'Digging Deep': how specific forms of green exercise contribute to positive outcomes for individuals, groups, and communities

Ph.D. by Published Works

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Abstract

In recent years there has been considerable reporting of a range of physical and psycho-social benefits derived from 'green exercise', a term which describes a myriad of nature-based activities, including gardening, walking, climbing, and running in natural surroundings. Extant literature has largely focused upon exploring these benefits in respect of specific physical and psycho-social health and wellbeing *outcomes,* including positive impacts upon mood states, enhanced social connectedness, and improvements in recovery rates for patients in physical rehabilitation programmes. However, numerous gaps existed within the research beyond a focus on outcome measures: firstly, articulating the essential influences (mechanisms and processes) potentially driving these impacts. Secondly, insufficient qualitative investigations, particularly longitudinal ones. Third, a lack of innovation in researching green exercise, especially in respect of ethnographic studies. Fourth, and relatedly fifth, a need for more granular focused research upon specific population groups and settings, and utilising specific modes of green exercise - gardening, horticulture, and conservation activity - that had hitherto been under-investigated.

The work consists of findings from six published papers that not only confirm that green exercise promotes positive enhancements to physical and psycho-social health and wellbeing for participants, but also offers possible explanations as to *why and how* these are derived, drawing upon relevant theories and concepts. The investigations were based upon a pragmatic overarching research approach employing ethnography to research participant experiences within four distinct contexts: a purpose-built garden within a medium secure NHS unit; a conservation project in an urban park; a woodland project outside formal mental health service provision; and a corporate health setting. Combined, these small-scale 'case studies' of GE offer important insight into the value of GE for specific groups and contexts and enable the development of a suggested socio-ecological model that emphasises a *'green*

transformative ripple effect' can be achieved delivering benefits not only for individuals, but also at group and community level. The latter is further evidenced through local 'social impact', demonstrating potential for the adoption of green exercise initiatives by practitioners and policymakers involved in social prescribing and community development as part of a more comprehensive health improvement strategy within communities.

Note – Author contributions

With the exception of chapters 3-8, the copyright of this PhD by Publication rests solely with the author. Any quotations from it should be properly acknowledged according to academic conventions.

Data throughout all studies represented herein was primarily collected by the author of this thesis.

Chapters 3-8 consist of journal articles that have been written with research colleagues including: Fiona Cole; Michaela Thomson; Dr Paul Miller; Louise Hulse; and Dr Susan Dewhurst. Their acknowledgements of my contribution to the articles have been confirmed by each author in respect of the requirements of a PhD by an alternative route.

A guide to author contributions for each paper in subsequent chapters is provided here:

Chapter 3: Christie (60%); Dewhurst (20%); Miller (20%).

Chapter 4: Christie (60%); Thomson (20%); Miller (20%).

Chapter 5: Christie (50%); Cole (50%).

Chapter 6: Christie (100%).

Chapter 7: Christie (75%); Miller (20%); Cole (5%).

Chapter 8: Christie (60%); Hulse (20%); Miller (20%).

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Glossary

ART: Attention Restoration Theory

GE: Green Exercise

LD: Learning Disability

NHS: National Health Service

PD: Personality Disorder

SRT: Stress Reduction Theory

PA: Physical Activity

CTN: Connectedness to Nature

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CHAPTER ONE

INTRODUCTION & RATIONALE TO

THE THESIS BY PUBLISHED

WORKS

Introduction

If your purse no longer bulges and you've lost your golden treasure,

If at times you think you're lonely and have hungry grown for pleasure,

Don't sit by your hearth and grumble, don't let mind and spirit harden.

If it's thrills of joy you wish for get to work and plant a garden!

If it's drama that you sigh for, plant a garden and you'll get it

You will know the thrill of battle fighting foes that will beset it

If you long for entertainment and for pageantry most glowing,

Plant a garden and this summer spend your time with green things growing.

If it's comradeship you sight for, learn the fellowship of daisies.

