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**EFFECTS OF ANIMAL-ASSISTED THERAPY FOR RESPONDING TO PASSIVE  
BEHAVIOR IN ELDERLY NURSING HOME RESIDENTS WITH DEMENTIA: A SINGLE-  
SUBJECT DESIGN STUDY**

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by

Cherie Ann Soprano

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The dissertation of Cherie Ann Soprano was reviewed and approved\* by the following:

Ann M. Kolanowski  
Elouise Ross Eberly Professor of The School of Nursing  
Dissertation Advisor  
Chair of Committee

Vernon M. Chinchilli  
Distinguished Professor and Chair, Department of Public Health Sciences  
Professor of Statistics

Daniel Lago  
Assistant Professor of Human Development and Family Studies

Janice Penrod  
Associate Professor of Nursing

Kathleen Byrne Colling  
Assistant Research Scientist  
University of Michigan School of Nursing  
Special Member

Paula Milone-Nuzzo  
Professor of Nursing  
Dean of School of Nursing

\*Signatures are on file in the Graduate School

## ABSTRACT

Passive behavior (PB) is a behavioral disturbance that affects 61 to 88 percent of nursing home residents (NHRs) with dementia. PB in persons with dementia (PWD) often leads to such negative consequences as, social isolation, loss of physical functioning, excess disability, and further cognitive decline, which, in turn, may lead to loss of quality of life, increased morbidity and mortality, and caregiver distress. PB in PWD is often misdiagnosed as depression and treated with psychoactive medications. The black-box warning against the use of psychoactive medications in PWD warrant the need for non-pharmacological interventions aimed at better managing PB in PWD. Many studies have suggested health and social benefits may be derived from animal-assisted therapy (AAT). The specific aim of the present study was to determine if a functional relationship existed between AAT and PB in PWD. The Need-driven Dementia-compromised Behavior Model (NDB) and attachment theory (AT) were the organizing frameworks for this study. A within-subject, repeated measurements, quasi-experimental A-B<sub>1</sub>-A'-B<sub>2</sub> design was used to measure PB. Eight subjects, who met the study's inclusion criteria, completed 32, daily, 20-minute sessions under two conditions: dog present and dog absent. Sessions were videotaped and measures of PB were obtained from the video-recordings, using the Observational Form of Passivity in Dementia (O-PDS) scale. Pairwise *t* tests were performed on the adjusted mean scores of the O-PDS. Visual analyses of the graphs of O-PDS scores consistently demonstrated significantly less PB in 7 of the 8 subjects during the AAT conditions. Findings suggest that AAT can serve as a useful intervention for decreasing PB in PWD.

***Key words:***

*Alzheimer's disease, animal assisted therapy, dementia, passive behavior*

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## DEDICATION

This dissertation is dedicated to my shihtzu, Kibbles, who assisted me in every AAT session. Kibbles brought joy to everyone she encountered. I know she enjoyed the petting, singing, and brushing, the kisses, the hugs, the laughter, and the treats! I will never forget her face after one resident fed her strawberry ice cream. The memories will last a lifetime. My dearest Kibbles, I love you!



## CHAPTER 1

### INTRODUCTION

Greater than 50% of elderly nursing home residents (NHRs) suffer from some form of dementia, the most common form of which is Alzheimer's disease (AD; Alzheimer's Association, 2009). Declarative memory deficits are hallmark of AD and other related dementias, but nearly 90% of persons with dementia (PWD) experience disruptive behavioral symptoms (Davis, Buckwalter, & Burgio, 1997). The literature is replete with studies that have investigated the incidence of the more overt, disruptive dementia behaviors, such as agitation, wandering, and repetitive vocalizations (Algase, 1999; Beck & Vogelpohl, 1999; Cohen-Mansfield & Billig, 1986). One behavioral symptom of dementia, passive behavior (PB), has received little research attention, despite recognition that it occurs on a daily basis and is often resistant to interventions (Cummings, 1997; Everitt, Fields, Soumerai, & Avorn, 1991; Kaufer et al., 1998; Wood et al., 1999). According to published estimates, PB affects 61 to 90 percent of NHRs with dementia, characterizing this segment of the nursing home population as the silent majority who show a reduction of energy, drive, and initiative (Buettner, 1999; Galynker, Roane, Miner, Feinberg, & Watts, 1995; Kolanowski, Litaker, & Buettner, 2005; Mega, Cummings, Fiorello, & Gornbein, 1996).

#### Statement of Problem

PB is defined as a constellation of behaviors, characterized by a decreased ability to experience or respond to human emotions, withdrawal from interactions with the environment and others, a decrease in motor activity, and diminished mental processes associated with thinking and knowing (Colling, 1999b). NHRs with dementia are at risk for PB because of the physical and cognitive deterioration associated with the progression of the disease (Colling, 1999b; Craig et al., 1996; Doody, Massman, Mahurin, & Law, 1995). This places the PWD at

considerable risk for increased frailty and excess disability, which, in turn, impedes quality of life and may result in increased morbidity and mortality (Beck et al., 2002; Mace & Rabins, 1999). Because a cure for dementia is not in the foreseeable future, efforts must be made to improve the quality of life for PWD who exhibit PB.

The U.S. spends more than \$148 billion annually on the treatment of AD and secondary problems caused by AD (Alzheimer Association, 2009). Pharmacological management of agitation is priority in the treatment of behavioral symptoms associated with AD (U.S. Department of Health and Human Services-National Institutes of Health-National Institute on Aging, 2008). Pharmacological management of PB is limited to few medications, mainly cholinesterase inhibitors whose efficacy has had mixed results (Clegg et al., 2001; Daiello, 2007; Mintzer, 2003; Rösler, 2002). This evidence warrants the need to develop and/or test other non-pharmacological interventions that may reduce PB in PWD.

Effective non-pharmacological interventions exist for responding to PB in PWD, but they are limited due to a poor understanding of PBs root cause (Colling, 1999a). Colling (1999a, 1999b, 2000, 2004) has contributed substantially to the conceptualization of PB. She laid the groundwork for a comprehensive theoretical base (Algase et al., 1996) that considers the root cause of PB. PB in PWD is conceptualized as an unmet need, that when addressed appropriately will enhance quality of life (Colling, 1999b, 2004). Initial research efforts have begun to identify antecedents or causative factors linked to PB. One compelling causative factor of PB has been identified by PWD who depict PB as a need to isolate and deliberately withdraw from inappropriate environmental stimuli (Colling, 2000, 2004; Davis, 1989; McGovern, 1993).

Many aspects of the physical and social environment influence an individual's behavior throughout life, even in older age (Haight, Barba, Tesh, & Courts, 2002). Due to cognitive impairment, the PWD has difficulty distinguishing between, and attaching meaning to, relevant and irrelevant environmental stimuli, resulting in lack of interaction with the environment (Beck

& Heacock, 1988). If the physical and social environment is perceived as too stimulating, a PWD may withdraw (Beck & Heacock, 1988). On the other hand, low stimulus environments lack the stimulation needed for maximum functioning, and may actually trigger boredom, resulting in social isolation and inactivity (Buettner, 1999). Seen this way, PB in PWD may be triggered by an environment that is either, over-stimulating or under-stimulating.

It has been suggested that behavioral symptoms of dementia improve when environmental stimuli are matched with environmental demands (Hall & Buckwalter, 1987). One non-pharmacological intervention gaining popularity in the treatment of PWD is animal-assisted therapy (AAT). AAT is a goal-oriented, sensori-motor intervention that brings humans and animals together (Delta Society, 2005). When implemented correctly, AAT is aimed at manipulating the characteristics of an individual's physical and social environment, producing an environment that is neither, under-stimulating or over-stimulating.

Several researchers (Corson & Corson, 1987; Kongable, Stolley, & Buckwalter, 1990) maintain that introducing an animal into the environment enhances the general milieu of the treatment setting and changes the way the environment is perceived, as non-threatening, more friendly, nurturing, and comfortable. Others claim that animals bring a sense of normalization to the environment (Haughie, Milne, & Elliott; 1992) and help create a more home-like atmosphere (Manor, 1991; Savishinsky, 1985). Contact with animals address some of the significant losses NHRs commonly experience, including diminished companionship, a decrease in tactile experience, a decline in stimulating leisure activities, and reduced ties with family and friends (Banks & Banks, 2002; Beyersdorfer & Birkenhauer, 1990; Kogan, 2000; Steed & Smith, 2002). Petting, a tactile link between a person and an animal, offers physical contact with another living creature and can invoke pleasant memories of past pets (Baun, Oetting, & Bergstrom, 1985). Animals are ideally suited for a distraction role, mainly due to their appealing or novel characteristics, such as floppy ears, fur, a wagging tail, and a boisterous personality (Brickel,

1982; Williams & Jenkins, 2008). These novel characteristics allow the animal to act as the catalyst to social interaction (Barak, Savorai, Mavashev, & Beni, 2001; Brickel, 1982; Corson & Corson, 1987; Haughie et al., 1992). Institutionalized elders have been noted to respond to the novel characteristics of the animal as evidenced by recalling childhood memories of pets (Kongable et al., 1990; Savishinsky, 1985). These are positive outcomes of AAT that indicate a reduction in behaviors that characterize PB.

The role domesticated animals play in creating an optimal health care environment is not new. AAT has existed in various forms in most cultures for many centuries. Boris Levinson (1964, 1972), the pioneer of pet therapy, now termed AAT, believed contact with animals was important for the emotional development of children, especially for those who can be withdrawn, catatonic, and largely unresponsive to engage in interaction. This belief has been expanded to include institutionalized elderly who are withdrawn, catatonic, and largely unresponsive to engagement in interaction (Fick, 1993; Holcomb & Meacham, 1989; Voelker, 1995). Since withdrawal and lack of engagement in activities are behavioral components of PB, AAT seems like a plausible non-pharmacological intervention for effectively responding to PB in PWD.

### **Specific Aims**

AAT is a popular non-pharmacological approach in nursing homes. Within the past twenty years, several studies have investigated certain behavioral components of PB in PWD in relation to AAT and have made the claim that AAT was effective in increasing verbal and non-verbal social behavior, increasing engagement in activities, decreasing social isolation, and improving mood in NHRs with dementia (Batson, McCabe, Baun, & Wilson, 1998; Churchill, Safaoui, McCabe, & Baun, 1999; Curtright & Turner, 2002; Hall & Malpus, 2000; Kanamori et al., 2001; McCabe, Baun, Speich, & Agrawal, 2002; Motomura, Yagi, & Ohyama, 2004; Richeson, 2003; Taylor, Maser, Yee, & Gonzalez, 1993; Walsh, Mertin, Verlander, & Pollard, 1995). Many of these studies, however, lacked empirical rigor and a theoretical framework,



which explains the cause-and-effect relationship among the variables. Furthermore, these studies lacked strong measures of PB in relation to AAT. Therefore, the specific aim of the present study was to determine if a functional relationship exists between AAT and PB in PWD, as conceptualized within the Need-driven, Dementia-compromised Behavior (NDB) Model (Algase et al., 1996) and as captured on videotaped data and measured using a reliable instrument, the Observational Form of Passivity in Dementia Scale (O-PDS; Colling & Antonakos, 2004). In this study, the presence of a functional relationship was indicated by a change in subject's behavior changed as a result of AAT and not some other variable.

### **Significance of the Study**

PB in PWD is poorly understood and often diagnosed as depression by medical doctors (Cummings, 2000; Landes, Sperry, & Strauss, 2005; Marin, 1990, 1997), who, in turn, prescribe psychoactive medications, such as stimulants, antidepressants, anticonvulsants, anxiolytics, sedative/ hypnotics, narcotic analgesics, and antipsychotic agents (Beers & Berkow, 2000). Psychoactive medications are costly and their use often results in ill consequences, such as paradoxically exacerbating PB (Borson & Raskind, 1997; Everitt et al., 1991; Marin, 1997; Marin, Fogel, Hawkins, Duffy, & Krupp, 1995) and, according to the U.S. Food and Drug Advisory (FDA; 2005), death. Given these consequences, it is clear that the non-pharmacological approach in the treatment of PB in PWD can be the most satisfactory option.

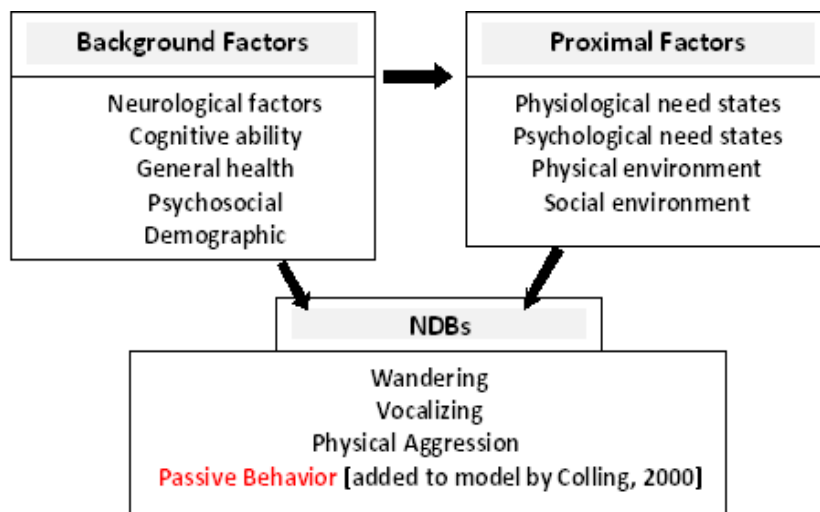
The Omnibus Budget Reconciliation Act (OBRA) guidelines generally recommend trying non-pharmacological interventions first in the management of behavioral symptoms of dementia before undertaking pharmacological treatment (Colenda et al., 1999). The rationale for using non-pharmacological interventions, such as AAT for example, in the treatment of PB in PWD is simple: non-biological factors often play a role in the emergence of behavioral symptoms of dementia, and some of these factors, in particular the environment, can be modified without the use of medications (Turner, 2004). Additionally, non-pharmacological interventions for PWD

have advantages over pharmacological interventions in that they can be administered to several NHRs simultaneously, thus being cost-effective, and they are rarely associated with unwanted side-effects. This latter advantage is particularly important given the context of polypharmacy prevailing among NHRs (Simonson, 2009).

### Theoretical Framework

#### *Need-Driven, Dementia-Compromised Behavior (NDB) Model*

The NDB Model (see Figure 1.1 below) explained the processes that produced PB and gave direction for testing the AAT intervention in the present study. The NDB Model is a middle-range theory developed specifically for NHRs with dementia. The NDB Model conceptualizes PB as a need-driven behavior in PWD and posits that PB is an expression of an unmet need, that when met appropriately, will enhance quality of life and reduce negative outcomes (Algase et al., 1996). The NDB Model provided direction for assessing the root cause of PB in PWD, which is theorized to be precipitated by the interaction of certain background and/or proximal factors.



**Figure 1.1.** The Need-driven Dementia-compromised Behavior Model (adapted from Algase et al.,1996).

As depicted above in Figure 1.1., background factors are stable, personal characteristics that shape the individual's pattern of behavior; they include: neurological factors, cognitive factors, general health status, and psychosocial factors. Background factors can impact NDBs directly as

well as indirectly via proximal factors. Proximal factors are variables that induce a need state; they include physiological and psychological need states and the qualities of the individual's physical and social environment (Algase et al.).

Within the NDB Model, PB in PWD is theorized to be triggered by lack of appropriate stimulation from the physical and social environment (Colling, 2000, 2004; Davis, 1989; McGovern, 1993). The characteristics of the physical and social environment became the targets for manipulation. For the purpose of this study, the intervention, AAT, was considered a proximal factor.

### *Attachment Theory*

Attachment theory explained the mechanism of action of AAT. Using the NDB Model, AAT activities were tailored to appropriately enrich the subjects' physical and social environment by matching to a select background factor, the human-animal bond. Attachment theory provided a descriptive and explanatory framework for understanding the importance of meaningful, affective bonds, or attachments, between human beings, in particular, children and their primary caregivers (Bowlby, 1969, 1988). Bowlby (1969) defined attachment as a component of a relationship with an object where proximity to that object provides a sense of security, as evidenced through such behaviors as eye contact, following, and touching. The attainment of a sense of felt security is an inner resource, which helps people buffer distress. Developed in infancy, these attachments are hypothesized to continue throughout the life span (Ainsworth, 1989; Bowlby, 1988; Cookman, 2005).

In addition to people-to-people attachments, it has been suggested (Bustad, 1984, 1996; Cookman 1996; Melson, 1989; Rynearson, 1978; Sable 1995) that animals/pets also represent aspects of the environment to which humans may form attachments, thus broadening the conceptualization of attachment. The term used to describe this human-animal attachment, the human-animal bond, has been defined as an attachment that can be interpreted as "affectionate,

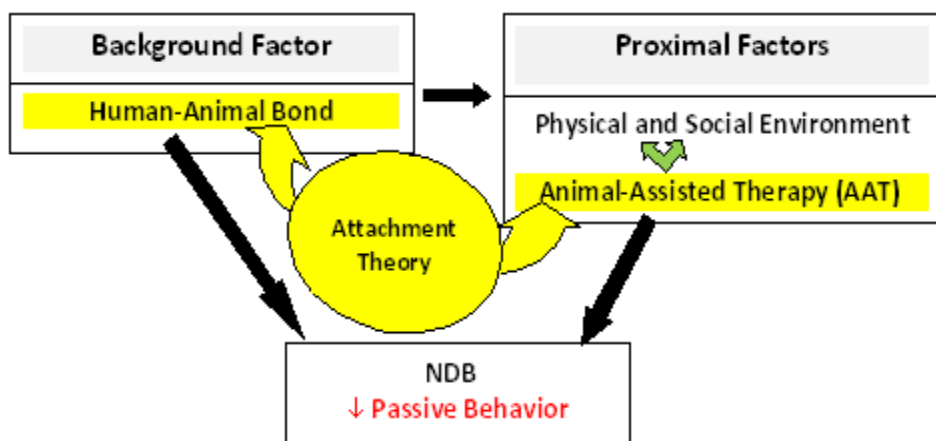
friendly, and companionable interaction between a human being and an animal” (Baun et al., 1985, p. 18).

Over thirty years ago, Rynearson (1978) made the following link between the human-animal bond and attachment theory: “Human and pet are significant attachment figures for one another...[and] share complementary attachment because of mutual need and response” (p. 533), “...the relationship... [is] a vital, reciprocating balance of attachment” (p.551). Today, domesticated pets are neotenized, meaning they have become a part of our personal world, and like infants, they need continual nurturing. In long-term care settings, where NHRs often lack the feeling of being needed, pets allow NHRs, even if for a short time, to be nurturers again, signifying a continual mutual connection (bond) with each other (Lasher, 1998). This nurturing response to animals is an important part of human-animal attachments, promoting well-being and security (Sable, 1995) and possibly reducing PB. This serves to better understand the mechanisms by which the human-animal bond moderates the relationship between AAT and PB.

Evidence suggests that individuals with strong human-animal bonds elicit more positive interactions with the animal (Banks & Banks, 2002; Garrity, Stallones, Marx, & Johnson, 1989; Poresky & Daniels, 1998; Stambach & Turner, 1999). Pet ownership is often the proxy for the human-animal bond, but it may not be the only proxy, for an individual may have developed an attachment or bond with an animal that he or she did not own (Garrity et al., 1989; Endenburg, 1995; Poresky & Daniels, 1998). In the present study, assessing for the presence of a human-animal bond was a necessary inclusion criterion, because responses to animals are highly individualized, depending on the person’s previous life experiences with animals (Sable, 1995). Furthermore, it would be unethical to subject an individual to AAT if he or she had a known fear of animals (Delta Society, 1996; Johnson, Odendaal, & Meadows, 2002).

As depicted below in Figure 1.2, the presence of a human-animal bond, derived from attachment theory, is a background factor in the NDB Model. AAT is part of the physical and

social environment. Attachment theory explains the link between the human-animal bond and AAT. The major factor for success with AAT is viewing the animal and the handler as a team. The animal serves as the handler's medium for manipulating the individual's physical and social environment with the intent of producing positive outcomes, decreased PB.



**Figure 1.2.** Proposed mechanism of action of AAT for responding to PB within the NDB Model.

### Research Hypotheses

The following hypothesis was tested using a quasi-experimental, within-participants repeated measures design with 6 phases: pre-baseline, A-B<sub>1</sub>-A'-B<sub>2</sub> phases, and a follow-up phase:

H<sub>1</sub>: NHRs with dementia will demonstrate a decrease in PB during AAT (phases B<sub>1</sub> and B<sub>2</sub>) phases when compared to the baseline (A) and control/reversal (A') phases.

A visual inspection of the data at the follow-up phase was compared to the B<sub>1</sub> and B<sub>2</sub> phases of the study.

H<sub>2</sub>: NHRs with dementia will demonstrate an increase in PB at follow-up (1-week post B<sub>2</sub> phase) when compared to the intervention phases, B<sub>1</sub> and B<sub>2</sub>.

### Definition of Terms

**Animal-Assisted Therapy (AAT)** is a goal-directed intervention delivered to a small group or a one-to-one session by a healthcare professional, operating from his or her professional

foundation to: (1) facilitate a behavioral, functional, cognitive, emotional, and/or social change in an individual through interactions with an animal in the immediate physical and social environment, and (2) document and evaluate the process (Delta Society, 2000). AAT activities include: making eye contact with the animal; talking/singing to or about the animal; petting, touching, holding the animal; showing affection to the animal (e.g., hugging or kissing); light grooming of the animal (e.g., brushing fur); light feeding of the animal (e.g., treats); walking or wheeling with the animal, if capable; and playing with the animal (e.g., tossing a toy).

**Passive Behavior (PB)** is conceptually defined as behaviors characterized by decreased ability to experience or respond to human emotions, fewer interactions with others and surroundings, a decrease in motor activity, and a lessening of certain specific mental processes associated with thinking and knowing (Colling, 1999b). PB was measured using the Observational Form of Passivity in Dementia Scale (O-PDS; Colling & Antonakos, 2004; see Appendix A).

**Human-Animal Bond** is defined as: “an attachment that can be interpreted as affectionate, friendly, and companionable interaction between a human being and an animal” (Baun et al., 1985, p. 18). The presence of a human-animal bond was assessed using the Informant-Based Canine Attachment Questionnaire, a brief qualitative tool developed by the principal investigator (PI; see Appendix B).

### **Limitations of the Study**

The most obvious limitation of the present study was the small number of subjects, which affects generalization and external validity (Hersen & Barlow, 1976). Even in the best designed and executed single-subject study, critics note that there is little basis for inferring that the intervention: (a) would be equally effective when applied to individuals with similar behavioral problems, (b) would achieve the same results with different investigators, and/or (c) would work in a different treatment setting (Hersen & Barlow, 1976). This limitation was addressed by

adhering to strict inclusion and exclusion criteria and by exercising control over potentially confounding variables. Because the issue of generalization from single-subject designs is a major source of controversy, future replication of the study by other researchers is warranted.

As with many study designs, single-subject methodology is not without threats to internal validity. Threats to internal validity affect the extent to which one is assured that the intervention was responsible for the change in the target behavior (Shadish, Cook, & Campbell, 2002). Controlling for all potential threats to internal validity can be difficult. However, in single-subject designs, history and observation are the two most cited threats to internal validity (Kazdin, 1982). In knowing this, researchers can execute tighter control of individual and environmental variables to reduce the history threat (McReynolds & Kearns, 1983). For example, in the present study, subjects' interaction with other animals during data collection was identified as a significant threat to the study's internal validity. The PI reduced this threat by asking the nursing home administrator to halt all other animal/pet encounters with the subjects during the data collection period. Performing inter-observer reliability measures aided in reducing the threat of observation (Kazdin, 1982).

Missing data is another limitation in studies with small sample sizes. But the power of this single-subject design study lies in the number of data points not the number of subjects (Kazdin, 1982; Metzger & Schultz, 1982). In the present study, the design took into account the possible occurrence of missing data by accounting for the number of data points needed to perform statistical analyses without violating assumptions. The phases were lengthened accordingly to allow for some missing data points.

### **Chapter Summary**

Despite years of intensive research, AD remains an urgent national health priority. The lack of an emerging cure for AD directs the focus of future research on treating behavioral disturbances that result from the disease. PB in PWD is one behavioral disturbance that has

received very little research attention, despite recognition that it affects the vast majority of NHRs with mid-to-late stages of AD. PB often leads to such negative consequences as, social isolation and inactivity, which places PWD at higher risk for further cognitive and functional decline (Beck et al., 2002; Mace & Rabins, 1999).

Very little is known regarding effective treatment for PB. Qualities of the NHRs physical and social environments can trigger PB in PWD (Colling, 2000, 2004; Davis, 1989; McGovern, 1993). Humans have a fundamental need to pay attention to, affiliate with, and respond positively to other living organisms in the natural environment. One natural stimulus that humans affiliate with is animals.

AAT is a sensori-motor intervention that brings humans and animals together. Although AAT is a popular approach in the nursing home, AAT lacks a strong empirical basis. The present study was aimed at determining if a functional relationship exists between AAT and PB in PWD. The outcome of this study provides direction for future AAT intervention research with elderly NHRs with dementia.



## CHAPTER 2

### REVIEW OF LITERATURE

This chapter provides a review of relevant literature highlighting what is known and not known about PB and AAT. The gaps in the knowledge support the rationale for this study. This chapter is divided into three sections. The first section begins with a discussion of PB, which includes the conceptualization of PB, prevalence of PB, negative outcomes of PB, differentiation of PB and depression, antecedents of PB, and measuring PB. The second section examines the use of non-pharmacological interventions for responding to PB in PWD. The third section relates to AAT and includes the following: AAT – what is it, the history of human-animal interaction research, literature examining the benefits of AAT for PWD, and a summary of the state of the science regarding AAT.

The literature search conducted for this study was aimed at identifying published empirical studies on PB and AAT. To identify studies for review, computerized literature searches of five electronic databases: *Cumulative Index to Nursing and Allied Health Literature (CINAHL)*, *ProQuest Nursing & Allied Health Journals*, *PsycINFO*, *PubMed (Medline)*, and *Dissertations and Theses*, were performed in January 2003 and periodically through February 2010. Studies chosen for initial screening met the following criteria: (1) publication between January 1960 and May 2009; (2) publication in peer-reviewed, English language journals; (3) description of non-pharmacological interventions for PB; (3) studies that utilized the NDB Model; and (5) all quantitative AAT studies were eligible for review. Keywords used to retrieve these studies were: *animal-assisted therapy*, *apathy*, *attachment theory*, *dementia*, *disruptive behaviors*, *human-animal bond*, *Need-driven Dementia-compromised Behavior (NDB) Model*, *negative symptoms*, *passive behavior*, *passivity*, *pet therapy*, and *withdrawn behavior*, or combination thereof. Table 2.1 summarizes the results of this computerized literature search.

**Table 2.1***Database Search – Key Words – Number of Citations\**

	<b>CINAHL “All Text”</b>	<b>ProQuest Nursing &amp; Allied Health Journals “Citation &amp; Document Text”</b>	<b>PsycINFO “Anywhere”</b>	<b>PubMed (Medline)</b>	<b>Dissertations &amp; Theses</b>
<b>Need-driven Dementia- compromised Behavior Model</b>	17	58	21	19	5
<b>Dementia + “Disruptive Behaviors”</b>	47	292	417	68	18
<b>“Animal-Assisted Therapy”</b>	103	296	468	73	116
<b>“Animal-Assisted Therapy” + Dementia</b>	10	15	85	10	3
<b>“Pet Therapy”</b>	497	291	175	78	31
<b>Apathy</b>	429	3,712	3,501	2,020	602
<b>Apathy + Dementia</b>	141	480	1,187	650	10
<b>Apathy + Dementia + Depression</b>	84	265	892	299	6
<b>“Attachment Theory” + Animals</b>	4	17	519	23	10
<b>“Human-Animal Bond”</b>	30	96	189	78	39
<b>“Passive Behavior “</b>	8	154	146	83	80
<b>“Passive Behavior” + Dementia</b>	4	21	9	2	1
<b>Passivity + Dementia</b>	27	39	108	22	1
<b>“Negative Symptoms”</b>	525	2,915	10,764	4,240	283
<b>“Negative Symptoms” + Dementia</b>	19	69	1,810	134	5
<b>“Withdrawn Behavior”</b>	12	197	515	55	91
<b>“Withdrawn Behavior” + Dementia</b>	2	10	10	4	0

*\*As of 2/28/2010*

Next, the ancestry method of examining references in review articles was used to identify additional empirical studies not captured through the computerized database search. Twenty books yielded additional information on AAT and attachment theory. Published reports on trusted internet sites provided up-to-date information on AD and AAT, and books pertaining to the single-subject methodology were also reviewed. This search yielded an enormous amount of literature.

Approximately 506 peer-reviewed references were retrieved and reviewed. Only those with conceptual relevance and applicability to the research variables of interest were cited. The references at the end of this dissertation delimit the literature to the conceptualization of PB, the theoretical perspective that explores the root cause of PB, the interventions that have already been tried for PB, research utilizing AAT, and how AAT might work for PWD who exhibit PB.

### **Passive Behavior (PB)**

#### ***Conceptualization of Passive Behavior***

PB or to be passive is often used freely in communicating, documenting, and reporting. For example, “The client is passive.” “PB noted.” “The resident is more passive today.” The *Merriam-Webster Online Dictionary* (2008) defined passive/passivity as: (a) lacking in energy or will; (b) tending not to take an active part; (c) existing or occurring without being active, open, or direct; and (d) receiving or enduring without resistance. As evidenced in the literature, several concepts have been used to connote PB in PWD. Several researchers (Doody et al., 1995; Galynker et al., 1995; Reichman, Coyne, Amirneni, Molino, & Egan, 1996) have conceptualized PB in PWD as a negative symptom complex, manifested by poverty of speech, apathy, withdrawal, and under-activity. Others (Burns, Folstein, Brandt, & Folstein, 1990; Haight & Warren, 1991; Landes, Sperry, Strauss, & Geldmacher, 2001; Levy et al., 1998; Marin, 1990, 1991) have conceptualized PB in PWD as apathy, a state of diminished motivation. PB has also been conceptualized as withdrawal (DeNuccio & Schwartz-Barcott, 2000; Everitt et al., 1991).

Similarly, Lucero et al. (2000) conceptualized PB in PWD as null behavior, and defined it as apathy, withdrawal, and not attempting to interact with others or the environment.

It would appear that researchers use negative symptom complex, apathy, withdrawal, and null behavior as surrogate terms, or terms that are used interchangeably to express the same concept (Rodgers, 2000). In order to gain a better understanding of PB, Colling (1999a) conducted a descriptive analysis of 15 empirical studies investigating the phenomenon. She noted that these empirical studies aided in sorting out various aspects of PB in PWD, but proclaimed the totality of the PB phenomenon extended beyond the narrower foci of negative symptom complexes, apathy, withdrawal, and null behavior and encompassed the following: a decreased ability to experience or respond to human emotions, fewer interactions with others and surroundings, a decrease in motor activity, and a lessening of certain specific mental processes associated with thinking and knowing (Colling, 1999b). For the purpose of this study, negative symptom complex, apathy, withdrawal, and null behavior are considered related concepts or correlates of PB, meaning they bear some relationship to the phenomenon of interest (PB) but do not seem to share the same set of attributes (Rodgers, 2000).

Colling (1999a) also discovered that the majority of the empirical works analyzed lacked a theoretical framework, provided inconsistent conceptual definitions, and used few, if any, reliable and valid instruments to measure the concept of interest. Her next step (Colling, 1999b) was to lay the groundwork for investigating PB within the NDB Model (Algase et al., 1996; see Figure 1.1), a holistic framework that is based on a comprehensive assessment of both person (background) and environment (physical and social) factors. The NDB Model maintains that PB in PWD is an active expression of an unmet need (Whall & Kolanowski, 2004), that represents the most integrated and meaningful response that can be mastered by the PWD (Colling & Buettner, 2002; Colling 2004).

PB is theorized to be triggered by lack of appropriate stimulation from the physical and

social environment (Colling, 1999b, 2004). This assumption stems largely from PWD who depict PB as a need to isolate and deliberately withdraw from inappropriate environmental stimuli (Davis, 1989; McGovern, 1993). The NDB model posits that when the unmet need is understood and responded to appropriately, the individual's quality of life will be enhanced. Since the characteristics of the physical and social environment have been identified as salient antecedents for PB in NHRs with dementia, they became the targets for manipulation in this study.

### ***Prevalence of Passive Behavior***

On any given day, an estimated 61 to 90 percent of NHRs with dementia are affected by PB (Everitt et al., 1991; Galynker et al., 1995; Kolanowski et al., 2005). PB is known to occur either alone or with other disturbing behaviors, such as agitation (Kolanowski, 1995; Kolanowski et al., 2005; Rubin, Morris, & Berg, 1987). Unlike agitation, PB is not considered disruptive to others, but caregivers find PB to be more distressful than agitation, because it is highly resistant to interventions (Cummings, 1997; Everitt et al., 1991; Kaufer et al., 1998; Wood et al., 1999).

PB occurs at all stages of dementia (Craig et al., 1996; Doody et al., 1995). Furthermore, as cognitive impairment increases during the course of the dementia the presence of PB increases as well. For example, one longitudinal study (Starkstein, Jorge, Mizrahi, & Robinson, 2006) found that the frequency of apathy increased from 14% in the mild stage of AD to 61% in the severe stage of AD. Similarly, Mega et al. (1996) found that the greatest percentage (66 to 72%) of PWD affected by apathy, as measured by the Mini Mental Status Examination (MMSE; Folstein, Folstein, & McHugh, 1975), were those whose dementia was considered moderate (MMSE score = 11 – 20) or severe (MMSE score = 0 – 10). This is noteworthy because these two stages of dementia severity reflect the typical PWD residing in a nursing home.

### ***Negative Outcomes of Passive Behavior***

PB characterizes the majority of PWD who exhibit a reduction of energy, drive, and initiative (Galynker et al., 1995). Evidence suggests institutionalized elders are at risk for PB

because of the physical and cognitive changes associated with increasing dementia severity, increasing frailty, and care in nursing home settings that is often delivered without attention and sensitivity to individual needs (Barba, Tesh, & Courts, 2002; Colling, 1999b; Craig et al., 1996; Doody et al., 1995). Despite this evidence, nursing home staff often disregards PB as a problem behavior because it is less noticeable than agitation and wandering (Wood et al., 1999). Wood et al. (2000) offered a reason for staff oblivion, that the majority of nursing homes are heavily dependent on low-paid, less-educated, and semi-skilled personnel who may not appreciate the negative outcomes associated with PB.

PB is a significant healthcare problem because it threatens the well-being of the NHR, often leading to such negative consequences as, social isolation, loss of physical functioning, excess disability, and further cognitive decline (Beck et al., 2002; Mace & Rabins, 1999). In addition, PB compromises executive cognitive functioning, which is necessary for goal-directed behavior (McPherson, Fairbanks, Tiken, Cummings, & Back-Madruga, 2002). The negative sequela of PB leads to decreased quality of life and increased morbidity and mortality for PWD.

### ***Differentiation of Passive Behavior and Depression***

There lies considerable conceptual and clinical overlap between PB and depression in PWD. Since PB and depression can have a negative impact on the PWD, an accurate differential diagnosis is essential for effectively treating PB in PWD. However, differentiating between PB and depression can be difficult. Both share key symptoms, such as, loss of interest or motivation, anhedonia, psychomotor retardation, fatigue/hypersomnia, and lack of insight (Landes et al., 2001). Often, apathy (a correlate of PB) is considered a symptom of depression, as clinicians tend to equate one with the other. It is known that both PB and depression occur simultaneously in PWD. The frequency of this occurrence, however, was noted to vary widely among studies. One explanation for the discrepant findings is that there are many structured instruments available to screen for or diagnose depression, but relatively few instruments exist that screen for or diagnose

PB. PB is often screened for by clinicians using arbitrary cut-off scores on broad behavioral symptom inventories or by structured psychiatric interviews (Tagariello, Giradi, & Amore, 2008). Marin, Firinciogullari, and Biedrzycki (1994) claimed that researchers reporting high frequencies of both apathy and depression in PWD in their studies were most likely using depression screening instruments that contain items common to both apathy and depression.

While PB has been implicated with depression in PWD, approximately 50% of PWD exhibiting PB have no concomitant depression (Starkstein, Petracca, Chemerinski, & Kremer, 2001). Evidence stemming from neuroanatomical and functional brain-imaging studies may aid in differentiating PB and depression. For example, depression in PWD is often associated with neuropathology of the frontal-striatal and subcortical limbic circuits of the brain, such as the locus ceruleus, substantia nigra, hippocampus, and hypothalamus (Cummings & Back, 1998; Landes et al., 2005; Levy et al., 1998; Rossen & Buschmann, 1995). Cummings (1993) reported that apathy was related to lesions in the mesio-frontal circuitry, and two studies (Craig et al., 1996; Rosen et al., 2005) implicated the medial frontal and anterior cingulated regions. Using the method of voxel-based morphometry of 3D magnetic resonance images (MRIs) performed on the brains of persons with dementia, apathy was correlated with atrophy in the right dorsolateral prefrontal cortex in one study (Zamboni, Huey, Krueger, Nichelli, & Grafman, 2008), and in another study (Bruen, McGeown, Shanks, & Venner, 2008), apathy was associated with a loss of grey matter density in the anterior cingulated and frontal cortex bilaterally, the head of the caudate nucleus, and bilateral putamen, all of which play a role in executive function, social cognition, and goal-directed behavior.

In terms of impairment in brain neurochemicals, depression is associated with serotonin deficits, or an imbalance between dopamine and norepinephrine, and apathy in PWD appears to be associated with cholinergic deficits (Cummings, 2000; Landes et al., 2005). Perhaps this would explain why administering serotonergic agents frequently relieve depression, but may

increase apathy/PB, whereas dopaminergic agents may relieve apathy/PB, but are ineffective in treating depression.

Despite the shared commonality of symptoms between PB and depression, inherent symptom differences do exist. Symptoms characteristic to PB in PWD include low social engagement, diminished initiation, and poor persistence (Landes et al., 2001; Marin, 1997). Symptoms characteristic of depression in elderly PWD include despair, dysphoria, guilt, and hopelessness with or without suicide ideation (Forsell, Jorm, & Winblad, 1994; Marin, 1990), and it is these symptoms that aid clinicians in distinguishing depression from PB (Marin, 1997; Royall, 1997).

### ***Antecedents of Passive Behavior***

Identifying the antecedents (background and proximal factors) of PB offers a greater understanding of the behavior and can potentially improve its management, by providing interventions aimed at well-defined targets. The background factors discussed in this section include: neurological factors, cognitive factors, physical function, general health, medications, gender, and pre-morbid personality. The proximal factors discussed in this section include: physiological and psychological need states, as well as the physical and social environment.

***Neurological factors.*** It is evident that PB is not a result of a single cause, but develops from multiple pathological changes in neuroanatomical brain structures, brain circuitries, and brain neurochemicals. In addition to the regions of the brain discussed in the previous section, other studies utilizing neuroimaging techniques, such as, single-photon emission computerized tomography (SPECT) scans, and positron emission tomography (PET) scans have implicated PB with alterations in the frontal-subcortical network, in particular, dysfunction in the brain's anterior cingulate frontal-subcortical circuitry, changes in the dorsolateral frontal lobe, the mesiofrontal cortex, nucleus basalis of Meynert, and a disruption in regional cerebral blood flow (rCBF; Craig et al., 1996; Galynker et al., 1995; Joseph, 1999; Mega & Cummings, 1994). PB



has also been correlated with higher neurofibrillary tangles, increased neuronal loss, and hyperintensities of white-matter in the frontal-subcortical circuits (Landes et al., 2001). Knowledge of these neurological factors associated with PB allows for a much richer understanding of the behavior. However, since no treatment is available to halt and/or reverse the pathology, clinicians must focus their attention on the other correlates of PB when determining appropriate interventions for responding to PB.

*Cognitive factors.* A body of research, spanning the past two decades, has shown an association between cognitive status and PB. For example, Galynker et al. (1995) examined the relationship between negative symptoms (a correlate of PB) to both depressive symptoms and cognitive impairment in PWD. In their study, negative symptoms were conceptualized as avolition, anhedonia, and emotional withdrawal and operationally defined by the negative scale of the Positive and Negative Symptom Scale (PANSS-N; Kay, Opler, & Lindenmayer, 1989). Cognitive impairment was measured by the MMSE. Depression was measured by the Hamilton Depression Scale (Ham-D; Hamilton, 1967). Subjects included 26 (11 males; 15 females) consecutive outpatients with AD and 13 (4 males; 9 females) subjects without AD (control). The PANSS-N, MMSE, and Ham-D were administered to all subjects. Since the PANSS-N included one item that directly measured cognitive function, an additional PANSS-N score, the PANSS-Cor, was calculated to exclude the potentially confounding item. Univariate nonparametric analyses of group differences in MMSE scores and PANSS-N and PANSS-Cor scores were evaluated using the Kruskal-Wallis analysis of variance (ANOVA). The Kruskal-Wallis ANOVA is an appropriate nonparametric alternative to the usual ANOVA when using ordinal data when comparing differences in group means (Montgomery, 2001). The analyses revealed a significant difference between the AD and control groups' cognitive status (MMSE =  $p \leq 0.0001$ ), with the AD group demonstrating greater cognitive impairment. Measures from the PANSS-N/Cor also yielded significant group differences (PANSS-N =  $p \leq 0.0005$ ;

PANSS-Cor =  $p \leq 0.0005$ ), with the AD group exhibiting more negative symptoms than the control group. There was no statistical significant between the Ham-D scores of the AD group and of the control group ( $p \leq 0.0161$ ). A Pearson correlation ( $r$ ) was run among the MMSE, Ham-D, PANSS-N, and PANSS-Cor for the AD group only. Significant inverse correlations were found between MMSE scores and PANSS-N ( $r = -0.81$ ;  $p < 0.001$ ) and PANSS-Cor ( $r = -0.73$ ;  $p < 0.001$ ) scores, indicating greater cognitive impairment was associated with more severe negative symptoms. Neither the MMSE scores ( $r = -0.33$ ) nor the PANSS-N/Cor ( $r = 0.36$  for both) scores significantly correlated with the Ham-D scores, indicating negative symptoms prevalent in AD do not result from depression.

Reichman et al. (1996) also examined the relationship between the negative symptoms (a correlate of PB) to both depressive symptoms and cognitive impairment in PWD. In their study, negative symptoms were defined as notable disturbances of initiation, drive, motivation, and emotional reactivity and operationally defined by the Scale for the Assessment of Negative Symptoms in Alzheimer's disease (SANS-AD), an instrument created by the researchers. Cognitive impairment was measured by the MMSE. Depression was measured by the CSDD. Twenty-four (24) PWD were compared to 26 cognitively intact older adults in terms of their scores on the SANS-AD, the MMSE, and the CSDD. Performance on the MMSE revealed significant differences between the AD group ( $M = 15.75$ ;  $SD = 6.1$ ) and comparison group ( $M = 27.62$ ;  $SD = 8.1$ ). Scores on the CSDD revealed neither group suffered from depression. Multivariate analysis of co-variance (ANCOVA) conducted on the total scores of the SANS-AD revealed that the AD group had significantly more severe negative symptoms ( $M = 18.79$ ;  $SD = 12.4$ ) than the comparison group ( $M = 5.62$ ;  $SD = 5.5$ ). Scores from the nonparametric, Wilcoxon rank sum tests revealed the AD group exhibited significantly higher scores than the comparison group on the avolition-apathy subscale ( $M = 6.88$ ;  $SD = 5.4$  vs.  $M = 0.77$ ;  $SD = 1.5$ ;  $p < 0.0001$ ) and the social-emotional withdrawal subscale ( $M = 8.58$ ;

$SD = 5.3$  vs.  $M = 2.92$ ;  $SD = 2.6$ ;  $p < 0.0001$ ). No group differences were found for the affective flattening or blunting subscale ( $M = 3.33$ ;  $SD = 5.7$  vs.  $M = 2.92$ ;  $SD = 2.6$ ;  $p > 0.05$ ). Negative symptoms in AD were also found to be correlated with dementia severity, as indexed by the MMSE ( $r = -0.40$ ,  $df = 22$ ,  $p < 0.05$ ) but not depression, as indexed by the CSDD ( $F = 1.62$ ,  $df = 1, 47$ ,  $p > 0.05$ ). When accounting for the variance ( $R^2 = 0.16$ ), the researchers concluded, in the absence of depression, a greater degree of negative symptoms are exhibited by PWD as cognition declines with dementia severity.

