

AN ABSTRACT OF THE DISSERTATION OF

Noriko Toyokawa for the degree of Doctor of Philosophy in Human Development and Family Studies presented on May 18, 2012.

Title: Trajectories of Social Support in Later Life: A Longitudinal Comparison of Socioemotional Selectivity Theory with Dynamic Integration Theory

Abstract approved:

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In this study, we contrasted socioemotional selectivity theory (SST; Carstensen, 2006) with dynamic integration theory (DIT; Labouvie-Vief, 2003) using trajectories of quantitative and qualitative social support in later life. SST is a lifespan theory of motivational development (Carstensen, Isaacowitz, & Charles, 1999). There is a normative decline in social support networks in later life. In other words, individuals who perceive the limitation on time left for their future are likely to decrease the quantitative social support and compensate for this decrease by improving qualitative social support with emotionally meaningful social partners. The theory also postulates that age is the primary proxy for perceived limitation of individuals' lives (Carstensen, Fung, & Charles, 2003). Further, self-reported health

and functional status are factors that affect older adults' perception of limitation of time left in their lives (Carstensen, 2006).

In contrast, DIT is a neo-Piagetian theory that emphasizes the presence of individual differences in quantitative and qualitative social support in later life depending on individuals' levels of cognitive resources that are associated with educational levels (Labouvie-Vief & Diehl, 2000). Despite these different arguments on the trajectories of quantitative and qualitative social support in later life, SST and DIT have not been tested within a same study.

The current study examined the trajectories of frequency of social contact (quantitative social support) and reliance on family members and close friends (qualitative social support) in later life. Participants were drawn from the Normative Aging Study (NAS; $N = 1,067$, $M_{age} = 60.83$, $SD = 8.08$) who completed social support surveys three times from 1985 to 1991. Using unconditional and unconditional analyses (Raudenbush & Bryk, 1986), growth models of frequency of social contact with and reliance on family members and close friends were tested. Within subject analyses found that the trajectory of frequency of social contact was a U-shaped curve with the age of 54 years at a peak, while the trajectory of reliance on family and friends were stable and linear. Random effects of age for the intercept and slope were significant in both models of frequency of contact and reliance on family and friends, although the random effect for the latter were small in both models.

Between subjects analyses were conducted to examine whether cognitive resources, marital status, health status, and functional status predicted variance in the intercept and slope of both types of support. As SST hypothesized, having better self-

reported physical health predicted higher levels of frequency of contact over age. Being married was associated with higher quantity of social support. However, contrary to our hypothesis based on SST, having poorer functional status predicted more frequent social contact over age. The random effect of intercept was still significant after controlling for these psychosocial predictors.

The evidence to test the DIT hypotheses was examined in the model of the qualitative social support. Having memory problems predicted decreasing reliance on social partners. However, marital status and education did not significantly predict change in qualitative social relationships. Contrary to the hypothesis based on SST that posited poor self-reported health was associated with higher qualitative social support, it was better self-reported health that predicted higher qualitative social support. The random effects for the intercept and slope were still significant after controlling for these psychosocial factors.

Taken together, the findings of the current study suggest that SST and DIT can be used as theoretical frameworks that are complementary rather than contradictory in their predictions of socioemotional development in later life. SST is useful to illustrate the overall trajectory of quantitative social support in a normative development in late life. DIT's stance better explains the individual differences in qualitative social support in non-normative contexts. The findings also suggest that having memory problems and poor self-reported health as non-normative developmental outcomes may be risk factors of older adults' ability to seek for social support.

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Trajectories of Social Support in Later Life: A Longitudinal Comparison of
Socioemotional Selectivity Theory with Dynamic Integration Theory

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I understand that my dissertation will become part of the permanent collection of the Oregon State University library. My signature below authorizes release of my dissertation to any reader upon request.

Noriko Toyokawa, Author

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CONTRIBUTION OF AUTHORS

In this study, Dr. Aldwin provided abundant ideas for the whole project, including research questions, theoretical background, data analysis, and discussion. Dr. Spiro permitted us to use the archival data from Normative Aging Study, and advised us on solutions for statistical problems.

TABLE OF CONTENTS

	<u>Page</u>
Chapter 1: Introduction.....	1
Social support and later life.....	1
Definition of terms.....	8
Rationale.....	9
Chapter 2: Literature Review.....	11
Theoretical perspectives.....	12
Empirical studies on social relationships in later life.....	22
Summary of the literature review.....	34
Present study.....	35
Chapter 3: Methods.....	38
Data collection procedure.....	38
Participants in the current study.....	38
Analysis of attrition.....	39
Measures.....	40
Analytic strategy.....	44
Chapter 4: Results.....	49
Descriptive statistics.....	49
Age-related change and stability in quantitative and qualitative social support.....	51
Individual differences in quantity and quality of social support.....	53
Summary.....	55

TABLE OF CONTENTS (Continued)

Chapter 5: Discussion.....	66
Overall findings.....	66
Quadratic trajectories of quantitative social support.....	68
Stability of qualitative social support.....	69
Predictors of individual differences in support trajectories.....	70
Limitations.....	75
Future studies.....	77
Chapter 6: Conclusions.....	80
Contribution to the field of adult development.....	80
Bibliography.....	83

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
4.1 The First 250 Cases of the Trajectories of Quantitative Social Support.....	62
4.2 Estimated Means of the Quantitative Social Support.....	63
4.3 The First 250 Cases of the Trajectories of Qualitative Social Support.....	64
4.4 Estimated Means of the Qualitative Social Support.....	65

LIST OF TABLES

<u>Table</u>	<u>Page</u>
3.1 Participants' Characteristics.....	47
3.2 Univariate Analyses of Quantitative and Qualitative Social Support by Age Group	48
4.1 Correlations among Social Support, Age, and Covariates.....	57
4.2 Maximum Likelihood Estimates for the Unconditional Model of Quantitative Social Support.....	58
4.3 Maximum Likelihood Estimates for the Unconditional Model of Qualitative Social Support.....	59
4.4 Maximum Likelihood Estimates for the Conditional Model of Quantitative Social Support.....	60
4.5 Maximum Likelihood Estimates for the Conditional Model of Qualitative Social Support.....	61

DEDICATION

I dedicate this dissertation to my mother, Tokuko Yoshida and my late father, Nobuo Yoshida, and to the memory of Trula and Bob Morris.

Trajectories of Social Support in Later Life:

A Longitudinal Comparison of Socioemotional Selectivity Theory

with Dynamic Integration Theory

CHAPTER 1: INTRODUCTION

SOCIAL SUPPORT AND LATER LIFE

An individual is psychosocially shaped and protected through exchanging social support with those people who are emotionally close and important over lifespan (Khan & Antonucci, 1980). Such emotionally close relationships are conceptualized as the social support convoy of the focal individual (Kahn & Antonucci, 1980). The members in the social support convoy of an individual change through time and space (Antonucci & Akiyama, 1987; Antonucci, Birditt, Sherman, & Trinh, 2011). Past studies have illustrated developmental changes in the members of the social convoy over age groups. The convoy is composed of diverse members such as family members and co-workers among young adults, while it is mainly composed of family members and close friends among older adults across cultures (Ajrouch, Antonucci, & Janevic, 2001; Antonucci, Fuhrer, & Jackson, 1990; Takahashi, Ohara, Antonucci, & Akiyama, 2002). These studies shows that family members and close friends who are emotionally close to the focal person are more likely to stay in the convoy over the lifespan, while other members who are less emotionally close to the focal person tend to come into and leave from the personal social networks as one grows older (Antonucci & Akiyama, 1987; Antonucci, Akiyama, & Takahashi, 2004; Takahashi et al., 2002). Despite the recognition of the stability and change of the members of social support convoy over lifespan in the literature, the psychosocial

process of change in the source of social support in later life has received little attention (Shaw, Krause, Liang, & Bennett, 2007). Understanding older adults' psychosocial processes of change in the source of social support is important in order to understand the normative process of aging and provide intervention for those who have fewer resources for social support.

Increasing Need for Social Support in Later Life

Generally, there is a positive association between availability of social support and well-being (George, 2010; House, Landis, & Umberson, 1988; Kahn & Antonucci, 1980). Availability of social support for maintenance of well-being becomes particularly important in later life. There are two major reasons for the importance of social support for older adults often documented in the literature. First, lifespan theory (M. Baltes & Lerner, 1980; P. Baltes, Reese, & Lipsitt, 1980) premises on the assumption that biological and social resources are allocated to maintain biological potential. Such age-related declining in biological potential is compensated by culture. Culture that compensates for age-related biological decline was defined as the "psychological, social, material, and symbolic (knowledge-based) resource that human have produced over the millennia" (P. Baltes, Staudinger, & Lindenberger, 1999, p. 475). Culture increases as age-related biological losses increase (P. Baltes, 1999). Thus, the lifespan theory hypothesizes that the need for social support to compensate age-related biological losses increases in later life. According to the recent NIH-commissioned Census Bureau report (Cire, 2011), the likelihood of older adults' having functional limitations and living in a nursing home increases by age. Approximately 85% of those who were 90 or older had reported one or more

limitations in physical functioning, and the proportion of nursing home living rose from 3% at the ages 75-70 to 11.2% for ages 85-89 to 19.8% for ages 90-94. The proportion reached 31% for ages 95-99, and rose up to 38.2% among centenarians. This census report supports age-related declining in biological potential and increase in social support to compensate the losses. Note that over 60% of centenarians are not living in institutions.

Older adults living in their home receive a wide range of support from their family members, including personal care, coordinating medications, and supervising activities (Roberto & Jarrott, 2008). The literature on family trends in the 2000s recognized that such family support has become increasingly common (Silverstein & Giarrusso, 2010). The primary caregivers to the elderly at home are spouses, followed by adult children (Wolff & Kasper, 2006). Adult children often negotiate with each other in terms of their contribution to their aging parents' care (Bedford & Ingersoll-Dayton, 2003; Connidis & Kemp, 2008). Thus, the literature illustrates older adults' increasing needs for familial support in order to compensate their age-related losses in biological potentials.

Social Support and Well-Being in Later Life

Generally, older adults are more likely to report chronic stressors than younger adults (Aldwin & Levenson, 2001). The literature on chronic problems prevalent in later life and the positive effect of various types of social support is summarized below.

A study using longitudinal data of older adults' health found a 50% increase in activity of daily living (ADL) limitation problems over 12 years (Covinsky et al., 2010). Perceived instrumental support is associated with a reduced risk of disability

and perceived emotional support is associated with fewer depressive symptoms among community residing older adults (de Leon, Gold, Glass, Kaplan, & George, 2001; Fauth, Gerstorf, Ram, Malmberg, & Zarit, 2010; Taylor & Lynch, 2004), and single older adults without children (Wu & Pollard, 1998). Similar effects of instrumental and emotional support were found in the recovery process of heart surgery (Oxman & Hull, 1997) and hip fracture (Mutran, Reitzes, Mossey, & Fernandez, 1995). Emotional support has positive effects on older adults' health care utilization, especially for higher levels of chronic illness (Penning, 1995). Non-professional friends or family companions facilitates older adults' primary care visits and raise their satisfaction with the care (Rosland, Choi, Heisler, & Piette, 2010), particularly for those who with low medical literacy and with serious medical conditions (Rosland, Piette, Choi, & Heisler, 2011). Instrumental support, such as giving a ride to the hospital, facilitates older adults' hospital use (Bosworth & Schaie, 1997).

In the early stage of the recovery from the spousal bereavement in later life, bereaved spouses strengthen the instrumental and emotional reliance on children (Ha, 2008; Ha, Carr, Utz, & Nesse, 2006). African American spouses grieved less than European American spouses because of the community support system embedded in their cultural tradition (Carr et al., 2000). In their new lives as widowed individuals, bereaved spouses develop new social support systems. Widowers receive companionships from a few male friends, and instrumental and emotional support from their sisters or nieces (Wenger, 2001). Widows often socialized with other widows (Morgan, Carder, & Neal, 1997) and received support from brothers or sisters' husbands when they had to do the work which had been done by their deceased

husband, such as dealing with legal issues or property maintenance (Matthews, 1994). These studies provide some examples of the necessity of social support to maintain well-being in later life.

Increasing Need for Emotional Support in Later Life

The literature shows that emotional support helps older adults to maintain their personal meaning in life. According to Erikson's (1950) theory of personality development, an individual in later life has the psychosocial task to develop an integrated sense of self by looking back on their lives and accepting their past and present. In the process of achieving this psychosocial task, social support may play an important role. A longitudinal study on the types of support and the meaning in life for individual older adults reported that greater anticipated support and emotional support from families were associated with older adults' deeper sense of meaning in life (Krause, 2007).

Psychological adjustment to aging, including finding meaning in life, developing sense of integrity, self-esteem, self-efficacy, sense of self-worth, and sense of belongingness, are directly associated with well-being in later life (Krause, 2006; Reblin & Uchino, 2008). For instance, loneliness is associated with more frequent passive wishes for death (Ayalon & Shiovitz-Ezra, 2011). Poor subjective usefulness to others and to society among Japanese older adults predicted poor self-rated health and higher mortality six years later (Okamoto & Tanaka, 2004). This line of studies indicates that drawing on the meaning of personal life in the context of social relationships is important for older adults. Older adults' elevated motivation to draw on their sense of meaning in life by investing in the development of caring

relationships with emotionally meaningful social partners is also conceptualized by socioemotional selectivity theory (SST; Carstensen, 2006).

Mixed Effects of Social Support

Despite the recognition of general benefits of social support in later life, some mixed effects of social support have been also found. Older adults' sense of obligation to their social partners is often associated with higher levels of depressive symptoms (Antonucci, Akiyama, & Lansford, 1998; Morgan et al., 1997). However, the literature shows that negativity in relationships was normative rather than harmful for older adults' well-being (Birditt & Antonucci, 2008; Birditt, Jackey, & Antonucci, 2009). Indeed, recent longitudinal studies found that older adults who reported greater negative relationship quality with their children and friends and those who reported higher numbers of functional problems both lived longer than those who reported better quality of family relationships and fewer functional problems (Antonucci, Birditt, & Webster, 2010; Birditt & Antonucci, 2008). A comparison of six different social relationships found a weaker association between perceived negative interactions and the occurrence of negative affect in family relationships than in non-family relationships (Newsom, Nishishiba, Morgan, & Rook, 2003). The findings of this study suggest the normative level of negativity in family relationships is milder than in other relationships. Furthermore, the inverse relationships of the negativity and longevity can be interpreted as the evidence to support SST. Older adults who perceived greater negative family relationships may perceive the time left for their future is not much limited.

