

Hortophilia Hypothesis

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Introduction

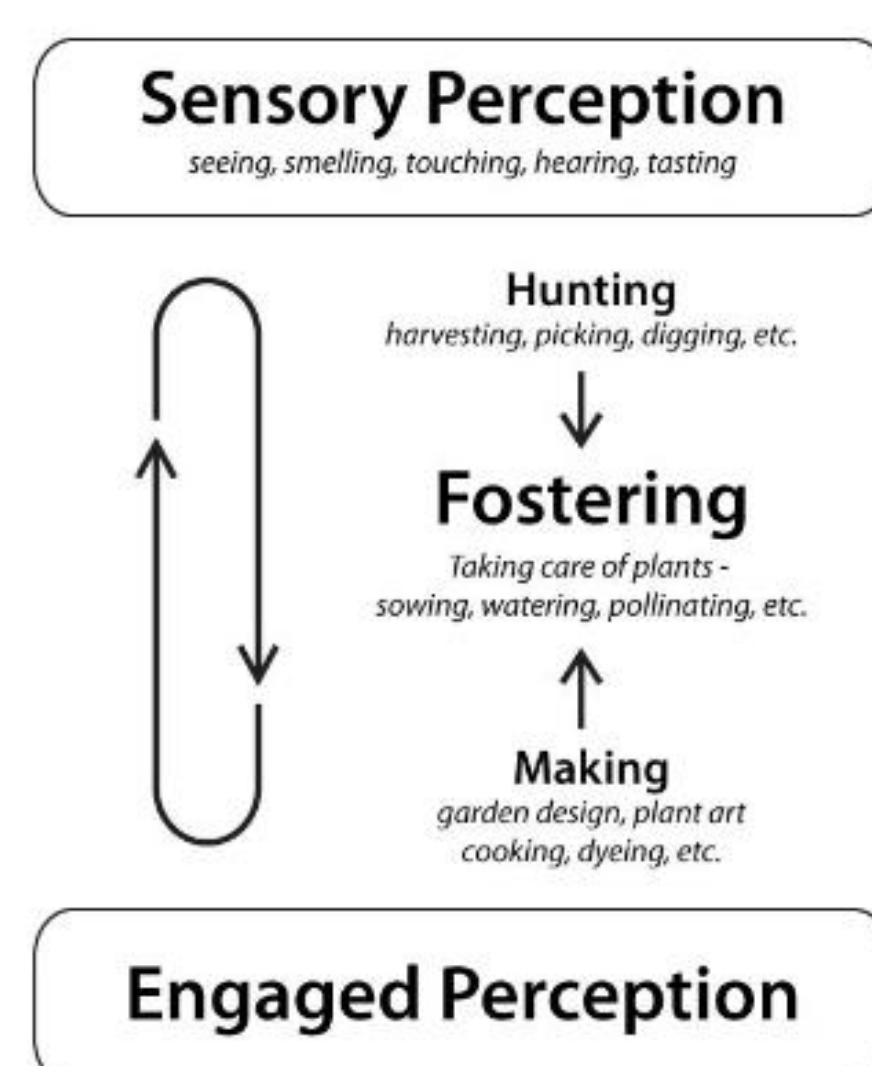
The hortophilia hypothesis proposes that humans go beyond the tenants of E.O. Wilson's biophilia hypothesis (the urge of emotional affiliation of human beings with other forms of life (Wilson, 1993). Hortophilia had been previously presented in an art context (Watts, nd) and then expanded to gardening by Sacks (Sacks, 2019). Sacks used the word hortophilia to describe the deep bond people have with gardens. He described this deep bond as "the desire to interact with nature, to manage and tend a garden, to water a sagging plant, deadhead a geranium" (Flower Power Daily, nd). The artist Charlie Watts expressed Sacks idea of hortophilia in her book through images of women in nature to honor Sacks idea.

