

Effects of Horticulture Therapy on Engagement and Affect*

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RÉSUMÉ

Devoir mettre en oeuvre des activités appropriées pour des personnes âgées atteintes de démence constitue une tâche difficile. La thérapie horticole (TH) permet de relever ce défi par l'utilisation de plantes afin de faciliter l'obtention de résultats globaux. À l'aide du modèle de l'évaluation du milieu, la présente étude cherche à analyser les réactions des participants des soins de jour pour adultes à l'égard de la TH par comparaison avec des activités traditionnelles.

Des activités de TH ont été menées une fois par semaine pendant une demi-heure dans le cadre de quatre programmes différents de soins de jour pour adultes sur une période de neuf semaines. Des données d'observation ont été recueillies pendant la TH ainsi que pendant les activités traditionnelles des soins de jour pour adultes, au moyen d'une version modifiée de la technique DCM (Dementia Care Mapping). Les observateurs ont utilisé des codes pour consigner les principales réactions de chaque participant d'un point de vue comportemental et affectif.

Les activités de TH ont suscité des niveaux plus élevés de participation productive, des conséquences positives ainsi que des niveaux moins élevés de non-engagement que les activités traditionnelles des soins de jour pour adultes. Par conséquent, la TH offre au personnel soignant des personnes atteintes de démence une activité de rechange valable qui est bien accueillie par les clients et qui intègre toutes les personnes intéressées, quelles que soient leurs limitations cognitives.

ABSTRACT

Implementing generationally appropriate activities for persons with dementia is a challenging task. Horticulture therapy (HT) addresses this challenge through the use of plants to facilitate holistic outcomes. Utilizing the model of environmental press, the current study sought to analyse adult day service (ADS) participants' responses to HT as compared to traditional activities.

HT activities were conducted once a week for a half an hour 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. Observers coded predominant behavioural and affectual responses for each participant.

HT activities facilitated higher levels of productive engagement and positive affect and lower levels of non-engagement than did traditional ADS activities. Therefore, HT offers dementia-care staff a viable activity alternative that is well received by clients and inclusive of all interested persons, despite cognitive limitations.

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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; while 1 in 10 persons over the age of 65 has AD, it affects close to half of individuals aged 85 and over (National Institute on Aging, 2000). As the older adult population becomes the largest segment of the population, with the most rapid growth among the oldest old, it is projected that, by the year 2050, 14 million Americans will have AD unless a cure is found (Alzheimer's Disease and Related Disorders Association, 2002).

Individuals with dementia may live between 8 and 20 years after symptoms of the disease appear. As the disease progresses, many families find it necessary to seek out formal care arrangements, including adult day services (ADS) and nursing homes. In the United States, the Omnibus Budget Reconciliation Act of 1987 (OBRA) specifies that formal care programs should emphasize holistic quality of life for dementia-care clients. More specifically, 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 continue to provide inadequate programming, characterized either by an absence of programming or by developmentally and/or generationally inappropriate activities (Nolan, Grant, & Nolan, 1995; Salari & Rich, 2001).

The absence of planned activities in dementia-care facilities creates problems that are compounded by the common inability of clients to plan or initiate activities on their own (Teri & Logsdon, 1991). Benefits of behavioural interventions include improved quality of life and reductions in depression, agitation, and problem behaviours (Buettner, 2001; Teri & Logsdon, 1991). Kitwood's theory of personhood highlights the need for caregivers to support the well-being of persons with dementia (Kitwood & Bredin, 1992) through meaningful occupations that reinforce individual dignity, autonomy, and personal history.

Inadequate programming often occurs when staff are unable to identify activities they can facilitate in a group of individuals representing the varied and

unique needs and interests of clients. Oftentimes, staff target activities to the lowest functioning individuals, leaving the higher functioning persons bored and more apt to engage in disruptive behaviours. Conversely, providing more challenging activities can also lead to negative outcomes for lower functioning clients, ranging from confusion and agitation to embarrassment and subsequent withdrawal and apathy (Taira, 1986).

