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THE RELATIONSHIP BETWEEN INTERGENERATIONAL SOLIDARITY AND

MEDICATION ADHERENCE IN COMMUNITY DWELLING ELDERS

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DEDICATION

I dedicate this work to my parents, Edward and Carol Rutan, who first taught

me the meaning of affectual and functional solidarity; my husband Bart, with whom I

have the joy of living those meanings; and my daughters Claire, Madison and Lindsay

for whom I hope those meanings bring a lifetime of love.

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Abstract

Data indicate 87.3% of individuals in the over 65 age group take medication on a regular basis (USDHHS, 2008). Effectiveness of these medications relies in part on medication adherence, which is estimated at 50 % and costs $300 billion per year (Cutler & Everett, 2010; New England Health Institute, 2009). Medication non-adherence affects older adults disproportionally, leading to increased risk for hospitalization and death when compared to younger counterparts (Ho et al., 2006; Osterberg, 2005; Roebuck, Liberman, Gemmill-Toyama & Brennan, 2011). While there is extensive research on adherence, there is a deficit of literature addressing adherence in the older adult and the possible relationship family members, and adult children in particular, may have on adherence in this population. This non-experimental, correlational design employed a survey of attendees at two senior centers in the mid-Atlantic region and used the intergenerational solidarity (IGS) framework (Bengtson & Roberts, 1991) to explore the relationship between affectual, functional and associational solidarity and medication adherence. After screening for cognitive impairment (Mini-Cog; Borson, Scanlan, Brush, Vitallano, & Dokmak, 2000) a sample of 121 CDEs was obtained. Findings indicate that adherence (64.5%) as measured by the ©MMAS-8 (Morisky et al., 2008) was predicted by pill burden ($OR = 0.62, p < .05$). In participants with a low level of depression symptoms, functional solidarity had a small, but significant ability to predict adherence ($OR = 1.04, p < .05$). For women, affectual solidarity increased the odds ($OR = 1.2, p < .05$) of adhering to medication. The benefits of functional and affectual solidarity toward

medication adherence in community dwelling older adults is variable, with affectual solidarity predicting adherence in women only and functional solidarity having small predictive value for those with low levels of depression symptoms.

Chapter I

PROBLEM

Current statistics indicate that by 2030 19% of the population will be over 65 years of age (United States Department of Health and Human Services [USDHHS], 2008). While advances in medical science are in part responsible for the increase in this age group, such advances often require continued treatment of chronic illnesses in the form of regular medication administration. Data indicate that 87.3% of individuals in the over 65 age group take medication on a regular basis (USDHHS, 2008).

Effectiveness of such medical regimens depends in part on correct self-administration, commonly referred to as medication adherence. The best overall estimate of adherence in all age groups is about 50% (Cutler & Everett, 2010). While one recent survey of 2,194 adults over 65 demonstrated an overall adherence rate of 85% (Krousel-Wood et al., 2010), other studies of community dwelling elders show rates closer to the 50% average (Berry et al., 2010). Non-adherence across all age groups costs 300 billion dollars per year (New England Health Institute [NEHI], 2009) and may be responsible for up to 70% of hospital readmissions (Osteberg, 2005). Ho et al. (2006) found that medication non-adherence in diabetics increases the risk of death ($OR=1.77$, 95% CI, 1.45-2.15, $p<.001$) and hospitalization ($OR=1.37$, CI 1.25-1.51, $p<.001$). While medication adherence is important for anyone

prescribed a regular pharmaceutical product, the consequences for the older adult may be more significant (National Council on Patient Information and Education [NCPIE], 2007).

Medication adherence has been shown to reduce the number of hospital days and lower mortality rates in individuals over 65 (Ho et al., 2006; Roebuck, Liberman, Gemmill-Toyama & Brennan, 2011). A survey of records from over 130,000 individuals utilizing a prescription health plan demonstrated that while days in hospital decreased in those who adhere to a medication regimen, adults over 65 benefit even more (Roebuck et al., 2011). Older adults who were adherent had 1-1.5 fewer hospital days than participants under the age of 65 (Roebuck et al., 2011). Finally, mortality rates for older non-adherent diabetics are also higher in an HMO survey of data from 11,532 individuals ($OR=1.81$ for all ages and $OR=1.91$ for adults >65 years of age; Ho et al., 2006).

Nurses are often in a position to work with patients surrounding effective strategies of self-medication administration through activities including hospital discharge instructions and home care. The recent Institute of Medicine (IOM) report on the future of nursing calls for nurses to fully engage in practice roles and become even more central to the health care system (2011). The call for full use of nurse practitioners in primary care encompasses medication prescribing as well as patient education placing nurses in a central role to address medication adherence. Given the potential complications of non-adherence, nurses must understand factors

contributing to and impairing medication adherence, particularly for potentially vulnerable older adults.

Current research literature suggests leading a regular lifestyle with a repetitious daily schedule, having a good relationship with a primary care provider and taking minimal number of pills per day are associated with improved adherence (Swanlund et al, 2008; NEHI, 2009; Ruppar, Conn & Russell, 2008). Well-established risk factors for poor adherence include cost of medication (Madden et al., 2008), uncomfortable side effects (NEHI, 2009) and lack of executive function (Park & Meade, 2007). Depression also appears to increase the risk of non-adherence in a population of older adults with hypertension (Krousel-Wood et al., 2010). For older adults with cognitive impairment, caregiver support has been linked to high levels of medication adherence (Cotrell, Wild, & Bader, 2006; Kuzuya et al., 2008).

The impact of family on medication adherence has been explored in a variety of settings, largely with a disease specific focus and without specific concern for older adults. Several studies demonstrate beneficial impact from family involvement upon on medication adherence. In individuals with schizophrenia, family contact, especially instrumental support (such as being driven to the bank or doctor's office) increased adherence (Ramirez Garcia, Change, Young, Lopez, & Jenkins, 2006). In a population of HIV patients, family support increased medication adherence (Knodel, Kespichayawattana, Saengtienchai & Wiwatwanich, 2010). Grzywacz & Marks (1999) utilized the social gerontology framework of intergenerational solidarity and surveyed adults with a mean age of 45, finding the degree of support and affection

between family members increased the odds of taking medication appropriately. A meta-analysis of social support and adherence to medical treatment (not just medication) concluded that family cohesion is related to improved adherence (DiMatteo, 2004).

These works do not focus on the older adult. There are only a few studies exploring medication adherence and family involvement or family functioning in the elderly. Voils, Steffen, Flint and Bosworth (2005) explored social support and medication adherence in a population of depressed elders. They found a small correlation ($r =. 3, p =. 01$) between social support and medication adherence, but did not specifically explore the impact of family social support. Similarly, Krousel-Wood et al. (2010) looked at social support and medication adherence in community dwelling elders who had hypertension. After controlling for depression symptoms symptoms they did not find a significant association between social support and medication adherence. However, this study also did not explore family support separately from social support.

A few studies demonstrate benefit to adherence rates with assistance with care. Kuzuya et al. (2008) looked at 1772 community dwelling elders in Japan regarding outcomes for those who needed, but did not receive medication administration assistance. The data showed that clients who needed, but did not receive, medication assistance had a statistically significant lower level of medication adherence ($M =76.5\%$, p <. 001) when compared to clients who did not need help ($M = 90.7\%$) and those who needed and got help ($M = 86.9\%$). Cottrell et al. (2006)

explored the impact of caregivers (not specifically family) upon medication

adherence in both patients with and without Alzheimer's disease (AD). Results

demonstrated a high level of adherence ($x = 84\%$) in both the AD group and normal

group, but caregiver support was provided 85% of the time for AD patients, as

compared to 30% for healthy individuals.

Ruppar, Conn & Russell (2008) looked at 63 intervention trials, all of which

dated prior to 2003, surrounding medication adherence in the elderly and found only

3 involved family members. The authors concluded that there is a substantial need to

include families and caregivers in future interventional studies (Ruppar et al., 2008, p.

141). In a systematic review of barriers to medication adherence in the elderly the

authors similarly conclude: "Medication nonadherence in the elderly is not well

described in the literature" (Gellad, Grenard, & Marcum, 2011, p. 11). Other

researchers in the field of medication adherence in older adults also urge research

from a systems perspective and exploration of the family caregiver (Park & Meade,

2007).

Problem Statement

There are no studies that explore the possible relationship between family

involvement, support or functioning upon medication adherence in a population of

community dwelling elders (CDE).

Theoretical Framework

       Roy Adaptation Model. The Roy Adaptation Model (RAM) will provide the frame to study the relationship between family and medication adherence in older adults. The RAM is a systems theory of nursing that states individuals or groups adapt to stimuli via coping ability found in the four parts, or modes, of a person (Roy, 2009). The four modes are: the physiologic, role function, interdependent and self-concept mode (Roy, 2009). These four components to an individual interact with each other, so that within the Roy model, interdependent relationships can influence and interact with the roles an individual has in their life, such as the role of taking medication correctly.

       For the purposes of this study, the stimulus acting upon the individual is seen as receiving a prescription for medication, with medication adherence the required role function adaptation. Whittemore and Roy (2002) view medication adherence as an adaptive behavior required for coping with chronic illness and state that the interdependent mode is relevant to adherent behavior as one must integrate self care role and self perceptions impacted by chronic illness into personal relationships. The interdependent mode involves the relationships one has and the ability to both give and receive love and respect, as well as share time and talents with one another (Roy, 2009). The model does not provide significant details about factors impacting those exchanges. The intergenerational solidarity framework does provide rich description and sound research instruments to better explore the components of the relationship between parents and their adult children.

Intergenerational solidarity framework. The social gerontology framework of intergenerational solidarity (IGS) (Bengtson & Roberts, 1991) offers one way to envision and study the specifics of an interpersonal family relationship. The framework describes characteristics of relationships between parents and their adult children that contribute to a sense of solidarity across generations. Solidarity is defined as: "The strength of commitment to performance of familial roles to meeting family obligations" (Bengtson & Roberts, 1991, p. 857). The solidarity framework posits seven dimensions of bonding within a parent-child relationship that may impact the likelihood of attending to such an obligation: association, affect, consensus, resource sharing, familism, opportunity structure and ambivalence-conflict (Bengtson & Roberts, 1991; Silverstein et al., 2010). As the literature suggests family support may be important in medication adherence, this framework provides a foundation from which to explore the possible factors that may contribute or detract from medication adherence in CDEs.

Association or the amount of contact family members have with each other, affection between a parent and child and exchanges of help may impact medication adherence in community dwelling elders (CDEs). Affectual bonds have been shown to increase the amount of help provided to an aged parent (Silverstein, Parrot & Bengtson, 1994; Silverstein et al., 2002) and are associated with proper medication use in younger adults (Gryzwacz & Marks, 1999). Time spent with children (associational solidarity) when young increases actual provision of support to an aged parent (Silverstein et al., 1994; Silverstein, Gans & Yang, 2006).

Bengtson & Roberts (1991) indicate resource sharing includes sharing of time, money, or emotional support. When an adult child pays for medication, fills a pillbox, or even asks about a medication regimen, they are engaged in resource sharing. Given the fact that there is evidence that caregiver support may enhance medication adherence (Cottrell et al., 2006), the dimension of resource sharing and functional exchange is important to evaluate. There are no known studies that explore medication adherence in the older adult within the IGS framework.

Purpose

The purpose of this study is to explore the relationship between measures of intergenerational solidarity (functional solidarity, affectual solidarity and associational solidarity), depression symptoms and medication adherence in a population of community dwelling elders, while controlling for the effects of cognitive impairment.

Definitions of Variables

Medication adherence. Adherence is defined with consideration of the definition from the World Health Organization (2003) and the conceptual model of Whittemore and Roy (2002). "Adherence is the extent to which a person's behavior [in] taking medications …corresponds to agreed recommendations from a health care provider" (WHO, 2003) and reflects an individuals perceptions of the cost and benefit to taking the medication (Whittemore & Roy, 2002).

Medication adherence will be operationalized in this study using the Morisky Medication Adherence Scale (©MMAS-8) which is an eight item self report

questionnaire regarding medication usage, including questions about forgetting medication as well skipping medication due to side effects (Krousel-Wood et al., 2010; Morisky, Ang, Krousel-Wood & Ward, 2008). Consistent with the literature, subjects will be considered adherent if they have scores over 80% (Dunlay, Evelath, Shah, McNallen, & Roger, 2011).

Associational solidarity. Based on the framework set forth by Bengtson and Roberts (1991) associational solidarity is defined as the degree, in both frequency and type of contact, to which the family interacts with one another. Associational solidarity will be operationalized using the associational solidarity scale from Silverstein et al. (2002). There are five questions about the frequency of various types of interactions answerable with a seven point likert scale.

Affectual solidarity. Affectual solidarity is defined as the "type and degree of positive sentiments held about family members" (Katz & Lowenstein, 2010, p. 34). This variable will be operationalized with the positive affect subscale of the parent-adult relationship questionnaire (PARQ) (Pitzer et al., 2011).

Functional solidarity. Functional solidarity is defined as "the degree of helping and exchange of resources" from adult-child to and from parent (Katz & Lowenstein, 2010, p. 34).The Intergenerational Solidarity Support Index (Fingerman et al., 2010) will be used to operationalize this variable. It is a 13-item questionnaire exploring exchanges of functional support, emotional support and time spent together.

Depression symptoms. For the purposes of this study depression symptoms are those recognize as contributing to a clinical diagnosis of depression. Depression

symptoms include: depressed mood, lack of interest in activities, weight change, insomnia or hypersomnia, agitation or restlessness, fatigue, feelings of worthlessness, difficulty concentrating, suicidal thoughts (American Psychiatric Association, 1994). Depression symptoms will be operationalized using Geriatric Depression Scale (GDS-15) short form (Sheik & Yesavage, 1986). This 15-item scale has been used specifically with populations of CDEs (Friedman, Heisel & Delavan, 2005).

Inclusion Criteria

Participants will be restricted to English speaking adults who reside in the community (community dwelling elder) independently and are 60 years of age or older. They may live in a free standing home, townhouse or apartment, including a setting designed for individuals over 55 years of age. They must be living independently, that is without formal care such as a nursing assistant or aide. Participants must be taking a medication on at least a weekly basis. The medication may be prescription or non-prescription, but they must be taking the medication or vitamin based on their health care provider's recommendation.

Participants must be without known cognitive impairment. Cognitive impairment is "a condition in which a person has problems with memory, language, or another mental function severe enough to be noticeable to other people and to show up on tests, but [may or may] not serious enough to interfere with daily life." (Alzheimer's Association, 2010). Participants must be able to make and keep an appointment to participate in the study.

Cognitive impairment will be assessed using the The Mini-Cog, a brief screening tool designed to facilitate screening for cognitive impairment (Borson, Scanlan, Brush, Vitallano, & Dokmak, 2000). The test involves asking individuals to repeat and then recall 3 words. A clock draw test is also given. Individuals are categorized as cognitively or not cognitively intact on these tests. Individuals who do not pass the cognitive screen will be excluded from the study.

Research Question

Is there a relationship between the associational, affectual and functional components of IGS, depression symptoms and medication adherence in cognitively intact community dwelling elders?

Significance

The findings from this study have the potential to impact the 87.3 % of people over age 65 who take medication on a regular basis (USDHHS, 2008). Despite extensive research, factors relating to the costly problem of medication non-adherence are not completely understood, especially in adults over 65. Older adults are more vulnerable to the significant impact on morbidity and mortality from poor levels of adherence. Health care providers require more information about factors impacting medication adherence in order to plan effective interventions to increase adherence. If measures of intergenerational solidarity such as association, assistance and emotional connectedness are related to proper medication use, health care providers can begin to tailor interventions towards inclusion of adult children in treatment planning for their parents. Relationships between an older parent and their

adult child begin to form at birth. If these relationships impact medication adherence late in life, public policies that enhance those early relationships should be pursued to strengthen those ties early in family formation. Finally, if the elements of IGS are related to levels of medication adherence, then nursing theorists may need to redefine their conceptualizations of family, family support and the relationship between family and health behavior.

Chapter II

REVIEW OF THE LITERATURE

This chapter will provide the theoretical basis for the current study, provide an overview of what is known about factors that impact medication adherence for older adults and review the literature regarding family as it relates to medication adherence in older adults. The Roy adaptation model (Roy, 2009) is used to provide a frame for the proposed study. An overview of the model will be presented, followed by a discussion of the factors within the model related to this study. Though Roy (2009) views family relationships as important, her conceptualization of the role of family focuses on the supportive nature of the relationship, not the dynamic interplay between affection and actual exchanges of support within a family. The model of intergenerational solidarity (IGS) (Roberts & Bengtson, 1991) provides a more detailed framework to explore the relationship between a parent and adult child. A critical analysis of the limited available studies exploring measures of IGS and medication adherence in community dwelling elders (CDEs) is presented.

Roy Adaptation Model

The Roy adaptation model of nursing (Roy, 2009) is a systems-based theory for nurses to utilize in approaching problems in practice, theory and research. Previous studies in areas of concern to CDEs include those on nutrition (Chen, 2005), chronic pain (Dunn, 2005) and creativity (Flood & Scharer, 2006). The assumptions

of Roy's model (mutuality, veritivity and humanism) fit well with the proposed study exploring the relationship between parent and adult child connections and medication adherence. Mutuality, or continual give and take with the world, fits well with the goal of studying families, where exchanges of love and help are common. Two other central concepts of the model, veritivity and humanism, also fit with the goal of exploring family and medication adherence (Hanna & Roy, 2001). Veritivity, the belief that people behave with purpose, have creativity, and interact with their social environment (Hanna & Roy, 2001) is reflected in this study with the exploration of the social environment of the family, which has an impact on adherence (DiMatteo, 2004; World Health Organization, 2003) and the purposeful behavior of taking medication. Within the idea of humanism, Roy states people strive to maintain integrity (Hanna & Roy, 2001). When individuals are adherent to medication, the impact of chronic illnesses is decreased, and system integrity is enhanced. According to the Roy model, adherence is an adaptive behavior in the setting of a chronic illness (Whittemore & Roy, 2002).

Overview of the model. Nursing, according to Roy, is the process of supporting and promoting adaptation, while considering the social and physical environment surrounding the patient (Roy, 1980). Adaptation is the "process and outcome whereby thinking persons use conscious awareness and choice to create human and environmental integration." (Whittemore & Roy, 2002, p. 313). As an individual or group encounters stimuli they adjust their behavior and those actions unfold towards integrated, compensatory or compromised adaptation (Roy, 2009).

When compromised responses (those that do not promote health) seem likely to, or do occur, nurses alter the environment to assist individuals or groups in achieving integrated outcomes. Nurses address problems of adaptation by viewing the person as comprising four interconnected categories, or modes: physiological/ physical, self-concept, role and interdependence (Hanna & Roy, 2001; Roy, 1999).

A stimulus is defined by Roy (2009) "...as that which provokes a response."(p. 33), may be focal, contextual or residual, depending on the primacy of the action and the required response. Focal stimuli are those that prompt immediate awareness (Roy, 2009). An example of a focal stimulus is the initiation or continuation of a medication prescription. Once an individual receives a prescription, he or she must respond with a variety of behaviors in order to correctly take, or adhere to, the medication. Contextual stimuli influence the response. In the setting of medication adherence these may include cognition and mental health status, daily routines and financial capabilities (Grenard et al., 2011; NCPIE, 2007; Ownby et al., 2006; Park & Meade, 2007). The behavioral responses to stimuli reflect an individual's level of adaptation (Whittemore & Roy, 2002).

Medication adherence, or any adaptive behavior, can be integrated (100% adherence) compensatory (partial adherence, or adherence with assistance) and compromised (non-adherent) (Roy, 2009). Coping processes and abilities within two major systems (the regulator and cognator) help determine these behaviors (Roy, 2009). The regulator system is seen to be automatic and often physiologic, while the cognator system involves perception, learning, judgment and emotion (Roy, 2009). A

detailed discussion of how these operate in the process of taking medication will be presented in the section on adherence.

