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2150 North 107th Street
Suite 205
Seattle, WA 98133
www.ahta.org

Effects of Horticultural Therapy on Symptoms and Future Perspective of Patients with Schizophrenia in the Chronic Stage

Takuya Kenmochi[1], Asuka Kenmochi[2], and Minoru Hoshiyama[3]

1 Department of Rehabilitation Sciences, Post-graduate school of Health Sciences, Nagoya University, Japan
2 Hinaga General Center for Mental Care, Yokkaichi, Japan
3 Brain & Mind Research Center, Nagoya University, Japan

We studied 23 patients with chronic schizophrenia to investigate effects of horticultural therapy (HT) on psychiatric symptoms, feeling of hopelessness, and quality of life. HT with routine occupational therapy (OT) for three months was given to 11 in-patients with chronic schizophrenia, and they were assessed with the Positive and Negative Syndrome Scale (PANSS), Beck Hopelessness Scale (BHS), and Japanese version of The Schizophrenia Quality of Life Scale (J-SQLS) before and after the intervention. The scores were compared with those in the control participants who solely received OT. The score for the depression/anxiety factor of PANSS decreased more in the group with HT and OT (experimental group) than when compared to those in the control group. Scores for BHS and J-SQLS were not changed by the HT intervention. Adding HT intervention for three months to routine OT intervention might be effective to decrease depression/anxiety symptoms in participants who had been hospitalized for more than 10 years. Their feeling of hopelessness and quality of life did not change. The long-term hospitalization and medication taken by the participants may have limited the effect of short-term intervention on such feelings. Factors relating to quality life, such as hopelessness, may require interventions with longer duration.

Introduction

Schizophrenia is a chronic and severe mental disorder with positive and negative symptoms which cause disturbance in thinking, feeling, and behaviors (Tandon, Nasrallah, & Keshavan, 2009). Patients with schizophrenia may have distortion of reality, lack of coping skills, and social failings, which result in a low level of quality of life (Goldman, Gattozzi, & Taube, 1981; Lehman, 1983). Antipsychotics, including newly developed drugs, have been the first-choice treatment for the patients with schizophrenia (Azmanova, Pitto-Barry, Barry, 2018). However, antipsychotic drugs do not treat all symptoms in patients with schizophrenia, and the treatment with antipsychotics may cause a number of side effects, such as motor side-effects, weight gain, and sedation (Azmanova et al., 2018).

Horticultural therapy (HT), as a complementary and alternative treatment, has been applied for patients with schizophrenia (Sullivan, 1979). HT may provide effectors, which cannot be given by drugs, natural environment, personal relationship, cooperation, responsibility, and social interaction (Detweiler et al., 2012; Soga, Gaston, & Yamaura, 2016). In addition, HT has also been found to reduce stress and to increase feelings of calm and relaxation with no side effects (Rodiek, 2002). Therefore, HT was thought to be potentially effective for patients with schizophrenia from therapeutic to social aspects. However, the quantity and quality of reports regarding the effects of HT were still insufficient (Luk et al., 2011; Kamoioka et al., 2014; Zhu et al., 2016; Lai et al., 2017).

The concept of intervention by therapists for mental disorders has changed over the past few decades. Slade et al. (2014) emphasized recovery-oriented intervention for patients with mental illness. A feeling of hopelessness is one of the core symptoms of patients with schizophrenia; such a feeling causes patients to delay discharge, leading to long-term hospitalization (Hoffmann, Kupper, & Kunz, 2000; Isohanni et al., 2005). We thought that HT could be helpful as a recovery-oriented intervention, if the feeling of hopelessness in patients with schizophrenia could be alleviated through HT. HT using growing plants may promote participants' future perspectives and hopes. Previous studies reported that participants could realize the growth of plants and waited for blooming and harvesting with expectancy (Jarrott, Kwack, & Relf, 2002) and HT interventions improved the hopes of women in a rural area (Kang, Min, Ha, & Kang, 2014),

Table 1.
Profiles of the participants at baseline

Group	Experimental (n = 11)	Control (n = 12)	Difference
	mean (SD)	mean (SD)	p [b])
Age (years)	55.8 (7.5)	53.0 (8.9)	0.74
Male : female	4 : 7	4 : 8	
CP [a]) equivalent medication (mg)	881.6 (401.3)	870.1 (232.7)	0.79
Hospitalization (days)	5,089.6 (2,080.9)	5,268.6 (3,572.4)	0.70

a CP: chlorpromazine
b p: one-way factorial analysis of variance (ANOVA)

However, to our knowledge, we could not find any study which reported HT effects on future perspectives and hopes in patients with schizophrenia. Therefore, the objective of the present study was to investigate the possible effect of HT on psychiatric symptoms and future perspectives and hopes of patients with chronic schizophrenia.

In the present study, changes in scores for psychiatric and psychological symptoms after HT in patients with schizophrenia were assessed, including patients' feeling of future perspective and hopes.

Methods

The present study involved a pretest-posttest design with experimental and control groups of patients with schizophrenia in the chronic stage. This study was approved by a local ethical committee in the Post-graduate School of Health Sciences, Faculty of Medicine, Nagoya University (No. 16-602). Witten informed consent was obtained from each participant prior to the study.

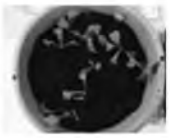
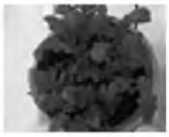
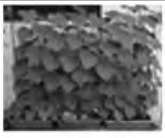
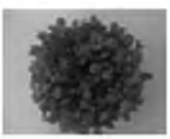
Participants
All participants met the following inclusion criteria: 1) diagnosis of schizophrenia was confirmed based on International Classification of Diseases and Related Health Conditions 10th version (ICD-10) (World Health Organization, 2016), 2) symptoms of schizophrenia were considered to be stable by the attending doctor, 3) aged younger than 65 years old with hospitalization of longer than 3 years, 4) no difficulty in verbal communication, 5) ability of decision-making in daily life in the hospital was preserved, and 6) those who were willing to participate in the present study. The exclusion criteria were: 1) permission not obtained from the attending doctor, and 2) patients with dementia.

Participants in both groups were engaged in routine occupational therapy (OT) program in the hospital. For participants in the experimental group, a 60-minute HT program was provided once a week for 3 months. Assessment of the psychological condition was performed twice during the period of the study: before the experimental period, and at the end of the period, which was 3 months after the initial assessment.

Interventions
Horticultural therapy (HT)
A horticultural therapist with more than 10 years of clinical experience provided the HT program. The HT program was given in a specific room (27.7 m2) designed for HT and OT. The present HT program focused on the growth and harvesting of plants. Plants used for HT were cucumber (*Cucumis sativus L.*), Boston lettuce (*Lactuca sativa*), and white radish (*Raphanus sativus var. longipinnatus*), which could be eaten at the end of intervention (Fig. 1). Participants cultivated these plants in planters. Three planters (at about 0.15 m2) for cucumber, one for Boston lettuce, and one for white radish were prepared outside the room. Before each intervention session, the horticultural therapist brought these planters inside the room. We aimed for HT to facilitate feelings of expectation and hope in participants, through which they looked forward to harvesting.

The HT program involved 11 sessions, starting from seeding, then planting, watering, and fertilizing, and

Table 2.
Horticultural therapy (HT) intervention program for the experimental group

Sessions [a]	Contents	White Radish	Cucumber	Boston Lettuce
1	Introduction, seeding (White radish and Cucumber)			
2	Observation			
3	Fertilizing, thinning Adding soil (White radish)			
4	Fertilizing and thinning			
5	Transplanting to planters (Cucumber)			
6 [b]	Thinning and watering			
7	Observation and watering			
8	Seeding (Boston lettuce) Harvesting (Cucumber) Watering			
9	Observation Harvesting and eating (Cucumber)			
10	Observation Harvesting and eating (Cucumber)			
11	Harvesting, cooking, and eating (all vegetables)			

a Each session onceweekly. Each session took 60 minutes.
b Cucumber planter was fixed outside after the session 5 finished.

finally a harvesting session. Details of the HT program are shown in Table 2. Each session of HT took 60 minutes, including: 1) warm-up (10 minutes), 2) review of the previous session with photos of plants and reports written by participants (10 minutes), 3) observation of plants and hands-on activities (25 minutes), 4) review and discussion of the day's session while drinking tea (15 minutes). In the last session, participants harvested, cooked and ate the vegetables. All activities were conducted inside the room designated for HT except for those involving cucumber during sessions 6-11. Since the cucumber grows on a climbing plant, the planter was fixed outside after the session 5 finished.

The horticultural therapist took photographs of plants, and described the behaviors of participants at the end of each session of HT. Participants also reported their feelings and impressions about the plants to the therapist. At the beginning of the subsequent HT session, the photos and participants' reports taken in the previous HT session were shown to the participants. Participants asked to observe the actual plants, comparing the photos taken with their reports in the previous HT session.

Occupational therapy

OT according to the standard program in the hospital was provided for all participants both in the experimental and control groups 1-2 hours per week. Participants in the HT and control groups were similarly provided with the OT program. OT was provided as group programs for all in-patients of the hospital, and the members of groups were not decided based on the HT and control groups in the present study. Occupational therapists set individual goals for the patients in activities during OT, including sports, recreation, music, and handcrafts. The OT program did not include any activity related to HT, such as gardening.

Data collection and statistical analysis

Data were collected over the three months between June to August in 2016. Assessment was applied twice, before starting the first session (pre-intervention) and just after the last session (post-intervention). Three clinical assessment tools, The Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein, & Opler, 1987), Beck Hopelessness Scale (BHS) (Beck, Weissman, Lester, & Trexler, 1974), and Japanese version of The Schizophrenia Quality of Life Scale (J-SQLS) (Kaneda, Imakura, Fujii, & Ohmori, 2002) were used. The attending doctors, who were blinded to the experimental groups in the present study, evaluated the severity of schizophrenia in each participant using PANSS.

The PANSS is one of reliable scales commonly used for measuring symptom severity of patients with schizophrenia in the previous studies (Salyers et al., 2001; Hatton et al., 2005). The scores of PANSS were calculated based on Lindenmayer's model (Lindenmayer, Bernstein-Hyman, & Grochowski, 1994). Each item in five factors was scored from 1 to 7 and a higher score indicated a more severe symptom of schizophrenia. Negative factor has 6 items (range of scores, 6-42), excite factor has 4 items (4-28), cognitive factor has 5 items (5-35), positive factor has 4 items (4-28), and depression/anxiety factor has 5 items (5-35) (Lindenmayer et al., 1994).

Participants' perspective on the future was evaluated by BHS (Beck et al., 1974). The BHS has been used in previous studies (Ringer, Buchanan, Olesek, & Lysaker, 2014; Lysaker, Buck, Hammoud, Taylor, & Roe, 2006), and we used the Japanese version of BHS (J-BHS) that comprises 3 domains, as in the original version (Tani et al., 2002): feelings about the future, loss of motivation, and future expectations. The original version of BHS asks subjects to answer questions by responding true or false, but in J-BHS, the subjects answer using 4 rank scales: strongly disagree, moderately disagree, moderately agree, and strongly agree (Tani, 2002). The range of the total score of J-BHS was between 0-60, with a higher score indicating a more marked loss of hope.

The quality of life was assessed by J-SQLS (Kaneda et al., 2002). The original version of SQLS was produced by Wilkinson et al. (2000), which evaluates the quality of life (QOL) specific to persons with schizophrenia. Both the original SQLS and J-SQLS include 3 domains: psychosocial (15 items), motivation and energy (7 items), and symptoms and side-effects (8 items), and they have been equally validated regarding reliability (Kaneda et al., 2002). The range of the total score was between 0 and 100, and a higher score indicated a lower quality of life.

Data were analyzed using SPSS (Ver. 24.0) for statistical analysis. To standardize the changes of scores after HT, relative to the control condition with OT, the difference between each score, Δscore, before and after the intervention was obtained in both groups. The Δscore in each assessment was compared between the intervention

Table 3.
Score changes between groups before and after intervention (mean (SE)).

	Groups		Statistics	
	Experimental (n=11)	Control (n=12)	F [d]	p [e]
PANSS [a]				
Negative	-1.91 (1.32)	-0.58 (1.27)	0.52	0.48
Excitement	-1.00 (0.90)	0.75 (0.86)	1.96	0.17
Cognitive	-2.00 (1.07)	1.08 (1.03)	4.29	0.051
Positive	-1.36 (0.97)	0.50 (0.94)	1.89	0.18
Depression/anxiety	-2.54 (0.94)	1.08 (0.90)	7.72	0.011*
J-SQLS [b]				
Psychosocial	-7.88 (6.00)	-9.72 (5.75)	0.049	0.83
Motivation/Energy	1.30 (4.33)	-1.50 (4.15)	0.22	0.64
Symptoms/Side effect	**-6.23 (4.36)**	**-14.82 (4.18)**	**2.02**	**0.17**
BHS [c]	2.82 (2.43)	1.50 (2.32)	0.15	0.67

a PANSS: Positive and negative syndrome scale
b J-SQLS, Japanese Schizophrenia Quality of Life Scale
c BHS: Beck Hopelessness Scale
d F: F value for one-way factorial analysis of variance (ANOVA)
e p: ANOVA, * $p < 0.05$

and control groups by one-way (groups) factorial analysis of variance (ANOVA). A p-value of less than 0.05 was considered significant.

Results

Twenty-three patients with schizophrenia participated in the present study. They were in-patients in the chronic stage of schizophrenia. The 23 patients participated in the study. They were randomly divided into two groups: experimental (n = 11) and control (n = 12). The age, sex, and experiences of participating in HT were matched between the two groups. Profiles of the participants are summarized in Table 1.

Table 3 shows the results in each assessment. In the assessment by PANSS, the score for the depression/anxiety factor significantly decreased after the intervention period in the experimental group with HT ($p = 0.011$, ANOVA) compared with that in the control group. Cognitive function based on PANSS tended to be lower ($p = 0.051$) in the experimental group with HT compared with the control group. There was no significant change in BHS or J-SQLS between the groups.

Discussion

The present study investigated the changes in psychological symptoms and feelings of hope for the future hope after HT for 3 months in patients with schizophrenia in the chronic stage. The score for the depression/anxiety factor in PANSS was improved in the experimental group with HT. However, the HT intervention did not change feelings of future perspectives or the QOL.