Scarcity of Longitudinal Studies on the Process of Social Support

Social support is generally positively associated with older adults' mental, physical, and functional health. However, the process of older adults' increase in investment in close relationships has seldom been known (Antonucci et al., 2010; Gerstorf et al., 2010; Krause, 2006; Shaw et al., 2007).

Socioemotional selectivity theory (SST; Carstensen, 2006) is one of few theories that explain the process of social support in later life, in regards to why individuals' preference of social partner changes in later life as well as how it changes. SST postulates that individuals' perceived limitation of time left for their future shifts their motivational priorities from 'expanding their horizons of knowledge' to 'deriving emotional meaning from their lives' (Carstensen, Fung, & Charles, 2003; Carstensen, Isaacowitz, & Charles, 1999). Consequently, the theory posits that older adults' quantitative social support decreases and the decrease of quantitative social support is compensated by an increased weight in qualitative social support with emotionally meaningful social partners (Carstensen et al., 1999). SST premises that age is the proxy for individuals' perception of the limitation on time left in their future (Carstensen et al., 1999), because the time left for their lives is generally less for older adults than younger people.

Despite the recognition of SST as the framework that hypothesizes the process of change in older adults' use of social support, the utility of SST has seldom been fully tested for several reasons. First, there is a scarcity of longitudinal studies on the utility of SST in regard to changes in social relations in later life. Although there are a few longitudinal studies that recently provided some evidence to support SST, these

studies mostly examined the trajectories of emotion regulation in later life (Carstensen et al., 2011; Cate & John, 2007; Charles, Reynolds, & Gatz, 2001). Changes in the domain of social relations have been relatively understudied. Second, the argument of SST, which emphasizes the predictive utility of individuals' perception of limitation on time left for the future, is challenged by dynamic integration theory (DIT; Labouvie-Vief, 2003). DIT premises that individuals' ability of emotion regulation, sense of self, and their ways to connect with others are integrated with cognitive resources (Labouvie-Vief). Consequently, DIT postulates that older adults' quantity social support may differ depending on the levels of individuals' cognitive resources that are associated with their socioeconomic contexts.

DEFINITION OF TERMS

Social Support

Social support is defined as exchange of tangible and intangible resources necessary for maintaining ones' lives, including affect, affirmation, and aid that are provided from members of the social network as the source (Kahn & Antonucci, 1980, p. 267) including provision of the opportunity for social contacts that provides a sense of connectedness to individuals (Cornwell, Laumann, & Schumm, 2008). Although the source of social support includes community organizations, service workers, and professional organizations (Aldwin & Gilmer, 2004), this study focuses on the social support from the family and close friends for the purpose of testing SST and DIT that predict older adults' changes in social support from family and close friends.

Quantitative Social Support

Quantitative social support is one aspect of social support resources (Zuckerman, Kasl, & Ostfeld, 1984). Generally, quantitative social support is represented by the number of members in a social network and the frequency of contact with network members.

Qualitative Social Support

Qualitative social support is another aspect of social support resources and taps more the perception of or quality of support (Bossé, Aldwin, Levenson, Spiro, & Mroczek, 1993). For instance, self-reported levels of reliance on social partners and the number of confidants can be the components of qualitative social support.

Emotionally Meaningful Social Relationships

In this study, emotionally meaningful social relationships are defined as the relationships with social partners who are important for older adults' meaning in life, based on the definition of SST (Carstensen, 2006).

RATIONALE

The proposed study will longitudinally test the utility of SST through a comparison with DIT for the following reasons. First, the proposed study will contribute to the gap in longitudinal studies that test SST in its argument of changes in quantitative and qualitative social support and DIT in its emphasis on individual differences in the trajectories of social support in later life. Most studies that have tested the utility of SST were cross-sectional (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Fung, Carstensen, & Lutz, 1999; Lansford, Sherman, & Antonucci, 1998) or experimental (Charles, Mather, & Carstensen, 2003; Fung & Carstensen,

2003, 2004; Mather & Carstensen, 2005; Mather, Knight, & McCaffrey, 2005). These studies can compare the mean differences in psychosocial outcomes by age groups, but longitudinal studies with at least three-time repeated measure is necessary to investigate how same individuals' developmental outcomes change over time (Hofer & Sliwinski, 2001). The design of longitudinal studies also allows us to investigate interindividual differences in intraindividual changes over time (Hofer, Sliwinski, & Flaherty, 2002).

The findings of the current study will contribute to the understanding of the changes in individuals' needs and use of social support in later life. The investigation of predictors for individual differences will be informative to recognize different needs for support among diverse populations.

CHAPTER 2: LITERATURE REVIEW

The purpose of this chapter is to review the literature on aging and social support. We will first start with theoretical perspectives, focusing on a review and critique of Socioemotional Selectivity (SST; Carstensen, 2006) and Dynamic Integration Theories (Labouvie-Vief, 2003). We will then examine the empirical literature on social relationships in later life, reviewing both cross-sectional and longitudinal studies. Next, we will identify possible predictors of changes in social support in later life. Finally, we will present the critiques of these two theories that led us to our research questions and hypotheses.

THEORETICAL PERSPECTIVES

Socioemotional Selectivity Theory

Socioemotional selectivity theory (SST; Carstensen, 2006) posits that individuals' perceived limitations on the time left in life shifts their motivational priorities from expanding their horizons to deriving emotional meaning from life (Carstensen, Fung, & Charles, 2003). Such motivational change is reflected in older adults' tendency to become more selective than younger people about the people with whom they socialize (Carstensen, 1995). Individuals who perceive that the remaining time is open-ended are more likely to invest in developing knowledge-based social relations, while individuals who perceive time constraints in their future prefer emotion-focused social relations (Carstensen et al., 2003). SST emphasizes that a variety of psychosocial factors raise individuals' awareness of the limitations on time left for their future. For instance, personal life events, such as a geographic relocation due to college graduation (Fredrickson, 1995; Pruzan & Isaacowitz, 2006) or

retirement (Carstensen, Isaacowitz, & Charles, 1999), raise individuals' perceived sense of limitation on time left for the future, leading them to select emotionally meaningful social partners to spend time with until the relocation. Historical life events that expose individuals to stress and anxiety for their future also shift individuals' socioemotional motivation. For instance, individuals who were exposed to the incident of the September 11 terrorist attack in 2001, the spread of severe acute respiratory syndrome (SARS) in Hong Kong between 2002 and 2003, or the transfer of the sovereignty over Hong Kong from United Kingdom to the Republic of China in 1997 (Fung & Carstensen, 2006) preferred emotionally meaningful social partners over social partners from whom they could acquire new knowledge, regardless of their age. Individuals' terminal illnesses also influenced the subjective sense of time. Individuals with human immunodeficiency virus (HIV; Carstensen & Fredrickson, 1998) and those who are in the advanced stage of cancer (Pinquart & Silbereisen, 2006) prefer to invest in intimate relationships rather than expand their network for their future, regardless of age. Thus, SST contends that individuals increase their sense of time limitations whenever they face a situation that decreases the time to achieve their personal goals (Fredrickson, 1995; Fung & Carstensen, 2004).

SST also posits that simple aging will result in differences in socioemotional motivations among people (Carstensen et al., 2003; Carstensen et al., 1999). Carstensen and her colleagues (1999, p. 165) stated, "People are always aware of time---not only of clock and calendar time, but of lifetime." In this context, individuals' perceived limitation of the time relates to the sense of impending mortality in normative developmental context. Comparisons between older adults and

younger adults in their preference of social partners found that older adults were more likely than younger adults to prefer emotionally meaningful social partners, while the latter preferred social partners from whom they could acquire new knowledge as the investment in their future (Carstensen et al., 2003; Carstensen et al., 1999; Carstensen & Turk Charles, 1994). With a picture of lifespan development, SST proposes that chronological age can be the proxy for the perceived limitation on time in the future in later life (Carstensen, 2006). Furthermore, SST also contends that individuals' motivation to invest in emotionally meaningful relationships is derived from their desire to assist in the reproductive success of their offspring by transferring their skills, labors, and knowledge to the kin (Carstensen & Löckenhoff, 2003). Thus, from the lifespan and evolutionary perspectives, SST proposes that chronological age can be used as the primary proxy for individuals' perceived limitation on time left in their lives.

SST as a domain specific lifespan theory. Carstensen perceives SST as a part of lifespan developmental approach in which individuals compensate for various limitations faced in later life (Baltes, Staudinger, & Lindenberger, 1999). In lifespan theory, older individuals who are successfully adjusting to their age-related losses in cognitive and physical resources, select the skills to be focused on and compensate losses to optimize the selected skills by operationalizing support resources. Thus, the model of selection, optimization, and compensation (SOC) is seen as an effective practice for successful aging processes (Baltes, 1999; Freund & Baltes, 1999a, 1999b). SST focuses on the SOC practice in the domain of emotion, motivation, and social relationships (Carstensen et al., 1999).

Social support is an element of the culture that compensates for age-related declines in biological potentials (P. Baltes & Smith, 2003; P. Baltes, Staudinger, & Lindenberger, 1999). Thus, maintenance of the availability of social support is particularly important in later life. SST presumes that older adults who are successfully adjusting to the age-related changes practice the SOC model in the domain of social relationships in order to maintain the availability of social support. More specifically, the theory posits that older adults compensate for a decrease in energy to socialize in a large social network by optimizing the quality of relations by becoming selective in the choice of social partners (M. Baltes & Carstensen, 1996; Carstensen, 1992). Carstensen and her colleagues (1999) argued that utilization of SOC in social relationships in later life occurs in the process of ontogenetic development; that is a normative developmental change (Carstensen & Löckenhoff, 2003). Thus, SST, as a domain-specific theory of lifespan theory, hypothesizes a decrease in quantitative social support and an increase in or stability of qualitative social support as the normative development.

Critiques of SST. There are three major contributions that SST has made to the field of adult development. First, SST illustrates psychosocial processes of change in quantitative and qualitative social support by introducing the concept of emotional salience in later life. Before SST (Carstensen, 1992), empirical studies based on social support convoy model (Kahn & Antonucci, 1980) showed that only the people to whom a focal person has a strong attachment were likely to stay in the convoy in later life (Akiyama & Antonucci, 1986; Antonucci, 1986; Antonucci & Akiyama, 1987; Antonucci, Akiyama, & Takahashi, 2004). However, the convoy model relied

primarily on changes in social roles to explain why peripheral network members drop out from the convoy. SST proposes an increasing level of emotional salience in later life as the reason for their trimming of peripheral network members. Second, although SOC model does not predefine specific criteria or goals of development, SST addresses the gap by proposing a domain-specific change (Baltes & Carstensen, 1996; Carstensen et al., 1999). SST explains changes in the quantitative and qualitative social support as applying SOC for maintaining emotional satisfaction. Third, SST provides a theoretical framework to predict quantitative and qualitative social support as a normative development in later life, using age as the proxy for individuals' perceived limitation on time left in their lives. In principle, SST recognizes the primary predictor for motivational change is individuals' subjective limitation on time left in their future.

Despite these contributions, SST has several limitations. First, there are relatively few longitudinal studies that have tested SST. Most studies that provided the evidence to support SST were cross-sectional (Charles, Mather, & Carstensen, 2003; Fung, Carstensen, & Lang, 2001; Lansford, Sherman, & Antonucci, 1998) or experimental (Charles & Carstensen, 2008; Mather & Carstensen, 2005; Samanez-Larkin, Robertson, Mikels, Carstensen, & Gotlib, 2009). These cross-sectional and experimental studies provided the information about differences in socioemotional outcomes by age; however, they do not allow us to examine how the same individual's developmental outcomes change overtime (Hofer & Sliwinski, 2001). Studies to test intraindividual change over time should be designed with more than two-time repeated measures (Hofer & Sliwinski).

In addition to a scarcity of longitudinal studies, SST has not fully responded to the critique raised by Dynamic Integration Theory (DIT; Labouvie-Vief, 2003), a Neo-Piagetian theory that proposes the organismic integration of development of an individual's cognitive resources, emotion regulation, and sense of self, as well as others. While SST emphasizes the normative change in social support, DIT emphasizes individual differences in quantitative and qualitative social support in later life. DIT proposes that the individual differences are explained by individuals' levels of cognitive resources, as well as socioeconomic conditions that influence the levels of these cognitive resources (Diehl, Elnick, Bourbeau, & Labouvie-Vief, 1998; Labouvie-Vief, 2005; Labouvie-Vief & Medler, 2002). Despite these contrasting hypotheses, SST and DIT have never been compared within the same study. Finally, SST has not clarified the resources that are being compensated for with elevated emotional salience in contexts that are not associated with mortality. For instance, young people who sense time constraints because of graduation (Fredrickson, 1995) or geographical relocation (Martin & Harder, 1994) may not have lost any biological or psychological potential. SST may need to redefine the concept of the SOC in a bigger picture in the context of a scarcity of personal or social resources in normative life events rather than only in aging processes so that it can emphasize subjective time left in the future as the predictor for the motivational change.

Despite these ambiguities in the theory, SST is a widely recognized theory that explains the process of social support in later life, particularly when it uses chronological age as the proxy for the predictor for socioemotional changes.

Dynamic Integration Theory

The tenet of DIT is the inherent relationships between development in cognition and emotion regulation, as well as their implication for social support (Labouvie-Vief, 2009). For instance, children in the preoperational stage do not have complex affect. Infants cry as the reaction to their biological needs and toddlers often express only basic feelings such as happiness, anger, or sadness (Piaget, 1981). When children grow older and their cognitive resources have developed to the stage of formal operations, this increases in cognitive complexity in turn supports affect complexity in self-reflective emotions, such as embarrassment, compassion, and guilt (Harris, 2000; Labouvie-Vief, 2009; Piaget, 1981). With increased maturity in cognition and emotion regulation resources, individuals are able to connect with other people through using advanced social skills, such as empathy and interpersonal problem solving skills (Gruhn, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Labouvie-Vief, 2009). Thus, cognitive development, emotional development, and individuals' ways to connect with others are innately related to each other.

An individual who has developed complex emotions in which both positive and negative emotions exist simultaneously has learned two types of emotion regulation strategies in order to work on the complexity: optimization of positive affect and affect complexity (Labouvie-Vief, 2003, 2009). Optimization of positive affect is a strategy that suppresses the negative emotions by focusing on positive emotions. It is relatively automatic and effortless. In contrast, affect complexity is a strategy in which both positive and negative affect are sustained in order to process the negative affect. Affect complexity is an effortful emotion regulation strategy that needs a certain level of cognitive resources. Individuals need the cognitive resources

to be aware of the complexity of their own emotions, have accurate memory to recall the incident that raises the emotion, the vocabulary to express the emotion in socially appropriate manners, and problem solving skills to work on the social relationships that raise the emotion (Labouvie-Vief & Medler, 2002).