As individuals strive to respond to stimuli, the resultant behaviors in the physiologic, role function, self-concept and interdependence modes interact and influence one another (Roy, 2009). Of concern to this proposed study are influences from the self-concept mode, as low self-worth and depression decrease medication adherence rates (Krousel-Wood et al. 2010; NCPIE, 2007) and the interdependence mode, which in this study refers to relationships between individuals and includes family relationships (Roy, 2009). Research that operationalizes these social relationships as social support (DiMatteo, 2004) and help with medication administration from a caregiver (Cottrell et al., 2006; Kuzuya et al., 2008) demonstrates improvement in medication adherence rates when such interdependent support is present.

In describing the interdependent mode of a person, Roy (2009) relays that family relationships are considered to be one of many possible significant life relationships (Roy, 2009). Based on Cobb's (1976) seminal description of social support, the Roy model (2009) states that a central aspect of a significant relationship is mutuality, or giving and receiving of both concrete items such as time spent with others and talent, as well as more intangible offers of love, respect and knowledge. The Roy model does not, however, provide significant detail on how family relationships may function and influence the individual apart from this social support frame, or on which relationships may be important.

Medication Adherence

Models of adherence. Adherence is seen as the degree to which patients follow a health care plan regularly (Bissonette, 2008; Cohen, 2009; Shay, 2008). Adherence suggests a mutually respectful relationship in which an expert in the health care field works with a patient, who is an expert in his or her own experience of taking medication. In their theoretical discussions of adherence, Bissonette (2008) and Whittemore and Roy (2002) emphasize the mutual nature of the patient-provider relationship as contributing to adherence.

Antecedents to adherence include the individual's perceptions, first about the risk presented by the illness or potential illness (Leventhal et al., 1999; Murray et al., 2004; Ownby, Hertzog, Corcco & Duara, 2006) and subsequently about the benefit and cost of the prescribed behavior to both the self and the family system (Cohen, 2009; Shay, 2008; Whittemore & Roy, 2002). Perceived threats to health depend in part on the individual's knowledge about the condition (Borgsteede et al., 2011; Meichenbaum & Turk, 1987; Murray et al., 2004). An individual must also have knowledge about the functional capacities necessary to take medication (Morrow et al., 2004; Park & Meade, 2007), such as initial understanding of instruction, as well as ability to actualize medication administration behavior in daily life (Park & Meade, 2007). Other individual factors related to adherence are emotional state such as depression and anxiety (Krousel-Wood et al., 2010; Osterberg & Blaschke, 2005; WHO, 2003) and personality characteristics such as conscientiousness, independence

and neuroticism (Bruce, Hanock, Arnett & Lynch, 2009; Insel, Reminger & Hsiao, 2006; Seides, 2011).

Through grounded theory methodology two studies describe the process of adherence, reflecting the importance of individual perceptions and family in forming intention to adhere to specified health behaviors (Landier et al., 2011; Wilson, Hutchinson & Holzemer, 2002). After interviewing 68 individuals with HIV, Wilson et al. (2002) describe a theory by which characteristics of both the individual and his or her beliefs led to decisions about the extent to which the prescribed regimen is followed. Landier et al. (2011) uncovered a decisional model based on adolescents with acute lymphocytic leukemia, which supports the role of perceptions, as well as the influence of family relationships upon adherence behavior. This understanding of adherence fits well with the adaptation theory (Helson, 1964; Roy, 2009) underpinning the Roy adaptation model.

According to adaptation theory (Helson, 1964), two conditions influence the ability to adapt to stimuli: the demands of the event and the internal situation. Leventhal et al. (1999) describe the components of the internal status of an individual relevant to adherent behavior as the emotions attached to the situation and the perception of self, both of which are affected by depression. The internal situation thus contributes to the perception of illness important to adherent decisions in the model of Landier et al. (2011).

Components of the internal situation are presented in a model of adherence specifically for older adults (Murray et al., 2004). Predisposing characteristics

(cognitive capacity, functional ability and knowledge) and enabling resources

(financial status, provider relationship and support) work together with perception of

need to predict adherent behavior. This model builds on the assertion of Park and

Meade (2007), who argue that cognitive function, the environment surrounding the

individual and beliefs about medication work together to influence the ability of an

older adult to adhere to a medication regimen.

The internal situation and personal characteristics required for adherence may

be limited in older adults, who are at risk for cognitive and functional impairments

(Gellad et al., 2011; Park & Meade, 2007). Additional challenges exist, as older

adults must integrate medication use within their family situation (Park & Meade,

2007; Whittemore & Roy, 2002). Studies addressing how these challenges are met in

relation to medication adherence during the older adult's time of life, and specifically

the impact of family upon medication adherence, is limited in the literature (Gellad et

al., 2011). A search in CINAHL, PROQUEST and MEDLINE for research articles

published between 2006-2012 including medication adherence in the abstract yielded

711 articles, 207 pertaining to the older adult. When the keyword family was added,

14 articles were available, with only 4 of these truly focused on the older adult

(Cottrell et al., 2006; Gellad et al., 2011; Lau et al. 2008; Voils et al, 2005).

Factors specific to medication adherence in CDEs. Medication adherence is

commonly viewed as being related to issues surrounding medication itself, externally

related or related to the patient and including social factors (ASCP, 2007; Gellad et

al., 2011; WHO, 2007). This section discusses the empirical literature related to these influences on adherent behavior.

Medication related. Several relatively self-evident and immediate problems that serve as focal stimuli can impact adherence in CDEs and are often related to the medication itself. Cost of medication is reported as a reason for non-adherence in many qualitative and quantitative studies that focus on older adults (Dunlay et al., 2011; Elliot et al., 2007; Iversen et al. 2011; McCauley, Bixby & Naylor, 2006; Madden et al., 2008). Pill burden, or the number of pills required to be taken in a day, also negatively impacts adherence rates (Chapman et al., 2008; Ingersoll & Cohen, 2007; George & Shalansky, 2007; Stoehr et al., 2008). Uncomfortable side effects were the most common self-reported reason for non-adherence reported in a survey of adults over 50 years of age (AARP, 2004).

Externally related. Relationship issues between an individual and the health care provider can influence medication adherence (Borgsteede et al., 2011; Gellad, Grenard & Marcu 2011; Murray et al. 2004; NCPIE, 2007). While older adults may be more likely to be adherent with increased frequency of health care visits in a year (Chapman et al., 2008), the reasons those visits are important may be due to providers sharing information regarding treatment, not necessarily the quality of the relationship (Heisler et al., 2007). These findings suggest that relationships are salient to medication adherence behaviors.

Individual factors. Adherence to a medication regimen begins with comprehension and remembering of the initial instructions regarding mediation

(Parke & Meade, 2007) reflecting Roy's cognator subsystem. Health literacy, the ability to learn about one's health and understand health information, has also been shown to impact medication adherence (Ingram, 2010; Kripalani et al., 2010). Once learning has occurred, more automatic processes (similar to Roy's regulator system) take over, with the use of reminders and routines facilitating regular medication use (George & Shalansky, 2007; Iversen et al. 2011; McCauley et al., 2006; Park & Meade, 2007; Swanlund et al., 2008). Linking medication administration with a regular activity, such as brushing one's teeth is an example of this process. While important for all age groups, older adults may rely on these automatic processes more than younger adults (Park & Meade, 2007).

Other factors related to medication adherence pertain to actual knowledge, perception and understanding surrounding the medication prescribed. Perception of both the actual and perceived effects of medication can impact adherence (NCPIE, 2007; Ownby et al., 2006). For example, in a survey of adults over 50 lack of perceived benefit of the drug was the most common self-reported reason for non-adherence (AARP, 2004). A common individual factor controlled for in this study that impacts medication adherence is depression.

Depression. Major depression is defined by diagnostic criteria that require a depressed mood or lack of interest to be present for at least two weeks along with a minimum number of additional symptoms such as change in body weight and difficulty concentrating and lack of interest in activities (APA, 2000). Depression thus affects all four modes of the person in the Roy model. Epidemiological estimates

suggest that 1-5% of older adults carry a diagnosis of major depression at any time

(NIMH, 2012). In older adults depression is associated with serious problems

including increased number of falls, (Eggermont, Penninx, Jones & Leville, 2012)

cardiovascular mortality, (Win et al., 2011) and increased risk for suicide (NIMH,

2012), Depression symptoms that do not meet diagnostic criteria due to lack of

sadness or inadequate numbers of symptoms, can have significant impact on quality

of life and medication adherence rates (Jeste, Blazer & First, 2005; Krousel-Wood et

al. 2010) and appears more common, with recent studies reporting prevalence from

13%, (Krousel-Wood et al. 2010) to 27 % (Wilby, 2011). Some authors suggest that

older adults experience depression differently, with loneliness, not sadness being a

central feature (Barg et al., 2006; Jeste et al., 2009). Diagnostic efforts are difficult

due to overlap of symptoms with physical illnesses that are common in this age group

(Hybels, Pieper & Blazer, 2009; Jeste et al., 2009; Piven, 2005). Risk factors for

depression in older adults include female gender, not being currently married and

chronic illness (Gum, King-Kallimanis & Kohn, 2009).

Large literature reviews of medication adherence across all ages (Grenard et

al., 2011; Krueger et al., 2005; Osterberg & Blaschke, 2005; Schlenk, Dunbar-Jacob

& Engberg, 2004) assert symptoms of depression have a deleterious effect on taking

medication. More recent work supports this assertion in the older adult population,

and provides additional detail. For example, Bambauer and colleagues (Baumbauer,

Safran, Ross-degnan, Zhang et al., 2007) found depression increased the odds of not

taking medication when cost was the stated reason for non-adherence. Because older ·

adults with depression report more physical symptoms (Waxman et al., 1985) some authors postulate that lower adherence in patients with depression symptoms relates to increased perception of side effects (Kilbourne et al., 2005).

Other studies point to the importance of the presence of depression symptoms apart from an actual clinical diagnosis of depression (Chapman et al., 2008; Cooper et al., 2005: Krousel-Wood et al., 2010). For example, Chapman et al. (2008) and Cooper et al. (2005) found no impact on medication adherence from a self-reported pre-existing diagnosis of depression. However, Krousel-Wood et al. (2010) found an increased risk for low medication adherence after controlling for age, sex and social support in participants currently experiencing depression symptoms (OR=1.96, p<. 01). There was no effect from a diagnosis of depression. Thus, while studies suggest a substantial impact on adherence from depression, the depression *symptoms* may be a stronger determinant of medication adherence than the diagnosis.

Cognition. As with depression, impaired cognition has been accepted as a factor in poor adherence (Hayes et al., 2009; Iverson, et al., 2011; Osteberg, 2005; National Council on Patient Information and Education, 2007; Insel et al., 2006; Wagner, 2003). Despite this wide assertion, some studies do not report a significant association between cognition level and adherence (Botelho & Dudrak, 1992; Haus, 2003; Kripalani et al., 2010). Park & Meade (2007) relay that because medication adherence involves both executive function (or memory and learning processes) and automatic (habitual) processes, older adults may be able to compensate with automatic functioning, which is less impaired by age and declining cognition. In a

hierarchical regression model, Insel et al. (2006) found that executive function, operationalized by the Wisconsin Card Sort test, contributed a modest significant change to medication adherence scores (R^2change=. 09, <. 05) after accounting for Mini Mental Status Exam scores (R^2 change = .04, p < .05) and depression, which was defined by the GDS-30, (n.s). Impaired cognition may only be an issue when strategies such as including caregiver assistance to compensate are not implemented (Cottrell, Wild & Bader, 2006; Ownby et al., 2006). Indeed, Cooper et al. (2005) found a U-shaped curve related to cognition and adherence supporting the idea that as cognition declines, others may take over administration of medication, resulting in good medication adherence.

Social factors. An individual's connections with others impacts medication adherence in various ways (WHO, 2003). This section will discuss how need for help and social support in general impact medication adherence.

While two studies (Cotrell et al., 2006; Kuzuya et al., 2008) support the idea that needing, but not receiving help, can explain poor adherence levels, the ability to self-identify as needing help may be impaired in older adults. In a study of Japanese elders Kuzuya et al. (2008) found higher rates of non-adherence in those who required, but did not receive, help with medication. In a small study (N=36) Cottrell et al. (2006) found that when a caregiver was involved, older adults with dementia had medication adherence rates identical to those of cognitively intact patients (85%). Of note was the fact that participants without dementia demonstrated a poor ability to correctly identify their own self-administration skill level, a finding supported by

Park & Meade (2007). Thus, older adults who might need help with medication do not appear to always be able to identify that need, further complicating their ability to have outside help to take medication.

Inability to self-evaluate one's ability to take medication correctly may help explain findings in which social or medication support were not linked with higher adherence. In a population of HIV patients, functional medication support (as measured by an instrument assessing *perception* of available help with regimen tasks) was inversely correlated with medication adherence ($r = - 0.20$, $p <. 05$) (Wagner et al., 2003). Similar findings are noted in a population of patients with congestive heart failure (mean age 63) (Kripalani, Gatti & Jacobsen, 2010). In that study, self–reported reliance on friends or family for reminders about medication actually increased the odds of poor adherence (Kripalani et al., 2010). Neither of these studies measured actual support provided. It is possible that the actual provision of assistance is the critical link to better adherence, as the work by Kuzuya et al. (2008) and Cottrell et al. (2006) implies. It is thus important to measure actual exchanges of support in order to more clearly define the role of others in bolstering medication adherence behavior.

Broad literature reviews on medication adherence assert that social support is related to improved medication adherence (DiMatteo, 2004; NCPIE, 2007; Osteberg & Blaschke, 2005; Schlenk, et al., 2004). Family support remains understudied as it is often subsumed under the umbrella of social support and most empirical literature does not parse out the effect of family support. A meta-analysis (N=122 studies) of social support and adherence to medical regimens (not just medication) across all age

groups, found good support for positive relationships between both functional and emotional social support and medication adherence (median correlations 0.27 and 0.20, respectively; DiMatteo, 2004). Fourteen of the 122 studies exploring family cohesiveness demonstrated a mean correlation with adherence of 0.27, however, none of these family studies focused on the older adult and none parsed out details regarding which family members provide support, or what types of support are significant (DiMatteo, 2004). In studies including older adults (N=7), none focused on family support apart from the broader frame of overall social support (DiMatteo, 2004). So while it appears family connections have a positive impact on medication adherence across all age groups, there is limited evidence that this is true for older adults, who may undergo changes in fundamental relationships within the family as they move from providing support to children, to being net receivers of support.

There are a few studies in younger patient groups or in studies of specific disease areas such as schizophrenia and HIV that provide more insight into how family support exchanges may be linked with better adherence (Hamilton, Razzano, & Martin, 2007; Knodel et al., 2010; Ramirez Garcia et al., 2006). Details surrounding exchanges of support in HIV patients demonstrated that being able to provide support to a caregiver enhances adherence (Knowlton et al., 2011). In an HIV population, Lehavot et al. (2011) found that general perceived social support had no effect on medication adherence, but medication specific support (such as getting reminders about medication) did increase adherence in those subjects who also were abusing illicit drugs (OR=1.52, p<. 05).

Living with someone and being married has been found to increase adherence in many studies (Cooper et al., 2005; DiMatteo, 2004; Trivedi, Ayotte, Edelman & Bosworth, 2008). These studies did not focus on the older adult. Contradictory results were reported by Dunlay et al. (2011), who found no difference in marriage rates between adherent versus non-adherent community dwelling elders with congestive heart failure (Dunlay et al., 2011).

While there are some studies supporting a positive relationship between social support in older adults and medication adherence, none measured family support separate from social support (Hedemalm, Schaufelberger & Ekman, 2010; Krousel-Wood, et al., 2010; Voils et al., 2005 and Nicklett & Liang, 2010) and comparisons between studies is complicated by the use of varied instruments to measure support, as some measure perceived support, and others actual support. A study of 85 adults over 60 who had a diagnosis of depression explored the impact of social support on medication adherence (Voils et al., 2005). The Duke Social Support Index was used to measure subjective (or perceived) support, actual exchanges of support, social network size and non-family interactions. Subjective social support was significantly correlated with medication adherence ($r = .3, p < .01$), while other measures were not (Voils, et al., 2005). However, social support was non-significant in the group who had low internal locus of control (Voils et al., 2005), supporting adherence models (Leventhal et al. 1999; Murray et al., 2004) that suggest belief about ones ability to manage medications is important.

Conflicting results are noted between two other studies (Hedemalm et al., 2010; Nicklett & Liang, 2010) where methodological limitations in size and statistical analysis (Hedemalm et al., 2010) make comparison difficult. In a disease specific review, Nicklett and Liang (2010) reported that perceived availability of help with medication taking increased the odds of self-reported adherence in a population of older community dwelling diabetics (OR=1.59, p <. 05). These results conflict with a small (N=69) Swedish study of elderly with chronic illnesses that found immigrants reported both lower perceived social support, yet higher medication adherence as compared to natives. The methodological limitations of this study include limited reporting of inferential statistics and small sample size, making it difficult to compare it with the positive association between adherence and perceived social support of Nicklett and Liang (2010). Beyond methodological limitations, the conflicting findings may relate to cultural differences or differences based on factors specific to the diabetic patient.

One study with a large sample, validated measures and detailed statistical reporting is that of Krousel-Wood et al. (2010), who also used the MOS to study social support, depression and medication adherence in a population of hypertensive CDEs. This large (N = 2,180) trial found that low perceived social support increased the odds of poor adherence (OR =1.41, p <. 01). When depression was controlled for, the odds that social support increased adherence approached, but did not reach, significance (OR=1.27, p =. 07).

Exploration of the impact of family on medication adherence in CDEs is limited to two studies (Haus, 2003; Kitchie, 2003) that report varying results. In a survey of 139 community dwelling elders, Kitchie (2003) used two measures to gather knowledge of social support and connections. Medication adherence was measured using a broad, well-standardized instrument that asked questions not only about the number of times medication was skipped, but perceived side effects and beliefs. Social support was operationalized with the MOS instrument and was not significantly associated with medication adherence. Family social network, measured with the Lubben Social Network Scale (LSNS), addressed issues of family contact as well as emotional support and was significantly correlated with Brief Medication Questionnaire (a self-report adherence scale; Svarstad et al., 1999) scores ($r = -.260$, $p < .002$), showing that as family contact and emotional support increased, non-adherence decreased. Further, the author reported a significant difference between family network ($M = 17.42$, $SD = 6.43$) and friend network support ($M = 16.12$, $SD = 5.99$, $t(138) = 2.198$, $p = .03$), suggesting that individuals received more support from family than non-family.

Another study of the impact of social support on medication usage in CDEs ($N = 60$) did not demonstrate an impact from perceived family support on appropriate self-management of medication skills (Haus, 2003), but 56% of participants stated that family would be the preferred source of support for help with taking medication. Methodologic limitation of this study include that fact that appropriate self-management was operationalized as a judgment by the researcher that the participant

used good strategies to manage their medications, as well as inadequate power due to 7 variables with only 60 subjects.

These studies demonstrate that family support may operate differently than the broader construct of social support (Haus, 2003; Kitchie, 2003). They also suggest that there are differences between perceived support and actual support exchanges (Lehavot et al., 2011). The work by Knowlton et al. (2011) indicates the net balance of actual supportive exchanges may be important to medication adherence rates. IGS provides a framework for this proposed study that incorporates these important concepts.

Intergenerational Solidarity

Intergenerational solidarity (IGS) (Bengtson & Roberts, 1991) is a multi-faceted paradigm from social gerontology that provides "...a comprehensive scheme for describing sentiments, behaviors, attitudes, values and structural arrangements in parent-adult child relationships." (Silverstein et al., 2010, p. 1007). While the structural component of the model closely mirrors the social support frame, the IGS framework includes the values held by each family member and levels of affection for one another, which are absent from the social support view. IGS focuses specifically on exchanges of support and love between generations of parents and adult children who have grown and left home. Thus, the framework guides research about parents, whose age is normally over 50, and their adult children, providing a good fit for the current study of CDEs.

