

**Doctorate School in Agri-Food Sciences, Technologies and
Bio-Technologies**

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**NATURE AND PSYCHOLOGY: AN HORTOTHERAPIC
APPROACH FOR THE PROMOTION OF
PSYCHOLOGICAL WELL-BEING**

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Abstract

Currently, the interest in the relationship between nature and human well-being has increased, and many disciplines are investigating the influence which nature has on human health, both physiologically and psychologically.

Exposure to a natural environment, for example, has proved to be a useful practice in improving attention as well as lowering stress levels. Horticultural therapy likewise uses plant-care activities as a non-pharmacological form of therapy associated with the improvement of mental and physical health. The aim of this industry-funded doctorate is to study new ways of promoting psychological well-being through exposure to natural environments and the use of hortotherapeutic practices, considering the relationship between an individual's exposure to the natural environment and his or her psychological health.

In the first part of this thesis a systematic literature review is presented, as well as an analysis of the specific context of the learning center where the research was carried out (e.g., psycho-educational context, types of users, needs of users and professionals, etc.). The construction and design of two outdoor spaces inside the center are illustrated; these are suitable for accommodating various types of hortotherapeutic activities, including psychotherapy sessions and outdoor teaching.

The second part of the thesis details three parallel projects with the common aim of promoting outdoor activities and exploring at a later stage their possible consequences for psychological health. First, using the space of the center, which acted as the home of the entire research project, an external structure was designed and built suitable for housing psychotherapy sessions primarily aimed at adolescent and adult patients. At the same time, an equipped garden was designed and built for younger users, allowing them to learn outdoor skills; to propose functional games in a natural context; and to complete a didactic program in vegetable gardening.

Finally, an evaluation in the form of an anonymous online questionnaire was proposed to various professionals engaged in psychological well-being during an outdoor psychotherapy practice. This considers the benefits perceived by the therapist relating to himself and the patient. This practice, called 'walk and talk', consists of performing an outdoor therapy session and walking and talking with the patient.

The aim of the investigation is manifold: firstly, to promote the choice of an outdoor learning environment by professionals; secondly, to provide professionals and clients with new forms of experimentation within the therapy pathway; and, finally, to collect the feedback of the therapists themselves on the perceived benefits so as to evaluate and then decide on any improvements to the protocol currently in use.

The various projects initiated within the company will be kept active over at least the next two years and the data collected will be compared with those obtained from the sessions illustrated in this thesis. The expected results include the increase: (1) in levels of well-being related to the exposure both of individuals and professionals to a natural environment and (2) in the implementation of therapies more generally in the outdoor context.

Riassunto

L'interesse nei confronti della relazione tra la natura ed il benessere umano è aumentato negli ultimi decenni e molte discipline stanno indagando l'influenza che la natura esercita sulla salute degli esseri umani, sia fisicamente sia psicologicamente. L'esposizione ad un ambiente naturale, ad esempio, è risultata essere una pratica utile nel miglioramento dei livelli di attenzione così come nell'abbassamento dei livelli di stress. Anche l'ortoterapia, nello specifico, utilizza attività di cura delle piante come terapia non farmacologica associata per il miglioramento della salute fisica e mentale.

Lo scopo del presente dottorato industriale è studiare nuova metodologia per promuovere il benessere psicologico tramite l'esposizione ad ambienti naturali e l'utilizzo di pratiche di ortoterapia, considerando la relazione tra l'esposizione di un individuo all'ambiente naturale e la sua salute psicologica. Nella prima parte di questa tesi è presentata una revisione sistematica della letteratura unita ad un'analisi relativa al contesto specifico del centro di apprendimento in cui si è svolta la ricerca (contesto psico-educativo, tipo di utenza, necessità di utenti e professionisti, ecc...). Sono successivamente illustrate le fasi di progettazione e realizzazione di due spazi outdoor all'interno del centro adatti ad accogliere vari tipi di attività ortoterapiche, includendo sessioni di psicoterapia ed insegnamento all'aperto.

La seconda parte dell'elaborato illustra tre progetti paralleli con lo scopo comune di studiare e promuovere le attività outdoor ed esplorare in una fase successiva le possibili conseguenze sulla salute psicologica. Per prima cosa, sfruttando lo spazio del centro, sede dell'intera ricerca, è stata progettata e realizzata una struttura esterna adatta ad ospitare sedute di psicoterapia rivolte principalmente a pazienti adolescenti ed adulti. Allo stesso tempo, è stato progettato e realizzato un giardino attrezzato pensato per gli utenti più giovani, che permette di insegnare abilità outdoor, proporre giochi funzionali in contesto naturale e fare un programma di orto didattico. Infine, è stata proposta a vari professionisti impegnati nel benessere psicologico, una valutazione sotto forma di questionario online anonimo, che prende in considerazione i benefici percepiti dal terapeuta relativi a se stesso ed al paziente durante una pratica di psicoterapia outdoor.

Questa pratica, detta walk and talk, consiste nell'effettuare una sessione di terapia all'aperto e letteralmente "parlare e camminare insieme". lo scopo dell'investigazione è molteplice: in primo luogo promuovere la scelta di un contesto outdoor da parte dei professionisti, fornire a professionisti e clienti nuove forme di sperimentazione all'interno del percorso di terapia ed infine raccogliere l'opinione dei terapisti stessi relativa ai benefici percepiti così da poter valutare eventuali miglioramenti al protocollo attualmente in uso.

I vari progetti iniziati all'interno dell'azienda saranno mantenuti attivi anche nel corso dei prossimi due anni almeno ed i dati raccolti saranno confrontati con quelli ottenuti

dalle sessioni illustrate nel presente elaborato. I risultati attesi relativi al benessere psicologico sono di un aumento dei livelli del benessere relazionati all'esposizione di soggetti e professionisti ad un ambiente naturale ed alla realizzazione di terapie in contesto outdoor.

Italian Higher Education Doctorate Program

This kind of Doctorate is an opportunity for people currently employed, to upgrade their skills working in a three-year research project shared between a company and the University. The project is partly financed by the Emilia Romagna region. The benefits for the company is a valuable knowledge acquired during the realization of the project under the supervision of university researcher. The project allows the growth of the partner company in terms of research and innovation thanks to the cooperation with the University. The present program in Higher Education has been developed thanks to a collaboration between the University of Modena and Reggio Emilia and the social cooperative TICE.

Tice is an innovative social cooperative composed of psychologists, psychotherapists, pedagogues, and health professionals that deals with counseling, services, and research in the field of learning, psychological well-being and mental health. The cooperative offers complementary and additional services to those proposed by the NHS (National Health System). Services include psychological support aimed at adults and adolescents or psychoeducational interventions aimed at children and adolescents with neurodevelopmental disorders.

The company includes a team of psychologists, psychotherapists and pedagogues working in the field of applied behavioral sciences and since 2006 has been offering psychological and after-school outpatient services with the aim of improving learning and the psychological and emotional well-being of children, adolescents, and young adults.

In the field of developmental and educational psychology, the company designs, develops, and offers personalized psychoeducational services for children and adolescents with learning difficulties such as dyslexia, dyscalculia, dysgraphia, dysorthography and other special educational needs, or individuals with simple study and / or emotional difficulties such as anxiety, depression, internet or video games addiction, social isolation or sleep difficulties. Each student, during these services, is followed by psychologists and psychotherapists who use evidence-based methodologies to promote psychological well-being and at the same time school functioning, enhancing basic skills, study method, emotional skills, self-esteem, and awareness.

The cooperative is based in Correggio, in the countryside of Reggio Emilia (Emilia Romagna region). The headquarters includes a portion of a farmhouse surrounded by greenery, with a front garden and a portion of uncultivated lawn at the back. The property is quite isolated from the town and is framed by large areas planted with vineyards for the production of wine grapes.

1.Introduction

Including Nature to increase psychological well-being, transferring counseling and psychotherapy sessions to an outdoor setting is a practice that has received increasing attention in the last decades, and the practice of bringing patients into the natural environment is steadily increasing.

There has been a proliferation of practices that insert the natural element into therapeutic paths, and today there are different types. There is for example horticultural therapy (Porchey, 2007; Elings, 2006; Hoseinpoor Najjar, A., Foroozandeh, E., & Asadi Gharneh, H. A., 2018), nature therapy (Berger & McLeod, 2006), nature-guided therapy (Burns, 1998); eco-therapy (Buzzell & Chalquist, 2009); wilderness therapy (Davis-Berman & Berman, 2008); adventure therapy (Gass, Gillis & Russell, 2012); bush adventure therapy (Pryor, Carpenter & Townsend, 2005) and outdoor therapy (Jordan, 2015; Revell, Duncan & Cooper, 2014).

At the base of each of these different practices is the presence of the natural element. According to Kaplan & Kaplan (1989), the term "natural environment" or "nature" indicates a very broad spectrum of more or less-man made spaces, ranging from the uncontaminated nature of a forest to roads, parks and gardens.

"We are referring to places near and far, common and unusual, managed and unkempt, big, small, and in-between, where plants grow by human design or even despite it" (Kaplan & Kaplan, 1989, p.2).

The connection with the natural environment and exposure to it, as opposed to exposure to urban environments, has proven useful for the promotion of well-being under various aspects including the increase of positive emotions and the decrease of negative ones (Hartig, Mang & Evans, 1991, Hartig et al., 2003; van den Berg, Jorgensen & Wilson, 2014), improvement of stress responses (Brown, Barton & Gladwell, 2013), support in emotion regulation (Johnsen & Rydstedt, 2013) and the increase in the restorative effect in general (Beyer et al., 2014; Bowler, et al., 2010; Bratman, et al., 2015, Kaplan, 1995; Ulrich, 1979).

Especially nowadays, in an increasingly frenetic society, a wider current interest in the role of nature by means of therapeutic gardening in improving health and well-being is receiving a growing attention (Clatworthy, Hinds, & Camic, 2013): this interest is related to the concept of biophilia, the idea that humans has an innate need to associate themselves with the natural environment in which they evolved (Wilson, 1984).

Several theories explain why nature-based interventions have mental health benefits: one of these is the attention regeneration theory shown by Kaplan and collaborators in the early 1990s (Kaplan & Kaplan, 1989; Kaplan, 1995), which provides useful explanations for nature's supposed restorative qualities. According to the authors, human exposure to natural environments, their observation and the use of such

environments allow the human mind to focus and regenerate in a much more significant way than exposure to artificial environments. This theory, which focuses primarily on cognitive functioning, assumes that people are endowed with two types of attention: direct attention, which requires voluntary and conscious effort to be maintained (for example when solving a problem), and the involuntary attention (charm), or the kind of attention that occurs without conscious effort, in which the attention is captured by intrinsically intriguing stimuli (Kaplan & Kaplan, 1989). In this sense, natural environments have numerous suggestive cues that allow humans to meditate carefully but effortlessly: these invoke involuntary attention that provides relief from direct attention, reducing mental fatigue and improving concentration (Roe & Aspinall, 2011).