You will come to know your neighbour by the blossoms that he raises;

If you'd get away from boredom and find new delights to look for,

Learn the joy of budding pansies which you've kept a special nook for.

If you ever think of dying and you fear to wake tomorrow

Plant a garden! It will cure you of your melancholy sorrow

Once you've learned to know peonies, petunias, and roses,

You will find every morning some new happiness discloses.

'Plant a Garden' (1940) by Edgar Guest

Edgar Guest's poem provides a useful opening context to this thesis by Published Works, evoking several important elements relating to research findings of the gardening experience over many decades. Guest alludes to benefits such as: therapeutic dividends; pleasure; uplifting experiences; a sense of purpose, achievement, and learning; the simple emotions of

joy, pleasure, satisfaction, and excitement; and, notably, the company of nature. A key

contributory factor is the evident 'soft' fascination with nature engendered through the act of

gardening (Kaplan 1995). Further, the poem hints at the social connections and interactions

that gardening can foster, and concomitant benefits, notably a reduction in contributory ill-

health factors such as social isolation (Howarth et al, 2020; Wakefield et al, 2007). Implicit,

then, in the poem, is an exhortation of the social ('comradeship', reduced 'isolation'), physical

('work', 'fighting') and mental ('cure', 'happiness', 'joy', 'delights') impacts of gardening,

and associated benefits to self-efficacy and personal agency ('learning', 'drama', being

productive and sense of achievement). These are all pertinent outcomes my research

investigated, but also how and why these are facilitated through forms of green exercise[1]

(henceforth GE) - a term used to describe different modes of physical exercise in the presence

of nature, including gardening.

Numerous researchers - including Armstrong (2001); Barton et al (2009); Fieldhouse (2003);

Genter et al (2015); Gladwell et al (2013); Hartig and Marcus (2006); Pretty et al (2007) and

Rappe et al (2008) - have examined, in different ways, the potential of specific forms of GE to

enhance human health and wellbeing. The specific GE modes explored in my investigations

involved gardening, horticultural and conservation activities. Initially, the research sought to

extend knowledge on specific parameters, focusing in the first paper upon physiological

impacts of GE (specifically, conservation work in a publicly owned urban park).

Subsequently, the emphasis shifted to examine physical, but more prominently, psycho-social

wellbeing outcomes, with a range of specific population groups (conservation volunteers;

adults presenting with intellectual disability (ID), personality disorder (PD) and offending

behaviour; volunteers presenting with long-term mental ill-health; and employees), in

different settings (a second paper focused on the urban park; a purpose-built garden in a

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[1] Green exercise can include diverse activities such as cycling, fell running, horse riding, hiking, conservation work, gardening, horticultural activities, and associated 'blue' exercise including open water swimming and kayaking (Pretty et al, 2005). It involves a direct and physical engagement with nature (Rogersen et al, 2015).

medium secure NHS complex; a private woodlands project; and a corporate environment) and with particular modes of GE (horticultural therapy, gardening, conservation). As my research investigations evolved, the focus shifted beyond simply evaluating the specific health and wellbeing *outcomes* - hitherto the core emphasis reported in the GE literature at the time of my studies, typically researched through quantitative means and largely focused on psychological wellbeing impacts (Barton & Pretty, 2010; Park et al, 2011; Wichrowski et al, 2005). Rather, my research gradually built momentum towards illuminating the *mechanisms and processes* underlying these oft reported positive outcomes from engagement in GE, an area previously identified as an important research 'gap' (Groenewegen et al, 2008; Ozer, 2008) and which has merited further investigation to enhance the evidence base (Gascon et al, 2015; Rogersen et al, 2016). Further, it became apparent that specific research methods for investigating experiences of GE, and GE settings, had largely ignored the potential of ethnographic enquiry, and the associated use of qualitative methods including focus groups or interviews, photography, and auto-photography. Therefore, the use of more innovative methodology towards investigating GE outcomes and processes, and the GE experience, could also 'add value' to the field of study.