The central concept to the framework, solidarity, is defined as: "...intergenerational cohesion after children reach adulthood and establish careers and families of their own." (Bengtson & Roberts, 1991, p. 856). IGS comprises seven components that contribute to solidarity in a family (Bengtson & Roberts, 1991; Silverstein et al., 2010). In addition to the original six elements (structural, associational, affectual, consensual, functional and normative solidarity) (Roberts & Roberts, 1990) experts in the field now include the concept of ambivalence within the frame (Lowenstein, 2007; Silverstein et al., 2010; van Gaalen & Dykstra, 2006). This inclusion reflects the argument of Luescher and Pillemer (1998) that the intergenerational model should include the inherent complexity of emotion between parent and child.

There is general consensus that the components of IGS can be described in the following manner (Bengtson & Roberts, 1991; Lowenstein, 2007; Silverstein et al., 2010). Structural solidarity refers to the composition of a family as well as how closely they live together. Building on that base, associational solidarity involves the type and frequency of interactions. Solidarity, or similarity, of family members individual values and beliefs is reflected in the elements of consensual solidarity, or the degree to which family members agree. Normative solidarity is defined as the level to which a family member believes he or she is obligated to provide help and affection for other members. In recognition that families may hold high normative values, but not necessarily warm feelings for each other, affectual solidarity, or the type and degree of positive feelings for one another, is conceived as a separate

element. Finally, reflective of the roots in social support theory, functional solidarity is the degree to which tangible and emotional sustenance are exchanged (Bengtson & Roberts, 1991). Ambivalence is seen as the intersection of conflict with affection (Luescher & Pillemer, 1998; Silverstein et al., 2010). These seven elements do not come together to create a summative explanation for intergenerational supportive behavior, or a predictive model, but instead provide a framework to view such relations (Bengtson, Giarrusso, Mabry, & Silverstein, 2002).

Further research with large randomized population surveys employed factor analysis and yielded similar results, demonstrating three broader components to solidarity: affectual, associational and functional solidarity (Lowenstein & Daatland, 2006; Silverstein and Bengtson, 1997; Syzdlik, 2008). The first of the three factors, affectual solidarity is considered to be a combination of affect and consensus (Lowenstein & Daatland, 2006; Silverstein & Bengtson, 1997). Associational solidarity is both the structure of the family and frequency of contact. Functional solidarity, or help exchanged does not appear to load in factor structure and is thus considered a separate component (Lowenstein, 2007; Silverstein & Bengtson, 1997).

Foundational modeling of the components was derived from data from the well established and still evolving Longitudinal Study of Generations (LSOG) (Bengtson & Roberts, 1991). In this work 363 older parents (mean age 67.1 in 1971) and 246 middle aged adult children (mean age 43.8) first took part in 1971 and are currently participating in a 4th survey (Bengtson & Roberts, 1991; Silverstein, personal communication, 2011). Results from the first survey demonstrated that

normative solidarity, affectual solidarity and proximity (structural solidarity) all contribute to associational solidarity (child affect (.109) + parent affect (.244) + proximity (.400) – child normative (.136); R^2 = .641)(Bengtson & Roberts, 1991).

Later works support many of these relationships. Affectual solidarity impacts functional solidarity and associational solidarity in a positive manner (Fingerman et al., 2010; Lawton et al., 1994; Lowenstein & Daatland, 2006; Merz et al., 2009; Silverstein et al., 1994). Associational solidarity also is connected to functional solidarity (Lowenstein & Daatland, 2006; Silverstein et al., 2002). Normative solidarity contributes to functional solidarity (Rossi & Rossi, 1990) and associational solidarity (Lawton, Silverstein & Bengtson, 1994). Functional solidarity levels above average increase ambivalence (Pillemer et al., 2007; Silverstein et al., 2010).

Historical underpinnings. The foundations for the creation of IGS stems from early sociological work about the importance of family to overall wellbeing and functioning and fit conceptually with the Roy model, which includes interdependence with others as a key component of a person (Roy, 2009). Durkheim (1915/1951) argued for the importance of family by citing lower rates of suicide in married persons and higher levels of well-being for individuals who are part of a family. Durkheim also laid out several ideas that are foundational to IGS in that shared experiences (e.g. associational solidarity) bind one to a group (Durkheim, 1915/1951) and that affection, common beliefs, need and obligation drive individuals together to create a sense of solidarity (Durkheim, 1933). Thus, IGS fits well with the central

assumption of mutuality found in the Roy model and in adherence theory (Bisonnette, 2008; Roy, 2009).

Other early sociological work contributes to the present understanding of what activities and behaviors create a supportive family environment. Angell (1936), who explored the responses of families after a significant income drop during the Great Depression, demonstrated that families who were successful in adapting offered mutual support through behaviors such as being gentle with each other, assisting with household chores and obtaining outside employment (Angell, 1936). Early writing on solidarity (Jansen, 1952) and social support (Cobb, 1976) credit Angell for descriptions of emotional and functional support.

Social support theory, as demonstrated in Homans' (1958) work describing exchanges between people in everyday interactions, is also foundational for IGS. Though not specific to family interaction, Homan's exchange theory describes social relationships as revolving around affection, association and consensus. People exchange these 'items' with each other and seek to find a sort of equilibrium in these exchanges (Homans, 1958). Given that families are social units, this idea of reciprocity is interwoven into the IGS model as affectual solidarity

Cobb's (1976) seminal work on social support builds on descriptions of Homans' (1958) exchange theory. Family support is subsumed under the umbrella of social support, described by Cobb (1976) as an individual's belief that he or she is loved and belongs to a community within which mutual exchanges of help and support can occur. Weiss (1974) laid out a more functional view of social support and

discussed the specific benefits or purpose of such supportive relationships. Such functionalities are now commonly held as emotional support and instrumental support (Finfgeld-Connett, 2005). These closely mirror affectual and functional solidarity within the IGS frame.

Underpinnings for affectual solidarity are found in the idea that family relationships have unique prescribed social norms surrounding behavior towards each other, often known as obligation (Bengtson & Roberts, 1991). The initial stages of such obligation within IGS are formed with affection and attachment in infancy (Roberts & Bengtson, 1991). The creation of a bond between parent and child begins in infancy and has been well characterized by theorists such as Bowlby (1961) and Ainsworth (1973). The affectional bond is often seen as one of positive affect, or love (Ainsworth, 1973). Attachment relationships are generally asymmetric (Bowlby, 1961), with support flowing from one individual to another and not in a reciprocal fashion. While the normal state for exchanges of support between parent and child are consistent with this during much of life (Antonucci, 1985; Fingerman et al., 2010; Silverstein et al., 2002), the balance may shift when parents age, as time and affection offered to young children is correlated with support provided to parents in later life (Antonucci, 1985; Merz et al., 2007, Silverstein et al., 2002). Normative obligations also play a role in children provided support to parents (Merz et al., 2007; Silverstein et al., 2002).

Empirical explorations of the components of IGS. Much of the work on IGS comes from large, randomized phone surveys throughout the United States (Bengtson & Roberts, 1991; Fingerman et al., 2010; Lawton, Silverstein & Bengtson, 1994; Logan & Spitze, 1996; Rossi & Rossi, 1990) and recently, internationally (Lowenstein & Daatland, 2006; Merz et al., 2009). These studies provide documentation of the amount of help exchanged within families (Bengtson & Roberts, 1991; Fingerman et al., 2010; Logan & Spitze, 1996; Lowenstein & Daatland, 2006), the relationships between the components of IGS (Bengtson & Roberts, 1991; Rossi & Rossi, 1990; Silverstein et al., 2002) and a few link IGS with well being (Lowenstein & Daatland, 2006; Silverstein & Bengtson, 1991). Significant attention has also been given to demographic and situational factors that contribute to IGS (Fingerman et al., 2010; Rossi & Rossi, 1990.). The focus of this section will be on studies that provide detail on factors affecting IGS, information about the balance of functional support within the parent-adult child dyad and the relationship of IGS to health outcomes.

Factors impacting IGS. Gender affects many components of IGS. In general, females are more likely than males to both give and receive functional support (Hogan, Eggebeen & Clogg, 1993; Ward, 2008; Lawton, Silverstein & Bengtson, 1994; Kahn, McGill & Bianchi, 2011), have contact with mother (Umberson, 1992), and report higher levels of filial responsibility (Gans & Silverstein, 2006; Lawton et al., 1994). Affectual solidarity also seems higher in daughters (Lawton et al., 1994) and for women is related to increased likelihood of engaging in healthy behavior

(Grzywacz & Marks, 1999) and providing higher levels of support to a parent (Fingerman et al., 2010). Male gender has been linked with provision of support to a father (Lawton et al., 1994). However, more recent studies did not find differences in measures of functional solidarity between genders, (Fingerman et al., 2010; Sarkisian & Gerstel, 2008), suggesting that the traditional gender gap may be decreasing.

A higher level of education predicted lower levels of filial responsibility (β = -.49, p <. 05) in the multi-generational study of Gans and Silverstein (2006). This finding supported the earlier findings of Lawton et al. (1994) in the AARP survey where higher levels of education predicted not living near a parent, and decreased daily contact (associational solidarity).

Studies regarding marital status of both aging parents and their adult children, and its impact on various measures of solidarity within the family have produced inconsistent results. In general, many studies found being married related to decreased solidarity with either the child or the parent (Fingerman et al., 2010; Gans & Silverstein, 2006; Kahn et al., 2010; Lawton et al., 1994; Sarkisian & Gerstel, 2008). Conflicting findings were noted by Grundy and Henretta (2006) who reported data from the Health and Retirement Survey (N=2,291), in which 27.1% of unmarried children provide no help (time or money) to an elderly parent or child compared to 20.3% of married women who give no assistance. These differences between studies may be attributed to the multiple factors influencing IGS (gender, health status of parent, and culture).

Culture plays a significant role in the expressions of IGS. Random sampling from large (>100,000) cities in five separate countries (Germany, Norway, Spain, England and Israel) yielded a total sample of 6,000 (Lowenstein & Daatland, 2006). Important cultural differences were noted. For example, while 90% of respondents in Spain reported weekly contact, only 59% in Germany reported such contact. In Israel, 87% of respondents indicated high affectual solidarity, but only 45% of German family members reported such affection. Other work with varied cultures supports the idea that both large (country level) and small (local level) cultures affect IGS. Yi and Lin (2009) report that in Taiwan, sons have higher levels of functional solidarity than daughters; a finding that is opposite those common in the US (Fingerman et al., 2010). Findings from Sechrist et al. (2007) demonstrate that adult children living in the southern United States have more contact and report higher quality of relationship with their mothers than those living in other regions.

Balance of functional support. Several studies demonstrate difference in functional support/solidarity based on various life situations. In research that explored the balance of support provided and received between 3 generations, Fingerman et al. (2010) studied a randomized selection of Philadelphia area subjects in a phone survey (*N*=633). They used the Intergenerational Support Scale to measure exchanges of support. Affectual solidarity was measured by a common, but perhaps less strong measure with two questions. Results demonstrated that being from the younger generation predicted the receipt of more support from a parent (β=-0.63, $p <. 001$). A separate multiple regression analysis to explore the predictors for providing help in

levels and patterns apart from average (e.g. more help or greater help to a parent than the median) found affectual solidarity (importance of tie) provided a small, but significant impact (β=. 17, p<. 001) upon provision of support (Fingerman et al., 2010). This bolsters the idea that affectual solidarity is important to functional solidarity and suggests that parents typically provide more help to progeny than to their own parent.

Multiple studies support the idea that as the need of the older adult increases, provision of support increases (Fingerman et al., 2010; Silverstein et al., 1994; Silverstein et al., 2006). This alters a normally lifelong pattern where children are net receivers of functional and emotional support. The reversal of normal patterns of exchange decreases the self-ratings of well-being of the parent (Merz et al., 2009) and increases the risk of having an ambivalent type of relationship with one's child (Silverstein et al., 2010).

Measurement of IGS. This section will review the development and current state of measures of IGS.

Affectual solidarity and conflict. Measures of affectual solidarity are commonly based on the original instrument development for the IGS framework (Gronvold, 1988). Ten (6-point Likert) questions surrounding understanding, trust, fairness, respect and affection demonstrated excellent reliability (α=0.936) and adequate factor loadings (exceeding 0.70 for each question and an eigenvalue of 6.35). Many studies use some, but not all of these questions, without stated rationale (Fingerman et al., 2010; Lowenstein & Daatland, 2006; Silverstein et al., 1994;

Silverstein & Bengtson, 1997). Operationalization of affectual solidarity is frequently done using two questions with reported reliability ranging from none (Fingerman et al., 2010) to marginal (0.65) (Umberson, 1992). In several studies, affectual solidarity has been measured by a single question about how close one feels to the child or parent (Silverstein & Bengtson, 1997; Shapiro, 2004).

A recent advance in operationalizing both affect and conflict in parent-child relationships can be found in the work of Pitzer, Fingerman and Lefkowitz (2011). In a sample of 312 middle age adults, they explored reliability and validity of an 8-item scale based on Gronvold (1988). The scale demonstrated 2 factors, one positive and one negative. Alpha reliability ranged from 0.74-0.82 varying slightly with gender and subscale. Test-retest reliability was acceptable at 0.77-0.80. Convergent and divergent validity tests demonstrate significant correlations with other established measures of positive and negative emotion.

Associational solidarity. Associational solidarity is traditionally measured with an instrument based on the definition of associational solidarity as shared activities (Mangen, Bengtson & Landry, 1988). Factor analysis demonstrated one factor accounted for 32-50% of the variance (depending on generation). Further analysis found that visits, talking and dinner together contributed the most to overall solidarity, and contact not involving non-face-to-face items (phone calls, letters) contributing poorly to the overall measure. Item reliability for 7 measures across generations is .76-.87 (Mangen & Miller, 1988).

Based on a suggestion that one item might be ample to measure associational

solidarity (Mangen et al., 1988), Grzywacz & Marks (1999) asked just one question

about frequency of any type of contact, including email. Silverstein & Bengtson used

a similar question from the larger question set in their analysis of LSOG data (1994;

1997). Others utilize daily face-to-face contact as indicative of associational solidarity

(Lowenstein & Daatland, 2006; Weinstein et al., 2004). These single question

measures have clear acceptability in the IGS literature (Grzywacz & Marks, 1999;

Lowenstein & Daatland, 2006; Silverstein et al., 2010) and some support from initial

tool development, but the single question asked varied from study to study, making

conclusions across studies regarding associational solidarity difficult. Reliance upon

face-to-face contact also does not take into account the impact of other contemporary

forms of social contact such as Internet and Skype. Silverstein et al. (2002) used a

five-question measure based on the original instrument with alpha reliability of 0.88-

0.90. This measure addresses a variety of contact scenarios and thus seems to capture

the concept most deeply.

Functional solidarity. Development of a functional solidarity measure has

only recently produced measures that are valid and reliable. Initial attempts at

creating a measure (Mangen et al., 1988) did not yield acceptable alpha coefficients.

Other authors have analyzed components of functional solidarity separately

(Lowenstein & Daatland, 2006; Shapiro, 2004). Some used measures that overlapped

both functional and affectual solidarity and did include reliability analysis (Shapiro, et

al., 2004; Weinstein et al., 2004). A more reliable measure of functional solidarity by

Silverstein et al. (2006) and Fingerman et al. (2010) measured functional solidarity using an 8-point Likert scale inquiring about help provided to a parent related to physical assistance, emotional support, errand running and financial assistance. Reliability ranged from 0.83-0.90 (Silverstein et al., 2006; Fingerman et al., 2010).

Empirical studies of IGS and adherence or health outcomes

While research connecting the components of IGS directly to health outcomes is limited, there is evidence that IGS impacts depression and even mortality. A single study (Grzywacz & Marks, 1999) explored the relationship between health behaviors including medication adherence, and measures of IGS.

Depression. One of the most studied health relationships is between components of IGS and depression symptoms (Byers et al., 2008; Umberson, 1992; Ward, 2008; Weinstein et al., 2004). Ward (2008) used data from the National Survey of Family and Households ($N = 2,270$), which used 12 checklist items about depression (undetailed, no reliability or validity noted) and found that measures of functional or associational solidarity did not contribute to depression. However, high relationship quality (affectual solidarity) predicted lower depression scores ($\beta= -.10, p <. 05$). While number of minutes of contact did not help predict depression, when frequency of contact (associational solidarity) was dichotomized into high and low, low contact predicted a small amount of variability in depression scores ($\beta =. 09, p<. 05$). Umberson (1992) also used a national probability sample ($N = 3,618$) and a robust measurement of depression, the Center for Epidemiologic Studies Depression scale (CES-D), but failed to demonstrate that level of contact as measured by one

question about frequency of contact (associational solidarity) or perceived emotional

support as measured by a question about perceived quality of relationship (affectual

solidarity) impacted depression. Frequency of contact did not significantly contribute

to CES-D scores, but in a sub-analysis was associated with higher CES-D scores in

widows (data not shown in the article) (Umberson, 1992). The author suggested that

needs related to depression symptoms might drive a family to increase contact with

an older adult.

Byers et al. (2008) used data from the LSOG responses from 304 parents and

adult children and explored the impact of functional solidarity measures (as measured

by 2 questions of emotional and instrumental support from the larger LSOG data set)

on depression symptoms symptomatology as measured by the CES-D. Unlike Ward

(2008) who found significant correlation between help provided and help received,

Byers et al. (2008) noted that when an adult child reported depending on parental

instrumental support, depression scores (CES-D) in the older adult were lower,

indicating fewer depression symptoms (β = -3.25, p<. 001). When a parent

perceived a child felt grateful for support provided, lower CES-D scores were also

reported (β = -3.16, p =. 003). The authors concluded that feeling connected or

"mattering" in a relationship may buoy mental health status (Byers et al., 2008).

These studies suggest that the relationship between depression symptoms and

measures of IGS are complex. While affection and support to a parent may not impact

depression (Umberson, 2002; Ward, 2008), the findings of Byers et al. (2008) suggest

that being a recipient of help may not be nearly as beneficial as being able or willing

to provide help to an adult child. Findings from Lowenstein (2007) support this idea in that receiving help predicted lower quality of life (QOL) $(\beta = -.246, p < .001)$ while providing help increased QOL $(\beta = .134, p < .001)$.

Impact of IGS on mortality. One study has explored the idea that IGS could decrease mortality risk. A longitudinal study $(N = 435)$ explored the link between measures of solidarity and mortality in the parent after death of a spouse or divorce of the older couple (Silverstein & Bengtson, 1991). Controlling for age, gender and health status, the authors found that while affectual solidarity does not directly influence survival time, in the setting of social loss (loss of spouse, parent or child or divorce) affectual solidarity contributed to decreased risk of mortality in the first 5 years after the loss $(\beta = -1.891, p < .05)$.

Medication and IGS. Only one study linking medication adherence to measures of IGS appears in the literature. Grzywacz and Marks (1999) used data from the National Survey of Midlife Development (1995) to explore connections between IGS and health. This randomized survey of adults between 25 and 74 years of age explored affectual, normative, associational, functional and structural solidarity and its effects on health behaviors, including appropriate use of medication. Proper medication administration was measured using a 5 question self-report asking yes or no questions. Scores ranged from 0-5 with a score of 5 indicating following instructions perfectly. Affectual solidarity was measured using questions that addressed both conflict and affection $(\alpha = .83)$. For each unit increase in affectual solidarity, the odds of being adherent to medication increased (women, $OR=1.56, p$

<. 01 and men, *OR*=1.77, *p* <. 001). Functional solidarity in terms of giving instrumental support increased the odds of appropriate medication use in men (*OR* =1.05, *p* <. 05), but not women. This finding bolsters the idea that older adults who can remain in an interactive relationship with their children may have improved health outcomes (Byers et al., 2008), perhaps driven by better medication adherence. While this study provided an overview of the impact of IGS upon health related activity, it did not focus exclusively on the older adult, limiting its direct applicability to the proposed study.