A further theoretical contribution to the importance of nature as a protective factor for man is given by psycho-evolutionary theory (Ulrich, 1993). The theory explains how certain environmental configurations promote the restoration of altered psychophysiological resources during a stress response. Man has always been exposed to stress and in response to this exposure he has been endowed, thanks to evolution, with the ability to very quickly assess whether a natural environment is dangerous or not (Grahm, Pálsdóttir, Ottosson, & Jonsdottir, 2017) .

While the model of Kaplan & Kaplan (1989) deals with the reparative effect of nature on cognitive functioning, the psycho-evolutionary theory of Ulrich (1993) deals mainly with the effect of nature on emotional and physiological functioning. The latter suggests that individuals are predisposed to find natural relaxing stimuli in the environment and that exposure to these stimuli has an immediate impact on emotions and triggers a parasympathetic nervous system response that results in a better feeling of well-being and relaxation. (Clatworthy et al., 2013). People who regularly visit natural environments can therefore quickly recover from exposure to high levels of stress (Ulrich, 1993).

The theories set out above concern the mechanisms according to which contact with natural environments affects the emotional and psychological well-being of the people who frequent them. (Maller et al., 2006).

Gardening interventions, however, offer much more than simple contact with nature: they are social interventions that offer the subjects involved the opportunity to interact with others, also allowing them to engage in a meaningful activity, developing specific knowledge and skills , which are social and occupational factors useful for promoting a sense of belonging and improving the social inclusion of people with mental health problems (Diamant & Waterhouse, 2010).

Mental health and psychological well-being in particular have been studied in relation to the benefits that can be obtained from passive or active exposure to the natural environment: researches investigating nature as an alternative form of therapy are increasing (Hartig, Mitchell, De Vries, & Frumkin, 2014): on the one hand there is a line of research that investigates the potential psychological benefits of exposure to

natural environments (Ecotherapy, MIND, 2007); on the other hand, an increasing number of studies have been conducted to identify the impact of these nature-based interventions on the health of participants (Hansen-Ketchum, Marck & Reutter, 2009; Maller, Townsend, Pryor, Brown & St. Leger, 2006). The results show that increased contact with nature can increase an individual's attention span (Berto, 2005) and improve cognitive functioning (Berman, Jonides & Kaplan, 2008), as well as showing scientific evidence that the natural environment can relieve symptoms of stress and improve recovery from mental disorders (Rodiek, 2002; Bratman, Hamilson, & Daily, 2012).

It is a type of non-pharmacological intervention that offers numerous benefits to different groups of people: in the treatment of disability, for example, it is configured as a complementary and alternative treatment that can also act as vocational rehabilitation, to initiate and prepare people with disabilities intellectual for the world of work (Joy, Lee, & Park, 2020), improving the quality of life of the people involved. Compared to people with disabilities, hortotherapy is particularly suitable because it focuses on activities that allow flexibility and at the same time allow you to adapt and adapt to different inter-individual skills and abilities (Lai, Ho, Kwan, Fung, & Mak, 2017). Furthermore, activities that use natural materials aimed at people with intellectual disabilities contribute to building a sense of competence in the subjects involved, affecting their sense of self-efficacy, as well as a strong sense of belonging when carried out within working groups (Eriksson, Westerberg and Jonsson, 2011).

In the context of psychopathologies, beneficial effects of rehabilitation training through horticulture have been reported in patients with depressive and anxious symptoms (Lee, Ro, & Lee, 2004), demonstrating, in the case of subjects with anxiety disorders, an improvement of attention and memory skills and, in subjects with depressive disorder, an improvement in associated psychological symptoms (Hoseinpoor, Najjar et al., 2018). In addition, the perception of horticultural experience as significant and influential at a deeper level of well-being, in terms of improved outlook on life (Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011), was investigated.

In patients with schizophrenia, there is scientific evidence to support the fact that the hortotherapy program improved self-efficacy and reduced psychiatric symptoms (Eum, & Kim, 2016), as well as an improvement in psychopathological symptoms, assertiveness, and interpersonal relationships (Cho, Son, & Kim, 2003). Currently the main treatment to counteract the effects of schizophrenia is through the administration of antipsychotic drugs (Oh, Park, & Ahn, 2018). Studies show that rehabilitation therapies carried out in nature often play a significant role in relieving psychiatric symptoms, enabling schizophrenic patients to readjust to society and restore their social functioning (Zhu et al., 2016).

The psychopathologies considered are often related to psychosocial difficulties, such as a decrease in the ability to cope with stress and self-confidence, with a consequent

deterioration of self-care, work and leisure (APA, 2013). Psychosocial interventions report benefits in the ability to cope with the stress of the subjects involved, improving interpersonal and professional skills, and acting as protective factors that play a key role in the rehabilitation of psychiatric disorders (Kam, & Siu, 2010).

Due to the large number of different types of environments that can intersect with the many practical strategies available, it is not easy to choose the type of external environment, to be correlated with the specific practice to obtain the best beneficial effect (Bowler et al., 2010).

1.1 Horticultural Therapy

There is a long tradition of using nature in therapy and in rehabilitation in healthcare, and hortotherapy is an example. Hortotherapy is configured as the commitment of people in horticultural activities with the specific aim of promoting physical and psychological health, as well as social and spiritual well-being (Porchey, 2007).

There is no precise definition of Horticultural therapy (HT), however the American Horticultural Therapy Association, originally founded in 1973 with the name of National Council for Therapy and Rehabilitation through Horticulture, indicates it as "the engagement of a person in gardening and plant-based activities, facilitated by a trained therapist, to achieve specific therapeutic treatment goals" (ATHA, 2012). Horticultural therapy or horticulture are terms often used interchangeably to indicate alternative therapies in which professional therapists involving patients in simple gardening activities, come to treat patients with special needs (Relf, 2008; Son, 2016).

In horticultural therapy, that involve a lot of different practice, plants become a tool for treatment and rehabilitation, thanks to the numerous sensory stimulations they offer (Elings, 2006). At a concrete level, hortotherapeutic activities are defined in the various gardening processes that are used to improve the physical, mental and emotional health of patients and are considered an effective and beneficial treatment for people of all ages, backgrounds and abilities (Hoseinpoor Najjar, Foroozandeh, & Asadi Gharneh, 2018).

Horticulture is often used as a complementary therapy for example in the treatment of schizophrenia or depression (Clatworthy et al. 2013; Sempik et al. 2003) or in the case of subjects with learning difficulties (Smith and Aldous, 1994). Its application is possible in many areas also thanks to the flexibility of the practices, which are used as adjuvant therapy often in association with different types of pharmacological or non-drug treatments. It should be noted that HT improves the physical and psychological well-being in general of anyone who comes into contact with it (Ferrini, 2002); for this reason it is not a therapy to be intended solely for people with discomfort or disability, but it can be useful in a much wider variety of cases.

Horticulture activities have beneficial effects in the emotional sphere: studies on patients have shown how this practice can lead to stress reduction (Kam et al., 2010), self-esteem increase, and sense of effectiveness (Lewis, 1988), and can be useful for stabilize emotions (Kam et al., 2010). Spending time in an outdoor setting such as a park or a therapeutic garden can also be useful in reducing fatigue and restoring attention and cognitive ability (Berman et al. 2008; Fjeld et al., 1998; Kaplan & Kaplan, 1989). In people with specific disabilities, Horticultural therapy programs could help them to develop sustainable professional and social skills (Best et al., 2008).

1.2 Aim of the study

The present study and research work stems from a growing interest in psychological health and the various activities that can positively affect it. It has always been known that outdoor activities, such as a walk rather than the view of a pleasant landscape, have a positive influence on the general psychophysical well-being as well as on the modulation of mood. The current growing interest in these non-pharmacological practices, to be used as a therapy associated with the classical practice with the aim of improving psychophysical well-being, reveals the tendency to experiment with new ways. These studies are valid both in the case of a general promotion of well-being, and in the face of more specific cases such as depression, schizophrenia, memory problems, Alzheimer's, etc.

The aim of this research work is twofold: on the one hand to investigate the positive effects of outdoor practices on psychophysical well-being, identifying in the variable "nature" an additional element of a treatment path already in place for users with disabilities; on the other hand as a perception of psychophysical improvement by the professionals involved.

The achievement of the objectives was therefore carried out on several levels in a multidisciplinary manner. It has been necessary to evaluate and identify a possible outdoor context, taking into consideration multiple factors concerning places and spaces, soil and plants; provide professionals and patients with new forms of experimentation within a therapeutic path; analyze the therapists' responses regarding the benefits achieved and evaluate any changes to the various protocols to optimize the responses.

2.Walk and Talk

Based on the experimental model conducted by Revell & McLeod (2016), which aims to evaluate the experience of therapists who have integrated the practice of walk and talk within their professional practice in the United Kingdom, we explored the possible benefits obtained from the use of the practice of walk and talk during psychotherapy sessions in an Italian context. Ten psychologists and psychotherapists have completed an online questionnaire to evaluate their experience related to therapy sessions, expressing their judgment in relation to the usefulness of walk and talk in improving the well-being of clients and therapists. The participants found that the walk and talk can be useful to the patient to feel more comfortable during counseling sessions, helps the patient to unlock as well as have positive effects for the physical well-being of the patient. At the same time, it has been found that outdoor counseling sessions can be useful to therapists professionally because it allows them to vary and offer a new type of practice and grow professionally. The therapists also noted that the practice of walk and talk can have beneficial effects for both patients and professionals and indicate that they perceive an improvement in their well-being in relation to the practice of this therapeutic form.

2.1 Introduction

It is known that in recent years there has been increasing interest in outdoor therapy practices for the promotion of psychological well-being, resorting for example to outdoor therapy practices, a term that refers to a wide range of outdoor programmes, including adventure therapy and wilderness therapy (Revell, Duncan & Cooper, 2014). The common interest of these practices is to associate the presence of the natural element understood as a natural environment with a therapeutic practice already in use. An example of an association is represented by the walk and talk, which combines the practice of therapeutic interview with outdoor physical activity.

Walk and talk therapy is described as a therapeutic activity where the therapist and client walk together outdoors during the therapy session (Doucette, 2004; Hays, 1999) (Fig. 1). There are many studies that indicate the importance of exposure to the natural environment and how nature can have positive effects on psychophysical well-being (Hartig et al., 2003; Jordan, 2015; Kaplan, 1995) and there is ample evidence regarding both physical and psychological benefits that derive from physical activity, in particular walking (Barton, Hine & Pretty, 2009; Hays, 1999; Pickett, Yardley & Kendrick, 2012). The practice of walk and talk therefore allows to combine the benefits of psychological therapy such as counselling, with the positive effects that derive from walking in a natural environment.