DIT proposes that age-related cognitive decline is inherently associated with declining in emotion regulation, particularly in the ability to utilize affect complexity (Labouvie-Vief, 2003; Labouvie-Vief & Medler, 2002). DIT also proposes that such declines in emotion regulation may be associated with relationships problems (Labouvie-Vief & Medler, 2002). DIT illustrates this process in the maintenance of homeostasis in psychological systems (Labouvie-Vief, 2009). Individuals' cognitive-emotional schemas develop when they have adapted a new intellectual stimulant into their pre-existing schemas. This process is effortful and causes their psychological disequilibrium. Once the stimulant is incorporated into the cognitive-emotional schema, the range of equilibrium is expanded. This, in turn, promotes the growth of the schema. For older adults who are losing their fluid intelligence, the range of equilibrium is shrinking. Consequently, they activate optimization of positive affect and avoid processing new intellectual information as cognitive-emotional stimuli. Thus, DIT proposes that older adults are more likely to utilize optimization of positive affect than affect complexity in order to compensate for their age-related losses in cognitive resources. Such declines in emotion regulation skills due to age-related cognitive losses are reflected in more problematic social relationships. DIT proposes that age-related losses in cognitive resources and emotion regulation abilities are associated with individuals' repressive emotional attitudes, decreases in tolerance and

empathy, and openness that are relevant to their social skills (Labouvie-Vief & Medler, 2002). This framework of DIT leads us to hypothesize quantitative and qualitative social support may decrease in later life because of age-related losses in cognitive resources and ability of emotion regulations.

Emphasis on individual differences. DIT suggests that individuals' cognitive resources are the primary drive of change in social relations in later life, in part because cognitive complexity may be a necessary component for affective complexity (Labouvie-Vief, 2003). The theory also recognizes the effect of socioeconomic status (SES) as a factor that influences individuals' cognitive resources (Labouvie-Vief, 2009; Labouvie-Vief & Medler, 2002).

The research based on DIT found four emotion regulation styles resulting from the different combination of optimization of positive affect and affect complexity (Labouvie-Vief, 2003). The four styles of emotion regulation are integrated, complex, self-protective, and dysfunctional. Those who use an integrated style utilize affect complexity when situations are controllable, but optimize positive affect when the situation is uncontrollable. Those who have complex style are more likely to use affect complexity than optimization of positive affect. They reported worse mental health than those use an integrated style. Those who have a self-protective style are more likely to use optimization of positive affect than affect complexity. Those who have a dysfunctional style are less likely to use emotion regulation and more likely to use impulsive behaviors to manage their negative affect.

There are some relations between age and emotion regulation styles. Those who use dysfunctional style are more likely to be younger individuals. Those who use

an integrated style tend to be middle-aged individuals. Older adults are over represented in the group of people who use a self-protective style (Labouvie-Vief & Medler, 2002). The study also found that higher education was associated with the practice of integrated strategy, while lower education was associated with dysfunctional strategy (Labouvie-Vief & Medler). Based on these studies, DIT proposed that not all adults could acquire integrated emotion regulation strategies that required a certain level of high cognitive resources (Labouvie-Vief, 2003).

DIT also stresses that the role of education as the predictor for the variance among individuals' cognitive resources (Labouvie-Vief, 2009). The theory's proposition of the significant existence of individual differences in emotion regulation skills was also longitudinally supported. A six-year longitudinal study of activation of affect complexity and optimization of positive affect found significant individual differences both in the initial levels and the rate of change in the frequency of activation of both emotion regulation strategies (Labouvie-Vief, Diehl, Jain, & Zhang, 2007). Thus, DIT emphasizes individual differences in emotion regulation explained by the cognitive resources, and presumably, emotion regulation will then also affect social relation.

Critiques of DIT. There are four major contributions of DIT to the field of adult development. First, it characterizes psychosocial development in adulthood as the integration of cognition, emotion, and social relationships in the service of homeostasis. Second, the theory connects child developmental theory and adult developmental theory by expanding Piaget's cognitive-emotional co-developmental schema to the framework of adult development. Third, DIT emphasizes the role of

emotional development in broader psychosocial development. Labouvie-Vief (1994) argued that emotional development has been considered secondary to cognitive development, and emphasized the co-development of emotion-cognition schemas. Finally, DIT emphasizes both interindividual and intraindividual differences, and, specific possible predictors of these differences (i.e., cognitive resources, education).

There are also some limitations to DIT. Specifically, many aspects of this theory have not been tested. For example, a study conducted by Labouvie-Vief and her colleagues (2007) found an increase of utilization of positive affect in later life, but did not examine the predictive utility of cognitive resources and education for individual differences in emotion regulation strategies. Further, there is a scarcity of research which examines its relevance to social support. The domains of DIT that have been tested by existing studies are limited to the age-related differences in emotion regulation styles, the level of crystallized and fluid intelligence, and individuals' representation of self in social relationships (Labouvie-Vief, 2005; Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005), in personality (Gruhn, Gilet, Studer, & Labouvie-Vief, 2011; Labouvie-Vief, Diehl, Tarnowski, & Shen, 2000), in empathy (Studer et al., 2010a, 2010b) and in support-seeking behaviors (Labouvie-Vief & Medler, 2002).

Similarities and Differences in SST and DIT

SST and DIT agree with each other in their hypothesis of an age-related decrease in frequency of social contact in later life. However, there are three major differences regarding the trajectories of the quantitative and qualitative social support in later life. First, SST proposes that there is the stability in or an increase of the qualitative social support in later life, due to the age-related increase of emotional

salience in later life. Conversely, DIT's hypothesis on age-related decline in emotion regulation suggests a decrease in qualitative social support in later life. Second, SST emphasizes normative change in the quantitative and qualitative social support, while DIT's emphasizes individual differences in the trajectory of the quantitative and qualitative social support. Third, SST recognizes that self-reported physical health and functional status may be the proxies for the perceived limitation on time left for the life. Therefore, its focus is in physical and functional health as covariates of change in quantitative and qualitative social support. DIT emphasizes that the differences in individuals' cognitive resources affect emotion regulation processes, which in turn affects changes in quantitative and qualitative social support. Despite these inconsistencies, few studies have empirically contrasted these theories.

EMPIRICAL STUDIES ON SOCIAL RELATIONSHIPS IN LATER LIFE

Experimental and Cross-sectional Studies

SST has been traditionally tested by experimental studies, cross-sectional studies, or two-time point longitudinal studies. Most of studies that tested SST focused on memory in later life (Charles et al., 2003; Fung & Carstensen, 2003; Mather et al., 2004; Mather & Carstensen, 2005; Pasupathi & Carstensen, 2003; Samanez-Larkin et al., 2009) and affect (Mather & Carstensen, 2003). Only a handful studies have examined social support in later life.

The cross-sectional designs have been often utilized to test differences in individuals' ways of connecting with others or preference of social partners by age groups. Most of these studies reported a significant association between older age and lower levels of quantitative social support. The individuals in the oldest age groups

are overrepresented in the types of network in which people rely on support from only friends or people who are socially isolated (DuPertuis, Aldwin, & Bossé, 2001; Fiori, Antonucci, & Akiyama, 2008; Fiori, Smith, & Antonucci, 2007; Litwin, 2011). The studies on the preference of social partners reported that older age was associated with the preference of intimate partners with whom they were emotionally associated (Carstensen et al., 2003; Fung et al., 2001; Fung, Carstensen, & Lutz, 1999; Lang & Carstensen, 2002). Older age was associated with better emotion regulation skills in marital relationships (Schmitt, Kliegel, & Shapiro, 2007) and in other social relationships as well (Kliegel, Jager, & Phillips, 2007). A recent study found that older adults' prospective memory performance became significantly better if the information contained the social importance (Altgassen, Kliegel, Brandimonte, & Filippello, 2010). The findings of this study illustrated that motivated memory encoding process select the information necessary to enhance the quality of social relationships to be stored as memory. Thus, experimental and cross-sectional studies provided the evidence for emotional salience in memory encoding processes, change in the preference of social partners with age, and an association between emotional salience and the change in older adults' preference of social partners.

Nevertheless, these studies compared the mean differences in the psychosocial outcomes by age groups. The aforementioned studies did not examine how psychosocial outcomes changed over time. Thus, in the experimental and cross-sectional studies, the effect of time on individuals' social relations was confounded with the effect of their cohort in these cross-sectional studies (Alwin, Hofer, & McCammon, 2006; Hofer & Sliwinski, 2001; Hofer, Sliwinski, & Flaherty, 2002). A

lack of investigation on the intraindividual change over time is a critical limitation of these studies. Another limitation of these studies is a lack of examination of the psychosocial factors that may covary with age and, thus, influence the quantitative and qualitative social support.

Longitudinal Studies

Although they did not directly test SST, there are a few longitudinal studies that examined interindividual differences in the pattern of change in social relations. The results of two panel studies following-up the same individuals over 10 years found a decrease in the size of social networks but stability in family relations over time (Cornwell, Laumann, & Schumm, 2008; Shaw, Krause, Liang, & Bennett, 2007). Shaw and his colleagues reported that the size of social networks, frequency of social contact with friends, and the provided social support decreased over time, while the perceived emotional support stayed stable and tangible support increased with age. The results of this study are consistent with SST in finding a linear decrease in the quantitative social support and a stability of qualitative social support. However, their study had an attrition rate of over 80% at the time of the second data collection. Over a 10-year study, the number of the participants, which was over 1,300 at the baseline study, had decreased to around 200. The results presented in this study relied on multiple imputations for missing data, particularly with social support. Although multiple imputation treatment is a powerful method for missing values, including the variables with too many missing values may increase the uncertainty of the imputation and greatly reduce the degrees of freedom (Acock, 2010). Therefore, the high attrition rate compromises the accuracy of the estimations. Another issue is in the prescription

of random effects. Shaw and his colleagues (Shaw et al., 2007) also found significant random effects in change in social support. However, these were only partially explained by gender and education, suggesting that there may be some other psychosocial factors that explain individual differences.

The other longitudinal study (Cornwell et al., 2008) reported that the trajectory of network size and frequency of social contact with network members were different from Shaw and his colleague's study (2007). These researchers found that age was inversely related with the network size. However, the frequency of contact with network members had a U-shaped trajectory, with minimum contact observed at age 70 and increasing thereafter, which is not consistent with the linear decrease of social contact by Shaw et al. One possible explanation of this inconsistent finding between two studies may be in the measurement differences. Cornwell and his colleagues assessed the frequency of social contact with people with whom they could discuss important issues, while Shaw and his colleagues asked the frequency of contact with family and friends. The measurement of frequency of social contact used by the first group of researchers was confounded with the concept of qualitative social support due to its referral of the specific types of people whom they could confide themselves.

A two-point longitudinal study conducted by Lang (2000) was one of few longitudinal studies that directly aimed at testing the utility of SST in light of the theory's argument for a decrease in quantitative social support and an increase in quality of social relations. The study found that older adults' network size had shrunk over four years, due to a decrease of peripheral people in older adults' network. Approximately 82% of network members stayed in the network after four years,

mainly people with whom older adults felt close. These findings are consistent with SST. However, three issues were not examined. First, a change observed in the two-time longitudinal study cannot be interpreted as a developmental change (Hofer & Sliwinski, 2001). The direction of change in outcome variables may move in un-hypothesized direction at the third repeated measure. In order to provide the evidence that a change from time 1 to time 2 is a continuous direction to time 3, at least a three-point repeated measure is necessary (Alwin et al., 2006; Hofer & Sliwinski, 2001). Second, the concepts of quantitative and qualitative social relations are confounded in the concept of social network in this study. This study assessed the network size based on the measure of social support convoy model, which defined network members as people for whom an individual feels attachment (Kahn & Antonucci, 1980). Because social support convoy is a model developed for the purpose of measuring the quality (i.e., emotional proximity to network members) and quantity (i.e., the number of network members) of a personal social network at the same time (Antonucci & Akiyama, 1987), quantitative and qualitative social support were not clearly distinguished from each other in this study. The construct of quantitative and qualitative social support must be explicitly distinguished in order to test the utility of SST.

In summary, there are some inconsistencies in the findings of the longitudinal studies on the change in the quantitative and qualitative social support in later life. Shaw et al. (2007) and Lang and Carstensen (2002) found a negative, linear trajectory, while Cornwell et al. (2008) found a positive quadratic trajectory of frequency of contact. These inconsistencies seem to be derived from differences in research design,

particularly in the definition of the quantitative and qualitative social contact. Shaw et al. assessed the frequency of contact literally, while Conwell's et al assessed confounded the frequency of contact with the frequency of discussion of important issues. Lang assessed the frequency of contact based on the social convoy model (Kahn & Antonucci, 1980). This construct of the quantitative social support is confounded with that of the quantity of social support in the latter two studies. In addition, the data in the study of Shaw and his colleagues had over 80% missing values and their analysis relied heavily on multiple imputations. Their study did not test the predicative utility of personal factors that were focused in the arguments between SST and DIT. Finally, although Lang's finding of a linear trajectory of frequency of social contact is consistent with that of Shaw et al., Lang's study relied on the data with two-time repeated measures. Therefore, the findings of Lang's study could not provide a compelling evidence to conclude that a lesser frequency of social contact in the second wave than the first wave denoted the direction of change in normative development. The factors that were related to development and that were not related to development are confounded in the findings of this study.

Possible Predictors of the Individual Differences

Health and functional status. Studies have utilized social support as a predictor of health outcomes, including self-reported health, morbidity, and mortality (for reviews see George et al., 2006; House, Landis, & Umberson, 1988). In their comprehensive literature review of conceptualization of social support, Cohen and Wills (1985) found that social support is conceptualized both as a direct predictor for health and well-being and as a factor that buffers the adverse effects of stressful life

events. More specifically, social support has a direct effect on individuals' higher self-esteem, sense of belongingness, and a clearer meaning in personal life, which emerges through others' expression of positive appraisal, respect, and companionship as well as buffering effect that moderates the stress reactions as the perceived availability of resources to manage the stress (Cohen & Wills, 1985; George, 2010; Krause, 2006).