Mega et al. (1996) investigated the relationship between 10 behavior abnormalities and cognitive impairment in 50 outpatients with AD compared with 40 age-matched normal control subjects. These behavioral abnormalities included delusions, hallucinations, agitation, dysphoria, anxiety, euphoria, apathy, disinhibition, irritability, and aberrant motor. The caregivers of the AD group and the spouses of the control group were interviewed with the Neuropsychiatric Inventory (NPI; Cummings et al., 1994), which was used to assess the frequency and severity of 10 behavioral abnormalities exhibited by the subjects in the month preceding the interview. Cognitive impairment was measured by the MMSE. Eighty-eight percent (88%) of the AD group had measurable behavioral changes. All 10 behaviors were significantly increased in the AD group compared with the normal control group. Apathy occurred most frequently and in 72% of the AD group. The researchers concluded that the AD group exhibited behavioral abnormalities across three levels of cognitive decline as assessed by the MMSE; mild (MMSE score = 21 – 30), moderate (MMSE score = 11 – 20), and severe (MMSE score = 0 – 10). The limitation identified by Mega et al. was the lack of a longitudinal assessment of the behavioral changes in AD.

Starkstein et al. (2006) addressed the limitation identified by Mega et al. (1996). This team of researchers conducted a longitudinal study to determine whether apathy was a significant predictor of more rapid cognitive decline in 354 PWD (specifically of the Alzheimer's type). Starkstein et al. utilized the Apathy Scale (Starkstein et al., 1992), a 14-item instrument scored by

the patient's relative or caregiver, to measure apathy. Apathy was diagnosed whenever the PWD was rated as having poor or no motivation (Item 7), poor or no interest (Items 1 and 2), poor or no effort (Items 4 and 9), and had feelings of indifference or lack of emotions most of the time (Items 10 and 13). Cognitive function was assessed using the MMSE. Measures of apathy and cognitive function were taken at initial intake (baseline) and at follow up (4 years after the initial evaluation). At follow-up, only 70% ( $N = 247$ ) of the sample remained. Repeated measurements ANOVA for MMSE scores, with baseline MMSE scores as the covariate, showed a significant group effect ( $F_{[2, 236]} = 8.70; p = 0.0002$ ), the expected time effect ( $F_{[1, 236]} = 33.8; p < 0.0001$ ), and a significant group by time interaction ( $F_{[2, 236]} = 7.39; p = 0.0007$ ). As for individual group comparisons, PWD exhibiting no apathy at baseline but apathy at follow up had a significantly greater decline on MMSE scores than PWD without apathy at both evaluations ( $F_{[1, 177]} = 15.7; p = < 0.0001$ ).

A critical analysis of these four studies revealed that each team of researchers provided a conceptual definition of their target behavior, as well as appropriate operational definitions for their dependent variable(s). Each study provided evidence to support the premise that PWD exhibit PB across the illness trajectory and that as the dementia increases in severity, as evidenced by declining MMSE scores, PB becomes more pronounced. Galynker et al. (1995) and Reichman et al. (1996) provided evidence to support the existence of PB despite an absence of depressive symptoms, comorbid systemic illnesses, or medication exposure, which may contribute to functional disability and thus, complicate disease management. In summary, these studies revealed that two covariates, cognitive status and depression, must be measured in the present study for the purpose of enrollment criteria and statistical analyses.

**Physical function.** Physical function appertains to one's ability to perform basic activities of daily living (ADLs). Currently, the relationship between physical function and PB remains unclear. For example, in one study, Starkstein et al. (2006) examined the longitudinal differences

(1 and 4 year follow up) between apathy and physical function of 354 PWD, using the Functioning Independence Measure (FIM; Granger, Hamilton, & Kayton, 1982). Starkstein et al. reported that apathy present at baseline (initial screening) was associated with increased functional decline ( $p = 0.006$ ) at follow up. On the other hand, Yu, Kolanowski, & Litaker (2006) found no relationship between physical function and PB. Yu et al.'s findings did suggest, however, that environmental factors may be important antecedents of PB in NHRs with dementia. Due to the equivocal findings between the association of physical function and PB, no measures of physical function were obtained in the present study.

**General health status.** One health condition, delirium, sometimes looks like PB, but it is very different. Delirium is defined as a mental disorder of acute onset with a fluctuating course, characterized by mental confusion that occurs rapidly, a clouding of consciousness (e.g., the person is in a stupor), decreased mental function often shifting from good to bad periods, difficulty with attention and concentration, delusions, hallucinations, and alterations in behavior, ranging from severe agitation to withdrawal (Cole, 2004). Possible causes of delirium include urinary and respiratory infections, fecal impaction, silent myocardial infarction, transient ischemic attack, cerebral vascular accident, vitamin B<sub>12</sub> deficiency, chronic fatigue syndrome, fibromyalgia, gastro-intestinal bleeding, new onset of diabetes or hypothyroidism, head injury, dehydration, or a reaction to alcohol or certain medications, such as anesthetics used during surgery (Campbell & Duffy, 1997). Existence of such medical conditions cue clinicians to take immediate action as delirium can be life-threatening (Voyer, McCusker, Cole, & Khomenko, 2006). For the purpose of the present study, delirium was considered an exclusion criterion, because the presence of delirium would be a confounding variable.

**Medications.** The most successful pharmacological approach in treating the behavioral symptoms of dementia is directed towards the loss of cholinergic function. Apathy in PWD is thought to reflect the interaction between neuropathological changes in frontal brain regions and

cholinergic deficiency (Rösler, 2002). Cholinesterase inhibitors, such as tacrine (Cognex®), donepezil (Aricept®), rivastigmine (Exelon®), and galantamine (Reminyl®) have been approved for the symptomatic treatment of patients with mild to moderate AD, and work by inhibiting the breakdown of acetylcholine, an important neurotransmitter associated with memory, by blocking the enzyme acetylcholinesterase (Rösler, 2002). A review of the clinical evidence suggests that in addition to improving cognitive ability, cholinesterase inhibitors appear to improve daily functioning and reduce apathy (Clegg et al., 2001; Daiello, 2007; Mintzer, 2003; Rösler, 2002). Dopaminergic agonists, such as bupropion (Wellbutrin®), and psychostimulants, such as methylphenidate (Ritalin®), have also shown some efficacy in treating apathy, but findings from these studies were limited to case reports or small clinical trials (Corcoran et al., 2004; Padala et al., 2007).

Psychoactive medications are defined as a chemical substance that affects the brain functioning, causing changes in behavior, mood and consciousness, and included behavioral stimulants, antidepressants, anticonvulsants, sedative/hypnotics, narcotic analgesics, and antipsychotic agents (Beers & Berkow, 2000). Evidence suggests certain psychoactive medications can paradoxically exacerbate PB (Everitt et al., 1991). In the absence of a thorough depression screening, antidepressants, such as nortriptyline, desipramine, and trazodone, and citalopram (Celexa®), an SSRI, can produce apathy and withdrawal from engagement with the environment (Borson & Raskind, 1997; Everitt et al., 1991; Marin, 1997; Marin et al., 1995). In 2005, the U.S. FDA issued a black box warning against the use of atypical antipsychotic drugs, such as risperidone (Risperdal®), olanzapine (Zyprexa®), and clozapine (Clozaril®), in elderly PWD exhibiting behavioral disturbances, as they were associated with increased risk of death in this population. The FDA (2005) acclaimed atypical antipsychotic medications were only approved for the treatment of schizophrenia and not for the treatment of behavioral disorders in PWD. Even short-term use of antipsychotic therapy in elderly PWD is not without serious

adverse effects, including hospital admission or death (FDA, 2005; Rochon et al., 2008). In summary, subjects on a stable dose of psychoactive medications were eligible to participate in the study. For the purpose of this study, a stable dose was defined as no change in dose 4 weeks prior to the study and throughout data collection.

***Gender.*** The existing evidence on the relationship between gender and PB is inconsistent. Two studies (Rubin et al., 1987; Gilley, Wilson, Bennett, Bernard, & Fox, 1991) found no correlation between gender and PB. Burns et al. (1990) found that men with AD were less apathetic than women with AD. Teri, Borson, Kiyak, and Yamagishi (1989) noted that loss of interest in people and activities were more common in men with AD. On the other hand, Ott, Tate, Gordon, and Heindel (1996) found that emotional instability and seclusion were more common in females with AD than males with AD, and apathy and vegetative signs, such as excess sleeping, were more common in males with AD than females with AD. These findings suggest that PB occurs in both men and women, but behavioral symptoms may vary.

***Pre-morbid personality.*** There is some evidence to suggest a relationship exists between PB and pre-morbid personality. In one study (Kolanowski et al., 2005), the researchers found that recreational activities tailored to the individual's functional ability and prominent personality traits resulted in higher levels of engagement and less PB than did non-tailored activities.

Kolanowski and Buettner (2008) maintain that an individual's personality does not completely deteriorate, and that one's style of interest demonstrates stability during the mild to moderate stages of dementia. This means that activities that were once enjoyed prior to the onset of dementia may still be enjoyable despite the dementia; the activities just may need to be adapted. This may help explain why people in their childhood who had an attachment to an animal were more likely to maintain that attachment throughout their life. Consider the following studies:

Kidd and Kidd (1980) conducted a survey to explore the relationship between personality

characteristics (autonomy, dominance, nurturance, and aggression) and preferences in pet ownership. The survey sample consisted of 223 (males = 93; females = 130) pet owners. Subjects were asked to describe themselves as cat-lovers, dog-lovers, and pet-lovers (both cat and dog), and then were classified into six groups (male-pet lovers, female pet-lovers, male dog-lovers, female dog-lovers, male cat-lovers, female cat-lovers). Of this sample, 94% had owned pets in their childhood. There was a strong tendency for people to identify themselves as lovers of the type of pet they had growing up. The subjects were also asked to complete the Edwards Personal Preference Schedule A (EPPS; Edwards, 1959), a forced choice, objective, non-projective personal inventory measuring the rating of individuals for autonomy, dominance, nurturance, and aggression. Scores for these 4 items were transformed into standardized  $t$  scores and analyzed by four double-classification ANOVAs. Significances found were then investigated via Scheffé multiple-comparison test. There were significant differences in specific personality traits among lovers of specific types of pet (either cat or dog), and there were also differences in these traits between gender. For example male and female pet-lovers (lovers of both cats and dogs) had significantly lower ( $p < 0.05$ ) autonomy scores, while male cat-lovers had significantly higher ( $p < 0.05$ ) autonomy scores than the remaining subject groups. In terms of dominance scores, male pet- and dog-lovers had significantly higher ( $p < 0.05$ ) scores and female cat-lovers had significantly lower ( $p < 0.05$ ) dominance scores than the other subject groups. Female pet-lovers had scored significantly higher ( $p < 0.05$ ) on the nurturance scale, while cat-lovers in general scored significantly lower ( $p < 0.01$ ) in nurturance than the other subject groups. On the aggression scale, female dog- and cat-lovers scored significantly lower ( $p < 0.05$ ), while male dog-lovers scored significantly higher ( $p < 0.05$ ) in aggression than the other subject groups. The researchers were not able to speculate if or whether childhood pet ownership affected adult personality. They did, however, suggest that gender and personality traits of an individual should be considered when selecting a pet. The information gained from this study can be applied to



AAT. Assessment of the individual's pet preference and various personality traits should be considered when selecting the therapy animal.

Kidd and Kidd (1989) conducted another survey to investigate the relationship between pet ownership and attachment to pets. They surveyed 900 adults (498 pet-owners; 402 non-pet owners) using the Wilson Pet Attitude Inventory for Pet Owners or for Non-Pet Owners (Wilson, Netting, & New, 1987) and found that 88% of current pet owners had owned pets during childhood, as compared with only 28% of current non-pet owners. A *t* test was conducted to assess for differences in level of attachment between pet owners and non-pet owners. The researchers found that pet owners had significantly higher attachment scores ( $p < 0.01$ ) than those who had not owned a pet. Similar results were found by Endenburg (1995), who surveyed 471 adult (current) pet owners and 400 adult non-pet owners in relation to their level of attachment. Pet attachment was measured using direct magnitude scaling (Lodge, 1982), in which the respondent was asked to draw two lines, one showing the average strength of attachment to an animal, and one indicating how strong his/her attachment was to the most recently acquired pet. A long line represented a very strong attachment, and a short line represented a weak attachment. The subject's response-to-reference Line Producing was transformed into a logarithm which was then used to produce an attachment coefficient (Lodge, 1982). The attachment coefficients ranged from 0.25 (very low) to 8.35 (very high). Of the 871 respondents, 669 owned pets in their childhood. The researcher found that those who had pets in their childhood were significantly ( $\chi^2 = 8.90$ ;  $df = 1$ ;  $p = 0.0029$ ) more likely to have pets as adults than those who did not have pets as children. No relationship, however, was found between owning a companion animal in childhood to the degree of attachment to the current animal owned. Endenburg explained that other variables could influence attachment, one of which is having an attachment to an animal in childhood that one did not own, and this was not assessed in the survey. These studies were difficult to compare due to the vast differences in the instruments used to measure attachment.

Lago, Kafer, Delaney, and Connell (1988) assert that comparing results of human-animal attachment studies are complex due to the various assessment tools, most of which lack information about their reliability and validity. These studies, however, are relevant to the current study in demonstrating that a human-animal bond or attachment does not wane as one gets older.

***Physiological and psychological need states.*** It is not known what role physiological need states, such as hunger, thirst, pain, elimination or sleep disturbance play in PB (Colling, 1999b, 2004). As for the relationship between PB and psychological need states, loneliness may be correlated with PB. Holmén, Ericsson, and Winblad (2000) investigated loneliness among 589 persons in Stockholm, Sweden. Of the 589 subjects (114 males; 475 females), 154 (26%) subjects had some form of dementia, and 47 (8%) of those subjects with dementia resided in a hospital/nursing home. Loneliness was defined as an absence of a meaningful friendship that is often connected with feelings of boredom and passivity. A Spearman's rank correlation test was used to assess the relationships between loneliness, dementia (as measured by the MMSE), age, gender, and housing. As for the relationship between loneliness and gender, women were found to feel significantly lonelier ( $p \leq 0.01$ ) than men. This is not surprising given the study's ratio of female to male subjects (4:1). As for the relationships between loneliness and housing, subjects residing in a hospital/nursing home reported significantly more loneliness ( $p \leq 0.001$ ) more often than those living in their own apartment. As for the relationship between loneliness and dementia, the researchers reported that the percentage of those subjects with mild dementia (MMSE  $M = 18.5$ ;  $SD = 4.2$ ; 45%) and moderate dementia (MMSE  $M = 13.1$ ;  $SD 5.5$ ; 53%) reported feeling lonely more often. The findings suggest loneliness may be correlated with PB and that loneliness increases as dementia severity increases, however, more research is needed using a larger sample of PWD who reside in nursing homes. While loneliness was not measured in this study, depression can manifest as loneliness, and depression was measured.

***Physical environment.*** The relationship between the physical environment and the well-

being of elderly PWD has been well documented (Lawton, 1982). The physical environment is considered the silent partner in caregiving, and nurses must be cognizant of all aspects of the environment that have an impact on caregiving (Noell, 1995/1996). Environmental qualities, or cues, act as stimuli. The two most obvious sources of sensory stimulation in the environment are light and noise (Baaker, 2003). Mismanaging or ignoring light and noise can result in under- or overstimulation for the PWD (Baaker, 2003). The amount and form of these cues indicate the informational value of the environment (Roberts & Algase, 1988). Cognitive impairment that accompanies dementia causes difficulty in one's ability to interpret environmental stimuli (Beck & Heacock, 1988). Low stimulus environments do not provide the stimulation needed for maximum functioning, and may actually trigger boredom and social isolation that results from inactivity (Buettner, 1999). On the other hand, if the physical environment is perceived as too stimulating (e.g., noisy), a PWD may withdraw (Beck & Heacock, 1988; Kunik et al., 2003).

There is some evidence to suggest a relationship exists between PB and noise. Typically, nursing homes can be very noisy. Noise results from such sources as the intercom or paging system, call bells, wheelchair/bed alarms, staff activities (e.g., music therapy), and patients yelling out. In one study (Elm, Warren, & Madill, 1998), noise was associated with reduced ability to perform tasks in PWD which is indicative of PB. Elm et al. (1998) used an experimental repeated measures design to investigate the effects of noise on the functional performance, specifically motor skills and process, of 30 (24% male; 76% female) PWD residing in a nursing home. Performance skills were measured using the Assessment of Motor and Process Skills (AMPS; Fisher, 1991). The researchers provided a detailed description of this instrument, including its psychometric properties, and a detailed protocol for data collection. The subjects were asked individually to perform three tasks, getting a drink, folding laundry, and setting a table, under three different auditory stimulus conditions, silence, conversation, and music. The experiments took place in a room where environmental stimulus conditions were controlled, and

each task was performed at least two days apart to prevent effects of rehearsal. The subjects were scored by the same rater. Raw scores underwent Rasch analysis, which calculates performance indices, taking into account task difficulty (Fisher, 1991). One way RM-ANOVAs, with post hoc Scheffé tests were used to analyze the data separately for motor skills and processes. Alpha was set at  $p < 0.05$ . The group means for process skills measured under silence, conversation, and music, were 0.415, 0.468, and -0.033 respectively, with higher scores indicating greater functional performance. Scores for process performance skills were significantly higher under the silence ( $F = 10.799$ ;  $p < 0.05$ ) and conversation ( $F = 8.619$ ;  $p < 0.05$ ) conditions than under the music condition. The group means for motor skills measures under silence, conversation, and music, were 2.029, 2.52, and 1.806 respectively, and a significant improvement in motor skills was found only under the conversation ( $F = 3.89$ ;  $p < 0.05$ ) condition. The researchers suggest that background music may have a negative effect on performance and that other forms of beneficial auditory stimuli pursued.

Noise is not the only environmental quality that can trigger PB. Kunik et al. (2003) conducted 7 focus group sessions with family members, professional caregivers, and PWD ( $N = 41$ ) to gain a better understanding of the types of environmental factors that trigger disruptive behaviors in PWD. They cross-tabulated group results and then examined quantitative studies to corroborate their findings. Both mutable (variable) and fixed factors related to PWD, their caregivers, and their environment were identified. The participants identified noise as being a major trigger of disruptive behavior. The researchers cited one PWD dementia who explained that he/she withdraws after too much noise. But other physical environmental qualities were cited as triggers as well. These included: staffing issues, mixing different stages of dementia on the same unit, the color of the environment (too much red), the presence of mirrors, fluorescent lighting, and temperature. The researchers suggest that modifying the mutable factors that trigger disruptive behavior may yield improvements in caring for PWD and quality of life. In this study,

in attempt to control for noise, AAT was conducted 1:1 in a room separated from the main unit.

***Social environment.*** There is evidence to suggest that lack of appropriate social stimulation may precipitate PB. The environment is more than the physical setting and its components. The environment has an implicit social component. Social withdrawal and isolation are widely reported among NHRs (Beck & Heacock, 1988; Buettner, 1999; Chen, Ryden, Feldt, & Savik, 2000). PWD are particularly vulnerable to low social isolation due to their loss of memory, word finding problems, impaired judgment, and difficulty expressing their needs (Beck & Heacock, 1988; Chen et al., 2000). Social interaction is important because it assists humans to exert some control over their environment in order to obtain some degree of self-worth (Beck & Heacock, 1988; Hall & Buckwalter, 1987). Most nursing homes operate from a medical model, focusing on treating the NHRs' physiological problems and failing to attend to their psychosocial needs (Barba et al., 2002). Greater demands are being placed upon reduced nursing staff today (Kunik, 2003). Aside from personal care activities, staff do not often have the time and energy to respond consistently to NHRs' psychosocial needs (Barba et al., 2002). Furthermore, nursing home staff need to drop the one-size-fits-all approach to intervention in favor of interventions that are tailored to individuals' social needs. The characteristics of the physical and social environment have been identified as salient antecedents for PB in NHRs with dementia. These antecedents became the targets for manipulation in the present study.

### ***Measuring Passive Behavior***

From her synthesis of 15 empirical studies, Colling (2000) created a non-hierarchic, natural taxonomy (category coding system) that resulted in the following five categories of PB: diminution of cognition, diminution of psychomotor activity, diminution of emotions, diminution of interactions with people, and diminution of interactions with the environment. Category definitions and corresponding behaviors associated with PB were also identified. The taxonomy was subjected to two rounds of review by an expert panel of six nurse-scientists with expertise in

dementia and neuroscience research. This review resulted in a *kappa* of 0.698, indicating substantial agreement ( $p < 0.001$ ), beyond chance, among raters. Internal consistencies (Chronbach  $\alpha$ ) for the taxonomy categories ranged from 0.71 to 0.94. The categories and items of the taxonomy resulted in the creation of an instrument, the Passivity in Dementia Scale (PDS; Antonakos & Colling, 2001). There are two versions of the PDS, a two-dimensional (before/now) caregiver version and a direct observer version, the O-PDS. The O-PDS is a new instrument, however it is the only available instrument developed specifically to measure PB in PWD.

### ***Summary of Passive Behavior***

PB has been defined, differentiated from depression, and identified as a highly prevalent and problematic health care concern that leads to loss of quality of life for NHRs with dementia. The NDB Model was used to direct an investigation of PB within a holistic framework that is based on a comprehensive assessment of both person and environment. Within the NDB Model, PB is viewed as a need to isolate and deliberately withdraw from inappropriate environmental stimuli, and results from the interplay of background and proximal factors. Several background factors (e.g., neurocognitive impairments, general health, medications, and gender), as well as proximal factors (e.g., loneliness, the physical and social environment), have been associated with PB. An understanding of the background factors linked to PB in PWD led to the development of a risk profile for PB and establishment of the inclusion and exclusion criteria for the present study. A better understanding of the proximal factors that trigger PB in PWD led to the utilization of a patient-focused intervention, AAT, for responding to PB in NHRs with dementia.

### **Description of Non-Pharmacological Interventions for Responding to PB**

The black-box warning against the use of atypical antipsychotic drugs in PWD and the pressing OBRA regulations warrant the need for non-pharmacological interventions aimed at managing PB in NHRs with dementia. Non-pharmacologic approaches have several advantages in that they lack drug interactions and adverse side effects, but more importantly, they address the

physical and social environmental causes of PB in PWD. This section reviews several empirical studies (Buettner, 1999; Buettner et al., 2006; Colling, 2004; Fitzsimmons & Buettner, 2002; Kolanowski et al., 2005; Lucero et al., 2000) that investigated non-pharmacological interventions for responding to PB in PWD.

Buettner (1999) investigated the effects of 30 handmade recreational items for reducing isolation and for responding to inactivity and agitation, among 55 NHRs (81% females) with dementia. A clinical cross-over design was used, with one long-term care facility receiving the intervention for six months followed by six months of usual care, and the other long-term care facility receiving a delayed intervention. Cognitive function was measured using the MMSE ( $M = 6.7$ ). The Cohen-Mansfield Agitation Inventory (CMAI; Cohen-Mansfield, 1986a) was used to measure agitation. Residents were observed using a time sampling method. Activity was coded via direct observation and via videotape at 99 different time periods at both sites during the intervention and non-intervention (control) periods. Mean scores were tallied for the intervention and control periods. A significant decrease in agitation ( $p < 0.001$ ) was found during the intervention phase at one research site, but not the other. Interestingly, the intervention periods at both facilities showed a decline in the number of residents not doing anything. Four sensorimotor items: an electronic busy box, sewing cards, a tablecloth with activities, and picture dominoes, best captured the interest of those NHRs who, prior to the study, were frequently observed as not doing anything.

Another team of researchers (Lucero et al., 2000) also investigated the interaction time with several sensory stimulation products among 16 PWD (2 males; 14 females) exhibiting null behavior. Null behavior was defined as apathy, withdrawal, and not attempting to interact with others in the environment. The Brief Cognitive Rating Scale (BCRS; Reisberg & Ferris, 1988) was used to assess level of dementia severity. Cumulative scores among the five BCRS axes ranged from 33 to 35. Twelve subjects were rated as having severe cognitive decline, while the

remaining four were rated as having very severe cognitive decline. The sensory products were identified as the Busy Box, Curves and Waves, Pat Mat, Spinner Board, large print *Reader's Digest* magazine, stacking cups, and abacus. The products were randomly introduced to the subjects, and their interaction with the products was video-recorded. Results of this study were similar to Buettner's (1999) study, in that, the subjects interacted longer with the products that best captured their interest; these being the Busy Box, Curves and Waves, Pat Mat, and Spinner Board.

A critical analysis of the Buettner (1999) and Lucero et al. (2000) studies revealed that interaction time increased with those products that best captured the individuals' interest, thus, decreasing the time the subjects spent doing nothing or exhibiting null behavior. Their findings also suggest that persons with moderate and severe dementia have preserved, latent cognitive abilities which need to be elicited and considered when designing interventions for responding to PB. Neither study used an instrument that specifically measured PB. The Lucero et al study lacked a theoretical framework.

In one qualitative investigation, Colling (2004) described the experience of PB from the perspective of 50 caregivers caring for community-dwelling PWD. Colaizzi's (1978) Phenomenological Thematic Extraction was used to analyze the following thematic extractions: examples of PB exhibited by the PWD and the caregivers' expressed frustrations in managing PB. According to the caregivers, factors that precipitated PB were loss of abilities to express self, decreased environmental stimuli, being alone, and increased environmental stimuli. The caregivers used an array of supportive interventions to promote engagement including: providing cues and assistance, initiating the task, giving guidance, and offering enjoyable activities. Other positive approaches used were humor, faith, patience, and contact with family and friends. Caregivers reported that PB was more pronounced when the PWD had to be corrected, was uncooperative, was rushed or pressured, and when unanticipated events occurred. The findings



from this study aided in the identification of several key factors that trigger PB. In addition, offering activities that captured the interest of the PWD and utilizing supportive interventions, such as cueing, assisting, and guiding were considered when conducting the present study.

Theory-driven interventions have demonstrated efficacy in managing PB in PWD. Fitzsimmons and Buettner (2002) used a pretest-posttest experimental design to assess: (a) the impact of at-home recreational therapy on agitation and PB, (b) the efficacy of specific theory-driven (NDB) interventions in calming agitated PWD and engaging persons exhibiting PB, and (c) the time of day in which agitation and PB occurred. Twenty-nine community-dwelling PWD (10 males; 19 females) were randomly assigned to either an intervention group or a delayed intervention (control) group. The intervention group received individually prescribed therapeutic recreation for 1.5 hours, three to five days a week for two weeks, during his/her peak time of day for agitation and/or PB, as determined in the baseline assessment period. The delayed intervention group received usual homecare for two weeks, followed by the individually prescribed therapeutic recreation program for two weeks. The baseline assessment period revealed that agitation was observed to gradually increase throughout the day and peaked between 1600 and 2000, while PB peaked late morning (1000 to 1200) and then again in late afternoon (1600 to 1800). Of the 29 study subjects, 8 individuals (27.6%) exhibited mainly PB, 2 individuals (6.9%) exhibited agitation, and 19 individuals (65.5%) exhibited both agitation and PB. The MMSE was used to measure cognitive function ( $M = 12.93$ ). The CMAI was used to rate agitation, and four questions from the PDS, caregiver version (Antonakos & Colling, 2001), was used to rate PB, at pretest and posttest time points. Each subject's pre-determined daily intervention period was videotaped. The subjects' biofeedback measures, blood volume pulse (BVP) and heart rate (HR), were measured at baseline and periodically throughout the intervention phase, and then compared. Statistical analyses included paired  $t$  tests and correlations, with a level of significance set at  $p = 0.05$ . Comparison measures of baseline/

intervention biofeedback readings revealed that increased BVP correlated with increased active engagement and decreased PB ( $p = 0.013$ ). Conversely, decreased HR correlated with decreased agitation ( $p = 0.018$ ). Analyses from the CMAI and PDS scores revealed that both agitation and PB significantly decreased following the clinical trial of at-home recreational therapy. Study limitations included scheduling of home visits, lack of ethnic mix of subjects, and lack of medication control.

Results of the Fitzsimmons and Buettner (2002) study showed that activities based on the individual's functioning level, past interests, and current skills, provided the subjects with many meaningful opportunities to fulfill their needs, which, in turn, resulted in either a decrease in agitation or PB. Interesting to note were the observed times of day when PB peaked, as well as the pre- and post- intervention measurement of PB. Another noteworthy finding from this study was the relationship between time engaged in a therapeutic activity, MMSE, and encouragement required. Lower MMSE scores were associated with less time engaged and more encouragement was needed to remain engaged.

Kolanowski et al. (2005) used a crossover experimental design with repeated measurements of dependent variables to test the efficacy of theory-driven (NDB) recreational activities for responding to agitation and PB in 30 NHRs (71% females) with dementia. The recreational activities were matched under three conditions: (a) skill level only, (b) style of interest only, and (c) a combination of both skill and interest. Prior to the onset of data collection, five consecutive days of observation was undertaken to determine each subject's peak time of day for agitation and/or PB. Following the pre-baseline period, trained RAs, blind to condition match, implemented the recreational activity during the subjects' peak behavioral time for up to 20 minutes per day for 12 consecutive days, with a 2-day washout period between conditions. Measures of engagement, affect, agitation, and PB (dependent variables) were taken from videotaped recordings, and measures of mood were obtained in real time, using the Dementia

Mood Picture Test (DMPT; Tappen & Barry, 1995). Engagement reflected time (in minutes and seconds) on task, measured via a stopwatch, and participation was measured using a method developed by Kovach and Magliocco (1998). Affect was measured using the Philadelphia Geriatric Center Affect Rating Scale (ARS; Lawton, Van Haitsma, & Klapper, 1996). Agitation was measured using the CMAI, and PB was measured using the O-PDS (Colling & Antonakos, 2004). A mixed-model ANOVA was used to analyze the data, using the subject as the random effect and the treatment as a fixed effect. Repeated measurements of the dependent variables were obtained under the different treatment conditions, and the analyses of the variation between-subjects and within-subjects were reported. When compared to baseline, agitation and negative affect improved under all treatment conditions. Comparisons of the NDB-derived activity condition with the matched to interest only condition, the skill level only condition, or baseline revealed that the subjects spent significantly more time on task ( $p = 0.001$ ) and greater participation ( $p < 0.001$ ); the subjects exhibited a more positive affect ( $p < 0.001$ ) and lower PB ( $p < 0.001$ ). Only the style of interest and the skill and style of interest conditions significantly reduced PB when compared with the baseline period. The researchers' findings support the use of the NDB model as a framework for understanding the behavioral symptoms of dementia, and in helping to explain the mechanisms that underlie treatment success, that is, when recreational activities are tailored to style of interest, behavioral outcomes are improved in PWD. The researchers acknowledged one noteworthy limitation, that dosage, which is the number of times the activity is given each day, and the length of each treatment needs further consideration when implementing behavioral interventions. The researcher team recommended using larger sample sizes, more frequent doses of NDB-derived activities, or both, to improve behavioral outcomes.

Buettner et al. (2006) examined the ability to predict outcomes of prescribed therapeutic recreation interventions (TRIs) for the treatment of agitation and PB in 107 elderly NHRs (25 males; 82 females) with dementia. The team of researchers used an experimental design,

randomly assigning subjects (6 at a time) to either an intervention group or a delayed intervention (control) group. The intervention group received individually prescribed TRIs 30 minutes a day, five days a week for two weeks. The control group received routine care and a 20-minute social visit from a member of the research team daily for two weeks, followed by the individually prescribed TRI program for two weeks. The researchers provided a detailed protocol and explicit definitions of their dependent variables. Guided by the NDB Model, the TRIs were selected based on the subject's: (a) current level of functioning, as determined by the Global Deterioration Scale (Reisberg, Ferris, de Leon, & Crook, 1982); past leisure interests, as determined by the Farrington Leisure Interest Survey (Buettner & Martin, 1995), and (c) targeted problem behavior, agitation or PB. Cognitive functioning was used for enrollment criteria and determined via the MMSE ( $M = 8.39$ ). Biofeedback readings, HR and BVP, were randomly obtained three times per subject during the two-week intervention period, using the ProComp<sup>TM</sup> Biograph system. Measurements of HR and BVP were taken for 2 complete minutes prior to the intervention (pretest) and then again 10 minutes into the prescribed TRI (posttest). The pre- and posttest data were compared to ascertain the physiological effect the TRI had on each particular subject. The rationale for collecting physiological data aids in eliminating the risk of subjective observations of the intervention's effects. In order to determine each subject's category of behavior, the primary nurses caring for the subjects were trained by research personnel in coding behavior as:

1 (*sleeping, either in bed or elsewhere*), 2 (*passive, awake and not doing anything*), 3 (*alert and engaged*), and 4 (*agitated*). This assessment took place daily for 8, two-hour blocks of time (from 0600 to 2200) over a 5-day period (baseline). Of the 107 subjects, 29.9% ( $n = 32$ ) exhibited PB only, 10.3% ( $n = 11$ ) exhibited agitation only, and 59.89% ( $n = 64$ ) exhibited a mix of PB and agitation. TRIs took place during each subject's peak period of agitation or PB, as determined during baseline. Engagement data, including time involved in minutes, level of engagement, encouragement needed, and participation levels, were collected each time a TRI was attempted

for a total of 1,825 intervention attempts. Seventy-two different TRIs were used, and based on the goals of the particular intervention, the TRIs were coded into six categories for analysis: feelings based, relation based, physical, cognitive, life roles, and aroma. Each TRI was individualized to match the functional ability of the subject and adapted as needed. Data were first analyzed using chi-square to determine if the physiological response to the prescribed TRI created the desired effect in the targeted behavior and then using *t* tests to detect significance in desired direction. While none of the prescribed TRIs generated a statistically significant desired therapeutic effect as measured by BVP, each prescribed TRI had the desired effect on heart rate, with the exception of those in the aroma category. The researchers reported that the greatest percentage of TRI sessions aimed at decreasing PB was in the physical category (91%). Conversely, the greatest percentage of sessions aimed at decreasing agitation included both, the life roles (100%) and physical (100%) categories. The researchers' demonstrated that TRIs predictably alerted elderly NHRs with PB 79 to 91% of the time and produced a calmed effect for those elderly NHRs exhibiting agitation 92 to 100% of the time. The limitations addressed in the study were: (1) the restricted two-week intervention time frame with no further follow-up data collected, (2) the limited availability of subjects at the time of day requested for treatment, (3) the rigid nursing home schedule, and (4) lack of controlling of prescribed medications.

The findings from the Fitzsimmons and Buettner (2002), Kolanowski et al. (2005), and Buettner et al. (2006) studies demonstrate recent effective contributions of theory-driven (NDB) interventions aimed at managing disruptive behaviors associated with dementia, in particular agitation and PB. One essential feature among all of the studies mentioned above is the move towards an individualized focus of care. This approach allows for a greater understanding of the individual's experience of dementia and for implementing strategies to improve the individual's quality of life (Turner, 2005). All three studies provided evidence to indicate that the key to managing agitation and PB was aimed at finding the right kind and level of environmental

stimulation that best captured each individual's unique interests. As seen in one study (Buettner et al.), application of non-pharmacological interventions predictably effected a desired change in agitation and PB greater than 79% of the time. When compared to the efficacy of psychoactive medications for managing disruptive behaviors associated with dementia, which is 18% to 26% (Lanctôt et al., 1998), NDB-derived interventions are by far more efficacious and warrant further investigation.

### **Animal-Assisted Therapy (AAT)**

#### ***Animal-Assisted Therapy – What Is It?***

Animals have been utilized as a therapeutic modality in nursing home settings in three ways: (a) residential pet programs, in which the animal lives permanently in the clinical setting; (b) animal-assisted activities (AAA), the casual meet-and-greet activities that involve pets visiting people; and (c) AAT. AAT is defined as a goal-directed intervention delivered one-to-one or to a small group by a healthcare professional, operating from his/her professional foundation: (1) to facilitate a behavioral, functional, cognitive, emotional, and/or social change in an individual through interactions with an animal in his/her immediate physical and social environment; and (2) to evaluate and document the process (Delta Society, 2000).

The application of AAT as a specific therapeutic intervention is a development largely of the late twentieth century (Delta Society, 2000). Advocates of AAT attribute much of AATs success to the Delta Society, which has worked for over 30 years to improve human health through the services of therapy animals (Delta Society, 2005). In the 1990s, the Delta Society created the first comprehensive training program in AAA and AAT and developed the *Standards of Practice in Animal-Assisted Activities and Animal-Assisted Therapy*, which provides guidance in the administrative structure of AAA/AAT programs, including animal selection, personnel training, treatment plan development, and documentation (Delta Society, 1996). Today, the Delta Society continues to: (a) educate healthcare and other professionals on how to incorporate

animals into goal-directed treatment to improve the quality of life of those they serve, (b) provides Gold Standard therapy animal curriculum and training, and (c) advances knowledge about the benefits of human-animal interaction research (Delta Society, 2005).

### ***History of Human-Animal Interaction Research***

The therapeutic use of animals is not a modern phenomenon but one with a significant history. The earliest documented therapeutic use of animals dates back to 1792 at the Quaker Psychiatric Retreat in York, England, when William Tuke, a tea merchant, used small domesticated animals to reduce the use of mechanical and chemical restraints and improve the overall milieu of psychiatric institutionalization (Hooker, Freeman, Stewart, 2002). In her *Notes on Nursing*, Florence Nightingale (1859/1969), the founder of the modern nursing profession, recognized the therapeutic value of pets, when she wrote, “A small pet is often an excellent companion for the sick, for long chronic cases especially” (p. 103). Even Sigmund Freud was aware of the value of animals as a therapeutic modality and often brought a dog to his sessions to act as a catalyst and improve social interaction (Eggiman, 2006).

The first therapeutic use of animals in the U.S. was believed to have occurred in 1919 at St. Elizabeth’s Hospital in Washington, D.C. The Secretary of the Interior, Franklin K. Lane, suggested that dogs be introduced to psychiatric inpatients to improve their morale (Hooker et al., 2002). The second documented use of animals in the U.S. occurred in 1942, at the Army Air Corps Convalescent Hospital in Pawling, NY. Run by the American Red Cross, dogs were introduced to wounded service men to aid in their recovery and morale. Unfortunately, no data were collected to support the therapeutic benefits of animal involvement in either of these patient care settings (Hooker et al.).

Formal documentation of the benefits associated with human-animal interactions began in 1964, when Boris Levinson coined the phrase, pet therapy, following observations he made when he began to use his dog, Jingles, in sessions with severely withdrawn children (Hooker et

al., 2002). Levinson's work with children and his dog is considered the birth of present day AAT. While the terms pet therapy and pet-facilitated therapy may still be seen in the literature, they are no longer preferred, as they refer to animal behavior training programs used several decades ago (Delta Society, 2005).

Stimulated by Levinson's work, Corson, Corson, Gwynne, and Arnold (1977) conducted one of the first documented studies of the benefits of using dogs within a hospital setting. Although they provided mainly descriptive accounts of the benefits observed, their study opened the door to a vast new arena for AAT. Since the late 1970s, nurse researchers have been investigating human-animal interactions in a variety of clinical settings, mainly LTCs and psychiatric facilities. However, the majority of these human-animal interaction studies have been criticized for lacking in scientific rigor. Furthermore, a critical examination of human-animal interaction research conducted over the past 30 years also revealed that many studies citing beneficial associations between human-animal interaction and various aspects of health often failed to provide clear causal directions of those relationships.

### ***Literature Examining the Benefits of AAT for PWD***

A vast body of literature exists on the use of animals as a therapeutic modality. This section critically examines studies investigating the effect of AAT on PWD, and in particular behavioral components of PB. One should note that approximately 12 variations of the term AAT/AAA/pet therapy have been identified in the literature. Therefore, for the purpose of the present study, AAT was assumed to occur if the animal was used therapeutically to improve health/behavioral outcomes and if the therapy followed a protocol.

Social isolation is a major problem in the nursing home setting (Barba et al., 2002). Yet, research investigating the effects of AAT on socialization in PWD has yielded mixed results. For example, two studies (Curtright & Turner, 2002; Hall & Malpus, 2000) found noticeable increases in verbal and non-verbal social behaviors during AAT, while Bernstein, Friedmann,



and Malaspina (2000) found improved behaviors in initiating brief conversation in the non-AAT group (control) only. This is not surprising given the vast differences in the designs and sample sizes of these studies, the manner in which their dependent variable(s) were defined and measured, the variations in the length of the studies (5 weeks, 10 weeks, and 20 weeks, respectively), and variations in data collection protocols. None of these researchers assessed their subjects for the presence of human-animal bond prior to the onset of the study.

Three experimental studies (Batson et al., 1998; Taylor et al., 1993; Walsh, et al., 1995) examining the social effects of AAT are worthy of discussion. Taylor et al. (1993) conducted an experiment with repeated measurements to evaluate AAT on eye contact and vocalizations (behaviors indicative of PB) of 18 NHRs (4 males; 14 females) under two stimulus conditions: a live puppy and a photograph of a puppy. Ages ranged from 68 to 96 years ( $M = 84$  years). Fifty-six percent of the subjects were diagnosed with dementia. The study provided a protocol. The dependent variables were explicitly defined and measured in seconds via a stopwatch. Vocalizations were tape recorded for later coding of time spent talking. Dosing of each stimulus was scheduled for 4 minutes, with a 30 second break in between. Presentation of either stimulus was terminated if there was a prolonged period of lack of eye contact; however, no definitive amount of time was specified. A repeated measurements ANOVA (RM-ANOVA) was used to analyze the data. Subjects demonstrated greater eye contact during the live puppy presentations ( $M = 149$  s;  $SD = 59$  s) than during the photograph presentations ( $M = 128$  s;  $SD = 64$  s), however, this did not reach statistical significance ( $p = 0.1189$ ). Furthermore, the analysis did not reach significant difference between the vocalizations elicited by the live puppy stimulus ( $M = 51$  s;  $SD = 45$  s) and the photograph stimulus ( $M = 48$  s;  $SD = 41$  s). Although not identified as a research hypothesis in their study, the puppy stimulus ( $M = 233$  s;  $SD = 47$  s), when compared to the photograph stimulus ( $M = 210$  s;  $SD = 47$  s), showed a significant difference ( $F_{[1, 17]} = 6.511$ ;  $p = 0.0213$ ) in total time interacting. Because one researcher was timing the

presentations, experimenter bias cannot be ruled out for the latter finding.

Walsh et al. (1995) used a pretest-posttest experimental design to evaluate the effects of AAT on 7 PWD (4 males; 3 females), who were deemed difficult to manage, in comparison with a matched control group ( $N = 6$ ). The control group was matched for gender, diagnosis, and medication. Dependent variables included: socially irritating behavior and disengagement (a behavior indicative of PB) as measured by two subscale scores from the London Psycho-Geriatric Rating Scale (LPRS; Hersch, Kral, & Palmer, 1978), and assessment of daily functioning, as measured by the Brighton Clinic Adaptive behavior Scale (BCABS; Wood & Brighton, 1984). Blood pressure (BP), HR and, ward noise measures were also obtained; a protocol for obtaining these measures was provided. The experimental group received AAT for three consecutive hours, two times a week for twelve weeks. Pre- and posttest mean group scores for both the LPRS and BCABS were analyzed using a one-tailed  $t$  test. Although the results showed no significant difference between the AAT and matched control groups from pre- to post-assessment, Walsh et al. reported that AAT brought about several palliative effects, including a reduction in yelling, screaming, and abusive behavior towards staff. They also noted that the effects of AAT were not long-lasting, as the subjects in the AAT group reverted to their previous behavior within 15 to 30 minutes following the removal of the dog. While there were no significant differences found between the groups for BP from pre- to posttest, there was a significant reduction in HR ( $t_{[27]} = 2.04$ ;  $p = 0.021$ ) for the AAT group only. A statistically significant decrease in noise levels ( $U = 83.5$ ;  $p = 0.001$ ) was also found for the AAT group only. Due to the small sample size and possible confounding effects of using psychotropic medications on a daily basis to control behavior, it is difficult to draw firm conclusions.

