1981). Recent research, however, has provided evidence contrary to these classical views of aging. Survey-based research has found that while aging is linked to shrinking network sizes, age is positively associated with the presence of higher quality relationships (Cornwell et al. 2008). While the understanding of social connection among older adults continues to evolve, it is clear that social networks, the quality of social relationships, and

frequency of social activities all play an important role in both the social disconnectedness and perceived isolation among older adults.

I. Physical and Mental Health-Related Consequences of Social Isolation

Research has found that social isolation leads to higher risks of mental and physical health problems among older adults (Cacioppo and Hawkley 2003; Tomaka et. al. 2006). Specifically, psychological research has demonstrated associations between worsened health and increased feelings of loneliness, resulting in a higher likelihood of cardiovascular disease, inflammation, and depression (Hawkley et. al. 2006). Social connectedness also protects and promotes mental health, while social isolation worsens mental health (Saeri et al. 2018; Cacioppo et al. 2006; Hawton et. al. 2010). Cacioppo and Cacioppo (2014) found that older adults who reported higher levels of loneliness and social disconnectedness demonstrated poorer cognitive functioning in the long-term and experienced increased levels of depressive symptoms.

While research has found that social isolation negatively impacts health, studies have also examined social connectedness as buffers against health effects. For example, socially connected individuals who have strong social support from family members, close friends, and co-residents experience reduced levels of stress, since they can occupy better coping strategies and have higher self-esteem (Waite and Hughes 1999; Cornman et al. 2003; Ernst and Cacioppo 1999). Furthermore, an individual's social network and amount of social participation allows greater access to resources such as transportation, financial support, and emotional support, reducing the likelihood of mental and physical health problems (Ellison and George 1994; Haines and Hurlbert 1992; Lin 2001). Worsened health can also prevent older adults from participating in social activities and maintaining close social ties, producing a cycle of worsened health and increased social isolation (Li and Ferraro 2006).

II. The Role of Intervention Programs

Research has demonstrated that intervention programs can ameliorate health problems by offering experiences of social connection (Webber and Fendt-Newlin 2017). Local interventions in rural Ireland communities have aided social isolation, showing ways Irish communities have built bonds with one another (Heenan 2010). Recently, research found that a telephone outreach program that provides friendly conversation with nursing home residents promoted the social well-being of seniors who "looked forward to their weekly phone calls" and experienced "gratitude for social connectedness" (van Dyck et. al. 2020).

Although these studies demonstrate the positive effects of intervention programs, few research examine their impact on social connectedness and health among aging adults. For instance, studies that focus on aging populations often emphasize well-being over physical health (van Dyck et. al. 2020). Studies targeting rural populations do not focus on aging populations (Heenan 2010). Therefore, our research aims to address these gaps in literature by examining intervention programs' effects on aging adults in rural New England, where the demographic has a higher concentration of older people. We aim to address the ways intervention programs can offer means of social connectedness to improve mental and physical health.

RESEARCH QUESTION

In our research, we focus on one particular intervention program: Senior Solutions, an Area Agency on Aging in Vermont established in 1973. Their 38-person staff and $4 million annual budget allows them to provide services and resources to people ages 60 and up in southeastern Vermont. Their goal is to help seniors age in the place of their choice, maintain physical and mental health, and actively engage in their community. The majority of their services and resources are dedicated to specifically helping seniors who live independently.

Senior Solutions connects volunteers with isolated seniors through home visits, and they also provide services that connect isolated seniors to local social events. To improve seniors' mental health, they offer a free in-home counseling program. They also have many resources to improve seniors' physical health, such as Tai Chi classes, dance classes, and a healthy living workshop. While they specifically serve the seniors of southeastern Vermont, their mission states that they want every senior to happily and healthily age in the place they desire.