One direct effect of social support is developing the personal meaning in life through interactions with social partners. Further provision of support to others in the network maintains self-esteem, and feelings of sense of personal control (Krause, 2004). The studies on the effect of social support in community-dwelling healthy older adults found that being committed to a meaningful social activity is positively associated with better mental health (Adams, Leibbrandt, & Moon, 2011; Lou, 2011). It also supports the hypothesis that social support is a resource for maintaining the personal meaning of life for older adults (Krause, 2006; Krause & Borawski, 1994). Although social activities, which accompanied by heavy responsibility, are inversely associated with poor mental health, emotionally meaningful social activities chosen by individuals are associated with better mental health (Krause, 2004). The perceived usefulness is inversely related with mortality among Japanese older adults (Okamoto & Tanaka, 2004). Conversely, loneliness is associated with passive death wishes (Ayalon & Shiovitz-Ezra, 2011). Further, perceived availability of social support is positively associated with older adults' morale to be committed in social relationships (Crohan & Antonucci, 1989) and provision of support to others is inversely associated with mortality (Brown, Nesse, Vinokur, & Smith, 2003; Brown et

al., 2009). Thus, the availability of social support has direct effects on older adults' morale and maintenance of their personal meaning in life, and self-esteem.

Social support for older adults may be particularly important in dealing with chronic stressors. In later life, older adults may face these chronic stressors more than younger people (Aldwin, Sutton, Chiara, & Spiro, 1991). Social support facilitates older adults' management of chronic pains and medical problems. For instance, instrumental support (Bosworth & Schaie, 1997) and companionship of family members and friends (Rosland, Choi, Heisler, & Piette, 2010; Rosland, Piette, Choi, & Heisler, 2011) facilitate older adults' medical service uses. Perceived frequency of family members' visits predicted better functional recovery from the surgeries (Mutran, Reitzes, Mossey, & Fernandez, 1995; Oxman & Hull, 1997). Older adults' perceived emotional support was associated with fewer depressive symptoms, particularly for those with poor functional health (Mutran et al., 1995; Oxman & Hull, 1997) and those who had lost their spouses (Ha, 2008; Ha & Ingersoll-Dayton, 2008, 2011). When problems are perceived as uncontrollable, individuals often felt more comfortable receiving emotional support than action-promoting support to solve the problems (Cutrona, Shaffer, Wesner, & Gardner, 2007; Cutrona & Suhr, 1992). Even though social support may not actually solve age-related chronic problems such as pain and chronic illnesses, it can provide emotional support for older adults to find their own personal meaning of life (Krause, 2004) and moderate the relations between the presence of chronic illnesses and older adults' life satisfaction (Blixen & Kippes, 1999; Newsom & Schulz, 1996).

Some researchers stress that received support is not always perceived helpful for older adults, if the support is not wanted by the support receivers (Newsom, Nishishiba, Morgan, & Rook, 2003). Depending on the context, perceived negative affect in close relationships could be associated with higher anxiety or anger of older adults (Ha & Ingersoll-Dayton, 2011). The sense of being helped is not significantly related with reduced levels of mortality (Brown et al., 2003), but it is associated with negative affect (Newsom & Schulz, 1998). Older adults often desire to avoid perceiving that they are being helped. Nursing home residents strive to maintain equity with the caregiving staff members by accepting daily life assistant services with deference even if they thought it was unnecessary (Beel-Bates, Ingersoll-Dayton, & Nelson, 2007). However, such negative affect is more likely to be evident in family relationships such as family relationships than in non-family relationships. After negative interaction, older adults are less likely to remain upset with family caregivers than with non-family ones (Newsom et al., 2003). While intergenerational ambivalence is associated with poorer mental health, this decrease after spousal loss as the widows or widowers and children grieve together (Ha, 2008; Ha & Ingersoll-Dayton, 2008; Ingersoll-Dayton et al., 2011). Thus, negative affect in family relationships is better managed in family relationships than in other types of social relationships.

Health and functional status in SST. In the framework of SST (Carstensen, 2006), perceived limitation on time left in the life is the primary predictor for the motivational shift from expansion of self to deriving the personal meaning in life. Chronological age of the individual is the proxy for the perceived limitation on time

left for the future. Carstensen, however, recognized the limitation of chronological age as the strong proxy for the predictor for motivational change in normative development. She stated that perceived health and functional status might explain the variance among older adults' socioemotional motivations.

Late life is associated with a wide range of health and functional problems, including the presence of multi-morbidity and disability (Stolwijk-Swiiste et al., 2010), higher geriatric symptoms (Steinman, Lund, Miao, Boscardin, & Kaboli, 2011), higher functional limitations (Hardy, McGurl, Studenski, & Degenholtz, 2010), and higher medical costs (Bosworth & Schaie, 1997). This line of research shows the association between age health and functional problems, and thus utility of age as the proxy for the perceived limitation on time left in their future. However, some studies found that self-reported health explained the variance of these bio-psychological outcomes among older adults after controlling for the effect of age. Higher levels of self-rated health predict higher life satisfaction over time (Mroczek & Spiro, 2003) and lower perceived health burden of multimorbidity (Perruccio, Katz, & Losina, 2012). Thus, the literature generally supports that SST's assumption of self-reported health and functional status as proxies, which covary with age, for the limitation on time left for their lives.

There is also the evidence of the predictive utility of self-reported health and functional limitations for the frequency of social contact and the perceived qualitative social support. Older adults' levels of instrumental activity of daily living (IADLs) are inversely associated with frequency of contact with non-family members (Aartsen, van Tilburg, Smits, & Knipscheer, 2004). Physical health impairment is associated

with fewer contacts with family members and friends and lower perceived support (Newsom, Knapp, & Schulz, 1996). In particular, hearing acuity (Dugan & Kivett, 1994; Hetu, Jones, & Getty, 1993; Weinstein & Ventry, 1982) and visual dimness (Branch, Horowitz, & Carr, 1989; Desai, Pratt, Lentzner, & Robinson, 2001) explain lower social contacts. Ability to drive is a critical factor for older adults' social relations. Being able to drive a car is positively associated with widowed older adults' social involvement (Utz, Reidy, Carr, Nesse, & Wortman, 2004) and driving cessation is associated with social activity limitations (Mezuk & Rebok, 2008). Thus, perceived health and functional status that covary with age can be factors that explain the variance in social support among individuals in the same age range.

Marital status. A recent longitudinal study of social support in later life found significant individual differences in the trajectory of the qualitative social support, which were partially explained by gender and education (Shaw et al., 2007). In their study, women had higher levels of perceived emotional, informational, and instrumental support. Having higher education predicted lower levels of instrumental support. The effect of race assessed by being White or Black was not significant on the perceived support. The study reported that the individual differences in the trajectory still remained significant even after controlling for age, gender, and education.

There are several possible explanations for the individual differences in quantitative social support that were explained only by gender and education in the aforementioned longitudinal study. First, the study on social support did not include other factors suggested by SST (Carstensen, 2006) and DIT (Labouvie-Vief, 2009).

SST hypothesizes the poor self-rated health and functional status may predict lower quantitative social support and higher qualitative social support, while DIT posits that lower cognitive resources and SES will predict lower quantitative and qualitative social support. Second, the literature suggests that marital status will be another critical demographic factor that explains the individual differences in quantitative and qualitative social support. In Dupertuis and her colleagues' (2001) study on social support and well-being among older men with the data from the Normative Aging Study, the young and married were more likely receive support from both families and friends. Generally, those who received support from both families and friends reported better self-reported health and fewer depressive symptoms. Single older adults were more likely to be in the age group of the oldest old and over represent the network typology of being supported only by friends or being socially isolated. Those who were socially isolated reported the poorest self-reported health and the highest depressive symptoms. Consistent results were also found by other studies of network typology among older adults (Bosworth & Schaie, 1997; Fiori et al., 2008; Fiori et al., 2007). The 20-year longitudinal study with the data on the Normative Aging Study also found that time-varying covariate of marital status and self-reported health predicted older men's life satisfaction (Mroczek & Spiro, 2003). This line of research showed that the positive association between being married with higher social support and better well-being among older adults. Thus, it is presumed that marital status will be an additional demographic variable that explains the random effects on the trajectory of quantitative and qualitative social support in later life.

SUMMARY OF THE LITERATURE REVIEW

SST is a domain specific life span theory of emotion, motivation, and social development in later life. SST postulates that the perceived limitation on time left in their future shifts individuals' motivation from expanding their abilities to deriving their personal meaning in life. By optimizing positive affect, older adults improve their emotion regulation skills and make emotion salient in their lives. This motivational change is well reflected in their preference of emotionally meaningful social partners over peripheral network members as social partners. Consequently, SST posits a decrease in quantitative social support and an increase or stability of qualitative social support in later life as a normative development.

In contrast, DIT is a neo-Piagetian theory of cognition, emotion, and sense of self in social relationships. DIT introduced two emotion regulation strategies: affect complexity and optimization of positive affect. The theory illustrated individuals' use of these two emotion regulation strategies in the psychological functioning to maintain psychological homeostasis. DIT contends that the use of affect complexity requires a certain level of cognitive resources. Therefore, DIT posits that the quantitative and qualitative social relationships in later life may have significant individual differences explained by the level of cognitive resources and SES that influences the cognitive resources.

Thus, there are three issues that have not been cleared in the utility of SST and DIT. First, both studies predict decreases in quantitative social support; the direction of change in qualitative social support is inconsistent. SST postulates that quantitative social support will increase due to increasing emotional salience in later life, while

DIT postulates that the qualitative social support decrease due to age-related declining in cognitive resources. Second, SST emphasizes the normative decline in quantitative social support promoted, while DIT emphasizes individual differences in the trajectories. Third, the predictors or covariates for individual differences in social support trajectories have rarely been tested. SST recognizes age as the primary proxy and self-reported health and functional status as the auxiliary predictors, which covary with age, for the change in social support. DIT stresses that the level of individuals' cognitive resources as the primary predictor for quantitative and qualitative social support and SES as the covariates with the level of cognitive resources. In addition, the literature denotes that marital status will also be an important explanatory factor for individual differences in the trajectory of social support (DuPertuis et al., 2001 for example). Despite these inconsistencies between SST and DIT, to an knowledge, no other studies have compared these two theories in the same study.

PRESENT STUDY

The purpose of this dissertation was to compare SST (Carstensen, 2006) with DIT (Labouvie-Vief, 2003) by examining trajectories of quantitative and qualitative social support in later life, as well as their predictors.

Hypotheses

Based on the proposals of SST and DIT theories, we have developed the following questions and hypotheses.

Question I: Is there an age-related change in social support?

Hypothesis 1a. According to SST and DIT, we hypothesized that the quantitative social support decreases over time.

Hypothesis 1b. According to SST, we hypothesized the qualitative social support would remain stable or increase slightly over time.

Hypothesis 1c. As DIT hypothesized that there will be an age-related emotion regulation decline, we hypothesized that there would be concomitant declining in qualitative social support.

Question II. Is there an age-related normative development, or are there significant individual differences in the trajectory of the quantitative social support and the qualitative social support?

Hypothesis 2: As DIT emphasized the significant individual differences in the initial levels and the rate of change in emotion regulation abilities, we hypothesized that there would be significant random effects of age on the trajectory of quantitative and qualitative social support.

Hypothesis 2b: According to DIT, we hypothesized that there would be significant random effect of age on the trajectory of qualitative social support.

Question III. Are there predictors of individual differences in the trajectories of quantitative social support and qualitative social support?

Hypothesis 3a: As SST posited that self-rated health and functional status will be the proxies for the perceived limitation on time left for their lives, we hypothesized that poor self-rated health and higher functional limitations would explain decrease in quantitative social support and increase in qualitative social support.

Hypothesis 3b: As DIT posited that those with memory problems and lower education will decrease in emotion regulation ability and presumably in social support,

we hypothesized that having memory problems and lower education would explain a decrease in quantitative and qualitative social support.

Hypothesis 3c: As Dupertuis et al. (2001) found an effect of marital status on social support, we hypothesized that being married would be associated with higher level of quantitative and qualitative social support.

CHAPTER 3: METHODS

DATA COLLECTION PROCEDURE

The Normative Aging Study (NAS) project was founded at the Boston Veterans Affairs (VA) Outpatient Clinic in 1961 to investigate the normative aging process of healthy men (Bossé, Ekerdt, & Silbert, 1984). Over 6,000 men were screened between 1961 and 1968 for good health and evidence of geographic stability, defined as having extensive kinship ties in the area (Aldwin, Spiro, Levenson, & Cupertino, 2001). Most participants were of European origin, which represented the Boston population in the late 1950s (Bossé, Ekerdt, & Davis, 1984). Every 3 to 5 years after enrollment into the NAS project, the participants completed the Cornell Medical Index (Aldwin et al.). The Social Support Survey of the NAS project was conducted in 1985, 1988, and 1991 (DuPertuis, Aldwin, & Bossé, 2001). In the year of 1985, 1,989 surveys were mailed to the NAS participants and 1,565 were returned, for a response rate of 82.5%.

PARTICIPANTS IN THE CURRENT STUDY

The participants of the current study were drawn from the data of the Social Support Survey of the Normative Aging Study (NAS; Bossé, Ekerdt, & Silbert, 1984) collected in 1985 (Time 1, $N = 1,565$), 1988 (Time 2, $N = 1,490$), and 1991 (Time 3, $N = 1,392$). Most of the NAS men responded at all three times ($n = 1,185$). An additional 316 men responded twice, and only 197 men responded once. Thus, a total of 1,698 men constituted the potential sample.

Mean age of the participants in 1985 was 60.56 ($SD = 8.01$, range 40 - 88).

Highest level of education in years was drawn from the baseline survey for the

Minnesota Multiphasic Personality Inventory Restandardization Study (MMPI-2) in the panel of the Normative Aging Study in 1986 ($N = 1,472$; Butcher, Aldwin, Levenson, Ben-Porath, Spiro, & Bossé, 1991). Participants who were in the MMPI-2 and did not participate in the NAS during the target years were removed from the sample. Additionally, 631 participants were missing data on the predictor variables and covariates (i.e., age, marital status, number of years in school, memory problem, self-reported physical health, and functional status). These participants were also removed, for a final sample size of 1,067. Finally, one participant who did not answer the question regarding the level of reliance in any of three years was removed, therefore, the final sample size for the model of the qualitative social support was $N = 1,066$.

The demographic data show that most participants of the current study were in the transition from late midlife to later life. The mean age of the participants at the baseline was 60.83 years old ($SD = 8.08$, range = 40 - 88). Approximately 96% of the participants were from European origin. Over 50% of the participants were full-time workers and approximately 14% of the participants were part-time. Approximately 34% had completely retired at the time of the MMPI survey in 1986. Most participants were married and reported good health status, while a relatively higher percentage of the participants reported memory problems. The demographic characteristics of the participants are presented in Table 3.1 (see page 47).