Using a within-subject design with repeated measurements, Batson et al. (1998) examined the effects of AAT on socialization and physiological indicators of stress in 22 (10 males; 12 females) PWD under two conditions: dog present and dog absent. Severity of

dementia was rated using the Burke Dementia Behavioral Rating Scale (BDBRS; Haycox, 1984). Mean BDBRS scores were 21.8 (range = 4 – 34). The study provided a detailed protocol and explicit definitions of the dependent variables of interest. Dependent measures of HR, BP, and skin temperature were obtained every 2 minutes during 10-minute sessions with and without dog present, and the data were analyzed using RM-ANOVA. Sessions were videotaped for later coding of social interaction variables. Verbalizations, looks, smiles, leans toward stimulus, tactile contact were coded by frequency and duration; praise and physical warmth were coded by frequency only; and temporal response time was measured by duration only (all behaviors indicative of PB). The socialization data were analyzed using dependent *t* tests. Pearson product moment correlations and split-plot ANOVA were used to determine the relationship between the severity of dementia and socialization variables. While Batson et al. (1998) found no significant interaction effects for HR, BP, and skin temperature, frequency scores for smiles ( $t = 2.33$ ;  $p < 0.05$ ), tactile contact ( $t = 4.35$ ;  $p < 0.01$ ), looks ( $t = 2.78$ ,  $p < 0.05$ ), physical warmth ( $t = 4.35$ ;  $p < 0.01$ ), and praise ( $t = 2.79$ ;  $p < 0.01$ ), and duration scores for smiles ( $t = 3.30$ ;  $p < 0.01$ ), tactile contact ( $t = 2.83$ ;  $p < 0.01$ ), looks ( $t = 4.42$ ;  $p < 0.01$ ) and leans toward ( $t = 2.08$ ;  $p < 0.05$ ), were significantly higher during the dog present condition. During the dog present condition, correlation coefficients indicated significant relationships between the BDBRS scores and frequency of smiles, looks, physical warmth and duration of looks and verbalization. Significant correlations for frequency of smiles and verbalizations and duration of smiles, verbalization, and temporal response also occurred during the control condition, dog absent. The researchers found that several indicators of socialization decreased as the severity of dementia increased but not to any significant difference. They concluded that AAT may activate a more basic form of communication for which those with greater cognitive impairment might participate. Although it is unknown how medications may have affected the physiological and socialization variables, using a within-subjects design aids in eliminating this bias.

An analysis of these three studies (Batson et al., 1998; Taylor et al., 1993; Walsh et al., 1995) revealed that the presence of a human-animal bond was not assessed prior to the study. None of the studies screened their subjects for depression, and none controlled for psychoactive medications during the data collection period.

PWD manifest many behavioral problems, and managing these problems has become an increasing challenge. The results of 5 studies (Churchill et al., 1999; Kanamori et al., 2001; McCabe et al., 2002; Motomura et al., 2004; Richeson, 2003) warrant further discussion, as they indicate that AAT may be helpful in reducing problem behaviors associated with dementia.

Using a within-subject design with repeated measurements, Churchill et al. (1999) investigated the effects of AAT for responding to agitation and desocialization (a behavior that is indicative of PB) that often occurred between the hours of 1700 and 1730 (sundown) in 28 NHRs (7 males; 21 females) with dementia, under two, 30-minute conditions: dog present and dog absent. Severity of dementia was rated using the Burke Dementia Behavioral Rating Scale (BDBRS;  $M = 22.2$ ;  $SD 8.3$ ). Subjects were assessed for past experiences with animals prior to the onset of the study. A detailed protocol and explicit definitions of the dependent variables of interest were provided in the study. Each session was videotaped for later coding of socialization behaviors; these included: verbalizations, looks, smiles, leans, tactile contact, praise, physical warmth, and temporal response. Agitation was measured using the Agitation Behavior Mapping Instrument (ABMI; Cohen-Mansfield, 1986b) and analyzed using a RM-ANOVA to determine the difference in agitation level over time. Agitation scores were significantly lower ( $p < 0.05$ ) during the dog present condition. There was no difference in the level of agitation over time during either condition. Dependent  $t$  tests were used to compare socialization behaviors between the two conditions both duration and frequency. Statistically significant differences were found between conditions, with frequency of tactile contact, leans, smiles, verbalizations, and looks, and duration for smiles verbalizations and looks increased during the dog present condition, all of

which are indicative of decreased PB. The researchers performed *t* tests to determine if the amount of increased socialization and decreased agitation, during the dog present condition, was related to severity of dementia, but no statistically significant differences were found. The findings from this study need to be treated with caution, as other variables, such as the presence of background music and the effects of mood-altering drugs, could have influenced the findings. The main findings of the study were emphasized in three figures, which was helpful in examining the level of agitation over time.

McCabe et al. (2002) also used a within-subject design with repeated measurements to determine the effects of AAT on problem behavior in a sample of 22 (7 males and 15 females) PWD residing in a special care dementia unit. The dog was present on the unit from morning to evening, with the exception of meals. A detailed data collection protocol and explicit definitions of the dependent variables of interest were provided in the study. Problem behaviors were measured by the primary care staff nurse on the day and evening shifts, 1-week prior to the introduction of the dog and weekly for 4 weeks (post-placement), using the Nursing Home Behavior Problem Scale (NHBPS; Ray, Taylor, Lichenstein, & Meador, 1992). The NHBPS is a 29-item, 5-point-Likert scale (0 = *never* to 4 = *always*) organized into 6 subscales: aggressive behaviors, irrational behaviors, sleep problems, annoying behaviors, inappropriate behaviors, and dangerous behaviors. The overall score is calculated as the sum of the individual items, with larger scores indicating a greater level of behavioral problems. Inter-rater reliability was reported as 0.80, and convergent validity with the CMAI was reported as 0.911 (Ray et al., 1992). Total NHBPS scores were analyzed using a two-way within-subjects RM-ANOVA (level of significance set at  $p < 0.05$ ). The two, within-subjects factors were the shift (time of day) with two levels (day and evening) and weeks with five levels (Week 1 through Week 5). A Mauchly's Test of Sphericity was performed to examine the form of the common covariance matrix. Sphericity requires that the variances for each set of difference scores be equal; the common

covariance matrix of the transformed within-subject variables must be spherical, or the  $F$  tests and associated  $p$  values are invalid (Munro, 2005). The Mauchly's Test of Sphericity was found to be non-significant ( $\chi^2 [9] = 14.99; p > 0.05$ ), thus supporting the assumption of sphericity. When compared to the evening shift, the findings revealed there was a sustained decrease in aggression, irritability, poor sleep, inappropriate and annoying behavior, over a 4 week period during the day shift. Univariate tests of within-subjects revealed a significant interaction between shift (time of day) and week ( $F_{[4, 80]} = 2.88; p < 0.05$ ) but not for overall main effect of week ( $F_{[4, 80]} = 2.39; p > 0.05$ ). Post hoc tests revealed a statistically significant effect ( $F_{[1, 80]} = 9.24; p < 0.01$ ) for shift (time of day). Overall NHBPS scores were significantly lower in the evening shift, and the authors contribute this to a shortened observation period, as some residents went to bed in the early evening hours. Medication use (routine and as needed) was also tracked pre- and post-placement of (4 weeks after) the dog. Descriptive statistics provided information on medication use. The authors found that 45% of their sample took at least one routine psychoactive medication. They also noted that the dose and frequency of all the subject's scheduled medications remained constant throughout the study.

Kanamori et al. (2001) used a pretest-posttest experimental design to investigate the effects of AAT on cognitive function, physical function, and stress in 7 PWD (2 males; 5 females) in an adult day care center. The findings from the experimental group were compared with a matched control group ( $n = 20$ ; 4 males and 16 females). The experimental group received a total of six, one-hour AAT sessions conducted biweekly over a 3 month period. Assessment of past experiences with pets was completed prior to the study. Measures of cognitive impairment (using the MMSE), ADLs (using Nishimura's ADL [N-ADL]; Yamashita et al., 1988), behavioral pathology (using the Behave-AD; Reisberg et al. 1987), and salivary chromogranin A (CgA), a neuroendocrine secretory protein found in the submandibular gland and used as an index for measuring psychosomatic stress in adults, were obtained prior to the AAT program (pretest) and

three months later, after the final AAT session (posttest). Salivary CgA had to be measured at fixed time intervals, immediately before and after AAT, to avoid variation due to circadian rhythm. All of the data were compared through matched paired *t* tests, with the selected level of significance at  $p = 0.05$ . Neither group showed a significant change in MMSE scores from pretest to posttest. However, the AAT group demonstrated some improvement in MMSE scores from pretest (11.43;  $SD = 9.00$ ) to posttest (12.29;  $SD = 9.69$ ), while the control group demonstrated a slight decline in MMSE scores from pretest (10.20;  $SD = 7.04$ ) to posttest (9.50;  $SD = 6.26$ ). Similarly, neither group showed a significant change in N-ADL scores from pretest to posttest: AAT group pretest 28.43 ( $SD = 14.00$ ) and posttest 29.57 ( $SD = 14.47$ ) N-ADL scores vs. control group pretest 29.70 ( $SD = 11.02$ ) and posttest 28.95 ( $SD = 10.92$ ) N-ADL scores. In the AAT group, the average pretest total score on the Behave-AD was 11.14 ( $SD = 4.84$ ) and at posttest it was 5.45 ( $SD = 3.27$ ), indicating a significant improvement ( $p = 0.029$ ) in behavior as assessed by the family. The control group showed no significant difference between pretest (5.45;  $SD = 3.27$ ) and posttest (5.65;  $SD = 3.59$ ) total scores on the Behave-AD. The researchers reported that the evaluation of salivary CgA, as a mental stress index, showed a decreasing tendency in the AAT group only, however, salivary CgA was obtained on only 4 of the 7 subjects in the AAT group. Caution needs to be exerted when interpreting the results of the salivary CgA on account of the small sample size, which makes generalization difficult. Furthermore, the authors note that it is difficult to conclude that the improvement in problem behaviors, as assessed by the Behave-AD, was solely due to the effects of AAT, as the subject's engaged in other day care activities throughout the day.

Motomura et al. (2004) used a pretest-posttest experimental design to investigate the impact of AAT on mental status, ADLs, depression, irritability and apathy in 8 female NHRs with dementia ( $M$  age = 84.8;  $SD = 7.0$ ). The subjects were assessed prior to (pretest) and immediately following 4 days of AAT (posttest). Mental status was measured using the MMSE, depression

was measured using the Geriatric Depression Scale (GDS; Yesavage et al., 1983), ADLS were measured using the Physical Self-Maintenance Scale (PSMS; Lawton & Brody, 1969), and apathy and irritability were measured using two scales developed by Burns et al. (1990), the apathy and irritability scales. The dosing of AAT was one hour over four consecutive days. The findings indicated no significant difference in MMSE, GDS, PSMS, and irritability scores pre- and post-AAT, but a significant improvement ( $p \leq 0.05$ ) was noted in apathy scores (pre-test  $M = 19.3$ ;  $SD = 3.7$  vs. posttest  $M = 14.0$ ;  $SD = 3.5$ ). Although this was a pilot study, the findings need to be treated with caution for several reasons, these being the length of the study (4 days), the small dosing of AAT, the lack of a specified AAT protocol, and the lack of a control group.

In a 9-week pilot study, using a quasi-experimental time-series design with three phases (A-B-C), Richeson (2003) investigated the effects of AAT on agitated behaviors and social interactions, a component of PB, of 15 NHRs (1 male; 14 females) with dementia. The study provided a detailed AAT protocol, strict eligibility criteria, explicit conceptual and operational definitions of the dependent variables of interest, and was guided by a theoretical framework (NDB Model). Dosing of AAT was one hour daily, Monday through Friday, at the change of shift (1430 to 1530) for three weeks. The rationale for this specified period of time was when agitation behavior peaked. Cognitive impairment was measured by the MMSE. Agitation was measured by a trained therapeutic recreation (TR) professional using the CMAI and not the PI; this was to reduce bias. The CMAI was administered three times, at baseline (condition A), immediately following three weeks of AAT (condition B), and three weeks post AAT/follow-up (condition C). Social interactions were measured during each AAT session using the Flow Sheet for Recreation Therapy AAT Intervention (Richeson & McCullough, 2002). This flow sheet is a 9-item, 4-point-Likert scale (1 = *never* to 4 = *more than three times*). Higher scores indicate increased social interaction. The AAT flow sheet has a reported internal consistency of 0.78 (Cronbach's  $\alpha$ )



and an inter-rater reliability of 0.98 (Richeson & McCullough, 2002). Data were checked for normality or for significant differences between the three conditions (A-B-C). The normality check produced  $p$  values  $> 0.10$ , therefore, paired-samples  $t$  tests were used to test differences between conditions A and B and between conditions B and C on agitation and to analyze the results of the AAT flow sheets for differences in social interactions between the first and last week of AAT. The author reported a statistically significant decrease in mean CMAI scores between condition A ( $M = 65.93$ ,  $SD = 15.40$ ) and condition B ( $M = 50.53$ ,  $SD = 9.41$ ;  $t [15] = 5.732$ ;  $p = 0.001$ ) and a statistically significant increase in mean CMAI scores between condition B ( $M = 50.53$ ,  $SD = 9.41$ ) and condition C ( $M = 54.86$ ,  $SD = 11.31$ ;  $t [15] = -3.617$ ;  $p = 0.000$ ). A paired-samples  $t$  test was also used to evaluate change in social interaction between the first and last weeks of the AAT intervention. The results of the social interaction data revealed the mean social interactions during the last week of AAT ( $M = 20.25$ ,  $SD = 6.38$ ) was significantly greater than the mean for the first week of AAT ( $M = 15.25$ ,  $SD = 7.97$ ;  $t (15) = -3.257$ ;  $p = 0.009$ ). A one-way ANOVA was performed to determine if there were differences between the cognitive status (MMSE scores) and agitation (CMAI scores) recorded in the CMAI and none were found. When needed (PRN) medication usage was tracked throughout the study. The author reported that Tylenol® and milk of magnesia were the only PRNs administered, and they were used sparingly. Although this was a pilot study, the design controlled for a wide array of extraneous variables, thereby decreasing bias in the results.

There is one other study (Edwards & Beck, 2002) that warrants further examination. Within the present study's theoretical framework, the NDB Model, it is posited that the environment (physical and social) is an important influence in managing disruptive behaviors in PWD. According to Lawton (1982) the more vulnerable the person, the more likely he/she will be influenced by the environment. Edwards and Beck (2002) took a unique approach to AAT by improving the environment with the placing of a fish aquarium in the dining rooms of three LTC

facilities' special dementia units. They conducted a 16-week experimental study, using a time-series design with a nonequivalent control group, to determine if the presence of the fish aquariums (AAT) influenced nutritional intake of 62 PWD (24 males; 38 females). Two of the LTCs ( $n = 45$ ) received treatment only, while the other LTC ( $n = 17$ ) received a delayed treatment (nonequivalent control group). The study provided a detailed data collection protocol and explicit operational definitions of the dependent variables of interest, body weight and nutritional intake. Nutritional data were obtained in all three LTC facilities during Weeks 1-2 (baseline). A fish aquarium was placed in the dining rooms of the two treatment facilities during Week 3 and it remained until the end of Week 10, at which time data collection ceased for this group. In the control facility, a scenic oceanic picture was introduced in Week 3 and removed after Week 4. A washout period occurred for the control facility during Weeks 5-6 (return to baseline), and then the protocol utilized in the treatment facilities was replicated. Utilizing an ANOVA, no significant differences were found in mean baseline nutritional intake when analyzed by facility. For the control group, a paired samples  $t$  test was conducted comparing baseline nutritional intake total with the control data (scenic picture) Weeks 3-4, and no significant difference was noted ( $t = -0.882$ ;  $p = 0.391$ ). Then a comparison was made between the control group's two baseline periods (Weeks 1-2 and Weeks 7-8), and no significant difference was noted ( $t = 1.513$ ;  $p = 0.150$ ). The authors concluded that the control group could be utilized later as a treatment group. The influence of the fish aquariums was analyzed by comparing the baseline nutritional intake period with the treatment period (level of significance was set at  $p < 0.001$ ). The nutritional intake of the PWD increased significantly ( $M = 21.1$ ) in all three facilities when the aquariums were introduced, and it continued to increase during the 6-week follow-up. Furthermore, a significant increase in weight was noted the month the fish aquarium was introduced ( $M = 0.54$  lbs.), and the trend continued throughout the study with a mean weight gain of 1.65 lbs. ( $p < 0.000$ ). The researchers reported that the fish aquariums held

the attention of those individuals who often wandered or who tended to be lethargic. Sitting for longer periods and being alert for longer periods led to increased nutritional intake. The researchers concluded that changing the environment with the presence of the fish aquariums increased the PWD desire to eat. They also noted that after the introduction of the fish aquariums, nutritional supplement usage decreased, which resulted in healthcare cost savings. The authors cited a few limitations, such as use of convenience sample which lacked in ethnic diversity and not ruling out the presence of other origins of dementia.

### ***Summary of the State of the Science Regarding Animal-Assisted Therapy***

More than forty years have passed since the humble beginnings of AAT with Levinson and his dog Jingles, and while quality research examining the use of animals as a health-enhancing therapy has steadily improved, it remains a work in progress. Findings in the studies reviewed provide some evidence that AAT is a health-enhancing intervention, especially in PWD, but the causal mechanisms behind the stated benefits remain unknown.

AAT studies have been criticized for their lack of empirical rigor. Most of the previous AAT studies cannot be replicated because they are methodologically flawed or they failed to provide a detailed protocol for replication. It was difficult to accurately assess the effectiveness of the AAT interventions in many of the studies examined in this section because of the vast differences in the dosing of AAT, length of study, and poorly defined instruments used to measure outcome variables. Studies that reported lack of significance for some of their outcome measures (Taylor et al., 1993; Walsh et al., 1995; Kanamori et al., 2001) did not necessarily report lack of effect. Many factors could have contributed to non-significant results; one factor might have been length of the study. The studies critiqued above varied in duration, from 8 minutes (Taylor et al.) to 4 months (Edwards & Beck, 2002). Another factor might have been lack of control group, as cited in one study (Motomura et al., 2004). The dosing of AAT varied across the studies from 4 minutes (Taylor et al.) to three hours (Walsh et al.).

All the studies used purposive sampling. However, this type of sampling is often necessary in AAT research due to fear or dislike of animals or medical conditions that could be aggravated by the presence of an animal (e.g., asthma). The characteristics of the samples across the studies were not congruent, with gender imbalance (more women than men) being the most common, and lack of ethnic diversity. To compensate for the use of small sample sizes, two studies used a times series design (Edwards & Beck, 2002 & Richeson, 2003). These studies demonstrated a high level of empirical rigor.

One difficulty that many of the researchers appeared to encounter was the use of psychoactive medications. Yet, it is often impossible to find medication-free NHRs with dementia. Two studies (McCabe et al, 2002; Richeson, 2003) tracked the use of medications prior to and throughout the data collection period.

The review of literature revealed significant gaps in the empirical knowledge in two bodies of literature, that of PB and AAT. When studying PB in PWD, there is a need to rule out depression and delirium, as these two variables can confound the results. There is also a need to not only monitor psychoactive medication use, but control for the use of psychoactive medication. Controlling for the use of psychoactive medications will improve internal validity. Many AAT studies failed to conceptualize the nature of the problem under study, which makes it difficult to interpret the results. The present study addresses these gaps in order to advance nursing science.

## CHAPTER 3

### METHODOLOGY

The present study was reviewed and approved by The Pennsylvania State University Office for Research Protections' (PSU-ORP) Biomedical Institutional Review Board (IRB; see Appendix C) and the Institutional Animal Care and Use Committee (IACUC; see Appendix D). IRB approval included a Health Insurance Portability and Accountability Act (HIPAA) Waiver (see Appendix E) to contact legally authorized representatives (LARs) of potential study participants and informed consent (see Appendix F) to obtain health protected information (HPI) for the purpose of eligibility screening. This chapter provides the methods and procedures used in the present study, which are described in the following sections: (a) research design, (b) setting, (c) sample, (d) intervention and controls, (e) dependent variables and their measures, (f) procedure for data collection, (g) training of research assistants (RAs), and (h) data analysis.

#### Research Design

A quasi-experimental, within-subject design with repeated measurements over 6 phases, pre-baseline, A-B<sub>1</sub>-A'-B<sub>2</sub> phases, and a follow-up phase, was used to investigate the effects of AAT for responding to PB in elderly NHRs with dementia. This type of research design is often considered the methodology of choice when one wants to determine if a quasi-causative or functional relationship exists between an intervention and a target behavior (McCormick, 1995; Richards, Taylor, Ramasamy, & Richards, 1999). In order to demonstrate a functional relationship, the researcher may create conditions, through manipulation of the environment. As a result of the intervention and not some other variable, only the individual participant may change his or her own behavior. Changes in the target behavior are used to determine if the intervention is having the desired effect (Richards et al., 1999).

Each phase of the A-B<sub>1</sub>-A'-B<sub>2</sub> design was composed of 8 consecutive days and one day of follow-up (1-week post the completion of B<sub>2</sub>), resulting in a total of 33 days of data collection

per subject. The proposed time frame took into account analysis of previous research, the number of data points necessary to perform statistical analyses, and the number of days necessary to establish a stable trend in the data (Hersen & Barlow, 1976).

The pre-baseline phase was necessary for pinpointing the performance of the target behavior (Kazdin, 1982). There is no defined length for this phase, however, a minimum of three observational days is recommended (Tawney & Gast, 1984). The pre-baseline period was also used as an opportunity to reduce sources of reactivity (Kazdin, 1982). Reactivity refers to the subject being observed altering his/her target behavior as a response of being observed (Richards et al., 1999). The use of videotaping is one potential cause of reactivity. In the present study, in order to decrease the extent to which the subjects were aware that they were being videotaped during the A-B<sub>1</sub>-A'-B<sub>2</sub> phases of the study, the videotaping equipment was placed in the subjects' line of vision in the off mode, a sensitizing session, during pre-baseline phase to decrease participant reactivity (Haidet, Tate, Divirgilio-Thomas, Kolanowski, & Happ, 2009). It has been suggested that participant reactivity generally wanes as the number of observations increase (Richards et al., 1999).

The baseline phase or Phase A is the initial, pre-intervention period of observation which involves repeated measurements of the target behavior under study. The primary purpose of baseline measurement is to have a standard against which the efficacy of an intervention may be evaluated (Hersen & Barlow, 1976). There is no defined length for this phase. Experts in single-subject methodology recommend that repeated measurements be obtained until a stable pattern emerges (Hersen & Barlow, 1976; Kazdin, 1982; Richards et al., 1999). However, if the baseline phase is extended, all the phases must be extended, in order to have a fairly balanced number of data points per phase (Kazdin, 1982), this, in turn, extends the length of the study which may not be practical when working with frail elderly patients (Maas, Kelley, Park, & Specht, 2002).

The intervention phases, Phases B<sub>1</sub> and B<sub>2</sub>, are the periods when the intervention is

implemented and observed. During these phases, repeated measurements of the target behavior are obtained and compared to the measures obtained during the baseline phase to determine if there was a change in the target behavior (Krishef, 1991). It is recommended that the intervention phase be repeated within a single experiment. According to experts in single-subject methodology (Hersen & Barlow, 1976; Kazdin, 1982), replications of the intervention give a fair degree of certainty that the change in the target behavior was caused by the intervention and not some other extraneous variable. One replication is sufficient (Hersen & Barlow, 1976).

The control phase or Phase A' is the period when the intervention is withheld. During this phase, repeated measurements of the target behavior are obtained. The purpose of the control phase is to reverse the direction of a response change, thus allowing the researcher to make reliable statements about the functional relationship between the independent and dependent variables (Yaden, 1995). Shadish et al. (2002) have claimed that the reversal phase of the single-subject design is very powerful for inferring causal effects.

The follow-up phase is the final phase of a single-subject design. During this phase, the researcher returns to the subjects after termination of the study with no direct intervention. The target behavior is reevaluated using the same measures employed previously. The purpose of the follow-up phase is to determine if improvements seen during the intervention have been maintained (McCormick, 1995). There is no definitive time frame on when to follow-up with subjects after termination of the study. This phase is often omitted but is highly recommended because it strengthens the validity of the study (Richards et al., 1999; Tripodi, 1994). The timeline for each phase is provided in Table 3-1.

**Table 3-1***Timeline of Phases*

Pre-Baseline	Baseline Phase A	AAT Phase B <sub>1</sub>	Control/Reversal Phase A'	AAT Phase B <sub>2</sub>	Follow-up (1-week post Phase B <sub>2</sub> )
Days 1 – 3	Days 4 – 11	Days 12 – 19	Days 20 – 27	Days 28 – 35	Day 42

***Rationale for Design***

The design specified in the present study addressed many of the methodological weaknesses identified as limitations in previous AAT studies. For example, one weakness identified was poor or lack of a control group. In the present study, each subject served as his/her own control, meaning all the subjects were exposed to the same level of treatment throughout the entire experiment. This type of control strengthens the repeated measures design considerably, reducing the chance of a type 1 error, and it strengthens the study's ability to draw conclusions (Kazdin, 1982).

Small sample size, attrition, and missing data were other limitations commonly cited in previous AAT studies. Within-subject control reduces the number of subjects required for the study (McReynolds & Kearns, 1983). When considering the factor of attrition, the single-subject design is most feasible to use with a small number of subjects who have chronic, debilitating diseases like dementia. When considering missing data, the power of the study lays in the number of data points (e.g. observations) not the number of subjects (Kazdin, 1982; Metzger & Schultz, 1982). This means that during design planning, the researcher needs to take into account the number of data points needed to perform statistical analyses without violating assumptions, and then plan the length of the phases accordingly, to allow for some missing data points.

Lack of replication has also plagued previous AAT studies. The most powerful feature of the present study's design was the two replications of the AAT intervention (e.g., B<sub>1</sub> and B<sub>2</sub>) with



each subject (Hersen & Barlow, 1976). The importance of these replications allowed for both the prediction of future responses and a test of that prediction in the same experiment (Kazdin, 1982).

One major criticism of the single-subject methodology is that generalizability of findings is limited due to the small number of subjects studied. This is true to some degree, however, direct replication or repetition of the same experiment on more than one subject aids in establishing generalizability of findings to those individuals with similar problems to the subjects in the experiment (Hersen & Barlow, 1976). It is recommended that four participants be used for single-subject experimentation, the original experiment plus three replications (Hersen & Barlow, 1976; McReynolds and Kearns, 1983). The rationale for this is that the more successful replications obtained the more generality to similar patients is accepted with greater confidence and external validity is strengthened (McReynolds & Kearns, 1983). In the present study, the original experiment plus seven replicate experiments were conducted.

### **Setting**

This study was conducted in one nursing home located in northeast Pennsylvania, with permission obtained from the administration to utilize the site pending approval from the IRB. The overall capacity of this nursing home was 176 beds, which included a 60-bed Alzheimer unit. All participants were recruited from the Alzheimer unit. The site was a for-profit facility, providing skilled level of care with Medicaid, Medicare, and private pay as the three sources of reimbursement. According to the site's Administrator, 80 – 90% of the NHRs at this facility had a diagnosis of dementia (e.g., vascular, Parkinson's, Alzheimer's), 88% of the NHRs were female, and the vast majority of NHRs were Caucasian. The facility had a policy in place regarding animal visitations and activities were conducted in a dayroom separated from the main unit. This particular facility did not have a resident dog program nor did it participate in the Eden Alternative. The Eden Alternative is a method of nursing care delivery and environmental enhancement through the integration of plants, animals, and children into the physical, personal,

and social milieu (Thomas, 1994). The fact that the facility did not have a resident dog program or participate in the Eden alternative is of great importance, as these are confounding factors.

### **Sample**

A purposive sample was recruited for this study. Enrollment began in July 2007 and follow-up ended in October 2007. An attempt was made to recruit a fairly homogeneous sample. Eighteen subjects met initial eligibility criteria, which meant they were identified by the Activities Director as having dementia of the Alzheimer's type (DAT) and exhibited symptoms of PB. The legally authorized representatives (LARs) of two NHRs declined participation; no explanations were given. Eight of the consented subjects did not meet all of the eligibility criteria and were excluded. The final sample (N = 8) met the study's specified inclusion and exclusion criteria, as screened by the PI, who is an advanced practice nurse (APN) with specialties in gerontological nursing and adult mental health.

### ***Inclusion Criteria***

Each subject was 65 years or older, as evidenced in *Section AA: Identification Information* and *Section* of the Minimum Data Set (MDS) – Version 2.0 (see Appendix G), and had a physician's diagnosis of dementia that met the *DSM-IV-TR* (American Psychological Association [APA], 2000) specified criteria for dementia. Dementia of the Alzheimer's type (DAT) was the targeted dementia for this study, because the prevalence of PB is greater in DAT than among any of the other dementias (Landes et al., 2001; Mega et al., 1996; Paulsen, Ready, Hamilton, Mega, & Cummings, 2001). Evidence of DAT was verified in the History & Physical, Problem List, and *Section AA: Identification Information* and *Section I: Disease Diagnoses* of the MDS – Version 2.0.

Each subject spoke English as evidenced in *Section AB: Demographic Information: Language* of the MDS – Version 2.0 and exhibited adequate hearing and vision, with the use of corrective devices (e.g., hearing aid and eye glasses). Adequate was defined as a 0 or 1 in the

code boxes for Question 1 in both, *Section C: Communication/ Hearing Patterns* and *Section D: Vision Patterns* of the MDS – Version 2.0. These criteria were necessary for effective communication (Hendryx-Bedalov, 2000).

Each subject met the residency requirement of at least a three month (90 days) length of stay. Evidence of this criterion was found in *Section AB: Demographic Information: Date of Entry* of the MDS – Version 2.0. The rationale for this criterion was that behaviors associated with relocating and transitioning to a nursing home environment tends to dissipate approximately three months following the relocation (Grant, Skinkle, & Lipps, 1992; Johnson, Stone, Altmaier, & Berdahl, 1998; Lee, Woo, & Mackenzie, 2002).

Each subject achieved a Mini Mental Status Examination (MMSE: Folstein et al., 1975; see Appendix H) score between 10 and 15. This score range is indicative of moderate cognitive impairment in PWD and reflects the typology of PWD residing in nursing homes (Ashford, Schmitt, & Kumar, 1998). The MMSE scores reported in this study reflect the scores obtained by the PI during eligibility screening. For reliability purposes the PI did not use the MMSE scores cited in the subjects' medical records.

All subjects exhibited PB. Evidence of PB was found in the documentation of the nurses' notes and in the following sections of the MDS – Version 2.0: *Section B: Cognitive Patterns*; *Section E: Mood and Behavior Patterns*; *Section F: Psychosocial Well-Being* and *Section N: Activity Pursuit Patterns*.

Each subject was on a stable dose of psychoactive medications. For the purpose of this study, a stable dose was defined as no change in dose 4 weeks prior to the study and during data collection. Four weeks allows sufficient time for the achievement of therapeutic effects and the abatement of symptoms for which the medication was prescribed (Beers & Berkow, 2000). Evidence of this criterion was found in the subject's Medication Administration Record (MAR) as well as *Section O: Medications* of the MDS – Version 2.0.

Each subject had a reliable LAR, who took an active interest in his/her NHR, visited routinely (at least weekly), and who provided accurate information about his/her NHR. Each LAR met the definition of health care representative under Pennsylvania's Act 169 of 2006.

There was evidence to support that each subject had a past interest in animals, in particular dogs, because dogs were the only type of animal used in the AAT intervention. This criterion was determined by the PI following the administration of the Informant-Based Canine Attachment Questionnaire (see Appendix B) to each subject's LAR. History of this interest (human-animal bond) was deemed necessary, because it would be unethical to involve an individual in AAT if he/she had a known fear of dogs, or had experienced negative outcomes as a result of a dog, such as being bitten or attacked (Delta Society, 1996; Johnson et al., 2002).

### ***Exclusion Criteria***

A subject was excluded if he/she: (a) had a known fear of or allergy to dogs, as determined by the LARs response of *Yes* to either of these preliminary screening questions (see *Procedure and Script for Screening Questions*; Appendix I); (b) had a diagnoses of Parkinson's disease (PD), Huntington's disease (HD), or history of a stroke/cerebral vascular accident (CVA), as these types of dementia have a higher prevalence of depression (Darvesh & Freedman, 1996; Levy et al., 1998; Moretti et al., 2005; Shulman, 2000), and depression in this study is a confounding factor; (c) had delirium, as defined as 2 in the code box – behavior present over past 7 days –in any of the six *Indicators of Delirium – Periodic Disordered Thinking/Awareness* items of *Section B: Cognitive Patterns* of the MDS – Version 2.0; (d) had a history of clinical depression prior to the onset of dementia, as verified in his/her medical chart, or was currently depressed as determined by a score of 8 or higher on the Cornell Scale for Depression in Dementia (CSDD; Alexopoulos et al., 1988; see Appendix J); (e) had evidence of a current infectious disease, such as an antibiotic resistant infection, *clostridium difficile*, conjunctivitis, pneumonia, tuberculosis and wound infection, or a compromised immune system, as seen in

acquired immunodeficiency syndrome (AIDS) and recipients of organ transplants; and (f) had a diagnosis of asthma, because contact with the animals' fur or dander may precipitate an asthma attack (Delta Society, 1996; Johnson et al., 2002). Information regarding these criteria was verified in the History & Physical, Problem List, and *Section AA: Identification Information* and *Section I: Disease Diagnoses* of the MDS – Version 2.0.

### ***Disenrollment from the Study***

Provisions were made to disenroll a subject from the study if: (a) he/she developed a fear of the therapy dog, (b) he/she became hospitalized or was removed from the facility (e.g. extended therapeutic pass lasting 2 or more days), (c) the LAR withdrew his/her NHR from the study, (d) the subject withdrew him/herself from the study, (e) the subject had a change in dose of psychoactive medications during data collection, or (f) the PI determined that the intervention was causing the subject distress. No subject was disenrolled from the present study.

### ***Instruments Used for Eligibility Screening***

*The Informant-Based Canine Attachment Questionnaire* (see Appendix B) was developed by the PI for the purpose of this study. This questionnaire contains 17 closed-ended questions (e.g. yes/no, multiple choice). The questions were derived from *Assessing the Human-Animal Bond: A Compendium of Actual Measures* (Anderson, 2007). This book, gathered, in one place, those measures presently used to study the human-companion bond. The questions cover the human-animal bond, principally by attachment, but also by fear.

The *Mini Mental Status Examination* (MMSE; Folstein et al., 1975; see Appendix H) is a brief standardized test that measures cognitive impairment. It yields a global performance score from eleven items which measure orientation, registration, attention and calculation, recall, language and construction tasks. The score is a sum of correct responses and ranges from 0 to 30. Administration time is approximately 10 minutes. The MMSE has test-retest reliability (24 hours) of 0.83 and internal consistency has been reported at 0.95 (Folstein et al.). Validity of the MMSE

has been demonstrated by positive correlations on the verbal ( $r = 0.776$ ) and performance ( $r = 0.660$ ) sections of the Wechsler Adult Intelligence Scale (Czubaj, 1997). A score of 10 – 15 has been determined as the range for subject eligibility. A score of 10 – 15 is indicative of moderate cognitive impairment in PWD (Ashford et al., 1998). Establishing a strict MMSE range increases homogeneity of the sample as well as a tighter measure of control. The MMSE was administered by the PI to determine eligibility. No permission was required for the use of this instrument.

The *Modified Hachinski Scale* (Hachinski et al., 1975; see Appendix K) was used by the PI to rule-out the presence of vascular dementia, which was an exclusion criterion in this study. The score is the sum of eight weighted items that have demonstrated positive correlation with ischemic changes in the brain. Scores range from 0 – 12, and higher scores indicate greater probability of vascular dementia. A cut-off point of 4 or higher indicates the presence of vascular dementia. No permission was required for the use of this instrument.

The *Cornell Scale for Depression in Dementia* (CSDD; Alexopoulos et al., 1988; see Appendix J) is a 19-item instrument specifically designed for the rating of symptoms of depression in PWD. The CSDD is a clinician-administered instrument that uses information from an interview with a reliable informant (e.g. LAR) to evaluate the full spectrum of depressive symptoms in the PWD. The CSDD takes approximately 20 minutes to administer with the reliable informant. The PWD is rated on each of the 19 items using a four-point grading system, with anchor points: a (*unable to evaluate*), 0 (*symptom is absent*), 1 (*symptom is present in mild or intermittent form*), and 2 (*symptom is present in severe form*). The score is the total of all points assigned, which can range from 0 to 38. A cut-off point of 8 or higher indicates the presence of depression. The CSDD has inter-observer reliability of 0.67 and internal consistency has been reported at 0.84 (Alexopoulos et al.). Validity of the CSDD was demonstrated by positive correlations (0.83) with depressive subtypes classified according to Research Diagnostic

Criteria (RDC). In a comparative study between the CSDD and Hamilton Depression Rating Scale (HDRS; Hamilton, 1967) and the Dementia Mood Assessment Scale (DMAS; Sunderland et al., 1988), the CSDD was found to be more sensitive in detecting true depression in PWD than the other instruments (Camus, Schmitt, Ousset, & Micas, 1993). This instrument was used once by the PI during the pre-screening phase to determine eligibility. No permission was required for the use of this instrument.

Demographic data were obtained by the PI using an investigator-developed tool for chart review (see Appendix L). The demographic data collected included: gender, age, race/ethnicity, date of admission to the nursing home, primary language, level of education, occupation, marital status, status of hearing and vision, type of dementia and other diagnoses, history of mental illness, indication of delirium, documentation of PB, and medications.

#### ***Psychoactive Medications and Medical Comorbidity***

For the purpose of statistical analyses, scores were calculated for both psychoactive medications and medical comorbidity. The mean psychoactive medication score was calculated by summing the actual number of routine psychoactive medications prescribed for each subject and dividing the sum by the number of subjects ( $N = 8$ ). Psychoactive medications included stimulants, antidepressants, anxiolytics, anticonvulsants, sedative/hypnotics, narcotic analgesics, and antipsychotic agents (Beers & Berkow, 2000). When needed, or PRN, medications were not factored into the calculation. If a subject received a psychoactive medication in equal doses more than one time a day (e.g., Klonopin 1 milligram twice a day) or in unequal doses more than one time a day (e.g., Klonopin 1 milligram in the morning and 0.5 milligrams at bedtime) it was only counted once. A list of the subjects' medications can be found in Appendix M.

A medical comorbidity score was calculated for each subject using the Charlson Comorbidity Index (CCI; Charlson, Pompei, Ales, & MacKenzie, 1987; see Appendix N). The CCI consists of 19 disease categories, each of which is assigned a weight as 1, 2, 3, or 6. The

weight reflects the magnitude of the adjusted relative risks associated with each comorbidity. The CCI score is the sum of the weights for all conditions, and the score can range from 0-37, with higher scores representing a greater burden of comorbidity. A mean CCI score was calculated by summing the calculated CCI scores and then dividing that sum by the number of subjects ( $N = 8$ ).

A chart review was conducted by the PI at the end of each phase of A-B<sub>1</sub>-A'-B<sub>2</sub> design and at follow-up, 1-week post the completion of B<sub>2</sub>, using the Chart Review and Demographic Data Form (see Appendix L). The purpose of the chart review was to monitor changes in behavior, changes in health conditions, (e.g., onset of illness or new diagnoses), and any changes in psychoactive medications, including change in dosage, deletion or addition of medication.

### *Sample Demographics*

The demographics of the study sample are presented in Table 3.2.

**Table 3.2**

### *Sample Demographics*

Variable	$\bar{x}$	SD	Range	Percentage
<b>Age</b>	86.4	3.15	80 – 90	
<b>Gender</b>				Female = 75% ( $n = 6$ )    Male = 25% ( $n = 2$ )
<b>Years Lived in Nsg Home</b>	2.7	1.5	3 mths – 5 yrs	
<b>Education (yrs)</b>	11.5	1.41	8 – 12	
<b>Marital Status</b>				Married = 25% ( $n = 2$ )    Separated = 12.5% ( $n = 1$ ) Single = 25% ( $n = 2$ )    Widowed = 37.5% ( $n = 3$ )
<b>Occupation</b>				Laborer = 50% ( $n = 4$ )    Coal miner = 12.5% ( $n = 1$ ) Housewife = 25% ( $n = 2$ )    Store clerk = 12.5% ( $n = 1$ )
<b>MMSE Score</b>	12.3	1.96	10 – 15	
<b>CSDS Score</b>	3.00	2.33	1 – 7	
<b>Psychoactive Medications</b>	1.38	0.74	0 – 2	
<b>Charleson Comorbidity Index</b>	1.63	0.74	1 – 3	



As depicted above in Table 3.2., the 8 subjects were primarily female (75%;  $n = 6$ ), and white, not of Hispanic origin (100%), with a mean age 86.4 ( $SD = 3.15$ ). The mean length of stay in the nursing home was 2.7 years ( $SD = 1.5$ ), and the mean education of the sample was 11.5 years ( $SD = 1.4$ ). The mean MMSE score was 12.13 ( $SD = 1.96$ ). The mean Cornell Scale for Depression in Dementia was 3.00 ( $SD = 2.33$ ).

### **Independent Variable – AAT, Control, and Videotaping**

#### ***Independent Variable – AAT***

The independent variable or intervention, AAT, was conducted during the  $B_1$  and  $B_2$  phases of the A- $B_1$ -A'- $B_2$  design. AAT took place in a dayroom separated from the main unit. The principal investigator (PI) was the dog handler and conducted all of the AAT sessions. The PI received training in AAT by completing the *Delta Society's Pet Partners*® *Team Training Course Home Study Program*, a national training and certification program for those who participate in Animal-Assisted Activities (AAA) and AAT. The dosing of AAT was 20 minutes during each subject's pre-established peak period of PB, for 8 consecutive days in Phase  $B_1$  and then again for 8 consecutive days in Phase  $B_2$ . Since there is no specified dosage for AAT, the dosage of AAT used in the present study was selected based on recommendations from Kovach and Magliocco (1998), who examined the participation behavior of PWD during various therapeutic activities. In the present study, AAT was offered one-to-one, and the activities included: petting the dog, brushing the dog's fur, playing with and holding the dog, feeding the dog treats, talking/singing to or about the dog to the handler, talking about previous pets he/she owned or knew, and walking with/wheeling with the dog, if able.

The therapy dogs (3 shihtzus) participating in this study were approved by Penn State's IACUC (see Appendix D). Only one dog participated in AAT at any given time. If one therapy dog became ill, fatigued or stressed, another therapy dog approved by IACUC could be utilized. A detailed description of the therapy dogs' requirements and the subject's involvement in AAT is

provided in the *AAT Protocol for Phases B<sub>1</sub> and B<sub>2</sub>* (see Appendix O). Human subject protection as well as discomfort and risks to human participants are addressed in the informed consent (see Appendix F).

### ***Control Phase***

Phase A' is the control phase. During this phase AAT is withheld and repeated measurements of the target behavior are obtained for 20 minutes during each subject's pre-established peak period of PB, for 8 consecutive days. This phase varies slightly from baseline (Phase A) in that each subject is offered the presence of the PI or RA (no dog). During this phase, the PI or RA asked for assent to sit with the subject. Casual conversation initiated by the PI or RA was held to a minimum, but non-verbal behavior, such as making eye contact, smiling, leaning, and/or touching the subject's hand or back, was permitted. The PI or RA verbally responded to the subject if the subject initiated and maintained the conversation.

### ***Videotaped Recording***

Each subject was videotaped for 20 minutes each day across the A-B<sub>1</sub>-A'-B<sub>2</sub> phases, during his/her established period of PB. The videotaped recordings were used to obtain measures of PB by a trained RA, using the O-PDS. The PI asked for assent to videotape the subject, and a sign indicating the occurrence of videotaping hung from the tripod. The video camera operator was trained to only videotape the subject, although verbal interactions with staff, other residents, visitors, and family members were recorded. The video camera operator was instructed to limit his/her interaction with the subject. Any attempts to involve the video camera operator in interaction by the subject were met with brief but positive responses.

The advantages of videotaped recordings are density and permanence of data (Heacock, Souder, & Chastain, 1996; Haidet et al., 2009). Direct observation and recording of data are limited by the difficulty in trying to observe and record simultaneously. Videotaping minimizes retrospective recall of events, which is a frequently cited limitation in studies using direct

observation (Hersen & Barlow, 1976; Heacock et al., 1996; Whall, 1999). Videotaping: (a) permits systematic slow motion analysis of complex or brief behaviors, as well as correction of omissions or coding mistakes; (b) decreases observer drift, which enhances the accuracy in recording the behaviors; and (c) is the best method for standardizing and facilitating the observational process and for establishing inter-observer reliability (Hersen & Barlow, 1976; Heacock et al., Haidet et al., Kazdin, 1982).