Given their mission statement, Senior Solutions is looking for a method of assessing the efficacy of their programs and services. Specifically, they are interested in knowing more about the effect of their programs on seniors' mental health, physical health, and social connectedness. *Therefore, this research seeks to examine the effect of participation in Senior Solutions's programs on overall health, and how social connectedness might mediate this relationship.*

METHODS

Independent Variable: Program Participation

In our study, we will be conducting a cross-sectional survey that measures the relationship of participation in senior solutions with social connectedness and mental and physical health. We will use a deductive approach by presenting hypotheses and gathering data to test them. An inductive approach would not suit this project because there is no existing data to support our research question. Our independent variable measures participation in Senior Solutions, and we define participation as the action of being involved in a project, program, or activity of some sort. We first ask about their living situations in order to gauge context about the participants. Then we ask if participants have been referred to an assistance program by Senior Solutions, and if so, the type of assistance they received. Our last question addresses the frequency of participation using an ordinal scale ("Daily," "once per week," "a few times per

month," etc). We believe that these questions will provide Senior Solutions with a comprehensive understanding of aging adults' experiences (or lack thereof) with their program.

Intervening Variable: Social Connectedness

Our intervening variable assesses the level of social connectedness participants experience, through nine objective and subjective indicators. One of our objective indicators asks, "In the past month, how often have you interacted with friends or family in person?" Our subjective measures ask, "To what degree do you value your personal time and being around others?" and "Do you feel that you have a reliable person you could turn to if you were going through a difficult time in your life?" Previous research has linked both objective and subjective measures of social connectedness to health factors among older adults (Cornwell and Waite 2009). Therefore, it is necessary to target both of these dimensions, since the presence of an objective experience may not indicate the presence of a subjective experience and vice versa. By addressing various aspects of social connectedness, Senior Solutions can gain comprehensive results, devising well-informed solutions to ways they can improve health.

Dependent Variables: Physical and Mental Health

We use self-rated measures to assess both physical and mental health. We first measured physical health with the standard question, "In general, would you say your health is: excellent, vey good, good, fair, or poor?" We hope that this self-rated measure will provide an accurate assessment of participants' perception of their health, as previous studies have demonstrated that self-ratings are predictive of mortality (Cornwell and Waite 2009). We then provide respondents with a 10-item measure listing typical physical activities and ask, "Does your health now limit you in these activities? If so, how much?" Some items in the list include, "Lifting or carrying groceries," "Climbing several flights of stairs," and "Walking more than a mile." Respondents

are asked to mark these items using an ordinal scale of "Yes, limited a lot," "Yes, limited a little," or "No, not limited at all." Our last indicator addresses whether or not the participant's physical health prevents them from accomplishing work or other daily activities. With these two indicators, we hope to understand the extent to which one's physical health has an impact on their daily life.

We measure mental health through five indicators, including mental health's intersections with physical health and social connectedness, as well as measures of depressive symptoms over a four-week period. For instance, our question about depressive symptoms lists 8 items, two of which are: "Have you felt so down in the dumps that nothing could cheer you up?" and "Did you feel tired?" Respondents are then asked to answer from a scale of 1 to 6, with 1 as "All of the time" and 6 as "None of the time." By assessing depressive symptoms, Senior Solutions can assess the possible impact of social isolation on these symptoms. We also devised two indicators targeting the participants' physical and mental health on their ability to participate in social activities. These questions aim to assess whether or not physical and/or mental health may influence older adults' engagement with forms of social connection. These indicators may help Senior Solutions gain an understanding of the extent to which physical and mental health play crucial roles in one's level of social connectedness.

We expect the following hypotheses from our variables:

H1: There will be a positive association between program participation and overall health

H2: There will be a positive association between program participation and social connectedness

H3: There will be a positive association between social connectedness and overall health

Why a Survey?: Advantages and Disadvantages

To examine the connections between our variables, we designed a mixed-methods survey (see Appendix A). The survey is available in Qualtrics, an online survey website, and in printable formats for mailing. The full survey should take about ten minutes to complete. The mail survey option is a useful tool to reach seniors who are less comfortable with an online format. Since Senior Solutions has a successful history of phone surveys, we have also adapted the survey to a reduced version to administer over the phone. Senior Solutions is welcome to choose whatever combination of survey distribution methods they feel will best serve their needs.