Improvement in the symptom of depression/anxiety was noted after the combination of OT with HT for three months in the present study. The results indicate that the score changes were probably due to HT or the combination of OT and HT. This result is in line with

those in previous reports which conducted short term within 2 weeks (Kam & Siu, 2010), middle term for 6 weeks (Kelley, Waliczek, & Le Duc, 2017), and long term over three months (Son, Um, Kim, Song, & Kwack, 2004) of HT. From the results of the previous studies, the effect of HT conducted for short to long terms was significant to decrease depression/anxiety among the participants.

We considered that HT, possibly with OT, affected the emotional state the participants with chronic schizophrenia, as well as persons with dementia (Blake & Mitchell, 2016). HT, as well as OT, was aimed to provide a wide-range of interventions, from physical to psychosocial factors, for participants (Wichrowski, Whiteson, Haas, Mola, & Rey, 2005; Kamioka et al., 2014). However, we should consider some specific factors in patients with chronic schizophrenia, which might restrict the change of scores after HT.

There was no significant change in BHS and J-SQLS, which indicated participants' perspective and hopes on the future and their QOL, respectively. One of the possible reasons for participants' refractoriness of those scores after HT intervention may be their long-term hospitalization. Long-term hospitalization might make participants inactive regarding psychosocial performance as reported in the previous papers (Wing, 1962; Harvey, Reichenberg, Bowie, Patterson, & Heaton, 2010). Intervention for participants who have stayed in the hospital for years has to overcome such inactiveness caused by long-term hospitalization. Among the factors assessed in the present study, depression/anxiety might be modified by HT for three months.

Another factor to consider was the effects of prescription drugs on participants. Prescription drug effects could not be excluded for ethical reasons inherent to any studies on patients with chronic schizophrenia. The mean chlorpromazine-equivalent dose of medication was more than 800 mg in both experimental and control groups in the present study. Sedative effects of drugs might inhibit the change in the activeness of participants.

The present setting of HT might be effective on depression/anxiety symptoms of the participants with schizophrenia. The depression and anxiety were common symptoms in people with schizophrenia (American Psychiatric Association, 2013), and those symptoms increased other symptoms such as persecutory delusions and sleep disruption (Freeman, 2006; Morphy, Dunn, Lewis, Boardman, & Croft, 2007). The primary effects of HT on depression/anxiety symptoms may be important to prevent or decrease other comorbid symptoms. Recent studies (Zhu et al., 2016; Oh, Park, & Ahn, 2018) and systematic reviews (Kamioka et al., 2014) reported positive effects of HT on patients with schizophrenia, although the number and quality of reports is still limited. Since HT can be combined other therapies, including antipsychotics (Zhu et al., 2016), we considered that HT could be an effective intervention to make patients with schizophrenia happier in a hospital setting.

Limitations

We compared two groups receiving OT and OT with HT. Since OT intervention has been the main and routine intervention for participants with schizophrenia in hospitals in Japan, we investigated the additive modulation of participants' symptoms after HT on the basic effect of OT on the participants. The effect of solely HT should be assessed in other series of studies; i.e. sufficiently powered randomized controlled trials. Liu et al. (2014) reported that the number of systematic studies regarding HT for participants with schizophrenia is still limited, as well as the number of participants, as in the present study. Basic and clinical studies will be accumulated to obtain evidence on HT in the near future. Although we observed changes in score for depression/anxiety by HT, further studies were required to confirm the effects of HT on other symptom-related factors with more participants and longer intervention.

Conclusion

In conclusion, adding HT intervention for three months to routine OT intervention might be effective to decrease depression/anxiety in participants with chronic schizophrenia with hospitalization of more than 10 years. However, their feeling of hopelessness and quality of life did not change. Long-term hospitalization and medication required by participants might have limited the effect of intervention.

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BIOGRAPHY

Takuya Kenmochi (Mr.), MA

Horticultural Therapist since 2007

2003-2007: Hyogo Prefectural Awaji Landscape Planning & Horticultural Academy
http://www.awaji.ac.jp/english/

2007 - : Department of Rehabilitation (Horticultural Thearpy), Hinaga General Center for Mental Care

2013-2016: Master Course, Postgraduate School of Health Sciences, Nagoya University

2016-: Doctor Course, Postgraduate School of Health Sciences, Nagoya University

Member of Japanese Horticultural Therapy Association
Member of Japanese Association of Occupational Therapists

Asuka Kenmochi (Ms.), MA

Occupational Therapist

2013-2016: Master Course, Postgraduate School of Health Sciences, Nagoya University

2016-: Doctor Course, Postgraduate School of Health Sciences, Nagoya University

Minoru Hoshiyama (Mr.), PhD
(Corresponding author)

Professor - Brain & Mind Research Center, Nagoya University

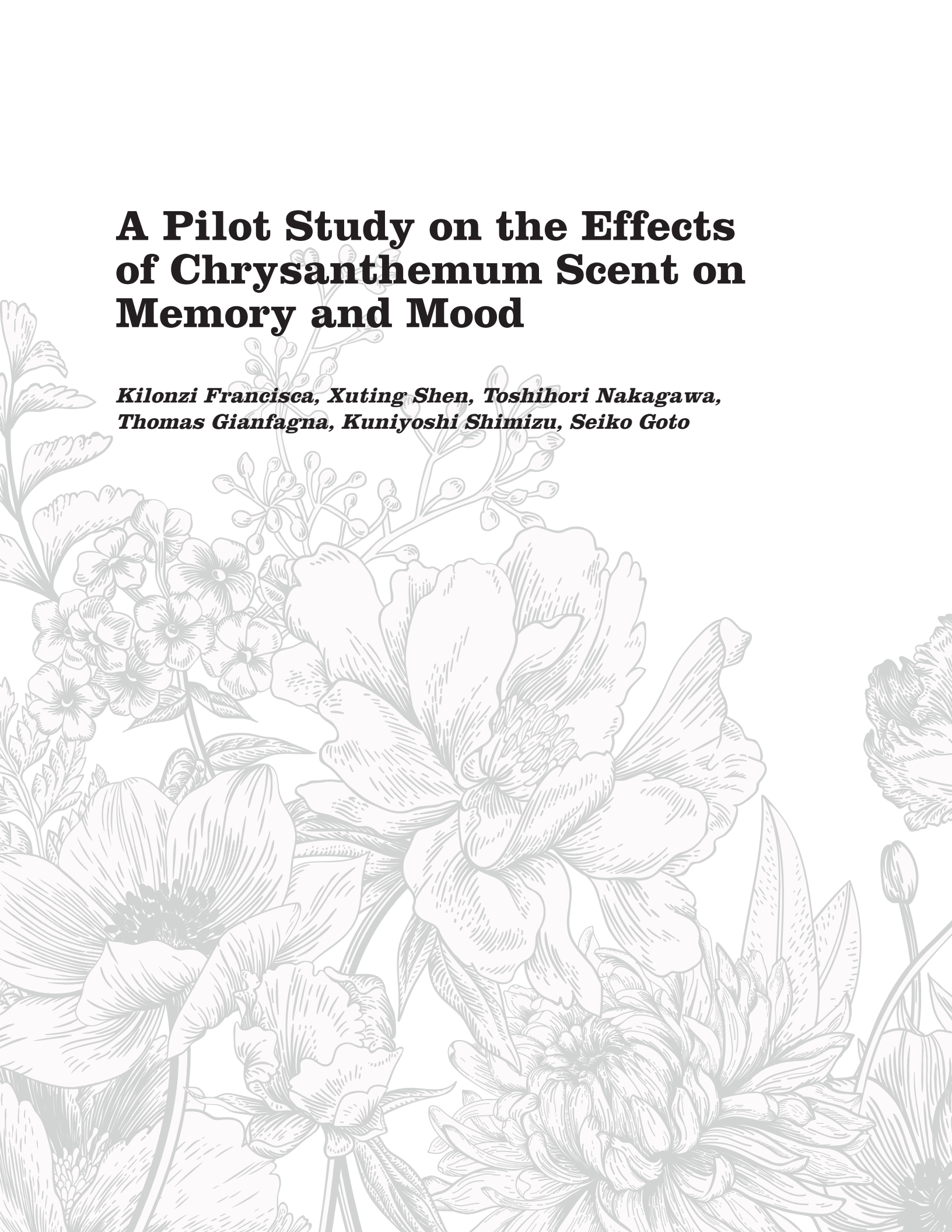
Professor - Department of Rehabilitation Sciences, School of Health Sciences, Nagoya University

http://www.met.nagoya-u.ac.jp/ENGLISH/index.html

1-1-20 Daiko-minami, Higashi-ku, Nagoya 461-8673, Japan
TEL./FAX: +81-52-719-3159
E-mail: hosiyama@met.nagoya-u.ac.jp
*M. Hoshiyama supervised T. Kenmochi.

A Pilot Study on the Effects of Chrysanthemum Scent on Memory and Mood

Kilonzi Francisca, Xuting Shen, Toshihori Nakagawa, Thomas Gianfagna, Kuniyoshi Shimizu, Seiko Goto



This pilot study aims to analyze effects on the short-term memory and mood of the scent of bornyl acetate and eucalyptol, two volatile which are commonly used in many essential oils. The 44 participants in this study were from Nagasaki University's School of Fisheries and Environmental Sciences (19 male, 25 female), and ranged in age from 18-20 with a mean age of 19. Effects on short-term memory by a memory test and changes in mood by the Profile of Mood States (POMS) questionnaire were examined. Results showed that the average score of females and the combination of males and females was significantly better in the room with eucalyptol scent compared to the unscented room. The scent of eucalyptol was more effective than bornyl acetate in improving short-term memory, whereas bornyl acetate was effective in reducing vigor. This effect was particularly apparent among female subjects.

Introduction

Aromatherapy is the use of essential oils extracted from plants to treat physical and psychological health issues. Many ancient civilizations like those of China, India, and Egypt used aromatherapy as an alternative natural therapy (Ali 2015), and it is now used as an effective non-pharmacological therapy, including for patients with Alzheimer's Disease (Scuteri et al. 2017). There is extensive research suggesting that certain essential oils have physiological, emotional, and psychological effects in different settings. For instance, exposure to the scent of lavender essential oil affects adults differently from the scent of rosemary essential oil (Moss et al. 2003). This study revealed that lavender scent produced a significant decrement in performance of working memory, and impaired reaction times for both memory and attention. In contrast, rosemary produced a significant enhancement of performance for overall quality of memory. While rosemary scent effective on memory, orange scents reduced anxiety and improved the moods of patients waiting for dental care (Lehrner et al. 2005). The challenge in studying these phenomena, however, is that the scent of plants is composed of many volatile components and it is difficult to link specific components to specific effects. Even within the same plant family, different varieties can have very different volatile components. Various brands of commercial essential oils differ not only in the production process but also in the varieties and components of plants. To address this problem, we focused on two major components of chrysanthemum, bornyl acetate and eucalyptol, commonly used in essential oils in general, and examined their effects on the short-term memory and mood of young Japanese adults.

Previous studies by Goto measured the physical and mood effects upon visitors to an indoor Japanese garden built in an institutional setting for dementia care units in the US (Goto et.al. 2014). The results showed that visiting and viewing a Japanese garden for 15 minutes improved the subjects' mood. Notably, people with dementia became more alert when visiting the garden, and their mood significantly improved while observing it. Furthermore, whereas subjects made few comments in a room with no plants, which served as a control, subjects with late-stage dementia made many statements and utterances in the garden that drew upon short-term as well as long-term memory. Because the garden was built in an airtight room which also held 20 pots of chrysanthemums, the scent of chrysanthemum was

Figure 1. Indoor garden with 20 pots of chrysanthemum flower

Figure 2. Viewing the rooftop garden

dominant (Fig.1). Because some subjects remarked about the floral scent, the effects of visiting the garden were hypothesized to involve two factors: olfactory and visual stimulation.

In order to identify the olfactory effect that occurred during the garden visit, Goto built a similar Japanese garden on the rooftop of a hospital in Japan and analyzed the effects upon an elderly population of observing the garden (Goto et al. 2016) (Fig.2). In the experiment, subjects' heart rate and behavior were monitored during a 15-minute garden observation in 4 stages: 1) the pre-construction of the garden; 2) the post- construction garden with doors open; 3) the post- construction garden with doors closed; and 4) the post-construction garden with doors closed and with the scent of bornyl acetate (95%) and eucalyptol (5%).

Chrysanthemum contains many volatile organic components. Sun detected 193 and found that chrysanthemum and its relatives formed six clusters based on their floral volatile compounds (Sun et al. 2015). Since the chrysanthemum plant has so many compounds and combinations of compounds and their volatilized amounts differ based on the variety, age, and part of the plant, Goto conducted a series of experiments to measure the physical and mood effects upon of elderly subjects of a mixture of two major components of chrysanthemum: bornyl acetate (95%) and eucalyptol (5%). Wang reported that eucalyptol and bornyl acetates are the main components of chrysanthemum scent (Wang et al. 2008). Bornyl acetate is a common component of essential oil from the *pinaceae* family. Eucalyptol is found in many aromatic plants such as camphor, laurel, and bay leaves. The scents of both bornyl acetate and eucalyptol are not considered hazardous and are commonly used in fragrances. In particular, eucalyptol is used in many food and pharmaceutical supplements such as flavorings and as an ingredient in mouthwash.

In the pre-construction garden, the average pulse rate of subjects remained mostly unchanged during the entire 15-minute session. After the Japanese garden had been installed, however, the subjects' average pulse rate dropped significantly [$F(1,150)=67.02$ $p<0.0001$]. A lower pulse rate indicates a more relaxed mood. Although the view of the garden remained largely (though not completely) unobstructed, the average pulse rate increased with the doors closed; however, it decreased to as low as when the doors were open when, after the first three minutes with the doors closed, the scent was introduced. (Fig.3). The attention of subjects to the garden objects weakened with the doors closed; however, it became stronger and more episodes relating to long-term and short-term memory were recorded when the scent was introduced (Fig.4). Closing the doors had a dramatic effect on the number of episodes of recall. These episodes essentially ceased when the doors were closed, but appeared again when the scent was introduced.

