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Older Adults' Social Networks and the Role of a Telephone Helpline Program

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by

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Abstract

Over the past century, advances in health care, higher levels of education, and improved living conditions have resulted in increased human life expectancy. However, with longer life expectancy comes potential challenges to quality of life, as individuals may face numerous transitions in older age: children leaving home, employment to retirement, or physical declines possibly leading to lack of mobility. As a result, older adults may experience social isolation and difficulty in building new relationships. This is problematic, as lack of social connection is a strong predictor of lower physical and mental health (Fiori & Jager, 2012; Fiori, Smith, & Antonucci, 2007). The present study takes a longitudinal approach to examine the social networks of older adults, and the role of an extant telephone helpline program in the lives of older adults who might be less socially-connected. Three theoretical frameworks were used to guide the present study: Rowe and Kahn's (1997, 1998) Successful Aging Model was used to examine the relationship between three lifestyle aspects, i.e., social, physical, and mental, that are related to the process of aging; Kahn and Antonucci's (1980) Social Convoy Model was used to assess social networks; and Carstensen's Socioemotional Selectivity Theory (1993, 1995, 1998) was used to guide the examination of goals older adults had towards the future. Thirty-one participants aged 60 to 94 were recruited as users of a telephone helpline program, and 46 participants who did not use a helpline program were also recruited. Both qualitative and quantitative data were collected using phone interviews at three time points over the course of approximately one year. Participants were asked questions regarding their social networks, and their physical and mental health; additionally, the users of the telephone helpline program were asked about the role that the helpline played in their lives. Results supported hypotheses with respect to social, physical, and mental health: that is, program users had fewer social

connections, as well as lower physical and mental functioning compared to program non-users. Further, patterns of change were evident in the size of social networks, although the quality of relationships remained stable over the three time points. In addition, the group who used the helpline rated the program as so important and close that they could not imagine their life without it, and shared the positive impact the program had in their lives. Overall, the results demonstrate the interconnectedness of the social, physical, and mental aspects of aging well, and the uniquely stable role the telephone program played for the group of older adults who used it. Findings are discussed in terms of implications for research, and how they may be applied in practice.

Keywords: older adults, social connection, social isolation, telephone helpline program, successful aging

Dedicated to my grandparents,

Mukhtiar Singh Chauhan & Joginder Kaur Chauhan

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I am proud of myself for being where I am today. Doing a PhD is not easy (writing a dissertation certainly isn't) and life does not pause for any of it. I will not shy away from admitting there were many times when I would put on a timer, have a mini breakdown, and get right back to work. I am certain many other graduate students go through these struggles and to all of you, I say "don't let anyone tell you that overwhelming amount of anxiety is part of graduate school or that spending time with family or friends means you are not focusing on your dissertation." I worked on my PhD every single day but I also slept at least seven hours a night, did social things, and went to hot yoga even when I was told to "only focus" on my dissertation. Throughout this process, I learned that it is okay to take care of yourself and to prioritize things that matter to you; this is what ultimately helped me complete my PhD on time with a big smile on my face at my defense. I am humbled by the experiences I have had, both exciting and challenging, and for all the resilience and relationships I have built throughout graduate school. And, I could not have done it without the support of my social convoy.

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Older Adults' Social Networks and the Role of a Telephone Helpline Program

In 2015, Canada reached the milestone of having more older adults than children, with 5,780,900 adults over the age of 65 compared to 5,749,400 children under the age of 15 (Statistics Canada, 2015). This shift in demographics has implications for older adults, social services, and the healthcare sector. Specifically, with publicly-funded healthcare in Canada, 2.4 million individuals over the age of 65 will require paid and/or unpaid continuing supports by 2026: an increase of 71 percent from 2011, with a further expected increase of approximately 3.3 million by 2046. In sum, this means significant expenditures in the healthcare sector; health care costs for older adults are anticipated to increase from approximately $28.3 billion in 2011 to $177.3 billion in 2046 (Hermus, Stonebridge, & Edenhoffer, 2015). From the perspective of health care funding, then, the rapidly-increasing number of older adults and the concomitant expense to the health-care sector make it critical to think of innovative ways to maintain the health and quality of life for older adults, with the related goal of minimizing current and future health-care costs.

From the perspective of the individual, social connections - specifically protection from isolation and loneliness - are important for older adults' better health and well-being (Uchino, 2004; Umberson & Montez, 2010). Research has shown that those who are less socially-connected and feel lonely are at higher risk of disability (e.g., Lund, Nilsson, & Avlund, 2010), increased risk of heart disease by 29% and stroke by 32% (e.g., Valtorta, Kanaan, Gilbody, Ronzi, & Hanratty, 2016), increased risk of developing clinical dementia by 64% (e.g., Holwerda et al., 2012), and increased risk of premature mortality by 30% (e.g., Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). Thus, the negative effects of social isolation and the important role of social connection are clear.

To promote social connection, research has generally focused on face-to-face social support received from family and friends (e.g., Antonucci, Birditt, & Webster, 2010). However, with advancing age, family and friends may have conflicting commitments or not be geographically close, resulting in a loss of social support for older adults. In addition, problems with mobility may also contribute to social isolation. By examining the role of a telephone helpline program in the lives of older adults who might have minimal to no social contact, the current research uses a longitudinal approach to address the limited literature on social support provided by informal social connections in addition to family members or friends.

The first section of this document (introduction) establishes the theoretical underpinnings of aging well by outlining the following psychosocial frameworks: 1) Activity Theory (Havighurst, 1961); 2) the Selection, Optimization, and Compensation model (Baltes & Baltes, 1990); and 3) the Successful Aging Model (Rowe & Kahn, 1998). The Successful Aging Model will be covered in more depth, as it is most pertinent to the current research. Thus, I will present empirical evidence examining the relationship between the three components of the Successful Aging Model: minimize risk of disease and disability, maintain mental and physical functioning, and continue active engagement with life (Rowe & Kahn, 1998). Subsequently, the focus is on one of the three components of the Successful Aging Model: active engagement with life (Rowe & Kahn, 1998). As social contact is an important aspect of active engagement with life, this section is further divided into subcomponents to consider the theoretical framework of the Social Convoy Model (Kahn & Antonucci, 1980) and Socioemotional Selectivity Theory (Carstensen, 1993, 1995, 1998). Finally, the introduction will conclude with an outline of intervention programs that provide social connection, such as humor therapy group interventions (Tse et al., 2010), friendship clubs (Hemingway & Jack, 2013), and one particular telephone program that provides social support to older adults who might have a small or no social network.

Psychosocial Theories of Aging Well

Aging is inevitable for most people; however, the definition of who is considered to be old has changed over time. Based on the perceptions of the previously-mandatory retirement age of 65 years in North America, society used to categorize individuals as being old at that age (Roff & Atherton, 1989). This focus on chronological age has been used as a marker to shift societal focus from a person's gains to a person's losses, a shift which is not an accurate representation of the diversity and complexity of the aging process (Baltes & Baltes, 1990). Given ever-increasing lifespans, younger adults are studying and working longer, are deciding to become parents (and often, subsequently grandparents) later in life, and the markers for defining who is old - based on chronological age - have moved. As a result, the aging process is now viewed as complex, individualized, and context-dependent (Dionigi, 2015). In addition, rather than defining who is old chronologically, researchers have become more interested in examining the quality of the aging process. To understand and study how to age well, researchers have proposed frameworks for aging such as Activity Theory (Havighurst, 1961) and the Selection, Optimization, and Compensation (SOC) model (Baltes & Baltes, 1990). In terms of a specific psychological model of aging well, Rowe and Kahn (1987, 1997, 1998) proposed the Successful Aging model, which is possibly the most commonly-used framework in research that examines aging well. In the following section, Activity Theory and the SOC model will be briefly discussed, as they offer broader perspectives of aging well. This will be followed by a more in-depth discussion of the Successful Aging Model, as it is the most pertinent to the current research.

Activity Theory. Activity theory suggests that older adults are considered to be aging well if they stay active and maintain social interactions in old age (Havighurst, 1961). The theory states that by staying active, individuals are able to substitute their mid-life roles (e.g., working)

with new activities in older age (e.g., volunteering to tutor young children; Havighurst, 1961). Maintenance of these activities is assumed to be necessary to experience greater happiness and satisfaction with life (Lemon, Bengtson, & Petersen, 1972). According to this theory, an older person is the same as a middle-aged person in terms of their psychological and social needs; however, due to declines in physical functioning in old age, an older person may have limited ability to participate in physical activities (Wadensten, 2006). Thus, continued participation in activities is a marker of aging well. Some important criticisms of the theory state that it is too broad, and that it underestimates how demographic factors such as class, race, and gender can affect a person's ability to remain active (e.g., Estes, 1983; Minkler, 1984).

The Selection, Optimization, and Compensation (SOC) model. To address diversity in the aging process, Baltes and Baltes (1990) developed the SOC model, which proposes that aging well involves a general process of adaptation to circumstances. This process of adaptation includes three components: selection, optimization, and compensation. These components are systematically interrelated. Specifically, selection refers to directing attention towards more relevant domains; optimization refers to optimizing the resources from the selected domains to enable success; and compensation focuses on compensating for losses within domains (Baltes & Baltes, 1990). In sum, the theory posits that a person can age well by maximizing their gains and minimizing their losses through the process of adapting to their circumstances (Freund & Baltes, 1999; 2002). Although the model is designed to allow for flexibility and individuality in conceptualizing what constitutes aging well, some critics have noted the difficulty in applying the model to assess successful adaptation or adjustment, and have instead focused on predictors of successful adaptation (e.g., Arbuckle & de Vries, 1995; Hatch, 2000); others have noted that the model does not provide strategies to proactively minimize losses before they take place (von Humboldt, 2016).

The Successful Aging Model. The Successful Aging Model (SAM) proposed by Rowe and Kahn (1987) is the most pertinent theoretical framework to this dissertation. First, Rowe and Kahn (1987) emphasized the importance of the conceptual distinction between "usual aging" versus "better than usual aging," with the latter more recently termed successful aging. According to Rowe and Kahn, individuals who are experiencing usual aging have typical age-related, non-pathological cognitive and physical decline, while those who are aging successfully have little or no cognitive and physical decline as they age. Consequently, those who are aging successfully are at lower risk of disease or disability than those who are considered to be aging in the usual way. This distinction is important, as knowledge of the risk factors associated with usual aging can facilitate successful aging through modification of life choices such as diet, education, physical activity, or social support (Rowe & Kahn, 1987).

Rowe and Kahn represent successful aging visually through the use of a Venn diagram including the following three intersecting components: 1) having a low probability of disease and disease-related disability; 2) maintaining high mental and physical functional capacity; and 3) being actively engaged with life (Rowe & Kahn, 1997, 1998; see Figure A). In this visual representation, the three components of the model intersect in the center, which is where successful aging resides. Further, each of the three components have sub-components. The criteria for the first component include absence of disease, disability, and the risk factors associated with disease (Rowe & Kahn, 1998). Criteria for the second component (i.e., high mental and physical functioning) are more than merely having the capacity to perform activities; the ability to perform the activities in the present moment is also important (Rowe & Kahn, 1998). For the third component of active engagement in life, the criteria include having interpersonal relations with others, as well as performing activities that are considered productive (either paid or unpaid) at the societal level (Rowe & Kahn, 1998). With these three components

in the model, Rowe and Kahn emphasize the multidimensionality and heterogeneity of the aging experience, which can ultimately lead to what the authors consider an optimal level of development, that is, successful aging.

In 2002, Kahn addressed some of the criticisms of his co-authored model by stating that successful aging is not an all-or-nothing concept, and that individuals cannot be labeled as aging successfully or unsuccessfully merely based on these three criteria. For example, a person who teaches at a high school and volunteers at a church but is also diagnosed with HIV/AIDS, would not automatically be considered as unsuccessfully aging because of their diagnosis. Instead, their meaningful paid and unpaid contributions to society could mean they are aging successfully. Thus, successful aging (or not) is not a dichotomous concept; the degrees of success with which aging is achieved can be on a continuum where individuals can be doing well in some aspects of life and not so well in others (Kahn, 2002). Most recently, Rowe and Kahn (2015) refer to the SAM model as Successful Aging 2.0, in which the authors acknowledge the need to understand social factors such as race, gender, sexual orientation, and socioeconomic status when evaluating whether one is aging well. The authors also highlight the need to consider a person's immediate interpersonal environment (e.g., family and friends), as well as macrosocial influences such as economic conditions, affordability of healthcare, public transportation, and urban design. These considerations continue to evolve and broaden the scope of the SAM to allow the model to be applicable to diverse populations (Rowe & Kahn, 2015).

In light of the criticisms of the SAM (e.g., Strawbridge, Wallhagen, & Cohen, 2002; Young, Frick, & Phelan, 2009) and Kahn's (2002) response, the intention of the present study is not to use the three criteria in the Successful Aging Model to label individuals as aging successfully or unsuccessfully. Instead, the goal of this study is to use the three components of

the Successful Aging Model to examine multiple aspects of well-being in individuals who might have minimal to no social connection as compared to those who are very socially engaged.

Operationalization of the Successful Aging Model. Rowe and Kahn's (1997, 1998) Successful Aging Model (SAM) has led to a large number of empirical studies that examine the definition, predictors, and correlates of successful aging (e.g., Berkman et al., 1993; Depp & Jeste, 2006; Jorm et al., 1998; Menec, 2003). Comprehensive systematic reviews conducted by Depp and Jeste (2006), and Cosco, Prina, Perales, Stephan, and Brayne (2014) outline research that has operationalized successful aging in various ways, using a diverse range of measures. For example, in their review, Depp and Jeste (2006) found that Garfein and Herzog (1995) operationalized the low physical functioning and high probability of disease/disability component of Rowe and Kahn's model as high scores on items such as being in a bed or chair most or all day, or difficulty bathing, climbing a few flights of stairs, walking several blocks, or doing heavy housework. In contrast, Strawbridge et al. (2002) operationalized this component as low scores on a different set of items such as the ability to walk quarter of a mile, climb one flight of stairs, and stand up without feeling faint. Similarly, Cosco et al.'s (2014) meta-analysis also found that researchers used a variety of criteria to identify the overall concept of aging successfully. For example, some researchers included solely physiological factors, whereas others focused on factors of social engagement (Cosco et al., 2014). Both systematic reviews suggest a lack of consistency in measuring the components of successful aging, and that the multidimensionality of the model's components is indeed indicated in the diversity of their operationalization (Cosco et al., 2014; Depp & Jeste, 2006).

Research has not only examined the diverse ways in which each component of successful aging has been operationalized, there is also a substantial body of research examining the relationship between the three components of Rowe and Kahn's (1997, 1998) model. A

longitudinal study that presents evidence of the interconnectedness between the three components of the model was conducted by Andrews, Clark, and Luszcz (2002). Using data from the eight-year Australia Longitudinal Study of Aging (ALSA), the authors first divided participants aged 70 years or more into three groups: higher, intermediate, or lower degrees of successful aging. After controlling for effects of age, gender, education, and income, these three groups differed on physical functioning and health, lifestyle, and psychological status. The results of this study indicated a higher likelihood of early mortality and lower ratings of quality of life by those who were classified as experiencing lower degrees of successful aging. Furthermore, the findings from this study highlight the linked nature of physical, psychological, and social functioning. For example, older adults who reported having had a stroke or fractured hip had lower physical functioning subsequently had difficulty performing daily tasks associated with social connectedness, such as not being able to drive, or a slower pace of walking (Andrews et al., 2002). The authors also discussed the importance of acknowledging the critical role of the interconnectedness of the three components of successful aging plays when planning possible interventions to improve quality of life (Andrews et al., 2002).

In another longitudinal study, Menec (2003) examined the relationship between everyday activities (e.g., exercising, meeting friends or family, volunteering) and predictors of successful aging, and found that higher activity level was associated with greater happiness, better physical functioning, and reduced mortality. Specifically, social activities (e.g., visiting friends or relatives) and productive activities (e.g., volunteer work, light gardening) were positively correlated with happiness and physical function, and negatively correlated with mortality. More recently, Choi, Lee, Lee, and Jung (2017) also found a positive relationship between physical activity and quality of life in older adults. These findings highlight the positive physical and psychological benefits associated with social and productive activities (Menec, 2003).

Similarly acknowledging a relationship between the three components of Rowe and Kahn's (1997, 1998) model, Pruchno, Wilson-Genderson, Rose, and Cartwright (2010) found that social connection was one of the key predictors of successful aging. In addition, a cross-sectional study conducted by Cho, Martin, and Poon (2014) looked at the possible indirect effects between cognitive functioning, positive affect, and social functioning, using data from 72 octogenarians and 234 centenarians. The authors found evidence for a significant relationship between cognitive functioning and positive affect that was mediated through social support. Overall, these findings regarding the contribution of social contact to the physical and mental components of SAM (Rowe and Kahn, 1997, 1998) - and vice versa - have been supported by many other studies (Depp & Jeste, 2006; Montross et al., 2006).

Thus, the literature points to the benefit of dynamic aspects of lifestyle as avenues to maintain or improve quality of life for older adults. Further, these empirical studies suggest that the SAM (Rowe & Kahn, 1997, 1998) is a promising framework for the study of the interrelated and modifiable factors of life (e.g., social contact) that contribute to aging well. The theoretical rationale for the current research is primarily derived from the literature regarding active engagement with life component of SAM (Rowe & Kahn, 1997, 1998). Specifically, older adults who have minimal to no engagement with life are compared to those who are highly-engaged in various aspects of life, such as physical and cognitive functioning, and mental health.

Successful Aging: Engagement with Life

According to Rowe and Kahn (1997, 1998), there are two dimensions to the engagement with life component of successful aging: 1) social support and 2) productive activity. This section on engagement with life is divided into three parts: 1) definitions and empirical research concerning social support and productive activity; 2) empirical research concerning the overarching theme of engagement with life; and 3) discussion of two lifespan theories related to

the engagement with life component: the Social Convoy Model (SCM; Kahn & Antonucci, 1980) and Socioemotional Selectivity Theory (SST; Carstensen, 1993, 1995, 1998). The SCM states that we are surrounded by a network of people who move with us through our life; however, the number of people and type of relationships in the network may change with age (Kahn & Antonucci, 1980). SST states that people's goal motivations change as a function of the person's perception of time left (Carstensen, 1993, 1995, 1998). Considering these two lifespan theories allows for an increased understanding of the impact of time horizons on a person's goals and his/her social relations, which in turn may affect a person's overall engagement with life.

Definition of and empirical research on social support. Social support involves feelings of being cared for, loved, esteemed, valued, belonging to a network, and having mutual obligations (Rowe & Kahn, 1998). Social support is further divided into two types: 1) socioemotional support (i.e., direct expressions of affection, esteem, and respect); and 2) instrumental support (i.e., offering help or assistance in a tangible way, such as providing support to an ill person or giving money to someone who has lost their job; Rowe & Kahn, 1998).

Both kinds of support, but perhaps most particularly socioemotional support, have been associated with positive well-being and better navigation of typical challenges (e.g., physical limitations, death of a partner) that come with aging (Burton et al., 2008; Haslam et al., 2008; Rowe & Kahn, 1998). A substantial amount of research has provided evidence of the positive association between socioemotional support and various aspects of older adults' lives, such as enhancing cognitive health and protecting against dementia (Fratiglioni, Paillard-Borg, & Winblad, 2004; Seeman, Lusignolo, Albert, & Berkman, 2001), protecting against immune-related disorders (Pressman et al., 2005), reducing the probability of heart disease among recently widowed, divorced, or single older adults (Sorkin, Rook, & Lu, 2002), and lowering psychological distress (Kafetsios & Sideridis, 2006). Further, Thoits (2011) examined the

mechanisms by which social support influences physical and mental health and found that having a social network encourages social comparisons that can encourage people to adopt healthier attitudes or seek preventive health care. Thoits (2011) also found that social networks provided purpose and meaning to an individual's role as a family member or friend, and that people feel valued, worthy, a sense of belongingness, and companionship by being part of a network. Thus, social support facilitates many positive physical and mental health outcomes in an individual's life through various mechanisms.

Definition of and empirical research on productive activity. A productive activity is defined as "any activity, paid or unpaid, that generates goods or services of economic value" (Rowe & Kahn, 1998, p. 237). Research investigating the influence of productive activity has found that these activities promote feelings of meaningfulness (Baker, Cahalin, Gerst, & Burr, 2005), provide opportunities of social approval and bolster self-esteem (Siegrist, Knesebeck, & Pollack, 2004), increase social networks (Onyx & Warburton, 2003), promote better cognitive health (Schwingel, Niti, Tang, & Ng, 2009), and enhance self-rated physical health and overall psychological well-being (Morrow-Howell, Hinterlong, Rozario, & Tang, 2003). Thus, it is evident that productive activity in later life, either through paid work or volunteering, has a positive impact on various aspects of an older adult's life. By staying socially connected and participating in productive activities, people have the opportunity to stay engaged with life, which is one of the key components of successful aging and the focus of this dissertation.

Empirical research on engagement with life. There is a strong positive association between the two dimensions of engagement with life (i.e., social network and productive activities) and better overall quality of life (Choi et al., 2017; Menec, 2003). Specifically, studies have shown a significant relationship between being actively engaged with life and better physical and cognitive functioning (e.g., Everard, Lach, Fisher, & Baum, 2000), lower

depression (Glass, De Leon, Bassuk, & Berkman, 2006), reduced risk of developing dementia and Alzheimer's disease (Fratiglioni et al., 2004), lower self-reported disability (Mendes de Leon, Glass, & Berkman, 2003), reduced risk of stroke (Rutledge et al., 2008), and lower mortality rates (Lennartsson & Silverstein, 2001). Thus, it is evident that engagement with life can have a profound impact on increased longevity and improved quality of life. However, while there is ample evidence demonstrating the positive effect of engagement with life, aging often comes with changes, such as retirement, mobility limitations, or loss of a loved one, which can affect a person's ability and motivation to stay engaged (Barnett, Ogilvie, & Guell, 2011; Maclean, Pound, Wolfe, & Rudd, 2000). Thus, the next section will be devoted to discussing two life span theoretical frameworks that are important to consider when examining how older adults stay engaged with life. The first of these frameworks is the Social Convoy Model (SCM; Kahn & Antonucci, 1980), which describes the structure and function of the network of people that accompany a person throughout their life, and its dynamic nature across the lifespan. The second framework is Socioemotional Selectivity Theory (SST; Carstensen, 1993, 1995, 1998), which states that the perception of limited time can influence one's goal priorities and social connection.

The Social Convoy Model

The Social Convoy Model (SCM; Kahn & Antonucci, 1980) offers a lifespan approach to studying social relations. The SCM posits that individuals are surrounded by a convoy or network of people who are sources of social support, and who have beneficial effects on an individual's well-being throughout the life course (Antonucci, 2001; Kahn & Antonucci, 1980). According to the SCM, the relationships in an individual's convoy serve as a protective base for healthier physical and mental well-being, and are shaped by various personal (e.g., gender, socioeconomic status) and situational (e.g., culture, life transitions) factors. Because of this

multilayered dynamic convoy, social relations can change over time in quantity, quality, frequency of contact, etc., and contribute significantly to physical health and psychological well-being across the life span (Fiori & Jager, 2012; Fiori, Smith, & Antonucci, 2007).

The model is represented as a diagram of three concentric circles (see Figure 2), with the centre of the smallest circle containing the word "you." Each of the three circles, labelled as inner, middle, and outer, respectively, represent varying levels of closeness and importance to the focal person – the person who identifies those who should be placed in each of the circles. The inner circle represents member(s) of an individual's network with whom they feel so close that they cannot imagine their life without them. The middle circle represents member(s) of the individual's network with whom they feel close and consider to be important to them. The outer circle represents member(s) of the individual's network whom they have not mentioned in the other circles but who are close enough and important enough in their life that they are placed in the diagram (Kahn & Antonucci, 1980). This framework provides individuals with the flexibility to describe their social network according to their own subjective feelings of closeness, and also provides deeper insight into their social network (Fiori et al., 2007).