We propose that humans have an innate response to the *act* of caring for and being responsible for the life of plants in our gardens and homes. Research over the last 20 years hints strongly that there are significant psychological, physiological, physical, social, cognitive, and spiritual gains to be made by people who participate in the act of gardening, that go beyond the simple presence of the plants or near-by nature as explained by biophilia. This paper seeks to begin a framework for understanding these responses; challenge other researchers to increase focus on the "act of gardening" research; and point toward the application of this information.

Background

Building on E.O. Wilson's Biophilia Hypothesis, Matsuo (1995) focused on the role horticulture has in helping us to live as human beings. As humans, we have a need to foster life and there are only a few limited activities for humans to foster life: horticulture, raising animals, and nurturing children. Matsuo (2008) expanded on this idea in defining and classifying the variety of therapies that use plants, e.g., horticultural therapy, forest therapy, garden therapy, flower therapy, etc. He proposed (see figure below) that an important distinguishing factor in the variety of plant-related therapies, is the client/patients having to foster the plant materials themselves, in other words, *do* horticulture.

In this schematic structure of horticulture, horticulture is the behavior of "fostering" plants that consists of the feedback process of sensory perception and engaged perception, which unites hunting, nurturing, and making actions in the growing process of plants. The vertical feedback loop indicates human actions to plants (Modified after Matsuo, 1998).



But perhaps we should begin with why we garden. Why do tens of millions of Americans engage in some form of gardening-like or plant care leisure activity, representing about 70% of all households in the U.S. (Butterfield, 2009)? Common replies to this question by gardeners include because gardening makes them feel better, relaxed, less stressed, happy, at peace, and proud of meaningful work.

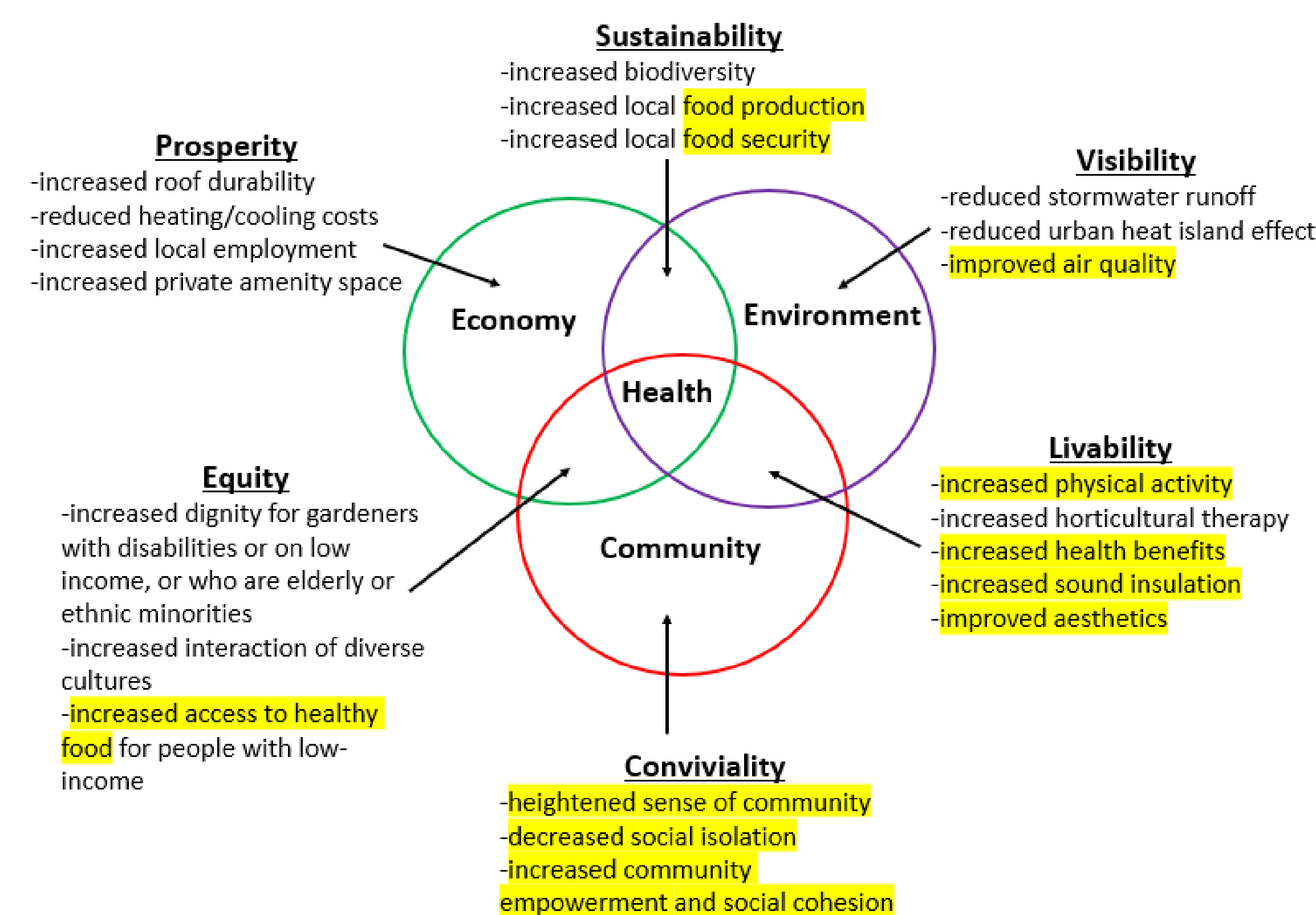
More than 40 years ago, Rachel Kaplan suggested that gardening would be a good starting point to understand the psychological benefits of nature experiences (Kaplan, 1973). She suggested that gardening as a source of "fascination" could prompt "involuntary attention" (where involuntary attention is not under the control of the individual and occurs when the conscious mind shifts focus in response to sudden and important changes in stimulus from the environment, and is less concerned with motives, interests, needs and functional factors) that allows the capacity for "directed attention" to be restored. Directed attention is the voluntary allocation of attention that can be focused selectively in a sustained way to specific information or cognitive processes. Since Kaplan's seminal study (1973), thousands of studies on the therapeutic benefits of gardening, horticultural therapy, and nature experiences have been published.

