

Horticulture Therapy for Persons with Dementia:
Effects on Engagement and Affect

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Abstract

Implementing generationally appropriate activities that engage groups of persons with dementia is a challenging task. Horticulture Therapy (HT) is one potential solution to this challenge through the use of plants with various populations to facilitate holistic outcomes. Utilizing the model of environmental press, the current study sought to analyze ADS participants' responses to HT compared to traditional activities.

HT activities were conducted once a week at four different ADS programs over the course of 9 weeks. Observational data were collected during HT and traditional ADS activities using a modified Dementia Care Mapping (DCM) technique. At five-minute intervals, observers coded predominant behavioral and affectual responses for each participant.

HT activities facilitated higher levels of productive engagement, lower levels of non-engagement, and higher levels of positive affect than did traditional ADS activities. By utilizing HT to facilitate congruence between the participants' environmental demands and individual competencies, environmental press was reduced. Therefore, HT offers dementia-care programs a viable activity alternative that is well-received by participants and able to include all interested persons despite functional or cognitive abilities.

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Running head: HORTICULTURE THERAPY FOR PERSONS WITH DEMENTIA

Horticulture Therapy for Persons with Dementia:

Utilizing an Environmental Press Perspective

to Integrate Theory and Research

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Abstract

The purpose of this paper is to integrate and synthesize the literature from the fields of Horticulture Therapy (HT) and therapeutic activities for persons with dementia using the theory of environmental press. Utilizing horticulture as a treatment modality, the therapist can either modify the environment or the person's competence level or both to assist persons to reach the desired Adaptation Level (AL). The AL represents an appropriate person-environment fit, and attainment of this zone is demonstrated by positive affect and adaptive behavior. At this time, research about HT for persons with dementia is limited. Applying theory to research is essential in order to clarify the appropriate outcome measures, independent variables, and research designs to the study. Therefore, research that fails to utilize theory often does little to contribute to the advancement of the field. This paper offers an environmental press perspective about HT for persons with cognitive impairment.

Horticulture Therapy for Persons with Dementia:
Utilizing an Environmental Press Perspective
to Integrate Theory and Research

The United States is currently experiencing a simultaneous demographic and epidemiological shifts in which longevity is increasing and people are experiencing more chronic illness. These phenomena are related to the increasing numbers of persons affected by diseases associated with aging, including Alzheimer's disease and related dementias (ADRD) (National Alzheimer's Association, 2003).

Four million people in the United States have some form of dementia, which manifests itself in a variety of domains, including loss of short-term memory, and inabilities in processing sensory information, using language (aphasia), performing previously learned motor tasks (apraxia), and properly addressing people and objects (anomia). Damage in the brain, resulting from the disease process, can cause delusions, hallucinations, personality changes, losses in physical coordination, and mood shifts (Mace, 1987; Mace & Rabins, 1999). A number of behavioral changes can occur in persons with dementia, including changes in affect, changes in activity, psychotic disturbances (hallucinations, delusions, paranoia), changes of basic drives (hyper and hyposexuality, hyperphagia, appetite loss), and sleep disturbances. Each person will exhibit differing degrees of changes in cognition, behavior, and personality.

Following the onset of symptoms, persons with dementia can live up to 20 years or more. As the disease progresses and impairment increases, formal respite options, including nursing homes and adult day service (ADS) programs, become more important (National Institute on Aging, 2000). Despite legislative attempts to guide formal service

providers in maintaining biopsychosocial well-being for persons with dementia, such as the Omnibus Budget Reconciliation Act of 1987 (OBRA), criticisms of current programs continue (U.S. Department of Health and Human Services, 2003). One common criticism includes a lack of planned activity; one study reported that most clients spend the majority of their time inactive (Nolan, Grant, & Nolan, 1995). Others emphasize the pervasiveness of developmentally and generationally inappropriate activity programs (Bowlby Sifton, 2000; Salari & Rich, 2001).

Because individuals with dementia exhibit a wide range of variability in symptomology and functioning, planning appropriate activities for groups of persons with dementia is a challenging task. Persons with dementia often lose the ability to plan or initiate activities that are meaningful and enjoyable on their own; therefore, the lack of appropriately planned programming is an issue that demands attention (Teri & Logsdon, 1991). Identifying meaningful activities that support autonomy, dignity, and unique personal histories of each individual is an acknowledged critical aspect of well-being, yet this task has proven difficult for staff in dementia-care programs.

One therapeutic activity for persons with cognitive impairment that has demonstrated its utility as an inclusive programming option for a wide range of cognitive and skill levels is Horticulture Therapy (HT) (Gigliotti, Jarrott, & Yorgason, 2002; Jarrott, Kwack, & Relf, 2002). HT is the use of plant materials and gardening activities that have been adapted to meet individualized needs and reach targeted treatment goals (AHTA, 2003). Horticulture therapists can either modify the environment or the activity in order to enhance the person's competence level and assist them in reaching the desired Adaptation Level (AL), which is characterized by a person-environment fit. Attainment

of the AL is demonstrated by positive affect and adaptive behavior. According to Lawton the notion of *fit* should be considered at two levels. Needs associated with activities of daily living (ADLs) must be met first; however, higher order needs (privacy, social contact) are also crucial. Addressing these two levels of needs supports attainment of and maintenance in the AL as a result of engaging in the HT activities.

Research grounded in theory that documents the effects of HT on persons with ADRD is still in its infancy. The purpose of this paper is to integrate and synthesize the literature on HT and other therapeutic activities for persons with dementia, utilizing Lawton and Nahemow's theory of environmental press (1973).

Literature Review

Challenges to Designing Activities for Persons with Dementia

Due to a multitude of causal agents, unique personalities, and the variable progression of dementia, the areas and abilities of functioning affected are incredibly heterogeneous. A variety of factors related to dementia-care participants and staff challenge the planning and implementation of activities for groups of persons with dementia. The spectrum of client abilities and interests increases the complexity of implementing meaningful and age appropriate activities. This challenge is often coupled with lack of time and resources and the staff members' lack of understanding of the benefits that can be obtained through activity participation, resulting in a lack of activities overall or in activities that are sub-par.

Criticisms of Current Programs

One common problem in dementia-care programs is the lack of stimulating activities. Recent research suggests that many elderly patients in long-term care are

totally inactive and isolated from human contact and that an absence of planned activity for patients is the norm (Nolan, Grant, & Nolan, 1995). Relying on persons with dementia to initiate activities on their own is problematic due to the deficits inherent in the disease process (Nolan, Grant, & Nolan, 1995). Armstrong-Ether, Browne, and McAfee (1994) found that most elderly patients in long-term care spent 95% of their time sedentary. These researchers also found that when persons with dementia did engage in activities, 45% of their time was spent engaged in solitary activities.

According to Buettner, “residents are often seeking stimulation, movement, or comfort which leads to need-driven dementia-compromised behaviors” (1999, p. 52). Need-driven behaviors include self-stimulating activities that fall into three main categories, disruptive, agitated, and aggressive problem behaviors. Oftentimes a lack of staff time and resources can deter active involvement in activity creation and implementation, thereby resulting in negative behaviors (Buettner, 1999). Furthermore the aforementioned problem behaviors can result in the removal of an individual from an activity session, thus creating a vicious cycle.

On the opposite end of the spectrum, other programs rely on rigid and structured agendas that do not allow for flexibility. Programs of this nature often encourage staff to, “rush individuals with dementia through activities of daily living (ADLs), so they can participate or wait to participate in other planned scheduled activities” (Fazio, Chavin, & Clair, 1999, p. 149). Many of these programs embrace the routine approach to care rather than a client-centered approach that emphasizes the unique aspects of the individual and the person’s stage in the disease. Staff persons who adopt this routine approach often do daily care *to or for* the individual rather than *with* the individual. Consequently, persons

may internalize the belief that they are incompetent. Researchers have also demonstrated that many staff in formal programs for the aged actually encourage and reinforce learned helplessness and excess disability by granting more time and attention to those individuals “needing” greater assistance (Baltes et al., 1995; 1996). This trend results in a premature loss of abilities and subsequent dignity due to limited opportunities to maintain those abilities through practice and routine.

Another problematic aspect of activity programming for persons with dementia is related to the appropriateness of the activities presented. Salari and Rich (2001) reported that the aides in ADS programs they studied aimed activities to the lowest cognitive functioning participants rather than to the highest functioning individuals or a middle range. Such scenarios may result in the participants feeling understimulated, isolated, embarrassed, and infantilized. Activities that swing towards the opposite side of the spectrum and prove to be too difficult also may exacerbate clients’ frustration, confusion, and agitation. These feelings can lead to subsequent behavioral issues such as wandering, yelling, physical aggression, and even withdrawal and apathy.

Some activity programs manifest the belief that old age is a “second childhood” and rely on “infantilization” of the older adults by providing activities that are targeted at levels far below the persons’ capabilities or that are childlike in nature (Miner & Rich, 2001). Miner and Rich examined the environments, activities, and interactions of clients at two adult day service (ADS) programs. Their findings concluded that when the ADS provided privacy, autonomy, and social contact with age appropriate activities more friendships were facilitated among clients. The study also found that the adults began to internalize the staff’s views of them, which subsequently led to a lower sense of self

identity and independent motivation; this phenomenon is coined “Goffman’s self-mortification effect (Miner & Rich, 2001).

Therefore, program professionals should embrace a strengths perspective to guide person-centered planning. Person-centered planning involves obtaining knowledge of each participant’s interests, abilities, and social history to guide the choice of activities that will be meaningful and support success. Because sustained engagement in the presented activity and positive affect are indicative of activities that are inclusive and enjoyable, these results are appropriate outcome measures.

The Theory of Environmental press

The norm of inadequate programming for persons with cognitive impairment underlies the importance of seeking out treatment alternatives guided by a person-centered philosophy that instill a sense of competence by maximizing intact abilities while minimizing disabilities (Kitwood & Bredin, 1992). The theory of environmental press emphasizes the importance of finding a balance between persons’ competence levels and environments to influence subsequent behavioral adaptation and attainment of positive mood as well as higher order benefits, such as social affiliation and self-esteem. (Lawton & Nahemow, 1973).

In their theory, Lawton and Nahemow (1973) proposed the idea that competence is not only a characteristic of an individual but also reflects the congruence between the individuals’ abilities and the demands and resources in their environments. Therefore, for competence to be achieved, there must be congruence between the environmental demands (*environmental press*) and the resources of the individual.

In their model, Lawton and Nahemow asserted that the result of achieving a balance between competence and *environmental press* is a zone termed the *adaptation*

level (AL) (Lawton & Nahemow, p. 44). The AL is characterized by neutral press, which results in adaptive behavior and neutral affect. Affect is hypothesized to be positive slightly to the right or left of the AL in the zones of *maximum performance potential* and *maximum comfort*, although the type of behavior exhibited in these two zones varies. In the zone of maximum performance potential, persons experience a mild-to-moderate environmental demand resulting in positive affect characterized by interest, pleasure, and social behavior. However, in the zone of maximum comfort, individuals are slightly underchallenged and bored resulting in less positive affect. If press is unbalanced with competence, individuals will engage in maladaptive behavior and negative affect.

The idea of fit between environmental press and competence level needs to be considered at two levels, which must be met in hierarchical fashion. The lower level encompasses life maintenance needs, such as the ability to perform ADLs such as eating, bathing, and dressing. Once these needs are met, *higher order needs* and desires can be targeted, including level of social contact, the need for privacy and autonomy, and the assertion of other day-to-day preferences. Therefore, once persons with dementia have fulfilled their lower level needs, caregivers should shift their attention to the fulfillment of higher order needs by providing meaningful occupation that results in benefits encompassed by biopsychosocial domains.

Lawton and Nahemow proposed that for less competent individuals, the impact of environmental factors is greater; they referred to this phenomenon as *environmental docility*. Because persons with dementia have compromised abilities to proactively reduce environmental press through exertion of individual competencies, a person-centered approach would mandate that social relationships in the person's life, primarily

caregivers, adapt the environment to better suit the competence level of persons with cognitive impairment or help them to increase their competencies through continued use of skills and abilities. Upon considering the need to adapt the environment for persons unable to do so for themselves, it is also important to recognize that the environment is multifaceted in nature and encompasses both social and physical elements; this will be covered in detail in subsequent sections of this paper.

Enhancing Competence Through Therapeutic Activities

Helping persons with dementia achieve a person-environment fit through activities that result in success and maintenance of intact functioning is one way that therapists can support the personhood of individuals with dementia. Therapists planning and implementing activities for persons with dementia will need to adapt the activities to the varied interests and abilities of each person in order to achieve these outcomes. In addition, the environmental context housing the activities may also need to be adapted to achieve balance.

Adapting activities. A number of researchers from a variety of disciplines have utilized a strengths perspective to inform the creation and implementation of dementia-care program activities. This perspective focuses on the assets of each individual and the importance of exercising and maintaining intact functioning to increase and maintain autonomy and subsequent well-being.

A strengths perspective encourages caregivers to support persons with dementia to continue to engage in activities that they can perform utilizing the abilities that often remain intact well into the disease process (Bowlby Sifton, 2000). Bowlby Sifton has recognized that there is often a *disability gap* between what members of this population

currently do and what they actually could do with support and encouragement from more competent individuals.

Camp and colleagues (1997) were also interested in engaging persons with dementia in meaningful activities to exercise intact abilities and improve the likelihood of appropriate behavioral responses and positive affect. Their approach to developing activities for this population entailed recognition of the environment and individuals' competence levels. In this approach, pre-planned adaptations, termed *extensions*, are created for each presented activity in order to enable all interested persons to participate despite ability level.

Adapting the physical and social environment. Researchers have also emphasized the importance of recognizing the role that the environment plays in facilitating greater competence and well-being in persons with dementia. When the focus of activity engagement is on the present moment, the importance of the social and physical environments creating the participant's atmosphere are emphasized (Bowlby Sifton, 2000). Because of the deficits inherent in persons with dementia, including the inability to remember the recent past and anticipate the future, the moment-to-moment aspects of daily life become paramount.