Horticulture therapy (HT) represents one programming option for dementia-care facilities. HT utilizes plant-based activities that are individually tailored to result in achievement of specified treatment goals. Although HT has been used in a wide variety of treatment settings with various populations of special-needs individuals, little empirical research exists documenting the outcomes of HT programs involving persons with dementia (Gigliotti, Jarrott, & Yorgason, 2004; Jarrott, Kwack, & Relf, 2002).

The purpose of the present study is to assess the effectiveness of HT activities in a group setting at adult day service (ADS) programs. Guided by Lawton and Nahemow's (1973) theory of environmental press, we designed the HT activities to foster clients' positive affect and adaptive behaviour, which Lawton and Nahemow designated as indicators of competence. Facilitators attempted to utilize the HT method to achieve a good person-environment fit by balancing the level of challenge with functionality (Lawton & Nahemow, 1973). We compared participants' affective and behavioural responses during horticultural activities and during more traditional ADS activities to determine the relative effectiveness of the two types of activities to engender a balanced person-environment fit. Findings that can guide program facilitators to identify meaningful activities that result in desirable behaviours 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 in age segments of the population (National Institute on Aging, 2000). This situation underlies the importance of seeking out viable and effective treatment alternatives for

individuals with dementia and their family caregivers. Guided by Kitwood's notion of personhood, holistic approaches to treatment, targeting benefits in the bio-psychosocial domains of functioning, must become the norm rather than the exception in dementia-care programs (Kitwood & Bredin, 1992). Instilling a sense of competence by maximizing someone's intact abilities while minimizing disabilities is a hallmark of the person-centred approach, which focuses on the uniqueness of all persons and their social histories. Person-centred care also insists 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-centred 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 of 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 behaviour and positive affect. They termed this zone of the model the *adaptation level* (AL). (For an illustration of the environmental press model, see Lawton & Lahemow, 1973, p. 661.) Alternately, persons who are unable to adapt will display maladaptive behaviour and negative affect, characterized by self-stimulating behaviours, non-engagement, and emotions such as anger, frustration, and depression. Lawton and Nahemow 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 reduce environmental press proactively through the exertion of individual competencies, a person-centred approach requires that social relationships in the life of a person with cognitive impairment, primarily with caregivers, adapt the environment to better suit the competence level of that person or help her/him to increase her/his 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 includes both social and physical attributes.

A number of researchers have utilized a strengths perspective to inform the creation and implementation of dementia-care program activities (Bowlby Sifton, 2000; Buettner, 2001). This perspective emphasizes the dangers of institutionalizing a learned helplessness cycle of care that is characterized by caregivers who encourage and reinforce unnecessarily dependent behaviours. 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 practising relevant skills and over-learned behaviours, persons with dementia may be able to slow decline and maximize functional competence, hence reducing environmental press.

Camp and Orsulic-Jeras (1999) were also interested in engaging persons with dementia in meaningful activities to exercise intact abilities and improve the likelihood of appropriate behavioural responses and positive affect. Their approach to developing activities for this population entailed recognition of both the environment and competence level. In this approach, pre-planned adaptations, termed *extensions*, are created for each activity presented 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 (Camp, 1999). Horizontal extensions are modifications to an activity that are designed to use a parallel skill or difficulty level; these extensions are employed if a person is currently operating at a given adaptation level and if sustained engagement is the desired outcome. Vertical extensions, on the other hand, are used to either increase (*upward*) or decrease (*downward*) the demands of an activity, based on someone's individual performance in that activity.

Camp and Orsulic-Jeras (1999) were duly attentive to the social and physical environment and set guidelines addressing the nature of how the activities should be laid out, organized, and administered. Through the use of techniques such as arranging objects from simple to complex and reducing unnecessary stimulation, competence level increases, along with a sense of mastery and consequent 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; Salari & Rich, 2001; 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, on the basis of 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 press is horticulture therapy (HT). Horticulture therapists actively modify the environment, as well as the presented gardening activities, to provide specified goals and objectives unique to each program participant. HT provides benefits in the 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, Cho, Han, & Kim, 2002; Midden & Barnicle, 2000; Mooney & Milstein, 1994; Powell, Felce, Jenkins, & Lunt, 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 and physical functioning, resulting in greater levels of independence and autonomy. In addition, HT programs have countered apathy by empowering older adults in institutional settings to self-initiate participation and engagement in activities (Burgess, 1990; Mooney & Milstein, 1994). Researchers have also noted the social benefits of gardening (Relf, 1981; Sarno & Chambers, 1997).