According to the SCM, both the number of people providing support and the quality of support received are important for an individual's well-being (Merz, Schuengel, & Schulze, 2009). Thus, the SCM considers age-related changes in measurable characteristics of a social network, which include size of the social network, type of relationships in the network (e.g., friends, family), method and frequency of contact, and quality of relationship (sometimes referred to as adequacy of social support) with the network member(s) (Antonucci, 2001). In the following section, each of these four aspects of social relations are explained, highlighting empirical evidence linked to individuals' physical and mental well-being.

Components of the Social Convoy Model. According to the Social Convoy Model **(**Kahn & Antonucci, 1980), an individual's convoy can vary in four different aspects.

Size of social network. One of the SCM's objective measures of social support is the number of individuals in a person's social network (Kahn & Antonucci, 1980). On the one hand, studies have shown that the size of a social network can be stable with advancing age (Antonucci, 2001; Antonucci & Akiyama, 1995; Baltes & Mayer, 1999; Martire, Schulz, Mittelmark, & Newsom, 1999; van Tilburg, 1998). On the other hand, studies have also shown that the size of a social network decreases with age, with the exception of very close social relations that stay stable throughout the lifespan (Due, Holstein, Lund, Modvig, & Avlund, 1999; Lang, Staudinger, & Carstensen, 1998; Shaw, Krause, Liang, & Bennett, 2007). Further, some studies also demonstrate that although there may be a decrease in the number of friends in the network, there is a simultaneous increase in familial relations; thus, the quantity of relationships does not change in old age (van Tilburg, 1998). In short, there is little consensus in the literature regarding the stability or change in the size of social networks over the life course; however, having a larger network of people certainly provides more opportunities to get assistance in times of need (e.g., illness, physical immobility; Antonucci, 2001). Further, as social relations serve as a protective layer for physical and mental well-being, the literature has shown that older adults who do not have long-term established relationships in their social convoy may have experienced an unusual number of relationship losses, and could be at risk both physically and psychology (Antonucci & Akiyama, 1995; Gouveia, Matos, & Schouten, 2016). Therefore, the present study examines the differences in older adults' physical and mental health as a function of different social network sizes (i.e., smaller versus larger).

***Type of relations in the social network*.** The type of relations component in the SCM refers to the types of relationships (e.g., partner, children, friends) that individuals have with the

members in their social networks (Antonucci, 2001). In general, with advancing age, the majority of members in a person's convoy are close familial relations, such as their partner, children, and grandchildren (Ajrouch, Antonucci, & Janevic, 2001; Ajrouch, Fuller, Akiyama, & Antonucci, 2017; Antonucci, Akiyama, & Takahashi, 2004). Further, having close familial ties in the convoy has been linked to having more opportunities to receive instrumental support (e.g., help with housekeeping, transportation), as well as improved well-being (Fuller-Iglesias, Webster, & Antonucci, 2015; Litwin & Attias-Donfut, 2009). In addition to close family ties, the presence of friends in individuals' social networks increases the availability and variety of support (Ajrouch et al., 2017; Antonucci, 2001; Gurung, Taylor, & Seeman, 2003). Specifically, those with diverse networks comprised of both family and friends report better well-being and health, and receive more instrumental and emotional support than people without friends or family in their networks (Fiori, Antonucci, & Cortina, 2006; Kim, Park, & Antonucci, 2016; Suanet & Antonucci, 2016).

Family and friends may provide different types of support. Although there is some overlap, familial ties usually provide more instrumental support, whereas friendship ties are usually non-obligatory sources of companionship, are beneficial when familial support is lacking due to typical events (e.g., death of family members), and provide cognitive and affective resources (Allan, 2008; Gurung, Taylor, & Seeman, 2003; Sherman, de Vries, & Lansford, 2000). A more diverse social network provides more opportunities to rely on different people for different needs (e.g. emotional or instrumental), thus increasing the likelihood of enhanced well-being and resiliency (Gurung et al., 2003; Plickert, Côté, & Wellman, 2007; Sherman et al., 2000). Those with restricted networks (i.e., those with fewer people in their networks, or those who have low potential of support from their networks) report poorer health and psychological well-being over time (Antonucci, 1986; Fiori et al., 2007; Kim et al., 2016). Thus, the present

study examines the association between membership diversity in social networks and older adults' physical and mental functioning.

Method and frequency of contact. Method of contact in the SCM refers to how contact is made (e.g., in person, over the phone, social media), and frequency of contact refers to how often the individual maintains connection with their social network (Antonucci, 2001). With recent advancements in communication technology (e.g., e-mail, texting, video chat, social media) facilitating connections in the community, the literature on these two aspects of social networks continues to evolve (Delello & McWhorter, 2017). In 1987, Antonucci and Akiyama showed that older adults had significantly less contact with their social networks than younger adults. However, a recent study by Ajrouch et al. (2017) showed that older adults were in contact with their networks more frequently than younger adults. It is possible that the increase in contact frequency between 1987 and 2017 is due to an increased availability and ease of use of different technological methods for staying in contact over the last 30 years (Cherepanova, Tukhvatulina, & Mirza, 2016; Delello & McWhorter, 2017; Kestnbaum, Robinson, Neustadtl, & Alvarez, 2002; Sum, Mathews, Hughes, & Campbell, 2008). For example, Kestnbaum et al. (2002) found that internet users reported more social contact with their friends and co-workers than non-internet users. Furthermore, Shklovski, Kraut, and Rainie (2004) also found that those who were connected with their social networks used more than one method to maintain their relationships, such that those who used the internet to stay connected also used the phone and in-person meetings. Thus, one method of communication can encourage the use of other methods of contact, which can lead to more frequent contact with network members (Shklovski et al., 2004). Finally, Sum et al. (2008) found that older adults who used the internet for communication with family and friends reported lower levels of social isolation. Together, these studies highlight the

diversity in communication media that older adults might use to maintain connection and the positive impacts of this connection.

In addition to using multiple methods to stay connected with their social networks, older adults report a varying degree of contact frequency with the members of their social network. Studies have shown that network members who are closer to the individual in the SCM (i.e., people who are placed in the innermost circle) are in more frequent contact with the individual than those who are placed in the middle and outer circle (Ajrouch et al., 2017; Antonucci & Akiyama, 1987). Specifically, Antonucci and Akiyama (1987) found that older adults were in contact with their innermost circle at least weekly, and in contact weekly or monthly with the middle and outermost circles. This varying degree of contact frequency within older adults' social networks indicates the importance that individuals place on spending more time with their closer family and friends in old age (Carstensen, 1993, 1995, 1998). Furthermore, studies have shown a significant positive association between older adults' higher frequency of contact with family/friends and their physical and mental health (De Belvis et al., 2008; Gouveia et al., 2016; Webb, Blane, McMunn, & Netuveli, 2011). Thus, the present study examines how often older adults are in contact with their networks and which method(s) they use to stay connected.

***Quality of relationships*.** According to Fiori et al. (2007), while the perceived quality of received social support is subjective, it is also possibly a more insightful measure of social support. While availability of social relations is necessary for the quality of a relationship to exist, perceived quality or adequacy of support, compared to size of network, is more strongly associated with an individual's health, well-being, and mortality (Antonucci, 2001; Antonucci & Akiyama, 1997; Antonucci, Fuhrer, & Dartigues, 1997). Further, research has found that people who report experiencing more positive qualities in a relationship (e.g., feelings of love, security, trust) cope with stress, illness, and other challenges in life better than those who have less

positive social relations (Antonucci, 2001; Everson-Rose & Lewis, 2005; Uchino, 2006). Additionally, people report lower self-rated health, greater functional limitations for activities of daily living (ADLs; e.g., bathing), and a higher number of acute and chronic health conditions when they experience more negative qualities (e.g., constant criticism, lack of support) in their relationships (e.g., Newsom, Mahan, Rook, & Krause, 2008). Compared to the benefits associated with positive qualities in a relationship, evidence suggests that negative qualities in a relationship can have a greater detrimental impact on well-being (Newsom, Nishishiba, Morgan, & Rook, 2003; Merz et al., 2009). Thus, the present study examines the association with older adults' physical and mental health of the quality of relationships in their inner, middle, and outer circles.

Overall, over the life span, social networks can vary in terms of size, types of relationships, frequency and method of connection, and quality. However, according to Kahn and Antonucci's (1980) model, people's core networks are stable over time. Thus, stability in individual's social network over a period of one year is also explored in the present study.

Socioemotional Selectivity Theory

When examining the social networks of older adults, it is important to consider the types of goals individuals have in forming and maintaining relationships over the lifespan, and how these goals or motivations can reshape their social networks over time. Socioemotional Selectivity Theory (SST**;** Carstensen, 1993, 1995, 1998) posits that individuals' relationships are motivated by two main types of socioemotional goals throughout life: 1) knowledge acquisition goals, such as meeting new people or travelling, and 2) emotion-focused goals, such as spending time with close friends or family. Although individuals are motivated by both types of goals, the relative priority of these goals shifts to being predominantly emotion-focused as a function of the perception that time left to live is limited (Carstensen, 1993, 1995, 1998). For example, in a

study conducted by Lang and Carstensen (2002), younger adults expressed more knowledge acquisition goals (e.g., wanting to become knowledgeable, seeking to have success in one's career), whereas older adults prioritized more emotional or social goals (e.g., being available to others who need to be comforted, helping others to find their purpose in life). This shift in goal priorities is in congruence with the predictions of SST, with perception of remaining time according to chronological age being associated with more emotion-focused goals. As a result of this reorganization of goal priorities, individuals are able to capitalize on social connection goals and needs (e.g., helping their close loved ones rather than expanding their social network) and minimize risks of social isolation in old age, thus embodying optimal aging (e.g., selection, optimization, and compensation; Baltes & Baltes, 1990).

Some research has also specifically addressed the question of whether it is chronological age or solely a perceived limitation of time that leads to changes in priorities from knowledge acquisition to emotion-focused goals. This question was addressed in studies conducted by Carstensen and colleagues (Carstensen & Fredrickson, 1998; Fung & Carstensen, 2006; Fung, Carstensen, & Lutz, 1999), with the consensus being that the perception of limited time, not merely chronological age, leads to prioritizing emotional goals over knowledge acquisition goals. For example, in a study conducted by Fung et al. (1999), participants were first given two hypothetical scenarios: one in which time was unspecified, followed by the second scenario in which they had 20 more years beyond the age they expected to live. After each scenario, participants were asked to choose among three social partners with whom they would like to spend time: an immediate family member (high on familiarity and emotional closeness, low on providing new information), a recent acquaintance with whom they had much in common (high on ability to provide new information and be a future contact), or the author of a book they had just read (high on ability to provide new information). The results showed that older adults

preferred to spend time with an immediate family member, compared to younger adults who showed no preference for any of the three choices. However, when participants were told they had an extra 20 years, older adults also did not show a particular preference among the three choices. This suggests that older adults begin to prioritize emotionally-meaningful goals and emotionally-close partners when limited time is presumed, not merely because they are old (Fung et al., 1999).

Fung and Carstensen (2006) also conducted two studies where time was perceived as finite in naturalistic contexts, using the same methodology as outlined above. In the first study, individuals' goals were examined before and after the September 11 attacks on the United States. In the second study, individuals were asked to share their goals throughout the Severe Acute Respiratory Syndrome (SARS) epidemic in Hong Kong. After the September 11 attacks and at the peak of SARS, both younger and older adults chose to spend time with an immediate family member, rather than a recent acquaintance or the author of the book they had just read. Four months after the September 11 attacks and at the end of the SARS epidemic, younger adults no longer felt that they had limited time left: they favoured a recent acquaintance or book author over an immediate family member, suggesting they no longer felt that they had limited time left. However, older adults' preference to spend time with an immediate family member remained consistent (Fung & Carstensen, 2006). These results also support those of a previous study (Carstensen & Fredrickson, 1998), in which young adults diagnosed as positive for HIV responded similarly to older adults by indicating their preference for an emotionally close social partner rather than a partner who offered information or would be a future contact. Taken together, these findings highlight the motivational shift in relationship goals from knowledge acquisition or future-oriented goals to currently emotionally-meaningful goals, when time horizons are perceived as limited.

Furthermore, the number of people, frequency of contact, and satisfaction with the size of their social network are also affected by the perception of a shrinking time horizon (Antonucci, 2001; Carstensen, 1992; Lang & Carstensen, 1994; Lansford, Sherman, & Antonucci, 1998). Studies have shown that as people age and perceive their time horizons to be more limited, their social networks become smaller, with close family and friends continuing to remain part of people's lives and distant family or friends becoming less important. Furthermore, older people have less frequent contact with their network members and express significantly more satisfaction with the current size of their social networks than younger adults (Antonucci, 2001; Carstensen, 1992; Lang & Carstensen, 1994, 2002; Lansford et al.,1998).

Thus, when time is perceived to be limited, either by chronological age or other life contexts (e.g., natural disaster, an illness), individuals shift their motivational priorities in such a way that meaningful relationships take priority over other types of goals (Charles & Luong, 2013; English & Carstensen, 2014). Grounded in this theory while also extending it, the present study examines whether there are differences in the size and quality of older adults' social networks according to which future goals (knowledge acquisition versus emotion-focused) they prioritize.

Social Isolation

The importance and positive impact of staying socially connected has been the focus thus far. However, research has shown that transition and loss (Edelbrock et al., 2001; Keller-Cohen et al., 2006; Terhell, Groenou, & van Tilburg, 2007; Victor & Bowling, 2012) can lead to the opposite of social connection: social isolation. Social isolation has been defined and measured in many ways in the literature (Biordi, & Nicholson, 2013; Hawthorne, 2006; Minnesota Department of Health, 2010; National Seniors Council., 2014b; Nicholas & Nicholson, 2008). For the purpose of the present research, social isolation was conceptualized as lacking social

connectedness (Zavaleta, Samuel, & Mills, 2017), and is defined as the absence of quantity and quality of relationships at an individual, group, community, and the environment level (Gierveld & Tilburg, 2006; Wister, Cosco, Mitchell, Menec, & Fyffe, 2019; Zavaleta et al., 2017). Similar to social connection, social isolation can also be divided into objective aspects, such as the number of relations, diversity of relations, frequency of contact, and the methods via which the interaction takes place, as well as more functional aspects, such as the quality of relations (Valtorta, Kanaan, Gilbody, & Hanratty, 2016; Wister et al., 2019). Additionally, the relationship between the objective and functional aspects can sometimes be complex. This complexity has led researchers to define social isolation with assessing the quantity and quality of relations with contacts, and to define another concept referred to as loneliness as the perceptions and feelings about whether social needs are being met (Newall & Menec, 2019).

Although the concept of social isolation and loneliness have their own definitions, research has suggested an overlap between the two concepts (Golden et al., 2009). More importantly, feeling socially-isolated or lonely has been linked to a higher risk of disability, heart disease and stroke, developing clinical dementia, and premature mortality (Holt-Lunstad et al., 2015; Holwerda et al., 2012; Lund et al., 2010; Valtorta et al., 2016). When a person is socially-isolated and also feels lonely, they are motivated to seek to restore their social connection (Cacioppo, Hawkley, Norman, & Berntson, 2011). Thus, the next section is divided into two parts: 1) a brief review of intervention programs that have been designed for older adults who are socially-isolated; and 2) an introduction to a specific program: a telephone helpline program that provides social calls, medication reminders, and safety check-in calls to older adults who might have minimal to no social support in their lives and perceive themselves as socially-isolated.

Interventions to Facilitate Social Connection

In addition to understanding the various dimensions of social networks (quantity, type of relations, frequency and method of contact, and quality of relationships), and how they are related to physical and mental health in older adults, it is also important to look at interventions that have been implemented and evaluated to combat social isolation amongst this population. In this section, these interventions are briefly reviewed, followed by a focus on one particular intervention program: a telephone helpline program in Toronto, Ontario, Canada.

To promote social connection, interventions have generally taken place in two formats: in-group settings and one-on-one programs (Heckman et al., 2006; Nicholson & Shellman, 2013; Stewart, Craig, MacPherson, & Alexander, 2001). For example, Stewart et al. (2001) developed a face-to-face bereavement support group in which 28 widowed seniors participated approximately one hour per week for up to 20 weeks and shared their experiences and coping strategies with the loss. As a result of involvement in this group, participants reported enhanced satisfaction with the received support, as well as increased positive affect. Overall, intervention participants reported lower social isolation and emotional loneliness after the intervention (Stewart et al., 2001). Another example of group therapy includes Tse et al.'s (2010) humour therapy program for older adults who felt lonely in a nursing home. This was an eight-week program during which participants created a portfolio called "My Happy Collection," which included funny entries from books, photos, audio tapes, videos, stories, and reflections, etc. At the end of the eighth week, participants shared their portfolio with each other. Compared to the control group (who were not offered any program), those in the humour therapy program reported feeling significantly lower levels of loneliness, and higher levels of happiness after eight weeks of the program. More recently, Hemingway and Jack (2013) evaluated the concept of friendship clubs in England. These charity-funded clubs provided older adults with transportation

to a local venue for weekly meetings, in which the members decided which activities they wanted to do together. For example, participants could choose to play card games, have an outing, do physical exercise, or have informal conversations over a tea and cake. Participants reported that being part of the club was fun and that it promoted friendships, and was very important to them as it was their only opportunity to connect with others (Hemingway & Jack, 2013). In sum, findings from these three intervention programs highlight the effectiveness of group interventions in tackling the challenge of social isolation.

While group interventions have consistently been shown to be beneficial, findings from one-on-one interventions have been mixed (Cattan, White, Bond, & Learmouth, 2005). Furthermore, most one-on-one befriending programs have focused on face-to-face support (Andrews, Gavin, Begley, & Brodie, 2003; Butler, 2006; van Haastregt et al., 2000), and only a limited number of them have examined the one-on-one service that is most pertinent to the present study: telephone befriending services (Cattan, Kime, & Bagnall, 2011; Heller, Thompson, Trueba, Hogg, & Vlachos-Weber, 1991). For example, Heller et al. (1991) found that a telephone program for those with low levels of family support did not have any effect on improving perceived social support, depression, or loneliness. However, more recent research by Cattan et al. (2011) found that a telephone befriending program improved older adults' perceived health, well-being, self-confidence, and sense of belonging, while also reducing loneliness and anxiety. One of the main differences in these two studies was the method of participant recruitment. In Cattan et al.'s (2011) study, participants self-selected to enroll into the telephone program, thus self-selection could be the main contributing factor to finding positive results for the program. In contrast, participants in Heller et al.'s (1991) study were selected by the researchers from a random sample of elderly women who were assumed to have low social support in a low-income community. The assumption that participants in Heller et al.'s (1991)

study lacked social support could be one of the reasons why this program was not as useful as those who self-enrolled and sought out social interactions in Cattan et al.'s (2011) study.

Overall, given the ambiguity regarding desire or need for social connection in previous intervention studies and the conflicting findings, one purpose of the present study is to gain a clearer understanding of the role of telephone befriending programs in the lives of older adults who might have minimal to no social support. Similar to Cattan et al.'s (2011) study, participants who used the particular helpline program in the present study voluntarily signed up to receive calls from the program volunteers. The medium of telephone support, as described in the following paragraph, is of particular importance in this study, given that it provides convenient access to such programs, especially for homebound older adults. Furthermore, older adults who wish to remain anonymous while seeking support can also benefit from a telephone service compared to a face-to-face service.

The telephone helpline program. The telephone program assessed in the present study is for adults over the age of 55 years and consists of telephone support for those who might have minimal to no social connection. This telephone service, managed by volunteers and funded by the city and province, is located in the Peel region of Toronto, Ontario. Older adults learn about the program through various means, such as nurses or a health care team at the hospital, a family doctor, and word-of-mouth. The program provides support through social calls, medication reminders, and safety check-in calls to approximately 135 older adults in the Toronto area in Canada. Social calls are approximately 20 minutes in length, while medication reminders and safety check-in calls last one or two minutes. A complete description of this program can be found in the Method section.

To assess the role that the telephone program plays in the lives of older adults, I use the Social Convoy Diagram (Kahn & Antonucci, 1980) as the scaffold. This is a historically under-

utilized approach, given that a meta-review by Hogan, Linden, and Najarian (2002) found that "the most salient problem [in reviewing 100 social support interventions] is that most studies examining efficacy of support interventions failed to include a measure of social support" (p. 425). The present study measures both the quantity and quality of older adults' social networks, and assesses the telephone program in its role as a potential source of social support.

Questions the Current Research Seeks to Explore

The goals of the current research are divided into five sections: 1) comparison of older adults' social networks between the two groups: those who use the telephone program and those who do not use the program; 2) relationships between the three components of successful aging: social connection, physical and mental functioning, and probability of disease and disability; 3) social networks and types of future goals; 4) assessing the size and quality of older adults' social networks over a period of one year; and 5) exploring the importance of a telephone program for older adults who used it.

Comparison of social networks between groups. First, differences in the social connection component of successful aging between the two groups is examined, given that one of the groups used the telephone program and the other group did not use the program. Thus, the questions concern whether there are differences in the social networks of the two groups. This will be a less common application of the Social Convoy Model (Kahn & Antonucci, 1980); that is, to a telephone helpline program.

Question 1. Are there differences in the number of members, types of relations (i.e., diverse, only family, only friends, or no social network) in the circles, frequency of contact, and methods of connection (i.e., in-person, telephone, mailed letter/card, e-mail, social media) in each of the three circles (inner, middle, and outer) of the Social Convoy Diagram (see Figure 2)

between the two groups: older adults who used the telephone program as compared to those who did not?

Hypothesis 1a. I hypothesize that those who used the telephone program will have fewer members, less diverse membership, lower frequency of contact, and use fewer methods to stay connected with the members in each of the three circles of their Social Convoy Diagram than those who did not use the telephone program.

Hypothesis 1b. I also expect within-person differences in both groups of older adults regarding varying levels of frequency of contact, depending on the placement of the member in the Social Convoy Diagram. Specifically, I expect that individuals will have more contact with members in their inner circle than with the members in their outermost circle (e.g., Ajrouch et al., 2017).

Hypothesis 1c. Furthermore, I also hypothesize that older adults in both groups who use fewer communication methods to stay in contact with members in their circles will report lower frequency of contact with those members than those who report using multiple methods of communication (Shklovski, Kraut, & Rainie, 2004).

Relationships between the three predictors of successful aging. This section consists of questions and hypotheses concerning the relationships between characteristics of social networks and the two remaining components of SAM: physical and mental functioning; and probability of disease and disability (Rowe & Kahn, 1998).

Question 2. What are the relationships between the three components of successful aging (social connection, physical and mental functioning, and probability of disease and disability)?

Hypothesis 2a. I hypothesize that participants with lower physical and mental functioning and higher probability of disease and disability will have fewer members in their social

networks, lower diversity of membership, lower frequency of contact with members in their social network, and use fewer methods to stay connected compared to participants with relatively higher physical and mental functioning and lower probability of disease and disability.

Hypothesis 2b. I also hypothesize that experiencing higher relationship quality compared to lower relationship quality with overall circle membership of the social network will predict better physical and mental health in older adults in both groups (e.g., Antonucci, 2001).

Social networks and future goals. This section consists of a question to examine the relationship between size of older adults' social networks and type of future goals they prioritize.

Question 3. Is there a difference in older adults' amounts of social connection based on the type of goal (knowledge acquisition versus emotion-focused) they mention?

Hypothesis 3. I hypothesize that having emotion-focused goals (e.g., spending time with close family and friends, taking care of one's own health) will predict fewer members in the social networks compared to having knowledge acquisition goals (e.g., volunteering, travelling, meeting new people), which will predict higher number of members in their social network. The results will extend the application of Socioemotional Selectivity Theory (Carstensen, 1993, 1995, 1998).

Exploratory Question 4. Are there within-person, rather than between-group, differences in the size and quality of social networks over a period of one year?

Role of the telephone helpline program. To what degree does the telephone helpline program play a role as a source of social support in the lives of older adults who might have minimal to no-social connection?

Question 5. How important or close is the telephone helpline program in the lives of older adults who might have minimal-to-no social connection?

Hypothesis 5. I hypothesize that program users will place the program in circles 1 or 2 of the Social Convoy Diagram, indicating high closeness and importance of the program in their life rather than placing the program in circle 3 or not in their diagram at all.

Question 6. What suggestions/recommendations do participants have to improve the telephone helpline program? This question is exploratory, in order to gather information about recommendations from participants about the program.