This exploratory study uses the schema proposed by Revell and McLeod (2016) and aims to explore the possible benefits obtained from the use of the practice of walk and talk in the Italian context. Another objective that we set ourselves with this survey is to increase the general relative awareness of outdoor therapies, to favor the inclusion of this type of practices within the traditional therapy pathways.



Figure 1: photo from a walk and talk session in the countryside.

2.2 Method

The method used, in agreement with Revell & McLeod (2016) is a mixed-methods approach (Creswell & Plano-Clark, 2011; Tashakkori & Teddlie, 2003) which allows to collect standardized information through multiple choice questions, and at the same time allows the participant to express opinions and provide information related to their individual experience. The mixed method uses different methods for the purpose of gathering different types of information.

Participants

Italian professionals, psychologists, or psychotherapists, who presented within their offers, some therapeutic activity directly related to nature, were identified as possible participants in the study. As search phrases, the keywords "walk and talk", "ecotherapy", "outdoor therapy" were used. Of the results that emerged, those

considered most suitable were selected, paying particular attention to the geographical area (Italian territory) and to the descriptions of the practices offered on the various websites. Potential participants were contacted by email and invited to fill out an online questionnaire; the link to the questionnaire was sent together with a brief presentation of the present research project.

Assessment Tools

The questionnaire (Revell and McLeod, 2016) was translated into Italian and edited online using the google forms platform. The questionnaire consists of a total of 39 questions and can be divided into two different sections. The first part includes a total of 12 questions that collect personal data such as age, gender, personal qualification, place of performance, duration of sessions, personal motivations in the choice of walk and talk. In the second part, professionals are invited to answer 24 questions through an evaluation from 1 to 5, regarding the usefulness of the practice of walk and talk. The 5-point scale use includes the following possibilities: neutral, slightly helpful, moderately helpful, greatly helpful and extremely helpful. The first 13 questions have as their object benefits perceived by the therapist for the patient, the remaining 11 items consider the benefits perceived by the professional on himself. Each of the two sections concludes with an open question in which each participant can express an opinion, suggestion, or observation. The answers to these questions were collected through special text boxes. Quantitative data were analyzed using descriptive statistics. qualitative analyses were analyzed using thematic analysis (Braun & Clarke, 2006).

2.3 Results

A total of 10 of the 28 professionals contacted by email responded to the questionnaire, one professional responded to the invitation specifying that they had not included the practice in their profession, the remaining 17 potential participants did not respond to the questionnaire for unknown reasons. 10 complete questionnaires were obtained from 10 participants, nine (90%) female and one (10%) male, aged 29 to 66 years (mean age 37,7). Most participants said they were psychologists (70%; n=7), while 30% said they were trained as a psychotherapist and in general the majority indicated that they had included the practice of walk and talk within the professional practice for one to two years.

Features of the practice

The duration of the walk and talk sessions is one hour (50%; n = 5) or one and a half hours (10% n = 1), while 40% of professionals indicated the time of therapy variable, between 40 and 50 minutes (20%; n = 2), between 20 and 50 min (10% n = 1) and

between 10 and 15 minutes (10% n = 1). The various locations indicated are in most cases tree-lined avenues, parks and public gardens and areas of open countryside. Walks along a river or along the shores of a lake were the locations indicated less frequently. The totality of the participants indicated the place of work as the starting point of the counseling sessions, in most cases an urban area (70% n = 7).

Evaluation of walk and talk experience

Most therapists believe they offer their clients the practice of walk and talk primarily because it is done in a natural setting (50% n=5). Other reasons that emerged are represented by the desire to change the therapeutic setting and increase flexibility (40%, n = 4), therapeutic needs such as exposition, increased openness to dialogue on the part of the patient or to offer a situation that can help the patient to feel at ease. One professional reported choosing to use the walk and talk also for lack of space inside.

From the answers obtained we can see that professionals in general believe that the practice of walk and talk is more useful to their clients to get unstuck during therapy and to experience a feeling of general well-being through walk and talk therapy. Professionals also believe that the practice can be useful to patients because it helps them open up during the interview and promotes self-discovery during therapy through a more holistic process. The opinions of therapists also agree that the practice of walk and talk can be useful to promote greater equality within the therapeutic relationship.

The usefulness of walk and talk in relation to therapists has emerged to be mainly related to professional aspects. The participants in fact believe that the practice is useful for them because it can help them grow from a professional point of view and allows them to offer new and different methods of therapy. The results, however, show that therapists agree that walk and talk is not particularly useful in improving their professional performance during interviews.

In general, the experience of therapists has not shown that walk and talk can be a better or more beneficial form of therapy for patients from a clinical point of view compared to indoor counseling.

Tables 1 and 2 show the assessment of the practice by professionals for clients and for themselves. Ratings were made using a 5-point scale, with a high score indicating the strong level of agreement.

Table 1: Perceived benefits of walk and talk therapy for clients

Perceived benefits of walk and talk therapy for clients	Mean	SD
Walking and talking during a therapy session helps clients to get 'unstuck'	3.4	0.6
Walk and talk therapy strengthens client's connection between body and mind	3.2	1.1
Walking side by side with a client helps them to open up	3.3	0.9
Clients achieve a greater sense of overall well-being through walk and talk therapy	3.5	0.8
The process of client's self-discovery is promoted in a more holistic way through walk and talk therapy	3.2	0.9
Walking together during walk and talk therapy promotes equality in the therapeutic relationship	3.6	0.9
Being outdoors during a therapy session enhances the therapeutic process	3.2	1.1
Walk and talk therapy encourages deeper ways of thinking	2.8	1.2
Walk and talk therapy is less intimidating for clients compared to indoor seated therapy	3.2	1.3
Through walk and talk therapy, the overall counselling process is enhanced	2.8	1.2
Lack of eye contact is more comfortable for the client	2.5	1.1
Walk and talk therapy improves physical fitness of the client	3.4	1.3
Clients resolve issues quicker through walk and talk therapy compared to indoor seated therapy	2.4	1.1

Table 2: Therapist experiences of walk and talk

Therapists' experiences of walk and talk	Mean	SD
I believe that offering a variety of therapeutic experiences (such as walk and talk) is useful to clients	4.1	1.1
I generally feel invigorated when doing walk and talk therapy sessions	4.0	0.9
I generally have no trouble being focused on my client during walk and talk therapy sessions	3.6	0.9
I generally have clear thought processes during walk and talk sessions	3.7	0.6
Offering walk and talk therapy has been beneficial for my professional development	4.0	0.6
I believe that walk and talk therapy offers mutual benefits to both client and therapist	4.1	0.8
Offering walk and talk therapy has reduced my own stress levels	4.0	0.8
I do some of the best therapeutic work during walk and talk sessions	3.5	0.7
I am physically fitter since starting walk and talk sessions with clients	3.5	1.1
I sometimes get distracted by things happening in the environment during walk and talk sessions	2.7	1.1
I find walk and talk mentally demanding to do with my clients	2.2	1.0

Qualitative Thematic Analysis

From the qualitative analysis of the responses indicated by the therapists in the open-ended items, seven different themes emerged. The various themes have been divided into two.

Helpful aspects of walk and talk

Environment and physical activity

One aspect that emerged from the experience of more than half of the professionals interviewed concerns the positive effects caused by the external environment. Simply being in a natural environment allows you to perceive greater relaxation and well-being and less difficulty in general concentration. In addition, customers and therapists can stay in the sun, breathe clean air and enjoy an aesthetically pleasing panorama. Along with the usefulness of the outdoor setting, the perceived usefulness of light physical activity also emerged, considered useful especially during counselling sessions with younger clients, who can hardly stand sitting for long periods.

Flexibility

The use of walk and talk is also a useful method for promoting flexibility for both patients and therapists. The variables that cannot be controlled during outdoor practice such as small climatic variations, the possibility of meeting other people during the journey or not being able to find a place where you can stop (for example a free bench in a public park), can be useful elements to promote greater flexibility and resilience. The importance given to change and flexibility within professional practice and more generally in conducting therapy sessions also consists of one of the motivations that have led some therapists to propose walk and talk within their professional practice.

Sensory experience

The numerous and varied sensory stimuli that can be received during outdoor counselling sessions have been indicated as a useful element for patients, within mindfulness sessions carried out in the context of the walk and talk.

Hindering aspects of walk and talk

Weather

The first aspect that emerged regarding the critical issues of the practice of walk and talk turned out to be that of the weather. In fact, professionals explain how the practice can be used only in case of adequate weather conditions since adverse conditions such as rain, windy or excessive heat conditions can affect the therapy session in various ways.

Privacy

Another important aspect noted by therapists is the fear of being able to meet along the way some person who can recognize the patient or therapist. The disorder generated by the meeting could cause the destruction of the clinical moment as well as making the patient less willing to repeat the experience in the future. Also, in relation to the possible presence of other people in the path, the fear emerged that part of the private conversations could be accidentally heard by others.

Distraction

Distraction was also an important element of difficulty during the practice of walk and talk, both for therapists and patients. The exercise of walking while talking makes it more difficult to focus on intense emotions and leaves more room for environmental distractions that often turn out to be greater than those that can be encountered indoors. The emotional connection between patient and therapist is more difficult during walk and talk sessions because both patients and therapists are also engaged in the activity of walking.

Taking note

Another difficulty related to the practice of walk and talk is the difficulty on the part of the therapist to take notes during counseling sessions. The fact of not being able to accurately write down some important information provided by the patient during the therapy sessions, makes the walk and talk a form of counseling not suitable for cognitive interviews.

Limits

The limitations of the present study are mainly represented by the small sample of therapists who participated in the study; however, the subject population of the study was limited to professionals who practice the profession in Italy. Similarly, using an online questionnaire decreased the amount of information obtained by participants. A further limitation is represented by the type of questions proposed within the questionnaire, formulated in such a way as to make the useful and positive characteristics of the practice of walk and talk more evident, to the detriment of negative characteristics. In the other hand, the open questions invited participants to indicate the potential obstacles and problems encountered during the walk and talk sessions.

The study also only considers the experience of therapists, who are invited to express a judgment on the usefulness of the practice both on themselves and on their patients. In future studies it would be desirable to be able to explore the experiences of a wider population of therapists to obtain a more precise overview of the perceived usefulness with respect to practice in the Italian context. Another important element that would

be useful to consider in the future is the possibility of including patients in the study, to obtain direct information related to their experience.

2.4 Discussion

The results obtained from the present study, according to Revell & McLeod (2016), suggest that the innovative therapeutic approach of walk and talk is increasing in the Italian context and is a practice positively perceived by the professionals who propose it.

These findings indicate that in general the therapists who propose the practice are convinced of the beneficial effects of conducting counselling sessions in the outdoor context both for their patients and for themselves and highlight how important this requirement is to push therapists to experiment with this type of practice. The importance of the therapists' personal believe about the outdoors and walking in their decision to offer walk and talk, and the range of psychotherapeutic modalities utilized in walk and talk, generally support the conclusions of McKinney (2011) study.