Therapeutic goals for HT programs are consonant with the bio-psychosocial model and target outcomes in the 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-centred 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 behaviour and facilitate subsequent positive affect; HT represents an attractive addition to traditional dementia-care programs.

Although the positive outcomes of HT have been demonstrated in a wide range of populations, there are few empirical articles documenting the benefits of HT to persons with dementia. However, two pilot

investigations of HT for adults with dementia at ADS programs preceded this investigation and reported encouraging results (Gigliotti et al., 2004; Jarrott et al., 2002). The first study found that participants spent a greater proportion 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 (Gigliotti et al., 2004). Findings did not demonstrate significant differences between the types of HT activities on engagement and affect levels (Gigliotti et al., 2004). Additionally, when all three types of HT activities were collectively compared to traditional activities, no significant differences were found between active engagement during HT activities and active engagement during traditional activities. The lack of significant findings between the HT activities and the traditional activities on active engagement was attributed to a ceiling effect resulting from the person-centred activity approach used by the activity director at the time of the study. However, significant differences in non-engagement 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 non-engagement than did the traditional ADS activities. These differences supported the important role that HT activities can play in reducing levels of unproductive behaviour and increasing levels of positive affect in this population of ADS clients.

In the current study, we applied Lawton and Nahemow's (1973) model of environmental press to the practice of HT with persons with dementia. More specifically, we were interested in replicating the positive findings of the two preceding studies examining the differences in engagement and affect of ADS participants with dementia during HT and during traditional ADS activities. We were able to improve upon the previous studies by enlarging the sample size with clients from four facilities instead of one and by 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 level of engagement and affect during HT activities in comparison to during traditional ADS activities:

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

Methods

Participants

The sample was comprised of older adults with a diagnosis of dementia attending one of four ADS programs in rural southwest Virginia. One ADS program was located in a university setting and typically served 8-to-12 clients daily. Two of the ADS programs were located on the campus of the Veterans Administration (VA); though located in the same building, participants of the two programs were usually kept separate from one another. While one program (VA mixed) served a mixed group of adults in need of ADS, the other group (VA DU) consisted of older adults with moderate to severe dementia. The VA mixed group was attended by 20-to-25 adults each day, while the VADU group usually consisted of 8-to-10 clients daily. The final program in the study was a community program sharing staff and other resources with the VA programs; it served approximately 10-to-12 clients daily. The total number of participants in the study was 48 (26 males and 22 females; 10 university, 12 community, 13 VA mixed, 13 VA DU). 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 HT activities and traditional activities, the participants served as their own controls.

Instrumentation

Assessments used 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 Mini-Mental Status Exam (MMSE) scores for each participant were gathered from each of the four facilities. The MMSE (Folstein, Folstein, & McHugh, 1975) is an extensively used instrument that assesses cognitive functioning. Possible scores range from 0 to 30, with lower scores indicating greater levels of impairment (Folstein, Folstein, & McHugh, 1975). For the sample of the current study, MMSE scores ranged from 0 to 26, with an average score of 13.07, indicating moderate cognitive impairment.

Observational Method

The observational tool used in the current study was designed and piloted by the second author to observe participants with dementia during HT and traditional ADS activities. Two trained research assistants (RAs) used the instrument to assess the 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 behaviour and affect code for each person every five minutes to describe the predominant activity and associated affect during that time frame. In order to capture a range of salient behaviours commonly observed during ADS activities, as well as HT behaviours, the four behaviour codes included in the measures were social (S), horticultural (HT), productive (P), and non-engagement (N). Table 1 presents the behaviour 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). Affect was recorded for each participant every five minutes in conjunction with the predominant behaviour code to document the level of positive or negative affect

Table 1: Behaviour code categories

Behaviour 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 behaviour, 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 behaviours, sleeping)

displayed by participants. Table 2 presents the affect scores and definitions utilized by the observers to capture participants' moods. Scores ranged from +5 to -5; participants who received positive affect scores (+1, +3, or +5) exhibited enjoyment, engagement, and positive social interaction during observed frames, while participants who received negative affect scores (-1, -3, or -5) displayed boredom, self-stimulating behaviours, and negative emotions and/or social interactions (see Table 2). A codebook with extensive examples and rules defining the nature of each activity was included with the measure. Following initial training, observers reviewed the codebook every two weeks to increase internal validity and reliability. The observers' training session included extensive discussion of behaviour and affect codes, as well as practice observations. Afterwards, observers were tested for inter-rater reliability, achieving an excellent alpha score of 0.90.