Creating environmental cues and prompts to assist persons in tapping into remaining procedural memories can assist individuals to improve success and function more independently resulting in feelings of competence and higher self-esteem. Regarding the social environment, dementia-care researchers have emphasized the importance of offering stimulation and activities that provided opportunities for interaction. Morgan and Stewart (1997) found that activities redirected restless and

irritable persons from worrying by helping them to focus on something positive instead. Additionally, activities have been demonstrated to increase the positive outcomes and quality of family visits (Buettner, 2001; Morgan & Stewart, 1997). Kitwood's theory of personhood in dementia also embraces this recognition of the fundamental nature of the social environment, proposing that personhood is created, maintained, and diminished through social relationships (Kitwood & Bredin, 1997). Therefore, personhood can be supported through meaningful activities that are age and ability appropriate resulting in success and helping persons engage in social interactions that focus on positive events.

These researchers have emphasized the need to preserve dignity and autonomy in persons with dementia by offering activities that are personally meaningful based on past experiences as well as previous and current roles in life (Camp, 1997; Salari & Rich, 2001). Therefore, identifying activities that are popular amongst older adults and that encourage them to utilize intact abilities is an essential aspect of meeting higher order needs for persons unable to do so for themselves.

Meeting Higher Order Needs Through Therapeutic Activities

In order for persons with dementia to retain or regain quality of life while experiencing a multitude of losses, treatment must move away from the medical model that emphasizes the disease and towards holistic health models is an integral part of this process. The acceptance of holistic health represents the understanding that all factors: physical, mental, emotional, social, and spiritual affect health and well-being (Kitwood, 1997). Involvement in suitable activities can provide individuals with dementia an essential sense of structure, security and feeling of belonging (Buettner & Ferrario, 1997).

Involvement in activities can address psychosocial needs by helping individuals to establish meaning in their lives, define roles, maintain autonomy, and create and maintain dignity and identity. Providing opportunities for restoring these fundamental human experiences may significantly increase well-being and quality of life. Langer and Rodin (1976) researched the effects of enhanced personal responsibility and choice in two groups of nursing home residents. The treatment group was given a choice of whether or not they wanted to care for a plant and which type of plant they preferred, and the control group was handed a plant, relinquishing that choice and was told the nurses would care for the plant for them. In comparing two groups of nursing home residents, the group that was encouraged to make choices and take responsibility for plant care, among other things, showed significant gains in well-being and participation in comparison to the control group.

The effects of social relationships on psychological health are well known. The higher order need for social affiliation can be facilitated through therapeutic activity programming. Familiar activities often evoke long-term memories and allow individuals to engage in positive reminiscence with peers and caregivers. Relationships help individuals to develop a sense of self and worth, and have also been associated with a number of health outcomes. Involvement with activities in group settings can provide opportunities for individuals to obtain closeness with others by integrating them within a group that shares a common interest. Group activities can facilitate interaction and create an environment where individuals' information and knowledge of one another can form and maintain vitally important relationships with peers (Fazio, Chavin, & Clair, 1999). Horticulture was also found to be a useful activity for programs targeting goals of

increased intergenerational interaction between older adults and children (Kerrigan & Stevenson, 1997; Predny & Relf, 2000). Hence horticulture can serve as a conduit for facilitating positive interactions and friendships among groups of various populations.

Enhancing Competence Through HT

Horticulture Therapy is one therapeutic activity alternative that uses practices and approaches that compliment the tenets set forth by the theory of environmental press.

The practice of HT requires that the therapist employ techniques that enhance the competencies of their clients through adaptation of the gardening activities and the contextual environment to facilitate success in the activities.

Adapting HT activities. Horticulture therapists actively modify the social and physical environment as well as the presented gardening activities to result in specified treatment goals and objectives unique to each program participant. Therapeutic goals for HT programs are consonant with a multidisciplinary approach and target outcomes in physical, social, cognitive, and psychological domains of functioning (Relf & Dorn, 1995).

HT programs work towards increasing competence levels in persons with special needs by exercising intact physical, social, and cognitive abilities, teaching them new skills, and empowering them through increased responsibility and autonomy. Also, as emphasized by the Montessori method and Bowlby Sifton's work, the use of activities that utilize everyday materials and techniques familiar to people represents an attempt to maximize their remaining procedural memory, or their memory for how things are done (Bowlby Sifton, 2000). HT activities provide an outlet for individuals to exercise a wide range of physical and cognitive skills performed throughout one's life. Activities that are goal-directed such as watering, planting, harvesting and flower arranging can be used to

build self-confidence and provide staff an opportunity to provide positive reinforcement (Ebel, 1991). Gardeners have many opportunities to engage in various activities that utilize gross and fine motor skills, balance and coordination, as well as muscle strength. Sustaining functional abilities in these domains of functioning will help persons with dementia retain greater levels of independence during other activities, including ADLs.

Additional support for the use of HT activities, in dementia-care programs stems from their adaptability to varying levels of cognitive and functional abilities (Gigliotti, et al, 2002, Jarrott, et al, 2002; Mooney & Milstein, 1994). Identifying activities that are modifiable is a difficult task, especially when facilitators are concerned about minimizing disability in persons with dementia. Providing extensions, or variations, to one activity may highlight an individual's disability as they and their peers become aware of the fact that each person is getting a different version of the same task. Horticulture, on the other hand, encompasses a wide range of tasks that must be accomplished to complete the process from beginning to end and therefore persons can be assigned various tasks that are integral to the process depending on their unique interests and abilities. For example, persons that have difficulty sitting still to complete an activity, or those persons that can no longer follow two-part directions, can still engage in the process of watering a garden with minimal assistance.

Powell and colleagues (1979) found that participating in an indoor gardening program resulted in participants demonstrating significantly higher levels of engagement among nursing home residents on gardening days than non-gardening days. In addition, persons who did not join the gardening activities continued to engage at low levels, while gardeners engaged at significantly higher levels. These researchers concluded that when

given the opportunity, frail elderly were able to engage at much higher levels than previously demonstrated or anticipated by caregivers.

Three studies of a dementia-specific HT program resulted in varied outcomes in engagement and affect levels (Gigliotti, et al., 2002; Gigliotti & Jarrott, 2003, Jarrott, et al., 2002). Two of the studies found significantly higher levels of active engagement during HT than during traditional activities, and all three studies found that participants spent significantly less time non-engaged during HT than during traditional activities. Two of the three studies also resulted in higher levels of positive affect during HT than during traditional ADS activities. The nature of the HT activities make them a good fit for therapists utilizing task analysis to break down activities into fundamental steps, which then guides in the selection and modification of tasks according to the unique needs of each individual (Ebel, 1991). Providing activities that can be modified will result in persons spending greater proportions of their time engaged in purposeful activity and less time engaged in self-stimulating and sedentary behaviors.

The combination of adaptive behavior, characterized by high levels of engagement in the presented activity, and high levels of positive affect support the conclusion that HT activities could be used to achieve the desirable zone of maximum performance within the environmental press model (Lawton & Nahemow, 1973).

Adapting the social and physical environment. Because gardening is among one of the most commonly cited active leisure pursuits of older adults, its use addresses the social histories and procedural memories essential to person-centered, dementia-care activities (Hill & Relf, 1983). HT activities are familiar to the majority of older adults, representing the most popular physical leisure pursuit (Hill & Relf, 1983). Continuity in

activities and interests throughout adulthood is an adaptive strategy to the processes of aging (Atchley, 1982). By expanding the repertoire of activities offered in dementia-care programs, caregivers are acknowledging the need to identify meaningful activities that can stimulate competent behavior and facilitate subsequent positive affect.

HT programming is also consonant with the environmental press model in that an inherent aspect of the profession is the adaptation and manipulation of the environment to reduce environmental press levels imposed on persons with disabilities, including dementia. Horticulture therapists minimize barriers to gardening using a number of strategies, including adaptive tools and equipment, raised beds and container gardening, indoor gardening, specific design techniques, as well as careful plant selection, using only those that are non-poisonous, safe, and tolerant of less than desirable conditions.

One growing area of research has concentrated on design considerations that must be attended to when designing gardens for persons with Alzheimer's disease (Ebel, 1991; Kavanagh, 1995; Mooney & Nicell, 1992). The specific design suggestions reviewed in these publications span beyond the scope of this paper; however, the finding that the use of the exterior environments reduced aggressive behavior in persons with AD supports incorporation of gardening programs into dementia-care programming (Mooney & Nicell, 1992). Another study that examined the effect of a walled garden on persons with Alzheimer's disease did not find a significant change in disruptive behaviors, but persons who utilized the garden demonstrated less sleep disruption and less overall disruptive behaviors in comparison to persons who infrequently utilized the garden (Mather, et al, 1997). Mather and colleagues hypothesized that lack of significant differences in disruptive behaviors may have been due to limited use of the garden by residents in the

cold Canadian climate where the study took place. This finding has implications for the needed dosage of exposure to gardening areas and activities. At this time there is no prescribed amount of HT activity supported by empirical research.

Stimulation of the senses and the creation of a more home-like, familiar environment are additional reasons to incorporate horticultural materials and activities into programs aimed at achieving a person-environment fit for persons with dementia. Plant materials can be used to stimulate visual, auditory, tactile, and olfactory senses to create a soothing environment that can reduce overstimulation of elders with dementia. Environmental cues, including sundials, signs, and landmarks such as sitting areas or characteristic plantings, may help participants regain a sense of reality orientation and direction in way finding. These environmental cues provide persons with memory impairment a sense of security and familiarity that increases the mastery with which they can exercise their autonomy as they utilize the space created with their special needs in mind.

Therefore, HT activities are consonant with the environmental press model in that they can be used to elicit adaptive behavior as well as positive affect by enhancing individual competence and modifying the physical environment to reduce press levels. Supporting competence through the use of a strengths perspective and the continued use of intact abilities, along with an environment that has been tailored to minimize disability and support personhood through adaptive equipment, HT can elicit positive outcomes for a wide range of persons with varying abilities and interests.

Meeting Higher Order Needs Through HT

One component of the environmental press theory is the assertion that the person-environment fit must be considered at two levels comprised of lower life maintenance

needs and higher order needs, including benefits encompassed by biopsychosocial domains. HT has been demonstrated to provide benefits, in social, psychological, physical, and cognitive domains of functioning to a wide range of elderly populations, including cognitively intact elders and various institutionalized elderly exhibiting a range of symptoms (Kim et al., 2002, Midden & Barnicle, 2000; Mooney & Milstein, 1994; Powell et al., 1979). Benefits to well being include increased socialization and reminiscence as well as self-esteem and life satisfaction. Other outcomes attributed to participation in HT programs for various groups of older adults include increased motivation, initiation, and physical functioning resulting in greater levels of independence and autonomy (Burgess, 1990; Mooney & Milstein, 1994).

Researchers have recorded some of the social benefits obtained through gardening (Relf, 1981; Sarno & Chambers, 1997). A variety of studies have documented that gardening in groups increases social interaction and provides a non-threatening means for engaging in new relationships. Relf (1992) reported that group gardening increased communication, socialization, and a sense of commitment and responsibility to the group, thus creating an overall sense of community. Institutionalization and the decline of cognitive skills are often accompanied by decreased contact with the larger community. Because humans are social by nature, the prolonged lack of social contact often results in ill-being and even subsequent dysfunction (Hansson & Carpenter, 1994). Relationships affect psychological well-being, help individuals to develop a sense of self and worth, and also have been found to be associated with a number of health outcomes.

Although benefits of HT programs have been documented with a wide range of populations, very few researchers have examined the effects of HT programming on

persons with dementia . Jarrott & Gigliotti (2002) reported that ADS participants experienced a wide range of benefits in social, psychological, physical, and cognitive domains of functioning ranging from fine motor skills to socialization to nurturing another living entity. Evaluation of the benefits presented in that study was limited to the HT researchers and participants; staff were not asked to assess the activities.

Additionally, although the benefits were operationalized and clearly defined to promote reliability and internal validity, standardized methodology is still a limitation to the research.

A study conducted by Rappe & Linden (2002) interviewed staff working in a dementia-care facility about the responses of the residents to plants and horticultural activities. A number of benefits were reported, including increased self-esteem and maintenance of functional abilities. An increase in quality of sleep was attributed to the physical exertion transpiring outdoors during the horticultural activities. Additionally, it was found that agitated and anxious persons could be soothed with familiar plants and stimulation of the senses.

Another benefit of HT activities is that they provide an outlet for creative expression that empowers the individual to exert control over some aspect of his/her environment. HT activities offer the added benefit of creating a valuable end-product. Although the focus of HT is on the process of horticulture, consistent with Bowlby Sifton's (2000) emphasis, the creation of a tangible end product of value that can be utilized and shared with others is an important component to the principles of HT. The acquisition of resources harvested from the garden may enable the older adult with limited functional abilities to engage in reciprocal exchanges with others, thus working to

offset some of the inequities inherent in the power status in the relationship between caregivers and care recipients. This higher order need for independence and equity in social relationships can be achieved through the use of HT programming.

Summary and Conclusions

As the number of persons diagnosed with dementia continues to rise, the importance of understanding how to provide adequate and holistic approaches to treatment becomes paramount. HT activities have demonstrated promise for dementia-care programmers seeking treatment alternatives that can successfully engage groups of participants and elicit positive affectual and behavioral responses.

The practice of HT embraces the explanatory mechanisms proposed by the environmental press model by working to facilitate a harmonious balance between the environmental demands and the competence levels of the targeted population, thus resulting in appropriate behavior and positive affect. HT practices adopt a strengths perspective and trigger procedural memories to enhance competencies. Task analysis may be applied to HT activities in order to successfully include persons representing a wide range of functional and cognitive abilities.

Concerning the environmental component of the environmental press model, HT embraces and recognizes the importance of adapting the physical environment to induce competencies in persons with reduced capabilities. The use of design techniques, adaptive equipment, and familiar plants and activities contributes to the ability of persons with dementia to achieve greater levels of independence and mastery over their environments. Additionally, HT activities' generational and developmental appropriateness help preserve the dignity, social history, and autonomy of this group of older adults.

Finally, the psychosocial benefits that can be obtained from participation in HT programming represent the higher order needs that can be attended through an effort to sustain a person-environment fit. As persons exercise intact abilities and achieve improvements in biopsychosocial domains of functioning, levels of mastery and independence are enhanced for greater periods of time allowing persons impaired by this progressive disorder to sustain quality of life well into the disease progress.

Recommendations for Future Research

Continued research in the fields of HT and dementia-care programming are needed to provide sufficient empirical data to warrant the integration of HT into the treatment efforts directed at persons with dementia. Future research should include control groups in the analyses so that intra- and inter-individual comparisons can be made. Comparing HT activities to other therapeutic activity approaches that utilize a similar strengths approach will help researchers to definitively conclude the effect of the HT programming content on outcomes. At this time, it could be argued that other therapeutic approaches utilizing similar approaches with differing medium could be just as effective at eliciting positive outcomes.