A survey was the ideal method of data collection for several reasons. Surveys are typically shorter for respondents to complete, which can increase the response rate of participants. Moreover, quantitative data collected from surveys are more straightforward to interpret and less time-consuming to analyze than qualitative data from interviews or field observations, which can require specific expertise to interpret. Qualtrics has several built-in analysis techniques that can be found under its "Data & Analysis" tab, which can aid in the interpretation of survey results. Surveys are also beneficial to cross-sectional research because their distribution can easily be stopped or started whenever Senior Solutions wishes to collect data.

Surveys are not without their disadvantages. Survey data are limited to a set number of questions and response options. This presents a number of difficulties compared to less structured qualitative formats, like in-depth interviews. For example, participants cannot ask researchers followup questions to clarify the meaning of response options. Researchers also cannot gauge the lived experiences of participants through more open-ended questions, and cannot ask participants to expand on topics. Unlike field observations, surveys measure

self-reported data. This opens the potential for biased results; participants might select response options that they think researchers would like to hear, or might choose responses that do not reflect their true experiences. For example, a senior experiencing depressive symptoms might be reluctant to indicate so, because they do not think of themselves as a depressed person.

Who will take the survey?

Our target population is seniors from Windsor and Windham counties in Vermont, the primary service area for Senior Solutions. The sample will be collected using non-probability sampling, primarily snowball sampling. Seniors living independently who have previously participated in Senior Solutions's programs will be asked to participate in the study. After they have been recruited, they will be asked to refer seniors they know who live independently and have never participated in Senior Solutions's programs. However, there are limitations to this recruitment method. Seniors who can refer someone or who have someone who can refer them are already, at bare minimum, socially connected. Using only this sampling method might then result in a sample with higher social connectedness than the target population.

We propose using purposive sampling as a supplementary sampling method to increase recruitment among seniors, a typically harder to reach demographic. Recruitment flyers could be posted at local grocery stores and bulletin boards in the center of town. Each town in the area has an email listserv, so information could be sent to these listservs to recruit local seniors. Furthermore, information about the survey could be posted in local newspapers such as the Valley News. We recognize that non-probability sampling methods are limited in that they cannot guarantee a random sample. Seniors who check town bulletin boards, email listservs, and the newspaper might be either more or less socially connected on average than those who do not. They also might have better mental and physical health than those who do not check these

sources, as they are mentally and physically able to go to the grocery store, use a computer, or read the newspaper. Senior Solutions should keep these limitations in mind when interpreting the data collected from the surveys.

Generalizability, Reliability, and Validity

Our research is generalizable to others seniors in the Upper Valley, where similar services are readily available. Our survey is specific enough to show Senior Solutions how they are impacting older adults, but the survey can be extended to other intervention programs such as the other four Area Agencies on Aging in Vermont. This can allow for more robust results in the future after Senior Solutions validates the concept of the research design for seniors in Windsor and Windham counties.

Our survey design is reliable, as we have multiple questions that determine characteristics of the independent, dependent, and intervening variables. This maximizes reliability by validating the internal consistency of our survey responses. This characteristic is a strength of our survey design as it allows us to create a specific map of each participant to accurately determine the relationship of our variables within them, and then place this data in our sample to obtain a holistic view.

In our research design, we are able to achieve validity in our survey questions by utilizing well-researched methods from previous literature. To generate our survey questions, we pulled together measures of social connectedness, physical health, and mental health from previous peer-reviewed survey designs that measured these concepts. We were intentional in asking questions that measured both the objective and subject measures of social connectedness, which we identified in the previous literature as having distinct impacts on physical and mental health.

Validity ensures that our survey questions reflect important issues for aging adults. (Cornwell and Waite 2009).

How will results be analyzed and interpreted?