The following provide examples of research findings across settings and populations as a starting point to begin to build a theory of hortophilia – humans innate response to gardening.

Examples

Urban Agriculture

Urban Agriculture (UA) is part of a local food system where food is produced within an urban area and marketed to consumers within that area (EPA, nd). UA offers many benefits beyond providing food. The figure below summarizes Mazereeuw's (2005) conceptualization of urban agriculture through the many benefits urban agriculture offered. While many of the benefits may have a link to our innate response to caring for plants, of note, for our purposes, are the benefits highlighted.



Community Development

In recent years, significant amounts of research have focused on the value of the presence of plants to communities, such as higher property values (Sander et al., 2010; Siriwardena et al., 2016), crime reduction and prevention (Kuo and Sullivan, 2001a, 2001b; Hino, 2018); and benefits to schoolchildren (Moore, 2003; Faber Taylor and Kuo, 2011; Davvand et al., 2015; Kiser, 2015). Research has connected plant and gardens to sense of place (Strunk and Richardson, 2019) and pride of place (Burke, 2018; Egerer et al., 2018), as well as multiple levels of social connection (Carney et al., 2012; Egerer et al., 2018) and aspects of well-being (Dorn et al., 2018). However, the mere presence of plants may not be enough to generate the elements of community described by McMillan and Chavis (1986). The feeling of "community" emerging from a public or community garden or neighborhood does not result from a one-time view of plants. Rather, it is people's ongoing interactions with the plants through efforts to maintain and care for the plants in the community setting, the reward of relationships among fellow gardeners or sources of food, and the sense of purpose and shared emotional connection through shared history associated with planting a tree or an ornamental bed and watching it grow (Soga et al., 2017; Howarth et al., 2020; Spano et al., 2020). Arguably, the overlap between these horticultural benefits and aspects of community compels further research into the value of the act of gardening within the community perspective, especially given trends toward urbanization.