Interviews

A short, seven-item interview was developed for this study to supplement the observational data and incorporate the perspectives of participants in the HT sessions. The questions targeted participants' opinions of the HT activities, including 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.

Procedure

Two horticulture therapists with experience working with older adults with dementia developed and implemented 9 weeks of scheduled HT activities utilizing live plant materials, at all four participating ADS programs. The activities were selected for anticipated therapeutic benefits within the social, physical, psychological, and cognitive domains of functioning. Additionally, 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 that all interested participants could be included with support in achieving the AL and sustained engagement. Each participant had the opportunity to perform one activity in a group setting each week for approximately 30 minutes; some activities were designed to facilitate teamwork and others were designed to engage participants individually in parallel activities.

Due to resource limitations, HT facilitators led HT activities 2 days a week, visiting two programs per day; 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, determined whether the activities took place inside. The physical environment varied across facilities, 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 from each facility were invited to help facilitate the HT sessions by working with participants needing one-on-one assistance and attending to participants' 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. The facilitators attempted to demonstrate appropriate facilitation through modelling and making specific requests of staff.

Influenced by the Montessori method (Camp & Orsulic-Jeras, 1999), the HT facilitators, prior to each activity, set out the materials for each participant to engage in the activity with optimal choice regarding plants and containers. The facilitators introduced the activity and modelled active engagement prior to the onset of the activity. In order to help participants identify meaning in the HT activities, facilitators encouraged social interaction and reminiscence through questions regarding participants' 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 used the observational scale both before (during traditional activities) and during the HT activities every week.

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 taken place in order to use environmental cues and prompts, such as completed

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

HT projects, to assist persons who might have otherwise forgotten that they had just participated in the HT program.

Analysis

In order to assess the participants’ responses to the HT activities as compared to the traditional ADS activities, we ran a series of paired sample *t* tests, after conducting a power analysis to ensure that a sufficient sample size was identified so that degrees of freedom in the statistical analyses were not comprised (Bond, 2003). Power calculations reduced the likelihood that a type-2 error would be committed, which would result in the failure to detect significant findings. 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 are used anecdotally to support observational findings.

Results

To compare mean levels of engagement in the horticulture activities as compared to the traditional ADS activities, *t* tests were used (see Table 3). At the two sites where afternoon observations were taken of HT and traditional activities, we frequently found that the scheduled traditional activities did not take place. Clients at these sites 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 order to address the first research hypothesis that participants would exhibit higher levels of active engagement during HT than during traditional activities, we compared levels of active engagement in the horticulture activities to engagement in the traditional activities. Our findings supported the first hypothesis, as analyses revealed a significant difference in the average amount of time that participants spent actively engaged in the activity during the horticulture activities compared to the traditional ADS activities ($t_{47} = 13.47, p < 0.001$). Participants spent an average of 78 per cent of their time actively engaged in HT activities, in comparison to 28 per cent of their time actively engaged in the traditional ADS activities.

In support of our second hypothesis that participants would exhibit lower levels of non-engagement during

HT than traditional ADS activities, *t*-test analysis revealed a significant difference between the mean level of non-engagement during the HT as compared to during the traditional ADS activities ($t_{47} = 13.42, p < 0.001$). Participants spent an average of 60 per cent of the period observed non-engaged during the traditional ADS activities compared to only 14 per cent of the period observed during the HT activities.

The third hypothesis was that participants experience more positive affect during HT than during traditional ADS activities. This hypothesis was also supported, as participants exhibited greater positive affect during the horticulture activities ($t_{47} = 5.15, p < 0.001$). The average affect score for HT activities was 2.43 (Max = 5), while the average affect score for traditional ADS activities was 1.90.