Researchers in the domain of HT should seek out multidisciplinary collaborations to expand the scope of the study and types of measures utilized. A mixture of qualitative and quantitative approaches should be integrated to strengthen designs by embracing the strengths inherent in each technique. Mixed methods in concert with the use of theory will help HT researchers to gain a greater understanding of why the HT activities were successful at engaging the participants and facilitating positive affect.

Other avenues for HT researchers include expanding the level of analysis beyond the individual level and incorporating multiple perspectives from family and staff in order to incorporate the ecological layers of the persons' lives. Although multiple perspectives should be sought out, the sole use of proxy informants to represent the experiences of this population of older adults is not adequate. It is important for researchers, embracing a person-centered approach and supporting a strengths perspective, to integrate the perspective of persons with dementia and empower them to inform the research process.

HT can support competencies in persons with dementia by providing a means in which therapists can help individuals achieve an appropriate person-environment fit. HT embraces a strengths approach guided by a person-centered philosophy of care to elicit positive outcomes for persons with dementia, who are vulnerable to environmental docility due to their diminished competencies in the cognitive realm. Horticulture therapists actively modify the gardening activities in addition to the social and physical environments to help persons achieve active engagement and positive affect. These outcomes are indicative of persons in the AL and the zone just to the right of that zone, the maximum performance potential.

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Running head: HT FOR PERSONS WITH DEMENTIA

Growing Gardenias at Adult Day Services:
Effects of Horticulture Therapy on Engagement and Affect
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Abstract

Implementing generationally appropriate activities that engage groups of persons with dementia is a challenging task. Horticulture Therapy (HT) is one potential solution to this challenge through the use of plants with various populations to facilitate holistic outcomes. Utilizing the model of environmental press, the current study sought to analyze ADS participants' responses to HT compared to traditional activities.

HT activities were conducted once a week for a half hour at four different ADS programs over the course of 9 weeks. Observational data were collected during HT and traditional ADS activities of equal length using a modified Dementia Care Mapping (DCM) technique. At five-minute intervals, observers coded predominant behavioral and affectual responses for each participant.

HT activities facilitated higher levels of productive engagement, lower levels of non-engagement, and higher levels of positive affect than did traditional ADS activities. By utilizing HT to facilitate congruence between the participants' environmental demands and individual competencies, environmental press was reduced. Therefore, HT offers dementia-care programs a viable activity alternative that is well-received by participants and able to include all interested persons despite functional or cognitive abilities.

Key Words: Alzheimer's Disease, Dementia, Environmental Press, Holistic approaches, Horticulture Therapy

*All names in this paper have been changed to protect the identity of the study participants

Growing Gardenias at Adult Day Services:

Effects of Horticulture Therapy on Engagement and Affect

Scientists currently estimate that approximately 4 million Americans have diagnosable Alzheimer's disease (AD), which is the most pervasive form of dementia. The prevalence of AD increases with age, which is demonstrated by the fact that while one in 10 persons over the age of 65 have AD close to half of individuals aged 85 do (National Institute on Aging, 2000). These statistics are becoming increasingly significant as the 65 and older age group becomes the largest segment of the population, and the 85 and older population continues to be the fastest growing demographic group. Unless a cure or prevention is discovered, it is projected that by the year 2050, 14 million Americans will have AD (Alzheimer's Disease and Related Disorders Association, 2002).

After symptoms of the disease appear in the afflicted individual, the average life expectancy is 8 years; however, some individuals may live up to 20 years with the disease. As the disease progresses and persons become increasingly impaired, it becomes necessary to seek out formal and informal caregiving arrangements. More than 70% of persons with AD age in place and receive up to 75% of their care from family and friends (National Alzheimer's Association, 2000). However, formal services including adult day services (ADS) and nursing homes are also available to family member seeking respite. Policies, such as the Omnibus Budget Reconciliation Act of 1987 (OBRA), have been enacted, which dictate that the model of care must shift from a medical emphasis to quality of life for the residents in nursing homes. More specifically, OBRA mandated that

nursing homes and dementia-care facilities must offer an “ongoing program of activities designed to meet, in accordance with the comprehensive assessment, the interests and the physical, mental, and psychosocial well-being of each resident” (U.S. Department of Health and Human Services, 1989, p. 5363). Despite these mandates, many dementia-care programs have been criticized for inappropriate programming characterized by activities that are developmentally or generationally inappropriate. Another problematic situation common in many dementia-care programs is an overall lack of planned activity where the majority of persons spend most of their time (95%) sedentary (Nolan, Grant, & Nolan, 1995).

The inherently problematic nature of nonexistent planned activity in dementia-care facilities is compounded by the fact that persons with dementia often lack the ability to plan or initiate activities on their own. Unfortunately, this group of elders eventually loses the ability to engage in activities that are pleasurable and gratifying (Teri & Logsdon, 1991). Although a cure or prevention for dementia does not currently exist, quality of life has been shown to increase as a result of behavioral interventions. Research had demonstrated that outcomes, including reductions in depression, agitation, and problem behaviors have resulted from engagement in meaningful activity (Buettner, 2001; Teri & Logsdon, 1991). The importance of supporting the dignity, autonomy, and personal history of persons with dementia through engagement in meaningful occupation is supported by Kitwood’s theory of personhood in dementia, which highlights the need to support well-being throughout each day (1992).

One reason that many dementia-care programs are lacking adequate and appropriate stimulation is the difficulty of identifying activities that can be presented to a

group of individuals representing a wide spectrum of cognitive and functional abilities. Creating group activities that address the varied and unique needs of each individual in such settings is extremely difficult due to the variability and progressive nature of dementia. Oftentimes, activities are targeted at the lowest functioning individuals leaving the higher functioning persons bored and more apt to engage in disruptive behaviors. On the other hand, targeting activities at a level of difficulty that is too challenging may lead to negative outcomes, ranging from confusion and agitation to embarrassment and subsequent withdrawal and apathy (Taira, 1986).

One alternative programming option for dementia-care facilities is horticulture therapy (HT), which is the utilization of plant-based activities that are individually tailored to result in achievement of specified treatment goals. Although HT has been utilized in a wide variety of treatment settings with various populations of special-needs individuals, there is very little empirical research documenting the benefits of HT and the cost efficiency of HT programs. Few researchers have documented the effects of HT on persons with dementia (Gigliotti, Jarrott, & Yorgason, 2002, Jarrott, Quack, & Relf, 2000). The purpose of the present study is to assess whether horticulture therapy (HT) activities can be effectively utilized in a group setting at adult day services (ADS) programs. Guided by Lawton and Nahemow's (1973) theory of environmental press, the activities utilized in this study were designed to foster positive affect and adaptive behavior, which are designated indicators of competence in the environmental press model. By utilizing the method of HT, facilitators attempted to achieve a balance between an appropriate level of challenge and functionality in order to result in a good person-environment fit (Lawton & Nahemow, 1973). We were interested in comparing

the participants' responses in engagement and affect during horticultural activities and more traditional ADS activities to determine whether one type of activity engendered a more balanced person-environment fit than did the other. The dementia-care literature emphasizes the challenges associated with identifying activities that engender high levels of engagement and positive affect in groups of persons with dementia. HT represents a valuable treatment alternative because both the activities and the environment are actively modified to balance persons' press levels with their unique competence levels. Findings that can guide program facilitators to identify meaningful activities, which result in desirable behaviors and subsequent benefits, are a valuable contribution to the field of dementia-care.

Literature Review

According to the Progress Report on Alzheimer's Disease 2000, 360,000 cases of AD will develop each year, and this figure will continue to grow, in concert with the impending demographic shift (National Institute on Aging, 2000). This situation underlies the importance of seeking out viable and effectual treatment alternatives for afflicted individuals and their family caregivers. Guided by Kitwood's notion of personhood, holistic approaches to treatment targeting benefits in biopsychosocial domains of functioning must become the norm rather than the exception in dementia-care programs. Instilling a sense of competence by maximizing individuals' intact abilities while minimizing disabilities is a hallmark characteristic of a person-centered approach, which focuses on the uniqueness of all persons and their social histories. Person-centered care also mandates that it is the responsibility of the cognitively intact caregivers to consistently maintain and support the person with dementia's sense of self-identity and

esteem (Kitwood & Bredin, 1992). A person-centered philosophy of care must guide all activities throughout the day, including both Activities of Daily Living (ADLs) and structured recreational activities.

Competence level is also an important variable in the theory of environmental press. In their theory, Lawton and Nahemow (1973) proposed the idea that competence represents the congruence between the abilities of an individual and the demands and resources in the environment; therefore, in order to achieve competence there must be a match between the environmental demands and the resources of the individual. In their model, Lawton and Nahemow asserted that the result of achieving this balance between competence and *environmental press* is a state of adaptive behavior and positive affect; they termed this zone of the model the *adaptation level (AL)*. Alternately, persons who are unable to adapt will display maladaptive behavior and negative affect characterized by self-stimulating behaviors, non-engagement, and emotions such as anger, frustration, and depression. Lawton and Namehow additionally identified that for less competent individuals, the impact of environmental factors is greater; they referred to this phenomenon as *environmental docility*. Because persons with dementia have compromised abilities to proactively reduce environmental press through exertion of individual competencies, a person-centered approach would mandate that social relationships in the person's life, primarily caregivers, adapt the environment to better suit the competence level of persons with cognitive impairment or help them to increase their competencies through continued use of skills and abilities. Upon considering the need to adapt the environment for persons unable to do so for themselves, it is also

important to recognize that the environment is multifaceted in nature and encompasses both social and physical entities.

A number of researchers have utilized a strengths perspective to inform the creation and implementation of dementia care program activities. This perspective emphasizes the dangers of institutionalizing a learned helplessness cycle of care that is characterized by caregivers who encourage and reinforce unnecessary dependent behaviors. Rather, a strengths perspective encourages caregivers to support persons with dementia to continue to engage in activities that they can still perform. Bowlby Sifton (2000) discusses the need to capitalize upon abilities that often remain intact in persons with dementia well into the disease process, including emotional memory, procedural memory, sensorimotor function, and social skills. By practicing relevant skills and overlearned behaviors, persons with dementia may be able to slow decline and maximize functional competence, hence reducing environmental press.

Camp and colleagues (2000) were also interested in engaging persons with dementia in meaningful activities to exercise intact abilities and improve the likelihood of appropriate behavioral responses and positive affect. Their approach to developing activities for this population entailed recognition of both the physical environment and competence level. In this approach, pre-planned adaptations, termed *extensions*, are created for each presented activity in order to enable all interested persons to participate, despite ability level.

An emphasis on minimizing risks of failure and maximizing the chances of success is a fundamental reason to employ the use of *extensions*, which can be *horizontal* or *vertical* in nature. Horizontal extensions are modifications to an activity that are

designed to utilize a parallel skill or difficulty level; these extensions are employed if the person is currently operating at the adaptation level and if sustained engagement is the desired outcome. Vertical extensions, on the other hand, are utilized to either increase (*upward*) or decrease (*downward*) the demands of the activity based on the person's individual performance in the presented activity.

Camp and colleagues (2000) were dually attentive to the social and physical environment and set guidelines addressing the nature of how the activities would be laid out, organized, and administered. By using techniques such as arranging objects from simple to complex and reducing unnecessary stimulation, competence level increases along with a sense of mastery and subsequent well-being in persons living with dementia. Regarding the social environment, Camp, in addition to other dementia-care researchers, emphasized the importance of avoiding activities that are childlike and insulting to an adult population (Bowlby Sifton, 2000; Miner & Rich, 2000; Teri & Logsdon, 1991). These researchers have emphasized the need to preserve dignity and autonomy in persons with dementia by offering activities that are personally meaningful based on past experiences as well as previous and current roles in life.

One therapeutic approach that embraces the philosophy of adapting the social and physical environment, while increasing competence levels to reduce environmental stress, is horticulture therapy (HT). Horticulture therapists actively modify the environment, as well as the presented gardening activities, to result in specified goals and objectives unique to each program participant. Although much of the HT literature has focused on the effects of the natural environment on different populations of stressed and recovering individuals (Ulrich, 1979), empirical research has focused to a lesser degree on the

therapeutic outcomes of engagement in adapted HT activities. Therapeutic goals for HT programs are consonant with the biopsychosocial model and target outcomes in physical, social, cognitive, and psychological domains of functioning (Relf & Dorn, 1995).

Because gardening is among one of the most commonly cited active leisure activities of older adults, its use addresses the social histories and over-learned skills essential to person centered, dementia-care activities (Hill & Relf, 1982). By expanding the repertoire of activities offered in dementia-care programs, caregivers are acknowledging the need to identify a variety of meaningful activities that can stimulate competent behavior and facilitate subsequent positive affect; HT represents an attractive addition to traditional dementia-care programs.

Although HT has been demonstrated to benefit a wide range of populations, including cognitively intact elders, empirical articles documenting the benefits of HT to persons with dementia are insufficient. However, two small pilot investigations about HT for adults with dementia at ADS programs precede this investigation and have reported encouraging results (Gigliotti, et al., 2002; Jarrott, et al., 2002). The first study found that participants spent greater proportions of their time actively engaged, and a lower proportion of their time disengaged during the HT activities than during the traditional ADS activities (Jarrott, et al., 2002). This result suggested that the HT activities were better able to include all interested individuals through the use of pre-planned modifications and activities that were more appealing to ADS participants. Although no significant differences were found in levels of affect between the HT and traditional ADS activities, affect was predominantly positive during both types of activities.

The second study examined the effects of three types of HT (cooking, crafting, and planting) activities on persons with dementia in an ADS setting. Findings did not demonstrate significant differences between the types of HT activities on engagement and affect levels (Gigliotti, et al., 2002). Additionally, no significant differences comparing active engagement during HT activities and traditional activities were found. The lack of significant findings was attributed to a ceiling effect resulting from the person-centered activity approach utilized by the activity director during the time of that study. However, significant differences in nonengagement and positive affect were found in the comparisons between HT and traditional ADS activities. The HT activities resulted in greater positive affect and lower levels of nonengagement than did the traditional ADS activities. These differences supported the important role that HT activities can play in reducing levels of unproductive behavior and increasing levels of positive affect in this population of ADS clients.