Elderly

Horticulture and specifically the act of gardening have a role to play in sustaining health as we age. A search of the literature identified 2 meta-analysis, 6 systematic reviews, and 2 reviews, exploring the role of horticultural therapy, therapeutic gardens and horticultural activities with older people. Each of these studies found limited research that met the criteria for the review but reported an apparent indication of positive impacts that justify further research and development in this field. One recommendation of note was "To further improve the use of the existing or planned gardens, an educational programme for staff that also includes skill training is recommended" (Gonzales, et al. 2014). Review of the literature indicates a need for a clear differentiation between nature experience such as walking or sitting in a garden and participation in the act of cultivating plants. The responsibility and rewards of growing plants and sharing them with others adds a dimension to the physical, mental, emotional, social and spiritual benefits of the integration of horticulture into programing with elderly both in community and residential settings. The use of a term "hortophilia" to differentiate the broad concept of "biophilia" from the act of caring for plants may be useful in the development and expansion of the field.

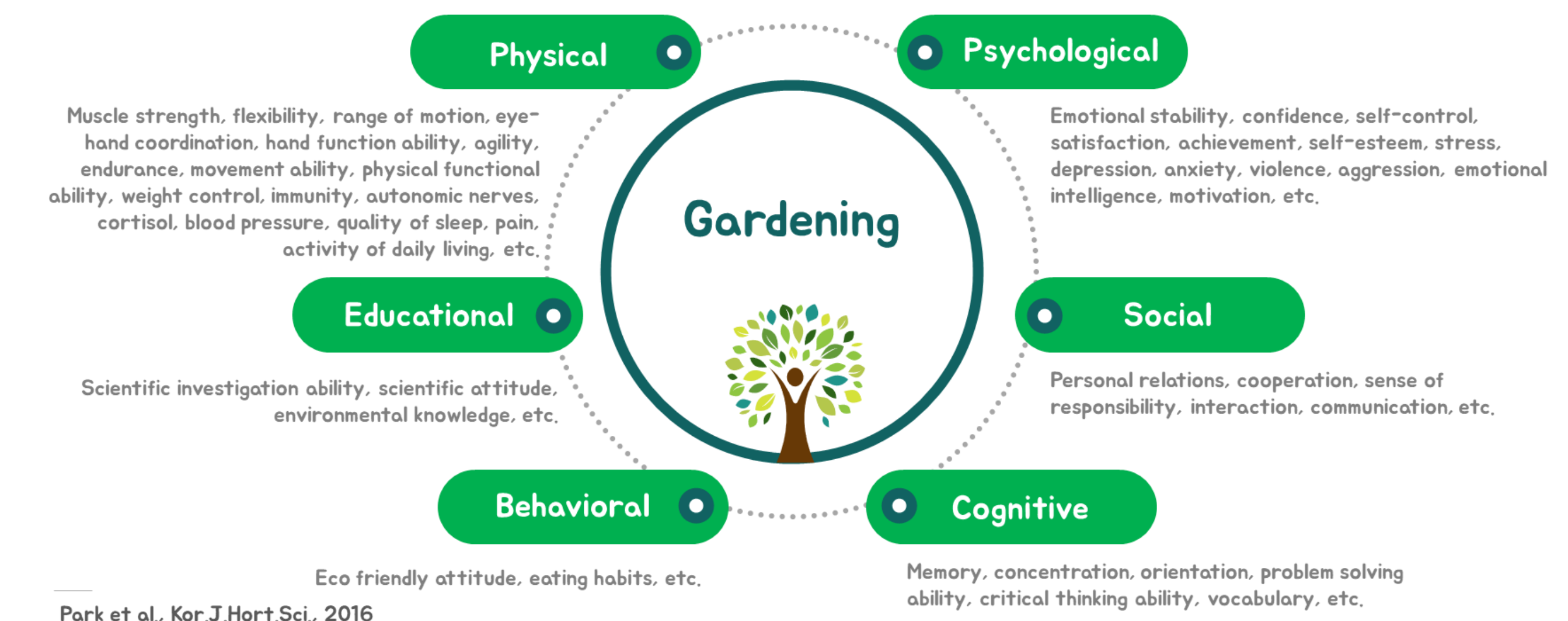
Youth and Gardening

The act of gardening and growing food has been demonstrated as a meaningful way to increase physical activity among youth (Phelps et al., 2010; Rees-Punia et al., 2017; Schmidt, 2017); increase in the number of fruits and vegetables ever eaten, preferences for vegetables, and asking for fruit and vegetables at home (Heim et al., 2009); improve cognitive development and academic performance (Blair, 2009); develop social skills (Lalli, Tennessen, and Lockhart, 1998; Blair, 2009; Ohly et al., 2016), and reduce stress (van Lier et al., 2017). Review of literature also suggests that youth horticulture is effective at reaching across cultural and demographic boundaries (Lalli, Tennessen, and Lockhart, 1998) and engaging the broader community (McGann and Berghage, 2004).

Chawla (1998) posits that adults who have significant and positive exposure to nature as children are more likely to view nature in positive and meaningful ways. Childhood experiences with nature strongly influence adult sensitivities to trees, such as their calming influence (Lohr and Pearson-Mims, 2005). Youth with prior gardening experience at 8 to 10 years of age had significant, positive differences in environmental attitudes and sense of personal control over the environment (locus of control) compared to youth without gardening experience (Aguilar, Waliczek, and Zajicek, 2008).