Method

Design

The present study employed a one-year longitudinal design. Data were collected at over three time points to assess various components of older adults' lives. Specifically, the study included two groups of older adults: clients of a telephone helpline program and those who were not using the telephone helpline program. The study employed a self-report method, and participants were interviewed and recorded over the telephone for all three waves of data collection. Based on experience from the first wave of data collection, participants were mailed response cards (see Appendix A) for the second and third waves of data collection. Data were analyzed to make between-group (i.e., older adults who used the telephone program versus older adults who did not) and within-group (e.g., examining the differences in size of social network over the one-year time period) comparisons.

Participant Recruitment

The recruitment method for the two groups differed in the study.

The telephone helpline program. This telephone helpline program is located in the Peel Region of Toronto, Ontario, Canada. Among many other telephone services that the organization offers, one of their support line programs is for older adults who are over the age of 55 years and might be socially-isolated. To be a client of this program, older adults have signed up and

provided their information to receive one of three types of calls: check-in safety calls, medication reminders, and social calls. First, the check-in safety calls are usually one to two minutes in duration and the volunteer simply asks the client if everything is okay. These reassurance calls provide older adults with the comfort of living independently in their household without the fear that they could die and no one would discover them for days. Second, medication reminders are also very short in duration and the volunteer simply reminds the client to take their medication. Clients can receive these calls once a day or as many as three times a day. Last but not least, the social calls are approximately 20 minutes in duration and involve the client talking about any subject matter of their interest with the volunteer. Helpline volunteers are randomly assigned to calls during their shifts, thus clients may not get the same volunteer for all their calls. The goal of these calls is to provide older adults with emotional support and companionship in order to reduce feelings of isolation and loneliness. At the time of starting recruitment for this research project, the program had a total of 135 clients (97 females and 38 males).

Participants in the telephone helpline program. The recruitment for participants from the telephone program occurred in two steps. The first step of recruitment involved internal personnel from the telephone program contacting their clients to inform them of this study. Out of a total of 135 clients, 122 clients on the program were contacted by the internal personnel to provide an equal chance to participate and to avoid biased selection of participants for this research. Thirteen clients were not contacted due to having severe cognitive impairments. Clients' permission was obtained to share the following: the client's name, phone number, type of call they receive from the telephone program (social call, medication reminder, or check-in call), and how long they had been a client of this telephone program. Once all 122 participants were contacted by the internal personnel, the information from those who gave permission was shared with the primary investigator. After the telephone program's internal personnel's call, 51

clients expressed interest in learning more about the study. Out of 51 clients, 41 were receiving social calls, eight were receiving medication reminder calls, and two received safety check-in calls from the telephone helpline program. The primary investigator contacted all 51 participants and followed the interview protocol for the study. From 51 participants, 31 expressed interest in taking part in the study (61% response rate). Once the participant gave consent, the duration of the interviews ranged from 30 minutes to two hours.

All participants from the first wave of data collection were contacted for the second and third waves of data collection. Unless participants indicated that they no longer wanted to be part of the research study during the second wave, they were contacted again for the third wave.

Participants who did not use the telephone helpline program. To recruit participants for this group, flyers were posted at local libraries, senior learning centers, bus stops, grocery stores, places of worship, and shared with educational lecture series organizations in Toronto, Ontario, Canada. Almost all participants who expressed interest in the study were attendees at the educational lecture series organized through the University of Toronto, in Toronto, Ontario. Participants e-mailed or called the primary researcher to express interest in the study and thereafter, they were scheduled to learn more about the study and for the interview if they chose to continue their participation. The duration of the interviews ranged from 30 minutes to one hour.

All participants from the first wave of data collection were contacted for the second and third waves of data collection. Unless participants indicated that they no longer wanted to be part of the research study during the second wave, they were contacted again for the third wave regardless of their participation in the second wave of the study.

Participants

Participants who used the telephone helpline program. At the onset of the study, a total of 31 individuals (54.80% female, 45.20% male; M_{age} = 79.10, *SD* = 7.67, age range = 63-94) participated in the first wave of data collection. From the 31 individuals, 29 were receiving social calls and two were receiving medication reminder calls from the telephone helpline program. In the second wave of data collection, 22 individuals (21 individuals from time 1 and 1 new participant) 50% female, 50% male; M_{age} = 78.00, *SD* = 6.38, age range = 64-92) participated in the survey and 18 individuals (61.10% female, 38.90% male; M_{age} = 77.70, *SD* = 6.40, age range = 64-92 years of age) participated in the third wave of data collection.

Those who did not participate after the first wave did so for the following reasons: they were unreachable after many attempts at calling or their phone number no longer worked (*n* = 5); they had recently suffered a medical issue (*n* = 4; had a stroke and could not follow along with the survey; recently diagnosed with cancer and had very little energy; recently had a fall with head injury; visually impaired and recently had a fall); they had passed away (*n* = 3) or moved to a nursing home (*n* = 1); they were disoriented and could not follow along with the survey (*n* = 1); or were no longer interested in participating in the survey (*n* = 3).

At time 1, 46.90% of participants indicated having a high school level of education, and 31.30% of participants indicated having elementary school education. In terms of relationship status, 43.80% of participants indicated being widowed, followed by 31.30% of participants who indicated being divorced. With respect to reported ethnic/cultural background, almost thirty-nine (38.7%) of participants identified as being White, followed by the "other" category (35.5%; where participants indicated having mixed ethnic/cultural background, e.g., mixed between Indian, Indonesian, and Scottish), and those who identified as being African American (19.4%). Data for two participants were missing. See Table 1 for a fuller description of the demographics.

Although no significant differences were detected between age, living conditions, heath rating, or number of illnesses between those who continued their participation to time 2 and those who withdrew after time 1, there were other differences in demographic characteristics. Specifically, the youngest participant (63 years of age) and the oldest participant (94 years old) withdrew from the study; additionally, those who tended to live alone, self-reported their health as lower, and those who reported more illnesses at time 1 withdrew from the study at time 2. Similar patterns were noticed for those who withdrew from the study between time 2 and time 3.

Participants who did not use the telephone helpline program. At the onset of the study, a total of 46 individuals (65.20% female, 34.80% male; M_{age} = 75.20, *SD* =8.86, Range = 61-94 years of age) participated in the first wave of data collection. In the second wave of data collection, 45 individuals (44 individuals from time 1 and 1 new participant; 65.20% female, 34.80% male; M_{age} = 74.70, *SD* = 8.86, Range = 61-94 years of age) participated in the survey, and 45 individuals (64.40% female, 35.60% male; M_{age} = 75.00, *SD* = 9.01, Range = 61-94 years of age) participated in the third wave of data collection. Two participants completed the first and the final survey and were unreachable for the second survey. Another two participants completed the first and the second survey and were unable to complete the final survey due to health reasons.

At time 1, the majority (68.10%) of participants indicated having a college/university degree, and 21.30% indicated having graduate school level of education. In terms of relationship status, 57.40% of participants indicated being married and 17.00% indicated being widowed. With respect to reported ethnic/cultural background, the majority (89.40%) of participants identified as White, with 10.60% indicating "other" (i.e., having an ethnic/cultural background such as Jewish or South Asian). See Table 1 for a fuller description of the demographic characteristics.

The intent at the beginning of the study was to gather data from a larger sample size of telephone program users; however, due to reasons such as lack of interest from telephone program clients and the multi-layer nature of the recruitment process (discussed in the procedure section of this study), the final sample size of telephone group participants was smaller than anticipated. In addition, although an attempt was made to match participants on gender and age to have comparable groups, the importance of matching participants on education levels, relationship status, or ethic/cultural background was overlooked. These drawbacks became major limitations of the present study; ultimately, the present study is shaped as mainly exploratory. This limitation is discussed in fuller detail in the limitations and future directions section of the paper.

Procedure

All data were collected over the phone. Participants were interviewed a total of three times over a period of one year. The first session began with an introduction to the study, followed by reading the consent form to the participant, which was also mailed or e-mailed to participants if they preferred to retain a hard copy for their records. The consent form for those who did not use the telephone program did not mention or involve information about the telephone program. Subsequently, participants were asked for their permission to record their verbal consent to participate in the research study. Once the recording started, the researcher stated the participant's unique identification code and then began the interview. All sessions were audio-recorded and responses to multiple choice questions were also recorded by hand on a hardcopy of the survey. All interviews were conducted by the primary investigator. Participants were encouraged to elaborate if brief or unclear responses were provided for open-ended questions. Recordings were later transcribed by three research assistants. This research study was

approved by Wilfrid Laurier University's ethics board and all participants were treated in accordance with APA/CPA ethical standards.

Both groups, program users and program non-users, were asked the same questions, with the programs users also asked questions about the telephone program. All participants were entered into a draw to win a $100 Visa gift card at the end of the research study. At the end of the study, participants were debriefed.

Measures

The survey was comprised of six sections. The sections assessed participants' social relationships, physical health, mental well-being, thoughts about the future, the role of the telephone program, and demographic characteristics. All measures were assessed at all three time points unless stated otherwise; see Appendix B for the full interview script for all three time points.

Social relationships. To examine each participant's social network, Kahn and Antonucci's (1980) Convoy Model of Social Relations was used. During the first wave of data collection, participants were guided to draw a set of three concentric circles, and write the word "you" in their innermost circle. In the second and third wave of data collection, participants were instructed to look at the response card that was mailed to them prior to their scheduled interview (see Appendix A). Participants were asked to think about people in their life and where these people would be placed in the Social Convoy Diagram (see Figure 2). In addition to the number and type of people being placed in the diagram, participants were asked follow-up questions about their social network in regard to the frequency of contact, method of contact, and quality of relationship.

Beginning with the innermost or circle 1, participants were asked to think about "people to whom you feel so close to that it's hard to imagine life without them." Participants were

allowed to place as many people as they wanted in each circle. Once they were ready to share the people they placed in that circle, they were asked follow-up questions about the type of relationship with the person/people in the circle, frequency of contact with them, and how they stayed in contact with them. Specifically, participants rated frequency of contact from 5 *(every day)* to 1 *(once a year)*; if they had more than one person in the circle, they provided an average for how often they were in contact with all members in the group. Second, participants were asked to share the different methods they used to keep in touch with the members in the specific circle; response options included: in-person, talk on the phone, through a letter/card, texting/e-mail/social media, or video chatting. Last, participants were also asked questions pertaining to the quality of relationship with the member(s) in the circle, responding to statements such as, "I enjoy being with this/these person/people"; "These/this person/people always understand me" using a 5-point Likert-type scale with anchors ranging from 1 = *Agree* to 5 = *Disagree*. Lower score on this measure indicates a more positive relationship between the participant and the member(s) placed in the specific circle. The same procedure was followed for circle 2, described as including "people to whom you may not feel as close as the first circle, but who are still very important to you", and for circle 3 or outermost circle with instructions, "people who you haven't already mentioned but they are close and important enough to be in your life that they should be placed in your diagram."

While not directly measured or studied in the current research, social isolation is defined as lacking social connectedness (Zavaleta, Samuel, & Mills, 2017), and lacking quantity and quality of relationships at an individual, group, community, and the environment level (Gierveld & Tilburg, 2006; Wister, Cosco, Mitchell, Menec, & Fyffe, 2019; Zavaleta et al., 2017). Thus, the social convoy model was used to measure all levels of social connection, including potential

isolation; the flexibility of the Social Convoy Diagram provided an opportunity for participants to share their social networks at all levels.

Predictors of successful aging. In addition to assessing the social connection component of successful aging, the other components - physical and mental functioning, and probability of disease and disability - were also examined with the measures as outlined below.

Physical functioning. Physical functioning was assessed in two ways: total score for physical health and number of physical activities in which participants engaged. A score for physical health was computed by aggregating two measures: participants' ratings of physical health and energy. Participants rated their health by answering the following one-item measure: "In general, how would you rate your health currently?" on a 5-point Likert-type scale with anchors ranging from 5 = *Excellent* to 1 = *Poor*. Participants were also asked to rate their energy levels in the same manner. Participants thus received an aggregated score that ranged from 2 to 10. One-item self-report health measures have been previously used in the literature, and have been found to be reliable and valid measures of physical health (Bowling, 2005; Meng, Xie, & Zhang, 2014). To assess level of participation in physical activity, participants were asked to list all physical activities, and the score for number of physical activities was the total count of physical activities in which participants engaged.

Mental functioning. Mental functioning was assessed in two ways: a total score for mental well-being from two measures, and a separate score for cognitive functioning. Mental well-being was computed by first standardizing scores on two measures to z-scores and thereafter aggregating them for a total score. The two measures included: the Satisfaction with Life scale (Diener, Emmons, Larsen, & Griffin, 1985) with responses on a Likert-type scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*), and the Patient Health Questionnaire (PHQ; Kroenke, Spitzer, & Williams, 2001), which included responses on a Likert-type scale

ranging from 1 (*Not at all*) to 4 (*Every day*). These measures are included in the interview script in Appendix B under the section "Feelings about life". Cognitive functioning was measured using Wallace and Herzog's (1995) animal naming task labelled as the "Ice Breaker Exercise" in the interview. In the following section, these measures are described in full detail.

Satisfaction with life. To assess participants' global well-being, the Satisfaction with Life scale developed by Diener et al. (1985) was used. This measure is a widely-used five-item indicator of self-reported life satisfaction and includes items such as "In most ways my life is close to my ideal." In the survey, participants responded to these items on a 5-point Likert-type scale with anchors ranging from 1 = *Strongly Disagree* to 5 = *Strongly Agree*; higher scores on this measure indicate higher levels of satisfaction with life. The original measure includes a 7-point Likert-type response scale; however, for this study the response scale was intentionally altered at the behest of the telephone helpline program organization on the grounds that clients would have difficulty conceptualizing and understanding a 7-point Likert-type scale over the telephone. Past literature has also used adapted 5-point Likert-type response options for this measure (Emerson, Guhn, & Gadermann, 2017). In the past, Diener et al.'s (1985) scale has demonstrated high internal consistency ranging from $\alpha = .79$ and $\alpha = .89$ (Atienza, Balaguer, & Garcia-Merita, 2003; Diener et al., 1985). Similarly, in the present study, the reliability was $\alpha = .89$.

Depression. To assess level of depression, a modified version of the Patient Health Questionnaire (PHQ; Kroenke, Spitzer, & Williams, 2001) was administered. The PHQ depression scale is shorter than other depression scales. It includes nine items, which correspond to the nine diagnostic criteria for a major depressive disorder covered in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). In the present study, participants were asked "During the past month, have you…" followed by the list of six of nine items from PHQ, such as

"had interest or pleasure in doing things" (reverse coded) and "had trouble falling asleep, staying asleep, or sleeping too much". Participants rated the frequency of experiencing each mood on a 4-point Likert-type scale with anchors 1= *Not at all* to 4= *Nearly Every day*. Scores on this measure can be interpreted as indicating no depression, minimal, mild, moderately severe, or severe depression. However, for the purpose of the present study, the measure was not used as a diagnostic tool, but rather as a tool to compare the frequency of depressive symptoms in the two groups of older adults: those on the telephone program compared to those who are not on the telephone program.

Although the original PHQ has nine items, the present study only included six out of nine items, again at the request of the telephone helpline program organization, in order to avoid triggering negative emotions in their clients; thus, the following three items were not administered: "felt down, depressed, or hopeless", "moved or spoken so slowly that other people could have noticed? Or the opposite – were so fidgety or restless that you have been moving around a lot more than usual", and "had thoughts that you would be better off dead or of hurting yourself in some way". In place of these three items, the following three positive/mood boosting items were administered: "felt that you were just as good as other people", "enjoyed life", and "felt happy". The positive items were reverse coded in the scale. PHQ-9 has demonstrated high reliability ranging $\alpha = .83$ to $\alpha = .89$ (Cameron, Crawford, Lawton, & Reid, 2008; Kroenke, Spitzer, & Williams, 2001). In the present study, the reliability of the modified version of the scale was $\alpha = .84$.

Cognitive measure. As a proxy measure of cognitive abilities, a retrieval fluency task examining vocabulary and processing speed developed for the Health and Retirement Study (Wallace & Herzog, 1995) was used in the present study. During the interview, participants were introduced to this task as an "ice breaker exercise" and asked to name as many animals as they

could within 60 seconds, and with the following instructions: "Now, I'd like to get us to do something we hope you will find enjoyable. I want to see how many different animals you can name. You will have 60 seconds. When I say, 'Begin', say the animal names as fast as you can." These instructions were repeated if necessary. After giving these instructions, the interviewer said "Are you ready?" and if the participant indicated being ready, the interviewer then said "Begin." If the participant did not list any animal for 10 seconds, the interviewer asked, "Anything else?" The task was completed when the 60 seconds were over or when the participant could not list any more animals.

Coding scheme for number of animals. As per Wallace and Herzog (1995), the following coding scheme was used: categories of animals (e.g., dog) as well as specific types (e.g., collie, terrier) were counted as correct. Further, sea mammals (e.g., whale), fish (e.g., tuna, shark), birds (e.g., robin), reptiles (e.g., snake), and amphibians (e.g., frog), as well as invertebrate animals such as insects (e.g., ants, mosquitos), arachnids (e.g., scorpion), mollusks (e.g., clams), and many others (e.g., earthworms, leeches, flukes, starfish, sponges, corals, etc.) were also counted as correct. Multiple mentions of the same animal only counted as one animal toward the final score. Total number of correct responses was added as the total score on this task.

Disease and disability. The total number of the illnesses reported by the participant was used as a proxy measure for probability of disease and disability. Participants were asked about six chronic diseases with the following question: "Has a doctor ever told you that you have…": high blood pressure or hypertension, diabetes or high blood sugar, cancer, chronic lung disease, heart problems, and ever had a stroke. This measure is also used in the Health and Retirement Study (Wallace & Herzog, 1995). Response options were "*Yes*" or "*No*"; participants were assigned a '1' for the presence of each diagnosis, and scores could range from 0-6.

Thoughts about the future. At the end of the survey, participants were asked to share their plans, dreams, hopes, and goals for the future. Participants were told they could consider the future to be something as close as next month, next year, or even five years from current time.

Coding scheme for type of future goal. Two coders (the author and another coder who was blind to the present study's hypothesis) read through all the responses from the transcribed data from time 1, and discovered that most participants reported goals in their response; thus, a coding scheme was adapted from Penninggroth and Scott (2012) to encompass the themes that were emerged from the data. Three main goal categories were identified: knowledge acquisition – the motivation for knowledge or information acquisition or novelty (e.g., going to another country or city; enroll into a course at a University); emotion-focused – the goal shows an emphasis on feelings and emotional states, and can be health-related (e.g., live a happy life, stay healthy); and social contact-related – spending time with or contacting people they are already close to (e.g., spend more time with grandchildren, visit a friend). In addition, an "other" category was created, which included participants mentioning dreams (e.g., winning a lottery), generative goals (e.g., give moral and ethical schemata to the next generation), broad present-oriented goals which show a desire to "live in the moment" (e.g., take it day-by-day), and broad future-oriented goals which show a focus on the future (e.g., plan the funeral). Each category was coded for presence or absence, and each participant could receive a score up to four.

The coding process involved the following steps: 1) two coders coded 10% of the data together for practice with the established coding scheme; 2) 20% of the data was coded separately for reliability; 3) the rest of data were divided for coding; 4) the last 10% of the data was coded to check for coder drift. Strong agreement between the two raters was demonstrated for each category, with kappa value ranging from 0.86-1.00, $p < .001$.

The role of the telephone helpline program. After the participant had shared the details of their social network, those who used the telephone helpline program received the following questions: 1) "Now, take a look at your diagram of the circles; in which circle would you place the Telephone Program?" and were given the following response options: circle 1; circle 2; circle 3; none of the circles, and 2) "If you could make one recommendation for the telephone program, what would it be?"

Demographic information. At time 1, the following demographics were collected: date of birth, gender, cultural/ethnic background, highest level of education completed, relationship status, number of children, number of individuals residing in the household, and volunteering status.

Plan of Analysis

Power analyses were conducted using G*Power 3.1 software (Faul, Erdfelder, Lang & Buchner, 2007) to determine the number of participants needed to conduct the originally-planned analyses: independent t-tests to compare the two group of older adults, linear regressions, and repeated measures multivariate analyses of variance. The power analyses showed lack of power, given smaller-than-required sample sizes, thus, non-parametric tests were conducted in place of the traditional parametric tests. In addition to sample size calculations, the data from both groups – those who used the telephone helpline program (also referred to as program users) and those who did not (also referred to as program non-users) - were inspected for normality. The results of the Shapiro-Wilk test of normality were significant for all three time points and for both groups, indicating that the data were non-normally distributed. This further supported the decision to use non-parametric tests throughout. These revisions to the planned statistical analyses permitted exploratory examination of the key hypotheses and research questions.

With the revised analyses plan, both groups were first compared in terms of the descriptive characteristics that were reported at the onset of the present study. Thereafter, the two groups were also compared in terms of the physical health, mental functioning, number of illnesses reported, and their social networks by conducting non-parametric Mann-Whitney U tests were conducted. After these analyses were conducted, it was clear that the two groups had very different lifestyles. Thus, any subsequent analyses were conducted within the groups.

Within each group, Wilcoxon-signed rank tests were conducted to assess how often participants were staying in contact with their circle memberships. Second, to examine the relationship between number of communication methods that were used in each circle and the frequency of contact with members in each circle, correlation coefficients were computed. Third, to assess the relationship between social network and predictors of successful aging and also with future goals, correlation coefficients were also computed as the small sample size prohibited linear regression analyses. Fourth, to examine the stability or change over time of size of social networks and quality of relationships, Friedman's tests were conducted. When Friedman's tests were significant, follow-up Wilcoxon signed-rank tests were conducted to assess where the differences occurred between the three time points. An alpha level of .05 was used for all tests. Last, the importance of the telephone program in the lives of those used it was assessed using descriptive analyses and from extracting themes from the open-ended responses. See Table 2 for a summary of whether the analyses were within or between groups, the time points(s) that were used, and the statistical test(s) that were conducted.

Results

In this section, the results are organized to allow comparison of the two groups of participants with respect to demographic characteristics and social networks. As shown in the demographic summary, the two groups of participants differed on demographic variables in

addition to the target variable regarding whether or not they used the helpline program. As a result of these differences, analyses focus on within-group comparisons, more so than between group comparisons.

The within-group results are organized in the following order: 1) frequency of contact with members in the circles; 2) relationship between number of communication methods used and frequency of contact; 3) relationship between social connection and physical and mental functioning and probability of disease and disability; 4) relationship between social networks and types of future goals; 5) assessing older adults' social networks (size and quality) over a period of one year; and 6) importance of the telephone program for those who used the program.

Group Comparison of Demographic Characteristics

Based on frequencies, demographic characteristics (i.e., education level, relationship status, living conditions, ethnic/cultural background, and current volunteering status) were compared between the two participant groups. Mann-Whitney U tests were conducted to compare the two groups on physical health, mental functioning, and number of illnesses.

In terms of level of education, the majority (81%) of program users had a high school degree or lower, whereas the majority (89%) of program non-users had college/university or graduate school degree. In terms of relationship status, the majority (75%) of program users were either divorced or widowed, and lived alone (63%), whereas the majority (68%) of program non-users were married, living together, or in a common-law relationship. Only 28% of program non-users lived alone. There was greater diversity in the ethnic and cultural backgrounds of the program users compared to the program non-users. Specifically, among the program users 40% identified as White, 40% as mixed background, and 20% as African American. The majority (89%) of participants in the program non-user group identified as White with 11% identifying as mixed background. Finally, the two groups also differed in their volunteerism within their

communities. Only 13% of program users reported volunteering, whereas over 70% of program non-users volunteered in the community. In sum, the program users and program non-users differed with respect to many key demographic features (See Table 1 for a full summary of demographic characteristics). As a result, although between group analyses were conducted to demonstrate differences in these groups, the majority of comparisons made in this document reflect within group comparisons rather than between group comparisons.

Between group comparisons were made to examine physical health, mental functioning, and number of illnesses between the two groups. Data from all three time points were used to conduct Mann-Whitney U tests for these comparisons.