ANALYSIS OF ATTRITION

In the aforementioned process of sample development, 631 of participants did not answer all questions of the variables used as the covariates in the current study.

The difference in quantitative social contact between the sample participants and those who were removed from the analysis was not significant, $t(1561) = -1.37, p = .17$ in 1985; $t(1482) = -0.69, p = .17$ in 1988; $t(1317) = 1.37, p = .17$ in 1991. Similarly, the difference in quantitative social support between the sample participants and those who were removed was not significant, $t(1536) = 0.80, p = .42$ in 1985; $t(1462) = 0.43, p = .66$ in 1988; and $t(1301) = -0.08, p = .94$ in 1991. The difference in mean age between the participants and those who were removed from the analysis was not significant, $t(1488) = -1.71, p = .09$. Therefore, we concluded that we could continue the analysis with the rest of the participants who had no missing values in all four covariates.

It is worth mentioning that the difference in marital status, education, self-reported physical health, and functional status between the sample and those who were removed from the analysis were significant. Those who were removed from the analysis due were more likely to be married, $\chi^2(1) = 10.69, p < .001$, had less education, $\chi(15) = 28.71, p < .05$, report more functional problems, $\chi^2(1) = 11.95, p < 0.01$, and poorer self-reported health, $t(1,536) = -2.37, p < .02$, than those who were in this sample. The difference in memory problems was not significant, $\chi^2(1) = .24, p = .63$. Thus, the respondents in this study were more likely to be married, in poorer health, tended to be older, and have less education, but there were no differences in qualitative and quantitative support between those removed from the sample and those who remained.

MEASURES

Quantitative Social Support

Quantitative social support was assessed by the frequency of social contact with family members and close friends. Participants were asked to respond to the question of “How often do you see or speak with at least one of the relatives listed below or close friends?” by seven-point Likert-type scale (0 = "Never" to 6 = "Nearly every day"). The relatives listed at Time 1 survey were mother, father, children, grandchildren, brothers, sisters, aunts, uncles, nieces, nephews, first cousins, second cousins, and close friends. At Time 2 and Time 3 survey, the list of relatives was reduced to parents, children, grandchildren, siblings, and other relatives. Therefore, in order to make the measurement of Time1 equivalent with those of Time 2 and Time3, the categories of Time 1 were collapsed. To create the frequency of contact with parents at Time 1, we examined the separate items for mother and father, and selected whichever item had the highest score. A similar procedure was used to create a sibling category for the brother and sister items. For the score of the frequency of contact with other relatives, the highest score was selected among the scores of aunts, uncles, nieces, nephews, first cousins, and second cousins.

Because more than 20% of participants indicated frequency of contact with one or more relatives listed in the survey but did not mark the rest of the questions regarding other relatives, we hypothesized that these participants had marked only the relatives with whom they had social contacts and left the answer column blank for the relatives with whom they had no contacts. Therefore, the missing values were recoded into zero for the answer of the frequency of contact with the relatives that they had not marked, if respondents answered at least one question. Then, the sum of the score of the frequency of contact with the family members (i.e., parents, children,

grandchildren, and other relatives) and friends at each time point was used to assess the quantitative social support. Scores ranged from 0 to 6, with higher scores indicating more frequent contact with different groups of people.

Qualitative Social Support

The qualitative social support was assessed by the sum of the score of two items. The respondents were asked to respond to two questions, “To what extent can you rely on family members for help in a crisis?” and “To what extent can you rely on close friends for help in a crisis?” Both used a five-point Likert-type scale (1 = "Not at all" to 5 = "Completely"). The sum of the score of these two items was utilized as the level of qualitative social support.

Covariates

We examined predictors for the change in quantitative and qualitative social support. The descriptive statistics of the factors tested as the predictors are presented in Table 3.1.

Marital status. Marital status was initially determined by five categories: never married, married, separated, divorced, and widowed. The items were dichotomized into Not Married = 0 and Married = 1. Approximately 85.5% of the participants were married in 1985.

Education. Participants were asked their highest level of education in a demographic survey in the 1986 mailing which also included the revised Minnesota Multiphasic Personality Inventory (MMPI-2).

Memory problems. Memory problems were assessed by the item of memory deterioration in the Elders Life Stress Inventory (Aldwin, 1990) administered to the

participants in 1985. The respondents were asked, “During the past year have you experienced deterioration of memory?” and answered by the dichotomous scale (1 = "Yes" or 0 = "No"). Approximately 42% of the participants reported that they had memory problems. Although this scale was not developed to assess the memory, this scale is only proxy for memory available in this dataset. Measuring one construct by only one item might not be desirable in terms of the reliability and validity of the measurement (Duncan, Duncan, & Strycker, 2006). However, Mroczek & Spiro (2003) also assessed older adults memory problems by this one item in their longitudinal study of older adults’ personality change, and thus we will follow their precedent.

Self-reported physical health. Self-reported physical health was assessed in 1985 by one item asking, “How would you rate your health at the present time?” The respondents were asked to answer this question by using a five-point Likert type scale (1 = "Very Poor" to 5 = "Excellent"). Higher scores represent better self-reported physical health. Most participants were in good health ($M = 4.15$, $SD = 0.07$).

Functional status. Functional status was assessed by the sum of three items, including “Are you able to do heavy work around the house, like washing windows or floors without help?”, “Are you able to walk up and down a flight of stairs without help?,” and “Are you able to walk a half mile (about eight ordinary blocks) without help?.” The respondents were asked to answer these questions with either "Yes" or "No". A higher score represents more functional problems. Only 6.37% of the participants indicated that they had functional problems.

ANALYTIC STRATEGY

Individual growth modeling was employed (Raudenbush & Bryk, 1986) to investigate intraindividual and interindividual changes in quantitative and qualitative social support through the use of Stata 11 (StataCorp, 2009). Individual growth modeling hypothesizes that occasion is nested in individuals and estimates individual-level trajectories as well as sample-level overall trajectories (Hox, 2010).

As described above, participants with missing values on the explanatory variables (i.e., age, self-rated health, functional problems, memory problems, education, marital status) were removed from the sample (Hox, 2010). Missing values in outcome variables were treated by the maximum likelihood estimation (MLE; Hox, 2010). MLE estimates are usually robust against non-normal distributions (Hox, 2010) and data with unbalanced numbers of observations in cells (Rabe-Hesketh & Skrondal, 2005).

Within Person Analyses

Each participant's quantitative or qualitative social support was modeled as a function of age centered to the youngest participants' age (i.e., 40 years old). The equations of the unconditional growth model with random intercept and slope (Raudenbush & Bryk, 1986) are below.

$$\text{Quantitative Social Support}_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \beta_{2j}X_{ij}^2 + \zeta_{1j} + \zeta_{2j}X_{ji} + \varepsilon_{ji} \dots \dots \dots (1)$$

$$\text{Qualitative Social Support}_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \zeta_{1j} + \zeta_{2j}X_{ji} + \varepsilon_{ji} \dots \dots \dots (2)$$

The intercept of the person i is indicated by β_{0i} and β_1 indicates the slope of person i , when the person is in the age at the time of measurement j . Therefore, age₁, age₂, and age₃ indicate person i when the age of the person i in 1985, 1988, and 1991,

respectively. In Equation (1), the β_{2i} indicates the quadratic slope of the trajectory of social support on the person i , when he was in the age j . The random effects are tested with ζ_{1j} and $\zeta_{2j}X_{ji}$. The residual is indicated by e_{ij} , when person i is in age j . The trajectory with quadratic term was tested for the model of the quantitative social support in Equation (1), because the univariate analysis of quantitative social support (see Table 3.2, page 48) suggested the possible presence of an inverted U-shaped trajectory. Based on the findings of relative stability in the mean of qualitative social support by each age in the univariate analysis (see Table 3.2), only a linear term was tested for the model of the qualitative social support in Equation (2).

The outcome of quantitative social support was measured as the frequency of contact with family and friends for person i at age j . Age was centered to the youngest participant's age across all measurement occasions for two reasons. One reason was to reduce the correlation between intercept and slope to avoid inflation of variance in the outcome. The other reason was to make the score of the intercept more interpretable (Hox, 2010). Centering age meant that the intercept, β_{0i} , predicts the frequency of social contact at age 40.

The conditional models (i.e., models with the covariates included) are represented by Equations (3) and (4) below:

$$\begin{aligned} \text{Quantitative Social Support}_{ij} = & \beta_{0j} + \beta_{1j}X_{ij} + \beta_{2j}X_{ij}^2 + \beta_3Z_{1i} + \beta_4Z_{2i} + \beta_5Z_{3i} + \beta_6Z_{4i} \\ & + \beta_7Z_{5i} + \zeta_{1j} + \zeta_{2j}X_{ji} + \varepsilon_{ji} \dots \dots \dots \end{aligned} \quad (3)$$

$$\begin{aligned} \text{Qualitative Social Support}_{ij} = & \beta_{0j} + \beta_{1j}X_{ij} + \beta_2Z_{1i} + \beta_3Z_{2i} + \beta_4Z_{3i} + \beta_5Z_{4i} + \beta_6Z_{5i} + \\ & \zeta_{1j} + \zeta_{2j}X_{ji} + \varepsilon_{ji} \dots \dots \dots \end{aligned} \quad (4)$$

As with the unconditional models, the intercept of the person i is indicated by β_{0i} and β_{1j} indicates the slope of person i , when the person is in the age at the time of measurement j . Again, in Equation (3), the β_{2i} indicates the quadratic slope of the trajectory of social support on the person i , when he was in the age j ; this term was not tested in the qualitative social support model (Equation 4). The covariates of self-reported health, ADLs, memory problems, education, and marital status are represented by β_3Z_1 to β_7Z_5 for the quantitative model, and β_2Z_1 to β_6Z_5 in the qualitative model. Again, the random intercept and slope of age were tested with ζ_{1j} and $\zeta_{2j}X_{ji}$, respectively. The residual is indicated by e_{ij} , when person i is in age j .

These growth models estimate the parameters that depict both the overall trajectory for the sample (fixed effects) and within-person trajectories (random effects). Random effects are deviations of individuals' trajectories from the overall sample-level trajectory. If the variances of these random effects were significant, this would indicate that people's growth trajectories are different in the level and slope. Therefore, significant random effects denoted the individual differences in intraindividual change over age.

Table 3.1

Participants' Characteristics (N = 1,067)

Variables	%	<i>M</i>	<i>SD</i>	<i>Range</i>
Age in 1985		60.83	8.08	40-88
Marital status				
Married	88.47			
Single	3.28			
Separated	1.59			
Divorced	3.66			
Widowed	3.00			
Years in school		14.17	2.75	8-20
Self-reported physical health		4.17	0.07	1 - 5
Memory problem				
Yes	41.99			
No	58.01			
Functional problems				
Yes	6.37			
No	93.63			

Note: For Self-Reported Health, 1=low and 5=high.

Table 3.2
Univariate Analyses of Quantitative and Qualitative Social Support by Age Group
 Quantitative Social Support Qualitative Social Support

Quantitative Social Support				Qualitative Social Support			
Age group	<i>n</i>	<i>M</i>	<i>SD</i>	Age group	<i>n</i>	<i>M</i>	<i>SD</i>
40-42	6	18.50	3.02	40-42	0	N/A	N/A
43-45	18	19.00	4.47	43-45	18	7.33	1.88
46-48	50	17.28	5.07	46-48	50	6.90	2.01
49-51	120	17.25	6.10	49-51	119	7.37	1.81
52-54	238	17.39	5.89	52-54	237	7.48	1.81
55-57	311	17.30	5.88	55-57	310	7.45	1.77
58-60	394	17.57	5.98	58-60	389	7.44	1.75
61-63	422	17.47	6.08	61-63	415	7.52	1.71
64-66	433	17.13	6.16	64-66	431	7.48	1.77
67-69	359	16.38	6.12	67-69	349	7.47	1.81
70-72	271	15.82	5.67	70-72	267	7.28	1.85
73-75	188	14.90	5.77	73-75	186	7.33	1.69
76-78	121	13.52	5.87	76-78	120	6.91	1.92
79-81	68	12.16	6.28	79-81	67	7.46	1.80
82-84	30	12.07	5.95	82-84	31	7.68	2.01
85-87	19	11.89	5.45	85-87	19	7.74	2.10
88-90	9	12.33	4.97	88-90	9	7.56	1.81
91-93	5	12.00	3.39	91-93	5	8.80	1.30

Note: The total sample number is $1,067 \times 3 = 3,203$ for quantitative social support and $1,066 \times 3 = 3,198$ for qualitative social support, because each participant contributed the information in 1985, 1988, and 1991. The number of each age group differs for qualitative social support because of missing values. The range for quantitative social support is 0 to 36 and the range for qualitative social support is 0-10.

CHAPTER 4: RESULTS

In this chapter, we first present descriptive statistics social support measures at each occasion, then bivariate relationships among age, covariates, and social support. Finally, we present the results of growth models of quantitative and qualitative social support. We will first present unconditional growth models for both types of support, and then present conditional models that include covariates in the model. This section will be organized in order of the hypotheses.

DESCRIPTIVE STATISTICS

First, we examined the raw data to ascertain change and stability over time. The distribution of the quantitative and qualitative social support by the time of measurement is presented in Table 3.1 (see page 47). Originally, the data were organized by the time of measurement (e.g., 1985, 1988, and 1991). Because we computed the estimated quantitative and qualitative social support as the function of age in this study, we reorganized the data by age group. As the data were collected in three year intervals, we presented the raw data in 3 year age groups. The age groups ranged from 40-42 to 91-93.

As can be seen in Table 3.2 (page 48), the bulk of the NAS men ranged in age from 50 to 78 at baseline, with relatively few individuals in the earlier or later age groups. Additionally, there appears to be a non-linear trend with a peak (17.57) at 59 – 61 years in quantitative social support. Therefore, we included a non-linear (quadratic) term in our analyses.

A similar procedure was conducted for qualitative social support, presented in the second set of columns in Table 4.1 (see p. 57). As indicated on the table, the range

of social support was much narrower, because the scale was smaller. Nonetheless, it appears that qualitative social support was more stable over time, ranging from 6.90 – 7.74.