Summary

From the above discussion one can see that the IGS model provides a rich base from which to obtain constructs to study exchanges of support across family generations. Findings support the basic generalization that demographic variables such as gender, culture and time of life impact measures of solidarity (Fingerman, et al., 2010; Grzywacz & Marks, 1999; Lowenstein & Daatland, 2006; Silverstein, et al., 2010). Gender appears especially important; women appear to be more likely to provide support than men and affectual solitary is related to provision of help in women, but normative solidarity is more likely to predict functional solidarity in men (Lawton et al, 1994; Lowenstein & Daatland, 2006; Silverstein et al., 1994).

The evidence indicates that some aspects of IGS influence behaviors of adult children toward their parents. Measures of solidarity are interconnected. For example, associational solidarity impacts provision of support to parents (Lowenstein & Daatland, 2006; Silverstein, et al., 2002; Lawton, et al., 1994). Affectual solidarity

receives some support in the literature as having impact on functional solidarity

(Fingerman et al., 2010; Lawton, et al., 1994; Silverstein et al; 1999) as well as

bolstering older adults through grief (Silverstein & Bengtson, 1991). The literature

suggests that measures of solidarity are important to well being and QOL (Byers et

al., 2008; Lowenstein, 2007; Silverstein & Bengtson, 1991).

Family support theory and research often focuses simply on the type of

support given. One critique of this perspective is that it lacks depth regarding the

factors influencing support, ignoring connections and linkages between these factors

(Hogan et al., 1993). Additionally, while family support is often operationalized as

perceived availability of support (Haus, 2003; Krousel-Wood et al., 2010; Nicklett &

Liang, 2010) the IGS frame acknowledges both the objective exchange as well the

perceived balance in the interaction (Bengtson & Roberts, 1991; Fingerman et al.,

2010). Lehavot et al. (2011) demonstrated that perceived availability of support did

not impact adherence, while actual support did increase medication adherence. Thus,

the IGS provides a rich, interactive frame to explain and explore such exchanges

within the Roy (2009) interdependence mode, allowing specific measurement of the

types of help provided (such as emotional support, or functional support) as well as

the net support received or provided to family members. There is a need to study

actual exchanges of support in the family context in order to further elucidate its role

in enhancing medication adherence of older adults.

Roy (2009) states the modes intersect and affect each other, thus the

responsibility of an individual with chronic health problems in taking medication

(role mode) may interact with and affect or be affected by the interdependence mode. This proposed study offers the opportunity to study the relationship between the older parent and adult child as envisioned by the IGS framework, and medication adherence, potentially offering insights into working with such dyads with a goal of increasing medication adherence.

Medication non-adherence in older adults is a complex phenomenon. It is clear from the literature that individual factors of older adults such as amount of depression symptoms, cognitive status, functional level and perceptions of illness and medication itself play a role in adherence. Although there is a plethora of work on medication adherence and social support, there are few studies that focus on community dwelling elders. This age group is at risk for depression and cognitive issues that can adversely impact adherence. Of the literature that focuses on older adults, most include only elders with one or two specific disease states: osteoporosis (Iverson et al., 2011); hypertension (Krousel-Wood et al., 2010), diabetes (Nicklett & Liang, 2010), depression (Voils et al. 2010) and congestive heart failure (Dunlay et al., 2010). While social support appears to enhance medication adherence, most studies also subsume the idea of family support under the umbrella of social support (Krousel-Wood et al., 2010; Nicklett & Liang, 2010; Voils et al., 2005). This may neglect the importance of the family relationship (Kitchie, 2003) and the preference of older adults for family provided support (Haus, 2003). Of the two studies that investigated family support data separately (Haus, 2003; Kitchie, 2003), only the

work by Kitchie (2003) was adequately powered and used a reliable measure of adherence to give the findings strength.

Finally, an unexplored focus in relation to family is detail regarding which family members may be influential towards medication adherence. While there is evidence that being married increases medication adherence (DiMatteo, 2004), and that perceived family support and involvement may increases adherence (Kitchie, 2003; Nicklett & Liang, 2010) there is no work regarding the relationship between components of IGS and medication adherence of CDEs. The IGS framework provides a rich foundation to study this gap in the literature.

Chapter III

METHODS AND PROCEDURES

Design of the Study

The study is a descriptive correlational design, exploring the relationship between measures of intergenerational solidarity and medication adherence in CDEs. The design is appropriate as it is not possible to manipulate either variable, making an experimental design inappropriate (Polit & Beck, 2012). Given the relative gap in exploring intergenerational solidarity as it relates to medication adherence in this population, interventional research is presumptive.

Description of the Population and Sample

According to the 2010 United States (US) census data there are nearly 35 million adults over the age of 65. There are more women than men in this age cohort (70 males per 100 females) (Werner, 2011). Of concern for the current study is the 13,439 of those individuals who reside in the township (US Census, 2010) where the present study was conducted. The target population was the 87.3% individuals in the over 65-age group who take medication on a regular basis (USDHHS, 2008). Within that target group, this study included older adults who have an adult child.

A convenience sample was obtained primarily from a senior center in a medium sized city from the Northeast United States. Census data demonstrate the township is a largely Caucasian (82%) and middle or upper-middle class with median

income at $72,052 and only 3% of citizens living below poverty level (US Census Bureau, 2010). The township has a relatively large senior community, with 15% of the population over 65 years of age as compared to 12.6% nationally (US Census Bureau, 2010). Due to saturation of interest in participation, a second senior center in the same county and neighboring town was utilized as it had similar demographic statistics.

Setting

Two senior centers in the same county were utilized for this study. While they are similar in terms of facilities and services, Senior Center 1 (SC1) has more attendees as well as a larger physical plant than Senior Center 2 (SC2). The primary senior center serves over 500 distinct individuals per week, while the second serves about 100. Both centers have a large dining hall where county supported lunch is served daily for $1. The dining halls also host Bingo games, exercise classes and are a place for gathering and playing cards. Each center also has exercise equipment, a separate room for billiard tables and an additional room with computers for general use. While SC1 has a shallow pool for water exercise, SC2 has a room dedicated to art activities.

Services provided by the centers include exercise classes, computer classes, and lectures by invited guests on topics such as health, finances and current affairs. In addition the centers bring in other community agencies that may be of service to the population such as nurses from local hospitals or the town for health screenings, state prescription assistance programs, legal aid or other benefit programs such as food

stamps. A ride share program can bring seniors who are unable to obtain their own transportation. The director of SC1 is a Registered Nurse, but no nursing care is provided in the setting.

Instruments and Measurement Methods

Demographic data. Given the factors that impact medication adherence and IGS such as gender, cultural identity and cost of medication, data was collected about these demographic characteristics (Appendix A). Participants were also asked if anyone helps them with their medication as well as how that individual provides help.

Affectual solidarity. The positive subscale of the parent-adult relationship questionnaire (PARQ; Appendix B; Pitzer et al., 2011) was administered to explore affectual solidarity in the parent-adult child dyad. This measure has eight questions on a five point Likert scale. There are two subscales, one for positive affect (questions 1-4) and the other for more negative relational emotions (Pitzer et al., 2011). Tested in a randomized sample ($N = 254$) of parents with a mean age of 55, the PARQ was found to have acceptable test-retest (0.76) and alpha internal consistency reliability (0.74 for mothers; 0.82 for fathers; Pitzer et al., 2011). Convergent validity was established by comparing the positive subscale with the question about overall relationship quality from the National Survey of Family and Households (Koropeckyj-Cox, 2002) and from the positive affect questions of the Americans Changing Lives survey (Umberson, 1992).

Functional solidarity. The Intergenerational Solidarity Support (ISS) Scale (Fingerman et al., 2010; Appendix C) is based on the measure of functional solidarity

used by Silverstein et al. (2006). The ISS will be used to measure exchanges of

support the subject provides to and receives from the adult child they consider to be

closest to them. The measure is derived from early social support work by Vaux and

Harrison (1985), which put forth five basic modes of support such as providing

tangible help, socializing and financial assistance. A qualitative content analysis of

mother-daughter pairs that found listening to each other speak about events of the day

also drove satisfaction with a relationship (Fingerman, 2000) provided the impetus for

a sixth dimension to the instrument.

The ISS scale provides a definition of the type of support (e.g. emotional

support) as well as examples, then asks a respondent to indicate how frequently they

provide seven different kinds of support on an 8-point Likert scale (never to daily).

Seven additional questions seek the frequency of support received. The scale score is

reported by providing the mean of all six categories (range 0-8). In a large sample

(N=633) of adults, who were interviewed verbally over the phone, with a mean age of

50 years old the measure had excellent reliability ($\alpha = 0.88$; Fingerman et al., 2010).

Associational solidarity. Associational solidarity was measured with an

instrument employed by Silverstein et al. (2002) that was based on the original scale

by Mangen (1988). The instrument has 5 questions about frequency of activities with

the adult child. Answers are given on a 0-7 point Likert scale and range from "almost

never" to "almost every day". In the Silverstein et al. (2002) study young adults were

asked verbally about their activity with both mothers and fathers. Alpha reliability for

mothers and fathers was almost identical (0.88 and 0.90 respectively). The total score

ranges from 0-35 with more contact and association with higher scores.

Depression symptoms. While there are several measures for depression

symptoms prevalent in the literature, the Geriatric Depression Scale-15 (GDS-15;

(Sheikh & Yesavage, 1986; Appendix E) was used, as it is developed and normed in

the geriatric population. The scale has the benefit of limiting the effect of physical

symptoms, which can be problematic in the elderly (Almeida & Almeidia, 1999;

Marc, Raue & Bruce, 2008). Original psychometric data demonstrated equivalency

with the Geriatric Depression Scale-30 (Sheik & Yesavage, 1986). A meta-analysis

studies using the GDS-15 showed pooled sensitivity of 0.805 with a specificity of

0.750, roughly identical to the widely used Center for Epidemiological Studies

Depression Scale (CES-D; Wancata, Alexandrowicz, Marquart, Weiss, & Freidrich,

2006). Another meta-analysis reported an average reliability of 0.8482 across 338

studies (Kieffer & Reese, 2002). In cognitively intact populations as indicated by a

Mini Mental Status Exam ($M = 28.2$) oral and written administration demonstrates

similar findings ($r = 0.77, p <. 001$; Cannon, Thlaer, & Roos, 2002). The GDS-15 has

15 questions that cover symptoms such as fatigue, hopelessness and anhedonia.

Alternate yes/no responses are used to avoid response set bias; a point is given for

each answer consistent with depression symptoms. A score of 5 or above indicates

possible depression.

Cognition. As with depression, there are numerous instruments available to

detect cognitive impairment. The purpose of exploring cognitive impairment in this

study was to delimit those participants. Given that goal, a screening measure is appropriate. The Mini-Cog (Appendix F) screening instrument is a brief 3-5 minute process involving 3-object recall and a clock draw test (Borson et al., 2000) and is the recommended screen for cognition of the Hartford Institute (Doerflinger, 2007). The instrument has sensitivity of 76-99%, and specificity ranging from 89-93% (Deorflinger, 2007). In a random sample of 1,119 older adults sensitivity (76%) and specificity (89%) was similar to the Mini Mental Status Exam sensitivity and specificity (79% and 88% respectively) (Borson, Scanlan, Chen, & Ganguli, 2003).

Participants were asked to repeat 3 words (apple, penny and ball) and remember them, then draw the face of a clock on a separate sheet of paper and to indicate the time as 8:20 (Borson et al., 1999). Upon completing the clock drawing they were asked to repeat the 3 words (Borson, Scanlan, Brush, Vitallano, & Dokmak, 2000). Zero points were given if no words are recalled (classification = cognitive impairment) and 3 points if all recalled (classification = cognitively intact). If one or two words are recalled, then classification was based on the clock draw. If the clock draw was correct, then the participant is considered cognitively intact (Borson et al., 2000).

Medication adherence. Measuring medication adherence in research and clinical settings in notoriously difficult. There are three main methods in common use: electronic cap monitoring, pharmacy fill data and self-report. Electronic cap monitoring is expensive and only assesses whether or not the bottle was opened. Pharmacy fill data is also costly in terms of time, and does not take into consideration

medications that may or may not have been taken, and other sources of medication to the patient such as samples. Considering affordability and feasibility, medication adherence was measured using the Morisky Medication Adherence Scale (©MMAS-8: Morisky et al., 2008), which is an eight item self-report questionnaire regarding medication usage (Appendix G).

The ©MMAS contains seven questions that ask for a yes or no response to items such as: "People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?" The final question asks participants to rate the frequency with which they forget their medication on a 4-point likert scale. Some questions are reverse coded to avoid response set bias. A point is given for each response that indicates adherence with the medication schedule and added to the score on the likert scale, scores the tool so that the range of possible scores is 0-11 (Morisky et al., 2008).

In a norming study, Morisky et al. (2008) explored the ability of the measure to correlate with blood pressure control. Subjects answered the questions from the ©MMAS-8 over the telephone. Good internal consistency, with a Cronbach's alpha of 0.83 is reported. Factor analysis demonstrated a unidimensional construct (.425-.668, $p < .01$; Morisky et al., 2008). By creating a dichotomy of high versus low scores (cut point = 6) the predictive validity in relation to blood pressure control was 80.3 %. Specificity is high at 93%. As would be expected with self-report, sensitivity is somewhat low at 52% (Morisky et al., 2008).

Other studies detail ©MMAS-8 correlation with other measures of medication adherence. In a small study ($N = 87$) comparing pharmacy fill data, there was 100% concordance between continuous medication gaps and scores below 6 on the ©MMAS-8 (Krousel-Wood et al., 2009). Trindade et al (2011) found the ©MMAS-8 correctly identified 85% of non-adherers in a population of patients with irritable bowel syndrome when compared to pharmacy fill data. Krousel-Wood et al. (2010) used both pharmacy fill data and the ©MMAS-8 in their study of CDEs, social support, depression, and medication adherence. Though rates of non-adherence were higher per pharmacy fill data, the conclusions of the study (that the deleterious impact of low social support on medication adherence disappears in when depression symptoms are present) were the same when the ©MMAS-8 and pharmacy fill data were used. In a meta-analysis of studies comparing self-report and electronic caps systems Shi et al. (2010) conclude that while they appear to under-report non-adherence, correlations between electronic measures and self-report questionnaires (including the ©MMAS-8) are moderate to high, statistically significant, making self-report measures acceptable options for research.

Data collection procedures. The researcher met with the center directors in order to establish a schedule for data collection. At the beginning of the study, the researcher installed posters (Appendix I) in the main hall announcing the study. The directors introduced the researcher to the attendees in the morning of the first day of each week during data collection. On the first day of data collection, the researcher read from the pre-approved IRB script (Appendix H). On each subsequent week

during data collection the directors re-introduced the researcher, stated that the study was continuing and the researcher re-read the IRB recruitment script.

The researcher then sat a corner table and offered health information and/or appointments to come to meet with the researcher. Seniors who agreed to participate made an appointment and were given a copy of the informed consent to review prior to their scheduled appointment. After the beginning week at each center, attendees began to approach the researcher to set appointments. As needed, the announcement and sitting in the main dining hall was repeated. Data collection took 5 weeks at SC1 and 2 weeks at SC2. Data collection was stopped as the target sample size was reached.

Upon arrival at the scheduled time, the participants were asked if they had any questions and the consent form was read aloud. Any questions were answered and the individual signed if they desired to participate. Two individuals declined to participate at this point. Once consent (Appendix I) was obtained the survey was read aloud to the participant, following the order in the appendix. The GDS 15 and the Mini-Cog were administered toward the end of the survey as they contain sensitive questions. Both the researcher and center directors agreed this order would best facilitate trust in the researcher. Pilot interviews with two people suggested this process would take about 20 minutes. Actual time was not measured, but most interviews took about 30 minutes. The researcher read the questions verbatim, and repeated the question if an answer was not forthcoming. At the end of the interview each participant was offered a pillbox and a small note pad and pen, as well as a

numbered chance to win gift cards to a local store raffled at the end of data collection. The number of chances and amounts differed between centers (three $25 gift cards at CS1 and two $15 gift cards at CS2) in response to the CS2 director's concern that a higher amount and more chances might be coercive in the smaller group. The Institutional Review Board at Seton Hall approved this compensation plan.

Sample size. Power analysis was conducted using GPower 3.1 (Faul, Erdfelder, Buchner. & Lang, 2009). A data analysis plan for a logistic regression, seeking to explore the factors contributing to medication adherence from the 4 variables in the study: affectual solidarity, associational solidarity, functional solidarity and depression was made. A-priori power calculations involved an assumption of a moderate effect size, $\alpha = .05$, and power of 0.8, yielding a projected sample size of participants of 118.

Plan for analysis of data. Descriptive statistics were determined with Statistical Package for the Social Sciences (SPSS: version 20; IBM, 2011) for demographics, means and SD of each variable and the number of participants who refused to participate. Participants were categorized into high and low adherence rates. Logistic regression was performed to determine the factors related to medication adherence scores (Polit & Beck, 2012). Results are presented in Chapter 4.

Ethical considerations. Several steps were followed in order to assure protection of human subjects. First, the first senior center had a research policy that requires a researcher to apply for permission by presenting an outline of the project

goals and procedures, as well as report the findings back to the center upon completion of the project. The researcher first obtained written permission to conduct the study from the director at this center, as well as the second center. Once obtained, the researcher obtained permission for the study from the Seton Hall University Institutional Review Board (IRB). Within that application, several protections were addressed.

First, both the directors and the researcher made it clear that participation was completely voluntary. Attendees were reassured that no repercussions would occur if an attendee refuses to participate. Potential participants had the informed consent read out loud to them in order to avoid any difficulties with visual acuity, language difficulty or written literacy skills. The informed consent included the fact that the senior should not expect to directly benefit from participation. Potential harms included possible emotional upset as the survey queries focus on a relationship with an adult child, as well as symptoms of depression and cognition. Concern for individuals who were unaware of difficulties with depression or cognition was addressed by having psychiatric referral available at participant's own cost. Following IRB instructions, the name and phone number of a psychiatric practice that offered same day service for low cost was attached to the copy of the informed consent given to the participant.

The informed consent also included the required assurances of confidentiality and the interviews took place in a closed room with only the researcher and the subject. As always, an individual were assured they may quit the study at any time.

The survey was administered with more neutral questions asked first in order to establish trust with participants. The questions about depression symptoms and cognition were asked toward the end of the survey.

In accordance with IRB approval, if a participant did not pass the Mini-Cog, the researcher gently reviewed the finding and suggested that this is a screening test only and that the participant may wish to discuss the findings with their primary care provider. Similarly, the researcher scored the GDS-15 immediately after completion, the 18 seniors who had a score of five or higher were also gently asked if they thought they might have a problem with low mood. Of the 18 who scored a five or more, only three were not aware. The researcher conducted an evaluation consistent with her skill as an Advanced Practice Nurse and according to the guideline of the American Psychiatric Association (2003). None of the individuals were at risk of harm to self or others. Individuals who were concerned, or visibly upset (e.g. tearfulness) were referred to their primary care provider or a local counseling center (n = 1) where sliding scale and same day appointments are available.

Chapter IV

RESULTS

This chapter presents the findings from the study. First, a brief description of the procedures used for data analysis is presented. Next, the descriptive statistics for demographic data are shown. Finally, the descriptive statistics for each variable precede the inferential statistical results of the relationships between the variables.

Data Analysis Procedures

Answers from each participant were manually entered into statistical processing software (SPSS; version 20.0; IBM, 2011) by the researcher. After following the procedure described in Chapter 3, 145 individuals signed the informed consent. Of those, 22 did not meet classification criteria for being cognitively intact and their surveys were eliminated from the analysis. Of the remaining 123, two reported having professional health care in the home and they were eliminated from the analysis, yielding a final sample size of 121. Seventeen participants answered the survey at the second senior center. In order to establish equivalence of the participants at Senior Center1 (SC1) with Senior Center 2 (SC2), comparisons of gender, age, income, and education level between the two sites were made. Table 1 demonstrates that though there were more males at the second center, and the age was higher, there were no statistically significant differences between centers. There was also no difference in the incidence of non-adherence between the two centers ($\chi^2(1) = 2.76, p = .096$). Given these facts, the data from the two centers was merged for analysis.