Physical health was assessed in two ways: ratings of physical health (rated on 5-point Likert-type scale with anchors ranging from 1 = *Poor to* 5 = *Excellent*) and number of physical activities. Specifically, at time 1, 2, and 3, the mean physical health rating for the program users was above the midpoint of the scale with $M = 3.11$, $M = 3.20$, and $M = 3.41$, respectively, and near the top end of the scale with $M = 4.15$, $M = 4.01$, and $M = 3.98$, for program non-users, respectively (see Table 3 for full summary). The mean physical health ratings for the program non-users were consistently greater than the program users, with smallest significant group difference at time 3, $U = 288.00$, $p = .001$. With respect to physical activity, the mean number of physical activities reported at time 1, 2, and 3 by program users was almost half those of program non-users with $M = 2.23$, $M = 2.10$, and $M = 1.56$ for program users, respectively, and $M = 4.00$, $M = 3.62$, and $M = 2.87$ for program non-users, respectively (see Table 3 for full summary). The mean number of physical activities reported by program non-users were consistently greater than the program users, with smallest significant group difference at time 3, $U = 141.50$, $p < .001$.

Mental functioning was also assessed in two ways: mental well-being and cognitive functioning. Mental well-being included aggregated standardized scores of two measures: the Satisfaction with Life Scale (maximum possible score = 25; Diener et al., 1985), and the Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001). Cognitive functioning was measured from the total count of number of animals (Wallace & Herzog, 1995). The raw scores for life satisfaction indicated the average score at time 1, 2, and 3, was above the midpoint with M = 15.87, M = 16.23, and M = 16.67, respectively, for program users, and near the top end of the scale with M = 20.83, M = 20.80, and M = 20.04, respectively, for program non-users. In respect to the Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001), lowest possible score of 9 indicated the participant had experienced more positive than negative mood compared to highest possible score of 36 which indicated the participant had experienced more negative than positive mood during the past month. The raw scores for both groups were on the low end of the scale as the average score at time 1, 2, and 3, was M = 16.20, M = 16.67, and M = 17.44, respectively, for program users, and M = 13.40, M = 13.36, and M = 14.11, respectively, for program non-users. The raw scores of both measures were aggregated to create mental well-being score, which was standardized to compare program users with program non-users. Specifically, at time 1, 2, and 3, the mean standardized mental well-being rating for the program users was M = -0.26, M = -0.23, and M = -0.56, respectively, and M = 0.19, M = 0.12, and M = 0.20 for program non-users, respectively (see Table 3 for full summary). The mean mental well-being ratings for the program non-users did not significantly differ than the program users for time 1 and time 2. However, there was a significant difference between mental well-being between the two groups at time 3, U = 178.00, p = .003, with program non-users reporting significantly higher mental well-being than the program users. With respect to cognitive functioning, at time 1, 2, and 3, the mean number of animals named by the program users was

approximately half those of the program non-users with $M = 11.14$, $M = 12.81$, and $M = 12.93$ for program users, respectively, and $M = 22.33$, $M = 22.68$, and $M = 22.00$ for program non-users, respectively (see Table 3 for full summary). The mean scores of cognitive functioning for program non-users were consistently greater than the program users, with smallest significant group difference at time 3, $U = 128.00$, $p < .001$.

The presence of disease and disability was assessed from number of illnesses reported by the participant. Specifically, at time 1, 2, and 3, the mean number of illnesses reported were relatively low for both groups with $M = 1.90$, $M = 1.41$, and $M = 1.44$, for program users respectively, and $M = 1.02$, $M = 1.00$, and $M = 1.02$, for program non-users, respectively (see Table 3 for full summary). At time 1, program non-users reported significantly fewer illnesses than program users, $U = 422.50$, $p = .002$. The mean number of illnesses did not significantly differ between the two groups at times 2 and 3.

Overall, from these analyses, it was clear that the two groups had different demographic characteristics from the beginning of the present study. Compared to program users, those who did not use the program had higher education, were married or in common-law relationship, living with someone, were predominately White, and involved in volunteering in the community. In the next section, the two groups' social networks were compared at each of the three time points.

Group Comparison of Social Networks

Group differences in the size, membership diversity, frequency of contact, and methods used to stay connected were tested for hypothesis 1a. Specifically, program users were hypothesized to have fewer members, less diverse membership, and to use fewer methods to stay connected with members in each of the three circles of the Social Convoy Diagram compared to

program non-users. To compare both groups, non-parametric Mann-Whitney U tests were conducted in the following analyses.

Size of the social network comparison. Participants were asked who they have placed in each circle of the Social Convoy Diagram and responses included labels of relationships (e.g., son, family, friends). To compare the size of social networks between program users and program non-users, a coding scheme was developed to capture both the singular and plural responses that participants provided. Examples of singular responses included relationship labels such as "*wife*", "*son*", "*daughter*", etc. and examples of plural responses included relationship labels such as "*friends*", "*family*", etc. The size of social network in each circle was rated from 1 to 5. Specifically, those who reported having no one in the circle received "1" on the scale which represented having no social connection. Those who reported 1-2 singular labels such as "*spouse*" or "*son*" received "2" on the scale which represented "few social contacts". Those who reported 3 singular labels such as "*spouse, son, and daughter,*" or 1 plural label such as "*family,*" or 1 singular and 1 plural label such as "*spouse and children,*" received "3" on the scale which represented "small number of social contacts". Those who reported 4 singular labels such as "*spouse, son, cousin, and friend*," or 2 plural labels such as "*family and friends,*" or 3 singular and 1 plural such as "*spouse, son, daughter, and friends,*" received "4" on the scale which represented "a lot of social contact". Those who reported 5 singular labels such as "*spouse, son, daughter, friend, and grandchild*," or 4 singulars and 1 plural such as "*spouse, son, daughter, friend, and grandchildren,*" or 3 singulars and 2 plurals such as "*spouse, son, daughter, family,* and *friends,*" or 3 or more plurals, such as "*family, friends, and colleagues,*" received "5" on the scale which represented "extensive number of social contact".

At time 1, the average number of people represented "few to small number of social contacts" in circles 1, 2, and 3, for participants in the program user group with $M = 2.53$, $M =$

2.27, and *M* = 1.97, respectively. Comparatively, the average number of people represented "a lot of social contact" in circles 1, 2, and 3, for participants in the program non-users group was *M* = 3.97, *M* = 3.54, and *M* = 3.53, respectively. Similar results were found for time 2 and time 3. At time 2, the average number of people in circles 1, 2, and 3, for participants in the program user group were *M* = 3.27, *M* = 3.18, and *M* = 1.72, respectively. Comparatively, average number of people in circles 1, 2, and 3, for participants in the program non-users group were *M* = 4.31, *M* = 4.27, and *M* = 4.02, respectively. At time 3, the average number of people in circles 1, 2, and 3, for participants in the program user group was *M* = 3.35, *M* = 2.59, and *M* = 2.24, respectively. Comparatively, the average number of people in circles 1, 2, and 3, for participants in the program non-users group was *M* = 4.11, *M* = 4.27, and *M* = 3.36, respectively. Overall, compared to program users, program non-users reported a significantly higher numbers of members in their social network in each of the three circles, at all three time points, with one exception. For Circle 1 at time 3, there were no differences between the groups, $U = 279.50$, $p = .078$. For all other comparisons, the smallest significant difference was found between number of members in circle 3 of both groups at time 3, $U = 204.00$, $p = .004$. See Table 4 for a complete summary of results.

Membership diversity comparison. Responses provided by the participants concerning membership in their social convoys were categorized as: 1) immediate family (e.g., spouse, son); 2) extended family (e.g., in-laws, cousins); 3) friend(s); 4) casual relationship(s) (e.g., acquaintance, colleagues, people in clubs); and 5) service worker(s) (e.g., cashier, café barista, car mechanic, doctor). In addition, one person in the telephone program group only mentioned God in the circle, which is not captured in this coding scheme. Participants received code of "1" for a presence of a category in the circle. A total diversity score was computed for each circle

and participants could receive a score up to five if they mentioned all five types of relationships in the circle; higher score reflected more diversity of membership in the circle.

Descriptively assessing the diversity of membership, program users had presence of family in circle 1 and circle 2, and friends and casual relationships in circle 3. In contrast, program non-users had presence of family members in circle 1, friends in circle 2, and casual relationships in circle 3. Table 5 shows the frequency of each type of relationship in each circle at each time point, for both groups.

At time 1, the mean number of types of relationships present in circles 1, 2, and 3, for participants in the program user group was $M = 1.27$, $M = 0.97$, and $M = 0.67$, respectively. Comparatively, the mean number of types of relationships present in circles 1, 2, and 3, for participants in the program non-user group was $M = 1.87$, $M = 1.52$, and $M = 0.67$, respectively. At time 2, mean number of types of relationships present in circles 1, 2, and 3, for participants in the program user group were $M = 1.55$, $M = 1.45$, and $M = 0.55$, respectively. Comparatively, mean number of types of relationships present in circles 1, 2, and 3, for participants in the program non-user group were $M = 1.84$, $M = 1.69$, and $M = 1.42$, respectively. At time 3, mean number of types of relationships present in circles 1, 2, and 3, for participants in the program user group were $M = 1.78$, $M = 0.89$, and $M = 0.83$, respectively. Comparatively, mean number of types of relationships present in circles 1, 2, and 3, for participants in the program non-user group were $M = 1.87$, $M = 1.89$, and $M = 1.44$, respectively. Overall, compared to program user group, program non-users had significantly more diverse membership in all of the circles at all three time points, with two exceptions. There were no significant differences between the two groups in circle 2 at time 2, $U = 408.50$, $p = .205$, and in circle 1 at time 3, $U = 390.50$, $p = .813$. The smallest significant difference was found between diversity of membership in circle 1 of both groups at time 2, $U = 356.50$, $p = .041$. See Table 6 for a full summary of the results.

Frequency of contact comparison. Participants used a 5-point Likert-type scale ranging from 1 (every day) to 5 (once a year) to rate how often they were in contact with each member/group of members they had placed in each circle of the Social Convoy Diagram. All means for both groups were above "3" on the scale, reflecting that they were in contact with member(s) of their social network at least once a month. At time 1, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program user group was M = 4.39, M = 3.93, and M = 3.48, respectively. Comparatively, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program non-user group was M = 4.52, M = 3.81, and M = 3.12, respectively. At time 2, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program user group was M = 4.30, M = 3.74, and M = 3.60, respectively. Comparatively, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program non-user group was M = 4.56, M = 3.88, and M = 3.37, respectively. At time 3, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program user group was M = 4.23, M = 3.86, and M = 3.50, respectively. Comparatively, the average frequency of contact with members in circles 1, 2, and 3, for participants in the program non-user group was M = 4.48, M = 3.83, and M = 3.28, respectively. There were no significant differences between the two groups in regard to frequency of contact with members in any of the circles at any of the time points. See Table 7 for a full summary of results.

Methods used to stay connected comparison. Participants were asked which method(s) they used to stay connected with member(s) in each of the three circles in the Social Convoy Diagram. The response options included: in-person, talk over the phone, through letter or card, by text/e-mail/social media, and by video chats/skype/facetime. Participants could receive a total

possible score of 5 for reporting the use of all methods to stay connected; see Table 8 for frequencies of how many participants reported using each method.

At time 1, the average number of methods used to stay connected with members in circles 1, 2, and 3, for participants in the program user group was relatively low with $M = 1.76$, $M = 1.61$, and $M = 1.24$, respectively. Comparatively, the average number of methods used to stay connected with members in circles 1, 2, and 3, indicates that participants in the program non-user group used approximately half of the methods listed in response options to stay connected, $M = 2.70$, $M = 2.22$, and $M = 1.79$, respectively. Similar results were found for times 2 and 3. Specifically, at time 2, the average number of methods used to stay connected with members in circles 1, 2, and 3, for participants in the program user group was $M = 1.67$, $M = 1.33$, and $M = 1.14$, respectively. Comparatively, the average number of methods used to stay connected with members in circles 1, 2, and 3, for participants in the program non-user group was $M = 2.98$, $M = 2.64$, and $M = 2.00$, respectively. At time 3, average number of methods used to stay connected with members in circles 1, 2, and 3, for participants in the program user group was $M = 2.33$, $M = 1.79$, and $M = 1.50$, respectively. Comparatively, the average number of methods used to stay connected with members in circles 1, 2, and 3, for participants in the program non-user group was $M = 2.96$, $M = 2.71$, and $M = 1.93$, respectively. Overall, compared to the program users group, the program non-users group used significantly more methods to stay connected with members of their social network in each of the three circles, at all three time points, with one exception. For total number of methods used to stay in contact with members in circle 3 at time 3, there was no significant difference between the two groups, $U = 160.00$, $p = .154$. The smallest significant difference was found between total number of methods used to stay in contact with members in circle 1 at time 3, $U = 199.00$, $p = .011$. See Table 9 for a full summary of results.

Summary of Group Comparisons

Compared to program users group, program non-users had a general pattern of results which showed that they had a significantly larger network of members, more diversity of membership, and used more methods to stay in contact with members in their social network.

Analyses and results for the following hypotheses and exploration question were conducted within-group, given the differences in demographics, and are presented separately for each group.

Within-Person Differences in Frequency of Contact

Within-person differences in the frequency of contact across the three circles of the Social Convoy Diagram was tested for hypothesis 1b. Specifically, participants were expected to be more often in contact with members in the inner-most circle than with members in the outer-most circle.

Program users. At time 1, the average frequency of contact with members in circles 1, 2, and 3 was $M = 4.39$, $M = 3.93$, and $M = 3.48$, respectively. At time 2, the average frequency of contact with members in circles 1, 2, and 3 was $M = 4.30$, $M = 3.74$, and $M = 3.60$, respectively. At time 3, the average frequency of contact with members in circles 1, 2, and 3 was $M = 4.23$, $M = 3.86$, and $M = 3.50$, respectively. The average frequency of contact with the member(s) indicates that participants were in contact at least few times a week with the member(s) placed in circle 1, about once a week with the member(s) placed in circle 2, and few times a month with the member(s) placed in circle 3. Overall, at all three time points, Wilcoxon-signed rank tests showed that participants were more often in contact with members placed in circle 1 than in circles 2 or 3, and more often in contact with members placed in circle 2 than in circle 3, with three exceptions. No significant differences were found at time 2 between the frequency of contact with members placed in circle 2 compared to circle 3, $Z = -0.57$, $p = .572$; at time 3,

between the frequency of contact with members placed in circle 1 compared to circle 2, Z = -1.44, p = .151 and at time 3, frequency of contact with members placed in circle 2 compared to circle 3, Z = -0.85, p = .398. The smallest significant difference was found between the frequency of contact with members placed in circle 1 and circle 2 at time 1, Z = -2.31, p = .021. See Table 10 for a full summary of results.

Program non-users. At time 1, the average frequency of contact with members in circles 1, 2, and 3 was M = 4.52, M = 3.81, and M = 3.12, respectively. At time 2, the average frequency of contact with members in circles 1, 2, and 3 was M = 4.56, M = 3.88, and M = 3.37, respectively. At time 3, the average frequency of contact with members in circles 1, 2, and 3 was M = 4.48, M = 3.83, and M = 3.28, respectively. The average frequency of contact with the member(s) indicates that participants were in contact at least few times a week with the member(s) placed in circle 1, about once a week with the member(s) placed in circle 2, and few times a month with the member(s) placed in circle 3. The results of the Wilcoxon-signed rank tests showed statistically significant differences between the frequency of contact with members in the three circles of the Social Convoy Diagram. The general pattern showed participants were more often in contact with members placed in circle 1 than circle 2 and circle 3, and more often in contact with members placed in circle 2 than with those placed in circle 3. The smallest significant difference was found between the frequency of contact with members placed in circle 2 and circle 3 at time 1, Z = -3.43, p = .001. See Table 11 for a full summary of results.

Relationship Between Communication Methods and Frequency of Contact

The relationship between the number of methods that were used to stay in contact and frequency of contact was assessed for hypothesis 1c. Specifically, those who used fewer communication methods to stay in contact with their circle membership were hypothesized to have lower frequency of contact with members in the specific circle than those who report using

variety of methods of communication. The original plan was to conduct regression analyses for this hypothesis; however, the small sample size and low variability in the data precluded the use of regression analyses. Thus, the following analyses were treated as exploratory and only significant correlation coefficients are presented below.

Program users. Overall, at each time point, there were no significant correlations between circles 1, 2, or 3, in regard to communication methods participants used to stay connected with members in the circle, and the frequency of connection with circle membership. See Table 12 for complete summary of all correlation coefficients.

Program non- users. Overall, at each time point, there were few significant correlations between circles 1, 2, or 3, in regard to communication methods participants used to stay connected with members in the circle and the frequency of connection with circle membership. At time 2, there was a significant negative correlation between the number of methods used to stay connected and frequency of contact with members in circle 1, $r(43) = -0.54$, $p < .001$ and a significant positive correlation between the number of methods used to stay connected and frequency of contact with members in circle 2, $r(43) = .30$, $p = .024$. At time 3, there was a significant negative correlation between total number of methods used to stay connected and frequency of contact with members in circle 1, $r(43) = -0.54$, $p < .001$. See Table 13 for complete summary of all correlation coefficients.

Social Networks and Predictors of Successful Aging

Relationship between aspects of social network and predictors of successful aging (i.e., physical and mental functioning, and probability of disease and disability) were tested for the second hypothesis. Specifically, those with lower physical and mental functioning and higher probability of disease and disability were expected to have fewer members in their social network, less membership diversity, lower frequency of contact, and to use fewer methods to

stay connected as compared to the social networks of those with high physical and mental functioning and fewer chronic illnesses.

Size of social network. To test this part of the hypothesis, correlation coefficients were computed between size of social network and the following variables: physical functioning (i.e., physical health and number of physical activities), mental well-being (i.e., the Satisfaction of Life Scale, the Patient Health Questionnaire, and cognitive functioning), number of illnesses, and demographic characteristics with enough variability to enable testing (i.e., age and number of children[1]). Lastly, t-tests were conducted to test for gender differences in regard to the size of social network.

Program users. There were no significant correlations between the size of social network for circles 1, 2, or 3 and any of the variables. See Table 14 for complete summary of all correlation coefficients. In addition, no gender differences were found.

Program non-users. A significant positive correlation existed between the size of social network in circle 1 and physical health, $r(44) = .30$, $p = .046$, and number of physical activities, $r(43) = .34$, $p = .021$. Another significant positive correlation existed between the size of social network in circle 2 and cognitive functioning, $r(43) = .36$, $p = .015$, and number of physical activities, $r(43) = .33$, $p = .026$. No other correlations were significant. See Table 15 for a complete summary of all correlation coefficients. In addition, no gender differences were found.

Membership diversity. To test this part of the hypothesis, correlation coefficients were computed between diversity of membership in each circle and the following variables: physical functioning (i.e., physical health and number of physical activities), mental well-being (i.e., the

[1] Correlations were only computed for age and number of children as other demographic variables (i.e., relationship status, level of education, and cultural/ethnic background) had low variability within-group to enable testing.

Satisfaction of Life Scale, the Patient Health Questionnaire, and cognitive functioning), number of illnesses, and demographic characteristics (i.e., age and number of children). Lastly, t-tests were conducted to test for gender differences in regard to diversity of membership.

Program users. A significant positive correlation existed between number of physical activities and membership diversity in circle 2, $r(26) = .42$, $p = .023$ and a significant negative correlation existed between mental well-being and membership diversity in circle 3, $r(26) = -.40$, $p = .046$. No other correlations were significant. See Table 16 for complete summary of all correlation coefficients. In addition, no gender differences were found.

Program non-users. A significant negative relationship existed between number of children and membership diversity in circle 1, $r(42) = -.43$, $p = .004$. In addition, a t-test revealed significant differences in diversity of membership in circle 2 between males ($M = 1.25$, $SD = 0.58$) and females ($M = 1.67$, $SD = 0.71$), $t(44) = -2.15$, $p = .039$, with females reporting more diversity in membership. No other correlations were significant. See Table 17 for complete summary of all correlation coefficients.

Frequency of connection. To test this part of the hypothesis, correlation coefficients were computed between frequency of contact with each circle membership and the following variables: physical functioning (i.e., physical health and number of physical activities), mental well-being (i.e., the Satisfaction of Life Scale, the Patient Health Questionnaire, and cognitive functioning), number of illnesses, and demographic characteristics (i.e., age and number of children). Lastly, t-tests were conducted to test for gender differences in regard to the frequency of contact with each circle membership.

Program users. There were no significant correlations between the frequency of connection with members in circles 1, 2, or 3 and any of the variables. See Table 18 for complete summary of all correlation coefficients. However, a t-test revealed significant differences in the

frequency of contact with circle 3 membership between males (M = 2.56, SD = 0.81) and females (M = 4.17, SD = 0.57), $t(19) = -5.34$, $p < .001$, with females reporting being in contact more frequently than males.

Program non-users. There were no significant correlations between the frequency of connection with members in circles 1, 2, or 3 and any of the variables. However, a t-test revealed significant differences in the frequency of contact with circle 3 membership between males (M = 2.38, SD = 1.18) and females (M = 3.53, SD = 0.69), $t(43) = -3.61$, $p = .002$, with females reporting being in contact more frequently than males. See Table 19 for complete summary of all correlation coefficients.

Method(s) used to stay connected. To test this part of the hypothesis, correlation coefficients were computed between the number of methods used to stay in contact with each circle membership and the following variables: physical functioning (i.e., physical health and number of physical activities), mental well-being (i.e., the Satisfaction of Life Scale, the Patient Health Questionnaire, and cognitive functioning), number of illnesses, and demographic characteristics (i.e., age and number of children). Lastly, t-tests were conducted to test for gender differences in regard to the number of methods used to stay in contact with each circle membership.

Program users. There were no significant correlations between the frequency of connection with members in circles 1, 2, or 3 and any of the variables. See Table 20 for complete summary of all correlation coefficients. In addition, no gender differences were found.

Program non-users. A significant positive correlation existed between number of methods used to stay connected with members in circle 1 and total physical health, $r(44) = .33$, $p = .025$; and a significant negative correlation existed between the total number of methods used to stay connected with members in circle 3 and total number of illnesses, $r(41) = -.33$, $p = .031$.

No other correlations were significant. See Table 21 for complete summary of all correlation coefficients. In addition, no gender differences were found.

Quality of relationship. Relationship between quality of relationship and physical health and mental well-being was assessed for hypothesis 2b. Specifically, higher quality of relationship was hypothesized to be associated with better physical health and mental well-being compared to lower quality of relationship. Correlations determined that there were no significant relationships between quality of relationship and physical health and mental well-being in any of the three circles, at any of the three time points, for both groups. See Table 22 for complete summary of all correlation coefficients for program users and see Table 23 for program non-users. In addition, no gender differences were found.

Summary of findings for program users. Overall, a significant positive correlation existed between number of physical activities and diversity of membership in circle 2 and a negative correlation existed between mental well-being and diversity of membership in circle 3. Second, females were more often in contact with members in circle 3 than were their male counterparts. No significant relationship was found between size of social network, number of methods used to stay connected, or quality of relationship and physical and mental functioning, number of illnesses, or demographic characteristics.

Summary of findings for program non-users. Overall, a significant positive correlation existed between the size of social network in circle 1 and physical health, and number of physical activities. Size of social network in circle 1 also had a significant positive correlation with number of physical activities and also with cognitive functioning. Second, a significant negative correlation existed between number of children and membership diversity in circle 1 and females reported having more diverse membership in circle 2 than their male counterparts. Third, females also reported being more often in contact with members in circle 3 than were their

male counterparts. Fourth, a significant positive correlation was found between the number of methods used to stay connected with members in circle 1 and physical health, and a significant negative correlation between the total number of methods used to stay connected with members in circle 3 and total number of illnesses. Finally, no significant relationship was found between quality of relationship with circle membership and physical and mental functioning, number of illnesses, or demographic characteristics.

Relationship between Social Networks and Future Goals

The relationship between the type of future goal(s) and size of social networks was examined for the third hypothesis. Specifically, having an emotion-focused goal(s) was expected to predict fewer members in the social networks of older adults whereas having a knowledge acquisition goal(s) was expected to predict greater number of members in the social networks. Responses to the question concerning participants' plans, dreams, hopes, and goals for the future were used to test this hypothesis. Participants were told they could consider the future to be something as close as next month, next year, or even five years from current time. Each response was coded for presence of the following types of goals: knowledge acquisition, emotion-focused, social contact-related, and "other" type of goals. Each response could include one or more type of goal.