The participants perceived as useful the change of setting during the therapy sessions and identified walking in nature, a useful element for their patients during the interviews, and for themselves within their path of professional growth. Results about helpful and hindering factors of walk and talk practice are generally similar to previous studies (Doucette, 2004; McKinney, 2011; Revell & McLeod, 2016).

The therapists considered, according to Jordan (2013) study, that the altered frame of walk and talk therapy creates an equal power distribution between therapist and client, furthermore the results indicate that the different frame is potentially useful to facilitate a more holistic experience, supporting previous study (Jordan, 2013).

The evidence obtained supports the possibility of future studies related to the type of positive interconnection between exposure to a natural environment and the benefits obtained from psychotherapy. Results, furthermore, supports the increase of exploration into the relationship between psychological well-being and bodily movement and more can be investigated about interaction between walk and talk and therapeutic changes (Corazon et al., 2010). It would be useful to be able to study more specifically how the three variables useful to promote psychological well-being in individuals such as (1) counselling, (2) exposure to a natural environment and (3) physical activity act and interact with each other.

3. Taking care

Horticulture is an increasing practice, especially as a supportive therapy within specific pathways for the improvement of health conditions or for the promotion of general psychophysical well-being. In particular, there is evidence of how the use of gardening activities can be useful to increase the sense of self-esteem and self-efficacy, as well as help promote the development of social skills in people with mental disabilities.

The aim of this study is to study the possible positive effects of hortotherapy practices on the perception of participants in relation to the sense of self-esteem and self-efficacy.

The study presents two different experiences, one individual and the other group, with the common theme of "taking care" and aimed at subjects with specific learning disabilities. The experiences of the participants, in accordance with the impressions of the therapists during the experiences, suggest that the use of hortotherapy activities can be useful to increase the perception of their self-esteem and self-efficacy, can promote the development of social skills and can be useful to strengthen in participants the connection with nature.

3.1 Introduction

The use of plants in therapeutic programs is a growing practice, in particular there are many areas in which we can find hortotherapy as an added practice to existing therapy. In the case of psychophysical well-being and mental illness, there are some evidence of a relationship between the use of gardening activities and the reduction of stress (Kam et al., 2010), the increase in concentration (Roe & Aspinall, 2011), improvement of self-esteem, sense of effectiveness as well as a greater sense of belonging to a group (Lewis, 1998; Eriksson, Westerberg, & Jonsson, 2011).

Horticultural therapy programs are useful to develop sustainable professional and social skills (Best et al., 2008) in people with specific disabilities. Other studies show how the presence of plants can have a positive effect on the perception of an indoor environment (Laviana et al., 1983) and there is evidence of how the presence of indoor ornamental plants could be useful to provide connection between children and nature (Hitter et al., 2019).

The aim of this pilot project, which consists of two different experiences, is to study the possible positive effects derived from the use of gardening activities within specific psychological therapy pathways. In the group experience, which consists in the cultivation in aquaculture of a cutting, the focus is mainly on the possible effects

related to the social skills of the subjects involved and the effects related to the self-esteem of the participants.

The focus of the individual experience, which consists in the cultivation of a plant in aquaculture, is placed on the possible effects of using gardening activities in increasing self-esteem and the sense of effectiveness perceived by each participant. To evaluate the possible influences, throughout the cycle of meetings the participants are invited several times to reflect individually and in groups on the action of "taking care", a theme common to both the proposed experiences.

3.2 Hydroculture experience

The experience consists of a cycle of meetings of about 50 minutes that take place in groups, once a month, proposed to users of lower and upper secondary schools.

From a practical point of view, participants are invited to engage in a simple gardening activity that consists, in this specific case, in the cultivation of a golden pothos cutting (*Epipremnum aureum*) through the hydroculture technique, a simple way to grow indoor plants. From a psychological point of view, the experience aims to induce participants to reflect on their emotions in relation to the specific task of "taking care".

During the first meeting the assistant briefly explains the experience and illustrates the activities that make it up. Each participant is then provided with the necessary material, in this case a medium-sized glass container and a pair of scissors. Participants are then invited to take a cutting of golden pothos (Fig.2) and place it inside their container, previously filled with water.



Figure 2: particular of students cutting plants during the experience.

When all participants have finished the practical phase of the experience, the assistant introduces the planned discussion topic (for example the concept of "taking care"), and collects the experiences and impressions of the participants. At the end of the experience, the various participants are asked to choose between the possibility of taking home their own cutting of pothos (1) or leaving it at the center (2).

The subsequent experiences always consist of a first moment that proposes a practical activity that focuses on the growth of the plant, for example control of the water level in the container, the observation of root growth or the attention to pests and to the light conditions.

The second part, always closely linked to the practical experience, proposes to the participants a reflection on an aspect of the central theme of the cycle of meetings, and favors the sharing of experiences and sensations within the group.



Figure 3: pothos in hydroculture.

3.3 Cultivation routine

The individual gardening activity proposed to student with learning disabilities consist to the cultivation in water of the batata tuber (*Ipomea batatas*), a herbaceous plant that has long stems, large bright green leaves, and bell-shaped flowers that can be of various colors, from white, to purple, to pink.

The project, designed specifically for adolescents with cognitive and learning disabilities, was included in a cycle of meetings held during the school break in the summer 2020. The students was asked to try their hand at this activity, which consists in germinating a batata tuber in water and subsequently taking care of the plant throughout the growing period.

The activity was proposed to stimulate the participant's sense of responsibility, encourage the factor of "taking care" and at the same time propose a type of gardening activity different than usual.

The student was provided with summary sheets (figure 4a; 4b) of the cultivation processes and the actions necessary for the activity, built with the aid of images and captions to make the instructions as simple and immediately understandable as possible.

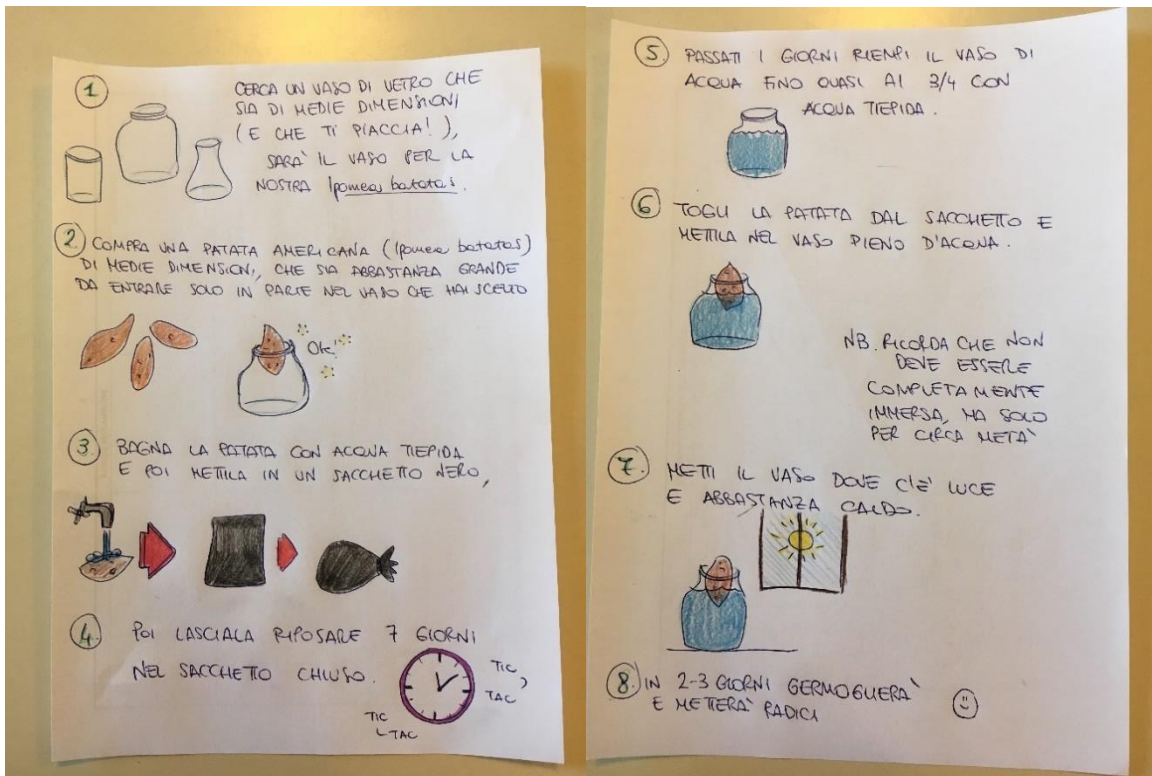


Figure 4a: summary sheet of experience, part 1. Figure 4b: summary sheet of experience, part 2.

The first part of the gardening experience was carried out inside the center under the supervision of an assistant. Subsequently, also to promote autonomy and a sense of self-efficacy, the student was asked to independently choose the times and methods with which to proceed in the experience.

Throughout the summer period of attendance at the center, the student undertook to take care of the plant through simple actions such as adding water when needed or choosing a larger container to allow the plant to continue growing.

3.4 Results and discussion

The results of both activities emerged from the experiences of participants and therapists. In general, both the group gardening activity and the individual activity were welcomed and judged positively by both participants and therapists. The opinions showed, according to Eriksson, Westerberg, & Jonsson, (2011), that the use of plant material within the activity may have been useful to increase the sense of self-efficacy and self-esteem perceived by the participants (Lewis, 1998;).

Furthermore, findings suggest that horticultural therapy programs could be useful to develop sustainable professional and social skills (Best et al., 2008) in people with specific disabilities.

The students expressed a positive opinion regarding the experiences, declaring themselves available to participate in other similar activities in the future, especially if

related to nature and gardening. The results according to Klemmer (2005) suggest that the use of practical activities with a scientific background can be useful to increase participants' interest in learning notions in the scientific field.

In addition to satisfaction, the students also positively evaluated the experiences with regard to the sense of effectiveness and the ability to succeed. This findings, according to previous studies, suggest that the use of plants within therapeutic activities can be useful to increase the levels of self-esteem of the participants (Lewis, 1998), have effects in strengthening the connection with nature (Hitter et al., 2019).

The observation by the assistants was unanimous in observing how was useful in increasing the student's sense of self-efficacy and general self-esteem. Therapists have also noted that the gardening experience is helpful in promoting independence skills. During the group experience, an increase in group cohesion was observed, which may have been favored by the horticultural activity proposed (Eriksson, Westerberg & Jonsson, 2011).

4.Greenhouse for individual counselling

4.1 Introduction

The natural environment, when you are immersed in it, is able to promote a situation of psychophysical well-being that can be traced back to the bond that is naturally present between man and the environment that surrounds him.