Table 1

Demographic Characteristics between Centers

Characteristic	SC1 (n = 104)	SC2 (n = 17)	χ^2	Total (n = 121)
Gender				
F	74 (71.2%)	9 (52.9%)	2.25	83 (68.6%)
M	30 (28.8%)	8 (47.1%)		38 (31.4%)
Age				
60-64	14 (13.5%)	0 (0)	7.68	14 (11.6%)
65-69	14 (13.5%)	0 (0)		14 (11.6%)
70-74	22 (21.2%)	3 (17.6%)		25 (20.7%)
75-79	20 (19.2%)	4 (23.5%)		24 (19.8%)
80-84	22 (21.2%)	7 (41.2%)		29 (24%)
85+	12 (11.4%)	3 (17.6%)		16 (14.0%)
Yr. Ed				
<12	9 (8.7%)	2 (11.8%)	1.75	11 (9.1%)
12	48 (46.2%)	6 (35.3%)		54 (44.6%)
13-15	26 (25%)	4 (23.5%)		30 (24.8%)
16	12 (11.5%)	2 (11.8%)		14 (11.6%)
>16	9 (8.7%)	3 (17.6%)		12 (9.9%)
Income				
<14,900	10 (10%)	3 (18.8%)	3.32	13 (11.2%)
15-24,999	31 (31%)	3 (18.8%)		34 (29.3%)
25-59,999	36 (36%)	8 (50%)		44 (37.9%)
60-99,999	19 (19%)	2 (12.5%)		21 (18.1%)
100,000 +	4 (4%)	0 (0%)		5 (3.4%)

Note. All chi square *p* values > .05

Demographic Characteristics

Detailed demographic findings for the total sample (*N* = 121) are presented in

Table 1. Participants were generally female (68.6 %), between 70 and 84 years of age (64.5 %) with a high school education (44.6%) and an annual household income of between $25,000 and $59,999 (37.9 %). Analysis of living situation (Table 2) shows the majority of participants were widows or widowers (51.2 %), living in a free standing home (78.5%) with slightly more than half of all participants living alone (51.2 %). Of those living with another person, the most common scenario was living with a spouse or significant other ($n = 42$, 34.7 %). Of the six participants living with someone other than a spouse or child, two lived with a grandchild, two with a sibling, one with a dad, and one with a friend. One participant was living in assisted living temporarily and expected to move to an apartment soon. Two participants selected other, volunteering that they lived in mobile homes.

This profile matches the typical attendee at SC1, where a 2012 survey of 412 attendees revealed that 69% were female, 54% between age 70 and 85, and half held a high school diploma. Income data was similar in that 33.7% of the attendees had income between $15,000 and $40,000 per annum. The senior center's recent membership survey reported a smaller percentage of respondents were widowed (36%) or lived alone (43%) than the participants of this study.

Table 2

Living Situation

Characteristic	n	(%)
Marital Status		
Married	46	(38)
Widow	62	(51.2)
Divorced	11	(9.1)
Never married	2	(1.6)
Lives with		
Alone	62	(51.2)
Spouse	35	(28.9)
Child	11	(9.1)
Significant other	7	(5.8)
Other	6	(5.0)
Housing		
House	95	(78.5)
Apartment	16	(13.2)
Condo	7	(5.8)
Assist Living	1	(0.8)
Other	2	(1.6)

Health and Medication Status

The health and medication status of participants was assessed with a series of questions about number of pills per day, frequency of administration, number of chronic illnesses as well as whether or not one received help with medications (Table 3). Health burden was established by the sum of the number of chronic conditions participants reported from a selection of twelve common chronic conditions ($M = 3.2$,

SD = 1.76, range 0 – 9). The most common chronic conditions were arthritis (n = 81, 66.9%) hypertension (n = 80, 66.1%), and heart disease (n = 48, 39.7%). A history of a diagnosis of depression was reported by 20.7 % of the participants (n = 25). The demographics for current depression symptoms (the scores on the GDS-15) are reported in the section on depression symptoms.

Participants overwhelmingly reported carrying insurance for medication (n = 114, 94.2%) and taking between three and nine different medications or recommended supplements daily (n = 82, 67.8%), which were most commonly taken twice per day (n = 62, 51.2%). This medication and illness burden may be somewhat higher than national data suggests, as a large (N = 17,569) randomized survey found 41% of older adults take five or more prescriptions per day (Wilson et al., 2007) as opposed to 57.1% taking six or more in the current study. A Center for Disease Control survey (2009) found 23.3 % of adults 65 years of age and older have three or more chronic conditions, while this study found that rate to be 63.4 %.

Receiving help with medication (n = 10, 8.3%) was unusual. Of those individuals who reported getting help with medication, three required physical help with bottle opening or injection due to arthritis or injury. Three others had another individual place medications in medication boxes. Two reported their wives ordered the medication. Two others reported a daughter and granddaughter sometimes verified the medications. Only one participant reported also getting reminders to take medication from his wife.

Table 3

Health Burden

Characteristic	*n*	%
Chronic Ill		
Arthritis	81	66.9
Hypertension	80	66.1
Heart disease	60	49.6
Gastrointestinal	45	37.2
Diabetes Mellitus	28	23.1
Depression	25	20.7
Osteoporosis	24	19.8
Neurological	23	19
Pulmonary	20	16.5
Meds/Day		
1-2	14	11.6
3-5	38	31.2
6-9	44	36.4
10 +	25	20.7
Times/Day		
1	33	26.8
2	63	51.2
3	18	14.6
4	9	7.3

Intergenerational Solidarity Measures

Participants identified one child to consider when answering questions about Intergenerational Solidarity (IGS) activity. Slightly more than half chose to answer questions based on relationship with their daughter ($n = 64$, 52.9%). Though participants chose a same sex offspring more often (56.6% for women, 55.3% for men), this difference was not statistically different ($\chi^2(1) = 1.49, p = .23$).

Affectual solidarity. The mean and standard deviation of each of the four

questions from the positive subscale (range 5-20) of the parent-adult relationship

questionnaire (PARQ; Pitzer et al., 2011) is reported in Table 4. Reliability (α = 0.67)

of the scale is lower than alpha of 0.76 reported from the norming studies (Pitzer et al.

2011). Aside from the norming studies, this is the first known use of the PARQ.

Burns and Grove (2009) note that early in development of an instrument, reliability

may be lower. Difference in the sum score between genders was explored using the

non-parametric Mann-Whitney U (Witte & Witte, 2009), as the data was skewed

(skew statistic = -1.3). Men reported slightly higher affect (mean rank = 65.5) as

compared to women (mean rank = 58.9), however, the difference was not statistically

significant (z = -.96, p = .34).

Table 4

Affectual Solidarity

Item	M	SD
Warm or affectionate	4.36	.93
Thoughtful or considerate	4.35	.93
Favors or other little things	3.93	.96
Supportive of decisions	4.15	1.0
Total	4.19	.67

Functional solidarity. The Intergenerational Solidarity Scale (Fingerman et

al., 2010) is comprised of 13 questions, with reliability of α = 0.83. Descriptive

statistics are noted in Table 5 with the mean for each subscale (range 1-8) as per

Fingerman et al. (2010). Gender differences were not statistically significant, $t(119) =$

-.96, $p = .34$ and therefore data are aggregated for both genders. Each subscale has six

questions, with a separate question about socialization making the total questionnaire

13 items.

Table 5

Functional Solidarity

Item	M	SD
Provided		
Emotional	5.1	2.1
Technical	1.3	1.1
Practical	4.0	2.1
Listening	5.6	1.8
Advice	3.7	1.8
Financial	2.9	1.3
Total Provide	3.8	1.15
Received		
Emotional	4.7	2.1
Technical	2.7	1.8
Practical	3.2	1.9
Listening	5.7	1.9
Advice	4.1	2.1
Financial	1.6	1.1
Total Receive	3.7	1.24
Socialize	3.9	1.5
Total ISS	3.75	1.0

Note. ISS = Intergenerational Solidarity Support Scale

The question regarding provision of technical support from the ISS was greatly skewed with 85% of the participants indicating they never provided technological help to their child. The corresponding mean to the receipt of technological help was also low, with 48.8% of respondents stating they got help once a year or less.

The data was also divided to explore the net provision or receipt of support following Fingerman et al. (2010). The net ISS scores (range, -17 – 21, M = .5, SD = 7.3) demonstrated a fairly even distribution of provision and receipt of support. Splitting the participants into two groups based on positive net ISS scores (ISS provided- ISS received) shows that 68 (56.2%) had a positive net ISS. Statistically significant differences were noted in the balance of support in practical, $t(119)$ = 3.51, p = .001 and financial support $t(119)$ = 7.7, p ,<.001 indicating that the participants provided significantly more practical and financial support to a child than they received. Differences in provision to child and receipt of support from the other measures were not significant.

Associational solidarity. There are five questions in the associational solidarity scale. The mean of each and the mean of the sum are noted in Table 6. The reliability for the scale was .72. Participants were in relatively close communication with their adult child as 93 (76.9%) spoke to their child at least once per week. Typically, they had dinner with the child on a monthly basis, M = 4.0, SD = 1.9, with 27 having weekly or almost daily dinners (n = 27, 22.3%). As with the other components of IGS, there were no statistically significant gender differences, with the

mean sum for women, $M = 20.8$, $SD = 5.9$, only slightly higher than for men $M = 20.4$, $SD = 5.9$; $t(118) = -.32$, $p = .75$.

Table 6

Associational Solidarity

Item	M	SD
Converse	6.5	1.3
Family gathering	3.7	1.8
Important talk	3.9	2.0
Dinner	4	1.9
Gift	2.6	1.2
Total	4.1	1.2

Depression Symptoms

The Geriatric Depression Scale (GDS) contains 15 items requiring a yes or no response. A point is given for each affirmative response though some items are reverse coded to protect against response set bias. Reliability of this frequently used research instrument was slightly low at .77 as compared to the reported 0.8 from a meta-analysis (Wancata et al., 2006). Nineteen participants (15.4%) scored a five or above, indicating a possibility of major depression (Marc et al., 2008). This is identical to the rate of depression in a population of home care patients ($N = 492$; Marc et al., 2008), and similar to the rate (13.1%) in a population of community dwelling elders with hypertension (Krousel-Wood et al., 2010).

This instrument is designed as a screening tool, and as such, normal scores would be expected to cluster in the low end. The data is thus skewed (1.65) with 77%

of participants scoring a three or less. Comparison testing for this measure used non-parametric procedures. The mean for females was slightly higher, $M = 2.5$, $SD = 2.7$, as compared to males, $M = 2.3$, $SD = 2.5$, but there was no difference in the likelihood of scoring a five or above, χ^2 (1) $=.83$, $p = .36$.

As noted in the demographic results section, 25 participants reported a current or previous diagnosis of depression. Of those 25, 15 did not score five or greater on the GDS. Ten of those with a history of a diagnosis of depression (40%) scored a five or greater, suggesting these participants may not have good current control of symptoms. Additionally, eight participants scored a five or greater on the GDS, but had reported no current or previous depression diagnosis. The rate of possible undiagnosed depression in this survey at 8.3% is higher than the national depression rate of 5.8% for adults over 50 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2008). This rate may be consistent with the rate for adults over 60, which is not reported.

Medication Adherence

The ©MMAS−8 was scored according to directions from the author (Morisky, 2012, personal communication) and described in Chapter 3. The overall mean was 6.4 ($SD = 1.4$). Reliability at 0.53 was markedly lower than that previously reported (.83; Krousel-Wood et al., 2010). A Guttman-Split half analysis showed somewhat better reliability of .63.

Adherence was determined by a total score of 6 or higher ($n = 78$, 64.5%). The incidence of non-adherence ($n = 43$, 35.5%) is higher than the 14.1% rate noted

in a study of CDEs with hypertension (Krousel-Wood et al., 2010), but consistent

with a rate of 32.1% across all studies provided by the author (Morisky, personal

communication, 2012). Table 7 shows that rates of adherence did not differ

significantly according to gender, living situation or marital status. Cross tabulation

and chi-square analysis across all age groups approached, but did not meet

significance, χ^2 (5) = 10.5, p = .063. Inspection of cell counts revealed that 50% of

participants in the 60-64 and 65 and over age group were non-adherent as compared

to 20% in the 70-74 years old age group. Age ranges were collapsed into three groups

(60-69, 70-79, 80 or more). Participants in the 60-69 year old group were 2.6 times

more likely to be non-adherent (n =16, 57.1%) than those aged 70-79 (n=11, 22.4%).

The difference was statistically significant with $\chi^2(2, N = 77) = 9.4, p$ = .009,

Cramer's V = .28. Data for marital status and living situation were similarly collapsed

in order to obtain adequate cell counts for analysis.

Table 7

Medication Adherence and Demographics

Demographic	Non-Adherent N	Adherent	Chi Square
Gender			
M	16	22	1.0
F	27	56	
Total	43 (35.5%)	78 (64.5%)	
Age			9.4[b]
60-69	16	12	
70-79	11	38	
80 +	16	28	
Marital Status			4.98
Married	19	27	
Widowed	16	46	
Divorced	6	5	
Total	41[a]	78	
Living Situation			1.33
Alone	19	43	
With other	24	35	

Note. Chi square p > 0.5 except where noted.
[a] Cases where individuals never married were excluded from analysis, $n = 2$
[b] $p = .002$

Health and medication status impact on adherence is presented in Table 8,

showing that as the number of medications per day increased, adherence was lower.

While previous literature (Chapman et al., 2008; George & Shalansky, 2007;

Ingersoll & Cohen, 2007; Stoehr et al., 2008) demonstrated that both number of

medications taken and times per day taken impacts medications adherence, only

number of medications taken per day had a statistically significant impact in this

study. Non-adherent participants had a higher number of chronic conditions, $M = 3.7$,

$SD = 1.9$, as compared to those who were adherent. $M = 3.0$, $SD = 1.7$, $t(119) = 2.04$,

$p = .043$.

Table 8

Medication Adherence and Medication Status

	Non-Adherent	Adherent	
	N (%)	N (%)	Chi Square
Meds Per Day			
1-2	3 (7%)	11(14.1%)	8.7[a]
3-5	11(25.6%)	27(24.6%)	
6-9	14(32.6%)	30(38.5%)	
10 +	15(35.9%)	10(12.8%)	
Times Per Day			7.2[b]
1	11(25.6 %)	21(26.9%)	
2	17(39.5%)	45(57.7%)	
3	9 (20.9%)	9(11.5%)	
4	6 (14.0%)	3(3.8%)	

Note. [a] $p = .03$
[b] $p = .064$

Relationships Between Variables

Correlations. A correlation matrix (Table 9) presents the basic relationships

between the variables. This initial exploration of relationships between variables

provides a foundation for further inferential statistical exploration.

Table 9

Correlations Between Health Burden, IGS, Depression Symptoms and Adherence

	Meds/d	Affect	Functional	Association	DS	Adhere	Health
Meds/d	–	-.14	-.002	-.11	.21*	-.19*	.63**
Affect		–	.2*	.21*	-.23*	.11	-.13
Functional			–	.76**	-.06	.09	.00
Association				–	-.07	.08	-.05
DS					–	-.2*	.25**
Adherence						–	-.19*
Health							–

Note. Meds/d = Number of medications per day; DS = Depression Symptoms
*denotes *p* <.05; **denotes *p* <.01.

Measures of affectual solidarity are correlated with functional and

associational solidarity (*r* = .2 and .21 respectively, *p* < .05), indicating participants

spent more time and shared more supports with children whom they reported higher

affection. The strong correlation (*r* = .76, *p* < .01) between functional and

associational solidarity shows that supportive behaviors are exchanged more often

with children with whom there is more frequent contact.

The strong correlation between health burden and number of medications

taken daily (*r* =.63, *p* < .01) shows that participants took more medications as the

number of chronic health issues increased. The small ($r = .21$, $p < .05$) correlation between depression and medications per day indicates that level of depression symptoms increase as the number of medications taken daily increases. The small negative correlation ($r = -.2$, $p = .04$) between scores on the medication adherence scale and numbers of medications taken per day support the widely reported finding that as numbers of medications taken per day increases, adherence decreases (NCPIE, 2009; Osterberg, 2005; WHO, 2006).

Comparison of means for IGS measures. Though the above correlation matrix suggests that there is no relationship between medication adherence and IGS measures, performing a correlation requires the ©MMAS–8 score to be treated as an interval level variable (Witte & Witte, 2007). As previously discussed, the score is used to create a categorical variable (Morisky, personal communication, 2012; Krousel-Wood et al., 2010), by bifurcating individuals into adherent or non-adherent categories. In order to explore relationships between adherence and the variables, comparative means testing was considered for all variables. However, as the affectual solidarity scores were skewed, the non-parametric Mann-Whitney U (Witte & Witte, 2007) was conducted to determine if non-adherent participants had lower affectual solidarity than their adherent peers. The results indicate this is true, $z = -2.03$, $p = .04$. Adherent CDE's has a mean rank of 65.75, while non-adherent participants had a mean rank of 52.38. Following the recommendation of Wilcox (2006) effect size is calculated as 1-2Q, where Q is the result of $U/$ (n1 x n2). The lower affectual solidarity in non-adherent participants had a small effect size of .22.

Independent-samples t tests were conducted on both functional and associational solidarity measures as they were normally distributed. While non-adherent participants had lower functional solidarity, $M = 46.0$, $SD = 1.9$, than adherent, $M = 50.4$, $SD = 1.51$, this difference was not statistically significant, $t(119) = -1.77$, $p = .079$. There were also no significant differences in scores for either provision of or receipt of help. Given the fact that the participants provided significantly more financial and practical support than they received from their children, differences in adherence rates for individuals for whom this statement was not true was explored. A calculation ([financial provided + practical provided] − [financial received + practical received]) created a net provision score for these two questions. Two groups were created: one who followed the normal pattern of providing more than they received (net providers; $n = 100$, 82.6%), and the other (net receivers) whom received more help than they gave ($n = 21$, 17.4%). A chi square analysis showed that there was no difference in non-adherence between net providers and net receivers, $\chi^2 (1, N = 121) = .54$, $p = .46$.

Similar results were noted for associational solidarity scores, where non-adherent individuals had lower scores, $M = 19.38$, $SD = 5.32$, than those who were adherent to medication, $M = 21.4$, $SD = 5.95$. This difference approached, but was not, statistically significant, $t(119) = -1.85$, $p = .067$.

Depression symptoms. The GDS is designed to categorize individuals as either having or not having depression symptoms in sufficient numbers to suggest possible depression (Marc et al., 2008; Sheik & Yesavage, 1986; Wancata,

Alexandrowicz, Marquart, Weiss, & Freidrich, 2006). To follow-up on the small

correlation between the adherence and depression scales (Table 9), a chi square

analysis was performed to see if those who are depressed have different rates of

medication adherence. The cell counts are presented in Table 10 and show that equal

numbers ($n = 9$) of participants scored five or higher on the GDS in the adherent or

non-adherent groups.

Table 10

Cell Counts for Depression Symptoms and Adherence

Depression Symptoms

Adherence status	Low symptoms	High symptoms	Total
Non-adherent	34	9	43
Adherent	69	9	78
Total	103	18	121

Although the proportion of participants with depression symptoms is higher in

the non-adherent group (26.7%) than the adherent group (13.1%), chi square analysis

found these differences to be not statistically significant, $\chi^2(1, N=121) = 1.93, p =$

.17. Because this finding was unexpected based on previous literature that asserts

depression deleteriously affects adherence behavior (Grenard et al., 2011; Krueger et

al., 2005; Osterberg & Blaschke, 2005; Schlenk, Dunbar-Jacob & Engberg, 2004), a

difference between means was further explored using a Mann-Whitney U, as the sum

of the GDS is skewed. This was significant, $z = -2.35$, $p = .019$, effect size .25. The

cut point of the GDS was then altered to those who had a score of 2 or lower (non-

depressed) and those with 3 or higher (depressed). This resulted in significance, χ^2(1,

$N = 121$) = 6.66, $p = .01$. and a Cramer's V of .235. This maneuver increases the

sensitivity of the GDS in picking up depression to 83.1% (from 76.1%) per Marc et

al. (2008) but also sacrifices specificity and lowers it to 51.3%, indicating that almost

half of those being qualified as depressed, may not have depression. As the standard

in the literature (Wancata et al., 2008) utilizes the cut point of five or greater, further

data analysis will use that cut point so that comparisons across studies can be made.