In the current study, we applied Lawton and Nahemow's model of environmental press to the practice of HT with persons with dementia. More specifically we were interested in replicating the findings of the two preceding studies examining the differences in engagement and affect of ADS participants with dementia during HT and traditional ADS activities. We were able to improve upon the previous studies by enlarging the sample size from one facility to four and incorporating mixed methods of assessment, including an interview with the participants to capture their comments regarding the HT activities.

The current study addressed three hypotheses concerning the level of engagement and affect during HT activities in comparison to traditional ADS activities.

1. Participants will exhibit higher levels of active engagement during the HT than traditional ADS activities
2. Participants will exhibit lower levels of non-engagement during the HT than traditional ADS activities
3. Participants will experience more positive affect during the HT than the traditional ADS activities.

Methods

Participants

The sample is comprised of older adults with a diagnosis of dementia attending one of four ADS programs in rural southwest VA. The first participating ADS program is located in a university setting and typically served between 8-12 clients daily. Two of the remaining three ADS programs were located on the campus of the Veterans Administration (VA), and the final program was a community program sharing staff and other resources with the VA programs. The community program had approximately 10-12 clients attend the center daily. Although two of the VA programs were located in the same building, on the same campus, they were usually kept separate from one another based on the level of clients' impairment. While one of the programs served a mixed group of adults in need of ADS (VA mixed), the other group consisted of older adults with moderate to severe dementia (VA DU). Twenty to 25 adults usually attended the VA mixed group each day, while the group with VADU usually consisted of 8-10 clients daily. The total number of participants in this study was 48 (26 males and 22 females; 10 university, 12 community, 13 VA mixed, 13 VA DU). The participants' mean age was 80 (SD= 11.0), ranging from 46 to 98. In terms of race, 41 participants were white and

7 were black. Because we were interested in comparing participants' differential responses to the HT activities and the traditional activities, the participants served as their own controls.

Instrumentation

Assessments utilized to address the three hypotheses included demographic information, cognitive functioning status, and observational data focused on engagement and affect levels.

Participant characteristics. Demographic information and MMSE scores for each participant were gathered from program staff at each of the four facilities. The MMSE is an extensively used instrument that assesses cognitive functioning. Possible scores range from zero to 30 with lower scores indicating greater levels of impairment (Folstein & Folstein, 1975). The mini-mental status exam (MMSE) (Folstein & Folstein, 1975) scores ranged from zero to 26 with an average score of 13.07 indicating moderate cognitive impairment.

Observational method. The observational tool used in this study was specifically designed and piloted by the second author to observe participants with dementia during HT and traditional ADS activities. Two trained research assistants (RAs) utilized the instrument to assess engagement and affect (mood) of the participants during HT and traditional ADS activities. The RAs observed up to six participants at a time, recording a behavior and affect code for each person every five minutes to describe the predominant activity and associated affect during that time frame. In order to represent a range of behaviors most commonly observed during ADS activities, as well as HT behaviors, the four behavior codes included in the measures are social (S), horticultural (H), productive

(P), and nothing (N). Table 1 presents the four behavior codes and their defining characteristics.

The affectual component of the observational tool was taken from the Dementia Care Mapping (DCM) scale (Bradford Dementia Group, 1997). This code was recorded for each participant every five minutes in conjunction with the predominant behavior code to document the expressed level of positive or negative affect displayed by program participants. Table 2 presents the affect scores and definitions utilized by the observers to capture participants' moods. The codes representing affect scores ranged from +5 to -5 (see Table 1). Participants who received positive affect scores (+1, +3, or +5) exhibited enjoyment, engagement, and positive social interaction during observed frames, while participants who received average to negative affect scores (-1, -3 or -5) displayed boredom, self-stimulating behaviors, and negative emotions and/or social interactions. A codebook (see Appendix 1) with extensive examples and rules defining the nature of each activity was included in the measure. After initial training, the observers reread the codebook once every two weeks to increase internal validity and reliability. The observers' training session included ample discussion of both behavior and affect codes as well as practice observations. Prior to the onset of data collection, observers were trained in the data collection technique and were tested for inter-rater reliability, achieving an excellent alpha score of .90.

Interviews. A short, seven-item interview was developed for this study to supplement the observational data and incorporate the perspectives of the persons who participated in the HT sessions. The interview questions were targeted at capturing the opinions of the HT participants related to what they liked and disliked about the sessions

as well as how the activities made them feel and whether they viewed the activities as helpful to them.

Procedure

Two Horticulture Therapists possessing experience working with older adults with dementia developed and implemented 9 weeks of scheduled HT activities utilizing live plant materials for all four participating ADS programs. All of the activities were selected for anticipated therapeutic benefits within social, physical, psychological, and cognitive domains of functioning. Additionally, while activities were being identified, special consideration was given to salient factors, including cost-effectiveness, safety of plant materials, and versatility. Pre-planned modifications were designed for each activity so all interested participants could be included with support in achieving the AL and sustained engagement. Each participant had the opportunity to perform one activity each week for approximately 30-minutes in a group setting; some activities were designed to facilitate teamwork and others designed to engage participants individually in parallel activities.

Due to resource limitations, HT facilitators led HT activities two days a week, visiting two programs per day. Therefore, two of the groups met in the morning, and two of the groups met in the afternoon. The timing of the sessions, coupled with the summer heat, also impacted whether the activities took place inside. The environment for the sessions varied per facility, although each group performed HT in more than one setting ranging from indoors, to a screened in-porch, to a raised bed garden area.

Staff persons from each facility were invited to help facilitate the HT sessions by working with persons needing one-on-one assistance and attending to persons' ADL needs. It was also requested that the staff help to transfer the participants from the main

recreation area to the setting where the HT sessions took place. Varying responses and levels of compliance with this request were experienced ranging from a complete lack of help to staff persons who were so eager to be involved that they took over participants' projects on some occasions. The facilitators attempted to demonstrate appropriate facilitation through modeling and making specific requests of staff.

Influenced by the Montessori method, (Camp et al, 1999) the HT facilitators, prior to each activity, set out the necessary materials for each participant to successfully engage in the activity with optimal choice regarding plants and containers. In this study, activity leaders introduced the activity and modeled active engagement through a demonstration prior to the onset of activity engagement. In order to help participants identify meaning in the HT activities, facilitators invited persons to engage in social interaction and reminiscence through questions regarding their social histories and past involvement with gardening, farming, cooking, and other related topics.

The traditional activities that comprised the control data were representative of activity programming at ADS programs, including exercise, crafts, games, and puzzles. These traditional activities were led by the facilities' regular activity directors and took place indoors in a group setting. The two RAs utilized the observational scale both before (during traditional activities) and during the HT activities every week; each watched up to six different individuals during each period to capture the experiences of up to 12 participants each session.

The two RAs conducted short interviews with two to four of the HT participants every other week immediately following the HT sessions. The RAs interviewed the participants in the location where the HT activity had just transpired in order to use

environmental cues and prompts, such as the completed HT projects, to assist persons who may have otherwise forgotten that they had just participated in the HT program.

Analysis

In order to assess the participants' responses to the HT activities in comparison to the traditional ADS activities, we ran a series of paired sample t-tests after conducting a power analysis (1.0) to ensure that a sufficient sample size was identified so that degrees of freedom in the statistical analyses were not comprised (Bond, 2003). Because the interviews were not conducted after the traditional ADS activities and were not conducted with every subject following the HT sessions, the answers obtained from the interview will only be utilized anecdotally to support observational findings.

Results

T-tests were used to compare mean levels of engagement in the horticulture activities to the traditional ADS activities (see Table 2). To address the first research hypothesis that participants would exhibit higher levels of activities engagement during HT than traditional activities, we conducted paired sample t-tests to compare levels of engagement in the horticulture activities during HT to engagement in the traditional activities during the control observations. During the course of the study, we found that scheduled activities intended to provide the source of control observations frequently did not take place at the two sites with afternoon sessions. Clients were frequently sleeping or sitting at a table with no activity in which to engage. To consider whether control observations including this data affected our results, we conducted the analysis with all four programs and again using only the morning programs (where scheduled control activities consistently took place). The results were similar for both sets of analyses, thus we present the result incorporating all four programs. In support of the first hypothesis,

which predicted higher levels of active engagement during the HT than during traditional ADS activities, analyses revealed that there was a significant difference in the average amount of time that participants spent actively engaged in the targeted behavior during the horticulture activities in comparison to the traditional ADS activities; ($t(47) = 13.47, p = .00$). Participants spent an average of 78% of their time actively engaged in HT activities in comparison to 28% of time actively engaged in the traditional ADS activities. Table 3 presents mean percentage of observations characterized by the different behavior codes and the average level of affect.

In support of our second hypothesis that participants would exhibit lower levels of non-engagement during the HT than traditional ADS activities there was a significant difference between the mean level of non-engagement during the HT and the traditional ADS activities. Participants spent an average of 60% of the observation nonengaged during the traditional ADS activities compared to only 14% of the observation during the HT activities ($t(47) = 13.42, p = .00$).

The third hypothesis stated that participants would experience more positive affect during the HT than during the traditional ADS activities. This hypothesis was also supported, as the participants exhibited greater levels of positive affect during the horticulture activities ($t(47) = 5.15, p = .00$). The average affect score for HT activities was 2.43, while the average affect score for traditional ADS activities was 1.90

Discussion

The current study utilized Lawton & Nahemow's theory of environmental press (1973) to evaluate the effect of a person-centered HT program for persons with dementia in an ADS setting. More specifically, we assessed participants' behavioral and affective

responses during HT activities and during traditional ADS activities. We found significant differences in the participants' responses to the HT activities compared to traditional activities.

Our results supported all three of our hypotheses concerning the differences in engagement and affect during HT and traditional activities. Due to the discrepancies in previous findings about mean levels of productive engagement in targeted behaviors during HT and traditional ADS activities, it was valuable to reassess our first hypothesis with a larger sample and find significant differences in the percentage of time actively engaged in the HT than during the traditional activities (Gigliotti et al., 2002; Jarrott et al., 2002). Sustained active engagement by a group of ADS participants in the HT activities is indicative of the value of the person-centered approach to planning and implementing activities. Prolonged engagement in the HT activities is also an indicator of the appeal and value of the horticultural activities. Anecdotal evidence supporting the fact that participants enjoyed and anticipated the HT activities was demonstrated by a number of participants as soon as the facilitators arrived at the program; these individuals demonstrated their enthusiasm by helping to carry in the materials and set them out during the preparation process. Additionally, as the study progressed the participants became so accustomed to the process involved in HT activities that they usually did not wait for instructions and began to work the moment that they sat down to their materials

Applying the theory of environmental press, the activities were presented in an individualized manner. For instance, persons inclined to wander were given the purposeful task of filling and refilling watering cans for other less mobile participants, and participants who disliked the dirt were given gloves and also the option of

deadheading spent flowers and dried leaves if planting was not desirable. The use of these techniques, in addition to adaptive gardening tools, was utilized in order to best match the environmental demands and the individual competencies of the participants, thus resulting in appropriate behaviors.

Consistent with the findings uncovered by studies conducted by Jarrott and colleagues (2002) and Gigliotti and colleagues (2002), participants spent significantly less time non-engaged during the HT than during the traditional activities. This finding suggests that the participants were able to actively engage in the activities due to the match made between environment and competence levels through the HT programming. The subjects found the activities enticing and the HT method accommodating to their varying abilities and interests, which in turn supported sustained periods of engagement. HT activities appear to offer dementia-care staff a viable activity alternative that overcomes common criticisms regarding the amount and nature of activities in many dementia-care programs (Kitwood, 1997; Nolan & Grant, 1995). HT offers a therapeutic programming option that engages participants and reduces the amount of time that they spend unengaged. Reductions in non-engagement amongst groups of persons with dementia have implications for subsequent behavior problems that are often provoked by boredom and a need for stimulation, such as repetitive and self-stimulating mannerisms (Kitwood, 1997; Nolan & Grant, 1995). Also important was the fact that all of the HT activities took place in a group setting with staff to client ratios comparable to the traditional activities. This is an important point because low staff to client ratios are often a limiting factor in programming options, and beneficial activities that require high staff to client ratios are unrealistic at many care programs.

In support of our third hypothesis, which predicted that subjects would experience greater positive affect during the HT activities than during the traditional ADS activities, we found significant results, which also support Lawton's model of environmental press. The theory of environmental press recognizes that a match between the environment and competency level of each individual will result in positive affect due to a sense of mastery and esteem that results from adaptive behavior. Bordering the AL zone of the model, there are two zones; the *zone of maximum comfort* prevails when the person is under-challenged and behaves in a manner that demonstrates passivity and boredom, and the *zone of maximum performance* is characterized by socially outgoing behavior, interest, and pleasure. Applying the findings that participants engaged in the HT activities for a sustained time and simultaneously demonstrated greater levels of positive affect, the conclusion can be drawn that participants actually achieved the zone of maximum performance.

Limitations

Although this investigation represents a significant improvement in previous research through the increase in sample size and the incorporation of multiple sites for data collection, several limitations must be acknowledged. The generalizability of these findings is still limited by the fairly homogenous sample of older adults and the relatively small sample size. The participants were predominantly white and all four facilities were programs in southwest Virginia. At the present time, so little research about the effects of HT programming on persons with dementia exists that the scope of this investigation and sample examined are an appropriate starting point for HT research with this population.

Another limitation that was unavoidable due to resource limitations was the time of day that the traditional ADS activities and HT activities were observed and implemented. One methodological flaw recognized by the researchers was the fact that the observers were unable to ensure that an activity would be implemented during the traditional ADS activity observation schedule. Oftentimes the researchers arrived at the sites to gather the traditional ADS activity observations and instead observed rest periods or transition times despite the fact that activities were scheduled for the time period. It appeared that non-compliance with the schedule resulted from staff decisions to extend rest periods and the absence of the activity directors. In both of these instances observations included as traditional ADS activities encompassed transitions from a rest period. In addition, implementing the HT activities in the heat of the summer afternoon was not desirable. The timing of afternoon activities, combined with the weather, limited the types of activities that could be performed by the participants and often necessitated that the HT activities take place indoors despite access to outdoor gardening plots. In order to assess whether this had an impact on engagement and affect levels in the afternoon groups, we conducted supplementary analyses comparing morning to afternoon groups and found no significant differences between the groups in engagement in HT, non-engagement, or levels of positive affect.