There are a few disadvantages to videotaped recording. Videotaping increases the costs of data collection (e.g., purchasing the necessary equipment and monetary compensation for the video camera technician), and data analysis (e.g., monetary compensation for raters) (Heacock et al., 1996). Videotaping can cause a Hawthorne effect, where a subject's change in behavior is due to being videotaped. This threat to internal validity, however, is easily overcome in PWD, because they quickly ignore or forget that the camera is present (Whall, 1999). In addition, strategically placing the video camera in the setting or setting up the video camera during the informal observation period (pre-baseline) can aid in decreasing the Hawthorne effect (Heacock et al.; Haidet et al., 2009; Kazdin, 1982). Equipment failure is another disadvantage of videotaping. This can include but is not limited to: (a) batteries that lose their charge; (b) malfunctioning of the video camera; (c) damaged videotapes (discs); and/or (d) distortion of picture and sound quality. In preparation for this disadvantage, a back-up videotape camera was kept on site, as well as extra charged batteries and extra videotapes/discs. The videotaped recordings were kept in a locked secure area according to University policy.

### **Dependent Variable and Measures**

The dependent variable of interest in the present study was PB, which was conceptually defined as behaviors characterized by decreased ability to experience or respond to human emotions, fewer interactions with others and surroundings, a decrease in motor activity, and a lessening of certain specific mental processes associated with thinking and knowing (Colling,

1999b). PB was measured using the Observational Form of Passivity in Dementia Scale (O-PDS; Colling & Antonakos, 2004; see Appendix A). The O-PDS is an observer rating scale that consists of 32 behaviors organized into 5 subscales: thinking, emotions, interacting with the environment, interacting with people, and activities. Nine (9) of the behaviors are scored in the negative and 23 behaviors are scored in the positive. In Appendix A, *PDS Behavioral Definitions* accompany the O-PDS form. Measures of PB are taken in four, 5-minute blocks of time for a total of 20 minutes. Each 5-minute block of time can have a score ranging from -9 to 23, and the total O-PDS score can range from -36 to 104, with lower scores indicating greater PB. The total scores for each of the 5 subscales are as follows: the *Thinking* subscale score can range from 0 to 20, the *Emotions* subscale score can range from -12 to 28, the *Interacting with Environment* subscale score can range from -4 to 12, the *Interacting with People* subscale score can range from -12 to 36, and the *Activities* subscale score can range from -8 to 8. Internal consistencies (Chronbach  $\alpha$ ) of 0.71 to 0.94 have been reported for the subscales and inter-observer reliability of 0.80 for the total score (Antonakos & Colling, 2001). The O-PDS is a new instrument, however it is the only available instrument developed specifically to measure PB in NHRs with dementia. Permission granting the use of the O-PDS for this study was obtained from the instrument's creator, K. Colling, Ph.D., RN. For this study, inter-observer reliability was calculated using the concordance correlation coefficient, which measured the agreement on the O-PDS, scored independently, between the videotape rater and the PI. The confidence limit was set at 95%. The estimate of the concordance correlation for the Total O-PDS was 95% CI [0.988, 0.997].

The PI utilized the O-PDS in the pre-baseline phase to make hourly observations (from 0900 to 1400) of each subject for three consecutive days. Results from these observations were used by PI to determine each subject's peak period of PB. The data collected from these observations were not included in the final analyses. An RA trained in rating the videotaped

recordings utilized the O-PDS to obtain measures of PB over four, 5- minute intervals for a total of 20 minutes per each taped session of the A-B<sub>1</sub>-A'-B<sub>2</sub> phases and from direct observations made during the follow-up phase.

### Procedure for Conducting Data Collection

This section describes the procedure for data collection, which includes videotape recording methods, and a description of what occurred in each phase of the study. Table 3.3 (below) outlines the schedule for data collection and the instruments used in each phase.

**Table 3.3**

*Schedule for Data Collection and Instruments Utilized According to Experimental Phase*

Phase	Instrument Used	Time	Responsible Person
<b>Eligibility Screen</b>	a. Chart review b. MMSE – mental status c. CSDD – depression d. Modified Hachinski e. Informant-Based Canine Attachment Questionnaire	Prior to subject observation	PI
<b>Pre-Baseline Phase</b>	a. O-PDS	Days 1 - 3 Hourly observations from 0900 to 1400 to determine each subject's peak time of PB	PI
<b>A-B<sub>1</sub>-A'-B<sub>2</sub> Phases</b>	a. O-PDS b. Chart review at completion of each phase	A = Days 4-11 B <sub>1</sub> = Days 12-19 (AAT) A' = Days 20-27 B <sub>2</sub> = Days 28-35 (AAT)	a. Trained RA for rating of video-taped recordings. b. PI
<b>Follow-up Phase</b>	a. O-PDS b. Chart review	Day 42	a. Trained RA for rating of video-taped recordings. b. PI

#### *Pre-Baseline*

During pre-baseline, the PI utilized the O-PDS to make hourly observations (from 0900 to 1400) of each subject for three consecutive days (Days 1-3), as recommended by Tawney and Gast (1984). The purpose of the pre-baseline period was to determine each subject's peak period

of PB. The 0900 to 1400 observational time-frame was based on the findings made by Fitzsimmons and Buettner (2002). Prior to the onset of each observational day, the PI read the *Script for Participant Assent* (see Appendix P) to each subject to obtain assent to observe him or her. As previously mentioned, the video camera was placed within each subject's line-of-vision, in the off-mode, during this phase to reduce reactivity in the up-and-coming phases of the study. Following completion of the third day of pre-baseline, the PI visually inspected the data and selected the intervention time for each subject based on his/her peak PB time.

### ***Baseline (Phase A)***

Immediately following the pre-baseline phase, each subject entered into the baseline phase (Phase A) in which he/she was videotaped for 20 minutes during his/her pre-established peak period of PB, for 8 consecutive days (Days 4-11). Prior to each 20 minute session, assent was obtained as previously described. No intervention occurred during Phase A. The subjects participated in their normal routine. Measures of PB, using the O-PDS, were taken from the videotapes/discs by the RA trained in the rating of PB. At the completion of baseline (Day 11), the PI conducted a chart review of the physician's orders, to determine if there were any changes in medications, and of the nurses' notes to determine if there were any changes in health condition and/or any changes in behavior and if so, what was done for the behavior.

### ***First AAT Intervention Phase (Phase B<sub>1</sub>)***

Following baseline (Phase A), each subject entered into the first AAT intervention phase (Phase B<sub>1</sub>). Prior to each 20 minute session, assent was obtained as previously described. Each subject was asked to partake in AAT one-to-one for 20 minutes during his/her pre-established peak period of PB, for 8 consecutive days. The subject was escorted to a room designated for one-to-one AAT sessions, and each session was videotaped. Measures of PB, using the O-PDS, were taken from the videotapes/discs by the RA trained in the rating of PB. At the completion of Phase B<sub>1</sub> (Day 19), the PI conducted a chart review as previously described.

### ***Control/Reversal Phase (Phase A')***

Following Phase B<sub>1</sub>, each subject entered into the control/reversal phase (Phase A') of the study. Prior to each 20 minute session, assent was obtained as previously described. During this phase, each subject was asked by the PI or an RA, if one could sit with him/her for 20 minutes during his/her pre-established peak period of PB, for 8 consecutive days. No dog was present during Phase A'. The PI or RA did not prompt any type of interaction with the subject, because this phase was to resemble baseline without that ethical dilemma of total withdrawal (Tawney & Gast, 1984). Each subject was videotaped during his/her 20 minute session. Measures of PB, using the O-PDS, were taken from the videotapes/discs by the RA trained in the rating of PB. At the completion of baseline (Day 27), the PI conducted a chart review as previously described.

### ***Second AAT Intervention Phase (Phase B<sub>2</sub>)***

Following Phase A', each subject entered into the second AAT intervention phase (Phase B<sub>2</sub>). This phase was conducted **exactly** like the first AAT intervention phase (Phase B<sub>1</sub>). At the completion of Phase A' (Day 35), the PI conducted a chart review as previously described.

### ***Follow-up Phase***

On day 42 (follow-up; 7 days post Phase B<sub>2</sub>), the PI obtained each subject's assent to have the RA trained in rating the videotapes perform a 20-minute real time observation of him/her (at the peak behavior time established in pre-baseline), using the O-PDS. No videotaping occurred during this phase. The PI conducted the last chart review as previously described.

### **Training of Research Assistants (RAs)**

Eleven RAs were recruited for the purpose of videotaping. Students, 18-years or older, who expressed a desire to participate in the project as part of an independent study, community service, or to gain experience in data collection were given priority consideration. Individuals, 18-years or older who were recruited but were not using this experience as part of their coursework/community service were financially compensated by the PI at the rate of \$8.00/taped

session. All of the RAs recruited for videotaping completed the *Penn State Human Participants Research Basic Training Seminar*, which was offered online at [www.psu.edu](http://www.psu.edu). Prior to the start of data collection, each RA completed a one-hour video recording training session conducted by the PI. The training session provided valuable hands-on experience in working with the video camera, the tripod, and other videotaping accessories (e.g., charging the extra batteries). Successful completion of the training session was evidenced by a return demonstration of proper videotaping techniques. Retraining by the PI occurred when warranted.

One RA was recruited for the purpose of rating the videotapes/discs and conducting the follow-up visit. This RA had a Master's Degree in Psychology and was financially compensated by the PI at the rate of \$12.00/videotape/disc. Prior to data collection, the videotape/disc rater successfully completed the *Penn State Human Participants Research Basic Training Seminar*. Prior to the implementation of the study, intra-observer agreement was established between the PI and video coder through a two-hour training session using sample tapes considered Gold Standard, because they were previously shown to be reliable in depicting PB in PWD. The training session ceased when  $\geq 80\%$  inter-observer agreement was achieved between the instructor and both, the PI and videotape/disc rater and between the PI and videotape/disc rater. Inter-observer agreement refers to the extent that two independent observers will agree on the occurrence or nonoccurrence of the target behavior behaviors (Hersen & Barlow, 1976).

Inter-observer reliability  $\geq 80\%$  is considered to be sufficiently high, and it is presumed that the two observers have agreed upon the occurrence or nonoccurrence of the target behavior (Hersen & Barlow, 1976; Whall, 1999). To maintain inter-observer reliability  $\geq 80\%$ , reliability checks were performed by the PI on 10% of the subjects (1 subject). If inter-observer reliability fell below 80% level of agreement additional training was implemented by the PI. Inter-observer reliability did not fall below 80%. In this study, inter-observer reliability was calculated using the concordance correlation coefficient and the confidence limit was set at 95%. The estimate of the



concordance correlation for the Total O-PDS was 95% CI [0.988, 0.997].

### **Data Analysis**

Descriptive statistics (e.g., mean, standard deviation, range, and percentage) were used to provide an understanding of the subjects' demographic characteristics, and were presented in a table format. Measures of PB were obtained from the videotapes/discs by the RA independently, using the O-PDS. The measures of PB obtained from the O-PDS data were entered into an Excel file and imported into Statistical Analysis System ® (SAS) – Version 9.1. The data were examined for accuracy. For hypothesis testing, data were analyzed using: (1) separate single-subject analyses, and (2) a repeated measurements analysis of covariance (RM ANCOVA) model with an autoregressive correlation structure. The dependency, or correlation, among responses measured in the same subject (within-subject) is the defining feature of a repeated measures design (A-B<sub>1</sub>-A'-B<sub>2</sub>). This correlation necessitates a statistical analysis that appropriately accounts for the dependency among measurements within the participant, which results in a more precise and powerful statistical analysis (Vonesh & Chinchilli, 1997). Pairwise *t* test comparisons were performed on the adjusted mean scores of the O-PDS at the 5-minute, 10-minute, 15-minute, and 20-minute intervals across the study's 5 time periods. Pairwise *t* test comparisons were also performed on the adjusted mean scores of the O-PDS five subscales and Total O-PDS across the study's five time periods. The adjusted means or least squares means are the means obtained after eliminating all differences that can be accounted for by the RM-ANCOVA (Munro, 2005). An alpha level of 0.05 was used to determine statistical significance. The trends in the data were presented using the graphical representation method normally used for the analysis of single-subject design studies (Krishef, 1991).

Pearson Product-Moment Correlations were computed: (a) to examine the relationships among the O-PDS blocks of time, O-PDS subscales, and Total O-PDS; (b) to examine the relationships among six variables: age, years of stay in the nursing home, MMSE, and Cornell

Scale for Depression in Dementia, psychoactive medications, and Charlson Co-morbidities Index; and (c) to examine the relationships among the O-PDS blocks of time, O-PDS subscales, Total O-PDS, and age, years of stay in the nursing home, MMSE, Cornell Scale for Depression in Dementia, psychoactive medications, and Charlson Co-morbidities Index. An alpha level of 0.05 was used to determine statistical significance. Data for the analyses are presented in a tabular format.

Inter-observer reliability was calculated using the estimate of the concordance correlation coefficient, which measured the agreement on the O-PDS, scored independently, between the videotape/disc rater and the PI. The confidence limit was set at 95%. The upper and lower concordance correlation confidence levels were reported in the narrative.

### ***Missing Data***

Missing data can have an unfavorable effect on the validity of the statistical inferences, yet, the handling of missing data in single-subject research is rarely discussed. In applied research, however, incomplete data is the rule and not the exception (Kneipp & McIntosh, 2001). Four subjects were recommended for this single-subject study, the original experiment plus three replications (Barlow & Hersen, 1976; McReynolds & Kearns, 1983). Provisions were made for attrition by recruiting 8 subjects. Analyses of the data were limited to only those subjects who completed the entire experiment, for multiple imputation is not feasible for a single-subject design (Shafer & Graham, 2002). All subjects completed the experiment.

No firm guidelines have been established for how much missing data can be tolerated in single-subject methodology. However, the PI took into account the amount of data points needed to perform accurate statistical analyses. The present study had a sufficient amount of data points per subject built into the design, 32 data points in each A-B<sub>1</sub>-A'-B<sub>2</sub> phase and 4 data points in the follow-up phase (total = 132 data points per subject). The frequency and percentage of missing data are reported for each subject.

## Chapter Summary

This chapter presented the methodology used to evaluate the effects of AAT for responding to PB exhibited by a sample of elderly NHRs with dementia. Purposive sampling was used to obtain a final sample of 8 NHRs with DAT who exhibited PB. To decrease extraneous variables, strict inclusion and exclusion criteria were established and appropriate covariates were used in the analyses. Each phase of the research design was adequately described, as was the protocol used for AAT. Ethical considerations, such as human subject protection, subject assent, criteria for disenrollment, confidentiality/privacy, and discomfort/risks were thoroughly explained. The instruments used in this study were identified, including information regarding their reliability, validity, and scoring. An explanation of how the O-PDS data were analyzed was provided.

## CHAPTER 4

### RESULTS

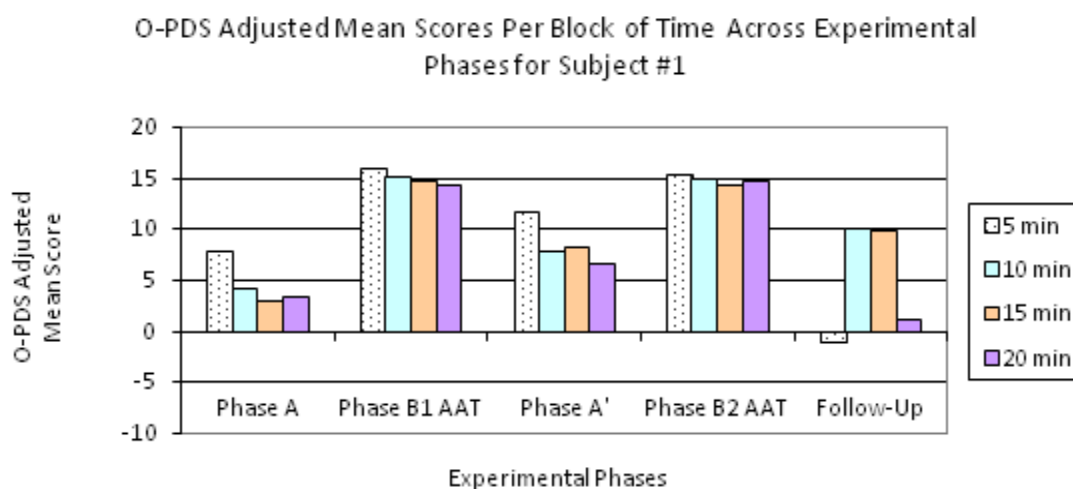
This chapter presents the major findings of the study, which was aimed at testing two hypotheses: NHRs with dementia will demonstrate a decrease in PB during AAT (phases B<sub>1</sub> and B<sub>2</sub>) phases when compared to the baseline (A) and control/reversal (A') phases; and NHRs with dementia will demonstrate an increase in PB at follow-up (1-week post B<sub>2</sub> phase) when compared to the intervention phases, B<sub>1</sub> and B<sub>2</sub>. This chapter is divided into five sections: (1) single-subject analyses, (2) pooled analyses using RM-ANCOVA, (3) Pearson's product moment correlations, (4) missing data, and (5) inter-observer reliability.

#### Single-Subject Analyses for O-PDS Blocks of Time

##### *Subject #1*

Subject #1 was an 80-year-old single white female, who had spent 3.64 years in the nursing home. She had worked in a sewing factory, had an eighth grade education, and scored 11 on the MMSE. She scored 1 on the Charlson Comorbidity Index for having the diagnosis of dementia, and she was receiving the psychoactive medication, Celexa ® (citalopram) 20 milligrams (mg) daily. Her peak PB was more pronounced between 1300 and 1330. Figure 4.1 illustrates the O-PDS adjusted mean scores at the 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #1. The true mean was represented for the 5-minute block of time because the statistical algorithm for the adjusted mean failed to converge.

As depicted below in Figure 4.1, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0012$  and  $p = 0.0014$ ), 15-minute ( $p < 0.0001$  and  $p < 0.0001$ ), and 20-minute ( $p < 0.0001$  and  $p < 0.0001$ ) time block intervals. Statistically significant differences in the O-PDS adjusted mean scores were found between



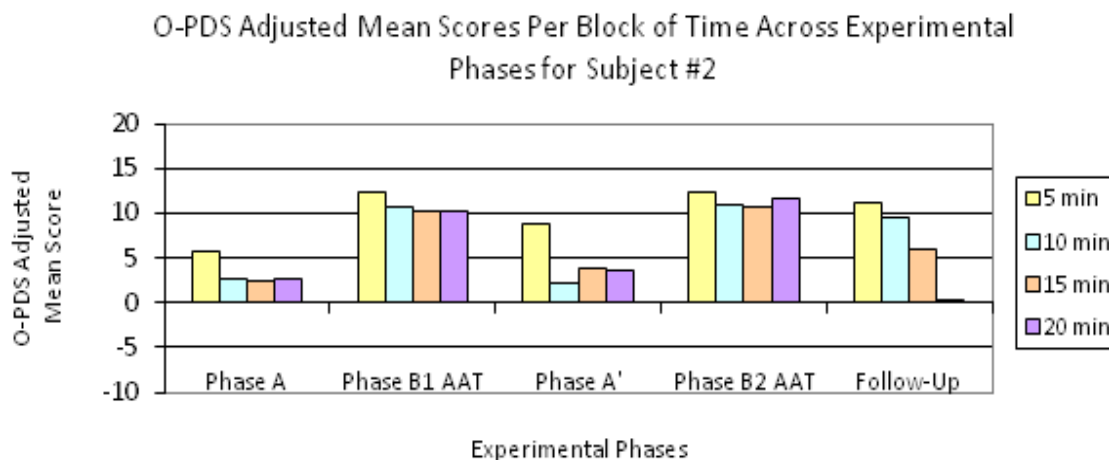
**Figure 4.1.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #1. Each 5-minute block of time can have a score ranging from -9 to 23.

phase A' (control/ reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0204$  and  $p = 0.0246$ ), 15-minute ( $p = 0.0014$  and  $p = 0.0029$ ), and 20-minute ( $p = 0.0004$  and  $p = 0.0002$ ) intervals, meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/ reversal) indicating lower PB. A statistically significant increase in O-PDS adjusted mean scores was found between phases A (baseline) and A' (control/reversal) at the 15-minute ( $p = 0.0080$ ) interval, meaning PB decreased when someone just sat with the subject. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) when compared to the AAT phases (B<sub>1</sub> and B<sub>2</sub>) revealed a low score, indicating increased PB. In summary, there was a consistent trend for Subject #1 to demonstrate significantly decreased PB during phases B<sub>1</sub> and B<sub>2</sub> (AAT).

### **Subject #2**

Subject #2 was an 87-year-old separated white female, who had spent 4.01 years in the nursing home. She had worked in a sewing factory, had a twelfth grade education, and scored 11 on the MMSE. She scored 2 on the Charlson Comorbidity Index for having the diagnoses, dementia and congestive heart failure (CHF). She was prescribed the following psychoactive medications, Lexapro® (escitalopram) 20 mg daily and Seroquel® (quetiapine fumarate) 25 mg

in the morning and 50 mg at bedtime. Her peak PB was evident between 1130 and 1200. Figure 4.2 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #2.



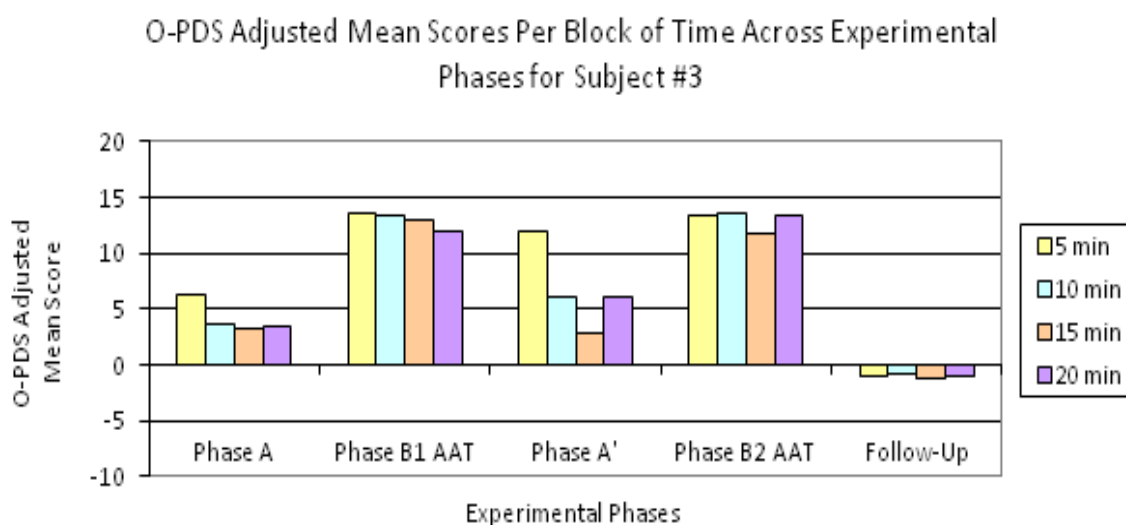
**Figure 4.2.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #2. Each 5-minute block of time can have a score ranging from -9 to 23.

As depicted above in Figure 4.2, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.0168$  and  $p = 0.0164$ ), 10-minute ( $p = 0.0027$  and  $p = 0.0020$ ), 15-minute ( $p = 0.0090$  and  $p = 0.0053$ ), and 20-minute ( $p = 0.0010$  and  $p = 0.0001$ ) time block intervals. There was no significant difference in the O-PDS adjusted mean scores between phase A' (control/ reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.2965$  and  $p = 0.2994$ ) interval, but statistically significant differences in the O-PDS adjusted mean scores were found between phase A' (control/ reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0016$  and  $p = 0.0013$ ), 15-minute ( $p = 0.0352$  and  $p = 0.0206$ ), and 20-minute ( $p = 0.0033$  and  $p = 0.0004$ ) intervals, meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/ reversal) indicating lower PB. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) appears to indicate less PB when compared to the A (baseline) and A' (control/reversal), however one must keep in mind that the

length of the follow-up phase was one day or 1 data point per block of time, whereas each block of time (5, 10, 15, and 20 minutes) in the A-B<sub>1</sub>-A'-B<sub>2</sub> phases is the average of eight data points. In summary, there was a consistent trend for Subject #2 to demonstrate significantly decreased PB during the intervention period, phases B<sub>1</sub> and B<sub>2</sub> (AAT).

### **Subject #3**

Subject #3 was a 90-year-old widowed white female, who had spent 5.04 years in the nursing home. She had worked in a sewing factory, had a twelfth grade education, and scored 12 on the MMSE. She scored 2 on the Charlson Comorbidity Index for having the diagnoses, dementia and diabetes. She was prescribed the following psychoactive medication, Remeron ® (mirtazapine) 15 mg at bedtime. Her peak PB was observed to be between 0830 and 0900. Figure 4.3 illustrates pairwise comparisons using *t* test analysis of the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #3.



**Figure 4.3.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #3. Each 5-minute block of time can have a score ranging from -9 to 23.

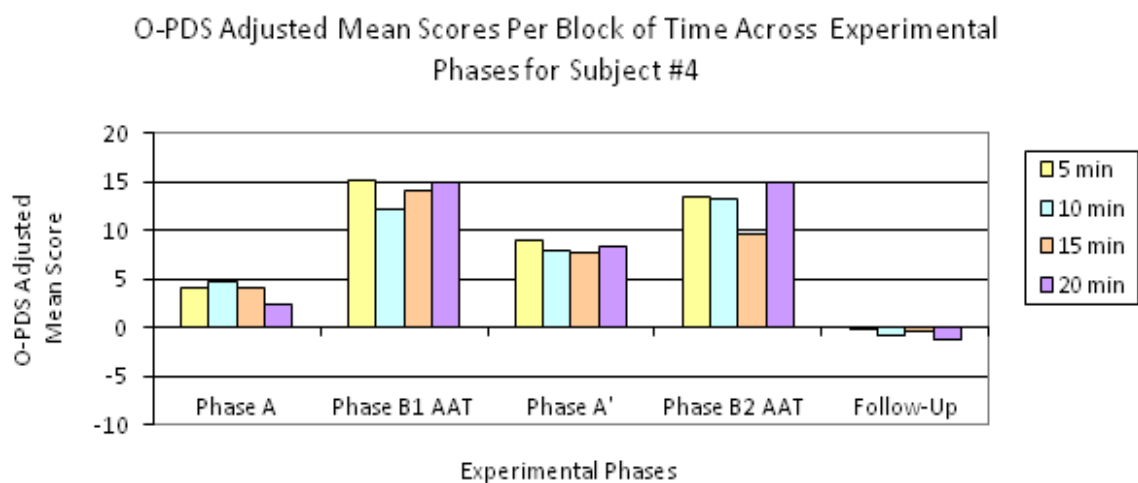
As depicted above in Figure 4.3, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline)

and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.0027$  and  $p = 0.0035$ ), 10-minute ( $p = 0.0004$  and  $p = 0.0003$ ), and 20-minute ( $p = 0.0222$  and  $p = 0.0093$ ) time block intervals, and only between phases A and B<sub>1</sub> at the 15-minute ( $p = 0.0290$ ) interval. There were no significant differences in the O-PDS adjusted mean scores between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.7201$  and  $p = 0.8219$ ) or 20-minute ( $p = 0.1302$  and  $p = 0.0523$ ) intervals, but statistically significant differences in the O-PDS adjusted mean scores were found between A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0044$  and  $p = 0.0035$ ) and 15-minute ( $p = 0.0242$  and  $p = 0.0478$ ) intervals, meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/ reversal) indicating lower PB. There was also a statistically significant increase in the O-PDS adjusted mean scores between phases A (baseline) and A' (control/reversal) at the 5-minute ( $p = 0.0166$ ) interval, meaning PB decreased when someone just sat with the subject. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) revealed that Subject #3 reverted back to baseline behavior. In summary, there was a trend for Subject #3 to demonstrate significantly decreased PB during the intervention period, particularly during phase B<sub>1</sub> (AAT).

#### ***Subject #4***

Subject #4 was an 84-year-old married white male, who had spent 0.25 years (3 months) in the nursing home. He had worked as a general contractor, had a twelfth grade education, and scored 15 on the MMSE. He scored 1 on the Charlson Comorbidity Index for having the diagnosis, dementia. He was prescribed the following psychoactive medications, Celexa ® (citalopram) 20 mg daily and Klonopin® (clonazepam) 1 mg daily in the morning and 0.5 mg at bedtime. His peak PB was observed to be between 0930 and 1000. Figure 4.4 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #4.



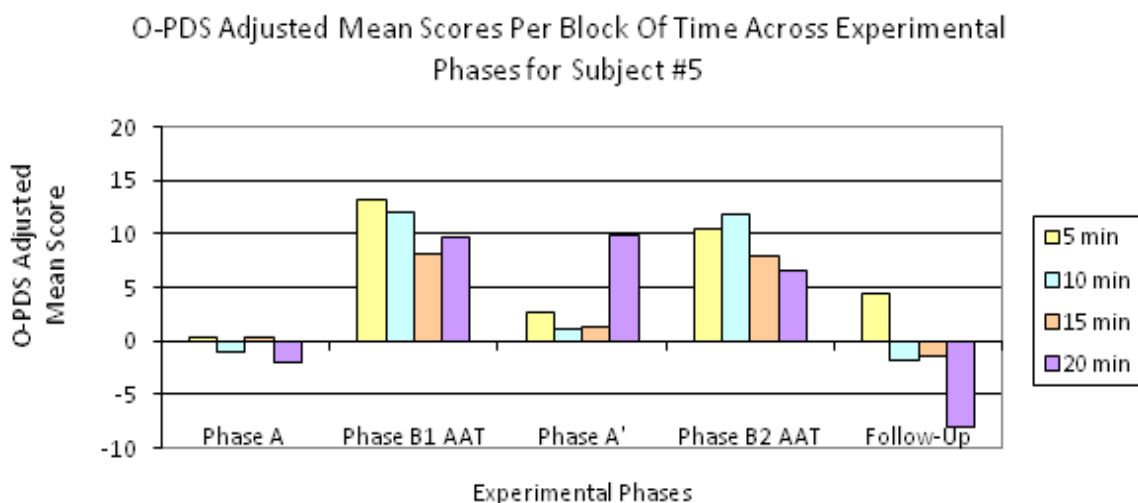


**Figure 4.4.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #4. Each 5-minute block of time can have a score ranging from -9 to 23.

As depicted above in Figure 4.4, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.0108$  and  $p = 0.0270$ ), 10-minute ( $p = 0.0153$  and  $p = 0.0051$ ), and 20-minute ( $p = 0.0004$  and  $p = 0.0008$ ) time block intervals, and only between Phases A and B<sub>1</sub> at the 15-minute ( $p = 0.0104$ ) interval. There were no significant differences in the O-PDS adjusted mean scores between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.1171$  and  $p = 0.3116$ ), 10-minute ( $p = 0.2564$  and  $p = 0.1045$ ), or 15-minute ( $p = 0.1356$  and  $p = 0.0962$ ) intervals, but a statistically significant difference in the O-PDS adjusted mean scores was found between A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 20-minute ( $p = 0.0255$  and  $p = 0.0461$ ) interval. There was also a statistically significant increase in the O-PDS adjusted mean scores between phases A (baseline) and A' (control/reversal) at the 20-minute ( $p = 0.0316$ ) interval, meaning PB decreased when someone just sat with the subject. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) revealed that Subject #3 reverted back to baseline behavior. In summary, there was a trend for Subject #4 to demonstrate significantly decreased PB during the first intervention phase, B<sub>1</sub> (AAT), only.

### Subject #5

Subject #5 was an 88-year-old married white male, who had spent 2.54 years in the nursing home. He had worked as a coal miner, had a twelfth grade education, and scored 10 on the MMSE. He scored 2 on the Charlson Comorbidity Index for having the diagnoses, dementia and chronic obstructive pulmonary disease (COPD). He was prescribed the following psychoactive medication, Zoloft ® (sertraline) 100 mg daily. His peak PB was observed to be between 1230 and 1300. Figure 4.5 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #5.



**Figure 4.5.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #5. Each 5-minute block of time can have a score ranging from -9 to 23.

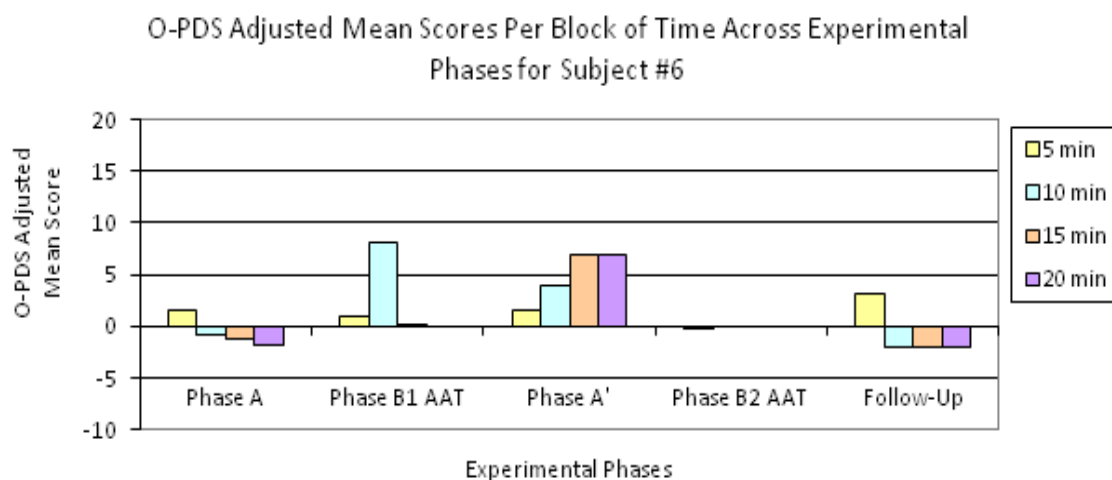
As depicted above in Figure 4.5, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0014$  and  $p = 0.0020$ ) interval and between phases A and B<sub>1</sub> at the 5-minute ( $p = 0.0271$ ) interval. There were no significant differences in the O-PDS adjusted mean scores between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 15-minute ( $p = 0.1228$  and  $p = 0.1636$ ) or 20-minute ( $p = 1.000$  and  $p = 0.9844$ ) intervals, but statistically significant differences were found between phases A'

(control/ reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute ( $p = 0.0030$  and  $p = 0.0037$ ) interval and between phases A' (control/reversal) and B<sub>1</sub> (AAT) at the 5-minute ( $p = 0.0467$ ) interval. A visual inspection of the data appear to show a considerable difference in scores between phases A and B<sub>2</sub> at the 5 minute interval, but this did not reach significance ( $p = 0.0731$ ). Similarly, the data appear to show a considerable difference in scores between phase A and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 15 minute interval, but the differences did not reach significance ( $p = 0.0725$  and  $p = 0.1026$ ). A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) revealed that Subject #5 reverted back to baseline behavior. In summary, the data for Subject #5 reveals variability among and between the phases, while the bar graph (Figure 4.5) appears to show a strong trend, it was not supported by statistical analyses.

### ***Subject #6***

Subject #6 was an 87-year-old single white female, who had spent 2.38 years in the nursing home. She had worked as a store clerk, had a twelfth grade education, and scored 14 on the MMSE. She scored 1 on the Charlson Comorbidity Index for having the diagnosis, dementia. She was prescribed the following psychoactive medications, Remeron ® (mirtazapine) 15 mg bedtime and Klonopin ® (clonazepam) 0.25 mg twice a day (morning and bedtime). Her peak PB was determined to be between 1030 and 1100. Figure 4.6 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #6.

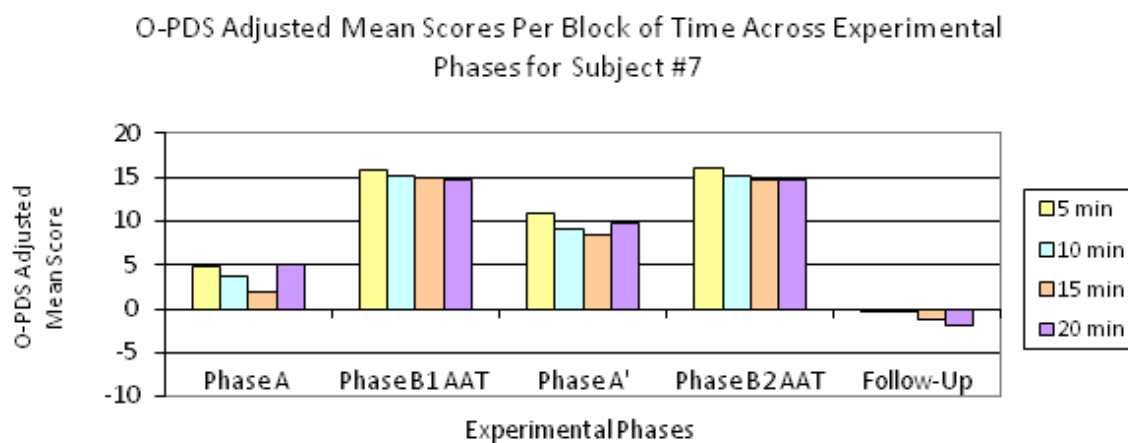
As depicted in Figure 4.6 below, pairwise comparisons using  $t$  test analysis revealed no significant change from phase to phase, except between phases A (baseline) and A' (control/reversal) at the 15 minute ( $p = 0.0233$ ) interval, meaning PB decreased when someone just sat with the subject. The data for Subject #6 are difficult to analyze, because, during data collection, the subject asked the researcher to stop/leave approximately 5 minutes into 21 out of 24 sessions (88%) of the B<sub>1</sub>-A'-B<sub>2</sub> phases of the study. Subject #6 demonstrated treatment failure.



**Figure 4.6.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #6. Each 5-minute block of time can have a score ranging from -9 to 23.

### Subject #7

Subject #7 was an 89-year-old widowed white female, who had spent 1.92 years in the nursing home. She was a housewife, had a twelfth grade education, and scored 10 on the MMSE. She scored 1 on the Charlson Comorbidity Index for having the diagnosis, dementia. She was not prescribed any psychoactive medications. Her peak PB was observed to be between 0900 and 0930. Figure 4.7 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases for Subject #7.



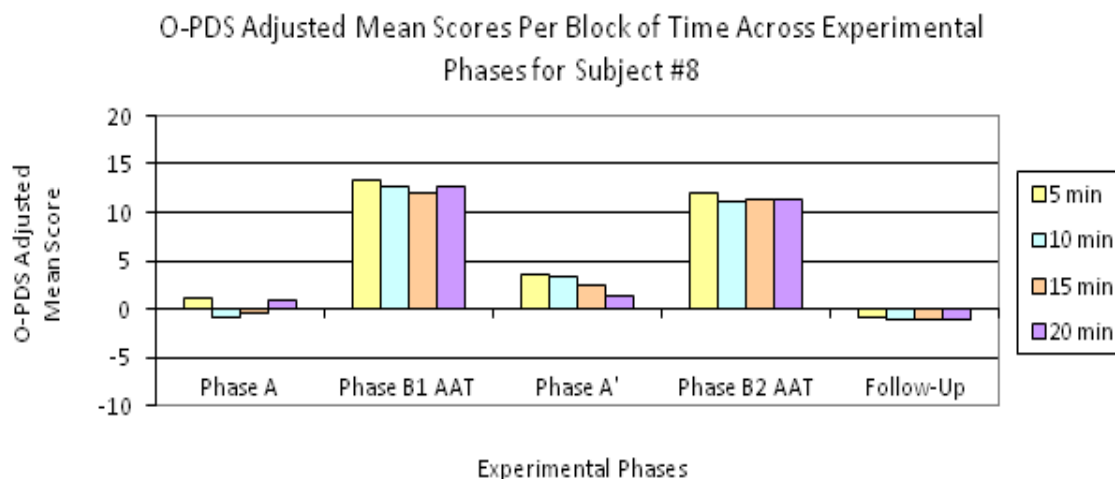
**Figure 4.7.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #7. Each 5-minute block of time can have a score ranging from -9 to 23.

As depicted above in Figure 4.7, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p < 0.0001$  and  $p < 0.0001$ ), 10-minute ( $p < 0.0001$  and  $p < 0.0001$ ), 15-minute ( $p < 0.0001$  and  $p < 0.0001$ ), and 20-minute ( $p = 0.0003$  and  $p = 0.0003$ ) time block intervals. Statistically significant differences in the O-PDS adjusted mean scores were also found between phase A' (control/ reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p = 0.0009$  and  $p = 0.0007$ ), 10-minute ( $p = 0.0015$  and  $p = 0.0026$ ), 15-minute ( $p = 0.0025$  and  $p = 0.0028$ ), and 20-minute ( $p = 0.0338$  and  $p = 0.0347$ ) intervals, meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/reversal) indicating lower PB. Furthermore, a statistically significant increase in the O-PDS adjusted mean scores was found between phases A (baseline) and A' (control/ reversal) at the 5-minute ( $p = 0.0001$ ), 10-minute ( $p = 0.0033$ ), 15-minute ( $p = 0.0014$ ), and 20-minute ( $p = 0.0434$ ) intervals, meaning PB decreased when someone just sat with the subject. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) when compared to the AAT phases (B<sub>1</sub> and B<sub>2</sub>) revealed an increase in PB (lower scores). In summary, there was a consistent trend for Subject #7 to demonstrate significantly decreased PB during the intervention period, phases B<sub>1</sub> and B<sub>2</sub> (AAT), as well as during phase A' control/reversal phase).

### ***Subject #8***

Subject #8 was an 86-year-old widowed white female, who had spent 1.53 years in the nursing home. She was a housewife, had a twelfth grade education, and scored 14 on the MMSE. She scored 3 on the Charlson Comorbidity Index for having the diagnoses, dementia, CHF, and COPD. She was prescribed the following psychoactive medications, Remeron® (mirtazapine) 15 mg bedtime and Depakote sprinkles® (valproic acid) 500 mg twice a day (morning and bedtime). Her peak PB was observed to be between 1330 and 1400. Figure 4.8 illustrates the O-PDS adjusted mean scores at the 5-minute, 10-minute, 15-minute, and 20-minute time block

intervals across the experimental phases for Subject #8.

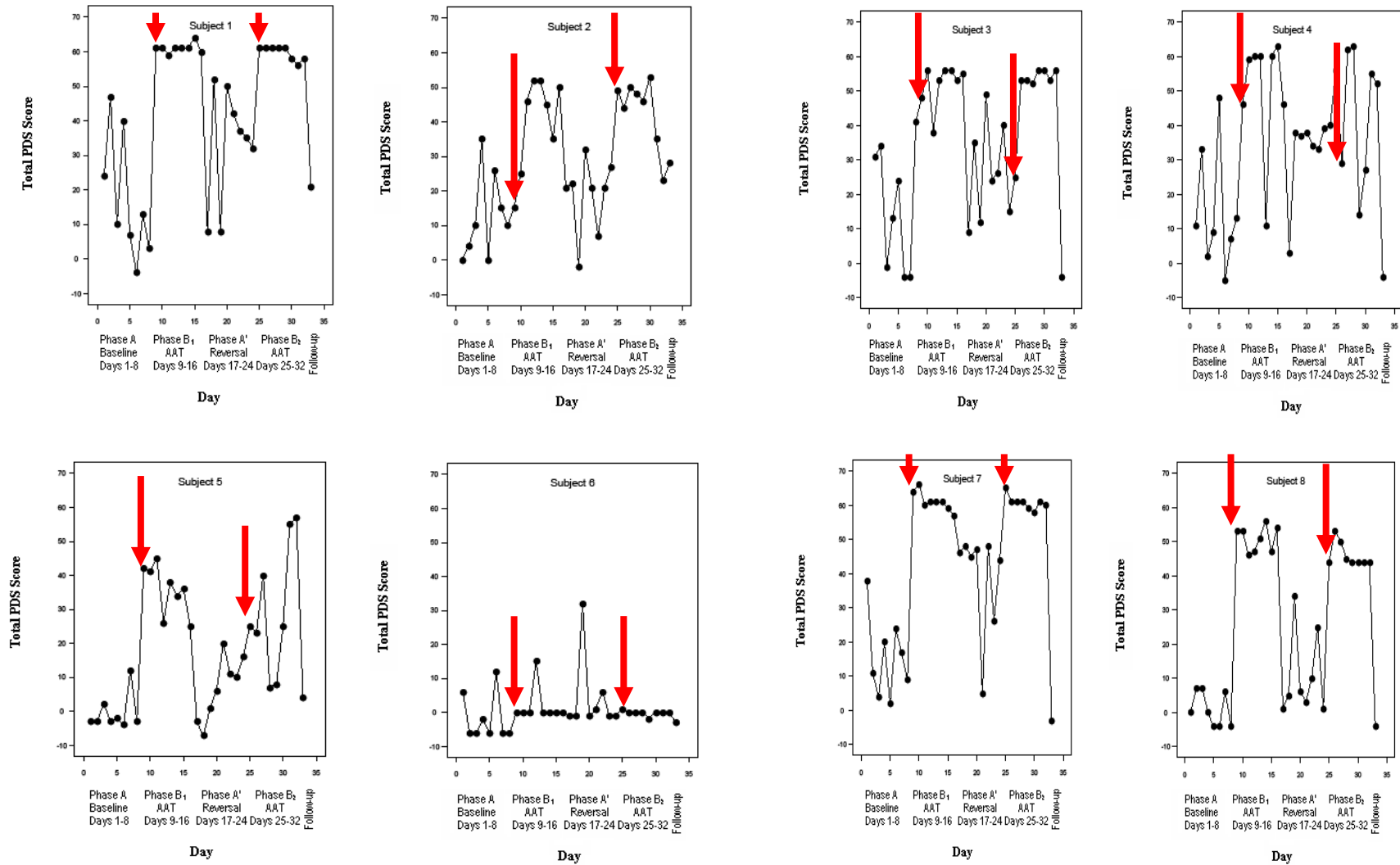


**Figure 4.8.** O-PDS adjusted mean scores per block of time across experimental phases for Subject #8. Each 5-minute block of time can have a score ranging from -9 to 23.