In accordance with the theories that focus on the link between nature and every human being (Kaplan, 1995; Ulrich, 1993) many studies have highlighted a relationship between psychophysical well-being and exposure to the natural environment.

According to the many nature-based disciplines that aim to study these interactions and to promote beneficial practices related to nature such as hortotherapy (Porchey, 2007; Elings, 2006), adventure therapy (Gass, Gillis & Russell, 2012);, ecotherapy (Buzzell & Chalquist, 2009) the positive effects that could be obtained from the natural environment can generally be identified in: resting in a natural environment (1) and engaging in specific plant-based activities (2).

Ecotherapy i.e. has been shown to be a useful practice to lower levels of anxiety (Mackay and Neill 2010) and stress (Kam and Siu 2010), can promote the lowering of pathological symptoms attributable to depression (Barker and Dawson 1999). Nature-based practices of this kind have also been shown to be useful to improve self-esteem (Pretty et al. 2005) and attentional capacity (Duvall 2011).

There are many studies that indicate that exposure to a natural environment or active hortotherapeutic activities can have a beneficial effect on psychophysical health (Hartig et al., 2003; Jordan, 2015; Kaplan, 1995) such as in relation to stress levels (Brown, Barton & Gladwell, 2013), improvement in mood management and increased overall well-being in terms of improved outlook on life (Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011).

The aim of this project is to study the possible positive consequences on psychological well-being of the inclusion of nature-based therapeutic practices within psychological therapy, in particular counselling. The focus of the study is on the possible positive influences of the exposure of patients and therapists to a natural environment during therapeutic interviews.

In order to promote the choice of an outdoor environment for counselling sessions with adolescents and adults, a structure was designed that could guarantee the presence of some comforts such as visual barriers to guarantee privacy or areas to be able to sit. The choice to build a greenhouse-like external structure, suitable for hosting psychotherapy sessions, in particular interviews, is the innovative part of the study that proposes as a setting a structured external environment that could be useful to allow an easier transition from an internal space to an external environment.

Firstly, the collection of information initiated the design of the structure, to promote and encourage the use of outdoor spaces by users and professionals. From the opinions of the therapists, it emerged the need for an outdoor space that could host outdoor psychotherapy sessions, but also useful for other activities proposed to the users of the center, in particular group activity sessions, designed for both adolescent and adult users, and activities to teach routines or specific skills of a practical nature (for example, tying shoes or setting the table) using the Applied Behavioral Analysis (ABA) method.

Applied Behavioral Analysis (ABA)

Applied Behavioral Analysis is the science based on the principles of behavior analysis (Skinner, 1953) and are commonly called the "ABA method". The practice is based on the observation and recording of behavior (evaluation) as a starting point for the study and design of targeted interventions with the aim of producing the change of inadequate behaviors as well as the learning of new skills. The principle behind the method is that of reinforcement and behavioral techniques (Martin and Pear, 2003) that can be used in a practical way to increase or reduce certain behaviors as well as to teach new skills. Briefly, it is an applied science that aims to reduce symptoms and increase the abilities of subjects.

This type of intervention has been studied over time as an approach in children with autism or developmental disorders, in particular children with autism is shown to benefit particularly from this type of interventions (Harris et al., 1991; Birnbrauer and Leach, 1993; Sheinkopf and Siegel, 1998; Smith et al., 1997). Studies also indicate the importance of early intervention (Eikeseth et al., 2002), which is more effective than late surgery.

It is also known that people with autism get more benefit from intensive educational interventions (Lovaas, 1987; McEachin et al., 1993, Harris et al., 1991; Birnbrauer and Leach, 1993; Sheinkopf and Siegel, 1998; Smith et al., 1997; Eikeseth et al., 2002). Also in studies conducted with subjects with autism, Baer, Wolf and Risley (1968), identify ABA as an intervention in order to increase and improve specific behaviors considered socially significant.

After having collected the needs that emerged, it was decided to use the outdoor space behind the center, because it is more isolated than the front, which on the contrary is usually more subject to frequent passage of users, families, and professionals. The rear area is accessible both from an entrance at the back of the center, and directly from the parking area: this means that the interview can be carried out completely outdoors, from the reception to the user's leave. In accordance with the company philosophy in general and for the promotion of green and zero-impact spaces, the structure has been completely built with recycled materials and as eco-sustainable as possible. An important part of the work, therefore, in addition to the design of the structure and its

uses, also consisted in the choice, recovery of materials and their assembly during the construction of the entire structure.

4.2 Design

Once the space was identified, the planimetric planning of the area was carried out using aerial photos (google earth) and cadastral plans for the design of the structure.



Figure 5b: greenhouse (front view). On the right the metal fence under the hedge.

Figure 5a: areal map of site, in the green sections are localized the greenhouse (top right) and the healing garden (lower centre)

The space identified, long and narrow, is delimited on one side directly with a field cultivated with alfalfa (Fig. 5a), on the other side by a metal fence that divides a gravel courtyard – a common space in the center and the houses – from the uncultivated lawn area that borders it. It was decided to create a sort of "greenhouse", essentially formed by a closed tunnel (Fig. 5b).

For the load-bearing structure, it was decided to use iron tubulars and then covered in wood, to guarantee solidity to the structure but using green, recycled and cost-free material as much as possible. For the flooring and the seats, it was chosen to use material of plant origin, in particular laminated fir wood (base), raw fir wood obtained from recycled pallets (some seats) and straw bales (seats).

4.3 Realization

Once the space on which to place the greenhouse was identified, the necessary measures were carried out for the construction of the structure. The ground was completely cleared of weeds, rocks, and other elements that could create problems during the installation phase.

For the supporting structure, eight arches in recycled iron tubing with a diameter of 2 cm were used, hollow inside (Fig. 6). Six were placed side by side to form a tunnel about 4 meters long, two and a half wide and one meter and ninety high, at the highest point of the arch.

The remaining tubulars were cut into two equal parts and three semi-arches were fixed by welding and tying with metal wire at the highest point of the tunnel, to form a semicircle apse. The metal skeleton was placed in the ground by means of special spikes, fixed to the ends of the tubes, which were driven into the ground at a depth of about 35 cm.



Figure 6: metal tubes used in the building of the greenhouse

The metal structure was then covered with long bamboo drums (*Bambosa Multiplex*) fixed by metal wire, used to join the metal arches and complete the roof. The stems, of different sizes in length and diameter, were set still green, with the leaves on (Fig. 7a) The presence of the leaves gave the structure a particular sound which, thanks to the action of the wind, a significant element for auditory stimulation, also gives the overall structure a more natural appearance (Fig. 7b).



Figure 7a: bamboo drums installation on the metallic structure. Figure 7b: particular of bamboo cover with leaves on.

Cover

Another important element consists in the protection from the sun and, more generally, in the need to have a visual screen during the interview, to guarantee the patient and the therapist a comfortable, isolated and safe environment. Since the design phase, it was clear the intention to recreate an area that was literally surrounded by greenery, consequently the final realization of the greenhouse roof is through the use of plants. However, given the time necessary for the plants to grow and completely cover the structure, it seemed useful to study intermediate temporary solutions to give therapists and users the opportunity to immediately use this outdoor space.

During the spring-summer 2020 season, therefore, the structure was temporarily enriched by the placement of beige and blue linen sheets above the dome as a visual screen and partial shelter from the direct sun. At the beginning of the autumn 2020 season the structure was modified with the addition of a transparent plastic tarpaulin suitable for outdoor use, to allow the attendance of the area even in case of light rain or wind.

The plastic cover has also played an important protective function towards the wooden floor and the seats placed above it, during the winter period, especially in case of heavy rain or snow. The plastic sheet was secured to the structure by means of nylon ropes fixed to the ground with metal pegs, to avoid any problems caused mainly by the wind.

Floor

A very useful element for the comfort of therapists and users is the flooring, which is important to allow a certain isolation from the ground during the wettest and most rainy periods and to allow easier positioning of various types of seats. For the realization it was decided to use laminated fir wood planks, about 3 cm high, fixed by chromed steel screws and water-based glues. The rectangular structure was then treated with a water-impregnating paint, to allow its durability, and placed under the metal structure. In the part of the flooring at the entrance of the structure, an inclined axis has been positioned to allow access to any users with mobility difficulties.

Seats

Different types of seats were created to be used in the outdoor spaces, inside the greenhouse during counseling sessions. Initially, rectangular straw bales were used, about 55 cm high and about 80 cm long. The bales were then covered at the top with linen fabric, to make the seat cleaner and more comfortable. (Fig. 8a)

In addition to this type of seating, 3 different wooden seats of different heights have been designed and manufactured using recycled pallets of small size. For the covering, pieces of hard foam rubber covered with a waterproof plastic sheet (pool liner) were used, which was fixed to the wooden base by metal nails. These seats, light and resistant, are designed to resist outside and can be easily moved from one place to another, to make the whole outdoor space usable as a possible interview area. (Fig. 8b)

A third solution chosen is represented by simple wooden logs, with a height between 55 and 65 centimeters. In this case, it was decided to simply place the logs next to the greenhouse, leaving the possibility for users and professionals to position and use them freely (Fig. 8a)



Figure 8a: wooden floor and some seats (at left straw bales and at right wooden logs). Figure 8b: greenhouse with straw bales linen covered (in the centre).

Plants

During spring 2021 the greenhouse was completed with the addition of plant elements. The intervention was carried out on two levels: as regards the roof, climbing plants were planted in correspondence with the structure, to form a green cover; (Fig. 9a) at the same time, plants with an erect posture were placed outside the structure, in correspondence with the perimeter delimited by the metal mesh, to form a hedge.

For the coverage of the greenhouse, 12 plants of Bali jasmine (*Rynchospermum jasminoides*) were used, an evergreen climbing plant with fast growth characterized by a good resistance to the climate of the area, showing white inflorescences particularly pleasing to the eye and with a characteristic scent during the spring-summer period.

The plants, of medium size, were planted directly into the ground, and the stems were intertwined and mildly fixed to the structure by means of biodegradable twine consisting of a metal core and a paper cover, used in agriculture for the mechanical and manual binding of vine plants. (Fig. 9b) Since the material used for tying is very light and fragile, it is necessary to repeat periodically - especially during greater vegetative growth - this operation of accommodation of the stems on the structure allowing the branches to grow freely using the wooden and metal structure as a support.

The space around each plant was then covered with a plastic mulch cloth to counteract the growth of weeds. The area was then covered with gravel and pebbles with the aim of keeping the area cleaner and more well delimited.



Figure 9a: planting of jasmine plants. Figure 9b: accommodation of jasmine branches around the structure.

Parallel to the jasmines, 10 plants of Photinia variety “Red Robin” (*Photinia x fraseri*) were placed in correspondence of the metal network delimiting the border between the rear gravel courtyard and the greenhouse. (Fig.10). Photinia is an evergreen shrub with an erect habit, widely used for the construction of hedges and border trees. In our specific case, it was chosen for its characteristics of resistance to pathogens and drought, good tolerance towards the characteristics of the soil and for its aesthetic characteristics. The leaves of this variety, in fact, large and lanceolate are green in spring-summer and bright red in autumn-winter, creating an aesthetically suggestive chromatic variation.