Since the survey is implemented in Qualtrics, Senior Solutions has a variety of options to tabulate and interpret the results. The first step will be to aggregate the survey data by inputting mail and telephone survey results into the online Qualtrics platform. Once the data has been aggregated, Senior Solutions can utilize the attached survey analysis guide (see Appendix D) to aid in the interpretation of the results. The survey analysis guide provides information on how to interpret the correlations between the independent variable, intervening variable and dependent variable.

Strengths & Weaknesses of Research Design

Our proposed research design was designed with Senior Solutions's limited resources in mind. The survey design is low-cost and flexible as it spans several possible methods of outreach. Our targeted approach to reaching seniors is cost-effective in sampling a larger number of individuals, which gives more statistical power to our results. Moreover, our survey was designed to take less than 10 minutes to complete, which should increase the response rate and make it easier to administer over the phone. The concepts we cover in our survey questions span well-researched topics in sociology and can generate meaningful insights for organizations that support seniors. If other Area Agencies were interested in implementing our survey design, there would be minimal cost to expand the sampling frame to encompass additional areas in the Upper Valley.

A potential weakness of our proposed design is the inability to draw causal relationships for the general aging population. Since our method uses a purposive sampling method to reach a

typically harder to reach population, there are confounding factors that could bias the survey results. Furthermore, several of our survey questions rely on self-reported metrics of health and social connectedness, which can cause our data to be attenuated. While this limits the generalizability of this research design for overall aging populations, our research design will still be able to produce meaningful insights for Senior Solutions and other Area Agencies for Aging that serve the aging population in the Upper Valley.

ETHICAL CONSIDERATIONS

When conducting sociological research, it is important to ensure the ethical treatment of participants. The Belmont Report (United States 1978) outlines three key pillars of ethical research: respect for persons, beneficence, and justice. This report will briefly detail each of these measures and describe how this study can account them.

I. Respect for Persons

Respect for persons is an ethical principle that entails both respecting the autonomy of study participants and protecting participants with reduced autonomy. Compliance with this guideline demands informed consent, data privacy, and protection of vulnerable populations. To take part in this study, participants must sign an informed consent form (see Appendix A) that describes the study, its risks, compensation, and other relevant topics. While signatures are not collected online, consent is measured from two additional questions. Given that this study's target population is senior citizens, participants may have reduced autonomy. If Senior Solutions considers this a significant concern, they should use a form to secure consent from a second party as an extra precaution. This may reduce sample size by excluding people living alone, or reducing participation from people who feel offended from having their autonomy questioned.

We believe that the self-selection of survey participation itself will guard against any possible issues of respondents with reduced autonomy.

Protection of privacy is another important component of respect for persons. In the initial recruitment survey, we will need to collect names and addresses of potential participants. To protect anonymity, no identifying information will be collected in the survey itself. In the same vein, contact information from the recruitment survey must be stored in a separate spreadsheet from the main survey data, to prevent linking identifying information with responses. This identifying data should only be held onto until a response is collected from that participant. Once a confirmed survey response has been recorded, any related contact data should be erased. Envelopes with return addresses should be similarly discarded.

II. Beneficence

Beneficence is an ethical principle requiring that researchers maximize potential benefits of the research and minimize potential harms. The potential benefits of this survey will come from Senior Solutions improving its programming from the study's results. We can safeguard against potential harms from this study in two ways. This survey asks questions about potentially sensitive topics including mental health and social connection. Reflecting on these variables could cause potential emotional distress for participants. First, the informed consent waiver will alert participants about this potential emotional discomfort as a result of the study. Second, in the case of such distress, we will provide information on how to access mental health resources by phone at the beginning of the survey, in the consent form.

III. Justice

To satisfy the ethical principle of justice, the sample population of a study must reap the benefits of the research being conducted. The sample population of this survey is exclusively

senior citizens living in Windham or Windsor counties in Vermont. The eligible population for the study is outlined in the informed consent form, so only eligible seniors should follow through with the survey if they complete the consent form. Since the target population of the study falls entirely within the geographic service range of Senior Solutions, all participants will be able to benefit from the program improvements Senior Solutions makes as a result of this research.