Types of goal and number of members in each circle. Given the limited sample size, correlations rather than regressions were computed between each type of goal category (i.e., knowledge acquisition, emotion-focused, and social contact-related goals) and the number of members in each of the three circles at time 1.

Program users. From descriptively assessing the presence of type of goal in participant's response, 34% of participants mentioned emotion-focused goals, 25% of participants mentioned knowledge acquisition goals, and 16% of participants mentioned social contact-related goals.

Goals that were coded as "other" which included dreams, generative goals, and broad present- or future-oriented goals were mentioned 34% of the time in this group.

There was a significant positive correlation between knowledge acquisition goals and number of members in circle 3, $r(28) = 0.48$, $p = .008$. There was also a significant positive correlation between presence of social contact-related goal and number of children, $r(28) = 0.40$, $p = .022$. There were no other significant correlations. See Table 24 for complete summary of all correlation coefficients.

Program non-users. From descriptively assessing the presence of type of goal in participant's response, 71% of participants mentioned knowledge acquisition goals, 59% of participants mentioned emotion-focused goals, and 46% of participants mentioned social contact-related goals. Goals that were coded as "other" which included dreams, generative goals, and broad present- or future-oriented goals were mentioned 44% of the time in this group.

There were a few significant correlations. There was a significant positive correlation between emotion-focused goal and number of members in circle 1, $r(44) = 0.33$, $p = .028$. There were significant negative correlations between presence of emotion-focused goal and age, $r(44) = -0.35$, $p = .016$, and presence of emotion-focused goal and number of children, $r(44) = -0.41$, $p = .006$. There were no other significant correlations. See Table 25 for complete summary of all correlation coefficients.

Stability of Size of Social Networks and Quality of Relationships

Stability of size of social network over time. Friedman's test was conducted to compare (within-person) number of members over the three time points. If results were significant, post-hoc analyses were conducted with Wilcoxon signed-rank tests.

Program users. The results presented below are within-person analyses of number of members in circles 1, 2, and 3, respectively, over the three time points.

Number of members in circle 1. There was a statistically significant difference in number of members in circle 1 over the three time points, $\chi^2(2) = 7.39$, $p = .025$. Post-hoc analysis with Wilcoxon signed-rank test showed a significant difference in number of members in circle 1 between times 1 ($M = 2.60$) and time 2 ($M = 3.27$), $Z = -1.98$, $p = .048$, with participants mentioning more members at time 2. However, no significant differences were found between times 1 ($M = 2.60$) and time 3 ($M = 3.33$), $Z = -0.33$, $p = .739$ and between time 2 ($M = 3.27$) and time 3 ($M = 3.33$), $Z = -1.88$, $p = .060$.

Number of members in circle 2. There was a statistically significant difference in number of members in circle 2 over the three time points, $\chi^2(2) = 6.20$, $p = .045$. Post-hoc analysis with Wilcoxon signed-rank test showed a significant difference in number of members between time 1 ($M = 2.13$) and time 2 ($M = 3.31$), $Z = -2.75$, $p = .006$, with participants mentioning more members at time 2. However, no significant differences were found between time 1 ($M = 2.13$) and time 3 ($M = 2.73$), $Z = -1.46$, $p = .145$ and between time 2 ($M = 3.31$) and time 3 ($M = 2.73$), $Z = -1.29$, $p = .196$.

Number of members in circle 3. The average number of members in circle 3 at each time point were as follows: time 1, $M = 2.13$; time 2, $M = 1.93$; and time 3, $M = 2.20$. There were no statistically significant differences in number of members in circle 3 over the three time points. See Table 26 for a complete summary of results.

***Program non-users*.** The results presented below are within-person analyses of number of members in circles 1, 2, and 3, respectively, over the three time points.

Number of members in circle 1. The average number of members in circle 1 at each time point were as follows: time 1, $M = 4.00$; time 2, $M = 4.31$; and time 3, $M = 4.07$. There were no statistically significant differences in the number of members in circle 1 over the three time points.

Number of members in circle 2. There was a statistically significant difference in number of members in circle 2 over the three time points, $\chi^2(2) = 12.64$, $p = .002$. Post-hoc analysis with Wilcoxon signed-rank test showed that there were significant differences between time 1 (M = 3.55) and time 2 (M = 4.21), Z = -2.97, p = .003 and between time 1 (M = 3.55) and time 3 (M = 4.26), Z = -2.98, p = .003, with participants mentioning more members at times 2 and 3 than at time 1. However, there was no significant difference between time 2 (M = 4.21) and time 3 (M = 4.26), Z = -0.28, p = .781.

Number of members in circle 3. There was a statistically significant difference in the number of members in circle 3 over the three time points, $\chi^2(2) = 8.95$, $p = .011$. Post-hoc analysis with Wilcoxon signed-rank test showed that there were significant differences between time 1 (M = 3.55) and time 2 (M = 4.02), Z = -2.32, p = .020, with participants mentioning more members at time 2; and between time 2 (M = 4.02) and time 3 (M = 3.31), Z = -3.04, p = .002, with participants mentioning more members at time 3. There was no significant difference between time 1 (M = 3.55) and time 3 (M = 3.55), Z = -0.98, p = .325. See Table 27 for a complete summary of results.

Quality of relationships over time. Participants responded to five statements in regard to the quality of relationship with members in each circle at each time point using a Likert-type scale ranging from 1 (agree) to 5 (disagree). Scores were reverse coded in order to have higher score on the measure reflect higher quality of relationship with maximum possible score of 25. Friedman's test was conducted to compare (within-person) the quality of relationship in each circle over the three time points.

Program users. The mean score of the quality of the relationship with members placed in circle 1 at 1st, 2nd, and 3rd time point, was M = 23.00, M = 21.77, and M = 22.39, respectively. The mean score of quality of relationship with members placed in circle 2 at 1st, 2nd, and 3rd time

point, was $M = 21.27$, $M = 21.45$, and $M = 21.09$, respectively. The mean score of quality of relationship with members placed in circle 3 at 1st, 2nd, and 3rd time point, was $M = 18.60$, $M = 20.60$, and $M = 19.20$, respectively. At all three time points, the mean scores were close to the top level of the scale indicating a high quality of relationship with members included in the social network. Overall, there were no significant differences in quality of relationship with circle membership over the three time points. See Table 28 for a complete summary of results.

***Program non-users*.** The mean score of the quality of the relationship with members placed in circle 1 at 1st, 2nd, and 3rd time point, was $M = 23.64$, $M = 23.55$, and $M = 23.59$, respectively. The mean score of quality of relationship with members placed in circle 2 at 1st, 2nd, and 3rd time point, was $M = 22.35$, $M = 22.83$, and $M = 22.15$, respectively. The mean score of quality of relationship with members placed in circle 3 at 1st, 2nd, and 3rd time point was $M = 20.74$, $M = 20.50$, and $M = 20.05$, respectively. At all three time points, the mean scores were close to the top level of the scale indicating a high quality of relationship with members included in the social network. Overall, there were no significant differences in quality of relationship with circle membership over the three time points. See Table 29 for a complete summary of results.

Importance of the Telephone Program

Importance of the telephone program in the lives of the program users was assessed for the fifth hypothesis. Specifically, participants were expected to place program in circle 1 or 2 of the Social Convoy Diagram, rather than in circle 3 or not in the Social Convoy Diagram at all. This hypothesis was supported: as the majority of participants placed the program within the first two circles at all three time points. Specifically, at time 1, 83.4% of the participants placed the program in circles 1 or 2; followed by 86.4% at the second time point; and 68.8% at the third time point.

In an open-ended question, participants were asked if they had any recommendations for the program. Although the initial intent of this question was to gather information about how the program might be improved, participant responses sometimes exceeded this expectation and instead shared the impact that the program has on their lives. As a result, thematic analysis was used to examine these responses more closely. All responses were read in their entirety. Recurring themes were extracted from the responses (Strauss & Corbin, 1990). One overarching outcome of this process was the inherent emotional tone that often accompanied the message conveyed. Specifically, in some cases very strong affective language, primarily positive in nature, accompanied expressions of the impact the program on the participants' lives. In the remaining cases affect tended to be neutral. Thematic summaries specific to the impact of the program yielded three themes: responses that were positive, responses that included recommendations, and responses in which the participant could not identify ways to improve the program. Themes were verified by two raters by reading 20% of the responses at each time point. The three themes and percentage of responses in each theme category are described below in detail.

First, at time point 1, of the 29 responses, 15 (52%) responses reflected participant's positive experiences with the program. Positive experiences primarily reflected social connection and social/emotional support. For example, some participants indicated that the telephone program offered them a social connection that they would otherwise lack in their life. One male participant indicated the helpline was the only social connection in his life: "[…] it's very great. It gives me a distractor to talk to someone. I talk to nobody really." In contrast, another participant who lost her vision after being diagnosed with eye cancer shared her experience of receiving socioemotional support from the helpline volunteers:

> I was crying to her and how depressed I am... I have nobody, my grandson had left me. I talk to them twice [a week]...they still make you feel good, it is very important to us to some people, you know um to have someone like that […] I cry, many times I cry with them and they wait and they encourage you...I feel that there is people who care for you and encourage you to live and give you the courage to continue going and they'll spend their time for us. I mean that lady called me on family day...You know when they take their time on family day and they offer to call us, that's very nice to do, you know and call someone that they think they need to talk to and make them feel good you know...I think the program is perfect because if they cannot reach you, they continue on trying to reach you. They really care and think "Why can't I reach her, is something wrong with her?" […] you know there is nothing to change really to me, maybe I'm wrong because they do a wonderful job and this is a wonderful thing for people.

This participant's story provides an example of how important this particular telephone program can be in one's life. The percentage of participants describing social connection and social/emotional support increased from time 1 to time 2 and 3. Specifically, 69% of the responses at time 2 and 64% at time 3 included participants' positive experiences with the program and the positive impact the program has in their lives.

At all three time points, approximately a third of all responses (28%, 31%, and 36%, at times 1, 2, and 3, respectively) included a recommendation to improve the program. Participants indicated desire for in-person contact, long-term predictable relationships, being connected to more services or receiving more calls from the program, and having a contact number to call back to connect if they miss a call from the program. For example, one participant shared his desire to connect with someone over the weekends and in-person:

> I hate weekends when they come along because if I had a car like I had before, and I could go out and do what I want to do, spend my money, and all that. But, not having this and now I'm stuck with a TV set. And there's nobody comes around, the phone never rings. That's…That's it. […] some of the girls and guys I talked to, you would like them to come into your home and sit down, it breaks up your day and you know somebody.

In general, participants expressed the need for more resources and a desire for more consistent and stable connections with volunteers.

Finally, close to approximately quarter of responses at time 1 (24%) and less than a quarter at times 2 and 3 (15% and 18%, respectively) indicated that they did not have any recommendations required for improving the program. For example, one participant indicated that he liked how the program was currently and had no suggestions for improvement: "I really don't know how I would change the program […] Works quite well."

In sum, participants placed the telephone program in circle 1 or 2 of the Social Convoy Diagram at all three time points indicating the importance of the program in their lives. This importance was further confirmed when participants spontaneously shared their positive experience regarding the program. Further, when asked to identify recommendations, those who shared recommendations expressed a desire for additional resources that would increase availability and access to this program and those who provide support in this program.

General Summary of Results for Both Groups

Overall, results showed that program non-users had bigger size of social network, more membership diversity, and used more methods to stay connected with members in their social networks. Program non-users also reported better physical health, fewer illnesses, participated in more physical activities, and had better cognitive functioning, and these factors were related to having a greater number of members in their social network. Additionally, physical health and

number of illnesses were also associated with the number of methods participants used to stay connected with their social network, and females were more frequently in contact with certain members in their social network than males in both groups. Results also showed participants contacted members in their social network based on where they placed them in the Social Convoy Diagram, i.e., participants were more frequently in contact with members in circle 1 compared to circles 2 and 3, and more frequently in contact with members in circle 2 compared circle 3. Participants who did not use the telephone program had more future goals compared to those who used the program; those who had either knowledge acquisition goals or emotion-focused goals (but not social contact-related or other types of goals) had more members in their social network. Pattern of change was found in the size of social network over the period of one-year but the quality of relationship remained stable in both groups. Finally, program users found the program to be important to them and placed it in circles 1 or 2 of the Social Convoy Diagram.

Discussion

The present study's main goal was to examine the differences in predictors of successful aging (i.e., engagement with life, physical and mental functioning, and probability of disease and disability) in two groups of individuals: those who used the program and those who did not. A subgoal was to explore the role of a telephone helpline program in the lives of those who might have minimal to no social contact.

First, it is important to highlight that the plan of analyses for the present study shifted as a result of two concerns: 1) the differences in lifestyle (i.e., demographic characteristics, physical health, cognitive functioning, number of illnesses, and social networks) between program users and program non-users showed that the two groups were different. Thus, subsequent analyses conducted for the hypotheses and the exploratory question were within-group and the results are

discussed separately for each group. 2) Due to low sample size in the telephone program group and low variability in the data in both groups, traditional parametric tests could not be conducted, and non-parametric tests were used throughout the dissertation. In addition, correlation coefficients were computed rather than regressions and findings were treated as exploratory.

To reflect the above two changes, this section of the document is organized to first discuss the differences between the lifestyle of both groups: who used the telephone program and those who did not, which showed the groups were different. And, thereafter, results within the groups are discussed; beginning with the relationship between predictors of successful aging (engagement with life, physical and mental functioning, and probability of disease and disability), relationship between social connection and future goals, and within-person changes in social networks (i.e., size and quality of relationship) over a period of one year. To end, the importance of the telephone program in the lives of older adults who might have minimal to no social connection is discussed.

Overall, the findings of the present study showed that program users had fewer members in their social networks, less diversity in membership, used fewer methods to stay connected, reported lower physical and had lower cognitive functioning, more illnesses, and fewer future goals than program non-users. In addition, the size of social networks assessed within-person changed over the period of one year; however, the quality of relationships was found to be stable. The importance of the telephone program was demonstrated with participants who used the program rating it as so close and important that they cannot live their life without it (i.e., placed the program in circles 1 or 2) and from their positive experiences with the program shared in open-ended responses.

Group Comparison of Predictors of Successful Aging

First, the two groups differed in various aspects of their lives: program users reported lower physical health, had lower cognitive functioning, reported more illnesses, and majority (87%) of them did not volunteer compared to program non-users. These differences are important to discuss as both groups of older adults exist within the community, however those who used the telephone program may have felt a particular need for the program. These participants could be viewed as a potentially marginalized group of older adults, and the process of aging looked different for them.

Those who used the telephone program reported a lifestyle which is in line with a large body of research that has found relationships between social support, paid or unpaid productive activity, physical health, and cognitive functioning (Everard, Lach, Fisher, & Baum, 2000; Onyx & Warburton, 2003; Schwingel, Niti, Tang, & Ng, 2009). Specifically, the findings of the present study support previous research that showed that those who had minimal social connection reported volunteering less often (Onyx & Warburton, 2003), reported lower physical health (Cornwell & Waite, 2009), and had lower cognitive functioning (Barnes, De Leon, Wilson, Bienias, & Evans, 2004; Fratiglioni et al., 2004) than those who are socially engaged. In the next section, the differences in the lifestyles of two groups, program users and program non-users, are organized by each aspect of social network (i.e., size, membership type, frequency of contact, method of contact, and quality of contact).

Size of social network. As expected, at all three time points, program users had fewer members in their social network than program non-users. This finding is important, as size of social networks has been associated with the amount of support older adults receive; that is, having a larger pool of people available provides more potential for receiving both emotional and instrumental support (Ajrouch, Reisine, Lim, Sohn, & Ismail, 2010; Plickert et al., 2007). In the

present study, some participants in the telephone program group only had one person or two people that in their closest circle (i.e., circle 1) and had no one in circles 2 or 3. One striking finding was that one telephone program participant indicated that they had no one in their entire social network. In contrast, those who did not use the program had 3 or more individuals in each of the circles of the Social Convoy Diagram. Overall, the lack of people in the lives of those who used the telephone program poses a risk of not having access to a network of people they could call when in need of help.

Interestingly, despite the findings of past literature which have shown a positive association between mental well-being and social support (Kafetsios & Sideridis, 2006), the comparison of mental well-being (i.e., satisfaction with life and number of depressive symptoms) did not differ between the two groups in the present study. There could be several plausible explanations for this. It is possible that the items on the measures may be too broad, and not age-appropriate for the current research to capture real differences between the two groups. For example, participants found it challenging to provide a rating for some items in the Satisfaction with Life scale (Diener et al., 1985). For example, the item "In most ways my life is close to my ideal" was too general for some participants and they could not define what an "ideal" life would look like for them. Furthermore, in the Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001), items such as "had trouble falling asleep, staying asleep, or sleeping too much"; were overloaded and participants had a difficult time rating such items. Alternatively, the results could be attributed to the way well-being is operationalized in the present study. For example, Kafetsios and Sideridis (2006) assessed mental health using the General Health Questionnaire (Goldberg, 1978), which includes items assessing state anxiety, somatic symptoms, social dysfunction, and depression. In contrast to the present study, other than depression, mental well-being did not include a measure of aspects related to anxiety or social dysfunction which may

have resulted in finding no difference between the two groups as some aspects of mental well-being were not assessed.

It is also worth noting that at time points 2 and 3, there were no differences between the number of illnesses reported between program users and program non-users. This may be simply due to the fact that those with more illnesses had withdrawn from the study prior to time 2 and time 3 and did not participate in the final survey.

Membership diversity. In general, compared to program users, program non-users had a significantly more diverse membership in their social network. This finding also ties well with the earlier finding that program non-users had larger social networks, which could result in more diversity in their network. Understanding the composition of social networks is important, as having a more (e.g., close family, extended family, friends, casual relationships) rather than less diverse networks (e.g., only close family or only friends) has been generally associated with receiving more emotional and instrumental support (Fiori et al., 2006; Suanet & Antonucci, 2016). The majority of participants who did not use the telephone program had friends in circle 2 after placing family and/or friends in circle 1, whereas only about one third of participants who used the program had friends in one of their three circles and instead predominantly had family present in their circles. This difference is important because although family has been shown to provide the majority of instrumental support (Litwin & Attias-Donfut, 2009), the nature of relationships with friends is mostly voluntary, which is often associated with fewer interpersonal conflicts and more emotional support (Fiori, Smith, Antonucci, 2007; Sherman, de Vries, & Lansford, 2000). Thus, it is important that individuals have networks composed of both friends and family. Given this evidence in literature, in the present study, those who used the program and rely primarily on family members for support might be at risk for placing more

responsibilities on one or a few individuals, which might result in caregiver burden for those family members and ultimately in receiving less support.

It is, however, important to consider cultural/ethnic backgrounds when assessing the impacts of diversity of membership in social networks. Antonucci (2001) discusses several studies highlighting the differences found in diversity of membership in various racial groups. For example, older adults who are African American report having a social network composed of family and friends, and members from their church; Chinese immigrants in United States report having children as their primary support; and in Japan, a daughter-in-law is reported to be the primary caregiver. Thus, preference for diversity of membership may be based on ethnic/cultural background and assessing expectations of participant's preferred amount of diversity in social network would provide more information about their level of satisfaction with the composition of their social network.

Surprisingly, one participant who used the telephone program placed the telephone program in their social network while filling out the Social Convoy Diagram on their own (before the interviewer asked them where they would place the program). This shows the importance of the telephone program in that participant's life, and exemplifies the diversity of membership which goes beyond family and friends for older adults.

Frequency of contact. Older adults in both groups were in contact with members of their social network with the same frequency. The general pattern showed that participants were more often in contact with members in circle 1 than circles 2 and 3, and more often in contact with members in circle 2 than with those in circle 3. Participants were in contact several times a week and most often daily with members in circle 1, about once a week with members in circle 2, and a few times a month with members in circle 3. This finding is consistent with previous literature; for example, in Ajrouch et al.'s (2017) study, participants also had more frequent contact with

members of circle 1 than with members of the other circles. Being in contact more often with the most immediate members is expected as older adults may be interested in spending more time investing in closer relationships than casual relationships placed in the outer circles.

Female participants in both groups were more frequently in contact with members of circle 3 than their male counterparts. This could be due to the fact that membership of circle 3 included more casual relationships and females are generally socialized to be more communal and thus may maintain casual relationships by being in touch more often than their male counterparts (Eagly, Wood, & Diekman, 2000). In addition, previous research has shown that females, compared to males, are more likely to maintain casual relationships by staying connected in-person and through active use of technology (e.g., cell phones, Skype; Cherepanova, Tukhvatulina, & Mirza, 2016; McDonald & Mair, 2010). It is important to keep this finding in mind when developing interventions are created to facilitate social connection, as males may need more encouragement to stay in regular contact with informal relationships that are created through the intervention.

Method of contact. Overall, compared to program users, those who did not use the program used significantly more methods to stay connected with members in their social network in each of the three circles, at all three time points. Most participants who used the telephone program stayed in contact with members of their social network through in-person interaction or via telephone, whereas those who did not use the program stayed in contact through in-person interaction, telephone, texting, e-mailing, and through social media. This is consistent with past literature, which states that those who use technology, such as internet, to stay connected also make use of the phone and in-person interaction opportunities (Shklovski et al., 2004).

Furthermore, education levels can possibly also explain the difference between the two groups. As compared to program non-users, program users had lower education level (more than 80% of participants had high school degree or less) and may lack digital skills to use new technology or devices with capabilities for texting, e-mailing, or social media (van Dijk & Hacker, 2003). Thus, it is important to consider digital literacy in order to best facilitate more social connection, as using more methods to stay connected has been found to increase communication and decrease likelihood of experiencing isolation (Antonucci, Ajrouch, & Manalel, 2017; Sum et al., 2008).

Quality of relationship. Quality of relationship was not related to any of the predictors of successful aging or demographic characteristics. This could be attributed to the low variability in the quality of relationship ratings (i.e., high ratings by both groups) making it difficult to detect significant differences. This explanation is in line with previous literature that shows that older adults are less likely to report relationship negativity and more likely to avoid interpersonal conflict than younger adults (Fingerman, Hay, & Birditt, 2004; Birditt & Newton, 2015). Furthermore, research has also shown that older adults invest more time developing higher quality relationships, rather than having many relationships (Antonucci et al., 2011). This latter reason also supports the ideas of SST, which claims that older adults focus on their emotions by intentionally surrounding themselves with emotionally meaningful and high-quality relationships (English & Carstensen, 2014). Altogether, the high rating of relationship quality is not surprising, and is in line with previous literature.

These results, however, need to be read with caution. Although it appears that those who used the telephone program had high quality relationships similar to the participants who did not use the program, it is still important to note that availability of social relations is at least necessary - if not sufficient - for the quality of relationship to exist (Antonucci, 2001). As some

participants who used the telephone program had no one in their circle 2 or 3, they were not asked any questions about quality of relationships. Thus, the high rating of relationship quality is not the complete picture for those who used the telephone program.

Furthermore, the method of measuring the quality of relationship may be associated with the lack of variability in the data. First, all items on the scale were positively worded. Given that negative aspects can occur in a relationship simultaneously with positive aspects, including both negative and positive items in the scale in the future would be beneficial. Alternatively, participants may have rated the quality of their relationship as high because they were asked to provide an overall rating for each circle rather than rating their relationship with each member mentioned in the circle. In future, assessing the relationship with each member individually would provide a deeper understanding of the quality of the relationships with members in participants' social networks (Fuller-Iglesias, Webster, & Antonucci, 2015).

Another possible way to further understand the quality of relationships would be to include a measure that disentangles the type of support received; for example, items concerning instrumental support (i.e., offering help or assistance in a tangible way such as providing transportation to attend medical appointments, offering money etc.), in addition to socioemotional support (i.e., direct expressions of affection, esteem, and respect). Instrumental support can be just as important as socioemotional support, as it can enable individuals to receive faster and better medical care, leading to better physical and mental health. For instance, Marquez et al. (2016) found that participants diagnosed with type 2 diabetes found family and friends providing help with instrumental support (e.g., grocery shopping, food preparation, transportation for medical appointments, and scheduling of medical appointments) helpful in treatment adherence, achieving weight loss, and decreasing depressive symptoms. Thus, receiving instrumental support is clearly important. In sum, future research should consider

adding negatively-worded items, evaluate relationship quality for each member individually, and also include items in regard to instrumental support.