Figure 10: planting of photinia plants

In addition to the aesthetic element, the choice to plant the photinias is also to form a dense and branched hedge that could act as a mainly visual screen for therapists and users engaged in interviews. To circumscribe the space of the greenhouse, to hide the area suitable for interviews from the sight of passers-by, a shading cloth was placed in correspondence with the metal mesh placed between the green space and the gravel driveway that houses the entrance to the building reserved for homes. (Fig. 11a)

The plastic shading sheet has been placed on the outside of the fence, so that it can be removed when the height of the hedges can guarantee adequate privacy for users and therapists (Fig.11b).



Figure 11a: greenhouse (front view). At the left you can see the shading cloth behind the plants. Figure 11b: greenhouse in winter (front view).

Irrigation and maintenance

To ensure constant irrigation, which is particularly important in the summer, it was decided to install an automatic drip-type irrigation system. The irrigation pipe was placed in correspondence with both jasmine and photinia plants in order to build a unitary network. The irrigation system was then connected to an automatic battery-powered control unit, which opens the water flow for 20 minutes twice a day. In addition to the ordinary actions necessary for the maintenance of the structure, routine operations have also been planned such as cleaning, cutting the grass, eliminating weeds, fertilizing, any treatments against pathogens and pests.

4.4 Task analysis: “irrigation”

In teaching skills to subjects with learning difficulties, in particular in subjects with disorders related to the autism spectrum, the use of applied behavioral analysis (ABA) methodologies (Baer, Wolf and Risley, 1968) may be useful. According to ABA the proposed activities can be broken down into simpler actions, to form a concatenation of easy actions which, when joined together, constitute a complex action (Martin and Pear, 2003).

Some activities among those indicated for the care and maintenance of the greenhouse have been identified and taken into consideration to be used as "skills" to be offered to some users within a of therapy path with the ABA method.

The aim of the experiment is to study the possible positive effects of horticultural therapy on learning a gardening skill compared to a similar skill that does not contain any natural elements. Another important perspective is that to investigate the relevance of the positive effects and the additional benefits gained from outdoor activities compared to the same type of activity performed indoors.

The two most considered skills are "watering" and "restoring pebbles", both of which are still being perfected by the therapists. Below in Table 3 the precise concatenation of simple actions necessary to complete the "watering" skill is shown by way of example.

Table 3 - irrigation task

Instructions	Expected behavior
Let's go outside	The student heads outside
Open the door	The student opens the platform to go out and exits
Close the door	The student goes out and hide the door behind him
Open the gate	The student crosses the courtyard and opens the gate to access the space where the plants are
Take the watering can	The student picks up the watering can
Let's go to the fountain	The student, with the watering can in his hand, heads towards the fountain
We fill the watering can	The student rests the watering can under the tap of the fountain
Open the tap	The student opens the fountain tap and waits for the time it takes to fill the watering can
Close the tap	Student closes fountain tap
Let's go to the greenhouse	The student takes the watering can full and heads to the plants
Water the plants	The student waters the plants
Store the watering can	The student puts the empty watering can in the place where he took it at the beginning
Let's go back to the classroom	The student heads to the building
Open the gate	The student opens the gate to return to the classroom
Close the gate	The student closes the gate behind him
Open the door	The student opens the door and enters the building
Close the door	The student enters the classroom and closes the door behind him

Each of these simple activities can be proposed by therapists during a single or group intervention, to improve learning, enable the acquisition of skills and increase the general levels of self-esteem and independence.

In the case of group interventions, it is also possible to promote contexts of collaboration among users, strengthening social relationships and communication in cases where it is useful to also strengthen these behavioral aspects.

The activity takes place under the constant supervision of one or more professionals who accompany the users throughout the learning session. The proposed sequence of actions is then repeated over time, so as to allow memorization and learning by the user who gradually becomes more and more autonomous in performing the assigned task.

The proposed project has been suspended due to the numerous variations caused by the Covid-19 pandemic and is currently under construction. We expect that within the ad hoc protocols studied by therapists for their patients there will be more and more routines and teaching sessions that may include nature both as a plant material and as a setting. The ever-increasing use of this type of activity based on plants will lead to the developing of other future studies.

4.5 Results and discussion

According to Rodiek, (2002) the results of this study emerged from the opinions of therapists indicate that exposure to the natural environment during subjects can be useful to decrease stress levels in general and improve levels of psychophysical well-being in subjects with mental disorders (Bratman, Hamilson, & Daily, 2012).

The increase in time spent outdoors was found to be positive for the health of therapists and users, as already noted in previous studies, in particular in relation to the decrease in anxiety in general (Mackay and Neill 2010; Lee, Ro, & Lee, 2004) during therapy sessions combined with a greater predisposition of the patient to "open up" during interviews, as already noted by Doucette (2004) during outdoor counseling sessions.

The therapists also indicated that counselling in the natural environment may have had a positive effect in making them and patients perceive a feeling of general well-being and relaxation (Clatworthy et al., 2013), which could be useful in order to obtain better results during the course of therapy.

From the observations of the therapists it also emerged, that conducting outdoor therapy sessions could have been useful to their professional practice (Revell & McLeod, 2016) and also could have had a beneficial effect on the patients' ability to adapt in terms of flexibility and adaptation to the context.

The opinion of the therapists on the possible beneficial effects of the natural environment on the psychophysical well-being of the patients was overall positive and most of them gladly proposed outdoor counseling sessions to their clients.

An interesting perspective, which could be the subject of future studies, is represented by the use of nature-based activities within skill teaching protocols with the ABA method. It may be useful to study the possible benefits of teaching outdoor skills compared to the benefits of teaching similar practices indoors.

Some aspects of the correlation between ABA-based learning and the influence of the natural environment on subjects with learning difficulties should also be clarified, which could be included in future research.

It has also been suggested that it may be useful within future studies to focus on the influence of the external environment in improving the psychological well-being of the patient during counselling, focusing on the type of nature-based experience proposed,

differentiating the most active experiences (such as walk and talk or gardening activities) from those activities that include only the natural environment as a setting for therapy sessions.

5. Healing garden

5.1 Introduction

The relationship between psychophysical well-being and exposure to a natural environment is the subject of growing interest in different disciplines. There are theories that affirm the importance of the action of nature and the natural environment in general towards human health and the psychophysical well-being of individuals (Ulrich, 1993; Kaplan, 1995).

The benefits that nature can bring to health can derive both from passive exposure to a natural environment, such as looking at a landscape or spending time in the middle of a forest, and from active engagement in gardening activities (Kaplan, 1995; Barton, Pretty, 2010).

Some studies have highlighted the possible positive effects on the psychological well-being of subjects with mental diseases that could be related to the natural environment. An example is the reduction of stress (Brown, Barton & Gladwell, 2013), the increase in the ability to adapt to difficult situations and the ability to regulate mood (Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011).

Being in a natural space has also highlighted possible positive effects on the general psychophysical health of subjects suffering from psychopathologies (Hartig et al., 2003; Jordan, 2015), promoting a decrease in pathological symptoms caused by depressive disorder (Barker and Dawson 1999), positively increasing the sense of self-efficacy and self-esteem of subjects (Lewis, 1988), up to be useful in some cases within occupational therapy programs to promote the return to work (Joy, Lee, & Park, 2020).

In the case of children and adolescents, the literature indicates how the inclusion of hortotherapeutic practices within the school curriculum as well as the increase in hours spent in a natural environment can have positive effects on the general well-being of the subjects (Retzlaff-Fürst, 2016; Blair, 2009) and also reducing stress, mental fatigue and improving attention. (Roe & Aspinall, 2011; Kam et al., 2010)

Some studies suggest that the inclusion of gardening pathways can help strengthen the relationship of school-aged children to the concept of science in general (Walicz et al., 2003), and there are many examples in the literature of manuals and guidelines for outdoor gardening activities (Waliczek et al., 2003).

Klemmer suggests that the use of simple gardening practices in schools, proposed in addition to traditional science teaching, is useful for increasing primary school students interest in science subjects, and for enhancing school learning in science topics (Klemmer 2005). This results may indicate the presence of a correlation between external learning of practical skills and the improvement of overall academic performance.



Figure 12: healing garden in summer (front view)

The aim of the project is to study the possible benefits of nature and outdoor spaces on the psychological well-being of users and on the possible positive effects related to learning abilities in children and adolescents with specific disorders.

To promote the use of outdoor spaces during therapy sessions, both in the case of teaching notions and in the case of teaching skills through the use of the Applied Behavioral Analysis method, an equipped outdoor area has been designed and built.

This area, which consists of a healing garden, is mainly studied for the youngest users of the center (4-12 years) but also suitable for hosting after-school lessons for children and adolescents during the warmer months (Fig. 12).

Therapeutic garden

In recent years there has been a significant increase in interest in therapeutic gardens. A therapeutic garden can be generically defined as spaces designed or adapted for the purpose of hosting various types of therapeutic application such as healthcare (hospitals or specialized clinics), rehabilitation care or other therapeutic contexts . The garden is

a natural environment dominated by the presence of plants that has been designed to facilitate user interaction with the healing elements of nature. There are many sub-types of therapeutic gardens including healing gardens, enabling gardens, rehabilitation gardens, and restorative gardens (ATHA, 2012) each designed *ad hoc* to encourage passive or active interaction with the natural environment according to the specific needs of users.

The features of the therapeutic garden were initially developed in 1993 by an American Horticultural Therapy Association (AHTA), and have been more recently enriched by contributions from the American Society of Landscape Architects (ASLA) and other bodies in order to understand the elements for therapeutic landscapes. On this basis, the main characteristics that allow to indicate a space such as therapeutic gardens are (1) the presence of specific and programmed activities such as horticultural therapy paths or classes encouraging gardening routine; (2) improved accessibility, to make the space as accessible as possible by users with different needs; (3) the presence of defined boundaries, for example between areas hosting particular gardening activities and resting and restoration areas; (4) a large number of plants and people/plant interactions, which may be active or passive; (5) benign and supportive condition, so as to offer users conditions of comfort and safety; (6) universal design, so that they can be exploited as pleasant and useful spaces for the widest possible number of users, each with different abilities and specific needs; (7) recognizable placemaking, such as a simple, unified and easily comprehended place (ATHA, 2020).

Based on the information provided by the professionals of the center and the evidence obtained through observation, the choice focused on the creation of a healing garden that can host structured horticultural therapy paths. To this end, a space has been designed and built to accommodate the various activities, through modification of an already present and usable environment .