IGS measures and depression symptoms. The relationship between

depression symptoms and measures of IGS (Byers et al., 2008; Ward, 2008)

demonstrates affectual and functional solidarity are correlated with depression

symptoms. To explore that relationship in the current study, comparisons of means in

affectual, functional and associational solidarity between depressed and non-

depressed participants were undertaken in a manner similar to the exploration of

means between adherent and non-adherent individuals. A Mann-Whitney U

demonstrated that individuals with low levels of depression symptoms had a

significantly higher rank in affectual solidarity of 66.24 versus their depressed

counterparts rank of 31. This was statistically significant, $z = -3.96$, $p < .001$, with a

moderate effect size of .58.

As the distributions of the functional and associational scales were normal, t-

tests were run to explore differences between the means. Table 11 shows that while

the differences between the total ISS score and the received ISS score were not

statistically significant, individuals with low levels of depression symptoms had

statistically significant higher levels of provision of support as well as higher net ISS

scores. There were no differences in associational solidarity levels between

participants based on levels of depression symptoms.

Table 11

IGS and Depression Symptoms

	Depression symptoms			
	Low	High		
	M (SD)	*M (SD)*	*t*	*95% CI mean difference*
ISS	49.3 (12.7)	46.2 (15.8)	.9	[-3.6, 9.8]
ISS pro	23.2(6.5)	19.1 (8.3)	2.1[a]	[.17, 7.1]
ISS rec	22.0(7.3)	23.2(8.5)	-.59	[-4.9, 2.6]
ISS net	1.2 (6.9)	-3.6 (8.0)	2.6[b]	[1.1, 8.4]
Association	20.9(5.7)	19.4 (6.6)	1.04	[-1.3, 4.5]

Note. ISS = Intergenerational Solidarity Scale; ISS pro= provision of support; ISS rec = receipt of support; ISS net = ISS provided – ISS received;
Low depression symptoms = GDS < 5; High depression symptoms = GDS ≥ 5
[a] *p*<. 05, [b] *p* = .01

Logistic regression. As indicated in the above results, there was a

relationship between depression symptoms and some IGS components. Additionally,

comparison testing demonstrated that non-adherent individuals took a statistically

significant greater number of medications daily. In order to control for these effects, a

logistic regression was conducted to predict medication adherence using measures of

IGS, depression symptoms and number of medications per day as predictors of

adherence. Table 12 demonstrates that a full test with the direct regression technique

with all of the variables loaded (Tabachnick & Fidell, 2013) against a constant only

model was statistically significant ($p = .048$). The regression demonstrates that as the

number of medications per day increases, the odds of adhering to medication were

lowered, $OR = .62$, $p = .04$, 95% CI [.389, .972]. The other variables were not

statistically significant. This model (Table 12) was better at predicting medication

adherence when compared to the constant only model (χ^2 (5)= 11.16, $p = .048$).

Nagelkerke R^2 of .122 showed a small ability of the model to predict adherence, with

19 % of non-adherent and 85.9% of adherent participants being correctly identified.

The overall accuracy of this model was 62.5%, which was actually less than the

accuracy of the constant only model (65%).

Table 12

Odds Ratio for Adherence

	Full Sample		*Low Depression Symptoms only*[a]	
	OR	95% CI	OR	95% CI
Affectual	1.07	[.92, 1.25]		
Functional	1.02	[.97, 1.07]	1.04	[1.00, 1.08][b]
Association	1.02	[.91, 1.13]		
Depression	1.46	[.47, 4.53]		
Meds/Day	.62	[.40, .97][b]	.64	[.39, 1.05]

Note. The full model is represented in the first column ($n = 121$). The low symptom model ($n = 103$) for subjects with GDS < 5
. [b] $p < .05$

Given the impact of depression on IGS measures demonstrated both in the current study and the literature (Byers et al., 2008; Ward, 2008) and the relatively small number of participants with GDS score of five or higher, a direct logistic regression was conducted excluding those participants. The results were not statistically significant. A sequential logistic regression (Tabachnick & Fidell, 2013) was then undertaken with the initial variable (medications per day) inserted as it was demonstrated in the previous model to be a significant predictor of adherence. Medications per day in the model did not predict adherence significantly better than the constant only model. The second run added functional solidarity, as the literature suggests this variable, which is the most closely related to family support, has a

relationship to adherence (DiMatteo, 2004). This model was significantly better (χ^2 (2)= 7.6, p = .02) at correctly predicting medication adherence based on both functional solidarity and number of medications per day 88.4% of the time, with a small Nagelkerke R^2 of .10. Similar to the previous all participant inclusive model, as number of medications per day increased, the odds of adhering to medications was lowered. However, in this model [-.79(constant) - .447 (pill burden) + .042 (functional solidarity)] where the impact from those with high levels of depression symptoms was eliminated, each unit increase in functional solidarity score raised the likelihood of adherence by a small, but statistically significant, extent. Given that there were differences in affectual solidarity scores between adherent and non-adherent participants, a model with affectual solidarity in addition to pill burden and functional solidarity was tested, but affectual solidarity did not contribute significantly to prediction of adherence. Associational solidarity also did not contribute to the ability to predict adherence.

Considering the fact that there was a difference in affectual solidarity between adherent and non-adherent participants, yet affectual solidarity did not significantly help predict adherence in these models, another approach was sought to explore this apparent lack of relationship. Given the often reported finding that there are differences in IGS based on gender (Fingerman et al., 2010; Hogan et al., 1993; Kahn et al., 2011; Lawton, Silverstein & Bengtson, 1994; Umberson, 2008;Ward, 2008), correlations between affectual solidarity and the Morisky score were conducted separately for women and for men. The results demonstrated that the correlation

between the Morisky score and affectual solidarity score was significant for women

(r_s =.24, p =.03), yet the correlation for men (r_s =-.05, p =.96) was not. In response,

a direct logistic regression was run for women only (n = 83). None of the variables

were able to contribute to prediction of adherence beyond a constant only model.

In consideration of the fact that affectual solidarity had a correlation with

adherence for women, and that in the direct regression affectual solidarity

approached, but did not reach significance, a sequential regression was conducted

loading affectual solidarity first, followed by pill burden and then depression

symptoms. Affectual solidarity was the only variable of the three that predicted

adherence. This led to a model that was significantly better than the constant alone,

χ^2 (1) = 4.7, p = .03, with increases in affectual solidarity increasing the odds of

adhering to medication, OR = 1.2, p = .04, 95% CI [1.01-1.4]. This model

(-2.01[constant] + .17[affectual solidarity]) also showed a small effect with a

Nagelkerke R^2 of .077 and correctly identified 22 % of non-adherent and 94.6% of

adherent CDEs. This model represents the best overall prediction of all the models,

with 71.1% of the participants being correctly identified. The small number of men in

the study precluded regression for men only.

Summary

The results presented in this chapter demonstrate that the sample was

representative of attendees at the senior center. In general, these participants were

largely female with a high school education and about evenly split between living

alone or with another person. The typical participant took more than two medications

per day and had three chronic health conditions. The rate of medication non-adherence (35.5%) did not differ based on gender or other demographic characteristics, though non-adherent participants took a greater number of mediations per day.

Relationships between measures of IGS, depression and adherence shows that participants who are categorized as adherent had higher affectual solidarity scores, as well as higher scores on the provision of support subscale of the ISS. Prediction modeling for adherence or non-adherence shows the complexity of attempting to predict this health behavior. As expected from the literature, increasing the number of medications per day has a deleterious effect on adherence. However, for women, number of medications per day does not seem to matter as much as affectual solidarity, with higher affectual solidarity scores increasing the odds of adherence for women. When data is explored only for those participants with GDS scores under the standard cut point of five ($n = 103$), both number of medications taken per day and functional solidarity have a small impact on adherent behavior.

The next chapter will discuss these findings in comparison to the current professional literature.

Chapter V

DISCUSSION of FINDINGS

The results presented in Chapter 4 demonstrated that in this study of CDEs, medication adherence is strongly predicted by pill burden. The results also indicate that the IGS components of functional and affectual solidarity may predict adherence to varying degrees in different groups, with affectual solidarity predicting adherence for women, and functional solidarity predicting adherence for those with low levels of depression symptoms. This chapter contains a discussion of these findings and compares them to previous research. Although pill burden was noted to be the most significant predictor of adherence, the findings from the intergenerational solidarity measures and depression symptoms will be discussed individually prior to discussing the summary analysis of the relationship among all the variables in this study.

Intergenerational Solidarity

The findings of this study are consistent with the previous empirically established connections between affectual, associational and functional solidarity (Fingerman et al., 2010; Lawton, Silverstein & Bengtson, 1994; Lowenstein & Daatland, 2006; Silverstein et al., 2006; Silverstein et al., 2002). Functional solidarity was highly correlated with associational solidarity, a finding reported in previous research (Lowenstein & Daatland, 2006; Silverstein et al., 2002). This is logical as it is difficult to exchange help with others if you do not visit or speak with them.

Lowenstein & Daatland (2006) argue that the relationship between associational and functional solidarity stems from adult children observing the functional status of the parents during time spent together, and then offering necessary assistance. Although some studies (Eggebeen & Davey, 1998; Fingerman et al., 2010; Lowenstein & Daatland, 2006) did find that need (e.g. functional limitations) was associated with increased provision of help to an older parent, there was no relationship found in this study between health burden, as conceptualized as number of chronic conditions, and functional solidarity. Because understanding the relationship between need and functional solidarity was not an aim of the study, other more detailed measures of need (such as functional capability) were not made. It is likely that the number of chronic conditions may not be an equivalent measure of parental need.

As expected from previous research (Fingerman et al., 2010; Lawton et al., 1994) affectual solidarity was correlated with both associational and functional solidarity. These findings indicate that a parent tends to spend more time with an adult child when the parent perceives higher levels of affection from that child. Similarly, others have noted the logical connection that higher affectual solidarity predicts increasing functional solidarity levels (Merz et al., 2009; Silverstein et al., 1994). Conversely, perhaps because it was an international study using a dichotomized measure of functional solidarity, Lowenstein and Daatland (2006) did not find a relationship between help provided to a parent and affectual solidarity. This conflicting finding suggests that the relationship between affectual functional solidarity may be culturally dependent.

Although the components of IGS are clearly inter-related, findings indicate that each individual component of IGS has a unique relationship with medication adherence. Prior to a discussion of those relationships, each solidarity variable will be discussed separately.

Affectual Solidarity. The participants in the current study demonstrated a higher level of affectual solidarity ($M = 4.19$) as compared to levels noted in the norming studies of Pitzer et al. (2011), who found a range from $3.89 - 4.07$. The level was also skewed to the right. Because participants in this study may have selected an adult child in order to reflect their most favorable relationship, the affectual solidarity level might have been closer to the findings of Pitzer at al. (2011) if the participants had been asked to report on a certain child in a randomized manner as other researchers have done (Pitzer et al., 2011; Fingerman et al., 2010; Stimpson et al., 2005). The high level of affectual solidarity may relate to the regional or cultural differences in affectual solidarity identified in other literature (Cichy, Lefkowitz & Fingerman, 2012; Lowenstein & Daatland, 2006; Sechrist et al., 2007).

The lack of difference between men and women in affectual solidarity scores in this study may be explained by differences among instruments used to measure affectual solidarity, a generational increase in closeness on the part of fathers, or regional variations in IGS. Two studies that are now 20 years old noted that women had higher affectual solidarity with their adult children than men (Lawton et al., 1994; Rossi & Rossi, 1990). More recent work suggests, as does this study, that the gender gap is dissipating (Fingerman et al., 2010; Lowenstein & Daatland, 2006; Monserud,

2006). However, many studies use an overall rating of relationship as a proxy for affectual solidarity (Fingerman et al., 2010; Lawton et al., 1994; Lowenstein & Daatland, 2006; Monserud, 2008) and therefore results cannot be directly compared between this study and others. The most direct and recent comparison (Pitzer et al., 2011) does not report PARQ scores for women and men. As previous literature notes regional variations in IGS (Lowenstein & Daatland, 2006; Sechrist et al., 2007), the local nature of this sample precludes generalization to the broader United States population, but raises the question about whether men are currently experiencing, or reporting, higher levels of affect with their adult children than previous generations.

Associational Solidarity. Levels of associational solidarity (M =4, possible range: 1-8) demonstrated that the average participant had at least monthly contact with his or her child. This mean is slightly higher than that reported by Silverstein et al. (2002) who found a mean of 3.4 for mothers and 3.06 for fathers in a California population. Because associational solidarity is operationalized using broad selection of instruments that may be categorical (Gryzwacz & Marks, 1999; Lowenstein & Daatland, 2006), it is difficult to make direct comparisons. As with other components of solidarity, a bias to report higher levels of contact than are factual may account for this finding (Silverstein & Giarrusso, 2010).

Similar to the lack of gender difference in affectual solidarity, there was no difference in associational solidarity based on gender. This differs from previous findings indicating mothers had higher levels of associational solidarity with their adult children (Silverstein et al., 2002; Umberson, 1992). As with all IGS solidarity

measures, this may relate to regional difference, or indicate that the gender gap in IGS is dissipating.

Functional Solidarity. Levels of functional solidarity were moderate, lacked differences based on gender and differed from previous research findings. Previous research results indicate that females give and receive more functional support than males (Hogan et al., 1993; Kahn, et al., 2011; Lawton et al., 1994; Silverstein et al., 2006; Ward, 2008). As previously discussed, the current findings may be confirmation of other results, which suggest the functional solidarity gender gap may be shrinking (Fingerman et al., 2010; Sarkisian & Gerstel, 2008). Alternative explanations include regional differences or social desirability bias.

Additionally, findings from exploration of the balance of support from older adult to child also differ from previous reports. Unlike the results from Fingerman et al. (2010) where participants provided more support to offspring than they received, CDEs in this study provided about the same amount of support as they received. Additional studies that used different instruments to measure functional solidarity also indicated that support in families flow from the oldest to youngest generations (Albertini et al., 2007; Merz et al., 2009). Analysis of individual components of functional support, namely financial and practical, did demonstrate consistency with previous research indicating older adults provide more of these types of support than they receive (Lowenstein & Daatland, 2006; Suitor et al., 2006).

In general, however, the findings here indicate a neutral exchange with both parties giving and receiving equally. Theoretical descriptions of functional solidarity

and the closely related concept of social support help explain these findings. In this

study participants reported providing about the same amount of support they received.

This is consistent with concept analysis work in social support that indicates

mutuality and parity in support exchanges are key components of social support

(Finfgeld-Connett, 2005; Stovall & Baker, 2010). Silverstein, Conroy and Gans

(2012) describe this mutuality as emanating from the perspective of some

intergenerational researchers that exchanges between parents and adult children are

fundamentally reciprocated either immediately, or over time. The pattern noted in this

study represents one subtype of family referred to as "ascending familiasm", in which

parents and adult children exchanged help and support with near immediate

reciprocation (Dykstra & Fokkema, 2011). The participants in this study may be in a

need neutral moment in family life, as these CDEs are living independently and

evidencing a certain level of functionality by attending senior center activity.

Depression Symptoms

With 15.4 % of the participants having high levels of depression symptoms

(GDS> 5), this study demonstrates the significant prevalence of depression symptoms

in the community dwelling elder population noted by other research (Gum et al.,

2009: Krousel-Wood et al., 2010). The findings of this study buttress a national

concern about under-diagnosis and under-utilization of mental health services in the

older adult population (Crystal, 2003: Gum et al., 2009; SAMSHA, 2008). While 10

of the nineteen participants who had a high GDS score may have been known to their

primary care providers as having such symptomatology, scores for nine additional

participants appear to indicate a previously undiagnosed problem. There were no

significant differences in this level between men and women.

Depression Symptoms and IGS

The significant relationships between depression symptoms and components

of IGS present in this study are congruent with previous research findings (Stimpson

et al., 2005; Ward, 2008). The negative correlation (r = -.23) between GDS score and

affectual solidarity, though small, suggests that higher affectual solidarity is related to

fewer symptoms of depression. Indeed, in the t test comparison CDEs with high

levels of depression symptoms had lower affectual solidarity scores (p = .001; effect

size .58). While not directly measuring depression, international survey results

indicate that opposing concepts such as quality of life and well being predicted

increasing levels of affectual solidarity (Lowenstein, 2007; Merz et al., 2009).

The finding that participants with a low level of depression symptoms had a

significantly higher functional solidarity is also consistent with previous findings that

quality of life is associated with high functional solidarity (Lowenstein, 2007; Merz et

al., 2009) and depression is lowered when providing help to a child is greater than

receiving help (Byers et al., 2008). Though similar to the question about whether

depression is an antecedent or a consequence of affectual solidarity, the work by

Byers et al. was longitudinal and thus suggests that providing more help to an adult

child than one receives may prevent depression symptoms later in life. Considering

the fact that this reflects the typical pattern of downward flow of support (Fingerman

et al., 2010), maintaining one's expected role as a parent may be essential to stability

of mental health as parents grow older. The finding of this study may also be

explained by Byers and colleagues' conclusion that "mattering", or being important to

a child in terms of providing support in the parent child relationship, buoys the mental

health of older adults.

Medication Adherence

Given the fact that higher functional and affectual solidarity is associated with

lower levels of depression symptoms, logistic regression was employed to help

control for the effect of depression symptoms upon medication adherence. The results

demonstrated that functional and affectual solidarity demonstrated a small ability to

help predict medication adherence beyond pill burden, but only for participants with

low depression symptoms, or in another regression, when men were excluded from

analysis. This section will discuss the demographic and health status characteristics

associated with non-adherence in this study, followed by a detailed discussion of the

lack of predictive ability to adherence from level of depression symptoms. The

relationship of IGS variables to medication adherence is also discussed.

The overall rate of medication non-adherence (35.5%) among participants is

consistent with previous reported rates in community dwelling elders, which range

from 15 % (Krousel-Wood et al., 2010) to 50% (Berry et al., 2010). As noted

previously, various methods of reporting adherence include self-report, pharmacy fill

data and electronic cap monitoring, with self-report typically yielding smaller non-

adherence rates (Shi et al., 2010). Because the ©MMAS–8 (Morisky et al., 2008) is a

newer instrument, there are few studies to which direct comparison of adherence rates

can be made. Munter et al. (2011) reported an 11% non-adherence rate in patients

status post cardiac stenting, while Kane et al. (2012) reported a 34% rate in patients

who have inflammatory bowel disease. Because no other study has reported using the

©MMAS-8 (Morisky et al., 2008) across a broad range of chronic conditions, there

are no direct comparisons available, but the 35.5% rate is in line with broader

research findings.

Relationship between Demographics and Adherence

While adherence differed between age groups, it did not differ based on

marital status or gender. The effect of age on medication adherence is variable

according to several research findings. Some previous literature reports indicate

adherence may actually increase with age (DiMatteo, 2004; Gadkari & McHorney,

2012; Marek & Antle, 2008), while others report no significant relationship (Stoehr et

al., 2008). In this study, participants between 60-69 years of age were 2.6 times more

likely to be non-adherent than their counterparts in the 70-79 year old group. As only

11 participants in this age group were non-adherent, sub-group size precluded

exploring the relationship between adherence and solidarity measures in this age

group (Tabachnik & Fidell, 2013).

Previous literature frequently reports that being married is associated with

increased adherence (Cooper et al., 2005; DiMatteo, 2004; Trivedi, Ayotte, Edelman

& Bosworth, 2008). As noted in Chapter 2, these works include participants across a

broad age range. Dunlay et al. (2011) did look at marriage and adherence in CDEs

with congestive heart failure and found no difference in marriage rates between

adherent and non-adherent participants. This finding and the lack of relationship

between marital or living status in the current study suggests that perhaps the salience

of the marital relationship in regard to medication adherence declines over time.