We conducted additional correlational analyses to consider the association between outcome measures and participant and program factors that could affect participants’ responses to HT activities (see Table 4). Neither the number of HT sessions attended nor the time of day during which the HT sessions were

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 ^a	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)	(0.74)	(0.65)

**p* = 0.000.

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

Table 4: Correlations between MMSE and attendance with outcome measures during HT

Sub-scale	1	2	3	4	5
1. MMSE (N = 28)	—	-0.02	0.47*	0.19	-0.33
2. Level of Attendance		—	0.20	0.25	-0.16
3. Average WIB during HT			—	0.38**	-0.35*
4. Average % H during HT				—	-0.87**
5. Average % N during HT					—

p* < 0.05; *p* < 0.01

conducted was associated with the HT outcome variables. MMSE was positively associated with affect expressed during HT, as participants possessing higher MMSE scores demonstrated more positive affect, on average, during HT ($p < 0.05$). This finding should be interpreted with caution, as MMSE scores were missing for 28 of the 48 participants.

Discussion

The current study utilized Lawton & Nahemow's (1973) theory of environmental press to evaluate the effect in an ADS setting of a person-centred HT program for persons with dementia. Specifically, we assessed participants' behavioural and affective responses during HT activities and during traditional ADS activities. Participants demonstrated significantly more positive responses to the HT activities than to the traditional activities.

Our results support our three 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 behaviours 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 as compared to during the traditional activities (Gigliotti et al., 2004; Jarrott et al., 2002). Sustained active engagement by a group of ADS participants in the HT activities indicates the value of the person-centred 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 suggests that participants enjoyed and anticipated the HT activities; a number of participants joined the facilitators as they arrived at the program to carry in materials and set them out during the preparation process. Additionally, as the study progressed the participants became so accustomed to the process involved in the HT activities that they usually did not wait for instructions and began to work the moment that they sat down to their materials.

In accordance with the theory of environmental press, the HT 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 dirt were given gloves and also the option of deadheading spent flowers and dried leaves if planting was not desirable. These techniques, in addition to the use of adaptive garden-

ing tools, were used to match the environmental demands and the individual competencies of the participants, thus contributing to appropriate behaviours and sustained engagement.

Consistent with the findings uncovered by studies conducted by Jarrott et al. (2002) and Gigliotti et al. (2004), participants spent significantly less time non-engaged during the HT than during traditional activities. The older adults found the activities enticing and the HT method of accommodating their varying abilities and interests. In fact, MMSE was not associated with level of engagement. (This should also be interpreted with caution due to missing data.) Therefore, HT offers a therapeutic programming option that engages participants and reduces the amount of time that they spend inactive. Reductions in non-engagement among groups of persons with dementia have implications for behaviour problems, such as repetitive and self-stimulating mannerisms, which are often provoked by boredom and a need for stimulation (Kitwood & Bredin, 1992; Nolan et al., 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 those of 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, we found that participants expressed greater positive affect during the HT activities than during traditional ADS activities, which further supports Lawton and Nahemow'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 the sense of mastery and self-esteem that results from adaptive behaviour. 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; the *zone of maximum performance* is characterized by socially outgoing behaviour, 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 over 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. 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, however, that the scope of this investigation and the 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. Collecting treatment and control observations in the afternoons was less than ideal. At the two sites visited in the afternoons, observers were unable to ensure that staff would adhere to the traditional ADS activity schedule, which provided the control observations. It appeared that non-compliance with the schedule resulted from extended rest periods and the absence of activity directors. In these instances, traditional activity observations encompassed transitions from a rest period. Furthermore, implementing HT activities in the heat of the summer afternoon limited the types of activities that could be performed by the participants and often necessitated that the HT activities take place indoors. Despite these less-than-ideal conditions, time of day did not negatively affect participants' experiences with HT.