During the design and construction of the garden, the possible effects of design on psychophysical well-being were considered to arouse predominantly positive emotions (Liu and Liao, 2015). Particular attention has been paid to the specific needs of users with autism spectrum disorder and their needs from a sensory point of view: it is important to adapt the environment as much as possible to the sensory needs of these users to guarantee the best conditions for learning and developing new skills.



Fig. 13: healing garden in fall (front view)

5.2 Design

For the realization of the Healing Garden, the part of the garden in front of the center was identified (Fig.13). The area identified to be used as a healing garden is a square shaped portion of land in which some trees are already planted, including hornbeams (*Carpinus betulus* L.) and downy oaks (*Quercus* spp.) placed mostly as a tree perimeter on the two opposite sides of the garden. The trees are placed on the border with a courtyard area used as a large parking lot and a portion of the garden for the exclusive use of families who live in the part of the farmhouse not occupied by the center.

On the first of these two sides, outside the border fence, lavender bushes (*Lavandula Angustifolia* M.) grow, a vigorous shrub with abundant and fragrant flowers, widely used in gardens also for the odorous characteristics given by the essential oil present in the flowers, as well as for the aesthetic characteristics. On the side facing the road there is a specimen of wisteria (*Wisteria sinensis*), a vigorous climbing plant with deciduous leaves and characteristic purple flowers collected in clusters. This climber grows using as a support the metal fence that encloses the whole garden on three of the four sides. The fourth side, at the entrance of the center, is bordered by a wooden fence about 70 cm high equipped with a small wooden gate, to allow entry into the area.

Within the area, some fixed structures (wooden tunnels) have been maintained, while the plastic structures present, considered dissonant with respect to the ecological and natural idea of the project, have been eliminated. After removing the unusable furnishings, a general cleaning and maintenance of the area was carried out and then the necessary structures were built.

The design phase itself was also used as part of the centre's training and activities. Technicians and users were involved in creating pencil drawings that graphically represented the healing garden concluded. The drawings, made from different perspectives, were useful to give an overview of the project and to actively involve users. Some examples are shown in figures 14,15 and 16.



Figure 14: Healing garden project – draw of areal view.



Figure 15: Healing garden project – draw of seen from behind.



Figure 16: Healing garden project – draw of front view

Model

In the previous perspective, a scale model was also designed and built.

The result obtained (Fig. 17) consists of a model entirely made of recycled material that reproduces the garden complete with the structures it will host, and which will be useful for the outdoor activities identified and studied in the design phase. The model, placed in an accessible and visible area, was used as an object of discussion by users and professionals who were thus more stimulated to provide feedback, advice, and suggestions related to the project for the entire duration of the realization. The realization of the model was very useful for a better and simpler organization of the real space and it proved to be a great stimulus for the younger users, in the choice of outdoor activities.



Figure 17: Healing garden project – model

5.3 Realization

The area chosen to host the garden was already used as an outdoor environment for free play during days of good weather, or as a waiting area for family members and users.

Now, however, its active usability has increased not only in the moment of practice for users and therapists, but also to allow the carrying out of activities generally carried out indoors. The installation, in addition to having an aesthetic value, can be used in the context of the center both during moments of free play, and during specific therapy sessions that include sensory stimulation.

Sensory path

Parallel to the other structures, a mobile sensory path was created entirely consisting of recycled material using worn tires of different types and sizes. After cleaning and painting the tires, 5 of them were placed in a shaded area of the garden, next to each other, to form a small path (Fig.18). Inside each tire, different elements were then added, in order: gravel, sand, water, grass and plastic bottle caps.

Gravel, sand, and bottle caps were placed directly on the ground inside the space delimited by the tire hole, in the case of water, a plastic container was placed inside the

tire to contain the liquid; finally a tire was left empty to allow contact with the grass below. The game has a dual functionality: 1) it can be used both for sensory experimentation , for example by touching with the palms of the hands or the soles of the feet, the different materials present inside the tires; 2) it can be used as a useful tool for proprioception, psychomotor coordination and balance , for example by walking on the edge.

This sensory path can be useful to allow users with intellectual disabilities and with disorders related to the autism spectrum to make sensory experiments of various kinds. Sensory disorders are particularly important and widespread in the case of autism, and autism itself is in some cases referred to as a sensory disorder (Delacato, C., 1974).

Sensory difficulties can affect every area such as hearing, touch, sight, smell, taste, but also the whole proprioceptive sphere (perception of one's body and one's position within the spatial context) and vestibular (regulation of general balance and related motor functions such as walking and coordination).

New evidence related to autism spectrum disorders indicates that it may be useful to review teaching protocols (Rivoltella, 2012; Rossi, 2011; Sibilio, 2014) to include strategies that take more into account the perceptual and sensory disorder, to increase the personal and social self-efficacy of the subjects.



Figure 18: Healing garden. You can see sensory path in the right side and in the center under the tree.

Sensory Game

A sensory structure was installed in an inner area of the garden, widely used by children and teenagers. The structure was built with firewood and forms a square of 3 meters long by three meters wide and 2.50 meters high. The wooden base is secured to the ground by means of iron spikes at a depth of about 50 cm, while the poles are fixed with the use of metal screws and specific glue.

The structure was then enriched with colored ribbons and other elements useful for sensory stimulation: the highest beams were alternately and randomly fixed with colored fabric tapes and long nylon threads with recycled threaded bottle caps of different colors and shapes.

Small silver bells have been added to some transparent nylon threads in order to produce a characteristic sound when moved by the wind. (Fig. 19).



Figure 19: Healing garden, a particular of sensory game.

Overall, the game has been structured to stimulate mainly the sense of sight with the use of ribbons with bright colors and bottle caps of different sizes and colors that appear "suspended in the air". Also the sense of hearing, stimulated by the sound of the bells and the rustle produced by the movement of the long wires hanging from the beams, and the sense of touch are , stimulated by the different consistencies of the objects that form the suspended part of the game (when, for example, during the game the user crosses the structure and is stimulated by the touch of the various elements present in the space of the game) are taken into account.

Green Space

An important part of the time spent outdoors by the users of the center is free play. Following the ABA protocols, it is important to establish break times during educational sessions, in which user and professional can carry out various recreational activities together (chatting, listening to music or playing).

For the younger users, these moments often coincide with free play, individually or in groups. Considering this observation, free areas were therefore provided within the healing garden to accommodate moments of pause.

The garden can also be used as an outdoor environment in which to do interviews or any other type of individual or group activity. For this purpose, various type of mobile elements have been placed that can be used as seats or for other purposes, such as the aforementioned tires, or stools built with recycled wood.

Horticultural wooden tanks

An integral part of the garden is also an area consisting of two small wooden tanks where it is possible to carry out horticultural therapy activities within educational paths designed for younger users with different intellectual difficulties.

The area has two square tanks 50 x 50 cm by 30 cm high, suitable for simple gardening activities, designed mainly for children. (Fig. 20a; 20b). The tanks were made using pre-assembled pine wood modules that were planted in the ground through special wooden spikes to form a square.

Each piece was then fixed to the adjacent one by means of metal screws, to prevent deformation of the tanks after filling or during gardening activities. The tanks were then filled with universal soil, suitable for the cultivation of many different types of plants from flowering plants to horticultural ones.



Figure 20a: Healing garden, particular of wooden tanks (right). Figure 20b: student repotting plants during an horticultural activity.

5.4 Results e discussion

From the evidence of the study it emerged, in accordance with the previous literature, that the use of outdoor spaces can be useful in improving the psychophysical well-being of users, in particular with regard to the management of stress in subjects with mental disorders (Ulrich, 1993; Rodiek, 2002; Bratman, Hamilson, & Daily, 2012). From the observation of the therapists it emerged that the increase in time spent in the space of the healing garden could have been useful to improve the control of emotions (Johnsen & Rydstedt, 2013) and can be useful to increase sociability in autistic subjects (Ford, 2018).

Furthermore, findings suggest that the sensory stimulations present in the natural environment, visual, tactile, auditory and so on, may have played a positive role within the therapy path of autistic subjects, in particular with regard to the specific sensory needs of this type of population (Etherington, 2012).

The observations also indicate a growing preference on the part of students to learn children both with regard to the improvement of attention and with regard to a decrease in work-related fatigue, perceived by both therapists and participants (Ulrich 1993; Roe & Aspinall, 2011).

The healing garden as a whole can host various types of therapeutic activities such as gardening activities, outdoor teaching sessions, counselling and so on. The change of setting and the adaptability of the environment allows therapists to increase the flexibility of therapy sessions, promoting the flexibility and adaptability of patients.

From the general observations of the therapists it emerged that the possibility of conducting outdoor therapy sessions may have been useful to decrease the perception of fatigue and increase concentration during the sessions (Roe & Aspinall, 2011;) making them feel a feeling of ease and comfort. However, specialists do not believe that outdoor practice is qualitatively better than the same practice in an indoor context and suggest the possible usefulness of future investigations in this regard.

The subject of future studies related to outdoor teaching activities could be the study of the benefits that could be obtained from the transfer of therapeutic activities related to the teaching of skills to subjects with autism spectrum disorders (ASD).

The opinions of therapists indicate that within more extensive studies it could be useful to evaluate the benefits of outdoor practices on various levels such as improving the effects of ABA therapy (1), increasing the speed of learning (2) and providing subjects with skills related to activities useful also in work contexts (3).

6. Experience group: "Nature and Emotions"

The use of nature within therapy programs is a well-known and increasing practice. Various disciplines such as Horticultural therapy, ecotherapy and adventure therapy have in common the use of nature-based practices with the aim of increasing human psychophysical well-being.

This pilot study, based on the use of therapeutic practices in an outdoor context, presents an example of group therapy consisting of 5 meetings with the aim of increasing the psychophysical well-being of the participants in particular on an emotional level.

The therapists' experiences showed that therapeutic practices in an outdoor setting may have had a positive effect on participants' emotional perception and may have had a positive influence in lowering overall stress levels.

6.1 Introduction

The benefits that can be obtained through the use of nature-based practices within therapy pathways are many and include in the psychological field an improvement in the management of feelings (Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011), decrease in stress levels as well as promoting a greater ability to adapt to stressful situations (Kam & Siu, 2010).

Evidence shows that the use of hortotherapeutic practices and exposure to a natural environment can be useful to promote an increase in self-esteem and a sense of self-efficacy in subjects with psychopathologies (Lewis, 1988).

Furthermore studies have shown the usefulness of hortotherapeutic practices within rehabilitation programs, in particular nature-based programs have been useful for improve self-efficacy, (Hoffman, Thompson & Cruz 2004) reduced psychopathological symptoms and improve interpersonal relationship (Eum, & Kim, 2016; Cho, Son, & Kim, 2003) in schizophrenic subjects.

The aim of the present pilot study is to study the possible positive effects of nature-based practices within a group psychotherapy program. During the therapy sessions, focused on feelings and emotions, the link between the natural environment and emotional well-being was of particular interest.