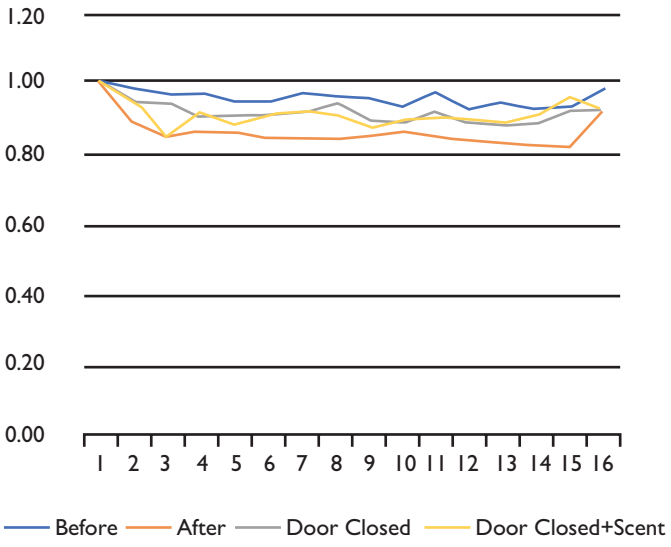


Figure 3. Average heart rate during observation

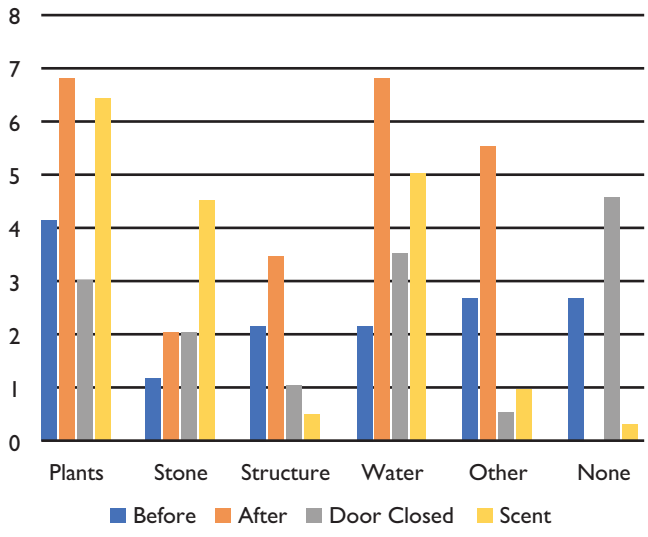


Figure 4. Attention to garden elements during observation

1. Bornyl Acetate and Eucalyptol

As the above experiment showed that memory and mood were positively changed by the introduction of mixed scents of bornyl acetate and eucalyptol, the present study was designed to clarify each compound's effect on short-term memory and mood.

Methods

Three classrooms were prepared for the experiment: Room 1 (9m x 12m) as the control with no scent, Room 2 (3m x9m) as the room with the scent of eucalyptol, and Room 3 (3m x9m) with the scent of bornyl acetate (Fig.4). Room 1 and Room 2 are located on the first floor of adjacent buildings, and Room 3 is located on the second floor in the same building as Room 2. It takes approximately 3 minutes to move from one room to the other by an indoor corridor or staircase. Bornyl acetate oil and eucalyptol oil were diffused without delusion with electric diffusers (Truffle) produced by the Tree of Life Company (Japan). Truffle is a type of nebulizing diffuser which does not use any water for the operation and can result in a potent mist. It operates on a 2-minute-on and 1-minute-off interval cycle for 2 hours. One Truffle is designed to fill up to a 32m2 room with scent in 2 minutes.

For this experiment, two diffusers were set in opposite corners of each room (Fig.5). In the experiment, 10 drops of the oil were put in the diffuser, which was turned on 10 minutes before the session started. The scent was lightly noticeable for healthy people. The temperature of experiment rooms was maintained at 22+ 1ºC. Prior to the experiment, the level of eucalyptol and bornyl acetate compound in the air was measured prior to the experiment in the following method.

After 10 minutes of operation of diffuser, the air was collected for 1 minute using TENAX TA tube (GERSTEL GmbH Co.KG) set in the pump with the flow rate 150mL/min, which was placed in the middle of the room. The sample was analyzed by TDU-GC/MS system (Agilent GC: 7890A MS: 5975C), which is equipped with a HP-5MS capillary column (30 m x 0.25 mm i.d., 0.25 um film thickness; Agilent). Low pressure liquid nitrogen was used for cryo-cooling. The CIS and TDU parameters were set using the Gerster software. The initial inlet temperature was set to -100ºC with an initial time of 0.05 min. The CIS was heated from 12ºC/s to 220ºC for a final time of 5min. In term of TDU, the initial temperature was set to 60ºC with an initial time of 0.1min and the transfer temperature was set to 220ºC. The carrier gas was He at a flow rate of 1.0 mL/minute. The oven temperature was 60ºC for 5 minutes, and was increased to 230ºC at 3ºC/minute rate, then held at this temperature for 10 minutes. The identification of the compounds was performed by a comparison of the mass spectrum with the mass spectra library database Wiley 9th library and NIST08 library. In addition, the Kovats

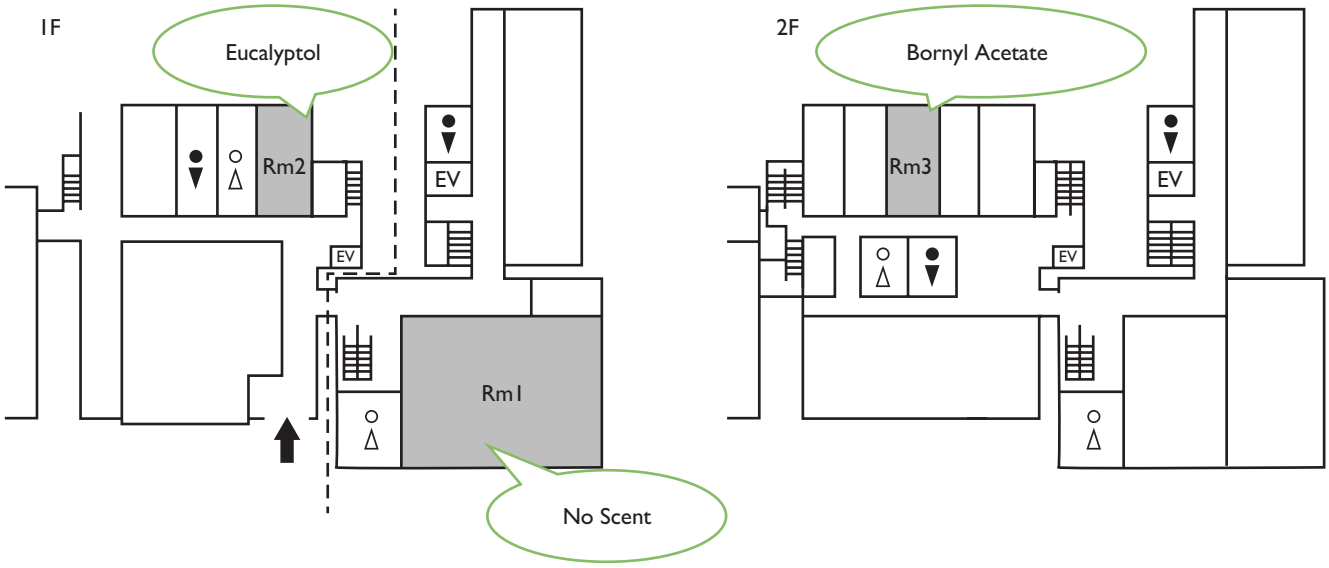


Figure 5. floor plans of experiment rooms

retention index (RI) was determined using Aroma Office software Ver. 3.0 (NISHIKAWA KEISOKU Co., LTD, Tokyo). Benzaldehyde (200ppm) was used as an internal standard.

The test above was repeated three times for eucalyptol and bornyl acetate and found that the average of eucalyptol compound in the room

Subjects

The 44 participants in this study were from Nagasaki University's School of Fisheries and Environmental Sciences (19 male, 25 female), and ranged in age from 18-20 with a mean age of 19. All participants were told that their participation in the study was voluntary and they would not receive any remuneration. A similar data collection method was successfully used in another study among students (Sarid et al. 2012).

Procedure

In this study, we assessed effects on short-term memory by a memory test and changes in mood by the Profile of Mood States (POMS) questionnaire. The memory test was conducted using a list of 25 nouns written on paper. Subjects were asked to look at them for one minute, then flip the paper over and write down as many words as they could recall within one minute. The POMS test was based on studies by Rétiveau and by Churchill (Rétiveau et al. 2004, Churchill et al. 2010). A set of 20 adjectives describing various feelings were presented to the subjects to evaluate on a 1-5 scale. (1: not at all, 5: extremely).

In each of the three rooms, subjects were asked to complete the memory test followed by the POMS test. Five different sets of 25 words were prepared for each memory test in the three rooms. All subjects were first ushered into Room 1 where desk rows were assigned to males and females alternately.

Subjects were asked to sit according to their gender at the desk where a memory test sheet was prepared. As they all sat down, the procedure of the experiment was explained to them. Then the subjects took 2 tests according to the following procedure:

1. Subjects were asked to turn the memory test sheet face up and memorize the written words for 1 minute.

2. After 1 minute, subjects were asked to turn the sheet face down and write words they memorized on the back for 1 minute.

3. After finishing the memory test, subjects were asked to answer the POMS questionnaire.

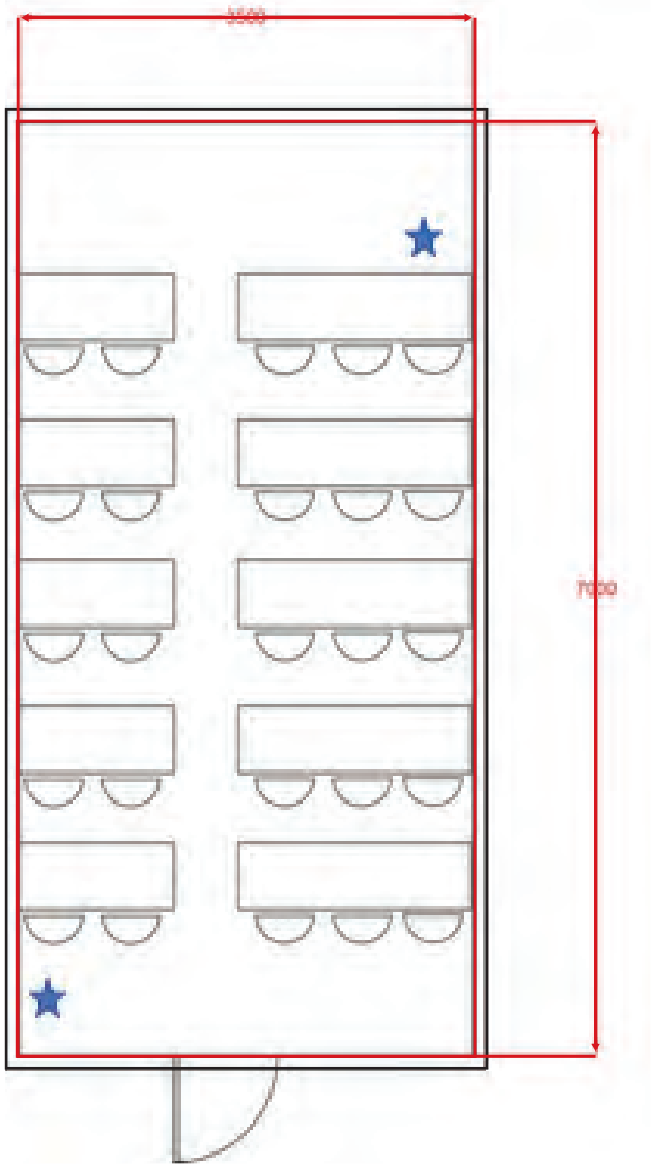


Figure 6. layout of the experiment room (★ position of the diffuser)

After finishing 2 tests in the unscented Room 1, subjects were randomly divided into 2 groups (Group A and Group B). Each group had equal numbers of male and female subjects. They were escorted to the second room (Group A to Room 2, and Group B to Room 3).

Prior to the experiment, same group of students took pre-test to find the order effects for the memory test. Subjects were asked to do three memory tests with different sets of 25 nouns consecutively with 2 minutes interval between tests. The results of the average score of three tests were; 1st test=11.82, 2nd test=10.9, and 3rd test=11.8. which shows that the result of the first test was not significantly different from the 2nd test (p=0.2) or the 3rd test (p=0.5) and the result of the 2nd test was not significantly different from the 3rd test (p=0.2). Based on these results, we decided to escort subjects to open air and spent 5 minutes after finishing tests in the room before entering the next room to avoid the order effects.

In the second room, subjects were asked to sit randomly at a desk where a face-down memory sheet was prepared and wait silently for 4 minutes as they absorbed the scent. Subjects were asked to inhale the air deeply. After four minutes, they were administered the memory test, which was a different set of 25 words from the first test, and the POMS test following the same procedure as ①~③. After completing tests in the second room, subjects were escorted to the corridor to spend 5 minutes in the unscented air. Then each group was escorted to the third room (Group A to Room 3, and Group B to Room 2) and had the 2 tests following the same procedure as ①~③ after inhaling the air silently for 4 minutes. The entire experiment, including listening to the instruction and changing rooms, lasted about 45 min.