SIGNIFICANCE

Senior Solutions is a non-profit organization that assists senior populations in Windsor and Windham county in rural Vermont by organizing community events and connecting seniors to services such as food distribution, legal services, transportation services, and community exercise services. Based on the available resources of Senior Solutions, we have designed an online survey and a mail-in survey to best assess their target demographic. We believe it is essential to have a non-online option to include seniors unfamiliar with or without access to technology. This will ensure that we have a representative sample of seniors within Windham and Windsor counties while maintaining ease of implementation for Senior Solutions.

Senior Solutions will also have the option to run a phone survey. As mentioned previously, seniors could be reached through the various purposive sampling methods to increase engagement. Once phone appointments are scheduled, volunteers can easily input the answers over the phone to the online Qualtrics survey. By including a variety of survey options, we ensure that Senior Solutions has the greatest flexibility in implementation. Once results are collected, Senior Solutions can measure the efficacy of intervention programs by comparing social connectedness and overall health among seniors who have participated in the program with seniors who have not. Using the Analysis Guide (see Appendix D), Senior Solutions can draw key insights that will allow them to improve their services and outreach to seniors.

The research on the effect of intervention programs on social connectedness and health of aging adults is still nascent. Furthermore, there has not been much research conducted in rural areas with a large proportion of seniors such as Vermont. Our study of aging populations in Windsor and Windham counties will provide key insights of intervention programs, specifically Senior Solutions, on social connectedness and the health of older adults. This builds upon the existing body of literature examining these same topics at the national scale. Our research also aims to provide key insights that can help Area Agencies on Aging improve upon their services that allow seniors to age independently.

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Appendix

Appendix A. Informed Consent

Introduction: You are being asked to take part in a research study. Taking part in research is voluntary.

What does this study involve?

We would like to learn more about your experiences with Senior Solutions programs. We will ask some questions about your involvement (if any) with Senior Solutions, your social life, as well as your mental and physical health. Participation in the study will take approximately 10 minutes.

Who is eligible to participate?

You must be a senior citizen living in Windsor or Windham counties to take part in this study.

Will you be paid to take part in this study?

Respondents will not be compensated for participation in this study.

What are the options if you do not want to take part in this study?

Your participation in this study is completely voluntary. You may withdraw your consent and discontinue your participation at any time with no consequences to you.

Will you benefit from taking part in this study?

The results of this study will help Senior Solutions improve its programs. As a senior resident of Vermont, you can access the services of Senior Solutions or one of its partner organizations, and will benefit from the results of this study, if you choose to get help from Senior Solutions.

What are the risks involved with taking part in this study?

This survey will ask questions about your mental and physical health, as well as social connection. These may be sensitive topics for some participants. If you feel distress or would like to access mental health resources at any point in the survey, we encourage you to reach out to either Senior Solutions at 802-886-4500, or a 24 hour crisis or emergency hotline at 800-622-4235.

How will your privacy be protected?

The information collected for this study will be kept secure and confidential. Your name or any identifying information will not be linked to your responses in any way. Only the research team will have access to your data.

Whom should you contact about this study?

If you have questions about this study, you can contact the research director for this study, Mark Boutwell, at mboutwell@seniorsolutionsvt.org.

CONSENT

I have read the above information and agree to take part in this study.