Correlations among Age, Social Support, and Covariates

The zero-order correlations were computed among quantity and quality of social support at Time 1, Time 2, and Time 3, as well as the possible predictors of individual differences (Table 4.1; page 57). There appears stability over time within measures for both quantitative and qualitative social support. All at three points in time, measures of quantitative social support were significantly correlated with one another, and as were the qualitative social support measures. The correlation coefficients among the three points in time were over .5 (.54 - .65) in both quantitative and qualitative social support.

The intercorrelations between quantitative and qualitative social support were generally modest but significant, with the within-time correlations ranging from .22 to .62. The across-time coefficients were of similar magnitude.

Table 4.1 also presents the covariate correlations. Age was inversely correlated with quantitative social support at Time 1, Time 2, and Time 3, but was unrelated to qualitative support. It was also related to having problems with memory and ADLs. Being married was associated with higher levels of quantitative social support, but unrelated to qualitative support. Education was only weakly correlated with quantitative social support.

The association between health and social support was more complex and not always in the predicted direction. Memory problems were unrelated to quantitative

support, but weakly and inversely related to qualitative support. In contrast, self-reported health was unrelated to quantitative support, but weakly and positively related to qualitative. Functional health, assessed in terms of ADLs, on the other hand, was unrelated to any support measure. Clearly the relationship between social support and health is more complicated than predicted by either of the theories.

AGE-RELATED CHANGE AND STABILITY IN QUANTITATIVE AND QUALITATIVE SOCIAL SUPPORT

The first set of hypotheses examined whether there are age-related changes in the quantitative social support. In Hypothesis 1a, we predicted that the frequency of contact would decrease over time. Table 4.2 (page 58) presents the estimates of the fixed effects of the intercept and slope of the trajectory of quantitative social support. The coefficient for age was significant, $B = 0.14$, $SE = .06$, $p < .01$; however, quadratic term was also significant, $B = -0.01$, $SE = .00$, $p < .01$.

Figure 4.1 (page 62) shows the raw data for the first 250 observations of quantitative social support. As can be seen, there is a slope with an accelerated decline. We then plotted out the predicted slope of the unconditional model (see Figure 4.2; page 63). As can be seen, there was a slight increase in frequency of contact with social network members up until approximately age 60, and then a slight decrease thereafter.

We confirmed this using the terms of the fixed effects in the expression of the unconditional model of quantitative social support, following equations (5) and (6) below. Age (centered at 40) is expressed as X and the estimated frequency of social

contact is expressed as \hat{Y} in the following equation (Cohen, Cohen, West, & Aiken, 2003, p. 206).

$$\hat{Y} = \beta_{12}X + \beta_{21}X^2 + B_0 \quad (5)$$

$$X_m = -B_{12}/2B_{21} \quad (6)$$

By solving Equation (6), the value of the \hat{Y} reaches its maximum when $X = 14$.

Because we centered age to 40, the chronological age when the estimated trajectory of frequency of social contact reaches its maximum value is 54. Therefore, the estimated trajectory of quantitative social support is a slope with an accelerated decline with the peak at age 54, when the random effect and residuals are controlled.

For qualitative support, SST and DIT had opposite predictions. According to SST, qualitative social support should be stable or increase slightly with age (Hypothesis 1b). In contrast, DIT would predict that qualitative social support declines with age (Hypothesis 1c). As can be seen in Table 4.3 (page 59), the coefficient for the effect of age was not significant. (Note that the raw data presented in Table 3.2 on page 38 was zero and flat, and preliminary analyses confirmed that the quadratic term was not significant, so this term was excluded from the model.)

The raw slopes are presented in Figure 4.3 (page 64). As can be seen, most of the lines are in the center of the figure. The predicted slope of the unconditional model is presented in Figure 4.4 (page 65), which confirms that qualitative social support is stable across age, supporting SST.

INDIVIDUAL DIFFERENCES IN QUANTITY AND QUALITY OF SOCIAL SUPPORT

The second set of hypotheses examined individual differences in slope trajectories. DIT suggests the presence of individual differences not only in the initial levels but also the rate of change in quantitative social support over time (i.e., random effects). As Table 4.4 shows (see p. 60), the random effects of age on the intercept of quantitative social support were significant, $\sigma^2 = 4.55$, $SE = .12$. Hypothesis 2a was supported in that there were individual differences not only in the intercept, but also in the slope, albeit modest effects.

Based on DIT, we hypothesized significant random effects for the intercept and slope of the qualitative social support (Hypothesis 2b). As Table 4.5 (page 61) shows, the random effects of age on the intercept for qualitative social support was significant, $\sigma^2 = 1.57$, $SE = .14$. The random effects of age on the slopes of qualitative social support was also significant, $\sigma^2 = 0.04$, $SE = .02$. Thus, there were significant variance in the intercept and slope of qualitative social support, supporting Hypothesis 2b.

Predictors of Individual Differences

The final set of hypotheses examined predictors of individual differences in both the intercept and slope for quantitative (Table 4.4, page 60) and qualitative support (Table 4.5, page 61). As SST posits that self-rated health and functional status are proxies for the perceived limitation on time left to live, we hypothesized that self-rated health would be positively associated with the size of social networks, but inversely associated with reliance. In contrast, functional limitations would decrease

in quantitative social support and increase in qualitative social support (Hypothesis 3a). The results suggested a more complex relationship. As seen in Table 4.4 (page 60), there was a trend for self-reported health to positively predict quantitative support, $B = 0.41$, $SE = .22$, $p = .07$, suggesting that healthier older adults were able to maintain higher levels of social contact, controlling for age and other covariates. Contrary to our hypotheses, self-reported health was related to higher levels of qualitative support (see Table 4.5, page 61), $B = 0.26$, $SE = .07$, $p < .001$. Thus, healthier older adults were able to maintain frequency of social contacts, but they also were more able to rely on them.

Similar complexities were seen for functional health. Contrary to our hypotheses, ADLs were also positively but marginally associated with quantitative support, $B = 1.26$, $SE = .66$, $p = .06$, but unrelated to quality of support. Thus, having functional limitations did not interfere with the frequency of social contact, and did not increase reliance.

DIT posits that those with memory problems and lower education will experience declining emotion regulation ability and presumably in social support. Therefore, we hypothesized that having memory problems would be inversely associated with quantitative and qualitative support, while education would be positively associated quantitative and quantitative social support (Hypothesis 3b). Again, a complex picture emerged. For quantitative support, the effect of having memory problems was not significant. However, having memory problems predicted qualitative social support, $B = 0.25$, $SE = .07$, $p < .001$. Thus, memory problems

apparently did not affect frequency of contact but indicated some withdrawal on relying on friends and family.

Our hypotheses concerning education were not supported. Contrary to expectations, it was negatively associated with quantitative social support, $B = -0.25$, $SE = .06$, $p < .001$, and not significantly associated with qualitative social support. Thus, those with higher education had less frequent contact with their social network and relied as much on their network as those with lower education.

Finally, we examined the effect of marital status on both quantitative and qualitative support (Hypothesis 3b). Given Dupertuis et al.'s (2001) findings in the same sample (but over a shorter period of time), we hypothesized that being married would be associated with higher level of quantitative and qualitative social support. Married men were more likely to have quantitative social support with family and close friends than single men, $B = 1.68$, $SE = .49$, $p < .01$. Contrary to our hypothesis, marital status was not significantly associated with qualitative social support. Thus, married men had higher frequency of social contact, but were not more likely to rely on family and friends than the unmarried.

SUMMARY

We compared Socioemotional Selectivity Theory (SST; Carstensen, 2006) and Dynamic Integration Theory (DIT; Labouvie-Vief, 2003), using trajectories of quantitative and qualitative social support in later life. We employed individual growth model (Raudenbush & Bryk, 1986) and analyzed the trajectory of quantitative and qualitative social support with the data of over 1,000 participants from the Social Survey project (data collected in 1985, 1988, and 1991) of the Normative Aging Study

(NAS; Bossé, Ekerdt, & Silbert, 1984). Within subject analysis supported SST in its hypothesis of a decrease in quantitative social support and stability of qualitative social support. The findings also supported DIT in its hypothesis on the presence of significant individual differences. The findings of the between subject analysis was complex. All factors selected as the predictors of the models based on the two theories predicted individual differences in the trajectory of either quantitative or qualitative social support. However, the direction of the association between predictors and social support were not always consistent with the hypotheses of SST and DIT. In the next chapter, we interpreted these findings.

Table 4.1
Correlations among Social Support, Age, and Covariates (N=1,067)

	QNT85	QNT88	QNT91	QLT85	QLT88	QLT91	Age	SRH	ADL	MEM	EDU	MS
QNT 85												
QNT 88	0.63***											
QNT 91	0.59***	0.65***										
QLT85	0.25***	0.20***	0.21**									
QLT88	0.21***	0.24***	0.24***	0.54***								
QLT91	0.24***	0.20***	0.24***	0.56***	0.60***							
Age	-0.19***	-0.21***	-0.19***	-0.02	-0.01	-0.04						
SRH	0.03	0.04	0.05	0.11***	0.10***	0.10**	-0.09**					
ADL	0.06*	0.01	-0.00	-0.03	-0.03	-0.00	0.07*	-0.28***				
MEM	-0.06	0.01	-0.05	-0.08**	-0.03	-0.11**	0.14***	-0.14***	0.05			
EDU	-0.15***	-0.10**	-0.11***	-0.03	-0.01	-0.01	-0.02	0.11***	-0.02	0.02		
MS	0.06*	0.11**	0.12***	0.04	0.01	0.04	0.02	0.01	-0.01	-0.00	-0.03	
Mean	16.64	16.74	16.37	7.30	7.52	7.44	60.83	4.18	0.06	0.42	14.17	0.88
Standard Deviation	5.90	6.29	6.09	1.84	1.77	1.75	8.08	.74	0.24	0.49	2.75	0.32

Note: QNT = quantitative social support, QLT = qualitative social support, SRH = Self-reported health, ADL = Activity of Daily Living, MEM = Memory Problems, EDU = Education, MS = Marital Status.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4.2

Maximum Likelihood Estimates for the Unconditional Model of Quantitative Social Support (N = 1,067)

	<i>Est</i>	<i>SE</i>	<i>p</i>	<i>95% CI</i>	
Fixed Effect					
Intercept	16.65	0.78	0.00	15.13	18.17
Age	0.14	0.06	0.03	0.01	0.26
Age ²	-0.01	0.00	0.00	-0.01	0.00
Random Effect					
Variance (Intercept)	4.65	0.12		4.41	4.90
Variance (Slope)	0.00	0.00		0.00	0.00
Residual Variance	3.72	0.06		3.61	3.84

Intraclass Correlation Coefficient = 0.61

Deviance (-2 Loglikelihood) = 18545.02

Akaike Information Criterion (*df*) = 18555.02 (5)

Bayesian Information Criterion (*df*) = 18585.15 (5)

Likelihood ratio vs Linear $\chi^2(df) = 1068.37(1), p < 0.001$

Note. Correlation between intercept and slope were omitted from the model.

Table 4.3

Maximum Likelihood Estimates for the Unconditional Model of Qualitative Social Support (N = 1,066)

	<i>Est</i>	<i>SE</i>	<i>p</i>	<i>95% CI</i>	
Fixed Effect					
Intercept	7.36	0.13	0.00	7.11	7.61
Age	0.00	0.01	0.62	-0.01	0.01
Random Effect					
Intercept	1.57	0.20		1.22	2.01
Slope	0.04	0.01		0.02	0.08
Intercept and Slope Correlation	-0.53	0.19		-0.80	-0.08
Residual Variance	1.17	0.02		1.13	1.21
Intraclass Correlation Coefficient = 0.64					
Deviance (-2 Loglikelihood) = 11225.09					
Akaike Information Criterion (<i>df</i>) = 11237.09 (6)					
Bayesian Information Criterion (<i>df</i>) = 11273.18 (6)					
Likelihood Ratio Test vs Linear Regression $\chi^2(df) = 891.00(3), p < 0.001$					

Table 4.4
Maximum Likelihood Estimates for the Conditional Model of Quantitative Social Support (N = 1,067)

	<i>Est</i>	<i>SE</i>	<i>p</i>	<i>95% CI</i>	
Fixed Effect					
Intercept	17.23	1.52	0.00	14.25	20.20
Age	0.11	0.07	0.08	-0.01	0.24
Age ²	-0.01	0.00	0.00	-0.01	0.00
Education	-0.25	0.06	0.00	-0.36	-0.14
Marital Status	1.68	0.49	0.00	0.73	2.63
Memory Problems	0.00	0.32	1.00	-0.63	0.63
Self-Reported Health	0.41	0.22	0.07	-0.03	0.85
Activity of Daily Living	1.26	0.66	0.06	-0.04	2.56
Random Effect					
Variance (Intercept)	4.55	0.12		4.32	4.80
Residual Variance	3.72	0.06		3.61	3.84

Deviance (-2 Loglikelihood) = 18509.03

Akaike Information Criterion (*df*) = 18529.03 (10)

Bayesian Information Criterion (*df*) = 18589.30 (10)

Likelihood ratio vs Linear $\chi^2(df) = 1024.94 (2), p < 0.001$

Note. Correlation between intercept and slope were omitted from the model.

Table 4.5

Maximum Likelihood Estimates for the Conditional Model of Qualitative Social Support (N = 1,066)

	<i>Est</i>	<i>SE</i>	<i>p</i>	<i>95% CI</i>	
Fixed Effect					
Intercept	6.36	0.40	0.00	5.57	7.15
Age	0.01	0.01	0.25	-0.01	0.02
Education	-0.01	0.02	0.43	-0.05	0.02
Marital Status	0.14	0.14	0.32	-0.14	0.43
Memory Problems	-0.23	0.10	0.01	-0.42	-0.05
Self-Reported Health	0.26	0.07	0.00	0.13	0.39
Activity of Daily Living	0.03	0.20	0.88	-0.36	0.42
Random Effect					
Variance (Intercept)	1.57	0.20		1.23	2.01
Variance (Slope)	0.04	0.20		0.02	0.08
Intercept and Slope Correlation	-.56	0.02		-0.81	-0.14
Residual Variance	1.17	0.02		1.14	1.21
Deviance (-2 Loglikelihood) = 11200.66					
Akaike Information Criterion (<i>df</i>) = 11218.66 (9)					
Bayesian Information Criterion (<i>df</i>) = 11272.80 (9)					
Likelihood Ratio Test vs Linear Regression $\chi^2(df) = 868.65(2), p < 0.001$					

Figure 4.1.