Results

Memory test

Figure 6 shows the mean scores of the memory test for males, females, and males and females together in the 3 rooms. Significance was established at p< 0. 05:*. From this result, the average score of females and the combination of males and females was significantly better in the room with eucalyptol scent compared to the unscented room (female: p=0.04, male +female: p=0.03). The difference between the average test score in the room with eucalyptol scent and the unscented room was almost significant (p=0.05). Although the results in the 2 scented rooms were better than the result in the unscented room, considering that the test in the unscented room was conducted prior to the test in the scented room, the statistical difference between the unscented room and scented rooms was affected by the order. However, there was no order effect between the two scented rooms. But when we compared the results in the rooms with eucalyptol scent and with bornyl acetate, the average score for females and for the male and female combined was significantly better in the

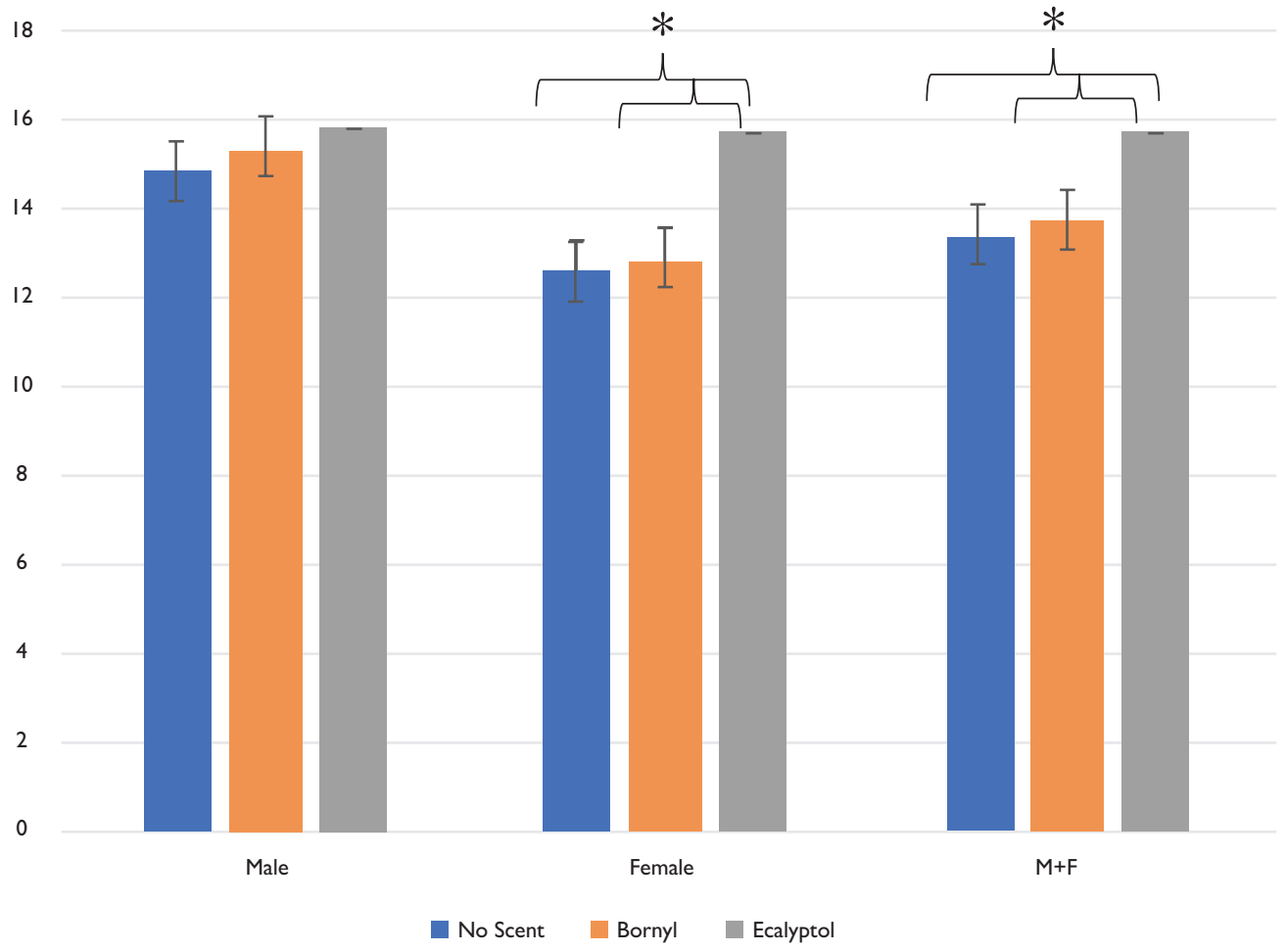
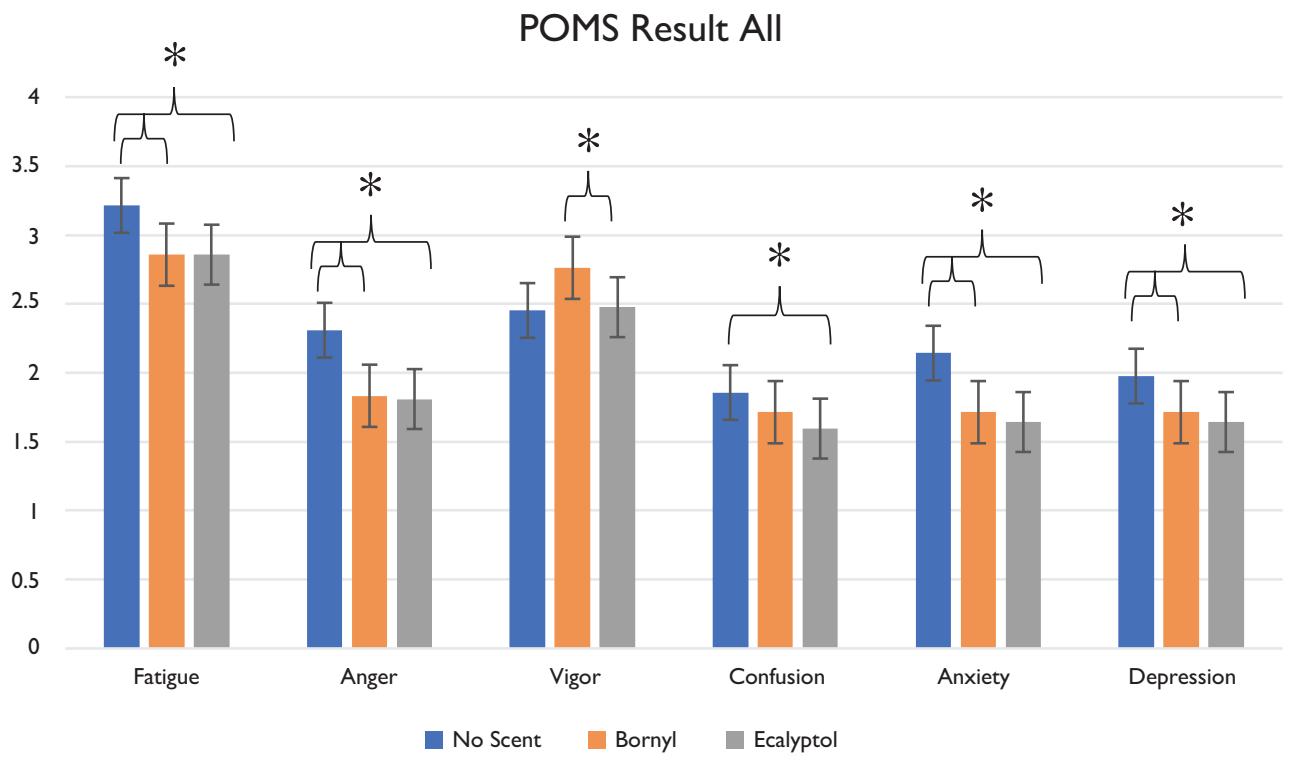


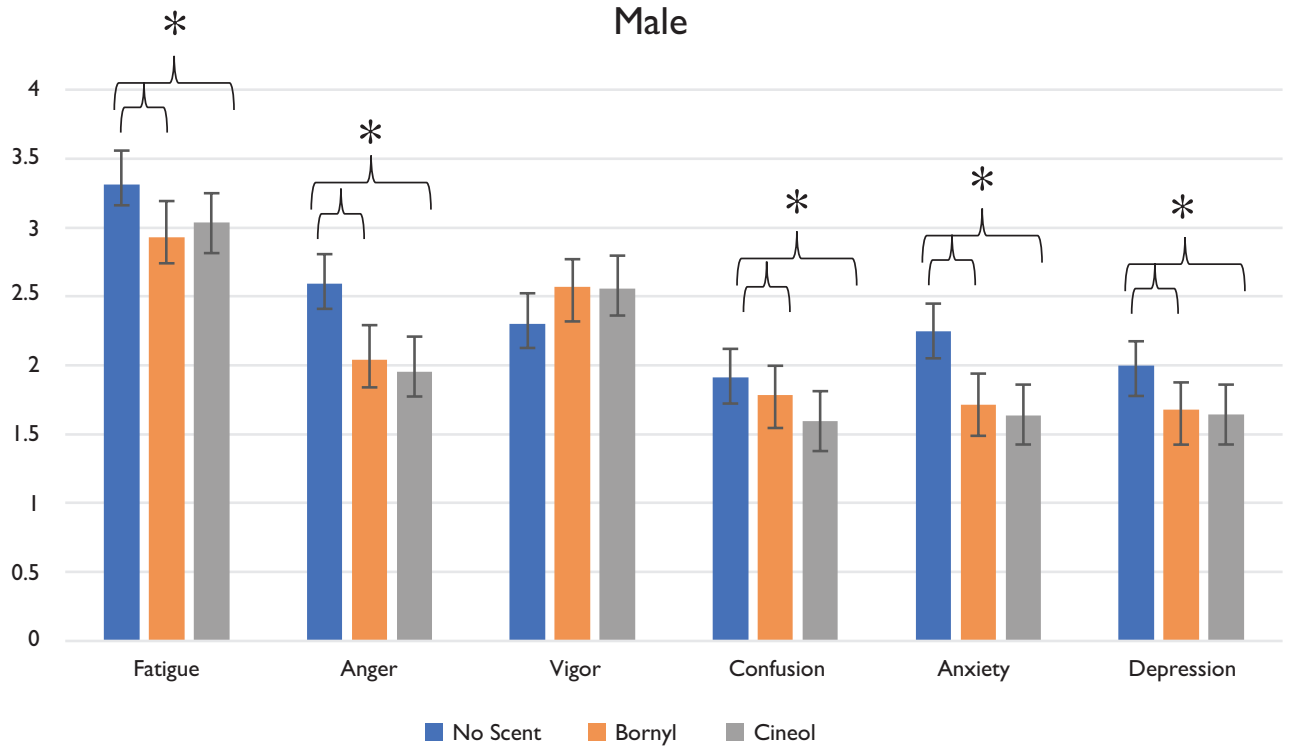
Figure 7. Average score of memory tests

room with eucalyptol (female: p=0.04, male +female: p=0.04). This result suggests that the scent of eucalyptol is effective in stimulating the short-term memory of female subjects.

POMS test

The abbreviated POMS test has 40 adjectives rated on a 5-point scale: 0=not at all, 1= a little, 2= moderately; 3=quite a bit, and 4=extremely. The 40 adjectives are grouped into 6 subscales: 1. fatigue, 2. anger, 3. vigor, 4. confusion, 5. anxiety, and 6. depression. Figure 7 shows the average for each subscale for male subjects, female subjects, and male and female subjects combined. Interestingly, the sense of fatigue was highest in the unscented room of all the test results there. On all subscales except "vigor," a lower score means better mood because it indicates less "fatigue," "anger," "confusion," "anxiety," and "depression." However, for "vigor," a higher score means better mood because it indicates more strength, enery or force. The trend of the graphs for the 5 subscales "fatigue," "anger," "confusion," "anxiety," and "depression," are identical for males and females combined, and for males and females separately. On these 5 subscales, average scores in the scented room were all significantly lower than in the unscented room (p<0.05), but there was no significant difference between the results for the two scented rooms. Only the result for "vigor" was highest in the room with bornyl acetate. Whereas other subscales indicated the same trend for males and females, results for "vigor" differed dramatically by gender. In the result of male and female, the level of "vigor" was lower in


POMS Result All
4
3.5
3
2.5
2
1.5
1
0.5
0
*
Fatigue
Anger
Vigor
Confusion
Anxiety
Depression
No Scent
Bornyl
Ecalyptol


Male
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Confusion
Anxiety
Depression
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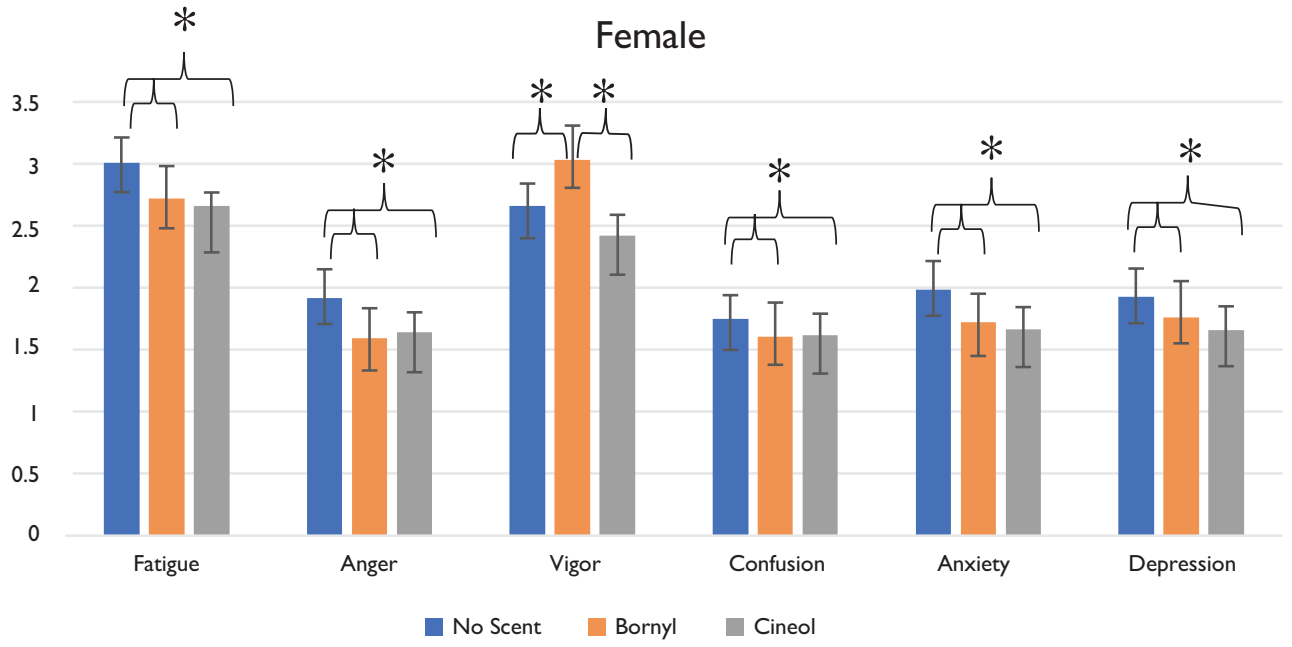
Bornyl
Cineol



the two scented rooms than in the unscented room, and bornyl acetate was significantly more effective at increasing vigor than eucalyptol.

Conclusion

This study started from the hypothesis that chrysanthemum has volatile components which contributed to improving the mood and memory of subjects in a study of the effects of garden viewing (Goto et al. 2014). Given positive results from the mixed scent of two familiar volatiles, bornyl acetate (95%) and eucalyptol (5%), in a subsequent study (Goto et al., 2016), we expected to find that the main scent component (bornyl acetate) was the source of improvement in short-term memory. However, this experiment showed that the scent of eucalyptol was more effective than bornyl acetate in improving short-term memory, whereas bornyl acetate was effective in increasing vigor. This effect was particularly apparent among female subjects which is coincident with the findings of Richard that females reacted to the scent in general more sensitively than male. (Richard, 1985)

Eucalyptol is a cyclic ether and a monoterpenoid. Bonnafe et al. reported that monoterpenoid-based essential oil can affect in improving learning and memory ability in bees (Bonnafe et al. 2017). Furthermore, Xu et al. demonstrated that lavender essential oil, whose volatile components include eucalyptol, affects to reverse cognitive deficits in mice (Xu et al. 2017, Da Porto et al. 2008). Similar effects have been seen in healthy human adults. For example, Moss reported that aromas of peppermint can significantly improve the overall quality of memory on human (Moss et al. 2008). Since eucalyptol is the major volatile component of peppermint (Edris et al. 2003), eucalyptol could be responsible for this effect. On the other hand, Matsubara reported that bornyl acetate affects relaxation (Matsubara 2011). In the present study, the level of "vigor" scored significantly higher in the room with the scent of bornyl acetate and this result might be related to the effect of relaxation.