As depicted above in Figure 4.8, pairwise comparisons using *t* test analysis revealed a statistically significant increase in the O-PDS adjusted mean scores between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p < 0.0001$  and  $p < 0.0001$ ), 10-minute ( $p < 0.0001$  and  $p < 0.0001$ ), 15-minute ( $p < 0.0001$  and  $p < 0.0001$ ), and 20-minute ( $p < 0.0001$  and  $p < 0.0001$ ) time block intervals. Statistically significant differences in the O-PDS adjusted mean scores were also found between A' and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 5-minute ( $p < 0.0001$  and  $p < 0.0001$ ), 10-minute ( $p = 0.0001$  and  $p = 0.0005$ ), 15-minute ( $p < 0.0001$  and  $p < 0.0001$ ), and 20-minute ( $p < 0.0001$  and  $p < 0.0001$ ) intervals, meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/reversal) indicating lower PB. There was also a statistically significant increase in the O-PDS adjusted mean scores between phases A (baseline) and A' (control/reversal) at the 10-minute ( $p = 0.0479$ ) interval. A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) when compared to the AAT phases (B<sub>1</sub> and B<sub>2</sub>) revealed an increase in PB (lower scores). In summary, there was a consistent trend for Subject #8 to demonstrate significantly decreased PB during the intervention period, phases B<sub>1</sub> and B<sub>2</sub> (AAT).

In summary, Figure 4-9 below displays each subject's daily O-PDS scores across the study's experimental phases. As can be seen in Figure 4.9, a specific and consistent pattern of change in PB is demonstrated during AAT (phases B<sub>1</sub> and B<sub>2</sub>) for 7 of the 8 subjects.

### Daily O-PDS Scores Per Subject Across Experimental Phases



**Figure 4.9.** Daily O-PDS scores per subject across experimental phases. Red arrows indicate the commencement of AAT (phases B<sub>1</sub> and B<sub>2</sub>).

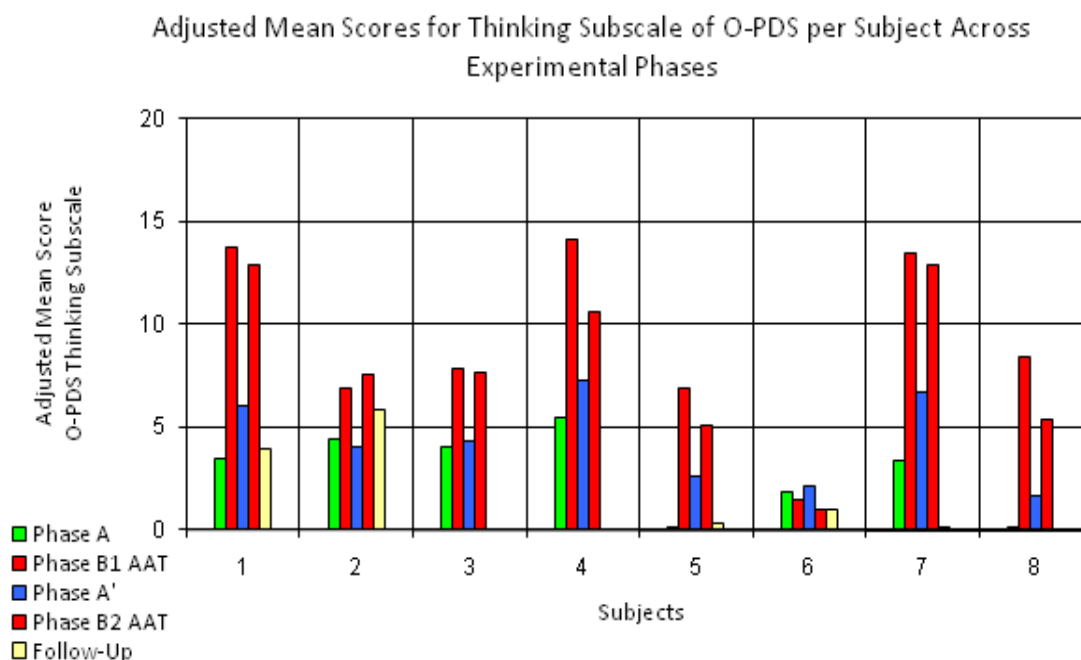


### Single-Subject Analyses for O-PDS Subscales and Total O-PDS

Pairwise  $t$  test comparisons were performed on the adjusted mean scores of the O-PDS five subscales and Total O-PDS across the experimental phases. The five O-PDS subscales include: thinking, emotions, interacting with the environment, interacting with people, and activities.

#### *Thinking Subscale of O-PDS*

The *Thinking* subscale of the O-PDS includes such items as: takes initiative, relies on self, is conscientious, expresses his/her thoughts through speech, and is intellectually curious. All items are scored in the positive, and the score for the *Thinking* subscale can range from 0 to 20. Figure 4.10 illustrates each subject's adjusted mean scores for the *Thinking* subscale of the O-PDS across the experimental phases.



**Figure 4.10.** Adjusted mean scores for *Thinking* subscale of O-PDS per subject across experimental phases.

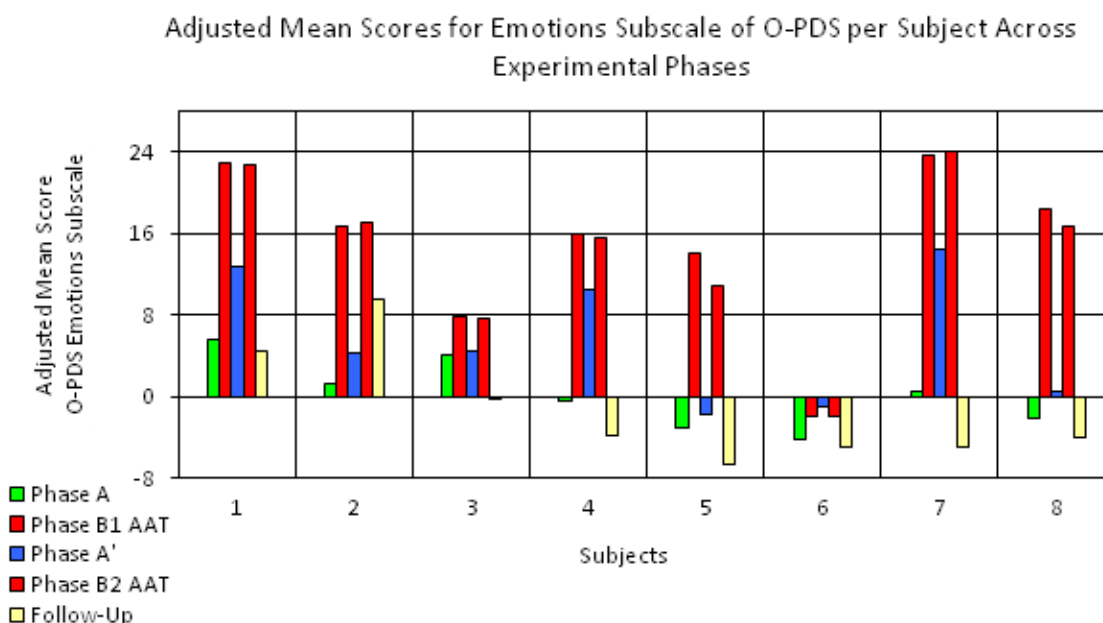
As depicted above in Figure 4.10, there was a consistent trend for the adjusted mean scores of the *Thinking* subscale to increase across all subjects, except Subject #6. Pairwise

comparisons using *t* test analysis revealed Subject #4 demonstrated a statistically significant increase in *Thinking* scores between phases A (baseline) and B<sub>1</sub> only ( $p = 0.0144$ ), while three subjects (#1, #7, and #8) demonstrated a statistically significant increase in the adjusted mean scores of the *Thinking* subscale between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p < 0.0001$  and  $p = 0.0002$ ;  $p = 0.0032$  and  $p = 0.0041$ ; and  $p < 0.0001$  and  $p = 0.0029$  respectively). The same three subjects (#1, #7, and #8) demonstrated a statistically significant difference in adjusted mean scores of the *Thinking* subscale between phase A' (control/ reversal) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p = 0.0009$  and  $p = 0.0021$ ;  $p = 0.0185$  and  $p = 0.0267$ ; and  $p = 0.0004$  and  $p = 0.0320$  respectively), meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/reversal) indicating lower PB.

### ***Emotions Subscale of O-PDS***

The *Emotions* subscale of the O-PDS includes such items as: has an unchanging facial expression (-), smiles if prompted or on his/her own, shows feeling in his/her voice, is enthusiastic, is affectionate, has dull emotions (-), endures unpleasant situations rather than protesting (-), gets angry, and uses gestures to express feelings. Three items in this subscale are scored in the negative, as indicated by a (-) after the items. The score for the *Emotions* subscale can range from -12 to 28. Figure 4.11 illustrates each subject's adjusted mean scores for the *Emotions* subscale of the O-PDS across the experimental phases.

As depicted below in Figure 4.11, with the exception of Subject #6, there was a consistent trend for the adjusted mean scores of the *Emotions* subscale to increase during phases B<sub>1</sub> and B<sub>2</sub> (AAT). Pairwise comparisons using *t* test analysis revealed the remaining seven subjects demonstrated a statistically significant increase in the adjusted mean scores of the *Emotions* subscale between phase A (baseline) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases, ( $p$  ranged from  $< 0.0001$  to  $0.0389$ ), indicating less PB during both AAT phases. Similarly, with the exception of Subjects #4 and #6, the remaining six subjects demonstrated a statistically significant difference

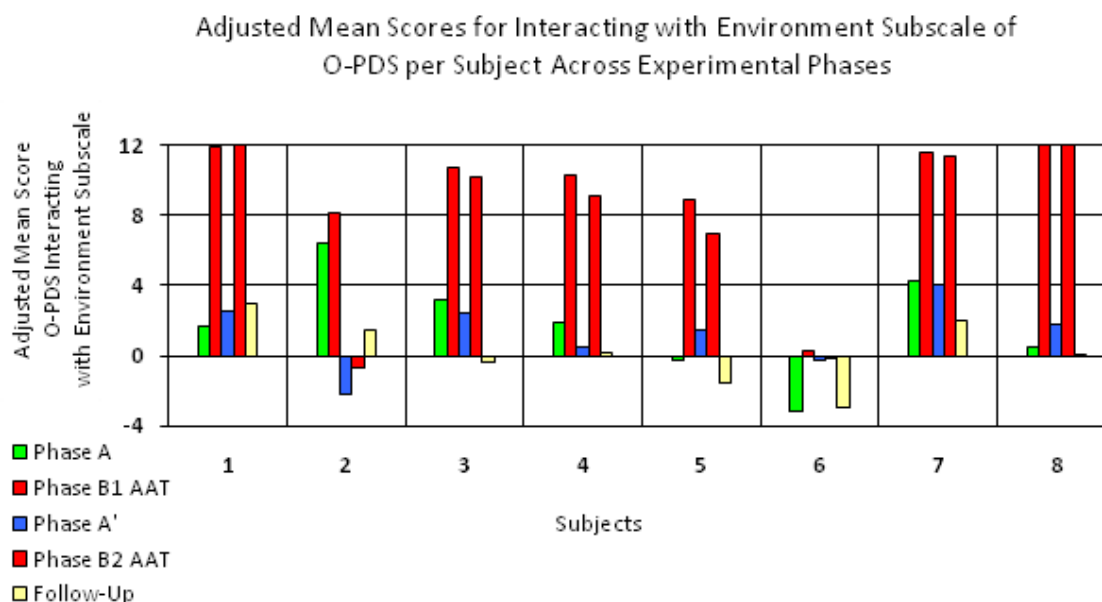


**Figure 4.11.** Adjusted mean scores for *Emotions* subscale of O-PDS per subject across experimental phases.

in the adjusted mean scores of the *Emotions* subscale between A' (control/reversal) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases, with  $p$  ranging from  $< 0.0001$  to  $0.0458$ , thus indicating that the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/reversal) indicating lower PB. Four subjects (#3, #4, #6, and #7) also demonstrated a statistically significant increase in the adjusted mean scores of the *Emotions* subscale between phases A (baseline) and A' (control/reversal), with  $p = 0.0135$ ,  $p = 0.0415$ ,  $p = 0.0127$ , and  $p < 0.0001$  respectively, indicating demonstration of positive emotions just sitting with someone.

#### ***Interacting with Environment Subscale of O-PDS***

The *Interacting with Environment* subscale of the O-PDS includes such items as: influenced by the environment, interacts with surroundings, avoids stimulating surroundings (-), and tries different activities. One item in this subscale is scored in the negative, as indicated by a (-) after the item. The score for the *Interacting with Environment* subscale can range from -4 to 12. Figure 4.12 illustrates the each subject's adjusted mean scores for the *Interacting with Environment* subscale of the O-PDS across the experimental phases.



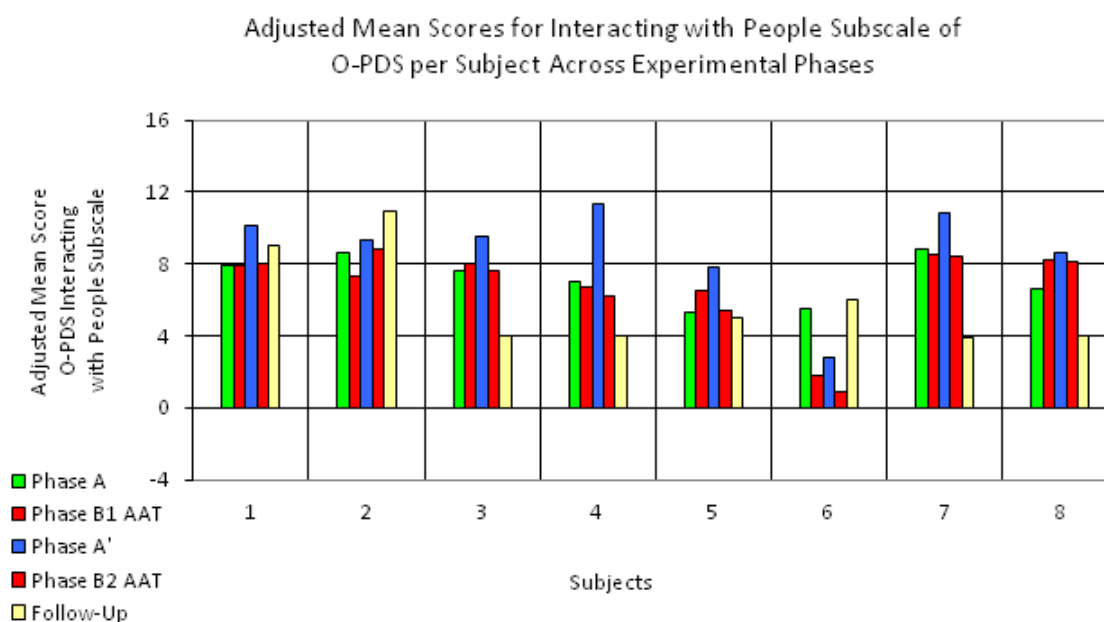
**Figure 4.12.** Adjusted mean scores for *Interacting with Environment* subscale of O-PDS per subject across experimental phases.

As depicted above in Figure 4.12, with the exception of Subjects #2 and #6, there was a consistent trend for the adjusted mean scores of the *Interacting with Environment* subscale to increase during phases B<sub>1</sub> and B<sub>2</sub> (AAT). Pairwise comparisons using *t* test analysis revealed five subjects (#1, #4, #5, #7, and #8) demonstrated a statistically significant increase in the adjusted mean scores of the *Interacting with Environment* subscale between phase A (baseline) and B<sub>1</sub> and B<sub>2</sub>, (AAT) phases, indicating less PB during AAT (*p* ranged from < 0.0001 to 0.0382). Subject #3 demonstrated a statistically significant increase (*p* = 0.0442) in the adjusted mean scores of the *Interacting with Environment* between phases A (baseline) and B<sub>1</sub> only. Similarly, five subjects (#1, #3, #4, #7, and #8) demonstrated a statistically significant difference in the adjusted mean scores of the *Interacting with Environment* subscale between phase A' (control/reversal) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases, with *p* ranging from < 0.0001 to 0.0388, thus indicating that the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' (control/reversal) indicating lower PB. Subject #5 demonstrated a statistically significant difference (*p* = 0.0154) in the adjusted mean scores of the *Interacting with Environment* subscale

between phases A' and B<sub>1</sub> only. Only Subject #6 demonstrated a statistically significant increase ( $p < 0.0001$ ) in the adjusted mean scores of the *Interacting with Environment* subscale between phases A (baseline) and A' (control/reversal). Subject #2 demonstrated no statistically significant difference in the adjusted mean scores of the *Interaction with Environment* subscale.

### ***Interacting with People Subscale of O-PDS***

The *Interacting with People* subscale of the O-PDS includes such items as: spends time with friends, staff, and others, makes eye contact with others, is generous, is responsive to others, is interested in others, is involved with others, withdraws from others (-), prefers being alone (-), and is submissive to others (-). Three items in this subscale are scored in the negative, as indicated by a (-) after the items. The score for the *Interacting with People* subscale can range from -12 to 36. Figure 4.13 illustrates each subject's adjusted mean scores for the *Interacting with People* subscale of the O-PDS across the experimental phases.



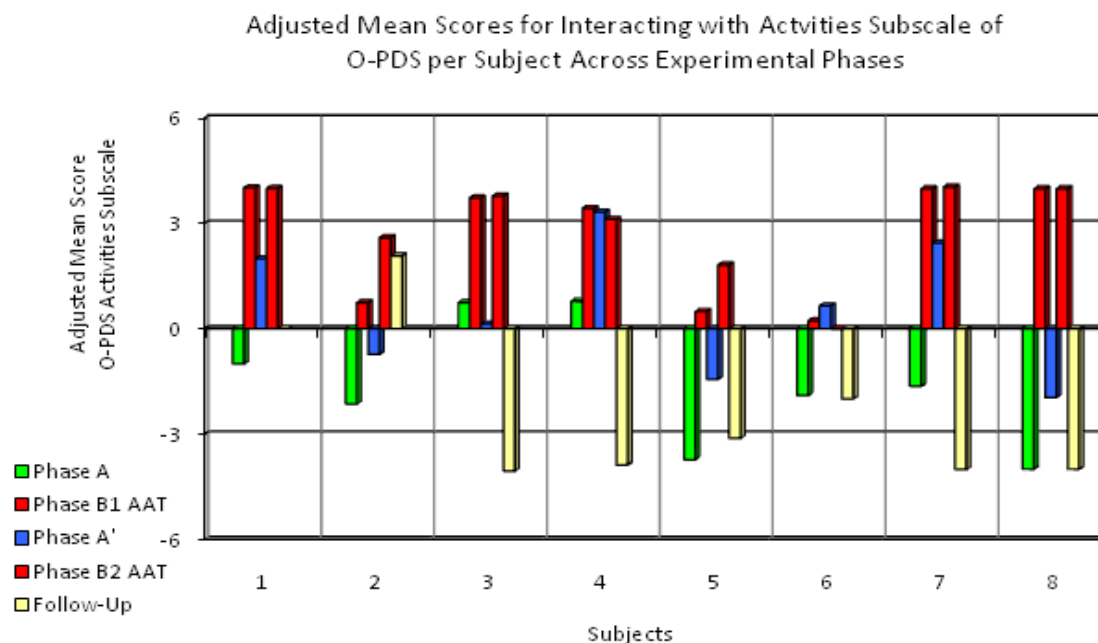
**Figure 4.13.** Adjusted mean score for *Interacting with People* subscale of O-PDS per subject across experimental phases.

As depicted above in Figure 4.13, the trend for the adjusted mean scores of the *Interacting with People* subscale remained consistent for all subjects across the experimental phases. Only Subject #6 demonstrated a statistically significant increase in the adjusted mean

scores of the *Interacting with People* subscale between phase A (baseline) and B<sub>1</sub> and B<sub>2</sub>, (AAT) phases ( $p = 0.0312$  and  $p = 0.0078$ ). Two subjects (#1 and #4) demonstrated a statistically significant difference in the adjusted mean scores of the *Interacting with People* subscale between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p = 0.0273$  and  $p = 0.0410$ ; and  $p = 0.0062$  and  $p = 0.0030$ , respectively). Subjects # 1 and #4 also demonstrated a statistically significant increase in the adjusted mean scores of the *Interacting with People* subscale between phases A (baseline) and A' (control/reversal), with  $p = 0.0249$  and  $p = 0.0088$ , respectively.

### ***Activities Subscale of O-PDS***

The *Activities* subscale of the O-PDS includes such items as: maintains positions quietly and does nothing (-), participates in routine daily activities, performs activities slowly (-), and looks for things to do. Two items in this subscale are scored in the negative, as indicated by a (-) after the items. The score for the *Activities* subscale can range from -8 to 8. Figure 4.14 illustrates the mean sum scores for the *Interacting with People* subscale of the O-PDS for each subject across all experimental phases.



**Figure 4.14.** Adjusted mean score for *Activities* subscale of O-PDS per subject across experimental phases.

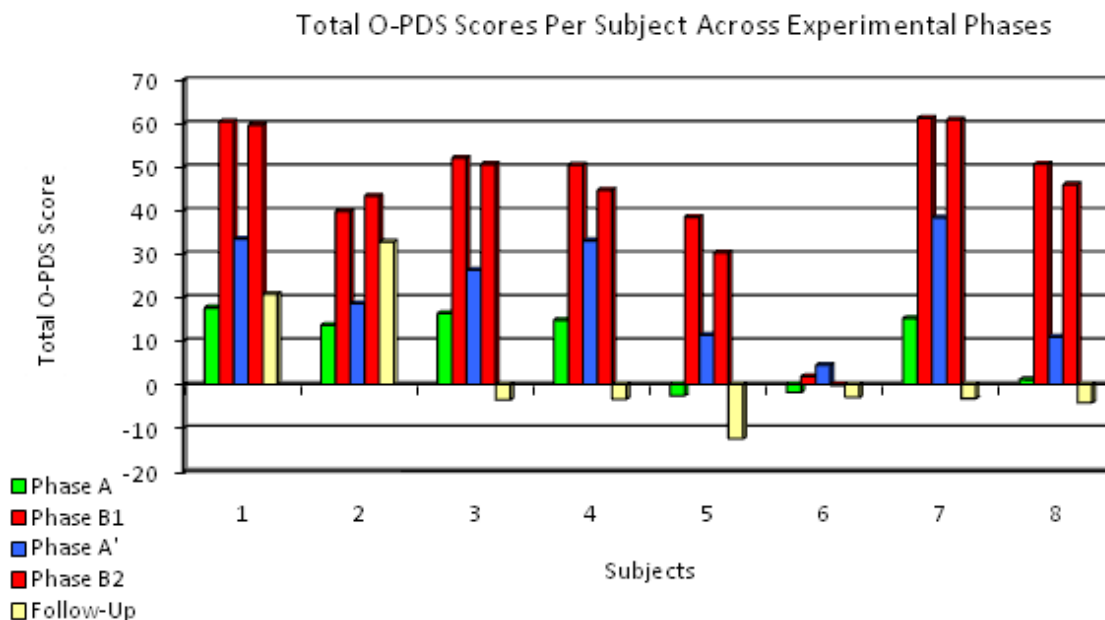
As depicted above in Figure 4.14, the adjusted mean scores of the *Activities* subscale shows the most variability in scores between subjects and across the experimental phases. Four subjects (#1, #6, #7, and #8) demonstrated a statistically significant increase in the adjusted mean scores of the *Activities* subscale between phase A (baseline) and B<sub>1</sub> and B<sub>2</sub>, (AAT) phases, indicating less PB during AAT ( $p$  ranged from  $< 0.0001$  to  $0.0382$ ). Two subjects (#2 and #5) demonstrated a statistically significant increase in the adjusted mean scores of the *Activities* subscale between phases A (baseline) and B<sub>2</sub> (AAT) only ( $p = 0.0066$  and  $p = 0.0438$  respectively). One subject (#8) demonstrated a statistically significant difference in the adjusted mean scores of the *Activities* subscale between phase A' (control/reversal) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p < 0.0001$  for both) and another subject (#2) between phases A' and B<sub>2</sub> ( $p = 0.0438$ ) only, meaning the scores during the B<sub>1</sub> and/or B<sub>2</sub> (AAT) phases were significantly higher than during the phase A' indicating lower PB. Two subjects (#6 and #7) demonstrated a statistically significant increase in the adjusted mean scores of the *Activities* subscale between phases A (baseline) and A' (control/reversal), with  $p = 0.0007$  and  $p = 0.0108$  respectively. Subjects #3 and #4 demonstrated no statistically significant difference in the adjusted mean scores of the *Activities* subscale.

### **Total O-PDS**

A Total O-PDS score was calculated for each subject across the experimental phases by adding the adjusted mean scores of the O-PDS 5 subscales, as seen in Figure 4.15. The Total O-PDS score can range from -36 to 104, with lower scores indicating greater PB.

As depicted above in Figure 4.15, with the exception of Subject #6, there was a consistent trend for the Total O-PDS scores to increase during phases B<sub>1</sub> and B<sub>2</sub> (AAT). Six subjects (#1, #2, #3, #4, #7, and #8) demonstrated a statistically significant increase in Total O-PDS scores between phase A (baseline) and B<sub>1</sub> and B<sub>2</sub>, (AAT) phases, with  $p$  ranging from  $< 0.0001$  to  $0.0430$  indicating less PB during AAT. Subject #5 demonstrated a statistically significant

increase ( $p = 0.0084$ ) in the Total O-PDS scores between phases A (baseline) and B<sub>1</sub> only. Similarly, four subjects (#1, #3, #7, and #8) demonstrated a statistically significant difference in the Total O-PDS scores between phase A' (control/ reversal) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases, with  $p$  ranging from  $< 0.0001$  to  $0.0145$ , thus indicating that the scores were significantly higher during phases B<sub>1</sub> and B<sub>2</sub> (AAT) than during phase A', indicating lower PB. Only Subject #7 demonstrated a statistically significant increase ( $p = 0.0004$ ) in the Total O-PDS scores between phases A (baseline) and A' (control/reversal), meaning PB decreased when someone just sat with the subject. Subject #6 failed to demonstrate any statistically significant difference in Total O-PDS scores across the experimental phases.



**Figure 4.15.** Total O-PDS scores per subject across experimental phases.

### Pooled Analyses

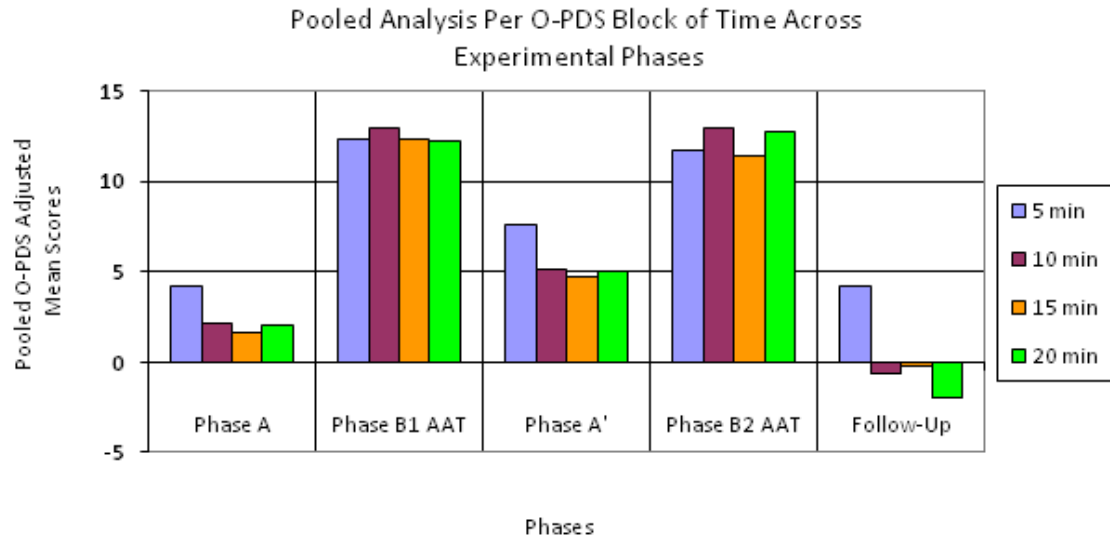
Pairwise comparisons were computed using the  $t$  tests based on maximum likelihood estimates from the RM ANCOVA. Three covariates were used: years of stay in the nursing home, MMSE score, and Cornell Scale for Depression in Dementia score. An attempt was made to include three other covariates: age, number of psychoactive medications, and Charleson Comorbidity Index, but these variables did not vary much across the 8 subjects, thus the statistical



algorithm did not converge. Maximum observations per participant totaled 33.

### *Pooled Analysis for O-PDS Blocks of Time*

Figure 4.16 below illustrates the pooled adjusted mean scores of the O-PDS at the 5-minute, 10-minute, 15-minute, and 20-minute time block intervals across the experimental phases.



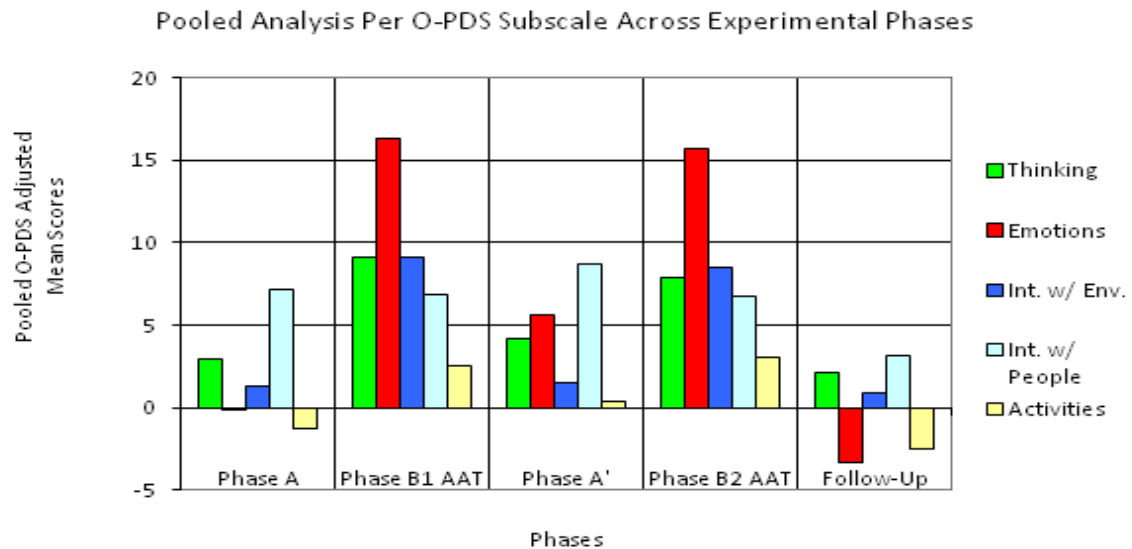
**Figure 4.16.** Pooled analysis per O-PDS block of time across experimental phase. Each 5-minute block of time can have a score ranging from -9 to 23.

As depicted above in Figure 4.16, a statistically significant increase in the pooled adjusted mean scores was found between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases at all blocks of time, with  $p$  ranging from  $< 0.0001$  to  $0.0158$ , 95% CIs [LL ranged from  $-14.06$  to  $-12.20$  and UL ranged from  $-1.41$  to  $8.69$ ]. Statistically significant differences in the pooled adjusted mean scores were also found between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases at the 10-minute, 15-minute, and 20-minute blocks of time, with  $p$  ranging from  $< 0.0001$  to  $0.0001$ , 95% CIs [LL ranged from  $-10.63$  to  $5.50$  and UL ranged from  $-5.75$  to  $10.23$ ]. In addition, there was a statistically significant increase in the pooled adjusted mean scores between phases A (baseline) and A' (control/reversal) at the 10-minute and 15-minute intervals only ( $p = 0.0241$ , 95% CI  $[-5.61, -0.30]$  and  $p = 0.0098$ , 95% CI  $[-5.60, -0.63]$ , respectively). The solution for fixed effects and type 3 tests of fixed effects for this analysis can be found in

Appendix Q. The findings from this analysis support this study's hypothesis.

### *Pooled Analysis for O-PDS Subscales*

Figure 4.17 below illustrates the pooled adjusted mean scores across the experimental phase for each of the O-PDS subscales.

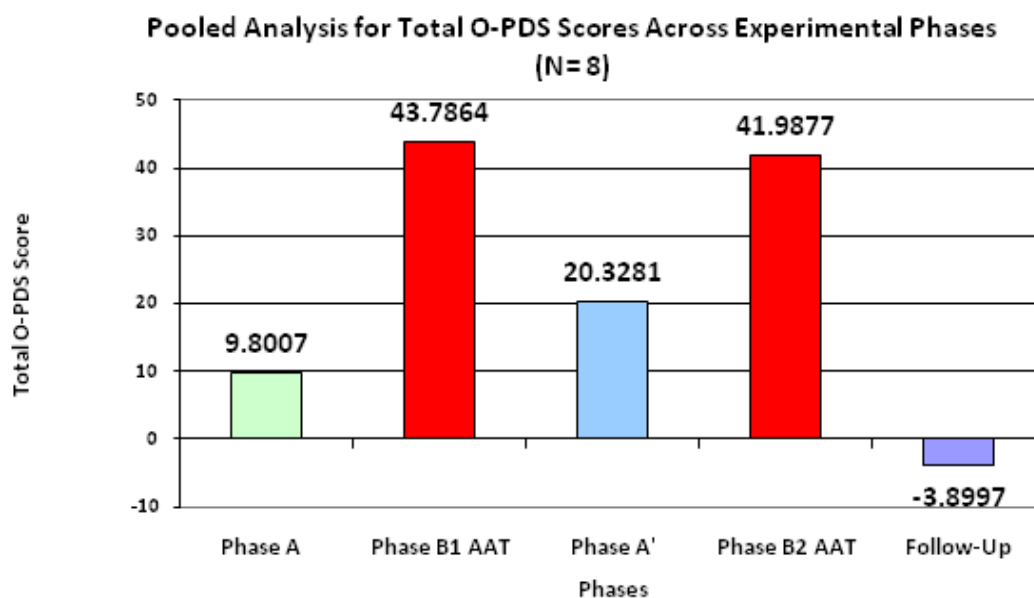


**Figure 4.17.** Pooled analysis per O-PDS subscale across experimental phases.

As depicted above in Figure 4.17, a statistically significant increase in the pooled adjusted mean scores was found between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases for all subscales ( $p$  ranged from  $< 0.0001$  to  $0.0239$ , 95% CIs [LL ranged from  $-21.29$  to  $-7.21$  and UL ranged from  $-10.92$  to  $-0.47$ ]), except the *Interacting with People* subscale ( $p = 0.9760$ , 95% CI  $[-1.55, 2.19]$  and  $p = 0.9730$ , 95% CI  $[-1.62, 2.31]$ ). Statistically significant differences in the pooled adjusted mean scores were found between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases for the *Thinking*, *Emotions*, and *Interacting with Environment* subscales ( $p$  ranged from  $< 0.0001$  to  $0.0240$ , 95% CIs [LL ranged from  $-15.88$  to  $4.93$  and UL ranged from  $-4.33$  to  $15.95$ ]). In addition, there was a statistically significant increase in pooled mean sum of scores between phases A (baseline) and A' (control/reversal) for the *Emotions* subscale only ( $p = 0.0191$ , 95% CI  $[-10.63, -0.77]$ ). The solution for fixed effects and type 3 tests of fixed effects for this analysis can be found in Appendix R.

*Pooled Analysis for Total O-PDS*

Figure 4.18 below illustrates the pooled analysis for the Total O-PDS adjusted mean scores across the experimental phases.



**Figure 4.18.** Pooled analysis for Total O-PDS scores across experimental phases. The Total O-PDS score can range from -36 to 104, with lower scores indicating greater PB.

As depicted above in Figure 4.18, a statistically significant increase in the Total O-PDS adjusted mean scores was found between phase A (baseline) and both B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p < 0.0001$ , 95% CI [-48.36, -19.61 and  $p = 0.0001$ , 95% CI [-46.80, -17.57], respectively), meaning PB was significantly reduced during AAT. Statistically significant differences in Total O-PDS adjusted mean scores were found between phase A' (control/reversal) and B<sub>1</sub> and B<sub>2</sub> (AAT) phases ( $p = 0.0009$ , 95% CI [10.09, 36.83] and  $p = 0.0026$ , 95% CI [-35.70, -7.61], respectively), meaning the scores during the B<sub>1</sub> and B<sub>2</sub> (AAT) phases were significantly higher than during phase A' indicating lower PB. A visual inspection of the comparison between phases A (baseline) and A' (control/reversal) reveals an increase in scores, however this did not reach significance ( $p = 0.1281$ , 95% CI [-23.32, 2.26]). A visual inspection of the follow-up phase (1-week post phase B<sub>2</sub>) revealed that the scores reverted back to baseline. The solution for fixed

effects and type 3 tests of fixed effects for this analysis can be found in Appendix S. In summary, the findings from this analysis support this study's hypothesis.

### **Pearson Product-Moment Correlations**

Pearson product-moment correlation coefficients were computed for the O-PDS blocks of time, O-PDS subscales, and Total O-PDS (see Table 4.1). As depicted below in Table 4.1, strong positive correlations were found between the all the O-PDS blocks of time and the *Thinking*, *Emotions*, *Interacting with Environment*, and *Activities* subscales of the O-PDS, as well as the Total O-PDS, with  $r$  ranging from 0.70 to 0.97. Weak positive correlations were found between the *Interacting with People* subscale of the O-PDS and the *Thinking*, *Emotions*, and *Activities* subscales, all O-PDS block of time, and the Total O-PDS, with  $r$  ranging from 0.21 to 0.33. There was no correlation found between the O-PDS subscales *Interacting with the Environment* and *Interacting with People* ( $r = 0.01$ ;  $p = 0.92$ ).

**Table 4.1***Correlations and Coefficient Alphas for O-PDS Blocks of Time, O-PDS Subscales, and Total O-PDS*

Pearson Partial Correlation Coefficients Prob >  r  under H0: Partial Rho=0 N = 222										
	Sum @ 5-min	Sum @ 10-min	Sum @ 15-min	Sum @ 20-min	Thinking	Emotions	Interact with Environment	Interact with People	Activities	Total O-PDS
<b>Sum @ 5-min</b>	--									
<b>Sum @ 10-min</b>	0.81 <0.0001*	--								
<b>Sum @ 15-min</b>	0.78 <0.0001*	0.85 <0.0001*	--							
<b>Sum @ 20-min</b>	0.70 <0.0001*	0.78 <0.0001*	0.84 <0.0001*	--						
<b>Thinking</b>	0.82 <0.0001*	0.85 <0.0001*	0.86 <0.0001*	0.83 <0.0001*	--					
<b>Emotions</b>	0.86 <0.0001*	0.91 <0.0001*	0.92 <0.0001*	0.88 <0.0001*	0.83 <0.0001*	--				
<b>Interact w/ Env.</b>	0.79 <0.0001*	0.86 <0.0001*	0.86 <0.0001*	0.81 <0.0001*	0.83 <0.0001*	0.86 <0.0001*	--			
<b>Interact w/ Peo.</b>	0.32 <0.0001*	0.29 <0.0001*	0.29 <0.0001*	0.31 <0.0001*	0.21 0.0020*	0.29 <0.0001*	0.01 0.9200	--		
<b>Activities</b>	0.80 <0.0001*	0.84 <0.0001*	0.86 <0.0001*	0.79 <0.0001*	0.83 <0.0001*	0.81 <0.0001*	0.75 <0.0001*	0.41 <0.0001*	--	
<b>Total O-PDS</b>	0.89 <0.0001*	0.94 <0.0001*	0.95 <0.0001*	0.90 <0.0001*	0.91 <0.0001*	0.97 <0.0001*	0.90 <0.0001*	0.33 <0.0001*	0.90 <0.0001*	--

Note. \*. Correlation is significant at the 0.05 level.

Pearson product-moment correlation coefficients were computed for the following covariates: age, years of stay in the nursing home, cognitive impairment (MMSE score), depression (CSDD score), number of psychoactive medications, and Charleson Comorbidity Index. As depicted below in Table 4.2, the only statistically significant finding from this analysis was the positive correlation found between cognitive impairment, as measured by the MMSE, and the number of psychoactive medications one takes on a daily basis ( $r = 0.75$ ,  $p = 0.03$ , 95% CI [0.04, 0.95]).

**Table 4.2**

*Correlations and Coefficient Alphas for Covariates*

Pearson Correlation Coefficients Prob >  r  under H0: Rho=0; N = 8						
	Age	Years of Stay	MMSE	CSDD	Psychoactive Meds	Charleson Comorbidity Index
<b>Age</b>	--					
<b>Years of Stay</b>	0.21 0.62	--				
<b>MMSE</b>	- 0.22 0.61	-0.51 0.19	--			
<b>CSDD</b>	0.25 0.55	-0.03 0.94	0.47 0.24	--		
<b>Psychoactive Medications</b>	- 0.25 0.55	-0.21 0.61	0.75 *0.03	0.16 0.70	--	
<b>Charleson Comorbidity Index</b>	0.31 0.45	0.17 0.68	0.04 0.93	0.16 0.70	0.29 0.49	--

Note. \*. Correlation is significant at the 0.05 level.

Pearson product-moment correlation coefficients were also computed for the 6 covariates: age, years of stay in nursing home, MMSE, CSDD, psychoactive medications, and Charleson Comorbidity Index, and the O-PDS blocks of time, O-PDS subscales, and Total O-PDS (see Table 4.3).

**Table 4.3**

*Correlations and Coefficient Alphas for Covariates and O-PDS Blocks of Time, O-PDS Subscales, and Total O-PDS*

	Pearson Correlation Coefficients									
	Sum @ 5-min	Sum @ 10-min	Sum @ 15-min	Sum @ 20-min	Thinking	Emotions	Interact w/ Environment	Interact w/ People	Activities	Total O-PDS
<b>Age</b>	-0.121 *0.049 264	-0.107 0.098 241	-0.140 *0.031 237	-0.089 0.186 222	-0.217 *0.000 264	-0.110 0.074 264	-0.057 0.352 264	-0.081 0.188 264	-0.125 *0.043 264	-0.133 *0.031 264
<b>Years of Stay</b>	0.136 *0.028 264	0.0129 0.843 241	0.004 0.948 237	-0.012 0.863 222	-0.064 0.303 264	0.130 *0.035 264	0.039 0.530 264	0.106 0.086 264	-0.027 0.660 264	0.063 0.311 264
<b>MMSE</b>	-0.234 *0.000 264	-0.076 0.239 241	-0.063 0.335 237	-0.023 0.733 222	-0.104 0.091 264	-0.215 *0.000 264	-0.174 *0.005 264	-0.248 *<.0001 264	0.036 0.561 264	-0.181 *0.003 264
<b>CSDD</b>	0.049 0.430 264	0.018 0.781 241	-0.030 0.648 237	0.007 0.920 222	0.022 0.725 264	0.019 0.760 264	0.042 0.497 264	0.007 0.914 264	0.115 0.063 264	0.038 0.537 264
<b>Psychoactive Meds</b>	-0.282 *<.0001 264	-0.200 *0.002 241	-0.164 *0.011 237	-0.186 *0.006 222	-0.238 *<.0001 264	-0.297 *<.0001 264	-0.257 *<.0001 264	-0.254 *<.0001 264	-0.136 *0.027 264	-0.287 *<.0001 264
<b>Charleson Co- Morbidity Index</b>	-0.048 0.439 264	-0.167 *0.009 241	-0.158 *0.015 237	-0.183 *0.006 222	-0.257 *<.0001 264	-0.047 0.446 264	0.089 0.145 264	0.109 0.077 264	-0.176 *0.004 264	-0.065 0.294 264

Note. \*. Correlation is significant at the 0.05 level. MMSE = Mini Mental Status Examination; CSDD = Cornell Scale for Depression in Dementia.