Overall, the two groups reported different lifestyles such that program users had fewer members in their social networks, less diversity in membership, used fewer methods to stay connected, reported lower physical, had lower cognitive functioning, and more illnesses. This difference is important to note as it provides further evidence for previous research that shows the interconnectedness between the three aspects of successful aging (i.e., engagement with life, physical and mental functioning, probability of disease and disability; Andrews et al., 2002). In addition, these differences also explain the high withdrawal rate of participants who used the telephone program as this group had high rate of morbidity and mortality over the one year compared to those who did not use the program.

As the two groups had different lifestyles, the following section includes a discussion of findings related to aspects of social network (i.e., size of social network, diversity of membership, and methods used to stay connected) and physical and mental functioning, and demographic characteristics. These relationships are first discussed for those who used the telephone program, followed by a discussion of those who did not use the program.

Program users. Due to low variability within the data and a small sample size, there were no consistent or global patterns of results. However, some interesting exploratory results were found and are discussed below with possible explanations for the findings.

An interesting finding emerged in terms of membership diversity. It was found that those who reported higher mental well-being reported less diversity of membership in circle 3, which consisted of people the participant finds just important enough to include in the diagram. This finding is interesting, as one third of telephone program participants did not have anyone in this circle and the other two thirds had just one type of relationship in this circle. Thus, those who

had no one in this circle reported higher mental well-being than those who had someone in this circle. In general, participants included casual relationships, friends, and extended family in circle 3. And, these relationships may not be as important or as emotionally-close as immediate family or close friends, and participants with lower well-being could be including these members in circle 3 because they have a small social network. In contrast, perhaps those with higher well-being did not feel the need to include any relationships in this circle, and had included more meaningful relationships in circles 1 and 2. Thus, this group of people may be happier with having quality of close relationships, rather than a bigger quantity of relationships in their social network.

Program non-users. Similar to the program users group, the findings within this group also did not have any consistent or global patterns. Thus, the focus in this section is on some of the interesting exploratory findings and possible explanations for them.

The exploratory analyses between successful aging predictors and size of social network showed that those who reported better physical health, better cognitive functioning, or those who were doing more physical activities reported having a larger social network. These results are consistent with past research that also shows relationships between the size of social networks and physical health, cognitive functioning, and number of physical activities (Barnes et al., 2004; Cornwell & Waite, 2009; Fratiglioni et al, 2004). Specifically, social connections have been linked to the availability of resources that are needed to protect and enhance health (van Tilburg & Thomése, 2010; Ajrouch, Blandon, & Antonucci, 2005), and initiation and/or maintenance of mental stimulation and health-promoting behaviors, such as participating in more physical activities (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003).

There were no relationships between the size of social network and age and gender. The lack of significant relationships between social network and these variables is in line with

previous research. For example, Shaw et al.'s (2007) study also found that age does not predict the size of social networks for adults over the age of 50, as very close social relations tend to stay stable in later life. In addition, in line with the results of Antonucci et al.'s (2004) study, gender does not predict the size of social networks. This could be due to the fact that most relationships exist in both men's and women's lives, particularly if the relationships are with children, grandchildren, and other family members.

In terms of membership diversity, those with more children had lower membership diversity in circle 1, which consisted of people who they cannot imagine their life without. This finding is in line with previous research by Antonucci and Akiyama (1987), which found that compared to circles 2 and 3, circle 1 mostly consisted of family members, such as spouse and children. In the present study, for those who had more children, membership in circle 1 consisted of children, children's spouse, grandchildren, etc.; therefore, they received a score for family and extended family. In contrast, those with fewer numbers of children included friends in addition to family in circle 1, resulting in more diversity in membership of this circle for this group. Those who had bigger families maintained diversity in their social network by placing friends and others in circles 2 and 3.

Assessing the relationship between number of methods used to stay connected and predictors of successful aging, it was found that those who had a higher level of physical health and fewer illnesses used a broader array of methods to stay connected. This may be due to the fact that those who feel physically well have more energy and fewer illnesses, and thus have more opportunities to participate in social activities and face-to-face interaction than those with restricted physical mobility (Wherton, Sugarhood, Procter, & Greenhalgh, 2015). It is also possible that the group of individuals who were not using a variety of methods to stay connected were unable to maintain connection with their network. As a result of lack of connection, they

may have had decreased motivation to engage in physical social activities that would, in turn, improve their physical health and decrease the probability of illnesses (Alpass & Neville, 2003).

It was also found that participants had higher frequency of contact with members in circle 2 when they were using multiple methods to stay connected. This finding further supports the idea that using one method of communication could encourage the use of other methods, which consequently leads to more contact with members in their social network (Shklovski et al., 2004). Interestingly, at time point 3, those who used fewer methods to stay connected with members in circle 1 had higher frequency of connection. This is in line with present study's earlier results, which showed that circle 1 includes spouse, other close kin, or friends that people are most likely in contact with face-to-face daily and do not require a variety of methods to stay connected. These results demonstrate the influence that the number of methods can have on the frequency of contact. Furthermore, interventions may find these results instructive, as they show the different ways individuals may be staying in contact with different members in their social network.

Types of Future Goals

In terms of the differences between the two groups' types of goals for the future, the results are consistent with SST (Carstensen, 2001). Specifically, compared to program users, program non-users had more goals related to knowledge acquisition, social contact, and more emotion-focused goals. In addition, program users had a higher frequency of mentioning no goals compared to program non-users. A plausible explanation for participants not having goals could be due to their perception of a shrinking temporal horizon due to their physical health and morbidity (Fung & Carstensen, 2006). Further, although both groups were of a similar age range, program non-users had goals such as going back to University, travelling, and staying in contact with family and friends. In comparison, program users expressed goals such as taking a trip to

see family and taking care of their health. Thus, the goals differed between the groups for participants of similar age. However, age had no impact on participants' type of goals within both groups, such that participants who were in their 60s expressed similar goals to those in their group in their 90s. For example, a participant in their 90s who did not use the program discussed her travel plans to Italy, in contrast to a participant of similar age who used the program and had a very limited social network, who discussed general goals such as keeping close to people and keeping hopes high for the next day. This difference in participants' goals further supports the notion that age is only a proxy for a shrinking time horizon, and that life circumstances may matter more than age alone (Carstensen, 2001).

Program users. Exploring the relationship between number of members in social network and type of goal revealed that those who reported having a knowledge acquisition goal had more members in circle 3 of the Social Convoy Diagram than those who did not mention a knowledge acquisition goal. It is important to note that knowledge acquisition goals included items such as taking trips to see family or friends in another country and taking a course at a University. As program users did not have many people in their network, this finding can perhaps be explained by dividing participants into three categories. Some participants had no one in circle 3 and had no knowledge acquisition goals. Another group of participants included member(s) in circle 3, but did not have any knowledge acquisition goals and instead reported emotion-focused and social contact-related goals. The last group of participants had one or two members in this circle and mentioned knowledge acquisition goals, such as taking trips to meet family or friends. Thus, having a limited number of members in this circle may have encouraged participants to keep in touch with members in circle 3. This is in line with SST, as participants did not discuss goals related to expanding their network, but instead placed greater importance on maintaining the network they had (Charles & Luong, 2013; English & Carstensen, 2014).

Program non-users. Exploring the relationship between number of members in social network and type of goal revealed that those who reported having an emotion-focused goal had more members in circle 1. As the emotion-focused goal category primarily consisted of health-related goals, it is possible that those who had these goals had bigger social networks as a direct result of participating in physical activities with others. In addition, their social network might also be encouraging health-promoting and risk-reducing behaviours, which could lead to having more emotional focus on staying healthy. For instance, studies have shown that spouse-involved physical activity interventions are more successful in encouraging partners to start physical activity, and more likely to encourage long-term adherence than individual-focused interventions (Jackson, Steptoe, & Wardle, 2015; Richards, Franks, McDonough, & Porter, 2018). It is possible that peers of similar age can provide each other with social support and encourage self-efficacy, factors which have shown to increase and maintain physical activity (Brawley, Rejeski, & King, 2003; Franks et al., 2012). Therefore, taking advantage of the co-occurrence of health-related motivations with similar age groups, older adults have the potential to build a social network which in turn could enhance adherence to physical activity. Thus, the positive relationship between health-promoting behaviours from social partners and having goals to stay healthy reinforces the importance of being socially connected.

Stability of the Size of Social Network and Quality of Relationships

The present study also assessed social networks at three points over a period of one year. In general, both groups showed trends of increasing number of people in their social network at time 2 from time 1 but stability from time points 2 to 3. This increase in social networks may be attributed to a change in the data collection method, rather than an actual increase. Specifically, participants were instructed over the phone to draw the scales and the Social Convoy Diagram at time 1, whereas they were mailed or e-mailed a response card (see Appendix A) at times 2 and 3.

As a result, they had more time to think about their social networks prior to the interview at times 2 and 3, or may have understood, interpreted, and visualized the question differently. This explanation is consistent with the results, as participants did not report change in most of the circles from time points 2 to 3. This explanation is also consistent with studies that show that older adults' social ties are relatively stable over five years (Kahn and Antonucci, 1980; Lund, Modvig, Due, & Holstein, 2000; Upenieks et al., 2018).

Although patterns of change were reported in the size of social networks between the three time points, the quality of relationship was stable and rated high at all three times by both groups. This further strengthens the earlier argument regarding older adults' high ratings of relationship quality at time 1, and is consistent with past research regarding the positivity bias in viewing relationships that older adults may have leading to high ratings of the quality of relationships (Birditt & Newton, 2016; Antonucci et al., 2011).

Stability of network size and relationship quality can also be explained by the availability of an abundance of technologies that facilitate maintenance of social connections at any time of the day, week, or year (Shklovski et al., 2004). Overall, having a stable and good quality social network is important as individuals can feel the comfort in knowing they have reliable support available when in need.

Importance of the Telephone Program

At all three times, those who used the telephone program were more likely to place the program in circles 1 or 2 of the Social Convoy Diagram than in circle 3 or outside the diagram. The most striking result that emerges from this aspect of the interview was that at times 1 and 2, over 80% of the participants who used the telephone program placed it in circle 1 (indicating that the program is so important that they cannot imagine their life without it) or circle 2 (indicating that the program is very close and important to them) and over 65% placed it in these two circles

at time 3. Participants' placement of the program in these circles of family and friends provides evidence of the important role of social connection played by this program for this potentially marginalized group of individuals in the community.

The open-ended responses to the question about recommendations for the program suggest that participants rated the program as very important because it provided social connection and social/emotional support (Cattan et al., 2011; Hartke & King, 2003; Smith & Toseland, 2006). Participants shared stories of being distraught, emotional, and feeling supported by the volunteer on the phone. In addition, those who had recommendations for the program expressed their desire for in-person and long-term contact. These themes from the open-ended responses about the program further confirm the important value of the social connection provided by the program.

The type of medium of support for older adults is also important to consider. Participants' positive experience with telephone support could be due to several reasons: 1) the telephone is a familiar technology (Hartke et al., 2003); 2) those who are homebound or live in rural areas can access such programs; and 3) participants have the ability to remain anonymous. These reasons may draw participants to use telephone support, and their positive experiences with volunteers may encourage them to subsequently access in-person support.

In summary, the use of the Social Convoy Diagram was a unique, effective, and flexible method of measuring and comparing the importance of the telephone program and participants' entire social networks, without directly asking participants to rate the importance of the telephone program. The findings show that participants who used the program placed the program in the same circles where family and friends were placed by both groups. This finding provides support for the importance of informal support services such as the telephone program in the lives of those who might be socially-isolated. Although this finding is valuable and

provides foundation for future work to be conducted, it is important to note that the current research precludes making casual conclusions about the impact of the telephone program. Given that those who participated in the research were already-existing clients of the program, the findings of the present study simply provide information about the thoughts and perceptions of the program's importance in the lives of those who have used it. This limitation and directions for future research are discussed in the following sections.

Limitations and Future Directions

The present study had several important outcomes for understanding the role of social connection in aging successfully. Further, it demonstrated the valuable role of a telephone program in the lives of those who were minimally socially engaged. However, along with these contributions to the literature, there were also limitations. This section discusses two main limitations that exist: those related to the study sample, and the study design.

First, a limited number of analyses could be conducted due to the small sample size, particularly for the group of participants who used the telephone program. For this group, the sample size was even smaller for times 2 and 3, which did not allow for many quantitative analyses for these time points. Even though efforts were made to retain as many participants as possible, contact was lost with participants over the year due to reasons such as medical concerns, relocation to a nursing home, no longer wanting to participate, or death. The small sample size was a limitation, as the sample had insufficient power and not enough variability to detect significant differences. Specifically, those who used the telephone program all scored relatively low on measures such as physical and mental health, and social connection. This lack of variability within the group may have led to detecting fewer significant results in the present study. Future studies would benefit from using a larger, more diverse sample. In addition, telephone program users should be oversampled at the beginning of any future longitudinal

studies, as the withdrawal rate can be high among older adults in general (Fokkema & Knipscheer, 2007; Shapira, Barak, & Gal, 2007).

The present study also involved a relatively homogeneous sample of those who did not use the program, which may limit the representativeness of these results for the general population of older adults. Even though efforts were made to recruit a diverse group of individuals by placing study advertisements at various places (e.g., grocery stores, bus stops, community programs, libraries, educational groups, and places of worship), the group of participants who did not use the telephone program self-selected to be part of the study; they were predominantly White, well-educated, healthy, and very socially engaged. As a result, this group of individuals was different from those who used the telephone program. After their differences were established, analyses were limited to within each group. In addition, since the organization providing the telephone program service was unable to support the enrollment of more clients on their program due to limited funding, the study also did not have a true control group which could be on a wait-list to receive telephone support. In addition, there was no information available from non-responders (e.g., those who were using the service for medication reminders or safety-check in calls, or those who simply did not want to participate) from the telephone group, thus their level of satisfaction with the program is unknown. An ideal type of control group would be composed of wait-listed individuals who do not use the telephone program but are interested in such a program at the beginning of the study. For this group, older adults with characteristics that may predispose them to become socially-isolated or lonely should be recruited. Some characteristics of those at risk of becoming socially-isolated can include individuals who had an early disadvantage such as low income, poor health, low morale or those who become socially-isolated suddenly due to factors such as widowhood, becoming a caregiver, separation from spouse, or retirement etc., (Coyle & Dugan, 2012; Edelbrock et al., 2001; Keller-

Cohen et al., 2006; Stewart et al., 2009; Terhell, Groenou, & van Tilburg, 2007; Victor & Bowling, 2012). Having a comparable wait-list control group would allow for a more comprehensive and direct assessment of the influence of the telephone program on the lives of those who feel socially-isolated.

Second, the study design was a limitation of the current research as well as a strength. Although this study employed a longitudinal design consisting of data collection at three time points over a period of one year, it is possible the interval between the three time points may not have been a long enough period for changes in health or social networks to occur. As research has shown that social ties to be relatively stable over five years (Kahn and Antonucci, 1980; Lund et al., 2000; Upenieks et al., 2018), perhaps a longitudinal design over a number of years would provide a deeper understanding of the various aspects of lifestyle and the role of the telephone program over time. Specifically, whether individuals who use the telephone program resources provided by the program become socially engaged in the community as a direct result of using this program can be assessed in a longer study.

The method of data collection in the present study's design could also be considered a limitation. Although over-the-phone interviews offered anonymity and convenience for older adults, the trade-offs were recognized: some participants, particularly participants who used the telephone program, had difficulty following along with questions over the phone. Perhaps due to this group's lower cognitive abilities, telephone program participants of all ages seemed to find over-the-phone interviews more challenging compared to participants who did not use the program. In efforts to ease some difficulty in the present study, participants were mailed response cards with the Likert-type responses and the Social Convoy Diagram before the second and third interviews. However, this change led to an inconsistency in methods over the three data points; consequently, study results should be interpreted with this caution. Although the

participants found the response cards to be very helpful, some participants, particularly those who used the telephone program, indicated preference for in-person interviews which could be to ease participation in the study, as well as to connect socially. Thus, research in this area would benefit from considering in-person interviews in the future.

Future research should also consider assessing the level of loneliness experienced by participants, as loneliness involves the subjective experiences of not having the desired social support in life (Newall & Menec, 2019). It is important to distinguish between social isolation and loneliness, and to measure both of these constructs; they are related, yet distinct from one another. For example, someone might appear to be socially-isolated but may not actually be experiencing loneliness, and instead prefer their lifestyle of solitude; in contrast, someone might feel lonely but may appear to be very socially connected. Yet another person could be both lonely and socially-isolated. In the future, researchers who are interested in assessing loneliness can use a short measure such as *UCLA Loneliness scale (R-ULCA)* which examines feelings of loneliness with three-items concerning companionship, feelings of being left out, and feeling isolated from others (Hughes, Waite, Hawkley, & Cacioppo, 2004) in addition to assessing level of social support using measures such as Social Convoy Diagram (Kahn & Antonucci, 1980). Alternatively, *Social Isolation Index using the Canadian Longitudinal Study on Aging (CLSA-SII)* is also another option to use in future studies if the goal of the study is to assess the two related yet separate constructs together in the same study (Wister, Cosco, Mitchell, Menec, & Fyffe, 2019).

Despite these limitations, the findings from the present study demonstrate the differences in various aspects of lifestyle between program users and program non-users. Furthermore, given that the results support the value of a service such as the telephone program, future studies can replicate and extend this research with a larger and more diverse sample.

Implications for Research and Practice

In general, the present study's findings are in accordance with the theoretical underpinnings of the Successful Aging Model (Rowe & Kahn, 1997, 1998), the Social Convoy Model (Kahn & Antonucci, 1980), and Socioemotional Selectivity Theory (Carstensen, 1993, 1995, 1998). In addition to contributions to extant research, this section highlights how the present study's methods and findings for conducting intervention research with services such as a telephone helpline program are useful in providing guidelines for future development in research and practice.

Recommendations for research. The present study is one of a few studies that have assessed the role of a telephone helpline program for older adults who might be socially-isolated (Cattan et al., 2011; Heller et al., 1991). In addition to the recommendations previously suggested in the future directions section, an additional valuable insight from the present study relates to the methods used in assessing the social networks of older adults. Specifically, this study provides support for the use of the Social Convoy Diagram (Kahn & Antonucci, 1980) as a particularly novel and useful measure to explore the role of an informal social support such as a telephone program. The measure was easy to administer, especially when participants had a visual representation of it, which allowed participants to arrange their network in a way they found to be personally meaningful. In addition, participants had the flexibility of sharing various kinds of support they found to be valuable in their lives. Examples of support include people they were related to, informal services (e.g., the telephone program), and non-human supports (e.g., God). Thus, this tool allows researchers to learn about people's social network without asking traditional and assumptive questions about family or friends.

Another important consideration for future research assessing factors that contribute to aging well involves incorporating the Life Course Perspective (Elder, Johnson, & Crosnoe,

2003) in addition to the use of Successful Aging model (Rowe & Kahn, 1997; 1998). While Rowe and Kahn's model offers an overview of how the individual is currently aging, and provides a framework to measure factors that can contribute to the aging process, the Life Course Perspective offers an opportunity to understand aging as a lifelong process involving development, history, and relationships over time (Elder et al., 2003). In addition, the Life Course Perspective also incorporates the concept of linked lives, which views individuals as social beings and focuses on the influence of interconnectedness of lives as fundamentally shaping the development of an individual (Stowe & Cooney, 2015). With the use of the Life Course Perspective and the Successful Aging model, data on both short-term and long-term factors at both individual and societal levels concerning later-life social isolation could be collected, providing insight into developing future interventions.

Finally, using a mixed-method approach with qualitative and quantitative methods was another strength of the present study. For example, participants had an opportunity to first provide a quantitative response for the importance of the telephone helpline program in their lives by placing the program in one of the circles or outside of their Social Convoy Diagram. Participants were then asked an open-ended question to expand on their experiences with the program. This method allowed rich data to be collected to further understand and confirm the important role of the telephone program and gave a voice to the participants in the study to share their experiences.

Recommendations for practice. The direct feedback in the present study from the participants who used the telephone program can also benefit community partners through the enhancement of their current programs and the planning of future ones.

Clients consistently mentioned their desire for more in-person contact in their feedback. Although the current telephone program facilitates in-person connection among program clients,

volunteers, and staff at an annual Christmas party, participants expressed desire for regular face-to-face connection in addition to connecting over the telephone. One possible way of facilitating face-to-face connection could be to connect the telephone program clients with one another, if they are interested. Through this method of connection, participants may be able to create friendships that can be long-term and more stable than their relationships with program volunteers. In addition, this method of connection could provide a productive activity for older adults, whereby they create a community that provides opportunities for social approval, and promotes a sense of meaningfulness and improves self-esteem (Baker et al., 2005; Siegrist et al., 2004).

Conclusion

The present study reconfirms the relationship between the three components of Rowe and Kahn's (1997; 1998) Successful Aging model: engagement with life, physical and mental functioning, and probability of disease and disability. The differences between the two groups in this study – telephone program users and non-users - are noteworthy as both groups exist within the community; however, the older adults who used the telephone program were, potentially, a marginalized group of individuals in the community for whom the telephone helpline program was an important source of social connection.

Although the results provided limited evidence of causality, it is promising to see the relationships between possible modifiable aspects of lifestyle (i.e., social connection), or productive activity (i.e., volunteering), and physical and cognitive functioning as well as number of illnesses. These exploratory findings suggest that a focus on the role of modifiable aspects, such as social connection, can help improve physical and cognitive functioning.

This study was also guided by Kahn and Antonucci's (1980) Social Convoy Model and Carstensen's Socioemotional Selectivity Theory (1993, 1995, 1998). The Social Convoy Model

offered valuable insights for the study design. Socioemotional Selectivity Theory also offered an important perspective to the study of social connection in old age. Examining older adults' future goals can help identify those who are at risk of becoming socially-isolated, with particular attention to encouraging social contact-related goals. Overall, the inclusion of both theories provided a more nuanced picture of social relations, and offered directions for future research in this area.

Finally, findings in the present study support the important role of the telephone helpline program in the lives of those who have minimal or no social connection. Specifically, social connection through programs such as the one explored in the present study might be the only contact some older adults have in their lives. This study sets the foundation for methods that can be used to do more rigorous assessment, evaluation and validation of other informal support services.

Humans' need for social connection is not new, of course. However, with better medical care and longer life expectancies, the need for creative solutions for social connection in later life needs to be considered by researchers, organizations, and governments to build and maintain healthy communities.