Other environmental limitations included resource factors beyond our control. One of these was a drought in the area, which made watering gardens a fineable offence! Therefore, a number of the plants wilted and died during the program, which may have had implications for the psychological benefits participants received from nurturing their gardens and potted plants out-of-doors. When plants look ugly, wilted, or dead, participants may feel that they have failed, which may 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 limiting factor was the lack of staff support at a number of the sites. Because many staff were not trained to embrace a person-centred approach, some had difficulty supporting 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. In fact, the finding that attendance level was not significantly related to outcome measures suggests that participants can actualize positive outcomes during HT, even when they attend irregularly. The absence of an association between the number of HT sessions participants joined and response to the HT sessions provides powerful testimony to the value of HT. Participants may reap the benefits of HT whether they join sessions regularly or sporadically. This may be due to the sensory aspect of the HT activities, which utilized live plant materials, and to the fact that many of the adults had gardened or farmed at earlier points in their lives, eliciting positive memories from earlier in the life course.

Future Research

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. Subsequent studies must examine this innovative therapeutic practice with more stringent adherence to a protocol for control activities and by incorporating various informant perspectives. A control group comprised of participants not receiving HT programming should be included for comparison, so that intra-individual and inter-individual comparisons can be made. This amendment would meet criticisms about using persons as their own controls, while still valuing the attempt to understand individual differences in response to varying activities.

Additionally, future research about HT for persons with dementia should span a variety of dementia-care programs, including nursing homes. The value of collecting data at a range of programs, from 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. Incorporating qualitative interviews with program participants to supplement observational data could also offer valuable insights; however, our prior experiences collecting interview data with this group has been that it has proven difficult. Often participants could not answer the questions appropriately or they did not remember attending the session. Yet, although all of the participants may not be able to answer interviewers' questions appropriately, research has demonstrated that persons with mild-to-moderate dementia can answer questions about their preferences reliably (Feinberg & Whitlatch, 2001). Therefore, participants interviewed during data collection should be chosen with

discretion, and researchers should be prepared to discard some of this data.

Future studies should expand beyond the individual level of analysis and incorporate multiple perspectives from family and staff in order to incorporate the ecological contexts of the participants' lives. 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 [his hands] 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. Data demonstrated that participants reaped the benefits of HT whether they joined sessions regularly or sporadically.

Another valuable endeavour in this domain of research would be to assess benefits in the physical, psychological, social, and cognitive domains of functioning using valid and reliable instruments. The current study assessed the benefits obtained by each participant during HT; however, rater bias was a risk as the HT facilitators completed the benefits assessment. Having observers and evaluation researchers blind to the intervention would reduce concerns related to biased data collection procedures.

Future research in this arena should compare HT to other professionally recognized alternative therapies, including music and art therapies, as well as to other therapeutic activities using a person-centred approach guided by a strengths perspective (Bowlby Sifton, 2000). This would help to clarify the importance of the plants; readers of this article have questioned whether it was the approach or the content of the activity that contributed to the positive outcomes.

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,

resulting in appropriate behaviour 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 the physical, social, psychological, and cognitive domains of functioning while recognizing the importance of the environmental context in which persons operate. HT programs offer the dual benefits of enhancing competence in persons with dementia and of beautifying dementia-care environments, which can be nurtured by program participants.

References

- Alzheimer's Disease and Related Disorders Association. (2002). *Statistics about Alzheimer's disease*. Retrieved 7 February 2003 from <http://www.alz.org/>
- Bond, J. (2003). *Statistics software for power calculator* [Computer software and manual]. Retrieved 13 April 2003 from <http://calculators.stat.ucla.edu/powercalc>.
- Bowlby Sifton, C. (2000). Maximizing the functional ability of persons with Alzheimer's disease and related dementias. In M.P. Lawton & R.L. Rubinstein (Eds.), *Interventions in dementia care toward improving quality of life* (pp. 11–38). New York: Springer.
- Bradford Dementia Group. (1997). *Evaluating dementia care: The DCM method*. Bradford, UK: University of Bradford, Bradford Dementia Group.
- Buettner, L.L. (2001). Therapeutic recreation in the nursing home: Reinventing a good thing. *Journal of Gerontological Nursing*, 27, 8–13.
- Burgess, C.W. (1990). Horticulture and its application to the institutionalized elderly. *Activities, Adaptation and Aging*, 14, 51–61.
- Camp, C.J. (Ed.). (1999). *Montessori-based activities for persons with dementia* (Vol. 1). Beachwood, OH: Menorah Park Centre for the Aging.
- Camp, C.J., & Orsulic-Jeras, S. (1999). Montessori-based activity programming for dementia. In C.J. Camp & S. Orsulic-Jeras (Eds.), *Activities as intervention: Use of Montessori-based activities for persons with dementia*. Beachwood, OH: Myers Research Institute.
- Feinberg, L.F., & Whitlatch, C.J. (2001). Are persons with cognitive impairment able to state consistent choices? *Gerontologist*, 41, 374–382.