As seen above in Table 4.2, statistically significant negative correlations were found between the covariate, age, and the O-PDS at the 5-minute block of time ( $r = -0.121$ ,  $p = 0.049$ , 95% CI [-0.24, 0.00]), the 15-minute block of time ( $r = -0.140$ ,  $p = 0.031$ , 95% CI [-0.26, -0.01]), the *Thinking* subscale ( $r = 0.217$ ,  $p = 0.000$ , 95% CI [-0.33, -0.10]), the *Activities* subscale ( $r = -0.125$ ,  $p = 0.043$ , 95% CI [0.25, -0.00]), and the Total O-PDS ( $r = -0.133$ ,  $p = 0.031$ , 95% CI [-0.25, -0.01]). Statistically significant positive correlations were found between the covariate, years of stay in the nursing home, and the O-PDS at the 5-minute block of time ( $r = 0.136$ ,  $p = 0.028$ , 95% CI [0.01, 0.25]) and the *Emotions* subscale ( $r = 0.130$ ,  $p = 0.035$ , 95% CI [0.01, 0.25]). Statistically significant negative correlations were found between the covariate, MMSE, and the O-PDS at the 5-minute block of time ( $r = -0.234$ ,  $p = 0.000$ , 95% CI [-0.34, -0.12]), the *Emotions* subscale ( $r = -0.215$ ,  $p = 0.000$ , 95% CI [-0.33, -0.10]), the *Interacting with Environment* subscale ( $r = -0.174$ ,  $p = 0.005$ , [-0.29, -0.05]), and the *Interacting with People* subscale ( $r = -0.248$ ,  $p < 0.0001$ , 95% CI [-0.36, -0.13]), and the Total O-PDS ( $r = -0.181$ ,  $p = 0.003$ , 95% CI [-0.30, -0.06]). No correlations were found between the covariate, CSDD, and the O-PDS blocks of time, subscales, or Total O-PDS. Statistically significant negative correlations were found between the covariate, psychoactive medications, and the O-PDS at the 5-minute block of time ( $r = -0.283$ ,  $p < 0.0001$ , 95% CI [-0.39, -0.17]), the 10-minute block of time ( $r = -0.200$ ,  $p = 0.002$ , 95% CI [-0.32, -0.08]), the 15-minute block of time ( $r = -0.164$ ,  $p = 0.011$ , 95% CI [-0.29, -0.04]), the 20-minute block of time ( $r = -0.186$ ,  $p = 0.006$ , 95% CI [-0.31, -0.06]), the *Thinking* subscale ( $r = -0.238$ ,  $p < 0.0001$ , 95% CI [-0.35, -0.12]), the *Emotions* subscale ( $r = -0.297$ ,  $p < 0.0001$ , 95% CI [-0.40, -0.18]), the *Interacting with Environment* subscale ( $r = -0.257$ ,  $p = 0.005$ , [-0.37, -0.14]), and the *Interacting with People* subscale ( $r = -0.254$ ,  $p < 0.0001$ , 95% CI [-0.36, -0.14]), the *Activities* subscale ( $r = -0.136$ ,  $p = 0.027$ , 95% CI [-0.25, -0.02]), and the Total O-PDS ( $r = -0.287$ ,  $p < 0.0001$ , 95% CI [-0.39, -0.17]). Statistically significant negative correlations were found between the covariate,



Charleson Comorbidity Index, and the O-PDS at the 10-minute block of time ( $r = -0.167$ ,  $p = 0.009$ , 95% CI [-0.29, -0.04]). 15-minute block of time ( $r = -0.158$ ,  $p = 0.015$ , 95% CI [-0.28, -0.03]), 20-minute block of time ( $r = -0.183$ ,  $p = 0.006$ , 95% CI [-0.31, -0.05]), the *Thinking* subscale ( $r = -0.257$ ,  $p < 0.0001$ , 95% CI [-0.37, -0.14]), and the *Activities* subscale ( $r = -0.176$ ,  $p = 0.004$ , 95% CI [-0.29, -0.06]).

### **Missing Data**

The total time spent with each participant during the study was 21 hours and 20 minutes (10 hours and 40 minutes without the dog and 10 hours and 40 minutes with the dog). Each 5 minute block of time represents a data point. Each phase of the A-B<sub>1</sub>-A'-B<sub>2</sub> design had 32 data points and the follow-up phase had 4 data points for a total of 132 data points per subject. All subjects completed the study, meaning data was obtained every day for 32 days of the A-B<sub>1</sub>-A'-B<sub>2</sub> phases and one day of follow-up.

There were missing data. Reasons for missing data included the subject asking the PI to stop or telling the PI to leave, this was the case with Subject #6. Some subjects got up and walked out of the dayroom, and, at times, some subjects fell asleep during the intervention period, and the intervention was stopped. One unusual incident did occur during data collection. The facility was under construction, as a new roof was being applied. The fumes from the roof adhesive caused many of the residents to complain of headaches and nausea. This unusual incident was also a reason for some missing data. The frequency and percentage of missing data per subject is presented below in Table 4.4.

**Table 4.4***Frequency and Percentage of Missing Data Per Subject*

<b>Subject</b>	<b>Day (Total Minutes Observed)</b>	<b>Missing Data Points</b>	<b>Percentage of Missing Data Points</b>
#1	Day 23 (15 min)	1	1%
#2	Day 9 (10 min); Days 10 & 32 (15 min)	4	3%
#3	Day 25 (15 min)	1	1%
#4	Days 13 & 29 (5 min); Days 2, 16, 26, & 30 (15 min)	10	8%
#5	Days 28 & 29 (5 min); Days 12, 16, 25, & 26 (15min)	10	8%
#6	Days 9-11, 13-18, 20, 21, & 23-32 (5 min); Day 22 (10 min); Days 1, 4, & 12 (15 min)	68	52%
#7	No missing data	0	0%
#8	No missing data	0	0%

#### **Inter-Observer Reliability**

To maintain inter-observer reliability of  $\geq 80\%$ , reliability checks were performed by the PI on 10% of the subjects, which was one subject chosen at random (Subject #2). Inter-observer reliability was calculated using the concordance correlation coefficient, which measured the agreement on the O-PDS, scored independently, between the videotape/disc rater and the PI. The confidence limit was set at 95%. The estimate of the concordance correlation for the O-PDS at the 5, 10, 15, and 20-minute blocks of time were 95% CIs [0.971, 0.993], [0.989, 0.997], [0.98, 0.994], and [0.988, 0.997], respectively. The estimate of the concordance correlation for the *Thinking*, *Emotions*, *Interacting with Environment*, *Interacting with People*, and *Activities* subscale of the O-PDS were 95% CIs [0.973, 0.993], [0.965, 0.992], [0.995, 0.999], [0.989, 0.998], [1], respectively. The estimate of the concordance correlation for the Total O-PDS was 95% CI [0.988, 0.997].

## CHAPTER 5

### DISCUSSION, LIMITATIONS, AND IMPLICATIONS

#### Discussion

Passive behavior (PB), a behavioral symptom of dementia, has received little research attention, despite recognition that it is often resistant to interventions (Cummings, 1997; Everitt, Fields, Soumerai, & Avorn, 1991; Kaufer et al., 1998; Wood et al., 1999). This study examined the effects of animal-assisted therapy (AAT) for responding to PB in nursing home residents (NHRs) with dementia. A discussion of these results and their significance will be presented. Limitations and implications for theory, practice, and future research are discussed.

The results indicated that AAT is an effective non-pharmacological intervention for reducing PB in PWD, thus supporting this study's first hypothesis: NHRs with dementia will demonstrate a decrease in PB during AAT phases when compared to the baseline and control/reversal phases. In the individual analyses, 7 of the 8 subjects demonstrated a significant reduction in PB during AAT. The pooled analysis for the Total O-PDS revealed that PB decreased significantly during AAT and returned to baseline behavior during the follow-up phase of the study, thus supporting this study's second hypothesis: NHRs with dementia will demonstrate an increase in PB at follow-up when compared to the intervention phases.

A possible explanation for why AAT is an effective intervention is that the dog and the handler work as a team. Additionally, the dog is less threatening than the person. In essence, the therapy dog acts as a bonding agent, consuming the subject's attention and placing the subject at ease, this in turn, positions the handler as less threatening, fostering a positive relationship between the subject and the handler (Sable, 1995). The foundation of this relationship sets the stage for modifying the environment, thus modifying the subject's behavior (Delta Society, 2005). In this study, the PI (handler) utilized the therapy dog as a focal point to provide goal-oriented, deliberate, therapeutic activities designed to meet the subjects' needs, and reduce PB.

When AAT interventions were in elderly NHRs with dementia, the most commonly studied dependent variable was increased social interaction behavior, which included such attributes as verbalizations, looks, smiles, leans, tactile contact, and praise (Batson et al., 1998; Churchill et al., 1999; McCabe et al., 2002; Richeson, 2003). Social interaction behavior is only one component of PB. The present study obtained measures of PB that consisted of 32 behaviors organized into five distinct subscales: *Thinking*, *Emotions*, *Interacting with the Environment*, *Interacting with People*, and *Activities*. The pooled analyses revealed a significant increase in the *Thinking* and *Activities* subscales and a significant improvement in the *Emotions* and *Interaction with the Environment* subscales during AAT. The *Interacting with People* subscale of the O-PDS remained stable for all subjects across all conditions; a possible explanation for this lack of difference may be the way AAT was delivered (i.e., one-to-one). According to the Delta Society (2005), AAT can also be offered in small groups (4 to 6 people); this method of delivery would provide more opportunities for interaction with people, and may be more cost effective. In the present study, the target of the AAT intervention was interaction with the dog not people.

In the pooled analyses, a significant reduction in PB was found when the control/reversal phase was compared to the baseline phase. This suggests that a resident may benefit from having someone simply sit with him/her. Kaiser, Spence, McGavin, Struble, and Keilman (2002) found similar results in their study which examined preference for the type of visitor (dog vs. person) on pro-social behaviors (e.g., moving closer, patting, and smiling) of five elderly NHRs with no diagnosis of dementia. The investigators found that residents were equally likely to move closer and smile at both types of visitors, dogs and people. Future research might examine the effect different types of visitors, such as robot pets and baby dolls, have on PB in NHRs with dementia.

Strong positive correlations were found between all of the O-PDS blocks of time and the *Thinking*, *Emotions*, *Interacting with Environment*, and *Activities* subscales of the O-PDS, as well as the Total O-PDS. Measuring the same dependent variable over time, one would expect strong

correlations from one time to the next. Weak positive correlations were found between the *Interacting with People* subscale of the O-PDS and the *Thinking, Emotions, and Activities* subscales, all O-PDS block of time, and Total O-PDS. No correlation was found between the *Interacting with the Environment* and *Interacting with People* subscales of the O-PDS; however, the opportunity for interacting with people was not a part of the AAT protocol. In this study, excellent inter-observer reliability was demonstrated for all subscales of the O-PDS; the factor structure was not examined. Future studies may want to examine the factor structure of the O-PDS when used with people in different stages of dementia.

Previous AAT studies failed to control for depression, the number of prescribed routine psychoactive medications, and comorbid illnesses, all of which can have an effect on the dependent variable. To improve the rigor of the study, data were gathered on these variables and they were used as covariates in the analyses when appropriate. There was no significant correlation found between PB and depression, as measured by the Cornell Scale for Depression in Dementia (CSDD). This is not surprising because all of the subjects were screened for depression to determine eligibility. In this study, depression was an exclusion criterion. Consequently, there was not much variability among the subjects' CSDD scores ( $\bar{x} = 3.00$ ;  $SD = 2.33$ ; Range = 1 – 7).

A weak negative correlation was found between the number of routine psychoactive medications prescribed and PB. This suggests that as the number of routine psychoactive medications one takes increases, PB increases (scores on the O-PDS decrease). This relationship has been discussed in the literature (Borson & Raskind, 1997; Everitt et al., 1991, Marin, 1997; Marin et al., 1995; and U.S. FDA, 2005). This finding may reflect the side effects (e.g. sedation) of the prescribed psychoactive medications these subjects received or misdiagnosis of depression.

A weak negative correlation was also found between the number of comorbidities, as evidenced by the Charleson Comorbidity Index (CCI), and PB. This suggests that as the number of comorbidities increase, scores on the O-PDS decrease, indicating greater PB. A possible

explanation for this finding is that as one's health becomes more compromised the person is placed at risk for social isolation, loss of physical functioning, excess disability, and further cognitive decline, all of which can lead to PB. In this study, the range of the subjects' comorbidities using the CCI was 1 – 3. However, every subject had additional comorbidities that were not captured by the CCI. A simple count of comorbidities indicated that the subjects in this study had from 4 to 12 medical comorbidities.

It is suggested that future AAT studies continue to control for depression, psychoactive medications, both routine and PRN use, and monitor number of comorbidities. These variables have been shown to contribute to, or exacerbate, PB.

The association of age, years of stay in nursing home, and cognitive impairment, as measured by the MMSE, to PB was also examined. A weak negative correlation was found between age and PB. This suggests that as one gets older, scores on the O-PDS decrease, indicating greater PB. A possible explanation for this is that as an individual ages he/she tends to become more introverted, and introversion is sometimes characterized by a preference for solitary activities, a behavior linked to PB (Kolanowski & Litaker, 2006).

No correlation was found between PB and years of stay in the nursing home, however, a weak negative correlation was found between cognitive impairment, as measured by the Mini Mental Status Exam (MMSE), and PB. This suggests that as the MMSE scores increase, scores on the O-PDS decrease, indicating greater PB. This finding is surprising. The evidence in the literature purport that as cognition and language skills decrease with dementia progression, individuals with PB may become even more withdrawn as they lose their ability to interact with the environment and with others (Colling, 1999b, Galynker et al., 1995; Mega et al., 1996; Reichman et al., 1996; Starkstein et al., 2006). A possible explanation for this finding may be attributed to the side effects of the subjects' psychoactive medications. All but one subject was receiving at least one psychoactive medication. It is suggested that future

AAT studies continue to monitor these variables, as well as physical function and education, because they have been shown to be associated with the ability to engage in activities (Katzman, 1993; Starkstein et al, 2006).

Correlations were examined between the covariates: age, years of stay in nursing home, MMSE, CSDD, number of routine psychoactive medications, and Charleson Comorbidity Index. The only significant correlation found was between cognitive impairment, as measured by the MMSE, and the number of psychoactive medications one takes on a daily basis ( $r = 0.75$ ,  $p = 0.03$ , 95% CI [0.04, 0.95]). This positive correlation indicates that residents with greater cognitive ability were prescribed a greater number of psychoactive medications. This is surprising given findings in the literature that are in contrast to what was found in this study (Borson & Raskind, 1997; Everitt et al., 1991, Marin, 1997; Marin et al., 1995; and U.S. FDA, 2005). A possible explanation for this finding is that the prescribed psychoactive medication may improve cognition by successfully treating depression and other challenging behaviors. In summary, controlling for stage and type of dementia, depression, and psychoactive medications was important in this study in order to clearly identify the relationship between AAT and true measures of PB.

Trends in the individual analyses were observed. In this study, several subjects (Subjects #1, 4, 5, 7, 8) showed rather rapid changes once AAT began. Despite some fluctuations in PB observed in baseline, the degree of change observed in the first intervention phase and then again in the second intervention phase was sufficient to suggest that AAT has an immediate effect on PB.

Subject #6 failed to demonstrate an improvement in PB during AAT. Subject #6 rarely left her room. She often refused to let anyone turn the lights on in the room. She kept the door, window blinds, and drapes closed, and she verbalized many somatic complaints (e.g., headache, leg pain, fatigue). One could speculate that Subject #6 was depressed and her legally authorized

representative (LAR) may have minimized the responses during the administration of the Cornell Scale for Depression in Dementia (CSDD). It is recommended that a clinician administer the CSDD to the subject in future studies. Subject #6 was willing to participate in the study, and stable baseline data were obtained. Once the first intervention phase began, Subject #6 did not want to leave her room for AAT, therefore, AAT was offered 1:1 at her bedside. Although she always gave assent, within the first 5 minutes she often said, “That’s enough.” This resulted in 52 % missing data for Subject #6.

One could speculate that Subject #6 did not have as strong an attachment to dogs as perceived by the LAR. Subject #6 may indeed have liked dogs but not to the degree of the other subjects. The Informant-Based Canine Attachment Questionnaire does not quantify human-animal attachment. Lago et al. (1988) did speak to the fact that methods for quantifying the human-animal bond are often complicated. The truth of the matter is that how and under what conditions the human-animal bond develops remains poorly understood. Garrity et al. (1989) has speculated that optimal attachment is more likely to develop when the animal is of the person’s preferred species and breed. Not all human-animal interaction studies have measured attachment, and those that did measure attachment used a variety of pet attachment instruments, some of which had not undergone psychometric testing (Anderson, 2007). It is recommended that human-animal attachment instruments be developed that assess for species, breed preference, and degree of attachment.

### **Limitations**

There are several limitations to the present study. The first limitation of the study is the small sample size. NHRs with dementia that manifest PB were purposively selected for inclusion into the study from one long-term care facility. Additional studies using a larger sample size and multiple locations are warranted to provide support for these findings (Kazdin, 1982).

The second limitation is generalizability of the findings. The sample was limited to



mainly females and Caucasians. These characteristics are typical of most nursing home populations. The results from this study, however, were strong enough to generalize the findings to NHRs with dementia who demonstrate PB and who have a human-animal bond. The evidence suggests that this group can benefit from AAT.

A third limitation was recruitment of subjects. Initially, the PI was striving for a sample that was not prescribed routine psychoactive medications. The PI, in agreement with her dissertation chair, filed a request for IRB modification to include subjects who were taking a stable dose of psychoactive medications, as long as they did not have a history of mental illness prior to admission to the nursing home, and were not depressed at the onset of data collection, as evidenced by a CSDD score of 7 or less. Seven of the 8 subjects were diagnosed with depression after their admittance to the nursing home, and these 7 subjects were prescribed stable doses of psychoactive medications.

A fourth limitation was a consequence of conducting intervention research in a highly unstable environment – the nursing home. Every clinical research setting poses unique challenges for the nurse researcher (Mentes & Tripp-Reimer, 2002). The composition of the nursing staff, mainly licensed practical nurses (LPNs), who have little or limited knowledge of the benefits of research, and the care rituals established by the certified nursing assistants (CNAs), made it difficult to adhere to the desired schedule. Two LPNs verbalized openly that the research was a waste of time. One LPN had to be repeatedly asked not to park the medication cart in front of the video camera. This project demonstrated that training of research assistants and an open relationship between the research personnel and nursing home staff is central in successful intervention research. As suggested by Maas et al. (2002), the PI spent much time in the facility getting to know the residents' routines and staff, particularly the Activities Director and the staff on the Alzheimer unit. Incentives, such as gifts of food (e.g. donuts, pizza, and candy), were brought in by the PI for the nursing home staff to thank them for their cooperation. Buckwalter et

al. (2009) claim non-coercive incentives “cultivate a win-win situation for researchers, participants, and agencies” (p. 119).

The last limitation concerned the use of video recording for data collection. As described in Haidet et al. (2009), it is impossible to capture off-camera interactions through the lens of the camera. In this study it was difficult to ascertain if the subject was responding to another person off camera. This was particularly true of the *Interacting with People* subscale of the O-PDS. In this study, the video camera RA was informed to talk into the camera microphone and briefly describe the situation (e.g. “Subject looking at the person to her left.”)

### **Implications for Theory**

One critical shortcoming of early AAT studies was the failure to specify a theoretical framework to guide the derivation of research hypotheses and link the studies to other related research. In this study, the NDB Model (Algase et al., 1996), which was developed specifically for NHRs, provided the direction for assessing the root cause of PB. Attachment theory (Bowlby, 1969, 1988) explained the mechanism of action of AAT. There are, however, other theories relevant to passive behavior and animal-assisted therapy one may consider for future research. For example, Wilson’s (1984) biophilia theory asserts that humans have a predisposition to affiliate with nature. One may also consider using Hall and Buckwalter’s (1987) progressively lowered stress threshold model. Their model uses patient behavior to determine appropriate level of environmental stimuli, care, and support to maximize patient comfort and safety.

### **Implications for Clinical Practice**

Animal-assisted therapy may be offered 1:1 or in a small group (Delta Society, 2005). The small group offers some advantages, for example, fostering interaction between the dog and handler as well as other people, and it may be cost effective. Animal-assisted therapy is a transferable intervention. It can be conducted in the home or in a community setting, such as an

adult daycare center. These are settings in which AAT may be especially effective. Individuals in early stages of dementia tend to withdraw to protect themselves (Colling, 2000, 2004; Davis, 1989; McGovern, 1993). AAT can be used for this and other need-driven, dementia-compromised behaviors (NDBs), such as agitation, as seen in the Churchill et al. (1999) and Richeson (2003) studies, and wandering, as seen in the Katsinas (2001) study.

Another clinical implication would be to establish a local animal-assisted therapy program. This can be done through the guidance and support of the Delta Society. All of the information necessary to start an AAT program can be found on the Delta Society's home page ([www.deltasociety.org](http://www.deltasociety.org)).

### **Implications for Future Research**

This study focused on the short-term effect of AAT. Future research should build upon this knowledge base by exploring what long-term effects, if any, are exhibited by passive NHRs with dementia who participate in AAT. An important question is whether the short-term effects can be maintained for longer periods of time. Studies are warranted that investigate the durability of AAT interventions once the intervention has been completed. These findings would provide valuable information regarding behavior change.

Future areas of research should include examining the cost of AAT. To date, evidence for the cost-effectiveness of non-pharmacological interventions in the management of behaviors associated with dementia is limited. As previously mentioned, future areas of research should compare AAT with other types of non-pharmacological interventions, such as music therapy, robotic pets, or dolls.

Lastly, comparative research on the effects of AAT versus medications for PB might yield findings important for practice and cost effectiveness. In the current study, 7 of the 8 subjects were diagnosed with depression after their admittance to the nursing home. An important question to ask is whether PB is precipitated by relocation to the nursing home. There is evidence

to suggest that people who relocate to nursing homes experience some loss of control over their lives, disruption to social networks, and loss of many personal possessions, especially pets (Prosser, Townsend, & Staiger, 2008). Perhaps residents admitted to the nursing home with dementia should be screened for PB and AAT be suggested, if appropriate, in an effort to decrease the effects of relocation trauma.

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**Appendix A****Observational Form of the Passivity in Dementia Scale (OPDS; Colling, 2000)**Participant ID#: Today's date: 

Observer Initials: \_\_\_\_\_

Facility Code: Time: IRR:  Yes  No

- Period:  Phase A – Baseline  
 Phase B<sub>1</sub> – AAT Intervention  
 Phase A' - Control  
 Phase B<sub>2</sub> – AAT Intervention  
 Follow-up

Items (Behaviors)	0-5 Min.	5-10 Min.	10-15 Min.	15-20 Min.
<b>THINKING</b>				
T1. Takes initiative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T2. Relies on self	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T3. Is conscientious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T4. Expresses his/her thoughts through speech	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T5. Is intellectually curious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>EMOTIONS</b>				
E1. Has an unchanging facial expression	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E2. Smiles if prompted or on his/her own	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E3. Shows feelings in his/her voice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E4. Is enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E5. Is affectionate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E6. Laughs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E7. Has dull emotions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E8. Endures unpleasant situations rather than protesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E9. Gets angry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E10. Uses gestures to express feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>INTERACTING WITH ENVIRONMENT</b>				
IE1. Influenced by environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IE2. Interacts with surroundings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IE3. Avoids stimulating surroundings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IE4. Tries different activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>INTERACTING WITH PEOPLE</b>				
IP1. Spends time with friends, staff and others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP2. Makes eye contact with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP3. Is generous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP4. Is responsive to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP5. Is interested in others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP6. Is involved with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP7. Withdraws from others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP8. Prefers being alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP9. Is submissive to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>ACTIVITIES</b>				
A1. Maintains positions quietly and does nothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A2. Participates in routine daily activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A2a. Performs activities slowly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A3. Looks for things to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## PDS Behavioral Definitions

### THINKING

1. **Takes initiative: begins a task on their own without verbal or physical prompting.** Rate only if subject starts a specific task by them self without prompting: eating, dressing, toileting, straightening up their area or recreational activity. **Do not include activities that are initiated by RA, walking, wheeling self in wheel chair or passive activities like watching TV.**
2. **Relies on self:** when working on a project or activity for **5 minutes**, doesn't ask for help.
3. **Is conscientious:** when working on a project or activity makes an effort to do the steps in project.
4. **Expresses thoughts through speech:** speaks to others or self
5. **Is intellectually curious:** may be expressed **verbally or non-verbally**. Is nosy, searches, goes through items or bags, **asks WHO, WHAT, WHERE, or HOW** questions: what is happening or what an item is, were an item or person is, or how another person is doing or what they are doing, when will dinner be?

### EMOTIONS

1. **Has an unchanging facial expression:** face appears wooden, frozen; does not change this expression for the **5 minute period**
2. **Smiles if prompted or on their own.** Corners of mouth turn up. **Rate even if seen momentarily.**
3. **Shows feeling in their voice:** voice rises and falls- this includes **positive** and **negative** expressions.
4. **Is enthusiastic: rate for positive behaviors only;** behavior is animated, happy, pleasure, may smile, is attentive, **heightened interest** with positive emotions
5. **Is affectionate:** Reaches out, touches, pats or strokes another person or animal in a positive approaching manor; expresses love or liking someone or an animal in speech.
6. **Laughs:** Repeats the "ha-ha" sound. Actually laughs
7. **Has dull emotions:** Feelings are expressed **in speech** in a dull, flat way without much intensity in speech or bodily expressions. **Rate only if behavior persists for the 5 minute period**
8. **Endures Unpleasant situations rather than protesting:** Appears uncomfortable, in pain, unhappy **over a 5 minute period without verbally stating so, screaming or calling out:**
9. **Gets Angry:** **Physically or verbally** expresses hostility. Uses obscene gestures or language, shouts, curses, shakes fist, spits, kicks, hits, bites, or attempts to do so.
10. **Uses gestures to express feelings:** Uses body to express self **positively** or **negatively**. Uses hand movements during speech, hugging, kissing, reaching out, sitting forward to listen, thumbing nose or other obscene gestures.

### INTERACTS WITH NON-PERSON ENVIRONMENT

1. **Influenced by environment:** Reacts to what is going on in the surroundings. Is aware of the environment. Has Stimulus/response behavior. Makes any kind of response to the **non-person**

**environment**: sounds, light, smells, objects, animals, plants.

2. **Interacts with the surroundings: verbally or physically** engages with what is going on for the **5 minute period** in the **non-person environment** around them. **EXCLUDES ACTIVITIES INITIATED BY RA'S**
3. **Avoids stimulating surroundings**: disengages from activities or things. Turns head or body away, expresses desire to leave the area, leaves the area.
4. **Tries different activities**: Does a variety of different recreational activities over the **5 minute period**-not just the activity presented by RA. Does not have to initiate the activity.

### **INTERACTING WITH PEOPLE**

1. **Spends time with friends, staff or others**: Stays with people **over the 5 minute period** **without interacting with them.**
2. **Makes eye contact with others**: Looks at others' eyes either briefly or ongoing
3. **Is generous**: gives objects, food etc. to others, physically helps another
4. **Is responsive to others: verbally or physically** reacts to the presence of other people in a **positive or negative** manner. Is aware of other people. (differentiate from # 1 interacts with non-person)
5. **Is interested in others**: Looks at others with interest, asks questions or keeps the conversation going with the same person **for the 5 minute period**. (differentiate from #2 interacts with the non-person)
6. **Is involved with others**: Works with and along side of others **in a task for the 5 minute period** (differentiate from #2 with non-person environment)
7. **Withdraws from others**: Once next to people, turns away from them, doesn't respond
8. when spoken to, leaves others presence (differentiate from #3 interacts with non-person environment)
9. **Prefers being alone: WHEN ASKED** refuses (in word or by not responding) to join others, group-withdraws as in #7, **but select only when asked to join in.**
10. **Is submissive to others**: Lets others take the lead, "gives in" during an activity.

### **ACTIVITIES**

1. **Maintains position quietly and does nothing**: sits or lies still and engages in no activity or conversation **for the 5 minute period. (This includes sleeping)**
2. **Participates in any activities**: Does basic **ADL's**: dresses, eats, toilets or participates in activities **with or without help**. Is engaged in something.
  - 2a. **Performs activity slowly**: moves slowly over a **5 minute period** during activity.
3. **Looks for things to do**: Actively seeks activities by self: Asks to do an activity. (This includes dressing & eating.)

## Appendix B

## Informant-Based Canine Attachment Questionnaire

<b>Participant ID #:</b>	
1. Did [name of participant] ever own a dog? (If answer is no, skip to question 13.)	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
2. Did [name of participant] talk about the dog often?	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
3. What was the name of the dog?	_____
4. How attached do you perceive [name of participant] was to the dog?	Very <input type="checkbox"/> Somewhat <input type="checkbox"/> Not very <input type="checkbox"/> Don't know <input type="checkbox"/>
5. Estimate years [name of participant] owned this dog.	< 1 yr <input type="checkbox"/> 1-5 yrs <input type="checkbox"/> 6-10 yrs <input type="checkbox"/> > 10 yrs <input type="checkbox"/> Don't know <input type="checkbox"/>
6. Do you know what breed of dog it was? If yes, state breed. _____	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
7. How often was [name of participant] responsible for the dog's care?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
8. How often did [name of participant] hold, stroke, or pet the dog?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
9. How often did [name of participant] sleep near the dog (e.g., naps on the couch or bed)?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
10. How often do you feel that the dog was responsive to [name of participant]?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
11. How often do you feel that [name of participant] had a close relationship with the dog?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
12. How often did [name of participant] travel with the dog?	Always <input type="checkbox"/> Often <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> Don't know <input type="checkbox"/>
13. Was there a reason why [name of participant] did not own a dog? (Only to be answered if no to question 1).	
14. Does [name of participant] have allergies to dogs?	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
15. Does [name of participant] have a fear of dogs?	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
16. Do you perceive that [name of participant] has a positive history of attachment to dogs, even though he/she may not have owned one? If yes, DESCRIBE:	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
17. Do you believe [name of participant] would like to participate in Animal-Assisted Therapy?	Yes <input type="checkbox"/> No <input type="checkbox"/>

**Appendix C****Letter of Approval from IRB**

Approval - New Human Participant Application - IRB#25880 - "Effects of Animal-Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia"

Dear Cherie Soprano,

The above referenced study has been approved. You may begin your research study. The approval date is 07/10/07 and the expiration date is 06/20/08.

Attached please find:

- The formal approval letter on PSU letterhead (customsearch.rtf)
- The dated, IRB-approved informed consent form to be used when enrolling participants in this research study, if applicable. Please ensure that the attached approval stamped consent form is used as a template for the following:
  1. make photocopies for new participant enrollment;
  2. revise for modification purposes without changing any information in the approval stamp box/statement;
  3. submit along with the Continuing Progress Report without changing any information in the approval stamp box/statement.

**THIS IS THE ONLY APPROVAL NOTIFICATION YOU WILL RECEIVE. HARD COPIES OF THESE MATERIALS WILL NO LONGER BE SENT.**

Please print out these documents in order to have copies for your records.

If a funding source requires a signature on the approval letter, please do not hesitate to contact me.



*Tracie*

Tracie L. Kahler, MLS, CIM [tlk14@psu.edu](mailto:tlk14@psu.edu)  
Research Compliance Coordinator - Human Participants  
Office for Research Protections  
The Pennsylvania State University  
201 Kern Graduate Building  
University Park, PA 16802  
Phone: (814) 865-1775  
Fax: (814) 863-8699  
<http://www.research.psu.edu/orp/>



## Appendix D

## Letter of Approval from IACUC

				Senior Vice President for Research Office for Research Protections	The Pennsylvania State University 201 Kern Graduate Building University Park, PA 16802-3301	(814) 865-1775 Fax: (814) 863-8699 <a href="http://www.research.psu.edu/orp/">www.research.psu.edu/orp/</a>
Date:	June 6, 2007					
From:	William G. Greer, IACUC Administrator					
To:	Cherie A. Soprano					
Subject:	Results of IACUC Protocol Review – New Protocol ( <b>IACUC# 25676</b> )					
	<p style="text-align: center;"><b>Approval <u>Expiration</u> Date: June 5, 2008</b></p> <p style="text-align: center;">“Effects of Animal-Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia”</p>					
	<p>The Institutional Animal Care and Use Committee (IACUC) has reviewed and approved your protocol for the use of animals in your research. <b>This approval has been granted for a one-year period.</b></p> <p>Approval for the use of animals in this research project is given for a period covering one year from the date of this memo. <b>If your study extends beyond this approval period, you must contact this office to request an annual review of this research.</b></p> <p>This Institution has an Animal Welfare Assurance on file with the Office for Laboratory Animal Welfare. The Assurance number is A 3141-01. As of February 13, 2001, The Pennsylvania State University was awarded Full Accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).</p> <p>By accepting this decision, you agree to notify the Office for Research Protections of (1) any additions or procedural changes and (2) any unanticipated study results that impact the animals. Prior approval must be obtained for any planned changes to the approved protocol. Any unanticipated pain or distress, morbidity or mortality must be reported to the attending veterinarian and the IACUC.</p> <p><b>On behalf of the IACUC and the University, I thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of animals.</b></p> <p><i><b>Please Note:</b> The ORP encourages all Principal Investigators and Co-Investigators to subscribe to the ORP listserv. The ORP listserv is designated for announcements on protocol deadlines, changes in protocol submissions, upcoming ORP events, office hours during the holidays, distribution of newsletters and other important research-related information. The listserv will be used sparingly and only to disseminate information that is important for all active researchers to know. Essential announcements will only be distributed to the ORP listserv and will no longer be sent out to all active investigators in the ORP database. Unlike most listservs, only the ORP has the ability to send notices to the listserv; thus, preventing any unnecessary information from being distributed.</i></p> <p><i>If you are interested in subscribing or being removed from ORP listserv, send an email to: <a href="mailto:L-ORP-Research-L-subscribe-request@lists.psu.edu">L-ORP-Research-L-subscribe-request@lists.psu.edu</a> to subscribe or <a href="mailto:L-ORP-Research-L-unsubscribe-request@lists.psu.edu">L-ORP-Research-L-unsubscribe-request@lists.psu.edu</a> to</i></p>					

*unsubscribe. There is no need to add any text in the subject line or in the message body of the email.*

**WGG/emk**

**Attachment**

**To the Investigator:**

Please forward the enclosed original approval letter to your funding agency, if applicable. This approval is effective for one year. During this time, you should notify this office of any changes in the protocol that will affect the care and use of the approved animals or that will result in the use of additional animals.

In a continuing effort to comply with federal regulations, this office reviews IACUC approvals on an annual basis. On the anniversary of this approval, you should expect to receive a letter soliciting your request for an "annual review" by the IACUC. It is my hope that this process aids researchers in maintaining active IACUC approvals and avoids the use of animals without the proper approval.

Also, in order for records of your animal usage at LAR and ORP to remain current, please review the information below. If you feel there is any discrepancy between this information and your request, please contact our office (ORP) immediately at 865-1775. Thank you.

**IACUC#:** 25676

**Approved:** June 6, 2007

**PI:** Cherie A. Soprano

**Title:** "Effects of Animal-Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia"

<u>Species</u>	<u>Total # Approved</u>	<u># Used to Date</u>	<u># Not Yet Used</u>
Dog	3	0	3

**Appendix E****HIPAA Waiver**

 PENNSTATE
**HIPAA WAIVER**

**Project Title:** Effects of Animal Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia

**Principal Investigator:** Cherie Ann Soprano MS, RN, CRNP, LNC, PhD(c)  
15 Oregon Street, Wilkes-Barre, PA 18702  
cas408@psu.edu  
(570) 881-3425

**Faculty Advisor:** Dr. Ann Marie Kolanowski PhD, RN  
307D Health & Human Development East, University Park, PA 16802-3506  
amk20@psu.edu  
(814) 863-9901 or (570) 288-8183

This form documents that \_\_\_\_\_ (name of legally authorized representative) has given his/her verbal permission for me to release his/her phone number to Cherie Ann Soprano, Principal Investigator, so that she may contact him/her about her research project. I understand that the legally authorized representative is under no obligation to consent to the research study. Any decisions made by the legally authorized representative will not affect the care of his/her nursing home resident.

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Date**

## Appendix F

### Informed Consent



#### Informed Consent Form for Biomedical Research The Pennsylvania State University

ORP USE ONLY: IRB# 25880 Doc# 1  
The Pennsylvania State University  
Office for Research Protections  
Approval Date: 08/16/07 M. Becker  
Expiration Date: 06/20/08 M. Becker  
Biomedical Institutional Review Board

**Title of Project: Effects of Animal-Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia**

**Principal Investigator:** Cherie Ann Soprano MS, RN, CRNP, LNC, Doctoral Candidate – PhD(c)  
**Address:** 15 Oregon Street, Wilkes-Barre, PA 18702  
**Email:** cas408@psu.edu  
**Phone:** (570) 881-3425

**Faculty Advisor: Dr. Ann Marie Kolanowski PhD, RN**  
**Address:** 307D Health & Human Development East, University Park, PA 16802-3506  
**Email:** amk20@psu.edu  
**Phone:** (814) 863-9901 or (570) 288-8183

**1. Purpose of the study:** Many nursing home residents with dementia display passive behavioral symptoms. Symptoms of passive behavior include: decreased ability to experience or respond to human emotions, fewer interactions with others and the environment, a decrease in purposeful movement, and a decrease in one's ability to think and know. These symptoms are different from depression. They become more severe over the course of the dementia, and they are associated with poor health outcomes, which can reduce quality of life. The purpose of this research study is to examine the effects of Animal-Assisted Therapy (AAT) for responding to passive behavior in four, elderly nursing home resident volunteers with dementia.

**2. Procedures to be followed:** You will be asked to give the Principal Investigator (PI) written consent on behalf of your nursing home resident. After you have given written consent, the PI will screen your nursing home resident to determine if he/she meets all eligibility criteria, and obtain information needed to conduct AAT with your resident. To be eligible for participation in the study your nursing home resident must: be age 65 or older; speak English; see and hear well with the use of corrective devices, such as a hearing aid or eye glasses; have lived in the nursing home for at least 90 days; have dementia with moderate impairment of mental status; have an interest in dogs; have no fear of or allergies to dogs; have no evidence or history of clinical depression prior to the onset of dementia; have no infectious disease or history of asthma; and displays passive behavior. This one-time screen involves a collection of information from his/her medical chart and an assessment of your nursing home resident's mental status. The PI will then interview you to obtain information about your nursing home resident's interest or attachment to dogs and administer the Cornell Scale for Depression in Dementia (CSDD) to assess your nursing home resident for depression.

If your nursing home resident meets all eligibility criteria, he/she will be entered into the study. Your nursing home resident will be involved in this study for 42 days. There are 6 phases to this study: pre-baseline, baseline (Phase A), AAT Intervention (Phase B<sub>1</sub>), control/reversal phase (Phase A'), AAT Intervention (Phase B<sub>2</sub>), and follow-up, which will occur 7 days post Phase B<sub>2</sub>. Pre-baseline is the period where the PI determines when your nursing home resident is most passive. Baseline is the period where your nursing home resident is observed during his or her daily routine activities. Intervention is the period where your nursing home resident is introduced to the dog through Animal-Assisted Therapy. The control/reversal phase is the period where the dog is removed and the PI will be sitting with your nursing home resident.

During pre-baseline your nursing home resident will be observed for 3 consecutive days, every hour from 9 am to 2 pm and his/her passive behavior will be rated by the PI. This is done to determine the time of day when passive behavior is most problematic.

Following pre-baseline, your nursing home resident will then enter the baseline phase (Phase A) in which he/she will be videotaped for 20 minutes (at the peak behavior time established in pre-baseline) for 8 consecutive days. The PI and a trained research assistant (RA) will take measures of your nursing home resident's passive behavior from the videotapes. At the completion of baseline, the PI will conduct a chart review to obtain nursing home staffs' record of your nursing home resident's passive behavior and what they did for the behavior.

Following baseline, your nursing home resident will enter the first AAT intervention phase (Phase B<sub>1</sub>). He/She will be asked to participate in AAT for 20 minutes each day for 8 consecutive days (at the peak behavior time established in pre-baseline). During AAT, your nursing home resident will be encouraged to pet the dog, brush the dog's fur, play with and hold the dog, feed the dog treats, talk to or about the dog to the handler, talk about previous pets he/she owned or knew, and walk with/wheel with the dog, if able. He/She will be videotaped during each 20-minute session. The trained RA will take measures of your nursing home resident's passive behavior from the videotapes. At the completion of Phase B<sub>1</sub>, the PI will conduct a chart review to obtain nursing home staffs' record of your nursing home resident's passive behavior and what they did for the behavior.

Following Phase B<sub>1</sub>, your nursing home resident will enter control/reversal phase (Phase A') of the study. During this phase, your nursing home resident will be asked to sit with the PI, who is also the dog handler, for 20 minutes each day for 8 consecutive days (at the peak behavior time established in pre-baseline). No dog will be present during Phase A'. The participant will be videotaped during each 20 minute session. The trained RA will take measures of your nursing home resident's passive behavior from the videotapes. At the completion of Phase A', the PI will conduct a chart review to obtain nursing home staffs' record of your nursing home resident's passive behavior and what they did for the behavior.

Following Phase A', your nursing home resident will enter the second AAT intervention phase (Phase B<sub>2</sub>). This phase will be conducted exactly like the first AAT intervention phase (Phase B<sub>1</sub>). The participant will be videotaped during each 20 minute session. The trained RA will take measures of your nursing home resident's passive behavior from the videotapes. At the completion of Phase B<sub>2</sub>, the PI will conduct a chart review to obtain nursing home staffs' record of your nursing home resident's passive behavior and what they did for the behavior.

On day 42 (follow-up), the trained RA will perform a 20 minute real time observation of your nursing home resident's behavior (at the peak behavior time established in pre-baseline) using an instrument that measures passive behavior. No videotaping will occur during the follow-up phase. The PI will conduct the last chart review to obtain nursing home staffs' record of your nursing home resident's passive behavior and what they did for the behavior.

**3. Discomforts and risks:** The risks to your nursing home resident are minimal. The AAT activities planned for this study are similar to the animal visitation and animal activities policy in effect at your nursing home resident's facility. The dog may lick or jump on your nursing home resident. If your nursing home resident indicates that they do not like the activity, the PI will stop the activity. Nursing home residents often have frail skin and injury easy with the slightest of scratches. The PI is the dog handler. She received training in AAT by completing the Delta Society's Pet Partners® Home Study Program. All of the therapy dogs participating in this study have had an annual physical examination by a licensed veterinarian. The therapy dogs have been determined to be free of infections and parasites and all of their vaccinations are up to date. Documentation of pet health status will be kept on-site with the PI during the entire study. The dogs will be clean and carefully groomed prior to each AAT visit. Their nails will be trimmed and filed. They will be exercised prior to each AAT visit to reduce excess excitement and to provide opportunity for elimination. All of the dogs participating in this study are mild tempered, friendly, and display no aggression. A lap pad or blanket will be placed between the participant and the dog when the dog is sitting on the participant's lap. The dog will remain on a 6 foot leash at all times to prevent jumping. Proper and frequent hand washing will be encouraged prior to and after the AAT sessions. If your nursing home resident should injure him/herself during an AAT activity, the PI will notify the nurse in charge immediately so they can contact your primary care provider for any necessary follow-up. The PI has experience working with persons with dementia and will stop any activity that seems to upset your nursing home resident.

Your nursing home resident may miss the dog when the AAT session and overall study is completed. With your permission, the PI will make arrangements with the nursing home administrator to allow for animal visitation after the study.

**4a. Benefits to the nursing home resident:** Your nursing home resident may enjoy petting, grooming, and playing with the dog. Your nursing home resident may want to talk about pets he/she owned or had a fondness for in his/her past. Your nursing home resident may enjoy the extra attention he/she receives while participating in AAT, and may experience less passive behavior associated with dementia as a result of their participation in the study.