Name (Print) _____

Signature _____

Appendix B. Survey Questions

1. Which of the following best describes your current living situation? (Select ONE only)
    a. Live alone in my own home (house, apartment, condo, trailer, etc.); may have a pet
    b. Live in a household with other people
    c. Live in a residential facility where meals and household help are routinely provided by paid staff (or could

d. be if requested)
e. Live in a facility such as a nursing home which provides meals and 24-hour nursing care
f. Temporarily staying with a relative or friend
g. Temporarily staying in a shelter or homeless
h. Other

2. Has Senior Solutions ever referred you an assistance program of any kind? (Ex: Transportation services, meals on wheels, HomeMeds, etc.)
a. Yes
b. No
c. Not sure

3. If so, please select all of the following services that you have used:
❏ Telephone Help Line (e.g. Senior Solutions)
❏ Meals on Wheels
❏ Home Visitors or Helpers
❏ HomeMeds
❏ Wellness Class
❏ Transportation Services
❏ Support Groups
❏ Other
❏ None of the above

4. In the past 12 months, how often have you participated in a service provided by Senior Solutions?
a. Daily
b. Once per week
c. A few times per month
d. Once per month
e. Every few months
f. Once per year
g. Never

5. How often do you participate in either in-person or online social activities? (Ex: spending time with friends, attending church, going to online events, etc.)
a. Every day
b. Every few days
c. Once a week
d. A few times a month
e. Once a month
f. Hardly ever

6. Please select the following groups, clubs, or organizations you are involved in:
a. Sports organizations
b. Religious-affiliated group
c. Community group
d. Volunteer organizations
e. I am not involved in any groups, clubs, or organizations
f. Other, please specify: _____

6a. If you are involved in an organization, how often do you engage with it, either in person or online?

g. Every day
h. Every few days
i. Once a week
j. A few times a month
k. Once a month
l. Hardly ever

7. To what degree do you value your personal time and being around others?

	Not at all	A little	Somewhat	Very much so
Personal Time	1	2	3	4
Being around others	1	2	3	4

8. In the past month, how often have you interacted with friends or family in person?
a. Never
b. 1 - 3 times
c. 4 – 7 times
d. 8 or more times

9. In the past month, how often have you interacted with friends or family online?
a. Never
b. 1 - 3 times
c. 4 – 7 times
d. 8 or more times

10. In the past month, how often have you engaged in physical activity with peers?
a. Never
b. 1 - 3 times
c. 4 – 7 times
d. 8 or more times

11. Do you feel that you have a reliable person you could turn to if you were going through a difficult time in your life?

No, not at all	Maybe	Yes, most likely	Yes, definitely
1	2	3	4

12. In the past 30 days, with whom have you interacted most?
a. Family member
b. Neighbor
c. Non-family caregiver
d. Friend
e. Club or organization member
f. Other: ____

13. In general, would you say your health is:
a. Excellent
b. Very good
c. Good
d. Fair

e. Poor

14. The following items are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
Lifting or carrying groceries	1	2	3
Climbing **several** flights of stairs	1	2	3
Climbing **one** flight of stairs	1	2	3
Bending, kneeling, or stooping	1	2	3
Walking **more than a mile**	1	2	3
Walking **several blocks**	1	2	3
Walking **one block**	1	2	3
Bathing or dressing yourself	1	2	3

15. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	Yes	No
Cut down the **amount of time** you spent on work or other activities	1	2
Accomplished less than you would like	1	2
Were limited in the **kind** of work or other activities	1	2
Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

16. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	Yes	No
Cut down the **amount of time** you spent on work or other activities	1	2
Accomplished less than you would like	1	2
Didn't do work or other activities as **carefully** as usual	1	2

17. These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.
How much of the time during the **past 4 weeks**...

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
Did you feel full of pep?	1	2	3	4	5	6
Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
Have you felt calm and peaceful?	1	2	3	4	5	6
Did you have a lot of energy?	1	2	3	4	5	6
Have you felt downhearted and blue?	1	2	3	4	5	6
Did you feel worn out?	1	2	3	4	5	6
Have you been a happy person?	1	2	3	4	5	6
Did you feel tired?	1	2	3	4	5	6

18. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

a. Not at all
b. Slightly
c. Moderately
d. Quite a bit

e. Extremely

19. During the **past 4 weeks**, how much of the time has **your physical health** interfered with your social activities (like visiting with friends, relatives, etc.)?

a. All of the time
b. Most of the time
c. Some of the time
d. A little of the time
e. None of the time