Pardasani (2010) notes that senior center attendees are more likely to live alone and

report they attend a center for the benefit of socialization. While a comparison

between center attendees and non-attendees was not made in this study, it may be that

attending a senior center expands social network support and thus may remove the

significance of the spouse in relation to medication adherence. No known literature

exists that addresses this question.

The lack of difference in adherence based on gender alone is consistent with

previous literature and might be explained by the fact that there were only 38 (32.2%)

men in this study. In a meta analysis, DiMatteo (2004) reports that the effect of

gender on adherence is variable and may relate in part to type of adherence measure

used. In a recent study, Khdour, Hawwa, Kdiney, Smyth, and Mcelnay (2012) did not

find gender difference in adherence rates while using the ©MMAS-8 (Morisky et al.,

2008), adding support to the findings of this study.

Medication Adherence and Health Status

Correlations between pill burden, depression and health burden were expected

based on literature that describes more depression in individuals with more chronic

health concerns (Gum, King-Kallimanis, & Kohn, 2009). The small negative

correlation ($r = -.2, p = .04$) between scores on the medication adherence scale and

numbers of medications taken per day support the widely reported finding that as

numbers of daily medications increase, adherence decreases (Chapman et al., 2008;

Khdour et al., 2012; NCPIE, 2009; Osterberg, 2005; WHO, 2006). Similarly, non-

adherent participants had significantly more chronic conditions than adherent

participants. This finding is consistent with studies that reported an increasing number

of co-morbidities were associated with lower medication adherence rates (Colby,

Wang, Chhbra, & Perz-escamilla, 2012; Khdour et al., 2012; Shermock, 2009).

Because chronic conditions often require increasing numbers of medications, the fact

that both the number of medications taken daily and chronic illnesses were associated

with non-adherence is not surprising.

Depression Symptoms and Medication Adherence

Despite the fact that numerous studies demonstrate a relationship between

depression symptoms and adherence in CDEs there was no significant difference in

the number of participants with a GDS score of five or more in the adherent and non-

adherent groups (Gentil et al., 2012; Grenard et al., 2011; Khdour et al., 2012;

Krousel-Wood et al., 2010). However, the Mann-Whitney U demonstrated that non-

adherent CDEs had significantly higher ranks of depression symptoms and the

Spearman's rho ($r_s = -.26, p < .01$) suggest a statistically significant relationship

between depression symptoms and non-adherence. This small correlation is

congruent with results from a meta-analysis by Grenard et al. (2011) showing an

overall r of -.16 across 31 studies exploring depression and medication adherence.

Lowering the traditional cut point from a score of five on the GDS to two, increased

sensitivity and helped predict medication adherence based on the presence of

depression symptoms. These findings suggest that small differences in depression symptoms may be important in predicting non-adherence. Expanded discussion of the role of depression symptoms in predicting non-adherent behavior follow in the next section.

Relationships between IGS, Depression Symptoms and Adherence

The current study was designed to address the research question: Is there a relationship between the associational, affectual and functional components of IGS, depression symptoms and medication adherence in cognitively intact community dwelling elders? The relationships among these variables were complex, with different components of IGS predicting medication adherence for different groups used in analysis. While affectual solidarity was both correlated with adherence scores and had a small significant ability to predict adherence for women, it was not correlated with adherence for men. For those with low levels of depression symptoms, functional solidarity had a small ability to predict adherence, but affectual solidarity did not improve the model's predictive ability. Each model generated had a small ability to predict adherence overall, demonstrating only slightly better ability to predict adherence beyond the 65% baseline adherence rate. Because initial exploration of the data suggested that pill burden was associated with adherence, it was included in a logistic regression with the other variables. Pill burden alone was found to lower the odds of adhering to medication ($OR = .62, p <. 05$). This result supports the frequently repeated finding that the likelihood of adhering to medication decreases as numbers of pill burden decreases (Chapman et al., 2008; Khdour et al.,

2012; NCPIE, 2009; Osterberg, 2005; Stoehr et al., 2008; WHO, 2006), but prompts

questions about why the other variables do not appear to have any impact on

prediction of adherence.

While depression is generally assumed to negatively impact adherence

(Grenard, et al., 2011; Ownby & Blaschke, 2005), study results did not indicate that

moderate levels of depression symptoms decrease the odds of adherence. It is

possible that the effect size of depression on adherence, which has been reported to be

small (Grenard et al., 2011), may not be enough to contribute to non-adherence

beyond the more powerful indicator of pill burden. Furthermore, sample size yielded

18 participants with high level depression symptoms, with 9 cases each in adherent

and non-adherent groups. While some (Courvoisier., Combescure, Agoritsas, Angèle

Gayet-Ageron, & Perneger, 2011) argue this may be ample, others suggest that

tradition is correct and less than 10 or more is not enough cases for substantive power

(Steyerberg, Schemper & Harrell, 2011). The sensitivity of the GDS may not have

been sufficient to detect true symptoms, possibly confounded by response bias

induced by verbal administration. Altering the cut point did reveal significance of

depression symptoms to predicting adherence levels, but as previously noted, the

GDS is not interpreted in this manner. Gonzalez et al. (2007) did suggest that even a

low level of depression symptoms may impact adherence and the results of this study

suggest this may be true. Finally, given the wide confidence interval for the odds ratio

for depression symptoms (.47- 4.53), it is possible that increasing depression

symptoms lowers the odds of adherence, but the width of the CI precludes a conclusion regarding the significance of this relationship.

Other studies have also failed to show a relationship between depression and adherence rates. Maguire, Hughes and McElnay (2008) did not find that depression, as measured by the CES-D, predicted self-reported medication adherence in a population of hypertensive patients. Lin et al. (2012) found no change in adherence as measured by pharmacy fill rates in a population of depressed adults with chronic illnesses after an intervention to treat depression. They also noted high (.79 -.84) possession ratios indicating a relatively high baseline adherence rate. Therefore, it is possible that unless non-adherent behavior is substantial (e.g. very low ©MMAS-8 [Morisky et al., 2008] scores), depression does not impact adherence. In this study the self-report adherence measure may have contributed to the reduced ability of depression symptoms to predict adherence. In a meta-analysis of depression and adherence in diabetics, Gonzalez et al. (2007) report that there is a stronger relationship between depression and adherence behavior when objective measures of adherence are used instead of self report.

Finally, it is difficult to discuss why depression was not a predictor because the exact mechanisms by which depression symptoms may decrease adherence are unclear, especially in the older adult population (Kilbourne et al., 2005; Krousel-Wood et al., 2010). Grenard et al. (2011) suggest that changes in cognition, social withdrawal and hopelessness may be responsible for lowering medication adherence when individuals are depressed. In this study of adults attending a senior center, and

thus evidencing some social connectedness, the small deleterious effect of depression

symptoms on adherence may have been obscured by the social contact at the senior

center. Similarly, as noted in the IGS research, affectual solidarity may buffer against

stressful events and the impact of depression symptoms (Silverstein et al., 2002). The

generally high level of affectual solidarity in this group may have compensated for

the impact of depression symptoms on medication adherence.

The lack of a significant relationship between adherence and associational

solidarity (AS) in this study may relate to the idea that the ability of AS to predict

adherence is not enough to be significant in addition to pill burden. These findings

may indicate that there is no distinct relationship between these AS and medication

adherence. The only other known study to explore adherence and AS (Gryzwacz &

Marks, 1999) found no relationship between the two. It may be reasonable to assume

that other aspects of time together, such as affectual solidarity and functional

solidarity may be more powerful predictors of adherence. Other measures of IGS may

also be more intertwined with level of depression symptomatology and thus, by

proxy, adherence behavior.

The lack of predictive value of functional solidarity upon adherence may

relate to the overall equality of help provided to and received from an adult child.

However, a negative balance of support (receiving more help than one provides) also

did not help predict adherence levels in this study. The only other known study to

explore IGS and medication taking behavior did not explore functional solidarity as a

whole, but explored support received and support provided as separate variables

(Gryzwacz & Marks, 1999). They found a small positive predictive value on adherence from providing and receiving instrumental support for men only. Receiving financial support lowered appropriate medication use more for women than for men (OR = .87, .92 respectively; Gryzwacz & Marks, 1999). Other studies have reported that reversals of typical flows of functional solidarity are associated with a poor sense of well-being (Gallant, Spitze, & Prohaska, 2007; Merz et al., 2009; Silverstein et al., 2010).

Several issues may have led to the findings contrary to previous literature reporting that a reversal in support exchange leads to negative consequences. One explanation for this disparity may be that Gryzwacz and Marks (1999) did not control for the effect of numbers of medications per day. An additional explanation is that they also had an overall younger population (mean age = 45). Older adults may not be affected as much by disparity in support exchanges as their younger sample. The sample size may not have been large enough to detect this effect, or as previously noted, the fact that these adults are engaged with others via senior center participation may have muted any possible effect. A final explanation for this lack of relationship may be that while receiving more support may be associated with poor well-being, medication adherence is not the same as well-being, and thus results from those works cannot be directly compared to this study.

In an effort to address the minimal number of individuals with high depression symptoms, a regression was conducted on only participants with a GDS score of less than 5. In this group, functional solidarity had a small, but significant ability

($OR = 1.04$, $1.0 - 1.08$ CI, $p < .05$) to predict adherence. Functional solidarity is most

closely aligned with the concept of social support (Gryzwacz & Marks, 1999), which

has been generally concluded to enhance adherence across all age groups (DiMatteo,

2004). The findings in this study that when depression symptoms are factored in

functional solidarity may not be helpful, suggest that for individuals with a high

number of depression symptoms, interconnections may not ameliorate those

symptoms of depression that are related to adherence. This is akin to the findings of

Krousel-Wood et al. (2010) that low social support predicted non-adherence in non-

depressed individuals, but when depression symptoms were present, social support

was not helpful in enhancing adherence.

Finally, given the fact that gender has been shown to impact measures of IGS

(Fingerman et al., 2010; Hogan, Eggebeen & Clogg, 1993; Kahn, McGill & Bianchi,

2011; Lawton, Silverstein & Bengtson, 1994; Umberson, 2008; Ward, 2008), a

logistic regression with just female participants was conducted and demonstrated that

affectual solidarity with an adult child increases the odds of being adherent to

medication ($OR = 1.2$, $p = .04$). The finding that affectual solidarity level helps

predict medication adherence replicates Gryzwacz and Marks (1999) results showing

that affectual solidarity is related to appropriate medication usage. However, males

had the slightly greater benefit in that study.

The relationship between gender and affectual solidarity has been noted in

several studies. Early studies have found men more likely buoyed by high levels of

affectual solidarity (Elder, Rudkin, & Conger, 1995; Whitbeck, Hoyt & Tyler, 2001).

More recent work tends to find the opposite, that the relationship between affectual solidarity and measures of well-being are significant in women only. Cichy et al. (2012) report that parent-adult child interaction styles around conflict were related to perceived positive affect (measured by the PARQ) differently, based on parent gender. Maternal ratings of affect in the relationship were negatively affected by children who withdraw, whereas the affect ratings of fathers were not affected by such behaviors. Seeking situations likely to induce depression symptoms, Nakonezny et al. (2006) found that women (but not men) with high levels of affectual solidarity did not experience a decline in affectual and functional solidarity with their children after their own divorce. This study's findings support these more recent and prevalent findings that affectual solidarity may matter more to women.

The complexity of the relationship between these variables and medication adherence is supported by the theoretical assertions of the Roy Adaptation Model (RAM; Roy, 2009), and the adherence model for older adults by Murray et al. (2004). Roy (2009) asserts that the interdependent mode (parent-adult child relationship) impacts the role function mode (taking medication correctly). The descriptions of affectual and functional solidarity are consistent with descriptions of important aspects of family "coherence" which relates to "give and take" and "love and respect" between members (Roy, 2009, p. 437). Murray et al. (2004) simply state that family relationships and support are beneficial to adherence. This study brings heretofore unknown detail about how one family relationship (that with an adult child) may increase medication adherence in CDEs.

Limitations

Several methodological issues may limit the generalizability of these findings. There was no attempt to randomize the selection of the child that the participant reported on, so there could be bias in terms of reporting a more favorable relationship. The sample was small and while cell sizes were adequate for analysis, there were limited numbers of individuals with high levels of depression symptoms and fewer men than women possibly influencing explanatory power.

The regional location and the specific setting of a senior center restrict generalizability. Though no data on race was collected, this was anecdotally a largely Caucasian sample in a local area in the Northeast United States. No information was collected about cultural or religious background, which may have impacted levels of solidarity (Lowenstein, 2007) and thus findings cannot be generalized to other groups. As this study explored concepts that are closely linked to social support, the high levels of affectual solidarity and functional exchanges may emanate from the fact that the participants had to be open and social enough to answer survey questions in a face-to-face scenario, further restricting application to CDEs who do not attend a senior center.

Other limitations relate to the instruments used for this study. The low reliability of the ©MMAS-8 (Morisky et al., 2008) and the PARQ (Pitzer et al., 2011) are of concern. While the overall rate of low adherence is consistent with previous studies (Krousel-Wood et al., 2010), it is possible that the ©MMAS-8

(Morisky et al., 2008) instrument is measuring more than one construct, thus affecting the reliability.

Strengths

Despite the noted limitations, this study has several strengths. This is a unique exploration of the impact that the parent-adult child relationship may have on the important health behavior of medication adherence. Further, it provides a rare exploration of adherence behavior across a variety of health conditions. With a focus on the older adult, the inclusion of depression symptoms and cognitive status as control variables is not consistently noted in the literature (Hedemalm et al., 2010; Kitchie, 2003; Nicklett & Liang, 2010) and this inclusion strengthens the findings.

Knowledge from this study benefits several aspects of a broad set of literature. For the IGS field, it is the first known use of the PARQ (Pitzer et al., 2011) and the ISS Scale (Fingerman et al., 2010), and adds to the foundational validity and well as provides data to begin instrument refinement to enhance reliability of both instruments. The findings provide data analysis results for medication adherence researchers to further analyze the reliability of the ©MMAS-8 (Morisky et al., 2008), yet it also bolsters the validity of this measure as it was significantly associated with the well known risk for non-adherence from high pill burden. The study links IGS with a health behavior of concern to nursing, offering nursing researchers a potential new conceptual framework to utilize in the study of self-care behaviors of older adults who have children.

Conclusions

The current study was a novel effort to explore the connections between adherence, depression symptoms and the relationship that CDEs have with an adult child. This study lends strength to models supporting complex interactions among many factors impacting medication adherence (Leventhal et al., 1999; Murray et al., 2004) Authors of the models should now consider inclusion of components of IGS, such as functional and affectual solidarity, as they may have unique roles in impacting medication adherence based on level of depression symptoms and gender. The findings thus support the tenets of the Roy Adaptation Model (Roy, 2009) and adherence models (Leventhal et al., 1999; Murray et al., 2004) that indicate both internal factors such as depression and external factors such as family relationships are related to adherent behavior. The results further suggest that the relationship between depression symptoms and non-adherence, while widely reported, are perhaps subtle, and may differ according to gender and level of depression symptoms. Functional and affectual solidarity may bolster adherence only in individuals with low levels of depression symptoms. Once a more clinical level of depression sets in, family connection and solidarity may not be enough to help, furthering the argument for additional prevention, screening and professional care to address this significant mental health problem.

Chapter 6

SUMMARY, RECOMMENDATIONS AND CONCLUSION

Summary

This descriptive correlational study, using a survey method with a

convenience sample of CDEs, explored the relationship between affectual,

associational and functional solidarity; depression symptoms; and medication

adherence. The results support many widely reported factors important for medication

adherence, as well as previously reported relationships between components of IGS.

Medication non-adherence was present in 35.5% of participants; with mid-age older

adults having higher adherence than their younger and older counterparts. Taking

fewer medications per day (pill burden) was an important factor predicting higher

medication adherence.

This study is the first known attempt to explore the predictive value of IGS to

medication adherence in CDEs. Components of intergenerational solidarity (affectual,

functional and associational) and depression symptoms did not contribute to the

prediction of adherence beyond pill burden, except in two separate regressions. One

was conducted only on participants with low level of depression symptoms and

another with only women. For non-depressed individuals, functional solidarity made

a small contribution to predicting improved adherence, suggesting that while IGS

may be important in improving adherence, those with depression symptoms may not

benefit from this type of interconnection with their adult child. In a regression using only female participants, affectual solidarity but not pill burden increased the odds of adhering to medication. All of these findings support the complexity of medication adherence behaviors, suggesting that both external factors such as pill burden and individual factors such as age, gender, level of depression symptoms, functional solidarity and affectual solidarity may all contribute to medication adherence in certain circumstances.

Findings regarding IGS are consistent with previous research in that affectual, functional and associational solidarity are all inter-related, with older adults spending more time with those for whom they have high affection and with whom they exchange more support. Higher levels of affectual solidarity and provision of support to a child are found in participants with low levels of depression symptoms.

Other incidental findings include a 8.3% rate of previously unrecognized significant symptoms of depression and a 15% rate of possible cognitive impairment in this population of community dwelling elders attending a senior center.

Recommendations

Because this study presents new information about the impact of IGS upon medication adherence in CDEs, the findings have implications for nursing practice, education and research.

Nursing practice. Several of the findings raise issues for nursing assessment and interventions in the care of older adults. According to study results, there exist a number of CDEs who may have undiagnosed depression and cognitive difficulty.

Because these problems have significant association with morbidity and mortality (Eggermont, et al., 2012; Jeste et al., 2005; NIMH, 2012; Win et al., 2011), nurses should routinely screen for the presence of depression symptoms and cognitive symptoms. Such assessment is supported by The Hartford Institute for Geriatric Nursing in their guidelines that recommend screening for depression in high-risk groups (Harvath & McKenzie, 2012). Many CDEs will fit the high-risk depression group due to co-existing illness or bereavement status and thus, most older adults would meet the criteria for depression screening. Conversely, there is no specific screening recommendation for cognitive impairment (Fletcher, 2012). The guide for cognitive impairment screening (Fletcher, 2012) suggests nurses remain alert for signs and symptoms, but does not identify specific risks or signs. A guideline listing specific risk factors and signs of cognitive impairment would be helpful for nurses who may be unsure of whether or not to screen for this health problem.

There are other interventions advanced practice nurses (APNs) and other prescribing providers can make on the basis of this study that may enhance medication adherence. The results of this study endorse previous findings indicating medication adherence declines as number of medications taken daily increases. Continued effort by prescribing providers to lower pill burden remains an important component of care. Further, nurses who do not prescribe can use these (and previous) findings to advocate for decreasing pill burden for patients.

Results suggest that nurses also consider the relationship an older adult has with his/her children. Standards of care provided by nurses routinely include

consideration of the family environment, but the limited research on the impact of an

adult child on medication adherence in a CDE makes the extent to which APNs

should include an adult child in addressing medication adherence unclear.

Furthermore, this study's findings suggest that family assessment and intervention

may be important to improve adherence. For CDEs with low levels of depression

symptoms, increasing levels of help and support exchanged with an adult child

(functional solidarity) may enhance adherence. Conversely, healthcare providers

should take note that with depressed individuals, the benefits of affectual and

functional solidarity disappear, and attention to depression symptoms may be

beneficial, although the work by Lin et al. (2012) prompts concern that once

depression takes hold, non-adherence may persist after treatment of depression.

Consequently, application of these findings suggests ongoing close monitoring of

patients with a history of depression and poor adherence.

Nursing education. As noted previously, this study's findings indicate that

medication adherence, depression symptoms and cognitive impairment exist in

significant amounts in CDEs. This triad of health concerns has a deleterious impact

on quality of life for older adults and schools of nursing should insure that they be a

part of the curriculum taught at both the graduate and undergraduate levels. Expedient

screening tools, such as the Mini-Cog, should be taught at all levels. Advanced

practice nurses must be adequately educated on methods to fully assess and evaluate

both cognitive impairment and depression. Awareness of and ability to administer

screening measures designed for older adults, such as the GDS-15, and to properly

evaluate and appropriately refer when necessary are essential to improved delivery of care specific to these health concerns in older adults.