**4b. Potential benefits to society:** The findings from this study may help health care professionals gain a better understanding about nursing home residents who experience passive behavior associated with dementia. This understanding may lead to developing better ways of caring for nursing home residents who are passive.

**5. Duration/time of the procedures and study:** As described above, your nursing home resident will participate in a total of 32, 20-minute videotaped sessions, 16 of which include AAT. The total length of the study is 42 days.

**6. Alternative procedures that could be utilized:** There are no effective medications for passive behavior. Non-pharmacological interventions are recommended as the first line of treatment for passive behavior.

**7. Statement of confidentiality:** Your nursing home resident's participation in this study is confidential. All records associated with your participation in the study will be subject to the usual confidentiality standards applicable to medical records (e.g., such as records maintained by physicians, hospitals, etc.). In the event of any publication resulting from the research, no personally identifiable information will be disclosed. Penn State's Office for Research Protections, the Biomedical Institutional Review Board, and the Office for Human Research Protections may review records related to this research study. All data obtained from this study, including videotapes, will be stored and secured in a locked file cabinet in the PI's home. Only authorized research personnel will have access to the data and videotapes. All data, including videotapes, will be kept for a period of 6 years. Following that period, the videotapes will be erased, destroyed, and disposed. In the event that you desire a videotape of your nursing home resident, you will need to notify the PI in writing. The PI will contact the Office for Human Research Protections for such permission. You will be responsible for the cost of duplicating the videotape.

**8. Right to ask questions:** You have been given the opportunity to ask any questions you may have, and all such questions have been answered to your satisfaction. Please contact the PI, Cherie Ann Soprano at (570) 881-3425 or her faculty advisor Dr. Ann Marie Kolanowski at (814) 863-9901 or (570) 288-8183 with further questions, complaints or concerns about the study. You can also call these numbers if you feel this study has harmed your nursing home resident. Questions about your nursing home resident's rights as a research participant may be directed to Penn State University's Office for Research Protections at (814) 865-1775. You may also call this number if you cannot reach the research team or wish to talk to someone else.

**9. Compensation:** You understand that your nursing home resident will receive no monetary compensation for his/her participation in the study.

**10. Voluntary participation:** You and your nursing home resident's decision to participate in this study are voluntary. You may withdraw your nursing home resident from this study at anytime by notifying the PI. You and your nursing home resident may decline to answer specific questions. Refusal to allow your nursing home resident to take part in or withdrawing your nursing home resident from this study will not affect his/her access to medical services. If it is discovered that your nursing home resident is afraid of the dog or he/she becomes very ill, his/her involvement in the study will be terminated by the PI without regard to your consent.

**11. Injury Clause:** In the unlikely event your nursing home resident will become injured as a result of his/her participation in this study, medical care is available. It is the policy of The Pennsylvania State University (PSU) to provide neither financial compensation nor free medical treatment for research-related injury. By signing this document, you are not waiving any rights that your nursing home resident has against PSU for injury resulting from negligence of the University or its investigators.

**12. Abnormal Test Results:** It is possible that during eligibility screening, particularly after the administration of the Cornell Scale for Depression in Dementia – CSDD, the PI discovers that your nursing home resident displays significant depressive symptoms. In the event this occurs, you and the nursing home administrator will

be made aware of the results immediately. The PI will recommend that your nursing home resident's medical provider be contacted for follow-up.

**13. HIPAA:** Health information about your nursing home resident will be collected from his/her medical chart because he/she is a part of this research study. This information includes:

- Demographic data: Gender, Age, Race/Ethnicity, Date of Admission to Nursing Home, Language, Level of Education, Occupation, Marital Status
- Medical history including hearing and vision patterns
- Medical diagnoses
- Medications currently prescribed
- Information from the nurses' notes and Minimum Data Set (MDS) – Version 2.0

Your nursing home resident will not be identified by name, social security number, address, phone number or by any other direct personal identifier in his/her research records given to someone outside of The Pennsylvania State University (PSU), except when required by law. For records shared outside of PSU, your nursing home resident will be assigned a code number and the list that matches his/her name with the code number will be kept in a locked file cabinet in Cherie Soprano's home.

By signing this form, you are allowing the people and groups that are listed in the next paragraph to use your nursing home resident's health information, but only to use it within this research. You are also allowing these groups to share your health information with other specific groups for their use within this research study. Your nursing home resident's information will only be used as explained in this consent form or when required by law. The privacy law, Health Insurance Portability & Accountability Act (HIPAA), protects your nursing home resident's individually identifiable health information (protected health information). The privacy law requires you to sign an authorization/agreement in order for researchers to be able to use or disclose your nursing home resident's protected health information for research purposes in the study entitled **Effects of Animal-Assisted Therapy for Responding to Passive Behavior in Elderly Nursing Home Residents with Dementia**. You authorize Cherie Ann Soprano and her research staff to use and disclose your nursing home resident's protected health information for the purposes described above.

Representatives of the following people/groups are allowed to use and share your nursing home resident's health information with other specific groups in connection with this research study:

- Cherie Ann Soprano, the principal investigator
- Dr. Ann Marie Kolanowski, faculty advisor
- Dr. Vernon Chinchilli, dissertation committee member/statistician
- The Pennsylvania State University's Institutional Review Board/Office for Research Protections

The people or groups listed in the above paragraph may share your health information with the following persons and organizations outside PSU for their use in connection with this research study:

- The Office of Human Research Protections in the U.S. Department of Health and Human Services

Once your health information has been disclosed to anyone outside of this study, the information may no longer be protected under this authorization.

The AAT that will be used in this study cannot be provided unless you allow the use and sharing of your nursing home resident's protected health information that is collected during his/her participation in this research study.

If you wish for your nursing home resident to participate in this research, you must sign this form. If you do not want your nursing home resident to participate in the study, this will not affect his/her access to medical services. Your permission for the use and sharing of your health information will expire upon completion of the research study.

You are free to withdraw your permission for the use and sharing of your nursing home resident's health information, but you must do this in writing. If you do decide to withdraw, we ask that you contact Cherie Ann Soprano, the Principal Investigator, in writing and let her know that you are withdrawing your nursing home resident from the research study. Her mailing address is 15 Oregon Street, Wilkes-Barre, Pa 18702.

If you withdraw your permission, we will no longer use or share medical information about your nursing home resident for the reasons covered by your written authorization, except when the law allows us to continue using your nursing home resident's information. We are unable to take back anything we have already done or shared with your permission, and we are required to keep our records of the care that we provided to you indefinitely.

This is to certify that I consent and give permission for my nursing home resident's participation as a volunteer in this study. I understand that I will receive a copy of this signed consent form. I have read this form, and I understand the content of this consent form.

\_\_\_\_\_  
Signature of Participant's Responsible Party

\_\_\_\_\_  
Date

I, the undersigned, have defined, answered all questions, and explained the study to the above volunteer.

\_\_\_\_\_  
Signature of Principal Investigator

\_\_\_\_\_  
Date





Resident \_\_\_\_\_ Numeric Identifier \_\_\_\_\_

**MINIMUM DATA SET (MDS) — VERSION 2.0**  
**FOR NURSING HOME RESIDENT ASSESSMENT AND CARE SCREENING**  
**BACKGROUND (FACE SHEET) INFORMATION AT ADMISSION**

**SECTION AB. DEMOGRAPHIC INFORMATION**

1. DATE OF ENTRY	Date the stay began. Note — Does not include readmission if record was closed at time of temporary discharge to hospital, etc. In such cases, use prior admission date.  <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> </div>
2. ADMITTED FROM (AT ENTRY)	1. Private home/apt. with no home health services 2. Private home/apt. with home health services 3. Board and care/assisted living/group home 4. Nursing home 5. Acute care hospital 6. Psychiatric hospital, MR/DD facility 7. Rehabilitation hospital 8. Other
3. LIVED ALONE (PRIOR TO ENTRY)	0. No 1. Yes 2. In other facility
4. ZIP CODE OF PRIOR PRIMARY RESIDENCE	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> </div>
5. RESIDENTIAL HISTORY 5 YEARS PRIOR TO ENTRY	(Check all settings resident lived in during 5 years prior to date of entry given in item AB1 above) Prior stay at this nursing home <span style="float: right;">a.</span> Stay in other nursing home <span style="float: right;">b.</span> Other residential facility—board and care home, assisted living, group home <span style="float: right;">c.</span> MH/psychiatric setting <span style="float: right;">d.</span> MR/DD setting <span style="float: right;">e.</span> NONE OF ABOVE <span style="float: right;">f.</span>
6. LIFETIME OCCUPATIONS (Put in 17 between two occupations)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%; border: 1px solid black; height: 20px;"></div> <div style="width: 45%; border: 1px solid black; height: 20px;"></div> </div>
7. EDUCATION (Highest Level Completed)	1. No schooling 2. 8th grade/less 3. 9-11 grades 4. High school 5. Technical or trade school 6. Some college 7. Bachelor's Degree 8. Graduate degree
8. LANGUAGE	(Code for correct response) a. Primary Language 0. English    1. Spanish    2. French    3. Other b. If none, specify
9. MENTAL HEALTH HISTORY	Does resident's RECORD indicate any history of mental retardation, mental illness, or developmental disability problem? 0. No    1. Yes
10. CONDITIONS RELATED TO MR/DD STATUS	(Check all conditions that are related to MR/DD status that were manifested before age 22, and are likely to continue indefinitely) Not applicable—no MR/DD (Skip to AB11) <span style="float: right;">a.</span> MR/DD with organic condition <span style="float: right;">b.</span> Down's syndrome <span style="float: right;">c.</span> Autism <span style="float: right;">d.</span> Epilepsy <span style="float: right;">e.</span> Other organic condition related to MR/DD <span style="float: right;">f.</span> MR/DD with no organic condition
11. DATE BACKGROUND INFORMATION COMPLETED	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center;"> </div> </div>

**SECTION AC. CUSTOMARY ROUTINE**

1. CUSTOMARY ROUTINE (In year prior to DATE OF ENTRY to this nursing home, or year last in community if now being admitted from another nursing home)	(Check all that apply. If all information UNKNOWN, check last box only)
<b>CYCLE OF DAILY EVENTS</b>	
Stays up late at night (e.g., after 9 pm)	a.
Naps regularly during day (at least 1 hour)	b.
Goes out 1+ days a week	c.
Stays busy with hobbies, reading, or fixed daily routine	d.
Spends most of time alone or watching TV	e.
Moves independently indoors (with appliances, if used)	f.
Use of tobacco products at least daily	g.
NONE OF ABOVE	h.
<b>EATING PATTERNS</b>	
Distinct food preferences	i.
Eats between meals all or most days	j.
Use of alcoholic beverage(s) at least weekly	k.
NONE OF ABOVE	l.
<b>ADL PATTERNS</b>	
In bedclothes much of day	m.
Wakens to toilet all or most nights	n.
Has irregular bowel movement pattern	o.
Showers for bathing	p.
Bathing in PM	q.
NONE OF ABOVE	r.
<b>INVOLVEMENT PATTERNS</b>	
Daily contact with relatives/close friends	s.
Usually attends church, temple, synagogue (etc.)	t.
Finds strength in faith	u.
Daily animal companion/presence	v.
Involved in group activities	w.
NONE OF ABOVE	x.
UNKNOWN—Resident/family unable to provide information	y.

**SECTION AD. FACE SHEET SIGNATURES**

**SIGNATURES OF PERSONS COMPLETING FACE SHEET:**

a. Signature of RN Assessment Coordinator \_\_\_\_\_ Date \_\_\_\_\_

I certify that the accompanying information accurately reflects resident assessment or tracking information for this resident and that I collected or coordinated collection of this information on the dates specified. To the best of my knowledge, this information was collected in accordance with applicable Medicare and Medicaid requirements. I understand that this information is used as a basis for ensuring that residents receive appropriate and quality care, and as a basis for payment from federal funds. I further understand that payment of such federal funds and continued participation in the government-funded health care programs is conditioned on the accuracy and truthfulness of this information, and that I may be personally subject to or may subject my organization to substantial criminal, civil, and/or administrative penalties for submitting false information. I also certify that I am authorized to submit this information by this facility on its behalf.

Signature and Title	Sections	Date
b. _____		
c. _____		
d. _____		
e. _____		
f. _____		
g. _____		

= When box blank, must enter number or letter     = When letter in box, check if condition applies

Resident \_\_\_\_\_

Numeric Identifier \_\_\_\_\_

**MINIMUM DATA SET (MDS) — VERSION 2.0**  
**FOR NURSING HOME RESIDENT ASSESSMENT AND CARE SCREENING**  
**FULL ASSESSMENT FORM**

(Status in last 7 days, unless other time frame indicated)

**SECTION A. IDENTIFICATION AND BACKGROUND INFORMATION**

1. RESIDENT NAME	_____ a. (First)      b. (Middle Initial)      c. (Last)      d. (Jr/Sr)			
2. ROOM NUMBER	_____			
3. ASSESSMENT REFERENCE DATE	a. Last day of MDS observation period _____ Month      Day      Year b. Original (0) or corrected copy of form (enter number of correction)			
4a. DATE OF REENTRY	Date of reentry from most recent temporary discharge to a hospital in last 90 days (or since last assessment or admission if less than 90 days) _____ Month      Day      Year			
5. MARITAL STATUS	1. Never married      3. Widowed      5. Divorced 2. Married      4. Separated			
6. MEDICAL RECORD NO.	_____			
7. CURRENT PAYMENT SOURCES FOR N.H. STAY	(Billing Office to indicate; check all that apply in last 30 days) Medicare per diem      a.      VA per diem Medicare per diem      b.      Self or family pays for full per diem Medicare ancillary part A      c.      Medicaid resident liability or Medicare co-payment Medicare ancillary part B      d.      Private insurance per diem (including co-payment) CHAMPUS per diem      e.      Other per diem			
8. REASONS FOR ASSESSMENT	a. Primary reason for assessment 1. Admission assessment (required by day 14) 2. Annual assessment 3. Significant change in status assessment 4. Significant correction of prior full assessment 5. Quarterly review assessment 6. Discharged—return not anticipated 7. Discharged—return anticipated 8. Discharged prior to completing initial assessment 9. Reentry 10. Significant correction of prior quarterly assessment 0. NONE OF ABOVE b. Codes for assessments required for Medicare PPS or the State 1. Medicare 5 day assessment 2. Medicare 30 day assessment 3. Medicare 60 day assessment 4. Medicare 90 day assessment 5. Medicare readmission/return assessment 6. Other state required assessment 7. Medicare 14 day assessment 8. Other Medicare required assessment			
9. RESPONSIBILITY/LEGAL GUARDIAN	(Check all that apply) Legal guardian      a.      Durable power attorney/financial Other legal oversight      b.      Family member responsible Durable power of attorney/health care      c.      Patient responsible for self NONE OF ABOVE			
10. ADVANCED DIRECTIVES	(For those items with supporting documentation in the medical record, check all that apply) Living will      a.      Feeding restrictions Do not resuscitate      b.      Medication restrictions Do not hospitalize      c.      Other treatment restrictions Organ donation      d.      NONE OF ABOVE Autopsy request      e.			

**SECTION B. COGNITIVE PATTERNS**

1. COMATOSE	(Resident vegetative state to disoriented consciousness) 0. No      1. Yes (if yes, skip to Section G)
2. MEMORY	(Recall of what was learned or known) a. Short term memory OK—seems/appears to recall after 5 minutes 0. Memory OK      1. Memory problem b. Long term memory OK—seems/appears to recall long past 0. Memory OK      1. Memory problem

3. MEMORY/RECALL ABILITY	(Check all that resident was normally able to recall during last 7 days) Current season      a.      That he/she is in a nursing home Location of own room      b.      NONE OF ABOVE are recalled Staff names/faces      c.
4. COGNITIVE SKILLS FOR DAILY DECISION-MAKING	(Make decisions regarding tasks of daily life) 0. INDEPENDENT—decisions considered reasonable only 1. MODIFIED INDEPENDENCE—some difficulty in new situations 2. MODERATELY IMPAIRED—decisions poor, cues/supervision required 3. SEVERELY IMPAIRED—essentially made decisions
5. INDICATORS OF DELIRIUM, PERIODIC DISORDERED THINKING/AWARENESS	(Code for behavior in the last 7 days.) (Note: Accurate assessment requires conversations with staff and family who have direct knowledge of resident's behavior over this time.) 0. Behavior not present 1. Behavior present, not of recent onset 2. Behavior present, over last 7 days appears different from resident's usual functioning (e.g., new onset or worsening) a. EASILY DISTRACTED—(e.g., difficulty paying attention, gets sidetracked) b. PERIODS OF ALTERED PERCEPTION OR AWARENESS OF SURROUNDINGS—(e.g., moves lips or talks to someone not present, believes he/she is somewhere else, confuses night and day) c. EPISODES OF DISORGANIZED SPEECH—(e.g., speech is incoherent, nonsensical, irrelevant, or rambling from subject to subject, loss of train of thought) d. PERIODS OF RESTLESSNESS—(e.g., fidgeting or picking at skin, clothing, napkins, etc; frequent position changes, repetitive physical movements or calling out) e. PERIODS OF LETHARGY—(e.g., sluggishness, staring into space, difficult to arouse, little body movement) f. MENTAL FUNCTION VARIES OVER THE COURSE OF THE DAY—(e.g., sometimes better, sometimes worse, behaviors sometimes present, sometimes not)
6. CHANGE IN COGNITIVE STATUS	Resident's cognitive status, skills, or abilities have changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change      1. Improved      2. Deteriorated

**SECTION C. COMMUNICATION/HEARING PATTERNS**

1. HEARING	(With hearing appliance, if used) 0. HEARS ADEQUATELY—normal talk, TV, phone 1. MINIMAL DIFFICULTY when not in quiet setting 2. HEARS IN SPECIAL SITUATIONS ONLY—speaker has to adjust tonality and speak distinctly 3. HIGHLY IMPAIRED—absence of useful hearing
2. COMMUNICATION DEVICES/TECHNIQUES	(Check all that apply during last 7 days) Hearing aid, present and used Hearing aid, present and not used regularly Other receptive comm. techniques used (e.g., lip reading) NONE OF ABOVE
3. MODES OF EXPRESSION	(Check all used by resident to make needs known) Speech      a.      Sign/gestures/sounds Writing messages to express or clarify needs      b.      Communication board Other      c.      Other American sign language or Braille      d.      NONE OF ABOVE
4. MAKING SELF UNDERSTOOD	(Expressing information content—(however able)) 0. UNDERSTOOD 1. USUALLY UNDERSTOOD—difficulty finding words or finishing thoughts 2. SOMETIMES UNDERSTOOD—ability is limited to making concrete requests 3. RARELY/NEVER UNDERSTOOD
5. SPEECH CLARITY	(Code for speech in the last 7 days) 0. CLEAR SPEECH—distinct, intelligible words 1. UNCLEAR SPEECH—slurred, mumbled words 2. NO SPEECH—absence of spoken words
6. ABILITY TO UNDERSTAND OTHERS	(Understanding verbal information content—(however able)) 0. UNDERSTANDS 1. USUALLY UNDERSTANDS—may miss some part/intent of message 2. SOMETIMES UNDERSTANDS—responds adequately to simple, direct communication 3. RARELY/NEVER UNDERSTANDS
7. CHANGE IN COMMUNICATION/HEARING	Resident's ability to express, understand, or hear information has changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change      1. Improved      2. Deteriorated

□ = When box blank, must enter number or letter      [a] = When letter in box, check if condition applies



Resident \_\_\_\_\_

Numeric Identifier \_\_\_\_\_

**SECTION D. VISION PATTERNS**

1. VISION	Ability to see in adequate light and with glasses if used 0. ADEQUATE—sees fine detail, including regular print in newspapers/books 1. IMPAIRED—sees large print, but not regular print in newspapers/books 2. MODERATELY IMPAIRED—limited vision, not able to see newspaper headlines, but can identify objects 3. HIGHLY IMPAIRED—object identification in question, but eyes appear to follow objects 4. SEVERELY IMPAIRED—no vision or sees only light, colors, or shapes; eyes do not appear to follow objects		
2. VISUAL LIMITATIONS/DIFFICULTIES	Side vision problems—decreased peripheral vision (e.g., leaves food on one side of tray); difficulty traveling (bumps into people and objects); misjudges placement of chair when seating self Experiences any of following: sees halos or rings around lights; sees flashes of light; sees "auras" over eyes NONE OF ABOVE	a b c	
3. VISUAL APPLIANCES	Glasses, contact lenses, magnifying glass 0. No 1. Yes		

**SECTION E. MOOD AND BEHAVIOR PATTERNS**

1. INDICATORS OF DEPRESSION, ANXIETY, SAD MOOD	(Code for indicators observed in last 30 days, irrespective of the assumed cause) 0. Indicator not exhibited in last 30 days 1. Indicator of this type exhibited up to five days a week 2. Indicator of this type exhibited daily or almost daily (6, 7 days a week) VERBAL EXPRESSIONS OF DISTRESS a. Resident made negative statements—e.g., "Nothing matters, I don't care to be dead. What's the use. Regrets having lived so long. Let me die" b. Repetitive questions—e.g., "Where do I go. What do I do?" c. Repetitive verbalizations—e.g., calling out for help, ("God help me") d. Persistent anger with self or others—e.g., easily annoyed, anger at placement in nursing home, anger at care received e. Self-deprecation—e.g., "I am nothing. I am of no use to anyone" f. Expressions of what appear to be unrealistic fears—e.g., fear of being abandoned, left alone, being with others g. Recurrent statements that something terrible is about to happen—e.g., believes he or she is about to die, have a heart attack h. Repetitive health complaints—e.g., persistently seeking medical attention, obsessive concern with body functions i. Repetitive anxious complaints/concerns (non-health related) e.g., persistently seeks attention/reassurance regarding schedules, meals, laundry, clothing, relationship issues j. UNPLEASANT MOOD IN MORNING k. Insomnia/change in usual sleep pattern l. SAD, APATHETIC, ANXIOUS APPEARANCE m. Crying/tearfulness n. Repetitive physical movements—e.g., pacing, hand wringing, restlessness, fidgeting, picking o. Withdrawal from activities of interest—e.g., no interest in long standing activities or being with family/friends p. Reduced social interaction		
2. MOOD PERSISTENCE	One or more indicators of depressed, sad or anxious mood were not easily altered by attempts to "cheer up", console, or reassure the resident over last 7 days 0. No mood indicators present 1. Indicators present, easily altered 2. Indicators present, not easily altered		
3. CHANGE IN MOOD	Resident's mood status has changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated		
4. BEHAVIORAL SYMPTOMS	(A) Behavioral symptom, frequency in last 7 days 0. Behavior not exhibited in last 7 days 1. Behavior of this type occurred 1 to 3 days in last 7 days 2. Behavior of this type occurred 4 to 6 days, but less than daily 3. Behavior of this type occurred daily (B) Behavioral symptom alterability in last 7 days 0. Behavior not present OR behavior was easily altered 1. Behavior was not easily altered	(A) (B)	
a. WANDERING	(moved with no rational purpose, seemingly oblivious to needs or safety)		
b. VERBALLY ABUSIVE BEHAVIORAL SYMPTOMS	(others were threatened, screamed at, cursed at)		
c. PHYSICALLY ABUSIVE BEHAVIORAL SYMPTOMS	(others were hit, shoved, scratched, sexually abused)		
d. SOCIALLY INAPPROPRIATE/DISRUPTIVE BEHAVIORAL SYMPTOMS	(made disruptive sounds, noisiness, screaming, self-abusive acts, sexual behavior or climbing in public, smeared threw bodily fluids, hoarding, rummaged through others' belongings)		
e. RESISTS CARE	(resisted taking medications/ injections, ADL assistance, or eating)		

5. CHANGE IN BEHAVIORAL SYMPTOMS	Resident's behavior status has changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated	
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**SECTION F. PSYCHOSOCIAL WELL-BEING**

1. SENSE OF INITIATIVE/INVOLVEMENT	At ease interacting with others At ease doing planned or structured activities At ease doing self-initiated activities Establishes own goals Pursues involvement in life of facility (e.g., makes/keeps friends; involved in group activities; responds positively to new activities; assists at religious services) Accepts invitations into most group activities NONE OF ABOVE	a b c d e f g h
2. UNSETTLED RELATIONSHIPS	Covert/open conflict with or repeated criticism of staff Unhappy with roommate Unhappy with residents other than roommate Openly expresses conflict/anger with family/friends Absence of personal contact with family/friends Recent loss of close family member/friend Does not adjust easily to change in routines NONE OF ABOVE	a b c d e f g h
3. PAST ROLES	Strong identification with past roles and life status Expresses sadness/anger/emptiness/feeling over lost roles/status Resident perceives that daily routine (customary routine, activities) is very different from prior pattern in the community NONE OF ABOVE	a b c d

**SECTION G. PHYSICAL FUNCTIONING AND STRUCTURAL PROBLEMS**

1. (A) ADL SELF-PERFORMANCE—(Code for resident's PERFORMANCE OVERALL SHIFTS during last 7 days—Not including setup)	0. INDEPENDENT—No help or oversight—OR—Help/oversight provided only 1 or 2 times during last 7 days 1. SUPERVISION—Oversight, encouragement or cueing provided 3 or more times during last 7 days—OR—Supervision (3 or more times) plus physical assistance provided only 1 or 2 times during last 7 days 2. LIMITED ASSISTANCE—Resident highly involved in activity; received physical help in guided maneuvering of limbs or other nonweight bearing assistance 3 or more times—OR—More help provided only 1 or 2 times during last 7 days 3. EXTENSIVE ASSISTANCE—While resident performed part of activity over last 7-day period, help of following type(s) provided 3 or more times: —Weight-bearing support —Full staff performance during part (but not all) of last 7 days 4. TOTAL DEPENDENCE—Full staff performance of activity during entire 7 days 8. ACTIVITY DID NOT OCCUR during entire 7 days		
(B) ADL SUPPORT PROVIDED—(Code for MOST SUPPORT PROVIDED OVERALL SHIFTS during last 7 days; code regardless of resident's self-performance classification)	0. No setup or physical help from staff 1. Setup help only 2. One person physical assist 3. Two persons physical assist 8. ADL activity itself did not occur during entire 7 days	(A) (B)	SELF-PERF. SUPPORT
a. BED MOBILITY	How resident moves to and from lying position, turns side to side, and positions body while in bed		
b. TRANSFER	How resident moves between surfaces—to/from bed, chair, wheelchair, standing position (EXCLUDE to/from bathroom)		
c. WALK IN ROOM	How resident walks between locations in his/her room		
d. WALK IN CORRIDOR	How resident walks in corridor on unit		
e. LOCOMOTION ON UNIT	How resident moves between locations in his/her room and adjacent corridor on same floor. If in wheelchair, self-sufficiency once in chair		
f. LOCOMOTION OFF UNIT	How resident moves to and returns from off unit locations (e.g., areas set aside for dining, activities, or treatments). If facility has only one floor, how resident moves to and from distant areas on the floor. If in wheelchair, self-sufficiency once in chair		
g. DRESSING	How resident puts on, fastens, and takes off all items of street clothing, including donning/removing prostheses		
h. EATING	How resident eats and drinks (regardless of skill). Includes intake of nourishment by other means (e.g., tube feeding, total parenteral nutrition)		
i. TOILET USE	How resident uses the toilet room (or commode, bedpan, urinal); transfer on/off toilet, cleanses, changes pad, manages ostomy or catheter, adjusts clothes		
j. PERSONAL HYGIENE	How resident maintains personal hygiene, including combing hair, brushing teeth, shaving, applying makeup, washing/drying face, hands, and perineum (EXCLUDE baths and showers)		

Resident \_\_\_\_\_

2. BATHING	How resident takes full-body bath/shower, sponge bath, and transfers in/out of tub/shower (EXCLUDE washing of back and hair). Code for most dependent in self-performance and support. (A) BATHING SELF-PERFORMANCE codes appear below	(A) (B)
3. TEST FOR BALANCE (see training manual)	(Code for ability during test in the last 7 days) 0. Maintained position as required in test 1. Unsteady, but able to rebalance self without physical support 2. Partial physical support during test, or stands (sits) but does not follow directions for test 3. Not able to attempt test without physical help a. Balance while standing b. Balance while sitting—position, trunk control	
4. FUNCTIONAL LIMITATION IN RANGE OF MOTION (see training manual)	(Code for limitations during last 7 days that interfered with daily functions or placed resident at risk of injury) (A) RANGE OF MOTION (B) VOLUNTARY MOVEMENT 0. No limitation 1. Limitation on one side 2. Limitation on both sides a. Neck b. Arm—including shoulder or elbow c. Hand—including wrist or fingers d. Leg—including hip or knee e. Foot—including ankle or toes f. Other limitation or loss	(A) (B)
5. MODES OF LOCOMOTION	(Check all that apply during last 7 days) Cane/walker/crutch Wheeled self Other person wheeled	a. Wheelchair primary mode of locomotion b. NONE OF ABOVE
6. MODES OF TRANSFER	(Check all that apply during last 7 days) Bed/flat all or most of time Bed rails used for bed mobility or transfer Lifted manually	a. Lifted mechanically b. Transfer aid (e.g., slide board, transfer, cane, walker, brace) c. NONE OF ABOVE
7. TASK SEGMENTATION	Some or all of ADL activities were broken into subtasks during last 7 days so that resident could perform them 0. No 1. Yes	
8. ADL FUNCTIONAL REHABILITATION POTENTIAL	Resident believes he/she is capable of increased independence in at least some ADLs Direct care staff believe resident is capable of increased independence in at least some ADLs Resident able to perform tasks/activity but is very slow Difference in ADL Self-Performance or ADL Support, comparing mornings to evenings NONE OF ABOVE	a. b. c. d. e.
9. CHANGE IN ADL FUNCTION	Resident's ADL self-performance status has changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated	

**SECTION H. CONTINENCE IN LAST 14 DAYS**

1. CONTINENCE SELF-CONTROL CATEGORIES (Code for resident's PERFORMANCE OVER ALL SHIFTS)	0. CONTINENT—Complete control (includes use of indwelling urinary catheter or ostomy device that does not leak urine or stool) 1. USUALLY CONTINENT—BLADDER, incontinent episodes once a week or less; BOWEL, less than weekly 2. OCCASIONALLY INCONTINENT—BLADDER, 2 or more times a week but not daily; BOWEL, once a week 3. FREQUENTLY INCONTINENT—BLADDER, tended to be incontinent daily, but some control present (e.g., on day shift); BOWEL, 2-3 times a week 4. INCONTINENT—Had inadequate control BLADDER, multiple daily episodes; BOWEL, all (or almost all) of the time	
a. BOWEL CONTINENCE	Control of bowel movement, with appliance or bowel continence programs, if employed	
b. BLADDER CONTINENCE	Control of urinary bladder function (if dribbles, volume insufficient to soak through underpants), with appliances (e.g., Foley) or continence programs, if employed	
2. BOWEL ELIMINATION PATTERN	Bowel elimination pattern regular—at least one movement every three days Constipation	a. Diarrhea b. Fecal impaction c. NONE OF ABOVE

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3. APPLIANCES AND PROGRAMS	Any scheduled toileting plan Bladder retraining program External (condom) catheter Indwelling catheter Intermittent catheter	a. Did not use toilet room/commodol/urnal b. Pads/briefs used c. Enemas/irrigation d. Ostomy present e. NONE OF ABOVE	t. u. v. w. x.
4. CHANGE IN URINARY CONTINENCE	Resident's urinary continence has changed as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change 1. Improved 2. Deteriorated		

**SECTION I. DISEASE DIAGNOSES**

Check only those diseases that have a relationship to current ADL status, cognitive status, mood and behavior status, medical treatments, nursing monitoring, or risk of death. (Do not list inactive diagnoses)

1. DISEASES	(If none apply, CHECK the NONE OF ABOVE box)		
ENDOCRINE/METABOLIC	Diabetes mellitus Hypothyroidism Hypothyroidism	a. Hemiplegia/Hemiparesis b. Multiple sclerosis c. Paraplegia d. Parkinson's disease e. Quadriplegia	f. g. h. i. j.
HEART/CIRCULATION	Arteriosclerotic heart disease (ASHD) Cardiac dysrhythmias Congestive heart failure Deep vein thrombosis Hypertension Hypotension Peripheral vascular disease Other cardiovascular disease	k. Transient ischemic attack (TIA) l. Traumatic brain injury m. PSYCHIATRIC/MOOD n. Anxiety disorder o. Depression p. Manic depression (bipolar disease) q. Schizophrenia r. PULMONARY	s. t. u. v. w. x. y. z.
MUSCULOSKELETAL	Asthma Arthritis Hip fracture Missing limb(s), e.g., amputation Osteoporosis Pathological bone fracture	aa. Asthma ab. Emphysema/COPD ac. SENSORY ad. Cataracts ae. Diabetic retinopathy af. Glaucoma ag. Macular degeneration ah. OTHER ai. Allergies aj. Anemia ak. Cancer al. Renal failure am. NONE OF ABOVE	an. ao. ap. aq. ar. as. at. au.
NEUROLOGICAL	Alzheimer's disease Aphasia Cerebral palsy Cerebrovascular accident (stroke) Dementia other than Alzheimer's disease	av. Septicemia aw. Sexually transmitted diseases ax. Tuberculosis ay. Urinary tract infection in last 30 days az. Viral hepatitis ba. Wound infection bb. NONE OF ABOVE	bc. bd. be. bf. bg. bh. bi. bj. bk. bl. bm.
2. INFECTIONS	(If none apply, CHECK the NONE OF ABOVE box) Antibiotic resistant infection (e.g., Methicillin resistant staph) Clostridium difficile (c. diff.) Conjunctivitis HSV infection Pneumonia Respiratory infection		
3. OTHER CURRENT OR MORE DETAILED DIAGNOSES AND ICD-9 CODES	a. _____ b. _____ c. _____ d. _____ e. _____		

**SECTION J. HEALTH CONDITIONS**

1. PROBLEM CONDITIONS	(Check all problems present in last 7 days unless other time frame is indicated) INDICATORS OF FLUID STATUS Weight gain or loss of 3 or more pounds within a 7 day period Inability to lie flat due to shortness of breath Dehydrated, output exceeds input Insufficient fluid did NOT consume all/almost all liquids provided during last 3 days OTHER Delusions	a. Dizziness/Vertigo b. Edema c. Fever d. Hallucinations e. Internal bleeding f. Recurrent/tiring aspirators in last 90 days g. Shortness of breath h. Syncope (fainting) i. Unsteady gait j. Vomiting k. NONE OF ABOVE	l. m. n. o. p. q. r. s. t. u. v. w. x. y. z.
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Resident \_\_\_\_\_

Numeric Identifier \_\_\_\_\_

2. PAIN SYMPTOMS	(Code the highest level of pain present in the last 7 days) a. FREQUENCY with which resident complains or shows evidence of pain 0. No pain (skip to J4) 1. Pain less than daily 2. Pain daily	b. INTENSITY of pain 1. Mild pain 2. Moderate pain 3. Times when pain is horrible or excruciating	
3. PAIN SITE	(If pain present, check all sites that apply in last 7 days) Back pain Bone pain Chest pain while doing usual activities Headache Hip pain	a. Incisional pain b. Joint pain (other than hip) c. Soft tissue pain (e.g., lesion, muscle) d. Stomach pain e. Other	t p h l j
4. ACCIDENTS	(Check all that apply) Fell in past 30 days Fell in past 31-180 days	a. Hip fracture in last 180 days b. Other fracture in last 180 days NONE OF ABOVE	c. d. e.
5. STABILITY OF CONDITIONS	Conditions/diseases make resident's cognitive, ADL, mood or behavior patterns unstable—(fluctuating, precarious, or deteriorating) Resident experiencing an acute episode or a flare-up of a recurrent or chronic problem End-stage disease, 6 or fewer months to live NONE OF ABOVE		a. b. c. d.

**SECTION K. ORAL/NUTRITIONAL STATUS**

1. ORAL PROBLEMS	Chewing problem Swallowing problem Mouth pain NONE OF ABOVE		a. b. c. d.
2. HEIGHT AND WEIGHT	Record (a.) height in inches and (b.) weight in pounds. Base weight on most recent measure in last 30 days; measure weight consistently in accord with standard facility practice—e.g., in a.m. after voiding, before meal, with shoes off, and in nightclothes	a. HT (in.) b. WT (lb.)	
3. WEIGHT CHANGE	a. Weight loss—5% or more in last 30 days, or 10% or more in last 180 days 0. No 1. Yes b. Weight gain—5% or more in last 30 days, or 10% or more in last 180 days 0. No 1. Yes		
4. NUTRITIONAL PROBLEMS	Complains about the taste of many foods Regular or repetitive complaints of hunger	a. Leaves 25% or more of food uneaten at most meals b. NONE OF ABOVE	c. d.
5. NUTRITIONAL APPROACHES	(Check all that apply in last 7 days) Parenteral/IV Feeding tube Mechanically altered diet Syringe (oral feeding) Therapeutic diet	a. Dietary supplement between meals b. Plate guard, stabilized built-up utensil, etc. c. On a planned weight change program d. NONE OF ABOVE	t p h l
6. PARENTERAL OR ENTERAL INTAKE	(Skip to Section L if neither 5a nor 5b is checked) a. Code the proportion of total calories the resident received through parenteral or tube feedings in the last 7 days 0. None 1. 1% to 25% 2. 26% to 50% 3. 51% to 75% 4. 76% to 100% b. Code the average fluid intake per day by IV or tube in last 7 days 0. None 1. 1 to 500 cc/day 2. 501 to 1000 cc/day 3. 1001 to 1500 cc/day 4. 1501 to 2000 cc/day 5. 2001 or more cc/day		

**SECTION L. ORAL/DENTAL STATUS**

1. ORAL STATUS AND DISEASE PREVENTION	Debris (soft, easily movable substances) present in mouth prior to going to bed at night Has dentures or removable bridge Some/all natural teeth lost—does not have or does not use dentures (or partial plates) Broken, loose, or carious teeth Inflamed gums (gingivitis); swollen or bleeding gums; oral abscesses; ulcers or rashes Daily cleaning of teeth/dentures or daily mouth care—by resident or staff NONE OF ABOVE		a. b. c. d. e. f. g.
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**SECTION M. SKIN CONDITION**

1. ULCERS (Due to any cause)	(Record the number of ulcers at each ulcer stage—regardless of cause. If none present at a stage, record '0' (zero). Code all that apply during last 7 days. Code 9 = 9 or more.) [Requires full body exam.]	Number at Stage
	a. Stage 1. A persistent area of skin redness (without a break in the skin) that does not disappear when pressure is relieved. b. Stage 2. A partial thickness loss of skin layers that presents clinically as an abrasion, blister, or shallow crater. c. Stage 3. A full thickness of skin is lost, exposing the subcutaneous tissues - presents as a deep crater with or without undermining adjacent tissue. d. Stage 4. A full thickness of skin and subcutaneous tissue is lost, exposing muscle or bone.	
2. TYPE OF ULCER	(For each type of ulcer, code for the highest stage in the last 7 days using scale in item M1—i.e., 0=none; stages 1, 2, 3, 4) a. Pressure ulcer—any lesion caused by pressure resulting in damage of underlying tissue b. Stasis ulcer—open lesion caused by poor circulation in the lower extremities	
3. HISTORY OF RESOLVED ULCERS	Resident had an ulcer that was resolved or cured in LAST 90 DAYS 0. No 1. Yes	
4. OTHER SKIN PROBLEMS OR LESIONS PRESENT	(Check all that apply during last 7 days) Abrasions, bruises Burns (second or third degree) Open lesions other than ulcers, rashes, cuts (e.g., cancer lesions) Rashes—e.g., intertrigo, eczema, drug rash, heat rash, herpes zoster Skin desensitized to pain or pressure Skin tears or cuts (other than surgery) Surgical wounds NONE OF ABOVE	a. b. c. d. e. f. g. h. i. j.
5. SKIN TREATMENTS	(Check all that apply during last 7 days) Pressure relieving device(s) for chair Pressure relieving device(s) for bed Turning/repositioning program Nutrition or hydration intervention to manage skin problems Ulcer care Surgical wound care Application of dressings (with or without topical medications) other than to feet Application of antiseptics/medications (other than to feet) Other preventative or protective skin care (other than to feet) NONE OF ABOVE	a. b. c. d. e. f. g. h. i. j.
6. FOOT PROBLEMS AND CARE	(Check all that apply during last 7 days) Resident has one or more foot problems—e.g., corns, calluses, bunions, hammer toes, overlapping toes, pain, structural problems Infection of the foot—e.g., cellulitis, purulent drainage Open lesions on the foot Nails/calluses trimmed during last 90 days Received preventative or protective foot care (e.g., used special shoes, inserts, pads, toe separators) Application of dressings (with or without topical medications) NONE OF ABOVE	a. b. c. d. e. f. g.

**SECTION N. ACTIVITY PURSUIT PATTERNS**

1. TIME AWAKE	(Check appropriate time periods over last 7 days) Resident awake all or most of time (i.e., naps no more than one hour per time period) in the: Morning Afternoon Evening NONE OF ABOVE	a. b. c. d.
(If resident is comatose, skip to Section O)		
2. AVERAGE TIME INVOLVED IN ACTIVITIES	(When awake and not receiving treatments or ADL care) 0. Most—more than 2/3 of time 1. Some—from 1/3 to 2/3 of time 2. Little—less than 1/3 of time 3. None	
3. PREFERRED ACTIVITY SETTINGS	(Check all settings in which activities are preferred) Own room Day activity room Inside N/H unit Outside facility NONE OF ABOVE	a. b. c. d. e.
4. GENERAL ACTIVITY PREFERENCES (adapted to resident's current abilities)	(Check all PREFERENCES whether or not activity is currently available to resident) Cards/other games Crafts/arts Exercise/sports Music Reading/writing Spiritual/religious activities Trip/shopping Walking/wheeling outdoors Watching TV Gardening or plants Talking or conversing Helping others NONE OF ABOVE	a. b. c. d. e. f. g. h. i. j. k. l. m.