In summary, this pilot study demonstrated that the scent of eucalyptol could improve general mood and clarity of the mind and the scent of bornyl acetate could increase the sense of vigor. This means that fragrant plants with eucalyptol, such as sweet basil and salvia, might improve mental clarity in the morning and plants with bornyl acetate, such as pine and rosemary, might help to provoke sleep in the evening. Based on the results of this study, we could say that, although the proportion was small (5%), it may have been the effect of eucalyptol that helped subjects recall old memories, and of bornyl acetate (95%) that reduced subjects' heart rate in Goto's study (Goto et al. 2016). If we

hypothesize that the effects of eucalyptol and bornyl acetate do not offset each other, we could say that the variety of chrysanthemum flowers containing both components could make even an elderly population with late-stage dementia more alert while reducing agitation and aggression as Goto found in the garden with chrysanthemum flowers (Goto et al. 2014). Due to the homogenous nature of the participants and the limited number of subjects, the results and conclusions of our study mainly reflect the responses of a limited group. Future studies are needed to examine a larger population with various ages and cultural backgrounds and with various settings.

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BIOGRAPHY

Seiko Goto is the professor at School of Environmental Study at Nagasaki University, Japan. She holds the doctorate from Chiba University in Japan and MLA from Harvard University Graduate School of Design. Prior to taking up her current position, she taught in the School of Environmental Biological Science at Rutgers University, Faculty of Architecture at the University of Manitoba, and Department of East Asian Studies at the University of Toronto. She has extensive publication on the history of Japanese garden and healing effects of viewing Japanese gardens.

Francisca Mutwa Kilonzi is a second-year doctoral student at Nagasaki University where she is majoring in environmental science. She completed her M.Sc in environmental science from Nagasaki University in 2017 and a bachelor's degree in education- geography major from Kenyatta University in 2013. She is also a research student at World Agroforestry Centre- ICRAF, Nairobi campus, Kenya. While as a graduate student, Francisca has recorded notable achievements and received awards in her research including the dean's award for the best thesis/research work for master's class of 2017 and the best poster presentation award at Punkyon National University in 2017.

Xuting Shen is a Postdoctoral fellow in the School of Biomedical Sciences at the University of Hong Kong. She received her M.D. and MB from Central South University in Changsha City, and her Ph.D. in Hong Kong University of Science and Technology in 2016. She has focused her research on Alzheimer disease and published her first paper entitled with Neurons in Vulnerable Regions of the Alzheimer's Disease Brain Display Reduced ATM Signaling in 2016 before several publications related to non-pharmacologic management of dementia came out. Her current research interest moves on to the mechanism of the neurodevelopmental diseases at synaptic level.

Kuniyoshi Shimizu is a natural product chemist, graduated from Faculty of Agriculture, Kyushu University in 2000. He worked in Venture Business Laboratory, Kyushu University as a postdoctoral fellow (2000-2002). He is currently an associated professor in Faculty of Agriculture, Kyushu University. He has focused on the development of biologically natural products from plants and mushrooms. He got The Japan Wood Research Society Progress Award in 2006 and The Japan Wood Research Society Award in 2014.

Thomas Gianfagna is a professor in the Plant Biology and Pathology Department at Rutgers University, New Brunswick, NJ. He received a PhD in Plant Physiology from Cornell University in 1980. His research interests are in plant-endophyte-pathogen interactions, environmental stress physiology, and natural products for agriculture and human health. Dr. Gianfagna has published over 80 articles in peer-reviewed journals, and is also an associate editor for the journal Plant Growth Regulation, and a member of the Ornamental Horticulture advisory board for Mercer County NJ Community College.

Exploring the Use of Therapeutic Horticulture to Enhance the Psychological Well-Being of Female Survivors of Childhood Sexual Abuse

Michelle Stephanie Watkins, Lota A. Teh, and Karina Therese G. Fernandez

Ateneo de Manila University

This study explored the use of therapeutic horticulture to enhance the psychological well-being (PWB) of child survivors of sexual abuse using mainly a qualitative research strategy. Twenty-six female children, aged 7-17, participated in a 10-week therapeutic horticulture program. Written questionnaires were given at the middle and end of the program for them to describe their experiences of the program. Filipino translations of the Brief Inventory of Thriving (BIT) and the Flourishing Scale (FS) were also administered at the beginning and end of the program to quantitatively assess their overall PWB. Thematic analysis of qualitative data indicate that the participants found value in learning horticulture, cultivated positive social relationships and interactions, heightened their engagement with nature, and fostered positive psychological change. Results of paired t-tests of the BIT ($t(25) = 4.17$, $p < 0.001$) and the FS ($t(25) = 3.83$, $p < 0.001$) indicate an increase in their PWB scores after the implementation of the program. The results suggest that therapeutic horticulture can enhance aspects of PWB among sexually abused children and has potential to be used as an adjunctive tool to aid in their recovery. Further research is needed to replicate these results and increase the internal validity of the study.

Application of Therapeutic Horticulture on CSA Survivors

Child sexual abuse (CSA) is a pervasive problem in the Philippines, with 1 in 5 children below the age of 18 having experienced sexual violence while growing up (Council for the Welfare of Children, 2017). The impact of sexual abuse on the survivor is devastating and can have negative long-term psychological effects (Hall & Hall, 2011; Lanes & Decatoria, 2011). Such effects include conduct and panic disorders, post-traumatic stress, dissociation, substance abuse, eating disorders, self-destructive behavior, interpersonal difficulties, adult victimization, forms of stress and anxiety, sexual dysfunction, low self-esteem, self-blame, shame, guilt, depression, anger or aggression, somatic concerns, and social phobia (DiLillo, 2001; Dinwiddie et al., 2000; Hall & Hall, 2011; King et al., 2003; Messman-Moore & Long, 2003; Paolucci, Genuis, & Violato, 2001). The experience of childhood sexual abuse can impede on various dimensions of psychological well-being which can plague many victims throughout their lives (Briere & Elliott, 2003; Hall & Hall, 2011; King et al., 2003).

Given the long-lasting effects of childhood sexual abuse and its impact on their psychological well-being, there is a need to provide survivors with adequate resources to aid them with their recovery. The use of horticulture as a therapeutic medium has been proposed and used as an adjunctive treatment for trauma (Harper, Stalker, Palmer, & Gadbois, 2008; Lorber, 2011; Wright, Woo, Muller, Fernandes, & Kraftcheck, 2003). Several social, emotional, cognitive, and physical benefits have been found to be associated with horticultural activities and from exposure to nature (Pfeffer, Deyton, & Fly, 2009). These include increased self-esteem, self-confidence, independence, dealing with anger and aggression, coping with stress, counteracting the effects of depression, opportunities for emotional expression and reflection, better social interactions, and increased well-being (Baker, 2009; Barley, Robinson, & Sikorski, 2012; Newton, 2007). The positive effects also include developing horticultural, social, and work skills, as well as better nutrition from the consumption of healthy food (Newton, 2007). For child survivors of sexual abuse, therapeutic horticulture may provide a way to help them cope with trauma and enhance psychological well-being.

This study aimed to explore how the use of a therapeutic horticulture program can enhance the psychological well-being of female survivors of childhood sexual abuse at a Philippine shelter, using mainly a qualitative

research strategy and supplemented by quantitative measures.

Method

Design

A mixed methods design was used with focus on an exploratory qualitative research methodology with a supplementary pretest-posttest quantitative design. A 10-week therapeutic horticulture program was developed by the primary researcher with the goal of enhancing the psychological well-being of 26 female survivors of childhood sexual abuse. Qualitative data were collected midway through the program and at the end, as well as quantitative data before and after the implementation of the program.

Participants and Setting

Twenty-six female CSA children from a shelter, aged between 7 years to 17 years (mean age: 12 years old), participated in this study. The shelter is a child welfare agency that cares for female adolescent survivors of sexual abuse. All survivors were brought in for protective custody and healing intervention. Their program aims to help children reintegrate with their families, when possible, and society in general.

The length of stay of participants at the shelter before the onset of the program was variable, with some participants having been there for a little more than three years, and others having been there for less than a month.

In general, the healing program of the shelter offers both individual and group counseling sessions which are given at least once a month depending on need. Interventions can include play, art, and music therapy. Social workers also give the participants group work activities to help in their healing. The participants' daily activities include home life, formal education, basic health services, family counseling, dance class, sports, birthday parties, and aftercare services.

In addition to their daily activities, the participants were invited to attend group horticulture sessions, once a week, for 1-3 hours for 10 weeks (10 sessions), held every Friday. The program took place at the shelter, with materials brought in by the primary researcher.

The 26 participants had never participated in therapeutic horticulture sessions before this study. Notably, a couple of participants mentioned having experienced gardening with their families. Interested participants were welcome to join the horticultural activities through actively participating in the scheduled activities or through passive observation. Participation in the program was voluntary, with attendance varying from session to session.

Because the shelter acts as the legal guardian and has custody of the girls, informed consent was discussed with the on-site psychologist and permission was granted to implement the therapeutic horticulture program at the shelter. The primary researcher was required to undergo an orientation by the on-site psychologist to understand child protection policies. An agreement to ensure the confidentiality and anonymity of the participants was made.

Measures

A questionnaire was given at the start and end of every therapeutic horticulture activity for the participants to process their experiences. Questionnaires were also administered at the middle and end of the program to assess and evaluate their overall experience of the activities. Two psychological well-being scales, the Brief Inventory of Thriving and the Flourishing Scale, were also administered in written format to the participants before and after the implementation of the 10-week horticulture program to test differences on their psychological well-being. The questions were also read to the younger participants, and images of smiling faces were added to the scales as representational guides to help the participants with their responses. All instruments were administered in Filipino for easy comprehension. Demographic data on the age of the participants was also collected. Additionally, the house parents were asked about any health issues participants might have to ensure the participants' health and safety during their participation in the therapeutic horticulture program.

Mid- and End- Questionnaires. The participants were asked to answer a set of questions at the beginning and end of every therapeutic horticulture session so they could process and share their experiences of each session. Another set of questionnaires with open-ended questions were administered at the middle and end of the 10-week program for them to evaluate their overall experience. The mid- and end- questionnaires were the primary tools used for the qualitative data analysis.

Brief Inventory of Thriving (BIT). The Brief Inventory of Thriving (BIT) was developed by Su, Tay, and Diener (2014) to serve as an indicator of psychological well-being. It was designed to give a comprehensive and concise overview of the psychological strengths and weaknesses of the examinee and to complement other tools used in assessing their condition and behaviors. The BIT includes 10 items which are rated using a 5-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement. Ratings of the ten items are summed together, with scores ranging between 10 to 50, with higher scores representing greater well-being. The measure was translated to Filipino to aid the participants' comprehension of the questions. Su et al. (2014) found that the BIT had "excellent psychometric properties, demonstrated convergent and discriminant validity with established measures, and was internally consistent" (p.22). It was also found to have "good concurrent and predictive validity for physical health, health behaviors, and health-related quality of life" (p.22).

Additionally, it was found to correlate strongly with the Flourishing Scale, another psychological well-being measure, with .82 correlation. While these two scales have overlapping facets of psychological well-being, they were designed to be complementary (Su et al., 2014).

Flourishing Scale. The Flourishing Scale (FS) was designed to include a broad range of psychological well-being constructs and to complement other existing well-being measures (Su et al., 2014). The scale has 8 positively phrased statements, where agreement or disagreement with each statement is determined using a 7-point Likert scale.

One of the advantages of using this scale is that it is brief and relatively easy to comprehend (Sumi, 2014). However, due to the age of the participants and to maintain consistency among all the measures, the scale was converted to a 5-point Likert scale, with 1 indicating strong disagreement and five indicating strong agreement. The ratings of the ten items are summed, with scores ranging from 8 to 40, indicating low and high well-being. A Filipino version of this scale was available for download from authors Diener et al. (2009), which was used in this study. Diener et al. (2009) found that the FS correlated at .78 and .73 with other psychological well-being scales. They also found it had good reliability and validity and moderate to high correlations with scores on several other well-being measures, suggesting it had acceptable construct validity. Cronbach's alpha coefficient was .87 and the test-retest reliability coefficient was .71 over one month (Sumi, 2014).

Procedure

Designing the Therapeutic Horticulture Program. The therapeutic horticulture program (Table 1) included opportunities for socialization and control and was also designed based on the elements of trauma models, particularly Hermans' Stage Specific Model (1992) and Briere's self-trauma model (1996). The first three individual activities were intended to create a sense of safety and security by allowing them a sense of control over the activities. The fourth to sixth sessions were designed to help them cope with their past issues and experiences. The last four sessions were group activities that were meant to bring together and connect earlier sessions as well as create a greater support system through increased social interactions among the participants.

The activities were designed to address aspects that would help enhance the psychological well-being of CSA survivors and aid them in their recovery. Included among the different therapeutic goals were: building self-confidence and empowerment, establishing a sense of safety, understanding self-care and nutrition, encouraging positive socialization and emotions. The horticulture activities were based on books, journals, and online articles on horticultural therapy and were also adapted from local workshops and seminars on urban farming and gardening attended by the primary researcher.

The therapeutic program was also intended to be self-paced to allow the participants to work at their individual comfort levels, as recommended by trauma theory. The option of participating actively or passively also allows participants in the group to take part in activities they were comfortable with. The program intended to provide both a safe and supportive environment and challenge, but not overwhelm the participants' coping skills (Briere, 1996).