Horticulture and gardening provide many benefits and are uniquely suited to teach youth about being better citizens and personal health while providing physical exercise, reaching diverse audiences, and linking interdisciplinary topics. Merely having access to gardens (i.e., on school grounds), however, does not appear to be enough. Research indicates that benefits accrue from more than just the act of planting alone (Lekies and Eames-Sheavly, 2007). This merits further exploration of the full gardening experience, including the value of and benefits associated with regular tending and maintaining of plants.

Human Health Responses from Gardening



- Gardening tasks performed by adults are moderate- to high-intensity physical activities (Park et al., 2014).
- Gardening activities improved brain activity and psychological relaxation in children and the elderly (Kim et al., 2021a; Kim et al., 2021b).
- Gardening activities increased the serum tryptophan, kynurenine, and serotonin levels, which are bio-markers for improved cognitive function in elderly people (Park et al., 2020)

Conclusions

Research over the past 40 years clearly demonstrate that nature and gardening offer a myriad of social, emotional, psychological, and physical benefits. Several theories, particularly in the 1970s and 1980s have been proposed to explain our relationship and interaction with nature and plants.

There have been about a dozen research review articles (meta-analysis, systematic reviews, reviews) published in the past 10 years reporting on the effects of gardening, including horticultural therapy, on health. A recent meta-analysis of 22 studies on the health benefits of gardening (health outcomes reported included reductions in depression, anxiety, and body mass index, as well as increases in life satisfaction, quality of life, and sense of community) reported "a significant positive effect of gardening on the health outcomes" (Soga, et al 2016). However, this review, as well most of the others, indicate that research on gardening and horticultural therapy has been primarily observational and subjective, thus we still have much research to do to advance the understanding of the mechanisms for the therapeutic benefits of gardening.

We have just begun to develop the hortophilia hypothesis. It is our intent that by advancing the hortophilia hypothesis it will inspire researchers to develop and test theories that clearly demonstrate the mechanisms of health through gardening just as E.O. Wilson's biophilia hypothesis inspired the development and research on theories such as the Kaplan's Attention Restoration Theory (Kaplan and Kaplan, 1989) and Ulrich's Psycho-evolutionary Theory of Stress Restoration (Ulrich, 1979; 1981; 1983; Ulrich et al., 1991).

References

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