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5.	<b>PREFERS CHANGE IN DAILY ROUTINE</b>	Code for resident preferences in daily routines 0. No change    1. Slight change    2. Major change a. Type of activities in which resident is currently involved b. Extent of resident involvement in activities		
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**SECTION O. MEDICATIONS**

1.	<b>NUMBER OF MEDICATIONS</b>	(Record the number of different medications used in the last 7 days, enter 0 if none used)		
2.	<b>NEW MEDICATIONS</b>	(Resident currently receiving medications that were initiated during the last 90 days) 0. No    1. Yes		
3.	<b>INJECTIONS</b>	(Record the number of DAYS injections of any type received during the last 7 days, enter 0 if none used)		
4.	<b>DAYS RECEIVED THE FOLLOWING MEDICATION</b>	(Record the number of DAYS during last 7 days, enter 0 if not used. Note—enter 0 for long-acting meds used less than weekly) a. Antipsychotic b. Antianxiety c. Antidepressant d. Hypnotic e. Diuretic		

**SECTION P. SPECIAL TREATMENTS AND PROCEDURES**

1.	<b>SPECIAL TREATMENTS, PROCEDURES, AND PROGRAMS</b>	a. SPECIAL CARE—Check treatments or programs received during the last 14 days <b>TREATMENTS</b> Ventilator or respirator Chemotherapy Dialysis IV medication Intake/output Monitoring acute medical condition Ostomy care Oxygen therapy Radiation Suctioning Tracheostomy care Transfusions b. THERAPIES—Record the number of days and total minutes each of the following therapies was administered (for at least 15 minutes a day) in the last 7 calendar days (Enter 0 if none or less than 15 min. daily) [Note—count only post admission therapies] (A) = # of days administered for 15 minutes or more (B) = total # of minutes provided in last 7 days																										
		<table border="0"> <tr> <td>a.</td> <td>PROGRAMS</td> <td></td> </tr> <tr> <td>b.</td> <td>Alcohol/drug treatment program</td> <td></td> </tr> <tr> <td>c.</td> <td>Alzheimer/side dementia special care unit</td> <td></td> </tr> <tr> <td>d.</td> <td>Hospice care</td> <td></td> </tr> <tr> <td>e.</td> <td>Pediatric unit</td> <td></td> </tr> <tr> <td>f.</td> <td>Respite care</td> <td></td> </tr> <tr> <td>g.</td> <td>Training in skills required to return to the community (e.g., taking medications, house work, shopping, transportation, ADLs)</td> <td></td> </tr> <tr> <td>h.</td> <td>NONE OF ABOVE</td> <td></td> </tr> </table>	a.	PROGRAMS		b.	Alcohol/drug treatment program		c.	Alzheimer/side dementia special care unit		d.	Hospice care		e.	Pediatric unit		f.	Respite care		g.	Training in skills required to return to the community (e.g., taking medications, house work, shopping, transportation, ADLs)		h.	NONE OF ABOVE			
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2.	<b>INTERVENTION PROGRAMS FOR MOOD, BEHAVIOR, COGNITIVE LOSS</b>	(Check all interventions or strategies used in last 7 days—no matter where received) Special behavior symptom evaluation program Evaluation by a licensed mental health specialist in last 90 days Group therapy Resident-specific deliberate changes in the environment to address mood/behavior patterns—e.g., providing bureau in which to rummage Reorientation—e.g., using NONE OF ABOVE																										
3.	<b>NURSING REHABILITATION RESTORATIVE CARE</b>	Record the NUMBER OF DAYS each of the following rehabilitation or restorative techniques or practices was provided to the resident for more than or equal to 15 minutes per day in the last 7 days (Enter 0 if none or less than 15 min. daily) a. Range of motion (passive) b. Range of motion (active) c. Splint or brace assistance <b>TRAINING AND SKILL PRACTICE IN:</b> d. Bed mobility e. Transfer																										
		<table border="0"> <tr> <td>f.</td> <td>Walking</td> <td></td> </tr> <tr> <td>g.</td> <td>Dressing or grooming</td> <td></td> </tr> <tr> <td>h.</td> <td>Eating or swallowing</td> <td></td> </tr> <tr> <td>i.</td> <td>Amputation/prosthesis care</td> <td></td> </tr> <tr> <td>j.</td> <td>Communication</td> <td></td> </tr> <tr> <td>k.</td> <td>Other</td> <td></td> </tr> </table>	f.	Walking		g.	Dressing or grooming		h.	Eating or swallowing		i.	Amputation/prosthesis care		j.	Communication		k.	Other									
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4.	<b>DEVICES AND RESTRAINTS</b>	(Use the following codes for last 7 days) 0. Not used 1. Used less than daily 2. Used daily Bed rails a. — Full bed rails on all open sides of bed b. — Other types of side rails used (e.g., half rail, one side) c. Trunk restraint d. Limb restraint e. Chair prevents rising		
5.	<b>HOSPITAL STAY(S)</b>	Record number of times resident was admitted to hospital with an overnight stay in last 90 days (or since last assessment if less than 90 days). (Enter 0 if no hospital admissions)		
6.	<b>EMERGENCY ROOM (ER) VISIT(S)</b>	Record number of times resident visited ER without an overnight stay in last 90 days (or since last assessment if less than 90 days). (Enter 0 if no ER visits)		
7.	<b>PHYSICIAN VISITS</b>	In the LAST 14 DAYS (or since admission if less than 14 days in facility) how many days has the physician (or authorized assistant or practitioner) examined the resident? (Enter 0 if none)		
8.	<b>PHYSICIAN ORDERS</b>	In the LAST 14 DAYS (or since admission if less than 14 days in facility) how many days has the physician (or authorized assistant or practitioner) changed the resident's orders? Do not include order renewals without change. (Enter 0 if none)		
9.	<b>ABNORMAL LAB VALUES</b>	Has the resident had any abnormal lab values during the last 90 days (or since admission)? 0. No    1. Yes		

**SECTION Q. DISCHARGE POTENTIAL AND OVERALL STATUS**

1.	<b>DISCHARGE POTENTIAL</b>	a. Resident expresses/indicates preference to return to the community 0. No    1. Yes b. Resident has a support person who is positive towards discharge 0. No    1. Yes c. Stay projected to be of a short duration—discharge projected within 90 days (do not include expected discharge due to death) 0. No    1. Within 30 days    2. Within 31-90 days    3. Discharge status uncertain		
2.	<b>OVERALL CHANGE IN CARE NEEDS</b>	Resident's overall self sufficiency has changed significantly as compared to status of 90 days ago (or since last assessment if less than 90 days) 0. No change    1. Improved—receives fewer supports, needs less restrictive level of care    2. Deteriorated—receives more support		

**SECTION R. ASSESSMENT INFORMATION**

1.	<b>PARTICIPATION IN ASSESSMENT</b>	a. Resident:    0. No    1. Yes b. Family:    0. No    1. Yes    2. No family c. Significant other:    0. No    1. Yes    2. None												
2. SIGNATURE OF PERSON COORDINATING THE ASSESSMENT:														
a. Signature of RN Assessment Coordinator (sign on above line)														
b. Date RN Assessment Coordinator signed as complete														
			<table border="0"> <tr> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td>Month</td> <td>Day</td> <td>Year</td> <td></td> <td></td> </tr> </table>	□	□	□	□	□	Month	Day	Year			
□	□	□	□	□										
Month	Day	Year												

## Appendix H

### Mini Mental Status Examination (MMSE)

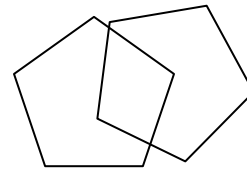
Participant ID #: \_\_\_\_\_ Date: \_\_\_\_\_

Participant's Highest Level of Education: \_\_\_\_\_

<u>Maximum Score</u>	<u>Score</u>	<u>ORIENTATION</u>
5	( )	What is the (year) (season) (date) (day) (month)?
5	( )	Where are we: (state) (county) (town) (hospital) (floor)?
3	( )	<p><u>REGISTRATION</u> Name 3 objects: One syllable words, 1 second to say each. Then ask the patient all 3 after you have said them.</p> <p>Give 1 point for each correct answer. Then repeat them until he learns all 3. Count trials and record. Trials _____</p>
5	( )	<p><u>ATTENTION AND CALCULATION</u> Serial 7's. 1 point for each correct. Stop after 5 answers. Alternatively spell "world" backwards. 100 – 93 – 86 – 79 – 72 – 65 – 58</p>
3	( )	<p><u>RECALL</u> Ask for 3 objects repeated above. Give 1 point for each correct.</p>
9	( )	<p><u>LANGUAGE</u> Name a pencil, and watch (2 points)</p> <p>( ) Repeat the following: "No ifs, and or buts." (1 point)</p> <p>( ) Follow a 3-stage command: "Take this paper in your right hand, fold it in half, and put it on the floor." (3 points)</p> <p>( ) Read and obey the following: "Close your eyes" (1 point)</p> <p>( ) Write a sentence. (1 point)</p> <p>( ) Copy design. (1 point)</p>

\_\_\_\_\_

**Total Score**



Assess level of consciousness along a continuum. \_\_\_\_\_

(Alert)    (Drowsy)    (Stupor)    (Coma)

M. F. Folstein, S. E. Folstein, and P. R. McHugh. "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12:189-198, 1975.



**INSTRUCTIONS FOR ADMINISTRATION OF  
MINI MENTAL STATUS EXAMINATION**

**ORIENTATION**

1. Ask for the date. Then ask specifically for parts omitted. e.g., "Can you also tell me what season it is?" One point for each correct.
2. Ask in turn, "Can you tell me the name of this place?", town, county, etc. One point for each correct.

**REGISTRATION**

Tell the person you are going to test their memory. Then say the names of three unrelated objects, clearly and slowly, about one second for each. After you have said all three, ask him to repeat them. This first repetition determines his score (0-3) but keep saying them until he can repeat all three, up to six trials. If the subject does not eventually learn all three, recall cannot be meaningfully tested.

**ATTENTION AND CALCULATION**

Ask the subject to begin with 100 and count backwards by 7. Stop after five subtractions. Score the total number of correct answers.

If the subject cannot or will not perform this task, ask him to spell the word "world" backwards. The score is the number of letters in correct order. e.g., dlrow = 5 points, dlorw = 3 points.

**RECALL**

Ask the patient if he can recall the three words you previously asked him to remember. One point for each correctly recalled.

**LANGUAGE**

Naming: Show the subject a wristwatch and ask her what it is. Repeat with a pencil. One point for each named correctly.

Repetition: Ask the patient to repeat the sentence after you. Allow only one trial.

3 Stage Command: give the verbal instructions, then present the subject a sheet of paper. One point for each part of the command that is correctly executed.

Reading: Have the subject read the phrase "CLOSE YOUR EYES". The letters should be large and dark enough for the subject to read. Ask him to "Read the sentence and do what it says." Score correctly only if they read and the phrase and close their eyes.

Writing: Give the subject a blank piece of paper and ask her write a sentence for you. Do not dictate sentence, it is to be written by the subject spontaneously. To score correctly, it must contain a subject and verb and be sensible. It should be a complete thought. Correct grammar and punctuation are NOT necessary.

Copying: On a piece of paper, draw intersecting pentagons, each side about one inch and ask him to copy it exactly as it is. To score correctly, all ten angles must be present AND two must intersect. Tremor and rotation are ignored.

Estimate the subject's level of sensorium along a continuum, from alert to coma.

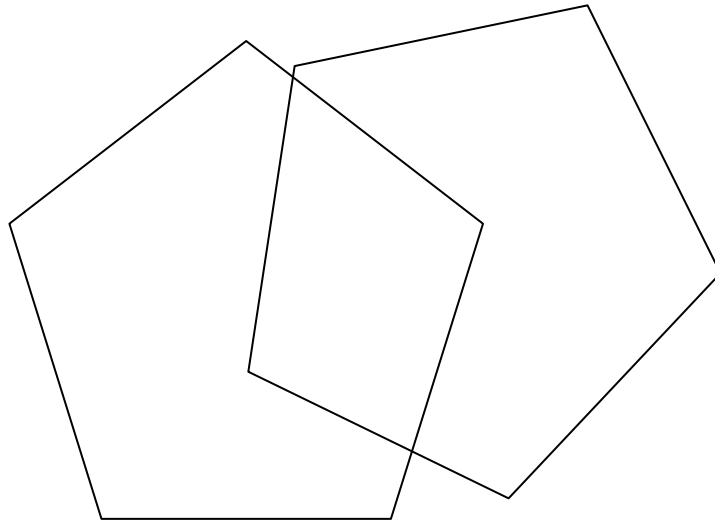
**TOTAL SCORE POSSIBLE = 30**

**0-12: SEVERE DEMENTIA**

**13-22: MODERATE DEMENTIA**

**23-24: MILD DEMENTIA**

**25-30: NORMAL AGING**



**Close your eyes.**

## Appendix I

### Procedure and Script for Screening Questions

Hello. Thank you for calling to find out more about the research study being conducted at [Name of Nursing Home].

My name is Cherie Ann Soprano, and I am a doctoral student researcher at The Pennsylvania State University. The purpose of my study is to look at the relationship between passive behavior and Animal-Assisted Therapy. Specifically, I want to determine whether Animal-Assisted Therapy is an effective treatment for responding to passive behavior in elderly nursing home residents with dementia.

I am seeking four nursing home resident volunteers to partake in the study. The [Name of Nursing Home Administrator or Designated Staff Member] has informed me that you have a resident at [Name of Facility] who may be a potential candidate for the study. I'd like to tell you more about the study.

As part of the formal study, I will be conducting Animal-Assisted Therapy with eligible participants. The Animal-Assisted Therapy activities include: brushing the dog's fur, playing with and holding the dog, feeding the dog treats, talking to or about the dog to the handler, talking about previous pets he/she owned or knew, and walking with/wheeling with the dog, if able. The human-animal interaction will be videotaped and measures of the participant's passive behavior will be obtained from the videotapes.

Before I go any further, do I have your permission to ask you about your nursing home resident's potential interest in participating in the study?

{If No}: Thank you very much for calling.

{If Yes}: Thank you. Before your nursing home resident can be considered for enrollment into the study, I need to know, to the best of your knowledge, if your nursing home resident is afraid of dogs?

{If Yes}: Thank you very much for calling. Your nursing home resident does not meet the study's eligibility criteria.

{If No}: To the best of your knowledge, does your nursing home resident have an allergy to dogs?

{If Yes}: Thank you very much for calling. Your nursing home resident does not meet the study's eligibility criteria.

{If No}: Do you believe your nursing home resident would like to participate in this study?

{If No}: Thank you very much for calling.

{If Yes}: It appears your nursing home resident meets preliminary eligibility criteria. At this time, I cannot collect any other information from you about your nursing home resident until you have read, signed, and returned the informed consent form. The informed consent form provides a detailed explanation of the study. I will mail two copies of the informed consent form. I ask that you sign both copies. Mail one copy to me, in the self-addressed stamped envelope enclosed, and keep the other copy as a reference for your records. If you have any questions you may contact me, Cherie Soprano, at 570.881.3425. Once I receive the signed informed consent form, I will need to ask you a few more questions about your nursing home resident's interest or attachment to dogs at a time when it is convenient for you.

## Appendix J

### Cornell Scale for Depression in Dementia (CSDD)

Participant ID#: \_\_\_\_\_

#### Scoring System

a = unable to evaluate                      0 = absent                      1 = mild or intermittent                      2 = severe

Ratings should be based on symptoms and signs occurring during the week prior to interview. No score should be given in symptoms result from physical disability or illness.

#### A. Mood-Related Signs

1. Anxiety: anxious expression, ruminations, worrying	a	0	1	2
2. Sadness: sad expression, sad voice, tearfulness	a	0	1	2
3. Lack of reactivity to pleasant events	a	0	1	2
4. Irritability: easily annoyed, short-tempered	a	0	1	2

#### B. Behavioral Disturbance

5. Agitation: restlessness, hand wringing, hair pulling	a	0	1	2
6. Retardation: slow movement, slow speech, slow reactions	a	0	1	2
7. Multiple physical complaints (score 0 if GI symptoms only)	a	0	1	2
8. Loss of interest: less involved in usual activities (score only if change occurred acutely, e.g., in less than 1 month)	a	0	1	2

#### C. Physical Signs

9. Appetite loss: eating less than usual	a	0	1	2
10. Weight loss (score 2 if greater than 5 lb. in 1 month)	a	0	1	2
11. Lack of energy: fatigues easily, unable to sustain activities (score only if change occurred acutely, e.g., in less than 1 month)	a	0	1	2

#### D. Cyclic Functions

12. Diurnal variation of mood: symptoms Worse in the morning	a	0	1	2
13. Difficulty falling asleep: later than usual for this individual	a	0	1	2
14. Multiple awakenings during sleep	a	0	1	2
15. Early morning awakening: earlier than usual for this individual	a	0	1	2

#### E. Ideational Disturbance

16. Suicide: feels life is not worth living, has suicidal wishes, or makes suicide attempt	a	0	1	2
17. Poor self esteem: self-blame, self-depreciation, feelings of failure	a	0	1	2
18. Pessimism: anticipation of the worst	a	0	1	2
19. Mood congruent delusions: delusions of poverty, illness, or loss	a	0	1	2

TOTAL SCORE: \_\_\_\_\_

**Interpretation of the Total Score:** A total score of 8 or more suggests significant depressive symptoms.

Adapted from: Alexopoulos, et al. Cornell Scale for Depression in Dementia. *Biological Psychiatry* 1988; 23(3):271-284.

## Appendix K

### Modified Hachinski Scale

**Participant ID#:** \_\_\_\_\_

#### **Multi-infarct dementia**

The characteristic features include stepwise deterioration and patchy distribution of deficits, focal neurologic signs and evidence of vascular disease as indicated by history, physical examination and laboratory testing.

Characteristic	Value		Participant Score
	Point YES	NO	
Abrupt onset	<b>2</b>		
Stepwise progression	<b>1</b>		
Somatic complaints	<b>1</b>		
Emotional incontinence	<b>1</b>		
History of hypertension	<b>1</b>		
History of stroke	<b>2</b>		
Focal neurologic signs	<b>2</b>		
Focal neurologic symptoms	<b>2</b>		
			<b>Total Score =</b>

**SCORING:** Dementia is not likely to be due to vascular causes if the total score is 4 or less; dementia is likely to be due to vascular causes if the total score is 7 or more.

## Appendix L

## Chart Review &amp; Demographic Data Form

<b>Date of Review:</b>	
<b>A</b>	<b>Participant ID#:</b>
<b>B</b>	<b>Facility:</b>
<b>C</b>	<b><i>MDS 2.0 - Section AA: Identification Information</i></b>
	<b>Gender:</b>
	<b>Age:</b>
	<b>Race/Ethnicity:</b>
<b>D</b>	<b><i>MDS 2.0 - Section AB: Demographic Information</i></b>
	<b>Date of Admission (90 day residency requirement):</b>
	<b>English Language:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
	<b>Level of Education:</b>
	<b>Occupation:</b>
<b>E</b>	<b><i>MDS 2.0 - Section A: Identification &amp; Background Information</i></b>
	<b>Marital Status:</b>
<b>F</b>	<b><i>MDS 2.0 - Section C: Communication/Hearing Patterns</i></b>
	<b>Adequate Hearing [0 or 1]:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>G</b>	<b><i>MDS 2.0 - Section D: Vision Patterns</i></b>
	<b>Adequate Vision [0 or 1]:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>H</b>	<b><i>MDS 2.0 - Section I: Disease Diagnoses</i></b>
	<b>Type of Dementia:</b>
	<b>Asthma:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
	<b>Allergies (specify):</b>
	<b>List Medical Diseases &amp; Infections:</b>
	<b>Problem Conditions (MDS 2.0 –Section J: Health Conditions):</b>
<b>I</b>	<b>Modified Hachinski Scale Score:</b>
<b>J</b>	<b>Mini Mental Status Exam (MMSE) Score:</b>
<b>K</b>	<b><i>MDS 2.0 - Section B: Cognitive Patterns – Indicators of Delirium</i></b>
	<b>Delirium Present:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>L</b>	<b>Cornell Scale for Depression in Dementia Score:</b>
<b>M</b>	<b>Evidence of Passive Behavior (Staff report, nurse’s notes, and MDS 2.0 – Section B: Cognitive Patterns; Section E: Mood &amp; Behavior Patterns; Section F: Psychosocial Well-Being; and Section N: Activity Pursuit Patterns):</b>
<b>N</b>	<b>List <u>all</u> prescribed medications &amp; when they were prescribed (Medication Administration Record and MDS 2.0 – Section O: Medications):</b>



## Appendix M

## Subjects' Medication List

ID	Name, Dose, Frequency of Medication		
1	- ASA 81 mg daily - Citalopram 20 mg daily - MVI daily - Aricept 10 mg bedtime	- Tylenol 650 mg prn - MOM 30 mL prn - Dulcolax 10 mg prn - Cepacol lozenge prn	- Compazine 5 mg IM for nausea prn - Lomotil prn
2	- Synthroid 25 mcg daily - ASA 81 mg daily - Lexapro 20 mg daily - Seroquel 25 mg daily in am - Seroquel 50 mg daily @ bedtime	- Cosopt i gtt OU BID - Pilocarpine 1% i gtt Left eye BID - Xalatan 0.005% i gtt OU @ bedtime	- Tylenol 650 mg prn - MOM 30 mL prn - Dulcolax 10 mg prn - Hydroxyzine 25 mg prn for itching
3	- Synthroid 88 mcg daily - Amaryl 2 mg daily - MVI daily	- Reminyl 4 mg BID - Glucophage 1000 mg - Remeron 15 mg @ bedtime	- Tylenol 650 mg prn - MOM 30 mL prn - Dulcolax 10 mg prn
4	- ASA 81 mg daily - Celexa 20 mg daily - Klonopin 1 mg daily in am - Klonopin 0.5 mg @ bedtime - Lisinopril 10 mg daily - Plavix 75 mg daily	- Toprol XL 100 mg daily - Digitek 125 mcg daily - Zocor 20 mg @ supper - Mucinex DM i tab BID - Namenda 10 mg BID - Aricept 10 mg @ bedtime	- Tylenol 650 mg prn - MOM 30 mL prn - Dulcolax 10 mg pr - Imodium 2mg prn
5	- Plavix 75 mg daily - ASA 81 mg daily - Namenda 10 mg daily am - Aricept 10 mg @ bedtime - Digitek 125 mcg daily - KCl 10 mEq daily	- Omeprazole 20 mg daily - Amiodarone HCl 200 mg daily - Oscal 500 mg daily - Synthroid 0.05 mg daily - Sertraline 100 mg daily - Tylenol 650 mg prn	- MOM 30 mL prn - Dulcolax 10 mg prn - Imodium 2mg prn - Robitussin DM prn - Darvocet N-100 i tab prn for pain
6	- ASA 81 mg daily - Namenda 10 mg BID - Klonopin 0.25 mg BID	- Remeron 15 mg @ bedtime - Glycolax 17 grams daily - Simvastatin 20 mg daily	- Tylenol 650 mg prn - MOM 30 mL prn
7	- Nitroglycerine 0.2 mg/hr patch daily - Glycolax 17 grams daily - Tylenol 650 mg prn	- MOM 30 mL prn - Dulcolax 10 mg prn - Imodium 2mg prn - Robitussin DM prn	- Vicodin 5/500 i tab prn for pain (mod/severe)
8	- Synthroid 125 mcg daily - Zantac 150 mg daily - ASA 81 mg daily - Oscal 500 mg daily - Lipitor 10 mg daily @ supper - Calcitriol 0.25 mcg BID	- Pletal 100 mg BID - Depakote sprinkles 500 mg BID - Aricept 10 mg @ bedtime - Remeron 15 mg @ bedtime - Senna – S ii tabs @ bedtime	- Tylenol 650 mg prn - MOM 30 mL prn - Dulcolax 10 mg prn

Psychoactive medications are highlighted in **YELLOW**.



## Appendix N

## Charlson Weighted Index of Comorbidity

Assigned Weighted for Diseases	Conditions
1	<b>Myocardial infarct</b> <b>Congestive heart failure (CHF)</b> <b>Cerebrovascular disease</b> <b>Dementia</b> <b>Chronic pulmonary disease</b> <b>Connective tissue disease</b> <b>Ulcer disease</b> <b>Mild liver disease</b> <b>Diabetes</b>
2	<b>Hemiplegia</b> <b>Moderate or severe renal damage</b> <b>Diabetes with end organ damage</b> <b>Any tumor</b> <b>Leukemia</b> <b>Lymphoma</b>
3	<b>Moderate or severe liver disease</b>
6	<b>Metastatic solid tumor</b> <b>Acquired immunodeficiency syndrome (AIDS)</b>

Assigned weight for each condition that a patient has. The total equals the score.

Example: chronic pulmonary (1) and lymphoma (2), plus dementia (1) = (4).

Assigned score: \_\_\_\_\_

## Appendix O

### Animal-Assisted Therapy (AAT) Protocol for Phases B<sub>1</sub> and B<sub>2</sub>

**Veterinarian/Consultant:** Dr. Nancy Dreschel, DVM  
 312 Agricultural Sciences & Industries Building, University Park, 16802  
[nad5@psu.edu](mailto:nad5@psu.edu) – (814) 863-4197

This protocol will be used during the AAT intervention phases (Phase B<sub>1</sub> and Phase B<sub>2</sub>) of the study. AAT will take place in room designated by the nursing home. This room will be isolated from the commotion of the unit. The principal investigator (PI) is the dog handler. She received training in AAT by completing the Delta Society's Pet Partners® Team Training Course Home Study Program, a national training and certification program for those who participate in Animal-Assisted Activities (AAA) and AAT. All of the therapy dogs (3 shihtzus) participating in this study have had an annual physical examination by a licensed veterinarian. The therapy dogs have been determined to be free of infections and parasites and are up to date on their vaccinations. Documentation of pet health status will be kept on-site with the PI during the entire study. The dogs weigh between 7.5 to 13 pounds. The dogs will be clean, carefully groomed, and checked for external parasites (fleas, ticks, lice) prior to each AAT visit. Their nails will be trimmed and filed. They will be exercised prior to each AAT visit to reduce excess excitement and to provide opportunity for elimination. All of the dogs participating in this study are mild tempered, friendly, and display no aggression. A lap pad or blanket will be placed between the participant and the dog when the dog is sitting on the participant's lap. The dog will remain on a 6 foot leash at all times to prevent jumping. Proper and frequent hand washing will be encouraged prior to and after the AAT sessions.

Only one dog will participate in AAT at any given time. If something occurs with one dog (e.g., stress, illness) another dog approved by the Institutional Animal Care and Use Committee will be used. The PI is aware of and will be alert to signs of stress in the dog (e.g., panting, pacing, sweating paw pads, withdrawing from the participant). Water will be available for the dog to drink

Veterinarian/consultant, Dr. Nancy Dreschel, is involved with guiding the PI on this protocol. Dr. Dreschel's expertise is in the area of companion animals. She has also completed the Delta Society's Pet Partners® Team Training Course Home Study Program. Dr. Dreschel will be available to advise the PI about the care and use of the therapy dogs and to answer any questions that may arise regarding the dogs during the course of the study.

During the AAT sessions, the participant will be asked to participate in AAT for 20 minutes each day for 8 consecutive days (at the peak behavior time established in pre-baseline). During AAT, the participant will be encouraged to pet the dog, brush the dog's fur, play with and hold the dog, feed the dog treats, talk to or about the dog to the handler, talk about previous pets he/she owned or knew, and walk with/wheel with the dog, if able. The participant will be videotaped during each 20-minute session. A trained research assistant (RA) will take measures of the participant's passive behavior from the videotapes.

Checklist of items for AAT:

√	Name of Item
	Dog bathed, groomed, checked for external parasites
	Toe nails trimmed and filed
	Vaccination record available
	6 foot leash
	Lap pad or blanket
	Doggie toys & water bowl
	Doggy treats
	Brush
	Sanitary hand wipes or hand disinfectant
	Breath mints

1. The participant will be asked if he/she needs to use the restroom prior to the conduction of the AAT session.
2. Assent will be obtained. "(Name of participant) today I have brought a dog with me. Would you like to be involved with the dog activities for today?"
3. The participant will be taken to the designated room for the AAT intervention.
4. Videotaping will begin as soon as the dog and handler approach the participant.
5. The participant will be approached from the front.
6. The handler will make visual and verbal contact with the participant. "Hi"[Name of participant]. Look who I brought to visit you today [Name of dog]."
7. Do not let the dog get too close before the participant is aware that the dog is there.

During steps 1 through 7 the handler will smile at the participant, make eye contact with the participant and then shift her eyes toward the dog. The handler will pet the dog. The handler will use hand gestures leaning toward the dog and direct the dog's attention from the handler toward the participant. The handler will make every effort to let the participant lead any conversation during the AAT sessions.

8. Allow the dog to lead. If eye contact is made, the participant may call the dog. The handler will follow from there.
9. The handler will ask the participant if he she wants to meet the dog and will talk for the dog. For example, "[Name of dog] wants to visit with you today. She wants to know if you will pet her."
10. The handler will present the dog at the participant's waist-level or below, not from above or at their face level.
11. The handler will present the dog by turning it sideways or backward. This will prevent the dog from becoming poked in the face.
12. The handler will move slowly. If the participant does not reach out to touch the dog, the handler will carefully take the participant's hand and move it slowly to the dog while asking if he/she wants to pet the dog.
13. Since the therapy dogs are small, the handler will ask the participant if he/she would like the dog on his/her lap, and proceed to place a pad (barrier) down on the participant's lap and then place the dog on the participant's lap, never in his/her hands or arms.
  - 13a. If the participant resists in any way, stop. If the person refuses, the handler will respect that.
  - 13b. If there is no acceptance, but no resistance, or if there is open, active acceptance, the handler will proceed to place the dog on the participant's lap.
14. "[Name of dog] likes to be scratched here." Handler will demonstrate.
15. The handler will interpret the dog's actions. "She likes you." "Look, she wants you to do that again."
16. The handler will guide the participant to feel the dog's ears, nose, and tail.
17. If at any the dog's welfare is threatened or the dog shows excessive signs of stress, the dog will be removed from the situation. The AAT activities will end for that day.
18. Allow the participant to sit quietly and stroke or hold the dog. Actions or words are not always necessary. The handler will smile at the participant and direct her eyes toward the dog
19. The handler will offer a brush to the participant and guide the participant in brushing the dog.
20. If the participant's medical record indicates that he/she is capable of ambulation, the handler will assist the participant to walk with the dog on a leash. This can be a special treat for someone in a wheelchair as well. If the participant is in a wheelchair, the handler will state, "I will wheel you from behind and you can walk the dog from your chair. You may hold on to the leash." The videotaping RA will follow to capture the activity, videotaping only the participant and the dog.
21. The handler will encourage the participant to give the dog a special treat. The treat will be placed in the participant's hand. "[Name of dog] would love it if you feed her this favorite treat."
22. The handler will encourage the participant to play with the dog by handing the participant the dog's favorite toy.
23. The handler will allow the dog to sleep on the floor next to the participant or on the participant's lap.
24. Encourage the participant to look at the dog in preparation for discussion of feelings. The handler will state, "How do you think [Name of dog] is feeling?"
25. The handler will then ask, "[How do you feel about [Name of dog]?"

26. Should the participant engage in socialization about the dog or past pets, the handler will use therapeutic communication techniques such as restating, exploring, and clarifying. The handler will use general leads such as "Go on," or "Tell me about ...". This allows the participant to direct the conversation.
27. The video camera RA will be keeping time. Eighteen (18) minutes in to the intervention, the video RA will hold up two fingers making sure the handler sees this signal. The handler will prepare to end the AAT session.
28. The handler will state, "It is time for [Name of dog] to say good-bye for today." "[Name of dog] enjoyed visiting with you today."
29. The handler will encourage the participant to say good-bye. "Say good-bye to [Name of dog]."
30. If the dog is still on the participant's lap, the handler will pick the dog up and place the dog on the floor.
31. The handler will remove the pad (barrier) and collect all the dog's belongings.
32. The handler will state, "We will back to visit you again soon."
33. If the handler has difficulty breaking away from the participant, the handler will state, "I have to be going because I have other people to visit, too."
34. As the handler walks away, videotaping stops.
35. The dog is secured away from the participant.
36. The handler will return to the participant and will offer the participant a sanitary hand wipe or hand disinfectant. If the participant does not wipe his/her hands, the handler will assist the participant in doing so.

## Appendix P

### Script for Participant Assent

**During Pre-Baseline - Days 1 to 3:**

Hello [Name of Participant]. My name is Cherie Soprano. I would like to observe you today. Would that be alright with you?

**During Baseline (Phase A) – Days 4 to 11:**

Hello [Name of Participant]. My name is Cherie Soprano. I would like to observe you today. We will be videotaping you. Would that be alright with you?

**During AAT Intervention (Phases B<sub>1</sub> and B<sub>2</sub>):**

Hello [Name of Participant]. My name is Cherie Soprano. Look who I brought today (show participant the dog). We would like for you to join us today. We will be videotaping the activities. Would you like to join us?

**During Control/Reversal Phase (Phase A'):**

Hello [Name of Participant]. My name is Cherie Soprano. I would like to sit with you today. We will be videotaping you and I. Would that be alright with you?

**At Follow-up:**

The research assistant trained in rating the videodiscs will approach the participant. Hello [Name of Participant]. My name is [Name of Research Assistant]. I will be observing you today for 20 minutes. Will that be alright with you?

If at any time during any phase of the study the participant refuses to give verbal assent, the PI will return 5 minutes later and ask for verbal assent once again. If the participant refuses to give his/her verbal assent on the second attempt no data will be collected on that particular day.

## Appendix Q

**RM-ANCOVA – Solution for the Fixed Effects and  
Type 3 Tests of Fixed Effects at 5, 10, 15, and 20-Minute Blocks of Time of O-PDS**

Pooled O-PDS Mean Sum Scores @ 5-Minutes RM-ANCOVA Solution for Fixed Effects					
Effect	Est.	SE	DF	t Value	Pr >  t
Phase A	20.18	4.38	16.4	4.61	0.0003
Phase B1	28.28	4.12	13.9	6.86	<.0001
Phase A´	23.55	4.28	15.5	5.50	<.0001
Phase B2	27.66	4.15	14.2	6.67	<.0001
Phase F/U	20.14	4.42	14.6	4.55	0.0004
Years of Stay In Nsg Home	-0.63	0.35	13.2	-1.78	0.10
MMSE	-1.30	0.31	13.2	-4.18	0.001
CSDD	0.51	0.22	13.2	2.25	0.04

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

Effects	Type 3 Tests of Fixed Effects @ 5-Minutes			
	Num DF	Den DF	F-Value	Pr > F
Period	5	9.32	18.30	0.0001
Years of Stay	1	13.2	3.16	0.0983
MMSE	1	13.2	17.50	0.0010
CSDD	1	13.2	5.07	0.0419

<b>Pooled O-PDS Mean Sum Scores @ 10-Minutes RM-ANCOVA Solution for Fixed Effects</b>					
<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	7.28	3.24	44.9	2.25	0.03
<b>Phase B1</b>	18.06	3.15	43.1	5.74	<.0001
<b>Phase A'</b>	10.23	3.22	45	3.18	0.003
<b>Phase B2</b>	18.09	3.14	43	5.76	<.0001
<b>Phase F/U</b>	4.52	3.42	45.6	1.32	0.19
<b>Years of Stay In Nsg Home</b>	-0.20	0.25	38.5	-0.80	0.43
<b>MMSE</b>	-0.42	0.24	44.4	-1.68	0.100
<b>CSDD</b>	0.13	0.17	41.5	0.79	0.43

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

<b>Effects</b>	<b>Type 3 Tests of Fixed Effects @ 10-Minutes</b>			
	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	22.3	72.24	< 0.0001
<b>Years of Stay</b>	1	38.5	0.63	0.4305
<b>MMSE</b>	1	44.4	2.83	0.0996
<b>CSDD</b>	1	41.5	0.62	0.4347

<b>Pooled O-PDS Mean Sum Scores @ 15-Minutes</b>					
<b>RM-ANCOVA</b>					
<b>Solution for Fixed Effects</b>					
<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	4.91	3.69	39.1	1.33	0.19
<b>Phase B1</b>	15.54	3.64	38.7	4.27	0.0001
<b>Phase A´</b>	8.02	3.68	39.4	2.18	0.04
<b>Phase B2</b>	14.66	3.66	39.4	4.00	0.0003
<b>Phase F/U</b>	3.04	3.74	37.3	0.81	0.42
<b>Years of Stay In Nsg Home</b>	-0.13	0.30	36.8	-0.44	0.67
<b>MMSE</b>	-0.28	0.28	39.4	-0.98	0.33
<b>CSDD</b>	0.14	0.20	38.5	0.71	0.48

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

<b>Type 3 Tests of Fixed Effects @ 15-Minutes</b>				
<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	20.2	139.78	< 0.0001
<b>Years of Stay</b>	1	36.8	0.19	0.6660
<b>MMSE</b>	1	39.4	0.96	0.3328
<b>CSDD</b>	1	38.5	0.50	0.4844



**Pooled O-PDS Mean Sum Scores @ 20-Minutes  
RM-ANCOVA  
Solution for Fixed Effects**

<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	4.85	1.79	7.13	2.70	0.03
<b>Phase B1</b>	14.99	1.76	6.98	8.52	<.0001
<b>Phase A'</b>	7.76	1.85	8.36	4.19	0.003
<b>Phase B2</b>	15.51	1.68	5.8	9.23	0.0001
<b>Phase F/U</b>	0.87	1.68	5.42	0.52	0.63
<b>MMSE</b>	-0.23	0.14	5.01	-1.72	0.14

Est. = Estimate

SE = Standard Error

DF = Degrees of Freedom

**Type 3 Tests of Fixed Effects @ 20-Minutes**

<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	9.47	281.48	< 0.0001
<b>MMSE</b>	1	5.01	2.95	0.1465

## Appendix R

### RM-ANCOVA – Solution for the Fixed Effects and Type 3 Tests of Fixed Effects for O-PDS Subscales

Pooled O-PDS Mean Sum Scores of Thinking Subscale RM-ANCOVA Solution for Fixed Effects					
Effect	Est.	SE	DF	t Value	Pr >  t
Phase A	8.46	1.63	7.71	5.18	0.0009
Phase B1	14.64	1.50	5.73	9.75	<.0001
Phase A'	9.72	1.52	5.97	6.39	0.0007
Phase B2	13.43	1.51	5.79	8.92	0.0001
Phase F/U	7.59	1.39	3.78	5.47	0.0064
MMSE	-0.44	0.12	3.52	-3.69	0.03
CSDD	-0.07	0.10	3.52	-0.69	0.53

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

Effects	Type 3 Tests of Fixed Effects for Thinking Subscale			
	Num DF	Den DF	F-Value	Pr > F
Period	5	7.9	25.68	0.0001
MMSE	1	3.52	13.61	0.0263
CSDD	1	3.52	0.47	0.5348

<b>Pooled O-PDS Mean Sum Scores of Emotions Subscale RM-ANCOVA Solution for Fixed Effects</b>					
<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	19.88	4.85	14.2	4.10	0.0011
<b>Phase B1</b>	36.23	4.85	14.4	7.47	<.0001
<b>Phase A´</b>	25.58	5.00	15.7	5.12	0.0001
<b>Phase B2</b>	35.68	4.86	14.6	7.34	<.0001
<b>Phase F/U</b>	16.63	4.88	13.8	3.41	0.0043
<b>MMSE</b>	-1.78	0.42	12.9	-4.25	0.001
<b>CSDD</b>	0.56	0.35	12.9	1.58	0.13

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

<b>Type 3 Tests of Fixed Effects for Emotions Subscale</b>				
<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	18.2	42.18	< 0.0001
<b>MMSE</b>	1	12.9	18.04	0.0010
<b>CSDD</b>	1	12.9	2.49	0.1390

<b>Pooled O-PDS Mean Sum Scores of Interacting with Environment Subscale RM-ANCOVA Solution for Fixed Effects</b>					
<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	11.63	1.39	4.21	8.39	0.0009
<b>Phase B1</b>	19.44	1.43	4.71	13.64	<.0001
<b>Phase A´</b>	11.82	1.34	3.74	8.79	0.0013
<b>Phase B2</b>	18.87	1.47	5.29	12.87	<.0001
<b>Phase F/U</b>	11.25	1.42	4.52	7.95	0.0008
<b>Years of Stay</b>	0.08	0.11	2.81	0.70	0.54
<b>MMSE</b>	-0.95	0.10	2.81	-9.88	0./003
<b>CSDD</b>	0.33	0.07	2.81	4.75	0.02

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

<b>Type 3 Tests of Fixed Effects for Interacting with Environment Subscale</b>				
<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	6.72	52.39	< 0.0001
<b>Years of Stay</b>	1	2.81	0.49	0.54
<b>MMSE</b>	1	2.81	97.55	0.0029
<b>CSDD</b>	1	2.81	22.52	0.02

<b>Pooled O-PDS Mean Sum Scores of Interacting with People Subscale RM-ANCOVA Solution for Fixed Effects</b>					
<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	14.08	2.31	12.2	6.10	<.0001
<b>Phase B1</b>	13.76	2.30	12	6.00	<.0001
<b>Phase A´</b>	15.65	2.33	12.7	6.72	<.0001
<b>Phase B2</b>	13.73	2.30	12.1	5.97	<.0001
<b>Phase F/U</b>	10.14	2.40	14.9	4.23	0.0007
<b>Years of Stay</b>	0.08	0.20	11.4	0.43	0.67
<b>MMSE</b>	-0.63	0.17	11.4	-3.66	0.004
<b>CSDD</b>	0.16	0.13	11.4	1.31	0.22

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

<b>Type 3 Tests of Fixed Effects for Interacting with People Subscale</b>				
<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	8.87	11.54	0.0011
<b>Years of Stay</b>	1	11.4	0.19	0.6742
<b>MMSE</b>	1	11.4	13.37	0.0036
<b>CSDD</b>	1	11.4	1.70	0.2174

**Pooled O-PDS Mean Sum Scores of Activities Subscale  
RM-ANCOVA  
Solution for Fixed Effects**

<b>Effect</b>	<b>Est.</b>	<b>SE</b>	<b>DF</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Phase A</b>	0.07	2.28	33.8	0.03	0.98
<b>Phase B1</b>	3.91	2.09	33	1.87	0.07
<b>Phase A´</b>	1.71	2.23	33.8	0.77	0.45
<b>Phase B2</b>	4.42	2.09	32.7	2.12	0.04
<b>Phase F/U</b>	-1.12	2.20	31.8	-0.51	0.62
<b>Years of Stay</b>	-0.06	0.18	32.5	-0.33	0.74
<b>MMSE</b>	-0.15	0.16	32.5	-0.97	0.34
<b>CSDD</b>	0.21	0.11	32.5	1.83	0.08

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

**Type 3 Tests of Fixed Effects for  
Activities Subscale**

<b>Effects</b>	<b>Num DF</b>	<b>Den DF</b>	<b>F-Value</b>	<b>Pr &gt; F</b>
<b>Period</b>	5	10.9	18.00	< 0.0001
<b>Years of Stay</b>	1	32.5	0.11	0.74
<b>MMSE</b>	1	32.5	0.94	0.34
<b>CSDD</b>	1	32.5	3.33	0.08

## Appendix S

**RM-ANCOVA – Solution for the Fixed Effects and  
Type 3 Tests of Fixed Effects for Total O-PDS**

Sum of All Subscales Combined (Total –O-PDS) RM-ANCOVA Solution for Fixed Effects					
Effect	Est.	SE	DF	t Value	Pr >  t
Phase A	55.46	8.82	8.31	6.29	0.0002
Phase B1	89.45	8.64	7.68	10.35	<.0001
Phase A´	65.99	8.92	8.65	7.39	<.0001
Phase B2	87.65	8.69	7.83	10.09	<.0001
Phase F/U	41.76	8.91	8.32	4.69	0.0014
MMSE	-3.90	0.73	5.94	-5.37	0.002
CSDD	0.54	0.61	5.94	0.88	0.41

Est. = Estimate  
SE = Standard Error  
DF = Degrees of Freedom

Type 3 Tests of Fixed Effects for Activities Subscale				
Effects	Num DF	Den DF	F-Value	Pr > F
Period	5	12.3	41.67	< 0.0001
MMSE	1	5.94	28.86	0.0018
CSDD	1	5.94	0.77	0.4136

## VITA

### CHERIE ANN SOPRANO

- Addresses:** 15 Oregon Street  
Wilkes-Barre, PA 18702  
(570) 881-3425
- Wilkes University  
109 S. Franklin Street – Pearsall Hall – Room 304  
Wilkes-Barre, PA 18766  
Email: [cherie.soprano@wilkes.edu](mailto:cherie.soprano@wilkes.edu)
- Education:**
- **Ph.D.** – Nursing. The Pennsylvania State University.  
Graduation anticipated May 2010.
  - **Post Master’s Nurse Practitioner Certificate** – Adult Mental Health.  
SUNY Stony Brook. May 2001
  - **Legal Nurse Consultant Diploma.** College for Professional Studies, June 2001
  - **M.S.** – Nursing. Wilkes University. May 1998
  - **B.S.** – Nursing. Wilkes College. May 1987
- Selected Professional Experience:**
- **Assistant Professor of Nursing.** Wilkes University, Wilkes-Barre, PA.  
August 2005 – Present
  - **Assistant Professor of Nursing.** Marywood University, Scranton, PA.  
January 2002 – July 2005
  - **Nursing Instructor.** Marywood University, Scranton, PA.  
August 1998 – January 2002
  - **Per Diem Staff Nurse.** First Hospital, Kingston, PA. – June 1997 – Present
  - **Staff Nurse.** VA Medical Center, Wilkes-Barre, PA.  
November 1987 – August 1998
- Professional License:**
- Registered Nurse – PA – Since September 1987
  - Registered Nurse – NV – Since September 2009
  - Certified Registered Nurse Practitioner – Adult Mental Health – PA – Since July 2001
- Honors & Awards:**
- Capital Blue Cross Nurse Scholars Grant – Fall 2004 & Fall 2005
  - Sigma Phi Omega – Alpha Sigma Chapter – Marywood University – January 2003
  - Summer Training on Aging Research Topics – Mental Health (START-MH)  
Research Fellowship – Summer 2003
  - International Honor Society for Distance Learning, Alpha of Florida Chapter of the  
Delta Epsilon Tau – Summer 2001
- Research:** **Research Assistant**, Dementia Behaviors Project. Funded by NIH.  
A. M. Kolanowski – Principle Investigator – Summers of 2002 & 2003
- Select Presentations:**
- Co-Presenter. Behavior and Treatment of Schizophrenia – Wilkes University  
November 12, 2008
  - Presenter. START-MH Conference, San Diego, CA – August 2003. Poster:  
“*Psychometric Properties of the Passivity in Dementia Scale – Nursing Home  
Version.*”
  - Presenter. ENRS Conference, Rochester, NY – Spring 1997. Poster: “*Indwelling  
Urinary Catheters: A Practice Protocol.*”