Other environmental limitations included resource limitations encompassed by factors beyond our control. One of these factors included a drought in the area, which made watering the garden a fineable offense! Therefore, a number of the plants wilted and even died in some instances. This caveat may have had implications for the psychological benefits that the participants received from nurturing their gardens and

potted plants out-of-doors. When the plants look ugly, wilted, and dead, it may make participants feel as if they have failed and actually reduce well-being and feelings of success. Additionally, the physical spaces where the activities occurred were often small, uncomfortable, and inhospitable to wheelchair access, thus challenging the facilitators to use innovative practices and creative approaches, such as transforming chairs into tables. Another factor that greatly impacted the HT sessions was the lack of staff and administrative support at a number of the sites. Because many staff were not trained to embrace person-centered approaches and techniques and were often operating from a medicalized deficit model, staff persons had difficulty supporting the participants in appropriate ways. This resulted in both over-involvement, in which staff took over the participant's projects, and under-involvement as staff failed to aid in the transport of participants to and from the sessions. Despite all of these limitations, we found important benefits for the HT participants.

Future Research

Subsequent studies in the realm of HT for persons with dementia are needed to overcome some of the limitations presented in this study and further support the development of the field. The findings produced by this research offer a significant contribution to the limited amount of research concerning HT and persons with AD; however, subsequent studies are needed to examine this innovative therapeutic practice utilizing more rigorous techniques, more piloted measures, and the incorporation of various theoretical and informant perspectives. Additionally, future research about HT for persons with dementia should span across a variety of dementia care programs, including nursing homes.

The design and methods utilized in the current investigation represent a realistic starting point in this domain of research; however, a number of improvements to the design and methods utilized could further enhance the magnitude and utility of the findings. Future research should include control groups not attending HT, in addition to control observations of the treatment subjects in the analyses, so that intraindividual and interindividual comparisons can be made. This amendment to the design would overcome criticisms directed towards utilizing persons as their own controls, while still valuing the attempt to understand individual differences in response to varying activities. The value of collecting data at a range of programs spanning ADS programs to nursing home facilities would further support the utility of HT for this population of individuals throughout the progression of the disease process.

Additional improvements that could be incorporated into future studies are questions that expand beyond the individual level and incorporate multiple perspectives from family and staff in order to incorporate the ecological contexts of the participants' lives. Although we did pilot staff interviews for the present study, the fact that the interviews were not consistently performed with staff from each site contributed to our decision to only utilize this information anecdotally to support observational findings. Comments made by staff demonstrated that the HT sessions enabled them to learn more about the abilities and interests of their own clients and that they felt the HT programming benefited the participants, the environment of the facility, and themselves. For example, one staff person stated, "I have learned that Deborah can actually do much more than I previously thought, and I never thought Frank would get dirty." Other indicators that the HT programming was well received by persons beyond the targeted

group of older adults became evident as family members donated unsolicited plants to the program and commented to the facilitators that their family members wanted to be sure to get to the program on time on HT days.

Attempts to improve the psychometric properties of the instruments incorporated in this research would represent a significant step forward in the field of HT research for persons with dementia. Obtaining congruence between the measures used in this study with other more established scales used to assess affect and engagement in persons with dementia, such as the Apparent Affect Rating Scale (AARS) (Lawton, Van Haitsma, & Klapper, 1996), Dementia Care Mapping (DCM) (Bradford Dementia Group, 1997), and the Menorah Park Engagement Scale (Orsulic-Jeras, Judge, & Camp, 2000), would help to establish reliability and validity information. In addition, it would be valuable to address concerns related to rater bias.

Another valuable endeavor in this domain of research is to assess the benefits obtained by participants resulting from engaging in the HT activities, using valid and reliable instruments. Although the current study did assess the benefits obtained by each participant during HT, a discussion of these findings is beyond the scope of this paper. Furthermore, a number of concerns related to collecting this information follow. One issue of concern was the risk for rater bias because the HT facilitators, rather than objective persons, assessed the benefits. Having observers and evaluation researchers blind to the intervention would reduce concerns related to biased data collection procedures. Additionally, it was decided that the operationalization of the benefits assessed need to be refined and evaluated to ensure conceptual clarity, reliability, and validity.

Research procedures that utilize mixed methods, including qualitative measures would also provide the researchers with a greater understanding of individual experiences of persons with AD and the staff associated with the HT program. These questions could also direct research towards a better understanding of the reasons why the HT activities were more successful at engaging the participants and facilitating positive affect. Although the current study used multiple methods, including staff and participant interviews, we did not utilize this data in the current investigation because interviews were not conducted with all participants.

Future research in this arena should compare HT to other professionally recognized alternative therapies, including music and art therapy, as well as other therapeutic activities utilizing a person-centered approach guided by a strengths perspective. This would help to clarify the importance of the plants in the equation rather than leading readers with healthy skepticism to question whether it was the approach or the content of the activity that actually resulted in the positive outcomes. Because a person-centered approach embracing a strengths perspective is inherent in the practice of HT and the materials and procedures utilized in HT are familiar, stimulating to the senses, and generationally appropriate, HT has been demonstrated to be an approach that can successfully engage this group of older adults and enable them to experience success as well as positive affect.

Conclusions

The current study demonstrates that HT activities are a viable and desirable choice for dementia-care programs because they successfully engage groups of participants in an activity that elicits high levels of active engagement and positive

affectual responses. HT activities embrace the environmental press model by working to facilitate a harmonious balance between the environmental demands and the competence levels of the targeted population, thus resulting in appropriate behavior and positive affect. Additionally, the generationally and developmentally appropriate nature of gardening for older adults supports the dignity and social history of this group of elders, thus supporting their personhood. HT activities should be incorporated into the therapeutic programming schedule of persons with dementia to diversify the programming options available in formal care settings, while taking care to maximize the participants' strengths and abilities. HT offers dementia-care programmers an activity alternative that is holistic in its attempt to facilitate benefits in physical, social, psychological, and cognitive domains of functioning while incorporating the importance of the environmental context in which persons operate. HT programs offer the dual benefits of enhancing competence in persons with dementia while also beautifying of dementia-care environments that can be nurtured by program participants.

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Table 1.

Behavior Code Categories

Behavior Codes	Description
SOCIAL (S)	social interaction, verbal or non-verbal, with no other activity (e.g., greeting others, talking with others, etc.).
HT (H)	horticultural behavior, either social or non-social (e.g., planting, watering, etc.).
PRODUCTIVE (P)	productively engaged in activity, but not HT, either social or non-social (e.g., singing songs, reading, exercising, etc.).
NOTHING (N)	non-engagement in activity and non-social (e.g., repetitive, self-stimulating behaviors, sleeping).

Table 2.

Affect Scores and Definitions.

Affect Score	Core Value
+5	High positive affect
+3	Moderate positive affect
+1	Mild positive affect
-1	Mild negative affect
-3	Moderate negative affect
-5	Extreme negative affect

Table 3.

Mean Levels of Engagement and Affect during HT and Traditional Activities (N=48)

	Activity	
	HT	Traditional
Mean % of time engaged in presented activity ¹	77.69*	27.74
(SD)	(22.27)	(21.70)
Mean % of time doing nothing	13.67*	60.38
(SD)	(19.84)	(21.41)
Average Affect (Max=5)	2.43*	1.90
(SD)	(.74)	(.65)

¹Mean percentages of H (horticulture) in HT activities vs. P (productive) in traditional activities.

* $p = .000$

Running Head: EXTENDED METHODS SECTION

Horticulture Therapy for Persons with Dementia:

Extended Methods, Section Three

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Section 3. Method

Participants

The sample is a non-random convenience sample, comprised of older adults with a diagnosis of dementia attending one of four ADS programs in southwest VA. The first participating ADS program was located in a university setting and served as the pilot test group for related preliminary HT research. This university program typically served between 8-12 participants daily (VT). The second site was a community program with 10-12 participants attending daily (LC). The final two ADS programs were located on the campus of the Veterans Administration (VA), and these facilities shared staff and other resources with one other as well as space. Although two of the VA programs were located in the same building, on the same campus, they were usually kept separate from one another based on the level of the participants' impairment. While one of the programs served a mixed group of adults in need of ADS (VAMU), the other group consisted of older adults with moderate to severe dementia (VADU). The mixed group usually had between 20-25 participants present daily, while the dementia only group usually consisted of 8-10 participants daily.

Along with informed consent forms, a cover letter from the program administrator endorsing the program was sent to caregivers to strengthen the chances that forms would be returned by family caregivers. The program administrators agreed that the program staff would collect these forms, making follow up calls as needed, and compile other demographic data and MMSE scores on each participant. Unfortunately, this agreement was only partially upheld at two of the four programs, and a great deal of information

regarding cognitive functioning was never obtained despite numerous attempts by the researchers to offer support in collecting it.

The total number of participants included in the analyses was 48 (26 males and 22 females. We had 10 participants from the University program, 12 from the community program, 13 from the VAMU, and 13 from the VADU). Despite the fact that all ADS clients were welcome to join the HT activities, data were only collected on those participants with a diagnosis of Alzheimer's disease or a related disorder and those who attended at least one HT session. The mean age represented in this sample was 80 ($SD=11$), ranging from 46 to 98. In terms of race, 41 participants were white and 7 were black. The participants served as their own controls, with control observations recorded during traditional activities and HT activities representing the treatment condition.

Instrumentation

This study utilized a multi-method assessment, including six methods designed to assess the effects of HT on persons with dementia. They included: participant characteristics, participant interviews, staff interviews, overall session evaluation, individual participant evaluation, and observational assessment of participants' engagement and affect.

The current investigation is limited to the participants' characteristics and observational data; however, the participant and staff interviews were used anecdotally in the interpretation of findings to support the observational data. This decision was made in order to streamline the focus of the investigation and to support the propositions set forth by the environmental press model.

Participant Characteristics. Participant characteristics included basic demographic information and functional impairment status. Demographic information

was gathered from the ADS files on each participant to capture gender, age, race, and diagnosis (see Appendix A). Level of cognitive impairment was assessed using the Mini-Mental State Examination (MMSE) (Folstein, Folstein & McHugh, 1975). This measurement was administered by the staff at the participating ADS programs to assess whether participants were operating at mild, moderate, or severe levels of impairment due to the effects of dementia. MMSE assessments were conducted within 6 months of the study to ensure more accurate scores. The MMSE contains eleven questions that are designed to assess seven different dimensions of cognitive functioning. On a scale ranging from zero to thirty, low scores (10 and below) indicate the greatest impairment, middle range scores (from 11-19) indicate moderate levels of impairment, and higher scores (from 20-26) indicate mild cognitive impairment. The MMSE has been widely used and recognized as a tool in examining individuals with Alzheimer's disease and Related Disorders (ADRD) (McCougall, 1990).

Observational Assessment. A measurement tool specifically designed for observing participants with dementia engage in traditional and HT activities does not exist; therefore, an observational assessment tool was developed (see Appendix B) and piloted in two prior HT studies with this population of older adults. The instrument, which is utilized by two trained research assistants (RAs), captures both the affect (mood) and behaviors of the participants during HT and traditional activities. The RAs each observed up to six participants at a time, recording a behavior and affect code for each person every five minutes to describe the predominant activity and associated affect during that time frame. In order to represent a range of behaviors most commonly observed during ADS activities, as well as HT behaviors, the four behavior codes in the measure included:

Table 1.

<i>Behavior Code Categories</i>	
Behavior Codes	Description
SOCIAL (S)	social interaction, verbal or non-verbal, with no other activity (e.g., greeting others, talking with others, etc.).
HT (H)	horticultural behavior, either social or non-social (e.g., planting, watering, etc.).
PRODUCTIVE (P)	productively engaged in activity, but not HT, either social or non-social (e.g., singing songs, reading, exercising, etc.).
NOTHING (N)	non-engagement in activity and non-social (e.g., repetitive, self-stimulating behaviors, sleeping).

The behavior category code (BCC) was used to identify whether the participants were engaged in the HT activities and to compare the level of engagement in HT with traditional ADS activities.

The affectual component of the observational tool was taken from the Dementia Care Mapping (DCM) scale (Bradford Dementia Group, 1997). This code was recorded for each participant every five minutes in conjunction with the predominant behavior code to document the expressed level of positive or negative affect displayed by program participants. Well and ill-being (WIB) scores ranged in affect from +5 to -5

Table 2.

Affect Scores and Definitions.

Affect Score	Core Value
+5	High positive affect
+3	Moderate positive affect
+1	Mild positive affect
-1	Mild negative affect
-3	Moderate negative affect
-5	Extreme negative affect

Participants who received positive affect scores (+1, +3, or +5) exhibited enjoyment, sustained engagement, and/or positive social interaction during observed frames, while participants who received negative affect scores (-1 to -5) displayed boredom, self-stimulating behaviors, negative emotions and social interactions, and unmet care needs.

Validity has not been established for the behavior code category, but the validity of the affect scale has received support in DCM research (Jarrott & Fruhauf, 2002). A codebook (see Appendix B) with extensive examples and rules defining the nature of each activity was included in the measure. RAs utilized digital timers with a second counter to accurately determine the predominant behavior and affect for a given time frame. After initial training, the observers reread the codebook once every two weeks to increase internal validity and reliability. The observers' training session included ample discussion of both behavior and affect codes as well as practice observations. Prior to the

onset of data collection, observers were trained in the data collection technique and were tested for inter-rater reliability, achieving an alpha score of .90.

The observers each watched and coded the affect and behavior of six participants over a 60-90 minute period of time. The observers gathered control data on each participant during the traditional activities prior to the onset of the HT activity and collected treatment observations during the HT sessions. Every other week (opposite participant interview weeks) observers captured post-HT data (see Table 3) This data was collected to capture post-HT behavior and affect scores to consider the possibility of carryover effects. The observers recorded both the behavior and affect codes for each participant every five minutes during the post-HT observation period. These data were not analyzed for the current investigation.

Figure 1.

Observation and Interview Schedule.

Week	1	2	3	4	5	6	7	8	9
Pre-HT observations	x	x	x	x	x	x	x	x	x
HT observations	x	x	x	x	x	x	x	x	x
Post-HT observations	x		x		x		x		x
Participant Interviews		x		x		x		x	
Staff Interviews									x

Participant Interview. Recent research suggests that persons with mild to moderate levels of cognitive impairment are able to reliably and consistently provide information about their preferences regarding daily care (Feinberg & Whitlach, 2001). Despite these findings, most research about older adults with dementia fails to give persons with dementia a voice and fails to recognize them as legitimate contributors to the research process. A short, seven-item interview was developed for the current study in order to supplement the observational data and incorporate the perspectives of the persons who participated in the HT sessions. The interview questions addressed the opinions of the HT participants related to what they liked and disliked about the sessions as well as how the activities made them feel and whether they viewed the activities as helpful to them. The interview gave the participants the opportunity to spontaneously respond to questions about the HT sessions (see Appendix C); however, prompts were added to each question to aid participants who were unable to answer the questions

spontaneously and to provide a means for assessing answer accuracy. The prompts were used even in cases where participants gave spontaneous answers in order to ensure that the participants' answers were not contradicting one another.