The First 250 Cases of the Trajectories of Quantitative Social Support

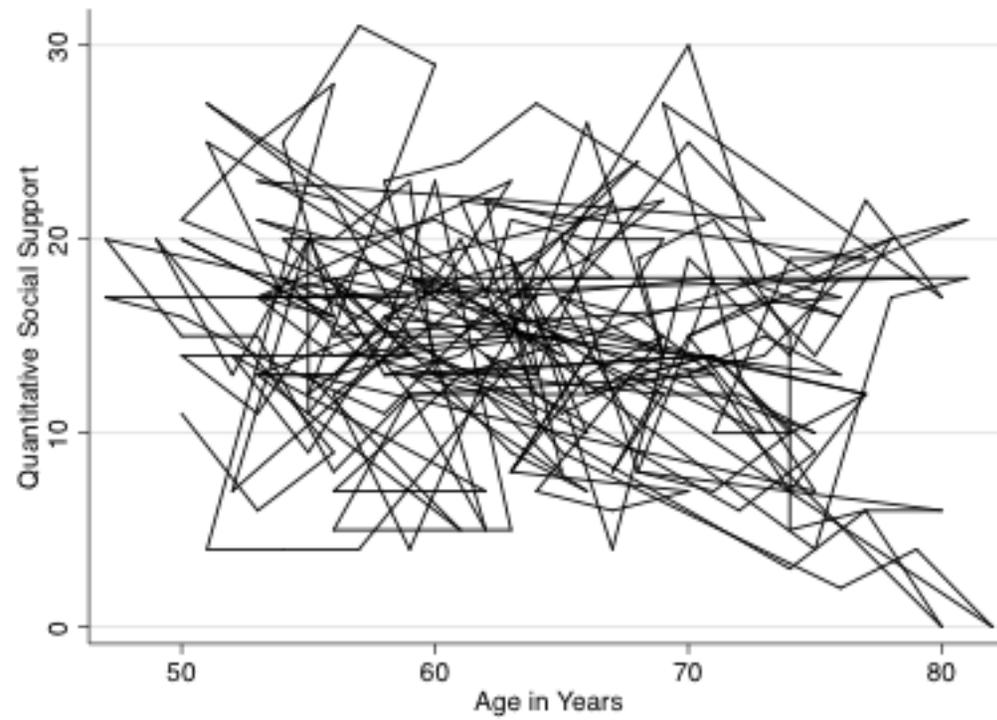


Figure 4.2

Estimated Means of the Quantitative Social Support (N = 1,067)

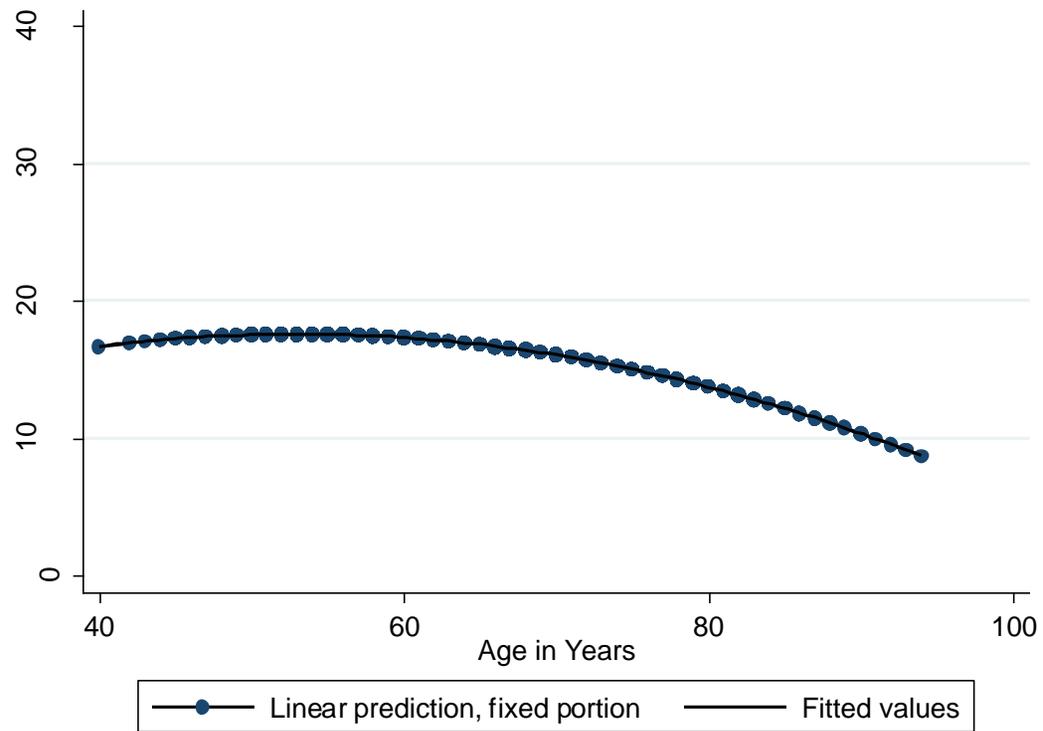


Figure 4.3

The First 250 Cases of the Trajectories of Qualitative Social Support

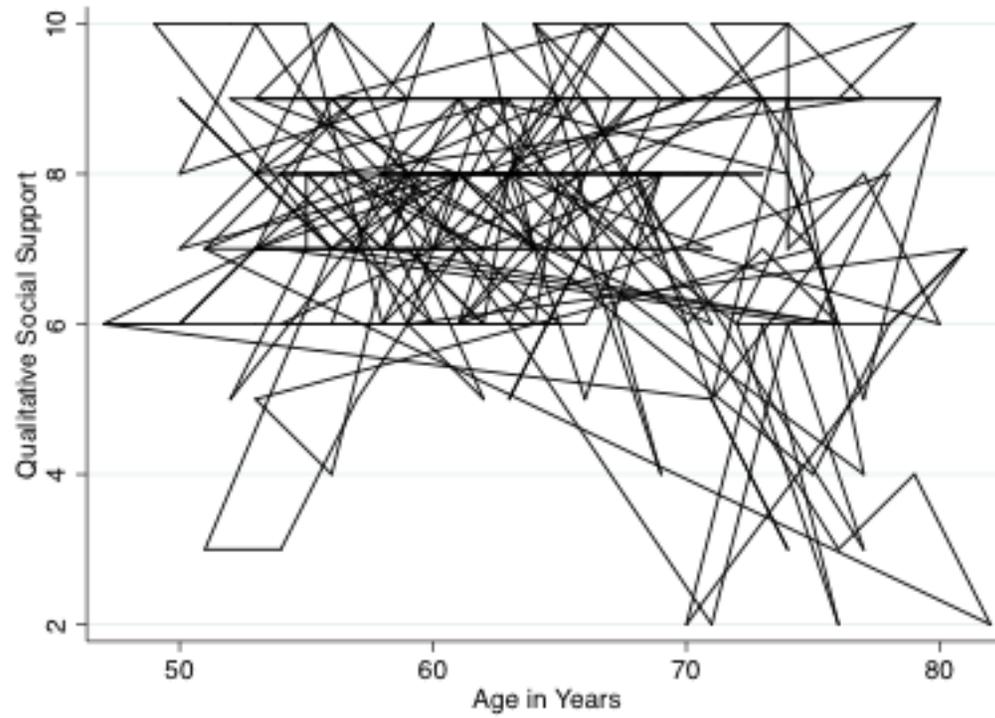
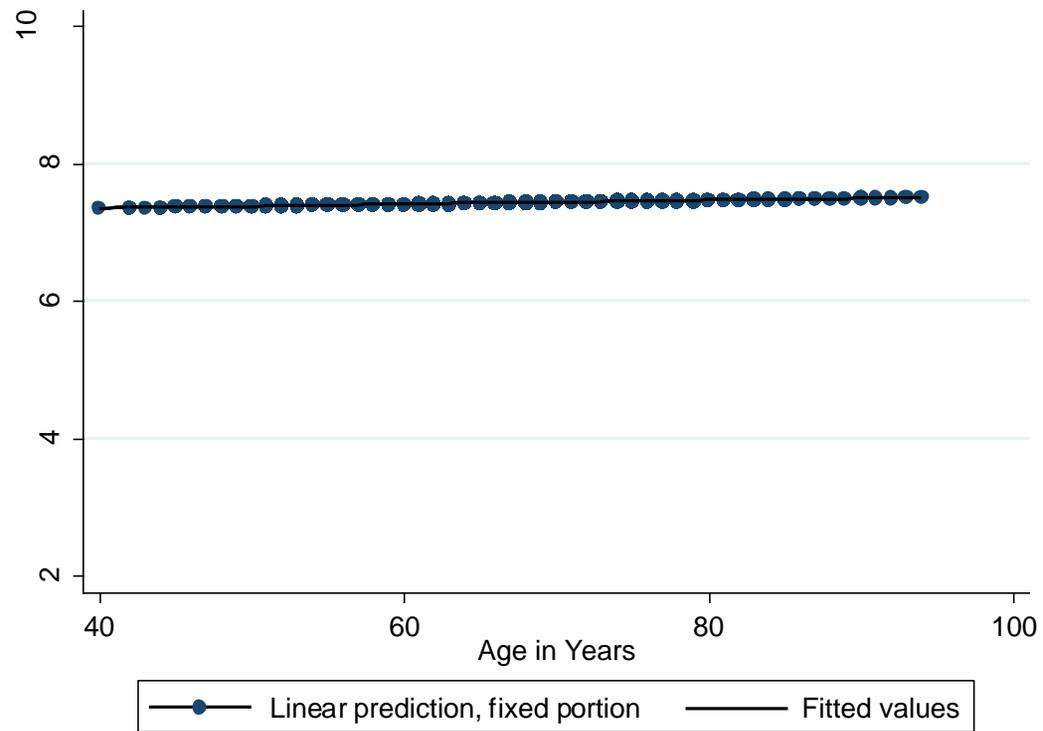


Figure 4.4.

Estimated Means of Qualitative Social Support (N = 1,066)



CHAPTER 5: DISCUSSION

OVERALL FINDINGS

The current study compared socioemotional selectivity theory (SST; Carstensen, 1992; 2006) and dynamic integration theory (DIT; Labouvie-Vief, 2003, 2009) by examining the trajectories of quantitative and qualitative social support. We used longitudinal data from over 1,000 older men, participants in the Normative Aging Study (NAS) who completed mail surveys in 1985, 1988, and 1991. To briefly summarize the hypotheses, SST predicted that there is a normative decline in quantitative support (frequency of contact with social network members), but stability or an increase in qualitative support. In contrast, DIT argued for individual differences in both quantitative and qualitative change with age, depending on age-related declines in cognitive resources. The two theories especially differ in their proposed covariates. For SST, health status is thought to affect perceived time to live; thus, poorer self-reported and functional health should be related to steeper declines in quantitative support but increases in qualitative support as social networks narrow to loved ones and older adults turn to them for support. In contrast, DIT emphasized the importance of cognitive resources, declines in which should affect both quantitative and qualitative support.

Individual growth model analyses were employed to test random intercept and slope models for the trajectory of quantitative and qualitative social support as function of age. We found that SST was supported in its hypothesis of an age-related decline in quantitative social support and stability in qualitative social support. Within-persons analysis of quantitative social support showed that the estimated

trajectory of quantitative social support was a slope with an accelerated decline near 54 years old, while the estimated trajectory of qualitative social support was stable over age. However, we also found significant individual differences (random effects) in the intercept and slope of both quantitative and qualitative social support, which supports DIT. In summary, SST and DIT were supported in a complementary fashion.

However, the effects of predictors for individual differences were complex and not necessarily in accordance with our hypotheses. For example, self-rated and functional health only marginally predicted quantitative support, but both were positive. Thus, both individuals with better self-reported health and those with more functional disability were slightly more likely to have higher levels of quantitative social support. Contrary to predictions, those with better self-reported health had more qualitative social support, while functional health was unrelated to qualitative support. Similarly, memory problems were unrelated to quantitative support, but negatively related to qualitative support. In other words, individuals with self-reported memory problems were less likely feel that they could rely on family and friends but still maintained the same level of social contact.

Finally, the demographic variables of marital status and education were significant predictors of quantitative trajectories but not qualitative support. Thus, married individuals enjoyed higher levels of social contact but did not perceive higher levels of qualitative support than their unmarried peers. Further, education was negatively related to quantitative support – the more educated had less social contact – but was unrelated to qualitative social support.

We will first discuss the implication of the results for the trajectories of support and then turn a discussion of the predictors of individual differences in those trajectories.

QUADRATIC TRAJECTORIES OF QUANTATIVE SOCIAL SUPPORT

As mentioned earlier, the current study found a slope with an accelerated decline of quantitative social support, suggesting that the hypothesis of SST in a decrease in quantitative social support would be supported only after the middle fifties. This finding was not consistent with the linear decrease in social contact in later life found in the study by Shaw and his colleagues (Shaw, Krause, Liang, & Bennett, 2007). However, this difference can be explained by the difference in the ages of the samples. The average of Shaw et al.'s sample at baseline, 74.49 years, $SD = 6.74$, was approximately 15 years older than that of our sample, $M_{age} = 60.83$, $SD = 8.08$. Thus, the pattern of results in our older men was similar to that found in Shaw et al.'s sample.

The finding of a quadratic trajectory of social contact with the early fifties as a peak is relevant to longitudinal studies of factors affecting emotion regulation in later life. For instance, past longitudinal studies of the trajectory of emotional experiences (Carstensen et al., 2011) and life satisfaction (Mroczek & Spiro, 2003) found an inverted U-shaped trajectory in their outcomes, with the age of the early sixties as the peak. A longitudinal study on NAS men reported a U-shaped trajectory in the level of neuroticism in later life with the age in the early sixties as the bottom of the curve (Mroczek & Spiro, 2003). Thus, the findings of the current study contribute evidence that the transition from midlife to later life may be developmental stage in which psychosocial changes manifest.

The quadratic trajectory of quantitative social support with a peak during the transition from midlife to later life as a turning point suggests that there may be several life events that may influence a rise and fall of quantitative social contact during the transition from the midlife to later life. For instance, retirees reported lower frequency of social contact with friends and colleagues than those in labor force (Bossé, Aldwin, Levenson, Spiro, & Mroczek, 1993; Bossé, Ekerdt, & Davis, 1984). Thus, retirement may be a milestone that influences individuals' socioemotional motivation. Becoming grandparents in the late midlife may also be a milestone to increase frequency of contact with families and close friends in midlife. The median age of having the first grandchildren is 50 years old for women and 54 years old for men (Census Bureau Report, as cited in the MetLife report on American grandparent, 2011). However, parental bereavement that many individuals experience after 65 years old (Aldwin & Levenson, 2001) may also be a factor that decreases the quantitative social network with family members. These are several possible life events that may be reflected to the quadratic trajectory of quantitative social support during the transition to later life.