Finally, the program was designed to use materials that were either familiar or easily accessible to both the participants and the researcher and included a mixture of both individual and group activities. Materials were

Table 1.
Summary of the 10-Week Therapeutic Horticulture Program

Introductory Activity	Flower Origami. Demonstrated how to make an origami kusudama flower	
Week 1	Growing Pechay (aka Bok choy) Participants prepared a simple self-watering bottle and planted pechay seeds.	To build self-confidence and empowerment.
Week 2	Sensory Plants Samples and cuttings of the different herbs were distributed among the participants to touch, smell, or taste with some herbs planted in their front yard.	To engage in relaxation and calm and build a sense of safety.
Week 3	Aloe Vera and Cucumber The benefits and uses of aloe vera and cucumber were discussed. Aloe lotion and a face mask were made for participants to play with. Aloe plants were also planted.	To engage in and understand the importance of self-care.
Week 4	Flower Box Craft and Blue Ternatea Participants designed and decorated a box with dried plants and flowers. The benefits of the Blue Ternatea flower was also described and this was given for the participants to care for.	To increase self-expression and build on self-care.
Week 5	Healing Teas Participants prepared different teas and were invited to smell, touch or taste the ingredients and share the teas they prepared.	To increase positive socialization and cooperation and understand the importance of consuming healthy food and self-care.
Week 6	Composting and Planting The process and benefits of composting were briefly discussed. Participants were invited to write their anger and fears on old cardboard and to cut and place it in the compost bin. Empty eggshell containers were also given for them to plant something new.	To address feelings of anger and fear constructively.
Week 7	Companion Planting and Vertical Gardening Discussed the importance of companion planting and how certain plant pairings are beneficial to each other. Participants were also grouped to help each other create a "vertical garden" using empty coke bottles and to repot some plants which made good companions.	To build cooperation and increase socialization.
Week 8	Landscaping 1 Participants were invited to imagine themselves as landscape architects and to work in groups to beautify the front yard by repotting plants and redecorating the area.	To build empowerment and increase cooperation.
Week 9	Medicinal Herbs and Landscaping 2 The benefits of a few local medicinal herbs were discussed and distributed to the participants for them to share their experiences. Landscaping theme continued for participants who were unable to attend the previous session.	To highlight the importance of consuming healthy food, increase cooperation, and build on self-care.
Week 10	The Vegetable Garden Participants discussed and planted seeds of a local vegetable dish. The vegetable dish was brought in for the participants to sample after the activity.	To understand the importance of consuming healthy food, increase cooperation, and build on self-care.

brought in by the primary researcher every session, which were obtained from garden houses or donated by volunteers. Materials included the use of recycled materials (e.g., coke bottles), soil, assorted plants, seeds, dried plants, and other gardening and craft materials.

Mode of Data Analysis

Qualitative Analysis. The answers to the mid- and end- questionnaires that yielded qualitative data were analyzed following the steps for thematic analysis by Braun and Clarke (2006). The written answers to the questions in the questionnaires were read several times to gain an overall understanding of their responses and to familiarize the researchers with the data. Their responses to each question were also typed into a spreadsheet to see their answers side by side and initial codes of their responses were generated from these. Relevant codes were then collated into themes that were similar. To establish the reliability and validity of the themes, the data set was also analyzed independently by a rater who was given a copy of the spreadsheets with the participants' responses. Themes extracted by the independent rater and the researchers were compared for any similarities and differences and narrowed down to the final themes.

Quantitative Analysis. A paired samples t-test was conducted to find out if there was a significant difference between the well-being scores in the Brief Inventory of Thriving and the Flourishing Scale of the 26 participants before and after the implementation of the therapeutic horticulture program. A per dimension t-test analysis was also conducted to find out which specifically influenced their overall psychological well-being.

Results

Attendance of the participants varied due to either illness or pre-planned obligations that required them to be elsewhere by the shelter. Of the 26 participants, 7 attended 10 sessions, 11 attended 9 sessions, 5 attended 8 sessions, and 3 attended 7 sessions.

Thematic Analysis of the Mid - and End - Questionnaires

Themes were extracted from both the mid- and end-questionnaires. Similar themes from the two evaluations were eventually combined. Table 2 presents the summary of the main and subthemes.

Found value in learning horticulture. The most dominant theme that was extracted from all the participants' responses was their enjoyment of learning and working on the horticultural activities. The TH program was perceived as generally enjoyable, eliciting positive reactions from the participants when they worked or interacted with the plants. Participant KF: "From Week 1 to Week 10 it was very fun. I really enjoyed all the activities." Participants particularly enjoyed learning new things, especially about plants and their uses.

Two subthemes were extracted under this: (a) Enjoyment of learning (b) Gained skills to use in the future.

Enjoyment of learning. This theme describes how participants were happy about learning from the activities. They mentioned that they enjoyed learning a lot about the different plants and their benefits. A few participants also indicated that this was the first time that they learned how to plant. Participant GE: "Very happy because I know that I learned a lot and it was the first time I learned how to plant and fix."

A few participants also noted how they enjoyed learning about some of the health benefits of plants, with some noting the value of consuming healthy food. Participant KJ: "...these plants are important for me and can help different illnesses in the body…[when older] I want to plant vegetables that are good for the body like moringa, sweet potato, ginger, tarragon, and rosemary."

Gained skills to use in the future. The participants felt that what they learned from the therapeutic horticulture program was also something that will be useful to them in the future or as something they can "take with them" when they leave the shelter or to use when they were older. Participant RZ: "I learned a lot from all our activities. I can take this with me when I leave [the shelter] I will miss it ehh...a lot!"

Cultivated positive social relationships and interactions. The participants' responses in the mid- and end- evaluations indicate improvement in their interpersonal or social relationships, through increased cooperation, repaired relationships, and improved interactions.

Two subthemes found in the qualitative analysis

Table 2.
Summary of Themes Extracted from the Mid- and End- Questionnaires

Main Themes	Subthemes
Found value in learning horticulture	Enjoyment of learning Gained skills they can use in the future
Cultivated positive social relationships and interactions	Group cohesiveness *More unity/ closeness/bonding* *Improved social relationships* Encouraged participation and sharing *Individuals became more participative* *Gained knowledge to share with friends and family outside of the organization*
Heightened engagement with nature	Affinity with nature *Became fond of planting* *Noticed nature more* *Having an improved environment was something they liked and enjoyed* Inclination towards future environmental interactions *Wanted to become a gardener/have a garden/ or do something with the environment in the future* *Desire to contribute to the environment*
Fostered positive psychological change	Stress relief Relaxation Helps deal with problems Better sense of self (self-belief/self-worth)

were: (1) Group cohesiveness and (2) Encouraged participation and sharing.

Group cohesiveness. The participants indicated that they felt more group cohesiveness and felt encouraged to share with others. They felt closer or more bonded with each other while working on the activities, with a few citing improved interpersonal relationships. Participant LM: "...because of your activity we bonded more closely with each other and became more understanding of each other and we learned to listen to the opinions of each other."

Increased cooperation was also observed among the participant's responses. Participant EV: "...it's like for every activity we do, we enjoy and we help each other, that's when we see the good in each other."

Encouraged participation and sharing. Some of the participants cited changes to their behavior from what they were like before and after the program, particularly in terms of their participation. Participant LM: "...I wasn't very close to them before, what I mean is that I used to be really quiet and shy with them, but now I am no longer shy with them. Before MJ and I weren't very close but now things seem to have changed, she is now my friend."

Additionally, participants noted that they felt they could share what they learned in the program with friends and family or use it to help others once they leave the shelter. Participant EV: "There were a lot of things I learned, and I can take this with me when I get older, and I can teach this to my other friends."

Heightened engagement with nature. The shelter is based in an urban area with limited access to nature and the participants' experiences of the program included comments on how the activities heightened their engagement with nature. Participants mentioned that the activities were fun and interesting and generally noted being excited about and looking forward to having the activities.

Table 3.
t-test Analysis of the Brief Inventory of Thriving Dimensions

BIT Scale	*M* Pretest	*M* Posttest	*t*	*p*	*r*
Subjective Well-Being (2 items)	7.81	9.08	3.69	.001	.59
Relationship (2 items)	7.69	9.31	3.43	.002	.57
Meaning (1 item)	4.69	4.77	0.35	.73	.07
Engagement (1 item)	3.96	4.73	3.95	.001	.62
Mastery (3 items)	13.31	14.31	3.61	.001	.59
Optimism (1 item)	4.65	4.77	0.83	.42	.16
Mean of Total Scores	42.38	46.96	4.17	<.001	.64

Two subthemes were observed under this theme: (1) Affinity with nature and (2) Inclination towards future environmental interactions.

Affinity with nature. Participants mentioned that they developed a fondness for planting, even for some who had never experienced it before or noted that they started to become more observant of the plants around them. Participant LM: "...what I thought were just plants or weeds turned out to be helpful for me and I became more interested in plants and others. I learned about their uses...I used to look at plants as nothing much, but since I joined these activities I started paying more attention to plants and sometimes I even talk to them, haha!" Changes to the external environment in the organization were also noted to bring about positive feelings. Participant N: "We became closer to plants. I love plants!!...The air is cleaner (for me) and I feel that is healthy for us."

Inclination towards future environmental interactions. Participants also mentioned that they were inclined towards doing more environmental activities in the future. Participant SH: "I really want to plant and plant because that's how I live." Some mentioned either a desire to garden in the future as they perceived personal value in it or do it to contribute to the environment in general. Participant EB: "I am going to care for plants around my house so that the environment is happy and beautiful."

Fostered positive psychological change. Participants enjoyed interacting with the plants from touching, tasting, and even just seeing the plants, as they helped bring about positive feelings and emotions. The activities in the program were thought of as helpful and provided relaxation, relief from stress, and helped them deal with problems. Participant MF: "My sadness decreased and I can think clearly. I avoid getting stressed and I'm not as stressed because there is a place and an activity that helps me relax." In response to a question about the effects of the activity, Participant KF mentioned, "I become happy because it's enjoyable to do, even when angry, my anger goes away."

Self-confidence and increased creativity were also some of the benefits that some participants gained from the program. Participant MR: "...I changed and I started to believe in myself."

Quantitative Analysis of the Psychological Well-Being Measures

Brief Inventory of Thriving. Results indicate that the post-test scores of the Brief Inventory of Thriving

Table 4.
t-test Analysis of the Flourishing Scale Dimensions

Flourishing Scale	*M* Pretest	*M* Posttest	*t*	*p*	*r*
Relationship (3 items)	12.31	14.04	3.48	.002	.57
Meaning (1 item)	4.50	4.73	1.19	.25	.23
Engagement (1 item)	4.19	4.58	2.61	.02	.462
Mastery (2 items)	8.65	9.35	2.56	.02	.46
Optimism (1 item)	4.46	4.89	3.07	.005	.52
Mean of Total Scores	34.12	37.58	3.83	< .001	0.61

(M = 46.96, SD = 4.49); t (25) = 4.17, p < .001 were significantly higher than the pre-test scores (M = 42.38, SD = 4.45), with a large effect size (r = .64) [Table 3]. The individual facets of Subjective Well-Being (Life Satisfaction and Positive Emotions), Relationship (Support and Belonging), and Mastery (Self-worth, Self-efficacy, and Accomplishment) were added together to reflect their respective dimensions.

The per dimension analysis indicates a significant difference in the pre- and post-test scores of the following: Subjective Well-Being, Relationship, Engagement, and Mastery. Engagement (r = .62) had the most impact on their psychological well-being, followed by Subjective Well-Being and Mastery, which had similar effect sizes (r = .59). The Relationship dimension was also found to be significant.

Flourishing Scale. A significant difference was found between the pre-test (M = 34.12, SD = 4.35) and the post-test (M = 37.58, SD = 3.52) scores; t (25) = 3.83, p < .001, with a large effect size value (r = .61) [Table 4].

The same t-test was conducted for each item of this scale to determine which dimensions influenced their well-being scores. The individual facets of Relationship (Social Support, Social Contribution, Social Relationships) and Mastery (Self-Respect and Competence) were added together to reflect their respective dimensions. A significant result was obtained for the following dimensions: Relationship, Engagement, Mastery, and Optimism. The Relationship dimension appears to have had the most impact on their psychological well-being, with an effect size of r = .57.

Discussion

This study offers an exploratory investigation into the benefits of using therapeutic horticulture with child survivors of sexual abuse. After taking part in the therapeutic horticulture program, the participants experienced an improvement in their psychological well-being. Specifically, thematic analysis revealed that the participants found value in learning about horticulture, which they enjoyed and believed they can share with others and benefit from in the future; and resulted in their heightened engagement with nature. Moreover, they were able to cultivate positive interpersonal and social relationships, learned new ways of relieving stress and addressing emotional and psychological concerns, and experienced a better sense of their self-worth. Results from the quantitative analysis provided additional evidence that the therapeutic horticulture program enhanced the psychological well-being of the participants.

The main findings are discussed in greater detail in the subsequent paragraphs, in relation to the results of previous related studies and relevant theories about

therapeutic horticulture.

Engagement with the activities was one of the aspects that influenced the participants' psychological well-being, which is supported by the item analysis of both the Flourishing Scale (FS) and Brief Inventory of Thriving (BIT). Participants also mentioned that learning new things about plants was one of the things they enjoyed most about the program.

Some participants also showed interest in learning about the health benefits of plants and consuming healthy food. As CSA survivors are known to be at risk for eating disorders (Hall & Hall, 2011), the results indicate that TH has the potential to promote more self-care behaviors. This corroborates what Okvat and Zautra (2011) have noted that learning about horticulture educates participants about the production of food which has been shown to increase their consumption of more nutritious food.

Continued engagement in horticultural activities outside the shelter for their personal well-being can also be considered as a long-term benefit, especially since childhood sexual abuse is known to have negative long-term psychological effects (Hall & Hall, 2011). Viewing the therapeutic horticulture activities as something that they could take with them or as something that they could do in the future on their own could potentially aid in maintaining their well-being.

The therapeutic horticulture program also included several activities designed to increase social interactions, as survivors of childhood sexual abuse are also known to struggle with interpersonal relationships (Hall & Hall, 2011). It has been previously noted that this particular goal of the program was achieved, which can be better understood in the context of Herman's trauma recovery model (1992). The first stage in the said model highlights the importance of establishing safety and stability in relationships. Other studies (e.g., Lorber, 2011; Stuart et al., 2002) have also found that horticultural activities and exposure to nature can restore social connections among individuals. Establishing supportive and enriching relationships is one of the key dimensions that can enhance psychological well-being (Su, Tay, & Diener, 2014).

The participant's responses in the mid- and end-evaluations indicate improvement in their interpersonal or social relationships, through increased cooperation, repaired relationships, and improved interactions. This aspect is also reflected in the item analysis of the FS and the BIT, which both showed a significant difference in the Relationship dimension. In the FS, the increase in their scores suggest that the participant's relationships were supportive and rewarding, they felt respected by their peers, and they felt they contributed to the happiness and well-being of others. This dimension was found to have had the most impact on their psychological well-being. Similarly, the increase in the BIT Relationship dimension indicated that participants felt a sense of belonging and appreciated by others.