The RAs observers conducted the interviews every other week. Because of time limitations and an insufficient number of trained interviewers, not every participant was interviewed; however, each time interviews were collected, an effort was made to include a variety of participants. Because the interviews were not conducted after the traditional ADS activities for comparison and were not conducted with every subject following the HT sessions, the answers obtained from the interviews were only utilized anecdotally to support observational findings.

Staff Interview. The staff interview was created for this study to expand the level of analysis from the individual with dementia (the micro system) to the other system levels of the ecological context (see Appendix D). Direct care staff most often involved with the HT activities were given the opportunity to give the observers feedback and reflections about the ten-week HT program during a one-time, five to seven minute, open-ended interview.

The interview included nine questions that asked the staff person to provide information about what benefits, if any, they thought the program had provided the participants, themselves, the family members, the grounds, and the facility. Respondents were also asked to inform the researchers about the challenges they saw to facilitating HT activities with this group of older adults and for themselves. The measure also captured whether they had learned anything new about the participants during the course of the study. Finally, the staff were asked to make suggestions on how we could improve the

sessions and how often they thought such activities would be appropriate at their programs. The RA observers conducted these interviews on the last day of the program at each site so staff would feel less inclined to give socially desirable responses.

Paralleling the participant interviews, this data was only used anecdotally to support the observational data and inform the interpretation of the findings.

Procedures

Prior to the onset of data collection, the PI, the HT facilitators, the observers, the program administrator, and activity directors attended a meeting and orientation day at all sites. At this meeting the investigators explained the project and the various roles of the research team members. The researchers and staff agreed that collecting demographic information, MMSE scores, and informed consent forms would be their primary responsibility in the project. Additionally, it was agreed that program staff would accompany the participants out to the sessions to help transfer them to the gardening areas, assist them when appropriate, and attend to their ADLs. The research team was also given a tour of each site, introduced to the appropriate gardening areas, and given time to meet program participants.

Two students with degrees in HT and experience working with older adults with dementia developed and implemented a schedule of HT activities with the participants (Appendix E). Ten HT activities (see Appendix F for sample) were conducted at each site over the course of the 9-week period. All of the activities utilized live plant materials to represent true HT activities. In addition, all of the activities were selected for anticipated therapeutic benefits within social, physical, psychological, and cognitive domains. It was paramount that activities chosen were simple, cost-effective, and

versatile enough for modification, in order to include a wide range of ability and interest levels. While some of the activities were designed to facilitate teamwork or cooperative group activity, others were designed to engage the participants individually in the same activity as one another, defined as parallel group activity.

Because there was no budget for supplies, all of the plants, soil, and gardening tools were solicited by the facilitators over the course of the study. This greatly impacted the decisions regarding which activities would be chosen for the calendar. Limitations on plant materials also existed; all of the plant materials were researched to ensure safety and to avoid toxic or poisonous species due to the tendency of many individuals with dementia to indiscriminately place objects in their mouths. The space provided at the sites also limited the types of plant materials that could be used due to growing requirements such as light levels, limited water supplies, and space limitations.

Each participant had the opportunity to perform one activity each week for approximately 30 minutes in a group setting. Within groups of participants, HT activities were administered during the same time and day each week; however between groups there were differences in the days and times that HT activities took place. Due to resource limitations, HT facilitators lead HT activities two days a week, visiting two programs per day. This factor, coupled with the 45 minute commute to the Roanoke area, resulted in two of the groups' HT sessions meeting in the mornings, and two of the groups meeting in the afternoon, which is typically characterized by lower activity levels. Time of day also limited the number of times that the afternoon groups were able to go outside for HT sessions due to the extreme heat and lack of adequate shade in the garden areas.

Prior to the onset of the activities, the HT leaders set out the necessary materials for each participant to successfully engage in the activity. At several of the facilities certain participants were so eager to join the HT session that they met the facilitators at the door and helped them transport the materials out the garden area and prepare for the activity. The leaders pre-planned modifications for each activity so that participants representing a wide range of functional abilities could be included.

Following set-up, the facilitators began inviting participants to the session. On many occasions, despite direct requests, staff did not assist in transferring participants from the activity room to the patio or porch, so the facilitators had to transport clients, which delayed the start of the sessions. Oftentimes, one facilitator would work on inviting more participants while the other would work with the group of participants already in attendance. This issue, combined with issues related to space limitations, reduced the number of participants invited to attend the sessions.

In this study, activity leaders introduced the activity and modeled active engagement through a demonstration; however, as the study progressed, the participants became so accustomed to the process involved in HT activities that they usually did not wait for instructions but began to work the moment that they sat down to their materials. Additionally, guided by strengths perspective and a person-centered approach, individual participants were often given different tasks that they were known to enjoy. For example, one individual who was highly mobile and often engaged in wandering behaviors enjoyed the task of watering; he was able to do this without a great deal of supervision, whereas the steps involved in other activities confused him without one-on-one direction. Another valuable reason for finding tasks that were self-directed for a number of

participants was large group size. A range of 10-20 participants attended the HT sessions at the various sites; with larger groups it was not possible for each participant to work with the same materials or engage in the same activity.

During the activities, the HT facilitators engaged the participants in social interaction and reminiscence by asking questions about their social histories and past involvement with gardening, farming, cooking, and other related topics. The emphasis on this component of the HT session recognized the importance of social interaction and helped to focus the groups' attention on the identification of the meaning inherent in engaging in the horticulture activities. Opportunities to facilitate nurturance of the plants and peers were used by the facilitators to empower participants and help to enhance their self-esteem.

Most often, the two HT leaders divided the HT participants into smaller groups, usually based on the location of two seated areas in the same general space, due to the large group size at some programs. This enabled each leader to work more intimately with a smaller group of individuals so step-by-step instructions, physical and verbal assistance, and a steady supply of materials could all be provided to each participant in need. Program staff were asked to join the sessions each week to provide assistance and to attend to ADL needs of the participants during the HT sessions. This request was upheld at a couple of the sites, but was rarely adhered to at the other facilities. The environment for the sessions varied per facility although each group participated in more than one setting ranging from indoors, to a screened in-porch, to a raised bed garden area.

Immediately following the activities, the HT facilitators evaluated the ability of the participants to complete the task and documented any modifications that they

employed in order to help participant achieve that level of engagement. In addition, the individual evaluation forms were used to assess the therapeutic benefits obtained by each participant during that activity. The HT facilitators also completed an evaluation form rating the overall effectiveness of the activity. This data was not utilized in the current investigation due to the potential for bias because the activity facilitators were the sole persons responsible for recording this information.

Trained RA observers utilized the observational scale both before and during the HT activities every week and collected observational data after the HT session every other week to consider the possibility of a carry over effect from the HT. Because it was difficult for the observers to know for sure who would and would not attend the HT session, particularly at the larger programs, pre-HT data were not always captured for each HT participant. For instance, in some cases the observers captured observations on persons during the control activities who did not join HT and did not capture control data on HT participants on other occasions. The observers also recorded information about the ratio of participants to facilitators, the location where the activity took place, and the start and ending time of the activity. They also made notes about the atmosphere of the facility, noting positive and negative events that occurred both before and during HT sessions.

Every other week, the RAs conducted interviews with the participants following the HT activity. The interviews were conducted individually so that participants answering the same questions would not influence each other's responses. The interview was conducted in the location where the HT activity had just taken place in order to provide prompts about the nature of the activity for participants that may have needed

such cues in order to answer the questions more accurately. Lack of sufficient data regarding the participants' diagnoses and consent to join in the project prior to beginning the project limited the degree to which participants could be systematically observed and interviewed.

Analysis

In order to assess the participants' responses to the HT activities in comparison to the traditional ADS activities, we ran a series of paired sample t-tests after doing a power analysis to ensure that degrees of freedom were not significantly compromised. Because the interviews were not conducted after the traditional ADS activities and were not conducted with every subject following the HT sessions, the answers obtained from the interviews were only utilized anecdotally to support observational findings.

To best address the research questions, the variables were analyzed to determine whether there was a normal distribution of the dispersion of scores. This information helped researchers to make decisions about which cases should be deleted based on attendance; the decision to include all persons that attended at least one HT session was implemented. Prior to conducting t-tests, average affect scores were calculated for each individual for each of the HT and traditional activities, as were percentages of time engaged in each of the coded behaviors

Chapter 4. Results

Research Hypotheses

T-tests were used to compare mean levels of engagement in the horticulture activities to the traditional ADS activities. Results are presented in table 4.

Table 3.

Mean Levels of Engagement and Affect during HT and Traditional Activities (N=48)

	Activity	
	HT	Traditional
Mean % of time engaged in presented activity ¹ (SD)	77.69* (22.27)	27.74 (21.70)
Mean % of time doing nothing (SD)	13.67* (19.84)	60.38 (21.41)
Average Affect (Max=5) (SD)	2.43* (.74)	1.90 (.65)

¹Mean percentages of H (horticulture) in HT activities vs. P (productive) in traditional activities.

* $p = .000$

Hypothesis 1. Hypothesis one predicted that participants would exhibit higher levels of active engagement during the HT than traditional ADS activities, and was supported by the analyses. During the course of the study, we found that scheduled activities intended to capture control observations frequently did not take place at the two

sites with afternoon sessions. Clients were frequently sleeping or sitting at a table with no activity in which to engage. To consider whether control observations including this data affected our results, we conducted the analysis with all four programs and again using only the morning programs (where scheduled control activities consistently took place). The results were similar for both sets of analyses, thus we present the results incorporating all four programs. In support of the first hypothesis, which predicted higher levels of active engagement during the HT than during traditional ADS activities, these analyses revealed that there was a significant difference in the average amount of time that participants spent actively engaged in the targeted behavior during the horticulture activities in comparison to the traditional ADS activities; ($p=.00, t=13.47, df=47$). Participants spent an average of 78% of their time actively engaged in HT activities in comparison to 28% of time actively engaged in the traditional ADS activities.

Hypothesis 2. In support of our second hypothesis that participants would exhibit lower levels of non-engagement during the HT than traditional ADS activities there was a significant difference between the mean level of non-engagement during the HT and the traditional ADS activities. Participants spent an average of 60% of the observation non-engaged during the traditional ADS activities compared to only 14% of the observation non-engaged during the HT activities ($p=.00, t=13.42, df=47$).

Hypothesis 3. The third hypothesis stated that participants would experience more positive affect during the HT than during the traditional ADS activities. This hypothesis was also supported, as the participants exhibited greater levels of positive affect during the horticulture activities ($p=.00, t=5.15, df=47$). The average affect score

for HT activities was 2.43, while the average affect score for traditional ADS activities was 1.90.

These significant findings revealed that the HT activities resulted in higher levels of active engagement, lower levels of non-engagement, and higher levels of positive affect than did the traditional ADS activities.

APPENDIX A: PARTICIPANT CHARACTERISTICS

Participant Characteristics

Characteristic	Value
Percent Female	45.8
<i>S.D</i>	.50
Mean Age	80.20
<i>S.D</i> (Range)	11.0 (46-94)
Percent White	85.4
Mean MMSE	13.07
<i>S.D</i> (Range)	8.25 (0-26)

APPENDIX B: OBSERVATIONAL FORM AND PROTOCOL

Date: _____ Observer: _____ Horticulture Activity (HT): (Circle one and specify) PLANTING CRAFTS COOKING
 Specify: _____
 Number of seniors in attendance: _____ HT Start Time: _____ HT End Time: _____
 Number participating in HT: _____
 Started observing: _____ Finished: _____ HT leader: _____ Pre-HT leader: _____ Post-HT leader: _____

Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	BCC																							
	WIB																							
	BCC																							
	WIB																							
	BCC																							
	WIB																							
	BCC																							
	WIB																							
	BCC																							
	WIB																							

NOTES ON POSITIVE AND NEGATIVE OBSERVATIONS/INTERACTIONS:

Observe participants simultaneously and code the predominant behavior for each five-minute period. Each 5-minute period = 1 cycle. Provide letter code for category of behavior in the first column for each cycle and a ranking of -5, -3, -1, +1, +3, +5 in the second column for each cycle to indicate the level of well/ill-being for that behavior code.

BCC Code	Behavior	WIBS Core	Value
S	SOCIAL Interaction, not productive	+5	Extreme well-being
H	HT: Social or non-social	+3	Moderate well-being
P	PRODUCTIVE: but not HT, Social or Non-social,	+1	Slight well-being
N	NEITHER: Non-social, non-productive	-1	Slight ill-being
		-3	Moderate ill-being
		-5	Extreme ill-being

Coding Rules

1. Choose the category that best describes the participant's activity during the five minute period, and record the BCC and WIB code under the appropriate time frame and column.

When the participant engages successively in different **TYPES** of behavior within the same five minute period, the following rules apply:

2. When two or more behaviors occur during the same five minute period with the same WIB value, record the category engaged in most of the time. For example, if the participant engaged in S for 2 minutes and P for 3 minutes, both with moderate well-being, code the time frame as P+3 because of the greater duration in P.
3. When two or more behaviors occur for the same amount of time in an observation frame, code the behavior associated with the more extreme WIB score. For example, if you observe within a single time frame 2.5 minutes of a pleasant conversation, which you rate as S+3, and 2.5 minutes of horticultural behavior with extreme well-being, which you rate as H+5, code the time frame as H+5 because it has the more extreme WIB value.
4. If participant is observed spending roughly equal time in two or more behaviors, and the WIB score for each is the same (e.g. both are +3) code whichever behavior occurs last. For example, if a participant spends the first 2 ½ minutes engaged in a drawing activity with moderate well-being (P+3) and then spends the last 2 ½ minutes of the cycle engaged in a social interaction with a staff member with moderate well-being (S+3), code the Social interaction since it occurred last (S+3).