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Table 1

Demographic characteristics of program users and program non-users

Variable	**Program users**			**Program non-users**		
	Time point			Time point		
	1	2	3	1	2	3
n	31.00	22.00	18.00	46.00	45.00	45.00
Age: *M*	79.10	78.00	77.70	75.20	74.70	75.00
(SD)	(7.67)	(6.38)	(6.40)	(8.86)	(8.86)	(9.01)
Age Range	63.00-94.00	64.00-92.00	64.00-92.00	61.00-94.00	61.00-94.00	61.00-94.00
Female (%)	54.80	50.00	61.10	65.20	65.20	64.40
Education (%)						
Primary School	3.10	-	-	0.00	-	-
Elementary School	31.30	-	-	0.00	-	-
High School	46.90	-	-	10.06	-	-
College/University Degree	18.80	-	-	68.10	-	-
Graduate School	0.00	-	-	21.30	-	-
Relationship Status (%)						
Married	6.30	-	-	57.40	-	-
Divorced	31.30	-	-	10.60	-	-
Widowed	43.80	-	-	17.00	-	-
Separated	9.40	-	-	0.00	-	-
Single & Never Married	6.30	-	-	4.30	-	-
Common Law/Living Together	3.10	-		10.60	-	-
Ethnic/Cultural Background (%)						
White	40.00	-	-	89.40	-	-
African American	20.00	-	-	0.00	-	-
Other	40.00	-	-	10.60	-	-
Living Alone (%)	62.50	-	-	28.30	-	-
Currently Volunteering (%)	12.90	-	-	73.90	-	-

Table 2

Summary of variables that were analyzed, time point(s) that were used, and the statistical test(s) that were conducted

Variables of Interest	Within-group or Between groups Analyses	Time point(s) used	Statistical test(s)
Demographic characteristics	Between groups	1	Descriptive assessment
Physical health, mental health, number of illnesses	Between groups	3	Mann-Whitney U
Social network	Between groups	3	Mann-Whitney U
Frequency of contact with-person across the membership of the three circles	Within groups	3	Wilcoxon-signed rank tests
Relationship between communication methods and frequency of contact between three circles	Within groups	3	Correlation Coefficients
Relationship between social network and predictors of successful aging	Within groups	1	Correlation Coefficients and t-tests
Relationship between social networks and future goals	Within groups	1	Correlation Coefficients
Stability of size and quality of network within-person	Within groups	3	Friedman's test; post-hoc Wilcoxon signed-rank
Importance of telephone program	Only assessed with program users	3	Descriptive and qualitative open-ended responses

Note. Between groups analyses refers to data being compared between program users and program non-users; '1' under time point(s) used refers to use of data from only time point 1 and '3' refers to data being used from all three time points over a period of one year

Table 3

Group comparison of physical health (PH), physical activities (PA), mental well-being (MW), cognitive functioning (C), and number of illnesses (NI) at each time point

Time	Variable	Program users (Mean, SD)	Program non-users Mean (SD)	Mann-Whitney U Statistics	Hedges' *g*
1	PH	3.11 (0.94)	4.15 (0.66)	288.50***	1.33
	PA	2.23 (1.28)	4.00 (1.72)	294.00***	1.13
	MW	-0.26 (1.08)	0.19 (0.97)	547.00, *ns*	-
	C	11.14 (4.67)	22.33 (8.72)	179.50***	1.51
	NI	1.90 (1.25)	1.02 (1.00)	422.50**	0.80
2	PH	3.20 (0.97)	4.01 (0.81)	253.00***	0.94
	PA	2.10 (1.00)	3.62 (1.34)	176.50***	1.23
	MW	-0.23 (0.90)	0.12 (0.71)	360.00, *ns*	-
	C	12.81 (6.05)	22.68 (8.20)	134.50***	1.30
	NI	1.41 (1.18)	1.00 (1.00)	392.00, *ns*	-
3	PH	3.41 (0.96)	3.98 (0.87)	228.00**	0.63
	PA	1.56 (0.78)	2.87 (1.16)	141.50***	1.25
	MW	-0.56 (0.89)	0.20 (0.91)	178.00**	-0.84
	C	12.93 (5.87)	22.00 (8.04)	128.00***	1.22
	NI	1.44 (1.29)	1.02 (1.01)	328.00, *ns*	-

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; $^{**}p < .01$; $^{***}p < .001$; *ns* = not significant

Table 4

Group comparison of the size of social network for each circle at each time point

Time point	Circle	Program Users Mean (SD)	Program non-users Mean (SD)	Mann-Whitney U Statistics	Hedges' *g*
1	1	2.53 (0.78)	3.97 (1.04)	215.50***	1.61
	2	2.27 (1.08)	3.54 (1.09)	285.00***	1.17
	3	1.97 (0.85)	3.53 (1.16)	198.00***	1.49
2	1	3.27 (1.49)	4.31 (1.02)	289.00**	0.85
	2	3.18 (1.05)	4.27 (0.94)	224.00***	1.12
	3	1.72 (1.08)	4.02 (0.92)	72.50***	2.36
3	1	3.35 (1.58)	4.11 (1.13)	279.50, *ns*	-
	2	2.59 (1.32)	4.27 (0.94)	126.00***	1.59
	3	2.24 (1.34)	3.36 (1.33)	204.00**	0.84

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; **$p < .01$; ***$p < .001$; *ns* = not significant

Table 5

Percentage of participants including each type of membership in each circle at each time point

Condition	Time	Circle	Immediate Family	Extended Family	Friends	Casual Relationships	Service Workers
Program users	1	1	76.67	30.00	20.00	0.00	0.00
		2	33.33	16.67	30.00	16.67	0.00
		3	0.00	10.00	23.33	33.33	3.33
	2	1	68.18	45.45	22.73	9.09	0.00
		2	36.36	36.36	36.36	36.36	0.00
		3	4.55	9.09	18.18	18.18	4.55
	3	1	82.35	58.82	29.41	11.76	0.00
		2	17.65	11.76	47.06	17.65	0.00
		3	17.65	11.76	29.41	23.53	5.88
Program non-users	1	1	93.48	50.00	39.13	6.52	0.00
		2	23.91	34.78	71.74	26.09	0.00
		3	4.44	20.00	31.11	64.44	8.89
	2	1	93.33	55.56	28.89	6.67	4.44
		2	35.56	37.78	77.78	15.56	2.22
		3	6.67	17.78	44.44	66.67	6.67
	3	1	91.11	57.78	33.33	2.22	2.22
		2	35.56	46.67	82.22	22.22	2.22
		3	11.11	17.78	48.89	62.22	4.44

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively

Table 6

Group comparison of membership diversity for each circle at each time point

Time point	Circle	Program Users Mean (SD)	Program non-users Mean (SD)	Mann-Whitney U Statistics	Hedges' *g*
1	1	1.27 (0.64)	1.87 (0.72)	378.00***	0.87
	2	0.97 (0.67)	1.52 (0.69)	433.50**	0.81
	3	0.67 (0.48)	0.67 (0.48)	415.00***	0.89
2	1	1.55 (1.06)	1.84 (0.64)	356.50*	0.36
	2	1.45 (0.80)	1.69 (0.73)	408.50, *ns*	-
	3	0.55 (0.67)	1.42 (0.66)	192.00***	1.31
3	1	1.78 (1.00)	1.87 (0.79)	390.50, *ns*	-
	2	0.89 (0.58)	1.89 (0.86)	159.00***	1.26
	3	0.83 (1.04)	1.44 (0.69)	219.50**	0.72

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; * $p < .05$; ** $p < .01$; *** $p < .001$; *ns* = not significant

Table 7

Group comparison of frequency of contact with member(s) in each circle at each time point

Time point	Circle	Program Users Mean (SD)	Program non-users Mean (SD)	Mann-Whitney U Statistics
1	1	4.39 (0.81)	4.52 (0.43)	607.50
	2	3.93 (1.00)	3.81 (0.61)	441.50
	3	3.48 (1.05)	3.12 (1.05)	378.50
2	1	4.30 (0.75)	4.56 (0.27)	393.50
	2	3.74 (0.77)	3.88 (0.55)	425.50
	3	3.60 (1.26)	3.37 (0.76)	180.00
3	1	4.23 (0.98)	4.48 (0.34)	307.00
	2	3.86 (1.06)	3.83 (0.71)	292.50
	3	3.50 (0.91)	3.28 (0.80)	190.50

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; all Mann-Whitney U Statistics were statistically non-significant

Table 8

Percentage of participants including each type of method used to stay connected with members in each circle at each time point

Condition	Time	Circle	In person	Talk over the phone	Through letter, sending cards	Text, e-mail, social media	Video chats, skype, facetime
Program users	1	1	80.00	76.67	0.00	10.00	3.33
		2	46.67	63.33	0.00	10.00	3.33
		3	36.67	43.33	0.00	3.33	0.00
	2	1	54.55	81.82	0.00	4.55	9.09
		2	54.55	59.09	0.00	9.09	4.55
		3	40.91	13.64	0.00	0.00	0.00
	3	1	88.24	76.47	0.00	29.41	11.76
		2	76.47	58.82	0.00	11.76	0.00
		3	41.18	41.18	0.00	5.88	0.00
Program non-users	1	1	91.30	80.43	2.17	73.91	21.74
		2	82.61	69.57	0.00	65.22	4.35
		3	66.67	55.56	2.22	46.67	2.22
	2	1	97.78	88.89	0.00	82.22	22.22
		2	88.89	75.56	0.00	86.67	13.33
		3	93.33	40.00	2.22	51.11	8.89
	3	1	100.00	86.67	0.00	80.00	28.89
		2	95.56	82.22	0.00	80.00	13.33
		3	86.67	44.44	2.22	53.33	2.22

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively

Table 9

Group comparison of number of methods used to stay connected with members in each circle at each time point

Time point	Circle	Program Users Mean (SD)	Program non-users Mean (SD)	Mann-Whitney U Statistics	Hedges' *g*
1	1	1.76 (0.69)	2.70 (0.99)	303.00***	1.06
	2	1.61 (0.78)	2.22 (0.87)	317.50**	0.73
	3	1.24 (0.54)	1.79 (0.74)	261.50**	0.82
2	1	1.67 (0.90)	2.98 (0.79)	93.00***	1.58
	2	1.33 (0.66)	2.64 (0.71)	99.50***	1.89
	3	1.14 (0.38)	2.00 (0.91)	67.00**	1.10
3	1	2.33 (0.90)	2.96 (0.88)	199.00**	0.71
	2	1.79 (0.58)	2.71 (0.82)	120.50***	1.21
	3	1.50 (0.53)	1.93 (0.85)	160.00, *ns*	-

Note. Program users sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; Program non-users sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; **$p < .01$; ***$p < .001$; *ns* = not significant

Table 10

Within-person comparison of frequency of contact with members in each of the three circles at each time- point for program users

Time point	Comparison	Mean (SD)	Wilcoxon-signed rank statistics (Z-value)
1	Circle 1	4.39 (0.81)	-2.31*
	Circle 2	3.93 (1.00)	
	Circle 1	4.39 (0.81)	-2.49**
	Circle 3	3.48 (1.05)	
	Circle 2	3.93 (1.00)	-2.95**
	Circle 3	3.48 (1.05)	
2	Circle 1	4.30 (0.75)	-3.11**
	Circle 2	3.74 (0.77)	
	Circle 1	4.30 (0.75)	-2.12*
	Circle 3	3.60 (1.26)	
	Circle 2	3.74 (0.77)	-0.57, *ns*
	Circle 3	3.60 (1.26)	
3	Circle 1	4.23 (0.98)	-1.44, *ns*
	Circle 2	3.86 (1.06)	
	Circle 1	4.23 (0.98)	-2.38*
	Circle 3	3.50 (0.91)	
	Circle 2	3.86 (1.06)	-0.85, *ns*
	Circle 3	3.50 (0.91)	

Note. Sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; *$p < .05$; **$p < .01$; ***$p < .001$; *ns* = not significant

Table 11

Within-person comparison of frequency of contact with members in each of the three circles at each time- point for program non-users

Time point	Comparison	Mean (SD)	Wilcoxon-signed rank statistics (Z-value)
1	Circle 1	4.52 (0.43)	-4.89***
	Circle 2	3.81 (0.61)	
	Circle 1	4.52 (0.43)	-5.47***
	Circle 3	3.12 (1.05)	
	Circle 2	3.81 (0.61)	-3.43**
	Circle 3	3.12 (1.05)	
2	Circle 1	4.56 (0.27)	-5.25***
	Circle 2	3.88 (0.55)	
	Circle 1	4.56 (0.27)	-5.49***
	Circle 3	3.37 (0.76)	
	Circle 2	3.88 (0.55)	3.57***
	Circle 3	3.37 (0.76)	
3	Circle 1	4.48 (0.34)	-4.59***
	Circle 2	3.83 (0.71)	
	Circle 1	4.48 (0.34)	-5.39***
	Circle 3	3.28 (0.80)	
	Circle 2	3.83 (0.71)	-3.87***
	Circle 3	3.28 (0.80)	

Note. Sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; **$p < .01$; ***$p < .001$;

Table 12

Correlation coefficients between the number of methods used to stay in contact and frequency of contact in each circle at each time point for program users

		T1							T2							T3			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T1	1. C1F		.09	-.11	-.01	-.49*	.20	.08	-.14	.11	.06	-.37	.26	<.001	.04	-.32	-.09	.54	.49
	2. C1M			-.05	.64**	.02	.29	.08	.83**	.10	.53*	-.02	-.13	.30	.84**	.21	-.03	-.14	-.36
	3. C2F				.05	.55*	.30	.20	.29	.63**	.05	.29	.51	.70*	.08	.22	.14	.50	-.10
	4. C2M					.11	.35	-.05	.72**	.02	.59*	-.27	-.38	-.09	.74**	.19	-.12	-.69	-.46
	5. C3F						.05	.30	.19	.21	.11	.04	.37	.09	.15	.75*	.87**	-.40	-.28
	6. C3M							-.02	.30	-.02	-.26	-.48	.24	.08	.54	-.02	.31	<.001	-.11
T2	7. C1F								.21	.66**	-.17	.68*	.38	.14	-.28	-.16	-.50	.26	.09
	8. C1M									.28	.60*	.18	.05	.27	.88**	.32	-.10	-.72	-.72
	9. C2F										.08	.59	.46	.37	-.17	.03	-.39	.44	.17
	10. C2M											-.36	-.24	.18	.42	.11	.25	-.60	-.21
	11. C3F												.60	.66	-.40	.21	-.68	.66	.13
	12. C3M													.61	-.25	.54	.41	.58	.58
T3	13. C1F														.30	.04	.29	.54	-.16
	14. C1M															.24	.28	-.31	-.63
	15. C2F																.26	-.22	-.12
	16. C2M																	-.21	.22
	17. C3F																		.46
	18. C3M																		

Note. Sample size (*n*) at time point 1, 2, and 3 was 30, 22, and 17, respectively; T, C, F, and M are used to represent time, circle, frequency of contact, and method of contact, respectively. *$p < .05$; **$p < .01$; ***$p < .001$

Table 13

Correlation coefficients between the number of methods used to stay in contact and frequency of contact in each circle at each time point for program non-users

		T1								T2									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T1	1. C1F		-.20	.37*	-.07	.03	.09	.32*	.04	-.18	.09	-.18	.06	.42**	-.02	.08	.06	.03	.15
	2. C1M			-.25	.37*	-.13	.14	-.06	.22	-.10	.15	-.13	-.08	-.08	.08	-.27	.04	-.09	.16
	3. C2F				.03	.08	.03	-.04	-.15	.08	.33*	.32*	-.02	-.05	.35*	.23	-.01	-.01	.12
	4. C2M					.01	.25	-.27	-.07	-.05	.16	.08	.32*	-.07	.05	-.01	.14	.12	.19
	5. C3F						.10	-.29	.11	.01	.13	.15	.22	-.23	.11	.22	.23	.30	.28
	6. C3M							-.19	.12	-.13	.21	-.02	.23	-.08	.03	.12	.01	-.03	.19
T2	7. C1F								-.18	.17	-.07	-.16	.10	.46**	-.28	.11	-.19	-.02	-.24
	8. C1M									**-.54***	-.19	-.40*	.07	-.15	.19	-.26	.37*	-.13	.04
	9. C2F										**.30***	.32*	-.05	.26	-.23	.33*	.17	.14	-.03
	10. C2M											.10	.07	.03	.15	.09	.15	.17	.22
	11. C3F												-.18	.06	-.05	.33*	-.08	.20	.24
	12. C3M													<.001	-.06	.04	.13	.08	.20
T3	13. C1F														**-.54***	.15	.14	.03	.04
	14. C1M															-.23	-.02	-.11	.06
	15. C2F																.25	.22	<.001
	16. C2M																	-.07	.24
	17. C3F																		.06
	18. C3M																		

Note. Sample size (*n*) at time point 1, 2, and 3 was 46, 45, and 45, respectively; T, C, F, and M are used to represent time, circle, frequency of contact, and method of contact, respectively. *$p < .05$; **$p < .01$; ***$p < .001$

Table 14

Correlation coefficients between predictors of successful aging and size of social network in each circle for program users

	1	2	3	4	5	6	7	8	9	10
1. C1		.28	.24	.01	.09	-.03	.29	-.10	-.01	-.07
2. C2			.54**	-.03	.35	-.30	-.04	.09	-.02	.09
3. C3				.15	.20	-.22	.27	.10	-.21	-.02
4. PH					.12	-.06	.21	-.25	.06	.01
5. PA						-.09	.05	-.16	-.51**	-.17
6. MW							-.05	-.05	-.16	.23
7. CF								.12	-.13	-.16
8. NI									.05	.25
9. Age										.29
10. NC										

Note. $n = 30$; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; $^{**}p < .01$

Table 15

Correlation coefficients between predictors of successful aging and size of social network in each circle for program non-users

	1	2	3	4	5	6	7	8	9	10
1. C1		.32*	.16	**.30***	**.34***	-.01	.21	-.21	-.22	-.21
2. C2			.37*	.22	**.33***	-.03	**.36***	-.26	.02	.09
3. C3				.26	.15	-.10	.14	-.10	-.10	.05
4. PH					.21	-.11	.11	-.44**	-.29	-.20
5. PA						.03	.24	-.32*	-.52**	-.35*
6. MW							-.06	-.10	-.13	.10
7. CF								-.11	-.28	-.17
8. NI									.53**	.36*
9. Age										.52**
10. NC										

Note. $n = 46$; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; $*p < .05$; $**p < .01$

Table 16

Correlation coefficients between predictors of successful aging and membership diversity in each circle for program users

	1	2	3	4	5	6	7	8	9	10
1. C1		.18	-.04	-.17	.08	-.08	.13	.02	.04	.03
2. C2			.61**	-.05	**.42***	-.28	.10	.16	-.14	.01
3. C3				-.03	.33	**-.40***	.08	.08	-.21	-.04
4. PH					.12	-.06	.21	-.25	.06	.01
5. PA						-.09	.05	-.16	-.51**	-.17
6. MW							-.05	-.05	-.16	.23
7. CF								.12	-.13	-.16
8. NI									.05	.25
9. Age										.29
10. NC										

Note. n = 30; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; $^{*}p < .05$; $^{**}p < .01$

Table 17

Correlation coefficients between predictors of successful aging and membership diversity in each circle for program non-users

	1	2	3	4	5	6	7	8	9	10
1. C1		.10	-.05	.13	.27	-.09	.11	-.21	-.21	**-.43****
2. C2			.15	.20	.29	-.19	.18	-.21	.05	.14
3. C3				.10	.13	.08	-.05	-.08	-.23	-.07
4. PH					.21	-.11	.11	-.44**	-.29	-.20
5. PA						.03	.24	-.32*	-.52**	-.35*
6. MW							-.06	-.10	-.13	.10
7. CF								-.11	-.28	-.17
8. NI									.53**	.36*
9. Age										.52**
10. NC										

Note. n = 46; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; *p < .05; **p < .01

Table 18

Correlation coefficients between predictors of successful aging and frequency of contact with member(s) in each circle for program users

	1	2	3	4	5	6	7	8	9	10
1. C1		-.11	-.49*	.14	.24	.22	-.25	.09	-.01	.32
2. C2			.55*	.31	.14	.02	-.02	.16	-.04	-.11
3. C3				-.28	-.27	-.15	-.09	-.25	-.01	-.27
4. PH					.12	-.06	.21	-.25	.06	.01
5. PA						-.09	.05	-.16	-.51**	-.17
6. MW							-.05	-.05	-.16	.23
7. CF								.12	-.13	-.16
8. NI									.05	.25
9. Age										.29
10. NC										

Note. n = 30; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; *p < .05; **p < .01

Table 19

Correlation coefficients between predictors of successful aging and frequency of contact with member(s) in each circle for program non-users

	1	2	3	4	5	6	7	8	9	10
1. C1		.37*	.03	-.06	-.06	.12	-.17	.02	-.19	.13
2. C2			.08	-.13	-.28	.09	.05	.16	.04	.23
3. C3				.10	.21	-.09	.29	-.04	-.14	.05
4. PH					.21	-.11	.11	-.44**	-.29	-.20
5. PA						.03	.24	-.32*	-.52**	-.35*
6. MW							-.06	-.10	-.13	.10
7. CF								-.11	-.28	-.17
8. NI									.53**	.36*
9. Age										.52**
10. NC										

Note. n = 46; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; *$p < .05$; **$p < .01$

Table 20

Correlation coefficients between predictors of successful aging and number of methods used to stay connected with members in each circle by program users

	1	2	3	4	5	6	7	8	9	10
1. C1		.64**	.29	.17	.04	-.01	.17	.03	.01	.00
2. C2			.35	.19	.10	.27	-.05	-.21	-.11	-.17
3. C3				.02	.18	.31	.29	-.10	-.30	-.18
4. PH					.12	-.06	.21	-.25	.06	.01
5. PA						-.09	.05	-.16	-.51**	-.17
6. MW							-.05	-.05	-.16	.23
7. CF								.12	-.13	-.16
8. NI									.05	.25
9. Age										.29
10. NC										

Note. n = 30; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; $*p < .05$; $**p < .01$

Table 21

Correlation coefficients between predictors of successful aging and number of methods used to stay connected with members in each circle by program non-users

	1	2	3	4	5	6	7	8	9	10
1. C1		.37*	.14	**.33***	.12	.04	.25	-.11	-.08	-.20
2. C2			.25	-.03	-.11	-.00	.25	.02	-.02	-.12
3. C3				.23	.03	-.13	.20	**-.33***	-.17	-.13
4. PH					.21	-.11	.11	-.44**	-.29	-.20
5. PA						.03	.24	-.32*	-.52**	-.35*
6. MW							-.06	-.10	-.13	.10
7. CF								-.11	-.28	-.17
8. NI									.53**	.36*
9. Age										.52**
10. NC										

Note. n = 46; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; *p < .05; **p < .01

Table 22

Correlation coefficients between predictors of successful aging and quality of relationship with members in each circle for program users

	1	2	3	4	5	6	7	8	9	10
1. C1		.25	.05	-.03	.06	-.02	-.00	.04	-.00	-.35
2. C2			.51*	.03	-.32	.31	-.16	.08	-.18	-.12
3. C3				.17	-.13	-.08	-.26	-.01	.06	-.40
4. PH					.12	-.06	.21	-.25	.06	.01
5. PA						-.09	.05	-.16	-.51**	-.17
6. MW							-.05	-.05	-.16	.23
7. CF								.12	-.13	-.16
8. NI									.05	.25
9. Age										.29
10. NC										

Note. n = 30; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; $*p < .05$; $**p < .01$

Table 23

Correlation coefficients between predictors of successful aging and quality of relationship with members in each circle for program non-users

	1	2	3	4	5	6	7	8	9	10
1. C1		.24	.57**	.10	-.06	-.09	.17	<.001	.09	.04
2. C2			.45**	-.05	.16	-.00	.22	.11	-.08	.19
3. C3				-.04	-.09	-.05	-.02	.28	.21	.22
4. PH					.21	-.11	.11	-.44**	-.29	-.20
5. PA						.03	.24	-.32*	-.52**	-.35*
6. MW							-.06	-.10	-.13	.10
7. CF								-.11	-.28	-.17
8. NI									.53**	.36*
9. Age										.52**
10. NC										

Note. n = 46; C = Circle; PH = Physical Health; PA = Physical Activities; MW = Mental Well-Being; CF = Cognitive functioning; NI = Number of Illnesses; NC = Number of Children; *p < .05; **p < .01

Table 24

Correlations between types of goals and size of social network in each circle for program users

	1	2	3	4	5	6	7	8
1. KA		.19	.35	.27	.20	**.48****	-.21	.02
2. EF			-.13	.01	.07	.03	-.30	-.23
3. SC				.27	-.03	.02	.32	**.40***
4. C1					.28	.24	-.01	-.07
5. C2						.54**	-.02	.09
6. C3							-.21	-.02
7. Age								.29
8. NC								

Note. n = 30; KA = Knowledge Acquisition Goals; EF = Emotion-Focused Goals; SC= Social Contact-Related Goals; C = Circle; NC = Number of Children; *$p < .05$; **$p < .01$

Table 25

Correlations between types of goals and size of social network in each circle for program non-users

	1	2	3	4	5	6	7	8
1. KA		.06	.09	-.11	.09	.02	.04	-.10
2. EF			.33*	**.33***	.22	.18	**-.35***	**-.41****
3. SC				.06	-.06	.19	-.04	-.22
4. C1					.32*	.16	-.22	-.21
5. C2						.37*	.02	.09
6. C3							-.10	.05
7. Age								.52**
8. NC								