One of the benefits observed from this study was increased cooperation, which was also listed as one of the therapeutic goals. Participants experienced more group cohesiveness and were encouraged to share and be more participative. This is similar to the finding of Gonzalez et al. (2011) that participants in a therapeutic horticulture program had increased social activity after the intervention and established strong group cohesiveness. Results from the current and previous studies reinforce the concept that social support is one of the main restorative and coping resources from therapeutic horticulture that benefits psychological well-being.

The activities from the therapeutic horticulture program engaged the participants towards more positive interactions with nature, which is also reflected in their Engagement scores in both the BIT & FS. The participants expressed positive experiences from the activities, which benefited their psychological well-being. Exposure to nature has been said to increase positive feelings and decrease feelings of fear, anger, or sadness (Ulrich & Parsons, 1992, as cited in Lorber, 2011).

Metaphoric comparisons also appeared in some of the participant's responses. Participant MF felt that nature reminded her of "God" and the process of gardening reminded her of "stress debriefing". Nature can serve as a symbolic representation or metaphor that can help children or adolescents confront personal issues and these meaningful and beneficial experiences with nature can influence well-being (Kellert, 2004). Metaphors have been said to strengthen therapeutic outcome when introduced with nature-based activities (Corazon, Schilhab, & Stigsdotter, 2011). This finding adds support to other studies that have found that people use

natural environments metaphorically for psychological support when handling existential issues and traumatic life events (Linden & Grut, 2002, as cited in Corazon, Schilhab, & Stigsdotter, 2011).

The participant's experiences of the horticultural activities reflect similar findings of past studies where exposure to nature, in either the immediate environment, or seen passively, can reduce stress (Brook, 2010; Largo-Wight, Chen, Dodd, & Weiler, 2011). Working or engaging with plants served as positive distractions for the participants, which helped the participants put aside stressful or worrisome thoughts and reduce their stress while they worked with the horticultural activities (Ulrich, 1999).

Another therapeutic goal from the program was to address feelings of anger and fear constructively, with some participants noting that their anger dissipates or is minimized while working on the horticultural activities. Their responses also support Kaplan and Kaplan's (1989) attention restoration theory which states that fascination with plants engaged their attention enough to direct attention away from stressful preoccupations. The activities allowed them to distance or "be away" from their personal situations and to recover by refocusing their attention on things that require less effort (Kaplan, 1995). Ulrich (1999) has noted that temporary escape from stress or negative situations is strongly related to control, as people who "escape" are able to either achieve actual or perceived control. A sense of control is said to be an important factor that influences an individual's ability to cope with stressful events or situations (Ulrich, 1999). Working on horticultural activities can allow CSA survivors to have control over the plants and gardening process, and also offer them opportunities for decision making. Empowering survivors in this way can also help buffer against some of the negative outcomes associated with childhood sexual abuse, such as negative self-thoughts, feelings of worthlessness, stress, and anxiety (Hall & Hall, 2011). As mentioned, according to Herman's (1992) trauma recovery model, the first stage to recovery begins with establishing a client's safety and stabilization. In establishing this stage, there is a focus on empowerment and connections, which were provided through the horticultural activities and the opportunities to socialize. The results from the program suggest that therapeutic horticulture provides some relief from cognitive overburden experienced by trauma survivors.

Self-confidence and increased creativity were cited as well by the participants as benefits of the program. The increase in self-confidence is further indicated in the significant results for the Mastery dimension of both the FS and the BIT, suggesting gains related to their self-worth, self-efficacy, self-esteem, and sense of accomplishment.

The overall positive feelings that the participants experienced from the program are also reflected in the Subjective-Well Being dimension of the BIT, which was found to be significantly different. Such results suggest that the therapeutic horticulture program elicited positive feelings that further enhanced the psychological well-being of the participants.

In all, this study offers an exploratory investigation into the benefits of using therapeutic horticulture with survivors of childhood sexual abuse. Both the qualitative and quantitative findings indicate that therapeutic horticulture can enhance the psychological well-being of CSA survivors and that there is great potential in using this as an adjunctive tool in crisis shelters for these survivors.

Limitations and Recommendations About the Therapeutic Horticulture Program. The primary researcher was not formally trained in horticultural therapy. However, her psychological background and training aided in adapting the use of horticulture as a therapeutic tool. Benefits were still derived from the implementation of the program, despite the lack of formal training.

One difficulty experienced during the implementation of the program was the inability to give individualized attention to each participant. It is recommended to either have a smaller group or have more people to assist during the activities to give more equal attention to each participant. Additionally, it would be ideal to separate the younger from the older participants or to narrow the age group of the participants to better adjust for the differences in developmental needs, learning styles, and educational levels when implementing the activities. This would also allow for better time management, as most of the activities given had variable time frames with some activities ending earlier and other activities ending later due to the different work pace of the participants.

A longer intervention period may also be beneficial as

the number of sessions may not have been enough given the long-lasting impact of sexual abuse on psychological well-being (Hall & Hall, 2011). Indicators that the sessions were not enough was the overall sadness that the participants noted in their questionnaires along with verbal statements that they did not want the sessions to end or that they wanted more sessions. Recommendations for future research would be to either have a longer period of intervention or a regular program that can monitor the impact of this on the participants' well-being.

About the Design. The quantitative part of the study was a pre- and post- test with no control group, and, thus, it is difficult to ascertain if the therapeutic horticulture program was primarily responsible for the changes in their well-being or if these were due to other programs at the shelter. However, the participants' responses suggests that there were benefits derived specifically from the therapeutic horticulture program itself. A pretest-posttest control group design to increase the internal validity of the study is recommended.

In terms of the measures used, while the conversion of the FS to a 5-point Likert scale may have been beneficial for the participant's comprehension, it could have affected the validity of the measure. In the same vein, the BIT was translated to Filipino to make it more comprehensible for the participants, but the translated version was not reliability tested and validated. For future studies that would use the FS with the converted 5-point scale and the translated version of the BIT, it is recommended that their psychometric properties be tested.

Other limitations of the study are its small sample size and its focus on female survivors. Future studies may look into exploring the experience of this program on male survivors of childhood sexual abuse and a larger sample size to increase the generalizability of the findings. The decision to limit to one site was due to budgetary constraint as the study was self-funded.

The activities were held both indoors and outdoors and thus external variables such as weather conditions, temperature, lighting, and ambient noise were not properly controlled for. Other uncontrollable variables included visits by relatives and visitors who come to volunteer at the shelter. Other factors may also account for the results, including participants who could not attend some sessions and other social and adjunctive activities within the organization. Should the study be replicated, better collaboration and coordination with the staff members of the target organization in the implementation of the program is highly recommended.

A couple of participants commented that they also enjoyed writing in the questionnaires. As the questionnaires were primarily intended as a tool for measurement, this was an unintended effect and may have also affected their well-being scores. Participants in general, throughout the program, were observed to be less verbally expressive, and perhaps the questionnaires worked as a medium to help them express what they wanted. Future research may also look into other tools of data collection, such as group or individual interviews or focus group discussions.

Conclusion

This study described how female survivors of CSA experienced the use of horticulture as a therapeutic tool and how it influenced their psychological well-being. Findings from both thematic and quantitative analysis strongly indicate that the therapeutic horticulture program was a positive non-threatening medium that provided several benefits to the 26 CSA participants, particularly in providing positive learning experiences, cultivating relationships and social interactions, heightening engagement with nature, and fostering positive psychological changes, which helped them deal with their emotional and interpersonal difficulties. Based on their responses, it appears that participants were able to build self-confidence, engage in relaxing and calming activities, increase positive socialization and cooperation, and address emotional issues. The therapeutic horticulture program also elicited positive emotions from the participants who felt the activities were engaging or interesting. Feelings of accomplishment, increased self-worth, self-esteem, finding meaning in the activities, and improved relationships were among the positive descriptions that came from the participants' experience of the program. Results from the scales also indicate that there was an increase in their overall psychological well-being scores. This strongly suggests that therapeutic horticulture, as an adjunctive therapy, has much potential to benefit the psychological well-being of survivors of CSA and may be a valuable tool for psychologists or social workers that work with these populations.

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BIOGRAPHY

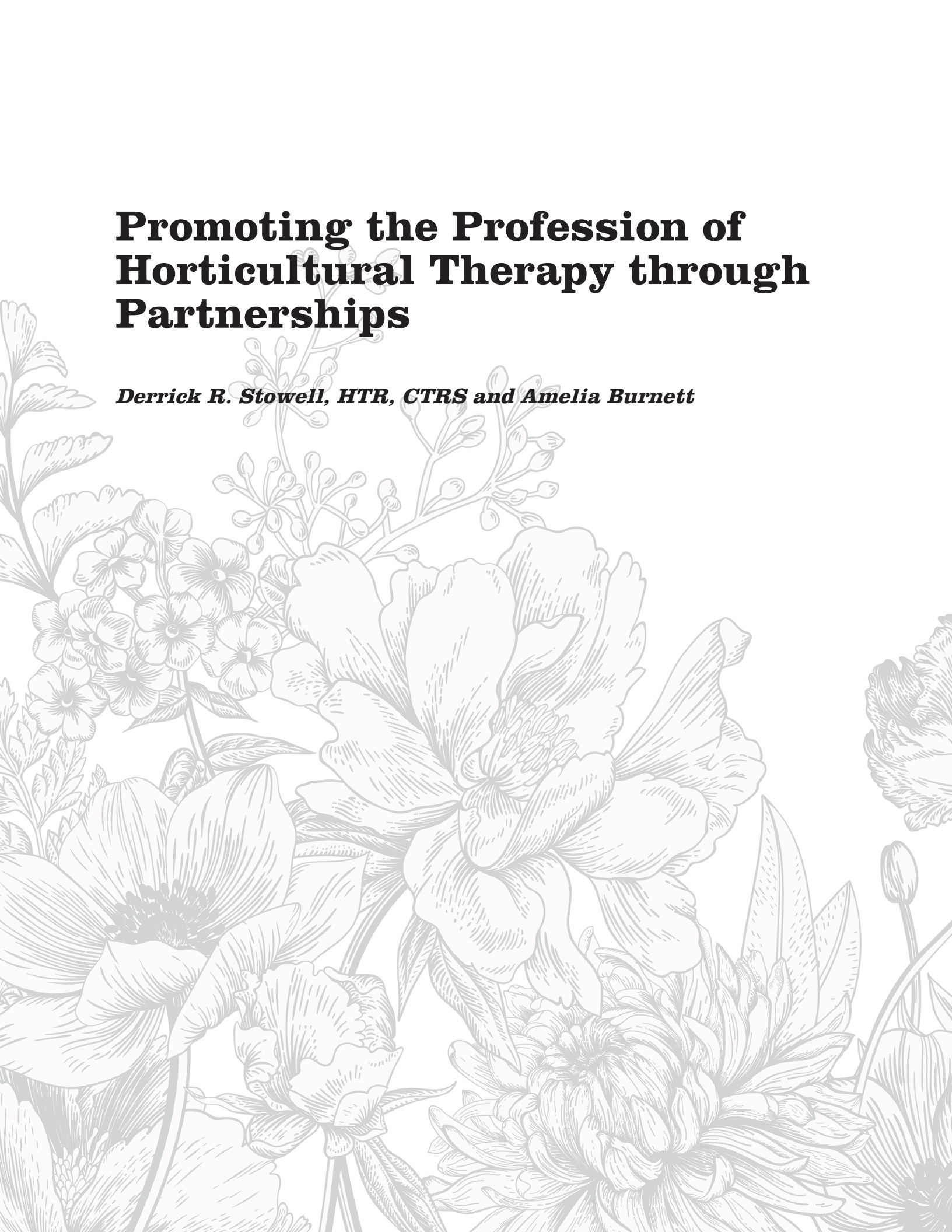
Michelle Stephanie Watkins received her bachelor's degree in Psychology and her MA in Counseling Psychology from Ateneo de Manila University, Philippines. She has done some work in psychological assessment and currently works as a language trainer and research analyst. Her research interests include Environmental Psychology and Therapeutic Horticulture. She has attended workshops and seminars on urban and organic gardening. In 2018, she presented a paper on the potential of therapeutic horticulture as an adjunctive tool for the therapy of survivors of child sexual abuse at the 55th Annual Convention of the Psychological Association of the Philippines.

Lota A. Teh, PhD is an Associate Professor of the Department of Psychology of Ateneo de Manila University, Philippines. She obtained her MA in Clinical-Counseling Psychology and PhD in Clinical Psychology from the same University. She has served as Chairperson of her Department, as Chair of the Technical Committee for Psychology of the Philippine Commission on Higher Education, and as Vice President of the Psychological Association of the Philippines. She is currently the Coordinator of the PhD Clinical Psychology program of the Department. She is a licensed clinical psychologist.

Karina Therese G. Fernandez, PhD finished her MA in Human Development from Boston College, USA and her PhD in Clinical Psychology from Ateneo De Manila University, Philippines. She is currently a full-time faculty member of the Psychology Department of Ateneo de Manila University. She is also the Executive Director of the Ateneo Bulatao Center for Psychological Services, a center of the Ateneo Psychology Department that provides counseling, therapy, psychological assessment, training and workshops, and research services to enhance the psychological well-being of children, adolescents, and adults.

Promoting the Profession of Horticultural Therapy through Partnerships

Derrick R. Stowell, HTR, CTRS and Amelia Burnett



The purpose of this article is to share lessons learned from partnering with the national organization AgrAbility to develop horticultural therapy workshops for Veterans, to explore the need for promoting the profession, and to discuss the value of partnering with other allied healthcare organizations. The goals of this project were to develop and pilot horticultural therapy workshops for veterans or active duty service members, to connect veterans to other programs and services offered by Tennessee AgrAbility Project (TAP), and to discuss how horticulture and nature-based experiences provide therapeutic outcomes. The workshops were designed as an introduction to horticultural therapy for participants, who may or may not have experience in gardening or agriculture. Data was collected in the form of anonymous evaluations filled out by participants after each workshop. Evaluations found that participants enjoyed the hands-on activities with plants, as well as learning how horticulture could be a positive activity to improve their well-being. Recommendations for future research would be to measure details as to the impact of each activity, and workshops overall, on attendees. Future projects could also schedule follow-ups with participants to determine how they benefited from AgrAbility services offered.