General Rules

1. Use your knowledge of the participant in assigning a score to a behavior. The same activity that might be a H+1 for one person could be an H+3 for another, depending on their normal level of activity and capacity for participation.
2. If a participant leaves the HT activity in the middle of an observation cycle and cannot be seen, code the behavior that was observed during that cycle before they left.
3. If a participant is absent for an entire observing cycle, place a slash through the coding space for that cycle to indicate no data was gathered.
4. If a participant interacts with the observer during a cycle, record a code and score, but draw a slash through the space to indicate that an interaction with the observer took place. This observation will not be used in data analysis.

5. Note the importance of staying in the background during the activities and trying not to interact with participants during the observation period.
6. Make notes of positive or negative events that you feel are not fully captured by a code and a score. Also, if you have any questions about coding an observed behavior, make notes and discuss with Dr. Jarrott.

How would you code something as P if you are going to observe the HT activities?

1. You may see a participant engage in a different activity other than the HT activity. Whether you are inside or outside, a participant may come to the table to join the HT activity but start a different activity or bring a different activity to the table with them.
2. If a participant leaves the setting of the HT activity to engage in another activity and the observer can continue to code the participant, s/he should do so. A note should be made about the time that the participant left the area where the HT activity was conducted. If the HT is taking place outside, and a participant goes inside and begins to talk with another participant, the observer may be able to see the participant and code the participant as S but **may not** be able to assign a WIB score since they cannot hear the conversation.

Examples of Scores for the Different Behavior Codes

H Productive in HT activity. Participant may be social or not.

- +5 taking part in the HT activity with very high involvement, enjoyment or interaction
e.g. asserting choice and exercising skill while making an HT craft; using seeds to make picture, with intense interest, while being skillfully helped by another person. May be reminiscing about their old garden.
- +3 actively participating in HT, with clear signs of continuing pleasure
e.g. actively and happily participating in a shared HT activity.
- +1 participating in HT, but with fairly low involvement
e.g. routinely gluing seeds on a card, in a rather desultory way. Following therapist's directions with little interest.
- 1 in a state of slight ill-being while participating in HT
e.g. engaging in HT but bored, clearly on the margins of a group in a shared activity
- 3 in a state of moderate ill-being while participating in HT
e.g. showing distress while trying to engage in HT unsuccessfully; being coerced into engaging in HT
- 5 in a state of severe ill-being while participating in an HT activity
e.g. showing strong signs of fear, embarrassment and discomfort while engaging in HT; showing despair or rage.

NOTE: What is 'productive' in Horticulture Therapy?

- Engaging to some degree in the activity being presented by the therapist. Remember different participants will have different capacities for participation.
 - Creating a horticulture product or activity other than the one presented by the therapist, e.g. making a creative seed picture directly on the table, when the therapist is leading participants in planting the seeds in containers.
 - Actively helping another participant with an HT activity, whether or not it is the one presented by the therapist.
 - Actively helping to straighten, tidy, or clean up the HT materials, whether or not the activity has been completed.
- X** Picking at the HT material or repetitive behavior such as wiping dirt off a person's lap over and over is **NOT** a productive activity.

Notes should be made on the productive HT activities that differ from the HT activity presented by the therapist. That is, indicate specifically in which activity the participant was engaged.

S Social but non-productive

- +5 highly therapeutic verbal or nonverbal exchange
e.g. sustained interactions which involve expressing and validating feelings; personal disclosures or reminiscences while the participant is in a very high state of well-being.
- +3 sustained, pleasant verbal or nonverbal exchange
e.g. sustained conversation about the day's activities; friendly chat about mundane matters such as food preferences
- +1 a small episode of verbal or nonverbal exchange

- e.g. giving brief factual information which is clearly received; routine greetings; small exchange of positive gestures.*
- 1 in a state of slight ill-being while interacting with others.
e.g. fidgeting and appearing bored during a conversation; showing discomfort when being outpaced (a staff member going to fast for the participant to follow).
 - 3 in a state of moderate ill-being while interacting with others
e.g. talking sadly about not feeling at home in the care setting and receiving no empathic response; showing unhappiness while being consistently invalidated, or discounted, in a conversation.
 - 5 in a state of severe ill-being while interacting with others
e.g. a sustained conversation in which the participant is demeaned, disparaged, or blamed, and when strongly negative effects are apparent.
- Note: What is social but non-productive?

Doing nothing other than talking is non-productive.

Talking to another person while engaging in a repetitive behavior e.g. rocking, pacing, or absentmindedly picking at the HT material is social, non-productive.

Talking to oneself is not social.

Social interactions may be verbal or non-verbal.

Any positive social interaction that involves more than a brief greeting or a brief exchange of information will typically be coded higher than +1.

N Neither social nor productive (in HT or any productive activity)

- +5 is not an appropriate code for someone who is doing nothing
- +3 displaying interest in others or the surroundings, but not taking part.
e.g. senior is actively watching and enjoying observing the HT activity (which has an activity component), but is not participating or talking with anyone.
- +1 displaying a small degree of interest in others or the surroundings, but not taking direct part
e.g. mild interest in the activities being observed. Senior is not participating in HT or another activity & is not talking.
- 1 uninvolved and showing no interest in others or the surroundings. A person taking a nap should be coded as N+1
e.g. mild distress evident. Senior may appear as if they want to participate or that they want to be a part of the conversation but don't know how to join in.
- 3 after 30 minutes in uninvolved state at N-1 with no one trying to intervene.
e.g. After 30 minutes of being at an N-1, the senior would be coded as N-3 to indicate degeneration from being in a constant period of disengagement. A senior may also be in a N-3 stage after a short period of time if they display moderate ill-being, such as asking for help so they can join the activity but not receiving a response.
- 5 after 30 continuous minutes in uninvolved state at N-3 with no one trying to intervene.

e.g. After 30 minutes of being in an N-3, the senior would be coded as N-5 to indicate degeneration from being in a constant period of disengagement. A senior may be in a N-5 stage without degeneration if they display extreme ill-being such as being in an obvious state of pain, anger, or severe discomfort and not having needs attended to despite repeated calls for help. Being told by a staff member that they can't participate in the activity using derogatory comments.

Note: Talking to oneself while doing nothing would be coded as N. It may receive a positive or negative score depending on the circumstances.

Someone may be engaged in watching/observing another activity that is going on around them or in another area (e.g. the playground) but still be coded as N because they are not involved in the active component associated with the activity.

Someone who is involved in an activity that does not have a visibly active component should be coded as P instead of N because they are behaving appropriately within the structure of the activity. For example, someone may be clearly engaged in a movie, a reminiscence session, or some other form of presentation and may be coded as P because participation in this activity involves periods of listening and thinking without obvious physical, verbal, or social behaviors.

P Productive in a non-HT activity. Participant may be social or non-social

- +5 taking part in a non-HT activity with very high involvement, enjoyment or interaction
e.g. asserting choice and exercising skill while making a craft; drawing a picture, with intense interest, while being skillfully helped by another person. May be reminiscing about another drawing she did as a young girl.
- +3 actively participating in a non-HT activity, with clear signs of continuing pleasure
e.g. actively and happily participating in a shared a non-HT activity.
- +1 participating in a non-HT activity, but with fairly low involvement
e.g. routinely gluing beads on a card, in a rather desultory way.
- 1 in a state of slight ill-being while participating in HT
e.g. engaging in a non-HT activity but bored, clearly on the margins of a group in a shared activity
- 3 in a state of moderate ill-being while participating in a non-HT activity
e.g. showing distress while trying to engage in HT unsuccessfully; being coerced into engaging in a non-HT activity
- 5 in a state of severe ill-being while participating in a non-HT activity
e.g. showing strong signs of fear, embarrassment and discomfort while engaging in a non-HT activity; showing despair or rage.

Note: What is productive in non-HT activities?

Most activity other than that which may be described as self-stimulating (typically repetitive behavior) may be considered productive.

Walking may be considered productive or non-productive depending on whether it serves the purpose of getting the person to a targeted destination or is a means of self-stimulation (restless pacing).

Someone who is involved in an activity that does not have a visibly active component should be coded as P instead of N because they are behaving appropriately within the structure of the activity. For example, someone may be clearly engaged in a movie, a reminiscence session, or some other form of presentation and may be coded as P because participation in this activity involves periods of listening and thinking without obvious physical, verbal, or social behaviors.

Examples of productive non-HT activities:

- Labor type activity, e.g. moving chairs, picking up trash.
- Eating
- Reading a book or magazine
- Engaging in another craft activity
- Actively listening to other participants talk during a reminiscence session

Examples of non-productive activities you might see:

- Rocking back and forth in chair
- Tapping on the table, chair, leg
- Pacing
- Repeatedly picking at visible or invisible lint or dirt on furniture or self

APPENDIX C: PARTICIPANT INTERVIEW

Directions: Ask the open-ended questions before asking the related items with prompts. If a person provides an open-ended response to the question that answers the item with a prompt, do not use that prompt. Use your judgment regarding combination of items (e.g. 3 a and 3b). You may combine for higher functioning participants but separate the items for lower functioning individuals. You may also choose not to ask questions 4-6 if you sense the participant cannot answer them.

Date:
 Interviewer:
 Activity:
 Participant:

1. Did you enjoy [name the activity] this [morning/afternoon]?

YES.....1
 NO.....0

a. What did you [*like/dislike*] about it?

_____ (Record Spontaneous Answer Here)

i. Did you enjoy visiting with the others?
 YES NO

ii. Did you enjoy the smell, the feel of the [*plant materials*]?
 YES NO

If Question 1 = yes, ask Question 2

2. Was there anything you did not like about [name the activity]?

YES.....1
 NO.....0

a. *If yes*, What did you dislike about [*name the activity*]?

_____ (Record Spontaneous Answer Here)

i. Did you dislike the mess? YES
 NO

ii. Did you find the activity boring? YES
 NO

iii. Did you find the activity too difficult? YES
 NO

3. How do you feel about yourself after doing this activity?

(Record Spontaneous Answer Here)

a. Prompts

- | | | |
|---|-----|----|
| 1. Do you feel good? | YES | NO |
| 2. Do you feel bad? | YES | NO |
| 3. Do you feel proud | YES | NO |
| 4. Do you feel frustrated? | YES | NO |
| 5. Do you feel productive/useful | YES | NO |
| 6. Do you feel that it was a waste of time? | YES | NO |

4. Do you feel this activity was helpful for you? YES NO
 [If yes] How?

5. What suggestions do you have for us as we plan more activities with the plant materials (e.g. things you would change or new things you would like to see)?

6. Is there anything else you'd like to tell me about this program?

Thank you for your time. I appreciate your taking the time to talk with me about the horticulture program.

APPENDIX D: STAFF INTERVIEW**Interviewer:****Staff Interviewed:****Date:****Location:**

1. What do you think the benefits of the HT activities were, if any, for the participants and their family members?
2. What do you think the benefits of the HT activities were, if any, for the staff?
3. What do you think the benefits of the HT activities were, if any, for the grounds and facility?
4. What were the challenges to facilitating HT activities with this group of older adults?
5. What were the challenges to facilitating HT activities for the staff?
6. Did you learn anything new about the social history or ability level of a participant from your program during HT sessions?
7. Would you recommend that a permanent HT program be included in the programming of this Adult Day Care facility?
 - 7.a. If yes, how often do you think it should be included?
8. Do you have any suggestions on how we could improve this program?
9. Is there anything more that you'd like to tell us about the HT sessions?

APPENDIX E: SAMPLE CALENDAR

Summer 2002 HT Research Activities

Week	Date	Liberty Center 10:30-11 HT 11-11:30 Tuesday	VT ADS 1:30-2 HT 2-2:30 Tuesday	VA D.U 10:30-11 HT 11-11:30 Wed.	VA Mixed 1-1:30 HT 1:30-2:00 Wed.
1	5/28 T 5/29 W	No Group	-Dig up bulbs -replant -deadhead	-deadhead petunias -pot petunias	-deadhead petunias -weed raised bed -plant tomatoes
2	6/4 T 6/5 W	-Plant in raised bed -Pot up petunias to take home	-plant tomatoes and stake -plant squash -dig up last of bulbs	-plant in window boxes	-stake tomatoes -plant in raised bed -pot up petunias to take home
3	6/11 T 6/12 W	-plant in raised bed -propagate cuttings (*8, 10)	-plant in raised bed -propagate cuttings (*8, 10)	-Propagate cuttings (*8, 10)	-plant in raised bed -propagate cuttings (*8, 10)
4	6/18 T 6/19 W	-Mixed hanging baskets	Mixed Hanging baskets	Mixed Hanging baskets	Mixed Hanging baskets
5	6/25 T 6/26 W	-Mixed hanging bags -larger mixed planters	-Mixed hanging bags -larger mixed planters	-Mixed hanging bags -larger mixed planters	-Mixed hanging bags -larger mixed planters
6	7/2 T 7/3 W	-Root division of various mints and pot up to take home	-Root division of various mints and pot up to take home	-Root division of various mints and pot up to take home	-Root division of various mints and pot up to take home
7	7/9 T 7/10 W	-plant in raised bed -pot up plants to take home	-plant in raised bed -pot up plants to take home	-pot up plants to take home	-plant in raised bed -pot up plants to take home
8	7/16 T 7/17 W	-Terrariums (*3)	-Terrariums (*3)	-Terrariums (*3)	-Terrariums (*3)
9	7/23 T 7/24 W	-Fresh flower arrangements (*2, 3, 7)	-Fresh flower arrangements (*2, 3, 7)	-Fresh flower arrangements (*2, 3, 7)	-Fresh flower arrangements (*2, 3, 7)
10	7/30 T 7/31 W	-pot up plants to take home (*3)	-pot up plants to take home (*3)	-pot up plants to take home (*3)	-pot up plants to take home (*3)

APPENDIX F: SAMPLE ACTIVITY

Activity Seed Sorting

Purpose:

Enhance fine motor skills
 Develop hand eye coordination
 Color and size discrimination
 Matching
 Reminiscing

Materials:

-5 types of seeds:
 1. Hyacinth Bean vine
 2. Onion
 3. Snap Beans
 4. Nasturtium
 5. Pumpkin
 -Note cards with a sample seed glued to them and name for each pile to be sorted
 -Bowls
 -clear Dixie cups each participant gets 5, one for each type of seed they are to sort

Materials for extensions:

-5 more seeds (smaller)
 1. Marigolds
 2. Hollyhocks
 3. Swiss chard
 4. Sunflower
 5. Cilantro
 -Bean pods, Hollyhock pods, and marigold and sunflower heads
 -Envelopes cut in half (5 envelopes, cut in half)
 -Sharpie
 -Tape

-Have materials set out at the activity table:

Place five bowls in the center of the table with the marked note cards in front of the bowls. Place materials for extensions near by

-Individually ask the appropriate group members to join you at the table for an activity
 We have a project that involves organizing seeds, would you mind helping us?