STABILITY OF QUALITATIVE SOCIAL SUPPORT

The current study found that the trajectory of qualitative social support in general indicated relative stability in later life. This is probably because that the quality of family relationships is relatively stable over the lifespan (Rossi & Rossi, 1900). In our study, no demographic factors explained individual differences in the trajectory of qualitative social support. This finding is consistent with the findings of previous study that described individuals' efforts to adapt to a lack of family support

resources (Allen, Blieszner, & Robert, 2011). This study found that older adults had compensated a lack of family support resources with members in their extended family system. For instance, divorced older adults were likely to maintain relations with ex-in-laws in their support resources, and never married or widowed older adults sought for support among members in their relatives. These findings were also consistent with those in studies of specific population, such as single older men without children (Wenger, 2001) and widowed older adults (Ha, 2007). This line of research shows older adults have managed to maintain qualitative social support.

The findings of the stability of qualitative social support over age supports SST (Carstensen, 2006) in its hypothesis of stability of relationships with socially meaningful social partners. However, there was significant random effect on the intercept and slope of the trajectory of qualitative social support.

PREDICTORS OF INDIVIDUAL DIFFERENCES IN SUPPORT

TRAJECTORIES

The current study also found that there were significant individual differences in these trajectories that are partially explained by their demographic characteristics, as well as health and functional status. Different demographic and/or personal factors explained some of the variance in quantitative and qualitative social support, respectively. The effects and directions of the effects of predictors were complex. The effects of some predictors were consistent with SST and/or DIT, while others were not significant or influenced social support in the opposite direction of the hypotheses of these two theories.

Self-reported Health and ADLs

Self-reported health was positively associated with both quantitative and qualitative social support. ADLs were positively associated with quantitative social support but not significantly associated with qualitative social support. These findings were not consistent with SST, which hypothesized a negative association of self-reported health and ADLs with quantitative social support and a positive association of these health and functional factors with qualitative social support.

One possible explanation of positive associations between self-reported social support and qualitative social support may be that better health allows older adults to assess social support from family and friends. Older adults desire to be self-sufficient and resourceful to younger generations (Brown et al., 2003, 2009). Therefore, those with good health status can seek for health for minor assistance or errand and those with more impaired health may not comfortably in relying on others.

The positive relation between having functional limitations and quantitative social support in this study also goes against the predictions of SST. One possible explanation concerns the support providers' motivation to help those with ADL problems. Indeed, a previous study found that an increase of social support from children and neighbors for those who had ADLs (Arsten et al., 2004). Thus, the discrepancy between SST and the findings of the current study can be interpreted as the meaning of social support as mutual exchange between a focal person and his/her social partners in one's life.

Also contrary to our hypotheses, having functional limitations was not significantly associated with qualitative social support. This is probably because

participants' perceived manageability of functional limitations could have been better predictors of qualitative social support than having functional limitations *per se*. For instance, even if an older man cannot do heavy house work by himself, he may not perceive it as a serious problem, if he can afford to hire a professional service to do it for him – or have his son do it.

As discussed in the study by Cornwell (2011), the mixed effects of demographic and personal factors on frequency of social contact such as those found in the current study suggest that older adult's social contacts can change not only because of their own motivational changes (as emphasized by SST), but also because of the social partners' motivation to provide support to older adults. Further the older adults' desire to stay independent, as well as their perception of their ability to be independent in daily living, may also play role. Thus, changes in social support may reflect complex motivations for both the individual and their support system.

Memory Problems and Education

Although DIT posits that memory problems and education are related as cognitive resources, the current study found memory problems and education were associated with social support differently. Although age was not a significant predictor of qualitative social support slopes, having memory problems significantly explained lower intercepts of qualitative social support. This finding suggests that the trajectory of qualitative social support will be stable in later life in a normative developmental context. However, having a memory problem, as non-normative development constitute a risk factor for older adults' ability to rely on family and close friends in a crisis. This finding is consistent with previous studies that had reported

higher social isolation of older adults with cognitive impairment (Hsiao, Chen, Chen, & Gean, 2011; Warner & Brown, 2011).

Thus, the findings of the current study support the hypothesis of DIT on the negative association of cognitive resources and qualitative social support. This might be useful to predict non-normative development of older adults with cognitive impairment, while SST may be useful to predict the trajectory of quantitative social support in normative development.

Education was negatively associated with quantitative social support, but it was not significantly associated with qualitative social support. These findings suggest that the hypothesis of DIT on the predictive utility of cognitive resources may be better reflected in the model of qualitative social support than quantitative social support. Furthermore, the findings suggest that having higher education has complex effects on individuals' utilization of social support. As a previous study found that education is positively associated with the use of affect complexity that is useful for problem solving (Labouvie-Vief & Mendle, 2002), older adults with higher education may not have to rely on family caregivers' assistance.

Our results may be partially explained by the work of Shaw and his colleagues (2007), who investigated the trajectory of frequency of social contact with family members and close friends independently. They found that having higher education was not significantly associated with the frequency of social contact with family members, while having higher education explained higher frequency of social contact with friends. Thus, having higher education, as cognitive resources, may be associated with older adults' active social participation with non-family members and

ability of being independence in their daily life chores. Our measure of social support contact more heavily focused on family members, which might account for these discrepant findings.

Marital Status

The findings of the effects of education, self-reported health, and functional status were somewhat inconsistent with our hypotheses. In the analysis of quantitative social support, our results supported prior research showing that married men have more social contacts, because wives facilitated contact their husbands, offspring, and other relatives as well (Rossi & Rossi, 1990). However, marital status was not significantly associated with qualitative social support. This finding was not consistent with the knowledge about bereaved spouses' challenges to acquire skills to manage deceased spouses' roles in their household as coping with anxiety and depression during the bereavement (Blieszner, 1992; Carr et al., 2000; Wortman, Kessler, & Umberson, 1992). These studies showed that married older adults had been tangibly and emotionally relied on their spouses' support for a long time, and those who had heavily relied on their deceased spouses were more likely to report higher psychological adjustment problems to their widowhood (Carr et al). Indeed, the bereaved older adults reported a fewer numbers of confidants 6 months after the spousal loss than before the loss (Ha, 2007).

One possible explanation of the gap between the findings of the current study and the hypothesized effect of marital status among older adults may be in single older adults' resilience against social isolation. Previous studies showed that older adults who perceived support from either family or friends reported better mental health than

those who were socially isolated (Dupertuis et al., 2001; Fiori et al., 2007). Further, older adults without family resources were able to compensate by friends and more extended relatives. The NAS men were selected for strong ties in the Boston area, and thus may have had these types of compensatory relations already in place.

LIMITATIONS

There were several measurement limitations. First, the measure of quantitative social support did not have the information of peripheral members of personal networks, such as neighbors, acquaintances, and other community members. Because SST's decrease in quantitative social support under perceived time constraint precisely means reducing the network size by decreasing the frequency of contact with these peripheral members (Carstensen, 2006), it is desirable to construct the measure of quantity of social support by adding the information of the frequency of contact with these peripheral members. Second, the measure of the frequency of social contact with family members at the baseline survey had more detailed items than other two surveys to assess with which family members the respondent had made contact. Although we collapsed the items used in the survey in 1985 in order to maintain the equivalence in the items used in the rest of two surveys, the assessment of the frequency of social contact is ideal to have the identical repeated measures (Kolen & Brennan, 2004). Third, the measures of quantitative and qualitative social support were constructed by only one approach in this study. In order to obtain better assessments of trajectories in late life, multidimensional constructs of quantitative and qualitative social support may be necessary. Particularly, the subconstruct of qualitative social support that reflects individuals' perceived importance of the social

partners will be useful to test SST and confirm the findings of the current study in the future.

Sample bias may also be a limitation of this study. Being in good physical, cognitive, and functional status and having geographic stability with stable social networks were major elements of selection criteria for the NAS participants. In addition, a lack of diversity in gender and ethnic backgrounds may be also related to a lack of sufficient statistical power to obtain the significant association between possible predictors and social support. There might also be cohort differences between the sample in the current study and those who were in their middle sixties or older in the early 21st century. The latter cohort is living in their early late life in a digital society in which the accessibility of internet and individuals' skills to utilize internet technology might influence their quantitative and qualitative social support. As DIT is concerned with the effect of social as distant social force as well as individuals' interaction with the proximate environment structure (Labouvie-Vief, 1994), different trajectories of quantitative and qualitative social support as well as predictors of the individual's differences may occur.

Finally, our study compared the implications of SST and DIT regarding the change in social support using archival data. Although SST hypothesized that individuals' motivational change from expansion of self to deriving the meaning of life is best reflected on their preference of social partners (Carstensen, 2006) and DIT implies that age-related change in emotion regulation may be associated with individuals' ways to connect with others (Labouvie-Vief, 1994), the central issue between these two theories are in their difference in the definition of emotion

regulation (Labouvie-Vief, 2009). Further, we did not have direct measures of individuals' motivations. Nonetheless, by focusing on a comparison of the implications of these two developmental theories, the current study found that the socioemotional implications of these two theories are useful to predict trajectories of social support in later life.

FUTURE STUDIES

Despite the aforementioned limitations, the current study found that the trajectory of quantitative social support decreased and that of qualitative social support were stable in later life. In order to enhance further understanding of the socioemotional changes in later life, three lines of research are suggested. First, future studies should examine the processes by which qualitative social support is maintained in the face of decreasing quantitative social support. A parallel process of the model of quantitative and qualitative social support may be one of the possible methods to approach the association between quantitative and qualitative social support. In this suggested study, the measure of quantitative and qualitative social support should be developed in order to compensate for the limitations of the current study discussed in the previous section.

Second, the research on the change in social support among diverse samples and social contexts is advised. For instance, the change and individual differences among women, single older adults, older adults without children, older adults with cognitive, functional, and physical health problems, immigrant older adults, and older adults in digital society will strengthen the understanding of the role of old age for the change and stability in social support, as well as the contextual differences in the

change in social support. In order to enhance the understanding of the role of age in the model of social support, the model of social support as a function of age with time-varying covariates can be tested.

Third, we should examine social support among those with impairments in physical and cognitive health. The quadratic trajectory of quantitative social support found in the current study suggests that the hypothesis of SST on social support may become applicable after the age in the middle fifties. As DIT hypothesizes the effect of cognitive declining on emotion regulation and social relationships, the significant effects of memory problems in the model of qualitative social support suggests that cognitive declining in late later life may predict a sharper decrease in quantitative social support in the context of normative development. If a sharper decline in qualitative social support in late later life or in the model with alternative time matrix of the time from the death is observed, it will suggest that SST can predict the trajectory of qualitative social support only at the age between the mid-fifties and eighties. Further research on this issue should be conducted.

Finally, the model with self-reported health and functional limitations as time-varying covariates with age, for instance, will be useful to understand the primary proxy for the change of social support.

SUMMARY

The current study compared the implication of SST (Carstensen, 2006) and DIT (Labouvie-Vief, 2003) on the trajectory of quantitative and qualitative social support within a same study. On one hand, we found that the hypotheses of SST were mostly supported. As SST hypothesized, we found an age-related decline in

quantitative social support and stability of qualitative social support over age. The age-related decline in quantitative social support, however, started around the early fifties. On the other hand, we found significant individual differences in the trajectories of quantitative and qualitative social support as DIT predicted. These findings suggested that SST would be useful to predict normative psychosocial development as function of age, while DIT would be useful to predict individual differences.

Different psychosocial factors predicted individual differences in the trajectories of quantitative and qualitative social support. The direction of association between the hypothesized predictors and social support was not always consistent with SST or DIT. This finding suggests the complexity of the relation between psychological factors and social support, which is also influenced by support providers' motivation and other social contexts.

CHAPTER 6: CONCLUSION

CONTRIBUTION TO THE FIELD OF ADULT DEVELOPMENT

There are four major contributions of the current study to the field of adult development. First, the findings of the current study suggest that psychosocial change in later life starts in the middle age, and the direction of the change continues slowly toward late life. In the model of quantitative social support in this study, the turning point of the quantitative social support was at the age 54. This finding was consistent with the findings of previous studies on emotional experiences (Carstensen et al., 2011), life satisfaction (Mroczek & Spiro, 2003), and personality (Mroczek & Spiro, 2005), which reported quadratic trajectories of these psychological outcomes with slightly later turning points in early sixties. This line of research suggests that the need for research on psychosocial development in midlife as the turning point or start of age-related psychosocial changes that may influence their well-being in later life.

Second, the findings of the current study imply the psychosocial changes in the early stages in our lives may influence our lives in later life. On one hand, the estimated trajectory of qualitative social support was relatively stable with significant random effects in the level of reliance on family and friends. This finding suggests that age does not matter in the trajectory of qualitative social support, but the initial level of the reliance substantially affects individuals' qualitative social support. This finding suggests that development of reliable long-term intimate relationships in early stages in our lives is critical for our ability to rely on intimate social partners in later life. On the other hand, we found significant random effects on the rate of change in quantitative social support. These individual differences were not explained by demographic factors but significantly explained by physical and cognitive health.

The finding suggested that individuals can develop the resilience against social isolation regardless of their marital structure; however, they may be vulnerable to non-normative health and cognitive impairments. Thus, the findings of the study imply the necessity of individuals' and society's efforts to promote sound social development and prevention of non-normative physical and cognitive problems in early stages of one's life for the well-being in later life.

Third, the findings of the current study suggest that SST and DIT are both useful to predict psychosocial development in later life complementary rather than contradictory. As the current study found a consistency with SST in its hypothesis of an age-related decline in quantitative social support and the stability of qualitative social support, SST will be useful to predict psychosocial development in the normative developmental context as the function of chronological age. The current study found that DIT was not in contradiction with SST in its hypothesis of age-related decline in quantitative social support. Rather, the latter theory complements SST in of its focus non-normative development (cognitive impairment) and in its implication of the trajectory of qualitative social support in late later life. Thus, the current study contributed to find strengths of both theories.

Finally, the current study found that physical, functional, and cognitive health status were predictors for quantitative and qualitative social support in later life. This finding implies that those who have poor physical, functional, and cognitive health may fall into a negative cycle of a lack of accessibility to necessary support and deteriorations of their conditions. The further research and necessary intervention should be promoted to break this cycle in later life.

Thus, with these four contributions, the current study contributes to the body of research on normative and non-normative late adult development in the framework of lifespan development.

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