Intergenerational solidarity is a relatively novel concept to nursing. A recent CINAHL search for articles on intergenerational solidarity with any nurse author revealed no articles. As the population ages, and nurses and APNs are increasingly responsible to be expert in geriatric knowledge, the IGS frame can be used to discuss and teach components of family relationships in later life.

Nursing research. On the basis of this study, several implications for nursing research and recommendations for future study can be made in reference to the relationship of gender to components of IGS, reliability of the instruments used, and ethnic and racial diversity. Recommendations will be made to consider stratified and purposive sampling of various ethnic and racial groups, expand sample size, and consider designs that will increase knowledge regarding the relationships between these variables.

As this study's findings suggest that some of the gender gap found in earlier studies of IGS may have changed, future research should continue to document and explore levels of IGS components across regions, cultures and race to both verify the lack of gender differences and better understand the nuanced differences in IGS based on these factors. Probability sampling beyond a specified setting such as a senior center could expand inclusion of these individuals. Though the overall gender gap in IGS may be decreasing, the results of this study indicate that the factors related to medication adherence differ for women and men. While there are fewer men than

women in the over 65 year old age group in the general population (United States

Department of Health and Human Services, 2011), in this study men were somewhat

underrepresented. The increased tendency for men to refuse noted in a similar study

by Krousel-Wood et al. (2010) supports using stratified sampling in future studies to

more fully elucidate possible gender differences.

Similar to stratified sampling would be purposive sampling in order to expand

understanding of the relationship among these variables for different regional areas,

cultural groups and racial identities. Diversity of groups would also enhance the

understanding of the reliability of the newer instruments used in this study such as the

PARQ (Pitzer et al., 2011) and the ISS Scale (Fingerman et al., 2010) which have yet

to be tested widely.

Expanding the sample size in this study would allow an increase in the

number of variables. Expansion of variables would allow data gathering to include

relationships with more than one child (if existing). While this study did not suggest

the balance of flow of support was related to adherence, the results suggest that when

older adults provide more to their adult children than they received they experience

fewer symptoms of depression. Inclusion of balance of support as its own variable

with a larger sample would increase power to detect a possible relationship with

medication adherence. Given the finding that functional solidarity predicts medication

adherence in CDEs with low levels of depression symptoms, inclusion of direct

medication support from an adult child would expound knowledge regarding what

types of support may be beneficial.

A study with an expanded sample size would also allow further refinement to enhance reliability and validity of the ©MMAS-8 (Morisky et al., 2008). Given the ease of use (both in cost and convenience) of a self-report medication adherence scale such research is important. A larger sample using the ©MMAS-8 (Morisky et al., 2008) in concordance with other measures of adherence such as electronic cap would further define the instrument's convergent validity and allow for exploration of the premise that findings may differ based on type of adherence measures used. While the factor-analysis reported by instrument developers described a uni-dimensional construct (Morisky et al., 2008), a theoretical work (Voils et al., 2011) suggests that the instrument measures both activity (taking or not taking medication) and attitude about medication (feeling hassled). A larger study with a broad population could provide the expanded data necessary for factor analysis. Additionally, the ©MMAS-8 (Morisky et al., 2008) might be tested against measures of social desirability, which if present may be responsible for the underreporting of actual adherence and support refinement of questions to address such bias.

Finally, a longitudinal study could help address some remaining questions including: (a) Does baseline affectual solidarity impact adherence over time? (b) Does affectual solidarity have to be mutual and stable over time in order to enhance adherence? (c) Do symptoms of depression that are alleviated by treatment cause a reduction of non-adherence, or as Voils et al. (2011) suggest, do personality characteristics influence non-adherence more than depression symptoms, thus making treatment of depression ineffective in improving adherence for some (Lin et al.,

2012)? Longitudinal research, perhaps using trajectory research design (Henly,

Wyman & Findorff, 2011), which considers the influence of natural aging changes as

well as interventions, would allow for exploration of these questions.

Conclusion

The findings of this study verify previous research that indicated pill burden

has a deleterious affect on medication adherence. This study also supports findings of

Gryzwacz and Marks (1999) that demonstrated components of the parent-adult child

relationship, as conceptualized by the IGS framework, are related to adherence in

adults. However, the relationships between measures of IGS and medication

adherence in this population of CDEs attending a senior center are small and findings

demonstrate significant amounts of non-adherence that was not well predicted by

measures of depression symptoms and IGS. Clearly nurse scientists must continue to

study medication adherence behavior and the factors related to it in this vulnerable

population. Expanded understanding of this complex problem is essential to

designing interventions that effectively reduce the incidence of non-adherence and its

unfortunate sequeli, including re-hospitalization and death.

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Appendix A

Demographic Data Sheet

I would like to ask you some questions about you, how you take your medications

and your relationship with an adult child.

Section I: This section has questions to tell me about yourself

1. What is your gender?

Male   Female

2. What is your Marital Status?

Married   Never Married   Widow   Widower

3. Whom do you live with?

Alone   Spouse   Significant Other   Child   Other

4. What is your highest level of Education?

<12 years   High School   < 4 yrs. college

4 yrs. college   graduate school

5. What best describes your Income level?

           <14,999   15,000-24,999   25,000-59,999

           60,000-99,999 100,000-199,999   >200,000

6. Do you have insurance coverage for medication?

        Yes   No

7. How many pills do you take per day?

  1-2   2-5   6-9   >10

8. How many different times per day do you take medication?

  1   2   3   4

9. Does anyone help you with your medication?

Yes   No

  a. If yes, who is that person?

  b. 10. How does this person help you?

Appendix B

Parent-Adult Child Relationship Questionnaire

I am going to ask you some questions about how you feel about one of your children. Please pick the child you feel closest to in answering the questions and tell me their name and birth order. Please tell me how often, if ever, your child may have done the following things recently.

1. How often has your child acted warm or affectionate toward you?

    Never   Rarely   Often   Sometimes   Always

2. How often has your child acted thoughtful and considerate toward you?

    Never   Rarely   Often   Sometimes   Always

3. How often has he/she done favors or other little things for you?

    Never   Rarely   Often   Sometimes   Always

4. How often has he/she been supportive of decisions you have made?

    Never   Rarely   Often   Sometimes   Always

5. How often has he/she acted angry or hostile toward you?

    Never   Rarely   Often   Sometimes   Always

6. How often has he/she behaved insensitively or unsympathetically toward you?

    Never   Rarely   Often   Sometimes   Always

7. How often has he/she made demands for favors or other little things from you?

   Never   Rarely   Often   Sometimes   Always

8. How often has he/she questioned or doubted your decisions?

   Never   Rarely   Often   Sometimes   Always

Appendix C

Intergenerational Support Scale

Section II: In this section I will be asking you questions about your relationship with one of your adult children. Please pick the child closest to you in providing responses to the questions.

HELP RESPONDENT PROVIDES

Now, I'd like to know about the different kinds of help and support you provide to your child. Please tell me the **actual** help you provide, not what you wish you provided or might provide under different circumstances.

IF R HAS RESPONDENT BOOKLET (cons4 = 1), READ: Please look again at Card 1 **(see last page of survey) OTHERWISE, READ:** Please look again at the list where the answer choices are:

(1) = daily, (2) = a few times a week, (3) = weekly, (4) = a few times a month, (5) = monthly, (6) = a few times a year, (7) = once a year, (8) = less than once a year or never.

Let's start with **emotional support**—Emotional support involves listening to someone's concerns or being available when they are upset. **(IF NECESSARY READ:** By available we mean willing to listen, by phone, in person, or in any form.)

D3. How often do you provide your child with emotional support? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

How about **technological assistance**—for instance, teaching them about a computer program, selecting electronic equipment, or how to use email?

D6. How often do you provide your child with technological assistance? (Would you

say:)

    (1) DAILY

    (2) A FEW TIMES A WEEK

    (3) WEEKLY

    (4) A FEW TIMES A MONTH

    (5) MONTHLY

    (6) A FEW TIMES A YEAR

    (7) ONCE A YEAR

    (8) LESS THAN ONCE A YEAR OR NEVER

    (Just tell me the number of your answer (from Card 1).)

Now, please think about other **practical assistance**—for instance, fixing something

around the house, running an errand, or providing a ride.

D9. How often do you provide your child with practical assistance? (**IF**

NECESSARY, READ: Please tell me the **actual** help you provide, not what you wish

you provided or might provide under different circumstances.) (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

How about **talking** about daily events—that is, talking with you about recent events or

things that have happened in their lives, at work or with the family?

D12. How often does your child talk with you about (his/her) daily life? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

Please think about **socializing**—such as going out or doing activities together?

D15. How often do you socialize with (CHILD NAME)? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

Now, please consider **advice you provide**—that is, help with a decision or suggestions about things they could do.

D21. How often do you give your child advice? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

Please think about **financial support.** Financial support involves giving money, loaning money, or helping them purchase goods, services, insurance, or education.

D24. How often do you provide your child with/ support?

(INCLUDE HOLIDAY/BIRTHDAY CASH GIFTS.)

(Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

You won't need the (card/list) for the following questions.

E. HELP RESPONDENT RECEIVES

Now, we'd like to know about the different kinds of help and support **you receive** from your child who is 18 or older. Please tell me how often you **actually** receive help and support, not what you wish you received or might receive under different circumstances.

IF R HAS RESPONDENT BOOKLET (cons4 = 1), READ: Please look again at Card 1. **OTHERWISE, READ:** Please look again at the list where the answer choices are: (1) = daily,

(2) = a few times a week, (3) = weekly, (4) = a few times a month, (5) = monthly,

(6) = a few times a year, (7) = once a year, (8) = less than once a year or never.

Let's start with **emotional support**—Emotional support involves someone listening to your concerns or being available when you are upset. **(IF NECESSARY READ:** By available we mean willing to listen, by phone, in person, or in any form.)

E3. How often does your child provide you with emotional support? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1)

How about **technological assistance**—for instance, learning a

computer program, selecting electronic equipment, or how to use email?

E6. How often does your child provide you with technological

assistance? (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

(Just tell me the number of your answer (from Card 1).)

Now, please think about other **practical assistance**—for instance,

fixing something around the house, running an errand, or getting a ride if

you need it.

E9. How often does your child provide you with practical assistance?

(IF NECESSARY, READ: Please tell me the **actual** help you receive, not what you wish you received or might receive under different circumstances.) (Would you say:)

(1) DAILY

(2) A FEW TIMES A WEEK

(3) WEEKLY

(4) A FEW TIMES A MONTH

(5) MONTHLY

(6) A FEW TIMES A YEAR

(7) ONCE A YEAR

(8) LESS THAN ONCE A YEAR OR NEVER

Appendix D

Associational Solidarity

I am going to ask you about how much time you spend with your child in certain activities.

1. How frequently do you have a conversation with this child?

Almost never   a few times per year   several times per year
monthly   a few times a month   weekly
a few times a week   almost every day

2. How frequently do you get together with this child at a family

    gathering?

Almost never   a few times per year   several times per year
monthly   a few times a month   weekly
a few times a week   almost every day

3. About how often do you talk about important matters with this

    child?

Almost never   a few times per year   several times per year
monthly   a few times a month   weekly
a few times a week   almost every day

4. How frequently do you have dinner together with this child?

Almost never   a few times per year   several times per year
monthly   a few times a month   weekly
a few times a week   almost every day

5. About how often do you exchange a small gift with this child?

Almost never   a few times per year   several times per year
monthly   a few times a month   weekly
a few times a week   almost every day

Appendix E

Geriatric Depression Scale

Geriatric Depression Scale (short form)

Instructions: Circle the answer that best describes how you felt over the past week.

1. Are you basically satisfied with your life?   yes   no

2. Have you dropped many of your activities and interests?   yes   no

3. Do you feel that your life is empty?   yes   no

4. Do you often get bored?   yes   no

5. Are you in good spirits most of the time?   yes   no

6. Are you afraid that something bad is going to happen to you?   yes   no

7. Do you feel happy most of the time?   yes   no

8. Do you often feel helpless?   yes   no

9. Do you prefer to stay at home, rather than going out and doing things?   yes   no

10. Do you feel that you have more problems with memory than most?   yes   no

11. Do you think it is wonderful to be alive now?   yes   no

12. Do you feel worthless the way you are now?   yes   no

13. Do you feel full of energy?   yes   no

14. Do you feel that your situation is hopeless?   yes   no

15. Do you think that most people are better off than you are?   yes   no

Total Score _____

Appendix F

Mini-Cog

Now I am going to do some testing of your memory.

Please listen carefully to the following 3 words and repeat them:

1.   1   2   3

2. Now please draw the face of a clock on this (separate) paper indicating

the time as 8:20

3. Can you tell me the 3 words I said earlier?

1   2   3

Appendix G

Morisky Medication Adherence Scale

You indicated that you are taking medication for your health. Individuals have identified several issues regarding their medication – taking behavior and I am interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experience with your medication.

	No=1	**Yes=0**
1. Do you sometimes forget to take your pills?		
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?		
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?		
4. When you travel or leave home, do you sometimes forget to bring along your medication?		
5. Did you take your medication yesterday?		
6. When you feel like your health is under control, do you sometimes stop taking your medicine?		
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your medication treatment plan?		

8.How often do you have difficulty remembering to take all your medication?
Never/Rarely..............0
Once in a while 1
Sometimes.................2
Usually....................3
All the time...............4

Appendix H

Recruitment Script

Intergenerational Solidarity and Medication Taking Behavior

My name is Connie Kartoz and I am a Family Nurse Practitioner and a nursing doctoral student at Seton Hall University. I am working to better understand the things that may or may not help with how older adults' take their medication and how their experiences with their adult children might be related to this. I am seeking volunteers to come to the computer room and complete a survey that will beI will read to you. This should take approximately 20 minutes. The questions are about you, the adult child you are closest to, and how you take your medication.

No senior center staff will be present and your participation or non-participation will not impact your ability to continue to participate at the center. Your answers will be confidential and not shared with anyone at the center.

Benefits to the research project include further understanding for nursing helping nurses and other health care providers regarding better understand how to work with patients and their families around taking medication. You may experience increased knowledge surrounding this area, or the experience may have no impact. If you

become uncomfortable with any question you may refuse choose not to answer it and move on to the next question. You may stop the interview at any time.

If you are willing to participate in this study I ask that you sign up for a time to come to the conference room to privately complete the survey questions. You may also sign up for a time to meet with me to ask any questions regarding health and your medications. If you wish to participate in the study, please take an informed consent packet with you. When you arrive, you will be asked to sign the informed consent. You may decline to participate at that time if you wish. At the completion of the questions I will distribute a small gift and you will be entered to win one of 3 $25 gift cards to K-mart.
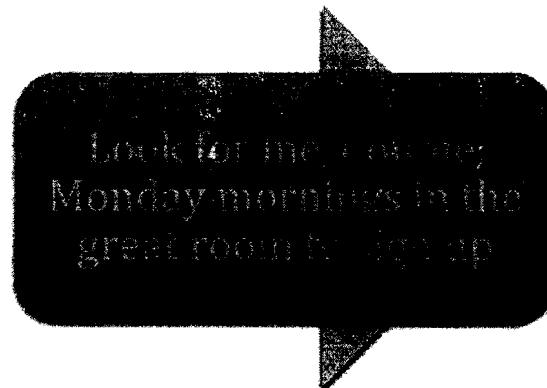
I will be glad to answer any questions at this time and thanks for your attention.

Appendix I

Nursing Research Study

Want a chance to help nurses understand issues for

older adults taking medications?

- I will be at the center conducting interviews beginning

August 13

Everyone who participates will get a small gift and a

chance to win one of 3 $25 gift cards

Appendix J

Intergenerational Solidarity and Medication Adherence

Informed Consent

AFFILIATION

Connie Kartoz is the researcher for this study. She is a PhD student at the Seton Hall University College of Nursing. The research project is part of the requirements for a PhD in Nursing.

PURPOSE AND DURATION

The purpose of the study is to determine the association between the relationships older adults have with their adult children and how they take their medications. Volunteers are being sought to spend about 20-30 minutes answering questions in a private room.

PROCEDURES

Interviews will be held in a private location within the center. Upon arrival, the participant will be asked if he or she is interested in participating in the study. If the senior is interested, the informed consent will be reviewed and signed. After providing informed consent, each participant will be asked a series of questions about how he or she takes medication and his or her relationship with an adult child. Screening for depression symptoms and memory difficulty will also take place at the end of the interview.

INSTRUMENTS

Each participant will be asked to answer questions about his or her background such as age, (in a range of 60-65, 66-70, etc.) level of education and gender. Standardized questionnaires about the relationship with a child over 18

years of age will include questions such as "how often do you talk about important matters with your child" and "how often do you provide practical support to your child?" The researcher will also ask questions about how a participant takes medication, such as "taking medication is a real hassle for some people, do you ever have trouble taking your medication?" Finally, the researcher will use a depression-screening tool with questions such as "do you feel full of energy?" Memory- screening questions will be read to the participant. At completion of the questions, each participant will be given an opportunity to share any comments, both verbally and in writing.

VOLUNTARY PARTICIPATION

Participation in the study is completely voluntary. A participant may withdraw at any point in the study by simply informing the researcher that he or she wishes to stop the questions. Participation at the center is in no way related to participation in the study.

ANONYMITY

Data will be collected on forms without any identifying data. Other than the consent form, names will not appear on any documents in the research study. Participants may sign up for a time slot using a pseudonym if they desire. Participation or non-participation will not be shared with any staff or clients at the center or elsewhere.

CONFIDENTIALITY

Consent forms and questionnaires will be collected by the researcher and stored in a locked file. The researcher will not discuss answers from any participant with anyone at the center or elsewhere. Data for analysis will be stored on a unique flash drive and kept in a lock box at the researcher's home. No material will be stored on a laptop or in any computer. As is routine and required,

data will be stored for 3 years following the completion of the study, and then destroyed.

RECORDS

Only the researcher and her faculty supervisor will have access to the questionnaires. Aggregate data that is coded and separate from the questionnaires may be shared with faculty as needed for assistance with statistical analysis. Aggregate data may be published in professional literature or shared at professional meetings.

RISKS

There are no direct risks from this study. Some participants may recall or experience uncomfortable emotions such as anxiety or sadness when answering questions about their family or their state of health. If a participant experiences feelings of distress related to the research study at any time, he or she should tell the researcher, or call the researcher. Referrals for professional counseling are available at the participant's own cost.

BENEFITS

Participants may not experience any direct benefit to participating in this study, but may realize that they need to change the manner in which they take their medication in order to have it be more accurate. Participants will receive free screening for depression and cognitive status.

It is hoped that the knowledge gained from this study will be of benefit to older adults in the future.

COMPENSATION

Upon completion of the study each participant will be given a small token gift (note pad and pencil) and a medication box. Each participant will also receive a numbered chance to be entered into a drawing for one of 3 $25 gift cards to a local store. The drawing will take place when the researcher has finished interviewing all the participants in the study.

ALTERNATIVE PROCEDURES

There are no penalties for participating in this study. If you choose not to participate or withdraw at any time you can expect to participate fully in the activities at the center.

CONTACT INFORMATION

Participants with questions may contact the researcher, Connie Kartoz, RN, MS, APN, BC, at the PhD Nursing Program College of Nursing, Seton Hall University, 400 South Orange Avenue, South Orange, NJ 07079 (973-761-9266) or email at [connie.kartoz@student.shu.edu]; the faculty advisor Pamela Galehouse, RN, PhD, College of Nursing, Seton Hall University (973-761-9294)

The Institutional Review Board at Seton Hall University can also be contacted for answers to any pertinent questions about the research and the study participant's rights and can be contacted by calling Dr. Mary Ruzicka at 973-313-6314, or by email at [irb@shu.edu]

AUDIO/VIDEO TAPE

There will be no recordings taken at any point in the research.

COPY OF CONSENT FORM

I understand that I will be given a copy of this form.

I agree to participate in the study Intergenerational Solidarity and Medication Adherence

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Study Participant   Date