Introduction:

This morning we are going to get organized for next spring's garden. At the end of the summer we gathered a lot of seeds off the plants in our garden. At the time, we were really rushed, since there was so much to do out there at that time. Now, since it has gotten colder and things have frozen, it is a good time to go back and organize all the seeds, so we can easily find them in the spring when it is time to plant again. Has anyone ever grown a plant from seed before? If so, what kind of plant was it? In vegetable and fruit plants, where do you find the seeds? (In the fruit) Can anyone think of a fruit that you must take all of the seeds out of before eating? (Cantaloupe, pumpkin, honeydew) Can anyone think of seeds that people like to eat? (Sunflower, pumpkin, beans) What other animals love to eat seeds? (Birds, squirrels) Does anyone like to watch the birds out at the birdfeeder? Does anyone have a bird feeder at their house, if so who is responsible for filling it? Discuss how different all of the seeds look, and how they come in so many different colors, shapes, and sizes.

Demonstration:

Discuss and demonstrate the following process before instructing participants to engage on their own.

1. Give each participant a handful of assorted seeds from the 5 listed in original Materials.
2. Sort the different seeds into the individual Dixie cups
3. Take a seed from the pile and compare it with the five on the note cards on the Table. Find the seed that it matches on the card and pour the Dixie cup full of matching seeds in the corresponding bowl.
4. Continue to do this until the entire pile of seeds has been categorized and all the Dixie cups have been emptied

Extensions:

Horizontal:

1. Use other seeds of comparable size
2. Sort pots of different shapes & sizes for storage
3. Sort beads

Vertical:

Downward Extensions:

1. Just separate the seeds in the pile into different groups without matching them to the cards
2. Pour the cups of already sorted seeds into the bowls
3. Put the seeds from the bowls into the envelopes
4. Just crack open the seedpods to release seeds from within
5. Have a bowl with only two types of seeds and sort those

Upward Extensions:

1. Do the same procedure with the five added smaller seeds listed in the extension materials
2. Cut the envelopes in half
3. Write the names of the seeds on the outside of the envelopes and add the appropriate seeds

APPENDIX G: IRB PROPOSAL

Study Protocol

Justification of Project

The proposed study involves an evaluation of horticultural therapy (HT) activities conducted at four adult day service (ADS) programs in the New River Valley. The evaluation will be a valuable tool in assessing the effectiveness of horticultural therapy for seniors with dementia in an ADS setting.

Horticultural therapy (HT) has been used in different settings with individuals with compromised abilities. It has been used primarily in institutional settings serving older adults, such as nursing homes and ADS programs. Although these programs have been well received by participants and staff at the programs, little gerontological research has been done to assess the effects of HT on seniors with memory problems. Such an evaluation would be of great use to horticultural therapists and other institutional care programs striving to provide therapeutic activities for their clients with dementia. The goals of HT range from increased social participation to greater range of motion.

It is expected that the proposed HT activities and evaluation will result in at least two professional presentations, one Master's thesis, and scholarly publications. The program will also provide an opportunity for inter-departmental collaboration between the departments of Horticulture and Human Development.

Procedures

The principle investigator will work with two horticultural therapy students and two graduate research assistants (RAs) to develop, implement, and evaluate the HT activities conducted with the ADS participants over a ten-week period. The proposed project involves three different components.

First, the investigators will advise the students on development of activities appropriate for the participants in the ADS programs. The HT students will develop appropriate goals for each HT activity, lists of needed materials, and steps to set up and conduct each activity. For each type of plant and plant material to be used in the HT activities, students will verify during activity development that none are toxic or poisonous to humans.

Next, the students will have an orientation period at the ADS programs, during which time they will observe the participants in regular ADS activities. The orientation is necessary so that the students become familiar with the individual ADS participants, their abilities, and limitations. Following the orientation, the HT students will present weekly HT activities lasting 30-45 minutes each. Other horticultural activities will be limited during the program.

The HT activities and evaluation comprise the third step in the project. Observations will begin during regular ADS activities 30-minutes prior to when the HT activity begins and will continue through the HT activity. The RAs will observe the participants, recording two codes every five minutes, the predominant behavior and affect expressed by each participant. After each HT activity, the HT students will complete a group evaluation that describes factors that may contribute to the effectiveness of the activity, for example, involvement of staff in the activity and the organization of the activity. HT students will also complete individual

evaluation forms on the participants' involvement in each activity. The evaluation will describe the skill each participant exhibited in completing the presented HT activity, whether any modifications were utilized to keep the participant interested and to facilitate success, and what benefits the participant experienced in the activity. Finally, the RAs will conduct two interviews with each participant, one in the first three weeks of the project, and one in the last three weeks of the project, to obtain participant feedback about the activities, what was beneficial, what was disliked, and whether the participants found the activity to be meaningful.

Risks and Benefits

The risks involved in the proposed study are no greater than might be expected in any natural observation in an adult day service setting. Horticultural activities are common at most adult day programs. The HT student who will be leading the activities in the proposed study will verify that none of the plants or plant materials to be used are poisonous or toxic to humans. Additionally, participation in the HT activities is completely voluntary as none of the older adults are required to engage in any activities conducted at the adult day service program. No promise or guarantee of benefits will be made to encourage subjects to participate. No compensation will be given to those who choose to partake in the activities.

Confidentiality

Confidentiality of senior participants will be protected in the proposed project. Although participants' names will be used to aid in recording observations and assessments, the RAs and HT students will erase individual names and assign an ID number to distinguish participants following the assessment. Each participant will have his or her own ID number throughout the course of the evaluation. Participants' names will not be presented in publications or presentations.

Informed Consent

Family caregivers of the adult day service participants will receive a letter describing the proposed project and plans to observe their relative in HT activities. They will be asked to complete a consent form indicating whether or not their relative may be observed during the activities.

Informed Consent Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Informed Consent for Participants of Investigative Projects

Title:

THE EFFECTS OF HORTICULTURAL THERAPY ACTIVITIES ON ADULT DAY SERVICE PARTICIPANTS

Investigators:

Shannon E. Jarrott, Ph.D., Assistant Professor of Human Development
P. Diane Relf, Ph.D., Professor of Horticulture

Purpose:

The main objective of this proposed research project is to study the effects of horticultural activities on older adults with dementia who are enrolled in an adult day service program. This will be determined by observing the adult participants during horticulture activities to determine if the level of activity and interactions among participants changes during a 10-week period.

Procedures:

This program will involve 10-15 participants at the [name of adult day service program]. Participants will have the freedom to choose whether or not to participate in any of the horticultural activities. All activities will take place at [name of the adult day program].

The participants will engage in simple horticultural activities led by Christina Gigliotti, a Master's student in Virginia Tech's department of Human Development. The activities will include planting and maintaining live plants, cooking, and creating crafts with horticultural materials. The activities will be designed to meet the abilities and interests of the adults participating in the study.

There will be one horticultural activity each week. Each activity will last approximately thirty minutes. The horticultural activities will occur indoors during cold or wet weather and outdoors whenever possible.

Information from each session will be collected using observations and interviews. Graduate students will be trained to make observations of the adults' involvement in the activities as well as their mood during the activities. Additionally, individual interviews will be conducted periodically with the participants so they may provide their assessment of the activities. The observations and interviews will help determine the effects of horticultural activities on the participants.

Risks and Benefits:

The horticultural activities have only minimal risk to the participants; similar to other activities offered at the program. The benefits include physical, intellectual, sensory, and social stimulation, and creative expression. No promise or guarantee of benefits will be made to encourage subjects to participate. No compensation will be given to those who choose to partake in the activities.

Confidentiality:

The data collected during this study will not be released at any time to anyone other than the individuals working on the project without the written consent of the participants or their guardians.

Freedom to Withdraw:

Participants may withdraw from the study at any time without penalty. The investigator may exclude a participant whose behavior is detrimental to the program and/or distracting to other participants.

Approval of Research:

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University, the Department of Horticulture, and Adult Day Services.

Participant's Responsibilities:

I voluntarily agree to allow my relative to participate in this study. My relative does not have any responsibility or obligation if he/she chooses not to participate at any time during the study.

Caregiver's Permission:

I have read and understand the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for my relative to participate in this project. If my relative participates, he/she may withdraw at any time without penalty.

Signature

Date

Should I have any questions about this research or its conduct, I may contact:

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Chair, IRB

Telephone / e-mail

Office of Research Compliance

Research & Graduate Studies (540)

Christina Gigliotti

Education:

- 2001-Present** Currently pursuing a M.S in Human Development, and a Certificate in Gerontology, Virginia Tech
GPA: 4.0/4.0
Currently pursuing a Certificate in Intergenerational Programming, University of Pittsburgh
- 2001** B.S Human Development, Human Services Option, Virginia Tech
GPA: 3.7/4.0
- 2000** B.S Horticulture, Horticulture Therapy Option, Virginia Tech
GPA: 3.6/4.0

Experience:

- **Horticulture Therapist**, Virginia Tech, Adult Day Services
Summer 2002, Summer 2001, and Summer 2000
 - Developed and implemented therapeutic activities with pre-planned modifications at four ADS facilities
 - Gathered materials and budgeted expenses for the project
 - Evaluated HT activities and interviewed older adults
 - Created codebook and datasets, cleaned, entered and analyzed data
 - Authored an article to be submitted for publication
- **Graduate Research Assistant**, Virginia Tech, Department of HD
Fall 2002, Spring 2002, Fall 2001
 - Developed and implemented therapeutic activities with planned modifications
 - Created a manual of activities with scripts
 - Evaluated activities
 - Cleaned, entered, and checked data
 - Worked directly with ADS participants
 - Prepared and collected billing for the ADS
 - Helped to prepare IRB materials
- **Volunteer Horticulture Therapist with Youth at risk**,
Spring 2002, Spring-Summer 1998
 - Worked alongside coordinator to develop and implement a horticulture program with at-risk youth

•Intern, Horticulture Therapist, Catawba Mental Health Hospital

Spring – Summer 2000

- Attended treatment teams bi-weekly with multidisciplinary staff to assess patient progress
- Worked alongside Horticulture Therapist to facilitate HT activities with all patients aged 18-geriatric
- Assisted in researching suitable plant material and design for a sensory garden for patients with Dementia
- Co-lead facilitation of implementing the sensory garden with all patients

Professional Presentations:

Gigliotti, C.M. & Jarrott, J.E. (2002, November). *Harvesting health through horticulture: Effects of different horticultural therapy activities for persons with dementia*. Paper presented at the meetings of the Gerontological Society of America. Boston, MA.

Gladwell, M., Jarrott, S.E., & Gigliotti, C.M. (2002, November). *Genesis of an IG program at a colocated ADS and CDL program*. Paper presented at the meetings of the Gerontological Society of America. Boston, MA.

Gigliotti, C.M. (2002, November). *Horticulture therapy activities for persons with dementia*. Poster presented at the meetings of the South West Virginia Association of Activity Professional. Roanoke, VA.

Relf, P.D & Gigliotti, C.M (2002, September). *Developing professional portfolios in Horticulture therapy*. Presentation given at the annual meetings of the American Horticulture Therapy Association.

Jarrott, S. E. & Gigliotti, C. M. (2002, August). *From the garden to the table: Evaluation of a dementia-specific horticultural therapy program*. Poster Presentation and at the International Horticulture Congress, Toronto, ON.

Gigliotti, C., Pecora, P., Gaines, B., Cook, C., Predny, M., Jarrott, S., Relf, D. (2002, August). *Master Gardener and therapist assessment of horticultural therapy and seniors: A manual for recreational therapists and master gardeners*. Poster presented at the meetings of the International Horticulture Congress, Toronto, ON.

Jarrott, S. E., Gigliotti, C. M., & Gladwell, M. S. (2002, May). *Adult day service use by Virginia caregivers: Support in the commonwealth*. Poster presented at the meetings of the Southern Gerontological Society, Orlando, FL.

Gigliotti, C.M, (2002, May). *Utilization of an ecological perspective to establish the practice of horticulture therapy in special care units*. Poster presented at the

meetings of Quint State hosted by Virginia Tech, Blacksburg, VA.

Gigliotti, C.M, (2001, October). *Person-centered activities*. Presentation at the meetings of the Virginia Adult Day Service Association, Charlottesville, VA.

Gigliotti, C.M, Pecora, P., Gaines, B., Cook, C. (2001, October). *Horticulture therapy and seniors: A manual for recreational therapists and master gardeners*. Oral presentation at the meetings of the Chesapeake Chapter American Horticulture Therapy Association, Wheaton, MD.

Grants and Awards:

- 2002:** Paolucci Research Grant from Kappa Omicron Nu Leadership Academy
Amount: \$1,500
- 2002:** Ann Lane Mavromatis Scholarship from the American Horticulture Therapy Association
- 2002:** Outstanding Gerontology Student Award from the Virginia Association on Aging

Honor Societies and Professional Memberships:

- Sigma Phi Omega: Treasurer (2002)
- Golden Key Honor Society
- Gerontological Society of America (GSA)
- Southern Gerontological Society (SGS)
- American Horticulture Therapy Association (AHTA)
- Mid-Atlantic chapter AHTA

Publications:

Gigliotti, C.M, Jarrott, S.E., Yorgason, J. (2002). *Harvesting health: The effects of different HT activities on persons with dementia*. Under review with *Dementia: The International Journal of Social Research and Practice*.

Gigliotti, C., Jarrott, S., Gaines, B., Cook, C., Pecora, P., Predney, M., & Relf, P.D. (in press). Horticulture therapy and seniors; A manual for recreational therapists and master gardeners. *Acta Horticulturae (XX). Expanding Roles of Horticulture in Improving Human Well-Being and Life Quality*. Editor P.D. Relf, International Society for Horticultural Sciences, Brussels, Belgium

Jarrott, S.E., & Gigliotti, C. (in press). From the garden to the table; Evaluation of a dementia-specific HT program. *Acta Horticulturae (XX). Expanding Roles of Horticulture in Improving Human Well-Being and Life Quality*. Editor P.D. Relf, International Society for Horticultural Sciences, Brussels, Belgium.