Introduction

Although the practice of using horticulture for patients with mental illness began as early as 1798 (Davis 1998), the now established profession of horticultural therapy is not as well-known as other allied healthcare professions in the United States. This poses a unique challenge for not only horticultural therapy practitioners but many other entities that influence healthcare, such as regulators, employers, and clients. Occupational therapy, recreational therapy, vocational rehabilitation, and music therapy are examples of health and human service fields closely connected to horticultural therapy by similar techniques, treatment strategies, shared facilities, program settings, and patients served (Shoemaker, 2004; Davis, 1998). As an emerging profession, horticultural therapy can learn from other allied healthcare fields, notably through focused collaboration with practitioners and organizations. Multidimensional partnerships resulting in methodical research can help advance the professions and have profound effects on patients receiving care. Promotion of both the profession and benefits horticultural therapy has on various populations is not only a core value of the American Horticultural Therapy Association (AHTA), but is key to moving forward as a profession. This article will explore the need for promoting the profession, the importance of partnerships with other allied healthcare organizations, and how a partnership with AgrAbility was developed to create horticultural therapy workshops for veterans is a prime example of a beneficial organizational partnership. The article ends with suggestions for additional promotion of the profession of horticultural therapy.

Promoting the profession

One way to further the future advancement of horticultural therapy lies in the promotion of the profession to other allied healthcare professionals and organizations that work with individuals who could potentially benefit from horticultural therapy. For many allied healthcare professional organizations, including the American Occupational Therapy Association (2018), National Association of School Psychologist (2017), and American Physical Therapy Association (2018), the promotion of their respective profession is listed as an important goal. The National Council for Therapeutic Recreation Certification (NCTRC) has identified "Advancement of the Profession" as one of their Professional Knowledge Domains in their 2014 CTRS® Job Analysis Report. The American Horticultural Therapy Association's Strategic Plan also lists promotion of the profession as an important goal

in the advancement of the profession (2015). It is clear that promotion of the profession to the public and wider medical and allied health care communities is vital for advancement of horticultural therapy as an accepted and effective treatment modality. Further, advocating for the horticultural therapy profession can help unearth future funding, ensure best methods in practice, and build national credibility.

Partnering with AgrAbility

AgrAbility was created by the 1990 Farm Bill to provide services to farmers, ranchers, and agricultural workers with disabilities. The National ArgAbility Project (NAP) and State and Regional AgrAbility Projects (SRAP) are funded primarily through grants from the United States Department of Agriculture/National Institute of Food and Agriculture (USDA/NIFA). The mission of AgrAbility is

to enhance quality of life for farmers, ranchers, and other agricultural workers with disabilities, so that they, their families, and their communities continue to succeed in rural America. For this target audience, "success" may be defined by many parameters, including: gainful employment in production agriculture or a related occupation; access to appropriate assistive technology needed for work and daily living activities; evidence-based information related to the treatment and rehabilitation of disabling conditions; and targeted support for family caregivers of AgrAbility customers. (AgrAbility, 2018)

Currently, 22 states are served through USDA funding. AgrAbility has partnered with many organizations around the nation to meet its mission such as Goodwill Industries, The Arthritis Foundation, Easter Seals and much more. Programs for AgrAbility serve people with many medical conditions including arthritis, spinal cord injury, amputations, brain injury, visual impairments, hearing impairments, and cerebral palsy. AgrAbility meets its mission through innovative educational programs to improve an individual's capabilities and utilize adaptive technologies, networking and information sharing, and direct serves to agricultural workers through consultation. AgrAbility has also focused on providing services to individuals with disabilities from diverse racial and cultural backgrounds. Through a partnership with National AgrAbility Project and the Farmer Veteran Coalition, they began developing programs to serve veterans who were interested in farming (AgrAbility, 2018).

Development of the Workshops

Partnerships often develop organically, as was the case for one SRAP, and a horticultural therapist in 2017, when Tennessee AgrAbility Project (TAP) applied to USDA/NIFA for funding. Through this application process, the horticultural therapist began discussing ways horticultural therapy could benefit TAP and the residents of the State of Tennessee. The primary focus on this partnership was to develop horticultural therapy workshops for veterans. Funding was requested to develop and pilot 3 workshops for veterans in TAP's service area. The final project application funded 3 years for horticultural therapy workshops for veterans with 3 workshops offered across the state each year. Funds were awarded in fall of 2017 and currently, three workshops have been offered reaching 28 individuals thus far.

Benefits of Horticultural Therapy for Veterans

Research shows that horticultural therapy has the potential to benefit many different populations. There is an increasing amount of research that validates the abundance of anecdotal findings already established for the positive relationship between people and plants (Cipriani et al., 2017; Marcus & Sachs, 2014; Soga, Gaston, Yamaura, 2017; Wise, 2018). Horticultural therapy has been known to impact a wide variety of domains including: physical, cognitive, emotional, social and spiritual (Wise, 2015). Past research has shown that interacting with nature yields positive psychological, social, and physical health outcomes. Specifically, gardening for as little as 30 minutes is proven to reduce stress and improve mood (Van Den Berg & Custers, 2001). Many populations can benefit from the array of positive outcomes horticultural therapy helps promote. One population that has particular potential to benefit from horticultural therapy programs is veterans. Research on the use of horticultural therapy for veteran populations has shown promising outcomes, although more research is needed to encompass the value of this effective treatment modality for veterans. Findings from several research studies has shown the efficacy in horticultural therapy programs to help veterans modulate stress and improve overall quality of life (Atkinson, 2009; Detweiler, et al. 2015; Stowell, Owens, Burnett, 2018).

Veterans and Farming/Agriculture/ Horticulture

Veterans to farmers programs have been growing throughout the United States since around 2007 (Fleming, 2015). These programs help address the multi-faceted concerns of transitioning back to civilian life post military. They focus mostly on vocational skill development for veterans beginning agriculture careers, but also include farming in rehabilitation and therapeutic programs. Several research articles do show promising benefits of these farmer veteran programs including providing a sense of purpose, calming effects, improved self-esteem, social interaction, increased physical activity, and improved career outcomes (Anderson, 2001; Atkinson, 2009; Fleming, 2015). These outcomes show a potential for agriculture and gardening programs serving veterans to have positive impacts on veteran's mental health and overall well-being, in addition to providing opportunities for a career.

One national organization that serves veterans is called the Farmer Veteran Coalition (FVC), which began in 2008. The mission of FVC is to "cultivate a new generation of farmers and food leaders and develop viable employment and meaningful careers through the collaboration of the farming and military communities" (Farmer Veteran Coalition, 2018). The FVC currently has chapters in nine states.

Goals/Objectives

The goal of this project was to develop and pilot horticultural therapy workshops for veterans across TAP's service area. The participants for these workshops were veterans or active duty service members. The workshops were designed as an introduction to horticultural therapy for participants. The activities and training were developed at a beginner level to interest veterans who may or may not have had experience in gardening or farming. An important goal to note was discussing how horticulture and nature-based experiences provide therapeutic outcomes such as helping reduce stress, improve mood, and increasing overall well-being.

Another goal of the workshop was to connect veterans to other programs and services offered by TAP. The workshops were also designed to help introduce agriculture/horticulture to veterans as a possible career choice. It provided hands-on gardening/horticulture activities that introduced basic gardening skills and skills important to starting a career in the agriculture/ horticulture industry. Finally, a proposed discussion forum for the participants was initially planned to give participants a chance to connect and discuss horticulture topics at the end of sessions.

Table 1
List of Activities Used in Workshops

Composting and soil management	Pest and disease management
Garden planning	Soft-tissue cuttings
Microgreens	Transplanting seedlings

Program development

The program was informed by publications describing HT work with veterans, such as Wise's Digging for Victory (2015), and Westlund's *Field Exercises: How veterans are healing themselves through farming and outdoor activities* (2014), and research findings described by Atkinson, (2009), and Detweiler et al. (2015). Specific activities for the six-hour workshop were chosen by looking at program components for of a pilot of a horticultural therapy program for veterans (Stowell et al., 2018). Activities also had to be selected that were able to be mobile as the three workshops were offered throughout the state. Each workshop lasted a total of six hours with lunch included. Program staff utilized a collapsible wagon, portable potting trays, soil in a tote and smaller plants to make the program portable. After each activity, the horticultural therapist debriefed the activity. This allowed time for development of therapeutic metaphors and processing of each activity. At the end of the workshop, participants were given additional information about AgrAbility and ways to be involved with additional farming/agriculture/ horticulture trainings offered by TAP. A final element of the pilot project was to create a social media group for participants. The idea of this group was to provide opportunities for participants to keep in contact and share information related to farming/agriculture/ horticulture. A closed Facebook group was created and participants in the workshops were invited to join and contribute.

Activities selected for the workshops included a variety of plant materials and techniques (Table 1). After each activity, workshop leaders debriefed each activity

with participants. During this time, workshop leaders allowed program participants to develop therapeutic metaphors to relate to each activity. "A metaphor is a figure of speech whereby a physical phenomenon or object is used to describe something less concrete, thus transferring the qualities and characteristics of the former to the latter" (Corazon, Schilhab, & Stigstotter, p. 166).Therapeutic metaphors allow participants to improve learning by connecting activities to concepts (Corazon et al., 2011; Hovelynck, 1998; Witztum, Van Der Hart, & Friedman, 1998).

Evaluation and Results

The three workshops had a total of 28 participants. Participants in the workshops fell into the following participant categories: veteran, active duty military, military spouse, horticultural therapist, and AgrAbility staff. Future workshops could be developed and targeted towards military spouses or their families. Evaluations collected at the end of workshops found that the participants enjoyed the hands-on activities with plants. Evaluations were created to be anonymous and participants did not list which participant category they belonged to. When participants were asked about the reason for attending the workshop, several participants noted that they attended to spend time with "other veterans". Participants also reported that they enjoyed learning how horticulture could be a positive activity to improve their well-being. Participants noted that they attended the workshop to learn more about options related to a possible career in horticulture or agriculture. The social media group that was created and participants were invited to post and share content. At the time of writing this article, group participation was minimal, with only a few posts.

Discussion

Future research on these workshops could provide additional details as to the impact of the workshops on attendees. Further follow-up scheduled for 3 or 6 months following the workshops could also help determine if attendees followed up on the services offered by AgrAbility and participants use of horticulture to improve their own well-being. Future research could be conducted to measure the impact of each specific activity. This could help further refine the program to meet its stated goals and objectives. During future workshops, the evaluation will need to be updated to allow participants to indicate which participant category they are part of. This will give workshop leaders the ability to analyze which elements were most effective in accomplishing workshop goals for each participant category.

The closed Facebook social media group has not been successful with this project. This may be explained by lack of interest time, or a barrier to social media, such as lack of technology, internet, or education. Wise suggests that veterans form a tight-knit community around the military (2015). This can allow for a sense of comfort and belonging among other veterans, though trauma from active duty often causes some veterans to distrust either people in general or civilians specifically and be less likely to be engaged on social media platforms. Social media is a challenging tool to use at times. To engage members/followers/participants, you need to initiate conversations and content (Kietzmann, Hermkens, McCarth, & Silvestre, 2011). A schedule of social media posts and a plan for adding content and to encourage participation may make increase future effectiveness of the social media group.

Opportunities for Further Partnerships

Promoting horticultural therapy is a vital element in the continued growth of the profession. Not only does it ensure a wider audience can be made aware of the benefits offered, but it opens the door for opportunities to collaborate. This can be done through several methods including partnering with other organizations, presenting at regional and national conferences, and publishing research or disseminating information in professional publications. This journal article focused on a partnership with AgrAbility, as an example of the benefits of organizational partnerships. Looking for other like-minded organizations is one way to develop further partnerships that could lead to funding and a greater awareness of the benefits of horticultural therapy. Another example of partnering with other organizations would be would be Michigan Horticultural Therapy Association's (MHTA) success in organizing American Therapeutic Recreation Association CEUs for their 2017 conference. This interdisciplinary professional development opportunity allowed recreational therapists an opportunity to earn CEUs at MAHTA's conference (Fleming, Carroll, Douglas & Flinton, 2017).

If the thought of putting together a proposal to present at a large national professional conference is overwhelming, consider looking at state or regional healthcare conferences or professional meetings. Don't

forget to look at resources that might be available right where you already work, by asking colleagues about conferences they attend. Consider working with colleagues to co-present if it is your first time presenting at a conference. Other complementary therapies to look into are social work, recreational therapy, music therapy, art therapy, occupational therapy, and physical therapy. Many of these already established professions have local and regional meetings or conferences.

Consider writing an article for a professional publication, or healthcare organization newsletter. Look for ways to partner on research projects and submit publications in other allied health professional journals.

Finally, look to partner with colleges, other nonprofits, and allied health organizations on grant writing. This will allow you to gain funds to conduct research or fund horticultural therapy programs.

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BIOGRAPHY

Derrick R. Stowell, HTR, CTRS is the Education and Horticultural Therapy Program Administrator for the University of Tennessee Gardens. Derrick is responsible for directing education programs and outreach for the UT Gardens, Knoxville location. He received his bachelor's degree from Maryville College with a double major in environmental studies and outdoor recreation. He has a master's degree in therapeutic recreation from the University of Tennessee. He spent five years directing the national camp program for the Amputee Coalition of America and was also their Annual Giving Manager.
Derrick has developed numerous programs for the UT Gardens including horticultural therapy programs. He is a Certified Therapeutic Recreation Specialist (CTRS) and became a registered Horticultural Therapist (HTR) in 2015. Derrick served on the Board of Directors for the American Horticultural Therapy Association (AHTA) from 2016-2018. He is currently a pursuing his PhD in Plant, Soil, and Environmental Science from the University of Tennessee and is focusing his studies on horticultural therapy.

Amelia Burnett is a full time horticulturist at Cheekwood Gardens & Estate in Nashville, TN. Prior to that, she worked for the University of Tennessee Gardens, Knoxville location as a garden educator. Her role included programming and leading children's garden camps, caring for the children's garden, and assisting in therapeutic horticulture programs for various groups. She received her bachelor's degree in 2012 from Soka University of America with a major in Liberal Arts and a concentration in environmental studies and French. She is currently pursuing her professional horticultural therapy registration (HTR) through the American Horticultural Therapy Association.

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You are invited to submit manuscripts for consideration for publication in the Journal of Therapeutic Horticulture. Manuscripts may include research projects, case studies, program and services descriptions, therapeutic practice descriptions, therapeutic horticulture philosophies, therapeutic design project descriptions, relevant book reviews, and other related topics.

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Matthew J. Wichrowski, MSW, HTR
Editor-in-Chief
matthew.wichrowski@nyumc.org
(631) 456-3010