Figure 21: Sample of natural environment chosen for the experience.

6.2 Materials

The project consists of a series of five meetings to focus on emotions, starting from the relationship between them and the natural environment. The five meetings, lasting between 50 and 60 minutes, were held monthly, in the external areas of the center (garden, greenhouse, countryside, pond, tree-lined avenue).

Each meeting aims to present a specific emotion starting from its relationship with nature and the natural forms that can represent it. All meetings take place outdoors (Fig.21) and as far as possible in different places, to be able to focus on the importance of the natural environment and the relationship it has with the modulation of emotions. At the end of the cycle each participant is given a container suitable for the growth of a plant complete with seed and substrate, produced step by step at each meeting.

The delivery of the plant to be cared for and maintained during the growth process is combined with an invitation from therapists to take care of the personal results obtained during the cycle of meetings.

Eleven participants took part in this first project, but only 6 completed the complete cycle of proposed meetings and expressed a favorable and positive opinion towards the experience during the moment of discussion scheduled at the end of the last meeting, in terms of appreciation and overall usefulness for their well-being.

Below in table 3 is briefly illustrated the protocol of activity used during each meeting and the issues raised during the discussion. There is also an indication of the materials and supports used for the realization of the permanent product (jar with seed) which will then be delivered to the participants at the end of the meetings.

Table 3 – “Nature and Emotions” Group Experience

Emotion	Experience	Materials
<i>Discomfort, embarrassment</i>	We introduce ourselves and get to know each other, establishing the rules of the group. It proposes a useful activity to say something about oneself using natural elements, such as gluing to a sheet element that they find in the garden, give the composition a title that represents us and explain it to the group. It is proposed to the participants to embrace a tree, to arouse embarrassment and introduce the theme. After sharing their feelings – both those who have agreed to try the experience, and those who have chosen not to – a glass jar is given to everyone and explained that the container represents their life. It is then required to fill it with a quantity of material (in this case gravel) as much as you think that the emotion it represents is present in your life.	<i>Glass and gravel</i> You provide a glass vase or other transparent material, and you are required to add gravel in the amount in which you have the perception that the emotion represented by it is present in the person's life. Each meeting will pay attention to the quantities, to try to bring out the importance of the overall vision. Gravel was chosen as a heavy and consistent element, bulky. Like the heavy feeling of embarrassment and discomfort
<i>Fear, anxiety</i>	The central experience consists of a sensory journey to be pastured (containers filled with various materials such as ice, grass, pinecones, flour, water and flour mixed) and blindfolded. We move in silence and ask the participants to blindfold themselves and then they are accompanied, always blindfolded, inside the path. After the experience we share in a group the feelings of each one and we try to understand what is the emotion that we have tried to arouse, so as to introduce the topic. Each participant is asked how they felt during the experience and concludes with a group reflection. At the end of the reflection, the jars delivered at the first meeting are returned and the participants are asked to add the second natural element, reflecting on how much the emotion that the element represents is present in his life.	<i>Sand</i> The vase is returned to each one with the elements previously inserted inside. We invite you to pay attention to what is already present and then you are asked to add as much material as you think that the corresponding emotion is present in our lives. Sand was chosen because it has the ability to fill even small empty spaces and infiltrate spaces, even where you would not expect, as sometimes happens in some moments when you feel anxiety or fear.

Sadness

The experience consists in representing in a group work, what sadness is. After sharing their feelings and identifying the emotion in broad outlines, each participant had a time to represent on a white tarpaulin placed in the center of the circle, their own representation of sadness. At the end, everyone is asked to illustrate their representation and explain it to the other participants, and then reflect together on the representations of others. We try to focus on sadness starting from personal experience to identify the various nuances of emotion, up to talk about the sadness of others. Group reflection on the meaning of "being in sadness" and the social consequences/habits related to these emotions.

Expanded clay

The vase is returned to each one with the elements previously inserted inside. We invite you to pay attention to what is already present and then you are asked to add as much material as you think that the corresponding emotion is present in our lives. Expanded clay was chosen to symbolize sadness because it is a very bulky but very light material, because it is empty inside. As sadness sometimes seems much harder than it actually is, also taking into account the difficulty we have in "being" in sadness. In the same way, however, sadness is a basic emotion, it serves our life, as well as expanded clay is useful to aerate the roots and prevent them from suffocating.

**Joy,
tranquility**

The experience consists in offering participants a walk in the middle of nature, without revealing the destination, only to discover on arrival a prepared and comfortable place, with a beautiful and pleasant view. In our specific case, a walk-through fields and vineyards was proposed, up to a pond enclosed among the trees. On the shore, in a flat and shady place, a place with blankets and pillows had been prepared to sit and rest and then the participants were served refreshing drinks. During the course the participants are asked to work in pairs, sharing together a positive emotion, a pleasant memory or a special moment (in our case some indications had been written on cards such as "tell a happy memory" that then the participants chose at random). Once arrived at their destination, it is proposed to the participants to share their emotion and to tell the group about the experience during the walk. Group reflection focuses both on the momentary positive emotion and on the positive power of good past experiences.

Dried lavender flowers

The vase is returned to each one with the elements previously inserted inside. We invite you to pay attention to what is already present and then you are asked to add as much material as you think that the corresponding emotion is present in our lives. Lavender flowers were chosen because they are not bulky and because they retain scent even when dried, like the happy memories that are maintained over time. They can also turn into fertile ground for growing something, such as positive experiences

Awareness

Mindfulness experience that focuses on the importance of mindfulness. After the moment of experience together, participants are asked to describe their mood and share

Soil and seeds

The vase is returned to each one with the elements previously

it with the group. Everyone is then given back their own jar, with the various components, and is asked if, in the light of the awareness acquired during the cycle of meetings, they wanted to review the quantities of materials that they have inserted each time. Participants after reflecting on the quantities and proportions of the materials in their jar, can choose to add elements or remove them, sharing their reflections with the group. They are then given the soil, which represents awareness and required to plant a seed. Participants are quickly instructed on how to care for the seed and subsequently the seedling and are asked to take home the jar. As a conclusion, it reflects on the entire cycle of experiences, asking participants to also share suggestions and advice.

inserted inside. We invite you to pay attention to what is already present and then you ask to add as much material as you think that the corresponding emotion is present in our lives and you give the possibility to change the percentages, removing or adding materials. New soil is then delivered and everyone is asked to plant a seed. The soil with the seed was chosen to symbolize how self-awareness and situations can make every situation fertile, regardless of the starting point.

6.3 Results and discussion

The results of the present study indicated that the inclusion of the natural element within the therapy pathway may have been useful to increase the psychological well-being of patients, in particular in relation to mood modulation and more generally inducing an improvement in emotional state (Gonzalez et al., 2011) during group therapy sessions.

In addition, in agreement with previous studies, it has been found that exposure to a natural environment and commitment to hortotherapy activities of various kinds during the experiences may have been useful to participants to cope with moments of stress (Kam, & Siu, 2010), decrease perceived fatigue and increase attention during the experience (Berman et al. 2008; Fjeld et al., 1998; Kaplan & Kaplan, 1989).

Therapists and participants gave an overall positive opinion of the experience, declaring themselves willing to participate in similar experiences in the future. From the opinion of the participants it also emerged how participation in practical activities with the use of plants may have been useful in improving the sense of self-efficacy of the subjects within the group (Eriksson, Westerberg, & Jonsson, 2011).

The therapists observed how the experience in a natural context may have been useful to increase the sense of cohesion of the group and the stimulation of the active participation of the subjects during the sharing phases proposed during the experience.

It may be useful to include in future investigations the possibility of studying the relationship between the use of gardening activities and the perception of the

emotions suggested to participants during the various activity sessions, in order to better understand the effect of nature on the various emotions perceived.

7. General remarks

A growing number of publications are bringing attention back to the ancient practice of horticultural therapy, the use of plants and gardens as a therapy that can benefit people with physical, mental, social or discomfort disabilities. The therapeutic action can be carried out both in an active and passive way, both with practical activities in the green or taking care of a single indoor plant, as well as by walking, resting or carrying outdoors the counselling sessions normally carried out indoors. All these activities have been shown to improve serenity and self-confidence, ability to relate but also strengthen memory and learn with less effort (Hoseinpoor Najjar, A., Foroozandeh, E., & Asadi Gharneh, H. A., 2018)

There are situations of intellectual disabilities of various types and severity, ranging from psychiatric disorder to emotional distress to specific cognitive disorders such as autism that can benefit from this approach. But in modern society, there is also an added discomfort coming from external causes; pressing working or socio-cultural conditions can become a source of stress and / or psycho-physical discomfort that can also affect the sphere of people without disabilities, while facing a particularly difficult period or phase of their life (Slavich, 2016; Michie, 2002). Returning to the silence and serenity of nature, breathing the pure air of a field, natural volatile aromas (which have been seen to have such a strong influence on moods) are all practices capable increase well-being (Kjellgren & Buhrkall, 2010; Damian & Damian, 1995; Fenko & Loock 2014).

Based on the current and updated literature, pilot innovative projects presented in this doctoral thesis have been developed and fine-tuned from scratch in the host facility, which made it possible to develop new solutions in the spaces available.

The results obtained in subjects with intellectual disabilities or with particular needs are promising. The innovative therapeutic approach applied with the technique of "walk and talk" has been perceived positively by the therapists, according to the results of McKinney (2011) and Revell & McLeod (2016). Patients, engaged in a multi-sensory experience, have been proved to be more relaxed, therefore the sessions were more productive. In fact, being more relaxed, in the outdoor setting patients were more susceptible to feedback from the therapists.

For this reason, the preliminary results obtained with the rear greenhouse and front healing garden structures are in the same vein. All the activities developed in those environments, from sowing to taking care of a plant, to simply sit under a wisteria cover under a counselling session, resulted in a better mood of the patients, who were more incline to open up, leading to social interaction and participation. Especially the multi-level sensory garden, created for all kind of user but with an eye above all towards

children with Autism Spectrum Disorder, had great positive effect on social and psychological behaviour of the patients. Colours, sound, fresh air and also birds and butterflies have a great impact on children with ASD (Miller S., 1968; Hadeer et al., 2019). But in general our results show that time in nature helped to be more relaxed and creative, reinforced children's skills, improved balance and coordination, and supported emotional development.

Interventions such as hortotherapy offered the possibility of associating rehabilitation and the enabling of specific cognitive processes, accidental training to learn a series of soft skills that can then prove functional to the insertion or re-insertion of people with psychopathology, often important in an all-round therapy program.

A limitation of the studies presented in this thesis, apart from the forced slowdown due to pandemic, was to use self-report evaluation tools in some cases. Another was the lack of a control group. However, since this is a preliminary study, future studies organized with a larger sample, will allow for a more in-depth investigation in the direction of exporting the results obtained, and to better define the results from the patients, parents, teachers, and therapists point of view.

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