20. During the **past 4 weeks**, how much of the time has **your mental health** interfered with your social activities (like visiting with friends, relatives, etc.)?

a. All of the time
b. Most of the time
c. Some of the time
d. A little of the time
e. None of the time

Appendix C. Survey Questions (Shortened for Phone Interviews)

1. Which of the following best describes your current living situation? (Select ONE only)

a. Live alone in my own home (house, apartment, condo, trailer, etc.); may have a pet
b. Live in a household with other people
c. Live in a residential facility where meals and household help are routinely provided by paid staff (or could
d. be if requested)
e. Live in a facility such as a nursing home which provides meals and 24-hour nursing care
f. Temporarily staying with a relative or friend
g. Temporarily staying in a shelter or homeless
h. Other

2. Has Senior Solutions ever referred you an assistance program of any kind? (Ex: Transportation services, meals on wheels, HomeMeds, etc.)

a. Yes
b. No
c. Not sure

3. If so, please select all of the following services that you have used:

❑ Telephone Help Line (e.g. Senior Solutions)
❑ Meals on Wheels
❑ Home Visitors or Helpers
❑ HomeMeds
❑ Wellness Class
❑ Transportation Services
❑ Support Groups
❑ Other
❑ None of the above

4. How often do you participate in either in-person or online social activities? (Ex: spending time with friends, attending church, going to online events, etc.)

a. Every day
b. Every few days

c. Once a week
d. A few times a month
e. Once a month
f. Hardly ever

5. In general, would you say your health is:
a. Excellent
b. Very good
c. Good
d. Fair
e. Poor

6. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	Yes	No
Cut down the **amount of time** you spent on work or other activities	1	2
Accomplished less than you would like	1	2
Were limited in the **kind** of work or other activities	1	2
Had **difficulty** performing the work or other activities (for example, it took extra effort)	1	2

7. During the past **two weeks**, how often have you…

	Not at all	Several Days	More than half the days	Nearly every day
Had little interest or pleasure in doing things?	1	2	3	4
Felt down, depressed, or hopeless?	1	2	3	4

8. During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	Yes	No
Cut down the **amount of time** you spent on work or other activities	1	2
Accomplished less than you would like	1	2
Didn't do work or other activities as **carefully** as usual	1	2

9. During the **past 4 weeks**, how much of the time has **your physical health** interfered with your social activities (like visiting with friends, relatives, etc.)?

a. All of the time
b. Most of the time
c. Some of the time
d. A little of the time
e. None of the time

10. During the **past 4 weeks**, how much of the time has **your mental health** interfered with your social activities (like visiting with friends, relatives, etc.)?

a. All of the time
b. Most of the time
c. Some of the time
d. A little of the time
e. None of the time

Appendix D. Analysis Guide

As mentioned in the main document, this survey measures three things:

- Our independent variable (participation in intervention programs)
- Our intervening variable (social connection)
- Our dependent variable (physical and mental health)

Below is a breakdown of which survey questions are designed to measure which pieces.

- Questions 1-4 measure the **independent variable**
    - In question 3, it is important to note that not all services listed relate to social programs. For the purposes of analysis, you might want to focus on just those social programs, but we included a broader range of services because we thought that you might appreciate the data on which programs are being utilized by your service population more than others.
- Questions 5-12 measure the **intervening variable**
    - These questions are aimed to understand how often seniors interact with others, who specifically they are interacting with, and in what format those interactions take place.
    - It is important to note that factors like loneliness and perceived isolation can vary from person to person, even between individuals with similar numbers or kinds of regular interactions. The strength or quality of relationships and the degree to which an individual values the company of others are important to weigh against any numeric measure of interaction.
        - Questions 7 and 11 measure both of those factors
- Questions 13-19 measure the **dependent variable**
    - Questions 13-15 and 18 measure physical health
    - Questions 16-17 and 19 mental health
        - Our questions are specifically targeted to measure depressive symptoms