Note. n = 46; KA = Knowledge Acquisition Goals; EF = Emotion-Focused Goals; SC= Social Contact-Related Goals; C = Circle; NC = Number of Children; *$p < .05$; **$p < .01$

Table 26

Number of members (M, SD) in each circle compared within-person over three time points for program users

Circle	Comparison	Mean (SD)	Wilcoxon-signed rank statistics (Z-value)
1	Time 1	2.60 (0.83)	-1.98*
	Time 2	3.27 (1.49)	
	Time 1	2.60 (0.83)	-1.88, *ns*
	Time 3	3.33 (1.59)	
	Time 2	3.27 (1.49)	-0.33, *ns*
	Time 3	3.33 (1.59)	
2	Time 1	2.13 (0.80)	-2.75**
	Time 2	3.31 (1.01)	
	Time 1	2.13 (0.80)	-1.29, *ns*
	Time 3	2.73 (1.33)	
	Time 2	3.31 (1.01)	-1.46, *ns*
	Time 3	2.73 (1.33)	
3	Time 1	2.13 (1.00)	-0.91, *ns*
	Time 2	1.93 (1.22)	
	Time 1	2.13 (1.00)	0.00, *ns*
	Time 3	2.20 (1.32)	
	Time 2	1.93 (1.22)	-0.67, *ns*
	Time 3	2.20 (1.32)	

Note. $n = 15$; *$p < .05$; **$p < .01$; *ns* = non-significant

Table 27

Number of members (M, SD) in each circle compared within-person over three time points for program non-users

Circle	Comparison	Mean (SD)	Wilcoxon-signed rank statistics (Z-value)
1	Time 1	4.00 (1.01)	-1.82, *ns*
	Time 2	4.31 (1.02)	
	Time 1	4.00 (1.01)	-0.41, *ns*
	Time 3	4.07 (1.16)	
	Time 2	4.31 (1.02)	-1.55, *ns*
	Time 3	4.07 (1.16)	
2	Time 1	3.55 (1.09)	-2.97**
	Time 2	4.21 (0.95)	
	Time 1	3.55 (1.09)	-2.98**
	Time 3	4.26 (0.93)	
	Time 2	4.21 (0.95)	-0.28, *ns*
	Time 3	4.26 (0.93)	
3	Time 1	3.55 (1.11)	-2.32**
	Time 2	4.02 (0.92	
	Time 1	3.55 (1.11)	-0.98, *ns*
	Time 3	3.31 (1.32)	
	Time 2	4.02 (0.92	-3.04**
	Time 3	3.31 (1.32)	

Note. $n = 42$; **$p < .01$; *ns* = non-significant

Table 28

Quality of relationship (M, SD) with members in each circle compared within-person over three time points for program users

Circle	Comparison	Mean (SD)	Friedman's statistic
1	Time 1	23.00 (2.45)	$\chi^2(2) = 1.31$, *ns*
	Time 2	21.77 (3.96)	
	Time 1	23.00 (2.45)	
	Time 3	22.39 (2.43)	
	Time 2	21.77 (3.96)	
	Time 3	22.39 (2.43)	
2	Time 1	21.27 (4.67)	$\chi^2(2) = 0.06$, *ns*
	Time 2	21.45 (3.61)	
	Time 1	21.27 (4.67)	
	Time 3	21.09 (4.87)	
	Time 2	21.45 (3.61)	
	Time 3	21.09 (4.87)	
3	Time 1	18.60 (6.42)	$\chi^2(2) = 0.44$, *ns*
	Time 2	20.60 (3.85)	
	Time 1	18.60 (6.42)	
	Time 3	19.20 (5.07)	
	Time 2	20.60 (3.85)	
	Time 3	19.20 (5.07)	

Note. $n = 15$; *ns* = non-significant

Table 29

Quality of relationship (M, SD) with members in each circle compared within-person over three time points for program non-users

Circle	Comparison	Mean (SD)	Friedman's statistic
1	Time 1	23.64 (1.57)	$\chi^2(2) = 0.07$, *ns*
	Time 2	23.55 (1.51)	
	Time 1	23.64 (1.57)	
	Time 3	23.59 (1.56)	
	Time 2	23.55 (1.51)	
	Time 3	23.59 (1.56)	
2	Time 1	22.35 (2.76)	$\chi^2(2) = 1.64$, *ns*
	Time 2	22.83 (2.05)	
	Time 1	22.35 (2.76)	
	Time 3	22.15 (3.12)	
	Time 2	22.83 (2.05)	
	Time 3	22.15 (3.12)	
3	Time 1	20.74 (3.41)	$\chi^2(2) = 1.08$, *ns*
	Time 2	20.50 (2.89)	
	Time 1	20.74 (3.41)	
	Time 3	20.05 (3.39)	
	Time 2	20.50 (2.89)	
	Time 3	20.05 (3.39)	

Note. $n = 42$; *ns* = non-significant

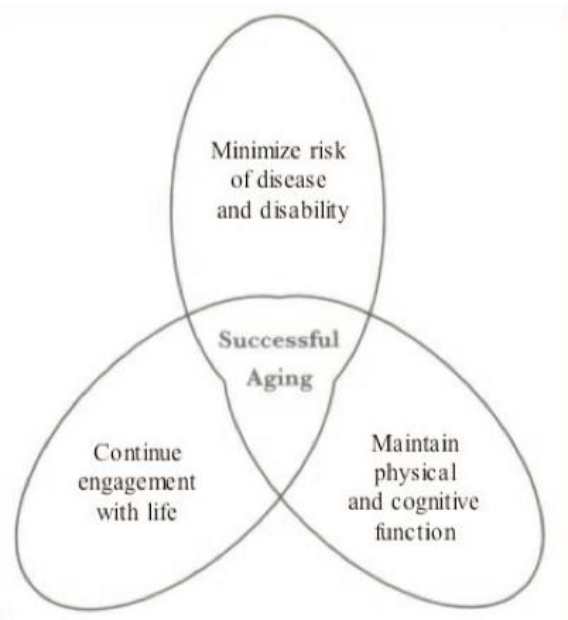


Figure 1. Successful Aging Model (Rowe & Kahn, 1997, 1998)

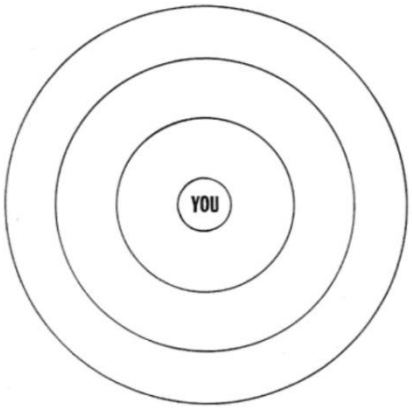


Figure 2. Social Convoy Diagram (Kahn & Antonucci, 1980)

Appendix A

Mailed Response Card

The following answer options will serve as a visual guide for the next interview. These will not be collected.

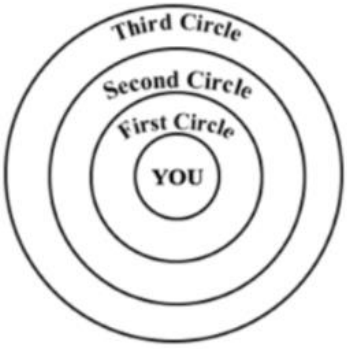
Scale number 1:

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

Scale number 2:

1	2	3	4
Not at all	Less than half of the month	More than half of the month	Everyday

Social Network Circles



First Circle: Place people who are very close and very important to you that it is hard to imagine your life without them.
Second Circle: Place people who are close and important but not as close or as important as the first circle people
Third Circle: Place people who are not as important or close as the first two circles but are important enough to be in your diagram

Scale number 3:

1	2	3	4	5
Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree

Appendix B

Interview Surveys

*Questions only asked at time 1 ** *Questions asked at time 2 and time 3*

DEMOGRAPHICS

To begin, we would like to get some basic information about you and your family.

1. What is your date of birth? _____ (dd/mm/yy)

2. *What gender do you most identify with? a) Male b) Female c) Other:_____

3. *With which cultural/ethnic group do you identify with? a) African American b) Asian c) Hispanic d) Pacific Islander e) White f) Other: _____

4. *What is your highest education level?

a) Elementary School b) High School b) College/University c) Graduate School
What is your highest degree? _____

5. *Are you currently: a) Married b) Widowed c) Divorced d) Single and Never Married e) Separated f) common law/living together

***Last time you indicated that you were _____ (married, widowed, divorced, single and never married, Separated, common law/living together), is that still the case? Yes No If changed: _____*

6. *Do you have any children, including adopted or step-children? Yes No
a) If yes, how many? _____
b) Do your children live with you? Yes No
c) If yes, how many live with you? _____

***Last time you indicated having ____ children and living with ____ them? Is that still the case? Yes No If changed: _____*

***How many siblings do you have? Total: _____; Brother(s) ____ Sister(s) ____*

***Do you have any pets? Yes No; What type of pet do you have? ___ If yes, how many: ___*

7. *Do you currently live in: a) apartment b) house c) retirement facility d) managed care facility
a) How many people, including you, currently live in your household? _____
b) What is your relationship with the people living at your household? _____

***Last time, you indicated living in _____ (apartment, house, retirement facility, long term facility) Has that changed? Yes No If changed: _____*

***Do you live in: Big city (e.g., Toronto), small city (e.g., Brampton), or in rural area/country side?*

8. *Are you currently employed? Yes No
a) (If yes) Is your current employment: part-time full-time
b) (If yes) Can you please briefly describe your current employment:

*** Has your employment status changed in the past 6 months?* *Yes* *No*
If changed: _____

9. *(If not currently employed), are you retired? Yes No
a) (If yes) what year did you retire? _____
b) What type of work did you do?

10. *Would you feel comfortable sharing your annual income with us? $_____

11. Do you volunteer? For example, this can include any unpaid work you do for a religious, educational, political organization, or if you provide help (help can include babysitting a child, cooking a meal, etc.) to friends, neighbours, or relatives not living with you. Yes No
a) **(If yes)** About how many hours per week do you volunteer? ____ hours per week
b) **(If no)** Have you volunteered in the past? ____ hours per week
c) Please briefly describe your volunteer work:

12.* I have some questions about religion and spirituality. I will give you a scale I would like you to use to answer each one, you have four options. For each question, you can say "not at all", "not very", "somewhat", or "very"

	Not at all	Not Very	Somewhat	Very
a) How religious are you?	1	2	3	4
b) How important is religion in your life?	1	2	3	4
c) How spiritual are you?	1	2	3	4
d) How important is spirituality in your life?	1	2	3	4

Ice Breaker Exercise

13. Now, I'd like to get us to do something we hope you will find enjoyable. I want to see how many different animals you can name. You will have 60 seconds. When I say, 'Begin', say the animal names **as fast as you can.** [*Interviewer: repeat the instructions if necessary*]. **[Cognitive Measure]**
Are you ready? Begin.
Animal Names:
***Great, now before we move on to do the rest of the survey, can you please share any changes that have taken place in your life since we last spoke in ___. Audio Recorder Time stamp:____*

HEALTH

14. Now, we're going to move on to your health. In general, how would you rate your health currently? Would you say it is excellent, fairly good, average, not very good, or poor?

5	4	3	2	1
Excellent	Fairly Good	Average	Not Very Good	Poor

15. How would you rate your energy level currently? Would you say it is excellent, fairly good, average, not very good, or poor?

5	4	3	2	1
Excellent	Fairly Good	Average	Not Very Good	Poor

16. What types of physical activities *(**and hobbies)* do you participate in? These could be things like walking, cleaning around the house, swimming, yoga; sports such as golf or tennis; or other activities such as gardening, mowing the lawn, or shoveling snow (in season) – or any other physical activities you do. ***And hobbies could include reading, playing a musical instrument, knitting, etc.*

6= Every day 5= every other day 4= about once a week 3=once a month 2=about once a year 1= Seasonal

Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1
Activity:	Frequency:	6	5	4	3	2	1

17. Next, I'm going to ask you about six different illnesses, please **say** yes or no. Has a doctor ever told you that you have:

a.	high blood pressure or hypertension	Yes	No
b.	diabetes or high blood sugar	Yes	No
c.	cancer or a malignant tumor, excluding minor skin cancer	Yes	No
d.	chronic lung disease such as chronic bronchitis or emphysema	Yes	No
e.	had a heart attack, coronary heart disease, angina, congestive heart failure, or any other heart problem	Yes	No
f.	had a stroke	Yes	No

18. How many times in the last **three months** have you been hospitalized? ____ of times
***How many times in the last three months have you been to the doctor? ___ of times*
***If you feel comfortable, can you share the reason for your last doctors' visit?* _____

19. Are you currently receiving medication reminders calls from TeleCheck volunteers? Yes No

a. We understand that sometimes it is hard to keep track of which medications to take and when. **How many times in the last three months** have been hospitalized as a result of problems with taking your medications, for example, either forgetting to take them or forgetting that you've taken them? ____ of time

FEELINGS ABOUT LIFE

[Statements denoted with SWL indicate items from the Satisfaction with Life scale (Diener et al., 1985) and statements with PIL indicate items from the Purpose in Life scale (Ryff, 1989)]

20. Now I'm going to read you some statements with which you may agree or disagree. After each statement, please tell me how much you agree or disagree on a one- to five-point scale, so you can strongly disagree, disagree, neither agree or disagree, agree, or strongly agree.

1 Strongly Disagree 2 Disagree 3 Neither Agree nor Disagree 4 Agree 5 Strongly Agree

a. In most ways my life is close to my ideal. _____ [SWL]

b. The conditions of my life are excellent. _____ [SWL]

c. I am satisfied with my life. _____ [SWL]

d. So far I've gotten the important things that I want in life. _____ [SWL]

e. If I could live my life over, I would change almost nothing. _____ [SWL]

f. I live life one day at a time and don't really think about the future. _____ [PIL]

g. I have a sense of direction and purpose in life. _____[PIL]

h. My daily activities often seem trivial and unimportant to me. _____[PIL]

i. I don't have a good sense of what it is I'm trying to accomplish in life. _____[PIL]

j. I enjoy making plans for the future and working to make them a reality. _____[PIL]

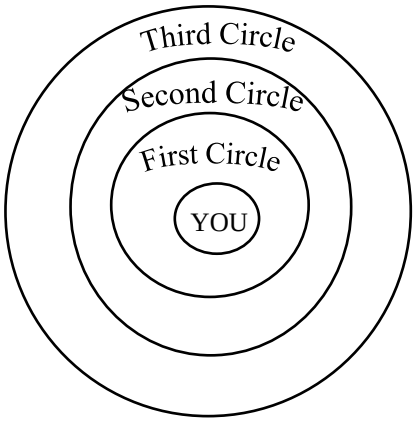
k. Some people wander aimlessly through life, but I am not one of them. _____[PIL]

21. The next few questions are about your mood. I'll read each statement, and I'd like you to tell me how often you experienced any of them DURING THE PAST MONTH. You can tell me you have experienced it: not at all, several days, more than half the days, or nearly every day?
[Patient Health Questionnaire (PHQ; Kroenke, Spitzer, & Williams, 2001)

During the past month, you have….	Not at all	Several days	More than half the days	Nearly every day
a. had interest or pleasure in doing things	1	2	3	4
b. had trouble falling asleep, staying asleep or sleeping too much	1	2	3	4
c. felt that you were just as good as other people	1	2	3	4
d. felt tired or had little energy	1	2	3	4
e. enjoyed life	1	2	3	4
f. felt bad about yourself – or that you are a failure or have let yourself or your family down	1	2	3	4
g. been able to concentrate on things, such as reading the newspaper or watching television	1	2	3	4
h. had poor appetite or overeating	1	2	3	4
i. felt happy	1	2	3	4

SOCIAL RELATIONSHIPS *(Kahn & Antonucci, 1980)*

Next, I want to ask you some questions about some of the people who are important in your life right now. Here is where you will need pencil and paper, as I'm going to ask you to use a diagram to help draw a picture of your personal social network. Think about a picture with you in the middle and **three increasingly larger circles around encircling the first circle which is you**---kind of like a bull's-eye; the closer the circle, the closer the person is to you. Think of people closest to you, the people who are most important to you. I will give you a few moments to draw and fill out the three circles. **(Have multiple ways of explaining this.** *Note: People might ask "What do you mean by "close? Like, physically/geographically closer?" You could maybe explain it further by saying things like "people you feel are necessary to your life; who you enjoy socializing with; whom you've known for quite some time" any of those things can be used as a prompt)*



First circle: In this circle, write down people you feel the closest to, so close that it's hard to image your life without them
Second circle: In this circle, write down people that are still close but not as close as people in the first circle. These people do not feel quite that close as the first circle people, but who are still very important to you.
Third circle: In this circle, you have people who you haven't already mentioned but they are close enough and important enough in your life that they should also be placed in your diagram.

22. Beginning with the people you feel closest to, is there any one person that you feel so close to that it's hard to imagine life without them? Yes____ No_____(If yes): That person would go in the first circle. Now, I would like to know about people you have placed in each of the three circles, so we will start with the first.

a) What is their relationship to you? _____

b) How often are you in touch with them?

5	4	3	2	1
Every day	About once a week	Once a month	About once a year	Less than once a year

c) What is the most common way you stay in touch with them? **Select all that apply.**

i) See them in person____
ii) Talk on the phone____
iii) Through a letter, sending a card ____
iv) Text, email, or social media (e.g., Facebook, twitter, etc.) ____
v) Video chat, for example using Skype____

d) Please rate the following statements tell me about your relationship with this/these person/people. Please tell me if you: Agree; Somewhat Agree; Neither agree nor disagree; Somewhat disagree; or Disagree.

1=Agree **2=**Somewhat Agree **3=**Neither agree nor disagree **4=**Somewhat Disagree **5=**Disagree

i) I enjoy being with this/these person/people 1 2 3 4 5
ii) I feel that this/these person/people encourage(s) me in whatever I do 1 2 3 4 5
iii) I feel that this/these people believe(s) in me 1 2 3 4 5
iv) This/these person/people always understands me 1 2 3 4 5
v) This/These person/people always appreciates the things I do for him/her 1 2 3 4 5

23. Now for the second circle out from you. The second circle has people that are still close but not as close as people in the first circle. These people do not feel quite that close as the first circle people, but who are still very important to you.

a) What is their relationship to you? _____

b) How often are you in touch with them?

5	4	3	2	1
Every day	About once a week	Once a month	About once a year	Less than once a year

c) What is the most common way you stay in touch with them? **Select all that apply.**

i) See them in person____
ii) Talk on the phone____
iii) Through a letter, sending a card ____
iv) Text, email, or social media (e.g., Facebook, twitter, etc.) ____
v) Video chat, for example using Skype____

d) Please rate the following statements tell me about your relationship with this/these person/people. Please tell me if you: Agree; Somewhat Agree; Neither agree nor disagree; Somewhat disagree; or Disagree.
1=Agree **2=**Somewhat Agree **3=**Neither agree nor disagree **4=**Somewhat Disagree **5=**Disagree

i) I enjoy being with this/these person/people 1 2 3 4 5
ii) I feel that this/these person/people encourage(s) me in whatever I do 1 2 3 4 5
iii) I feel that this/these people believe(s) in me 1 2 3 4 5
iv) This/these person/people always understands me 1 2 3 4 5
v) This/These person/people always appreciates the things I do for him/her 1 2 3 4 5

24. Now for the third circle out from you. In this circle, you have people who you haven't already mentioned but they are close enough and important enough in your life that they should also be placed in your diagram? These people go in this third circle.

a) What is their relationship to you? _____

b) How often are you in touch with them?

5	4	3	2	1
Every day	About once a week	Once a month	About once a year	Less than once a year

c) What is the most common way you stay in touch with them? **Select all that apply.**

i) See them in person____
ii) Talk on the phone____
iii) Through a letter, sending a card ____
iv) Text, email, or social media (e.g., Facebook, twitter, etc.) ____
v) Video chat, for example using Skype____

d) Please rate the following statements tell me about your relationship with this/these person/people. Please tell me if you: Agree; Somewhat Agree; Neither agree nor disagree; Somewhat disagree; or Disagree.
1=Agree **2=**Somewhat Agree **3=**Neither agree nor disagree **4=**Somewhat Disagree **5=**Disagree

i) I enjoy being with this/these person/people 1 2 3 4 5
ii) I feel that this/these person/people encourage(s) me in whatever I do 1 2 3 4 5
iii) I feel that this/these people believe(s) in me 1 2 3 4 5
iv) This/these person/people always understands me 1 2 3 4 5
v) This/These person/people always appreciates the things I do for him/her 1 2 3 4 5

***Thank you for sharing your social network with me. When you think back to our last interview in _____, do you feel that your social network has changed since then? Yes No*
If yes, _____ Audio recording time____

Importance of Telephone Helpline Program [Questions with * are only asked to the Telephone Helpline Program group]**
25. ***Now, take a look at your diagram of the circles; in which circle would you place the Spectra Telecheck program? Audio Recorder Time Stamp: _____
[Comparison group: Now, take a look at your diagram; in which circle would you place a telephone helpline program where you could sign up to receive social calls, medication reminders, or safety check-in calls. *If the participant is confused, clarification tips: these types of volunteer services exist, we are trying to assess how important would this type of a service be to your life currently*].

i) First circle
ii) Second circle
iii) Third circle
iv) None of your circles

a) ***How long have you been a Spectra Telecheck program client? ____ day/months/years

b) ***How often do you receive a call from your Spectra Telecheck program?

5	4	3	2	1
several times a day	once a day	three times a week	two times a week	once a week

*****Relationship with telephone program:**

26. Please rate the following statements on a scale: Agree (1) Somewhat Agree (2) Neither agree nor disagree (3) Somewhat disagree (4) Disagree (5)

a)	I enjoy talking to the volunteer that calls	1	2	3	4	5
b)	I feel that the volunteers encourage me in what I do	1	2	3	4	5
c)	I feel that the volunteers believe in me	1	2	3	4	5
d)	The volunteers always understand me	1	2	3	4	5

27. ***For what purpose did you sign up for the Spectra Telecheck Program?
[In your answer, you can talk about: Who encouraged you to sign up for the program? Where did you hear about the program? Why did you sign up for the program?]
[Comparison group] Thinking about the future or someone else in your life, what are your thoughts on a helpline program that provides social calls, medication reminders, or safety check ins?

28. ***If you could make one recommendation for Spectra Telecheck what would it be?

***Similar to the telephone program, there are some internet communities that exist for connecting with others. Are you using any online communities?*

- *a) If participant says yes, what are you using? [Follow ups: what are your experiences using ---? Are there any online communities you want to start using but have not due to barriers or concerns that you have? Can you tell me a little bit about these communities and barriers?]*
- *b) If participant says no, what are some barriers or concerns that you have from using internet communities? [Follow ups: how do you think --- (barrier) can be removed/ --- (concern) can be addressed?]*

***Are you a part of any program that is for individuals over the age of 55. These programs can be educational, recreational, fitness, social, etc.?*

THOUGHTS ABOUT THE FUTURE

29. We're almost at the end of the interview, but I have one more question for you. Can you please describe your plans, dreams, hopes, and goals for the future (and future could mean things you hope to accomplish in the month, next year, or even 5 years from now). Please tell me in as much detail as you can.
[Prompts: You can tell me about any immediate plans for, say, next month, or maybe longer-term plans for next year?]

WRAPPING UP

30. Those are all the questions I have. Thank you so much for taking the time to take part in the interview. We appreciate that you were willing to contribute your experiences to our research.

a) At this point, is there anything I missed asking or that would you like to add to the interview?

a) I've asked you a lot of questions; do you have any questions for me?

b) I will now turn off the recording, do you have any questions or comments for me off recording?

Again, if you have any questions about the study, please contact the study leader, Preet Chauhan, at (519) 884-0710 x 266 or by email at chau5030@mylaurier.ca. Dr. Newton can be reached by (519) 884-0710 x 4828 or email at nnewton@wlu.ca.

We would also like to remind you that if you experience any uncomfortable feelings as a result of participating in this study, please contact the researchers immediately. You may also contact the Mental Health Helpline at 1-866-531-2600. I hope you enjoyed being a part of the interview and again, I would like to thank you for being willing to participate.

Thanks, and have a great day! We will call you again in 6 months for the second interview.

Total Call Time: _____