- Folstein, M.F., Folstein, S.E., & McHugh, P.R. (1975). "Mini-Mental State": A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189–198.
- Gigliotti, C.M., Jarrott, S.E., & Yorgason, J. (2004). Harvesting health: Effects of different horticultural therapy activities for persons with dementia. *Dementia, 3*, 161–180.
- Hill, C.O., & Relf, P.D. (1982). Gardening as an outdoor activity in geriatric institutions. *Activities, Adaptation and Aging, 3*, 47–53.
- Jarrott, S.E., Kwack, H.R., & Relf, P.D. (2002). An observational assessment of a dementia-specific horticultural therapy program. *HortTechnology, 12*(3), 403–410.
- Kim, H., Cho, M., Han, I., & Kim, J. (2002, August). *Effect of horticultural therapy on the community consciousness and life satisfaction of the elderly living alone*. Paper presented at the meeting of the International Horticulture Congress, Toronto.
- Kitwood, R., & Bredin, K. (1992). Towards a theory of dementia care: Personhood and well-being. *Ageing and Society, 12*, 269–287.
- Lawton, M.P., & Nahemow, L. (1973). Ecology and the aging process. In C. Eisdorder & M.P. Lawton (Eds.), *Psychology of adult development and aging* (pp. 619–667). Washington, DC: American Psychological Association.
- Midden, K., & Barnicle, T. (2002, August). *Evaluating the effects of a horticulture program on the psychological well-being of older persons in a long-term care facility*. Paper presented at the meeting of the International Horticulture Congress, Toronto.
- Mooney, P., & Milstein, S. (1994). Assessing the benefits of a therapeutic horticulture program for seniors in intermediate care. In M. Francis, P. Lindsey, & J.S. Rice (Eds.), *Healing dimensions of people-plant relations: A research symposium* (pp. 173–194). Davis, CA: UC-Davis, Center for Design Research.
- National Institute on Aging. (2000). *2000 progress report on Alzheimer's disease: Taking the next steps*. Washington, DC: National Institutes of Health.
- Nolan, M., Grant, G., & Nolan, J. (1995). Busy doing nothing: Activity and interaction levels among differing populations of elderly patients. *Journal of Advanced Nursing, 22*, 528–538.
- Powell, L., Felce, D., Jenkins, J., & Lunt, B. (1979). Increasing engagement in a home for the elderly by providing an indoor gardening activity. *Behavioral Research and Therapy, 17*, 127–135.
- Relf, D. (1981). Dynamics of horticulture therapy. *Rehabilitation Literature, 42*, 147–150.
- Relf, D., & Dorn, S. (1995). Horticulture: Meeting the needs of special populations. *HortTechnology, 5*, 94–103.
- Salari, S., & Rich, M. (2001). Social and environmental infantilization of aged persons: Observations in two adult day care centers. *International Journal of Aging and Human Development, 52*, 115–134.
- Sarno, M.R., & Chambers, N. (1997). A horticultural therapy program for individuals with acquired aphasia. *Activities, Adaptation and Aging, 22*, 81–91.
- Taira, E.D. (Ed.). (1986). *Therapeutic interventions for the person with dementia*. New York: Haworth Press.
- Teri, L., & Logsdon, R.G. (1991). Identifying pleasant activities for Alzheimer's disease patients: The pleasant events schedule-AD. *The Gerontologist, 31*, 124–127.
- U.S. Department of Health and Human Services, Health Care Financing Administration. (1989). Rules and regulations. *Federal Register, 54*(21), 5316–5373.

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