Initial insight into GE health-related outcomes, and underpinning influences, can be provided with selected participant responses from the research presented in later chapters highlighting the psycho-social wellbeing effects; the connectedness with nature, knowledge acquisition; the feel-good factor; and the sense of pride and achievement promoted by GE engagement:

> *"Because it's a park, trees…a natural environment, because it's a beautiful park, I like working in such an environment, you get results and rewards in terms of what you are achieving, making it better, keeping on top of it, maintaining it, it's good, I enjoy it…physically, mentally, I like the rewards, I like being in the place"*
>
> (Greenfingers Study)

"I just like… watching the trees, and the wind blowing through the trees and… I don't know, it's a really lovely place isn't it. You know, you could spend hours up here, looking over at the view."   (Greenfingers Study)

"Muck-spreading in the garden is to help the flowers, stop them from [dying]…it's old poo (manure) which helps things grow."

(NHS Study)

"…as a gardening group we're trying to make something that's…providing for different levels (of nature), so we'd try and think about birds, about encouraging wildlife, insects, we've talked often about all sorts of plants that can encourage that and also to make it a sensory experience, so other people can just go and sit on the bench, experience the smells, the different textures, and yeah… what we're trying to do is build something that lasts and has interest at different times of the year for people and having that…interesting conversation we had as a group and what came through was people feeling strongly about that, so that was good."

(Corporate Health Study)

"Before I came, because I have been attending here for eighteen months to two years, I was stopping at a friend's house, unemployed, and the walls were closing in. I had had a very turbulent five years, split up with my partner, lost contact with my son and I was finding it difficult, so I came across this rural centre and was motivated to come. After I had attended couple of times, got my hands dirty, [I] decided that… if I'm unemployed, I could do something beneficial here. I made a good bond with some of the lads and lasses who come here and I think it is generally good for me. For example, this morning, I have just been sitting in a flat with no electric for five days and sleeping on the floor with no bed and it is good motivation to get up and out and be in the countryside… I have just suffered a stroke, so following the stroke, it is

important to try and have something that therapeutic, so this is what it offers to me

anyway, at this stage in my life" (Woodlands Study)

This section now considers the key drivers for the published papers, my personal perspective leading into the research, how the research as a whole links to a broader context, and highlights definitions and classifications of types of GE.

The Seven Core Drivers for the Thesis

The imperative for my research came from seven main directions. Firstly, as a sports sector industry professional who for many years had sought to provide opportunities in sport and physical activity for socially excluded groups, including disabled people, who were, and continue to be, manifestly under-represented in terms of physical activity participation (Activity Alliance, 2020; Collins & Kay, 2014). Second, from a personal perspective, as someone who has personally felt the health-related benefits of nature-based activity in respect of a number of sporting pursuits, and from my own labours tackling numerous domestic gardens over the years (recognised with a public award for a wildlife friendly garden). Third, within my latter career in academia, I increasingly became aware of how my previous employment within sport development, and subsequent research within the broad field of health and physical activity (henceforth PA), was becoming more concerned with seeking alternative means of engaging the 'at risk' groups in society (Hartmann, 2001; Kelly, 2011; Long et al, 2002; Theeboom et al, 2010). Thus, this merger of experiences naturally lent to working in a cross-disciplinary way to investigate GE interventions with other domains including occupational health. Fourth, whilst numerous studies were pointing to tangible health outcomes resulting from GE, there remained a lack of explanation for these outcomes, as to *how and why* these came about – essentially, the key mechanisms, and processes (Maas et al, 2008). Fifth, it became apparent that, allied to this concern, there appeared to be a distinct lack of ethnographic, qualitative inquiry (Wakefield et al, 2007). Sixth, relatedly,

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whilst there was a developing literature resource that had investigated a number of GE contexts including care farms, hospitals, educational facilities and community gardens (Allen et al, 2008; Söderback et al, 2004) and specific populations including cardiac and psychiatric patients in rehabilitation settings (Pálsdóttir et al, 2018; Wichrowski *et al*, 2005); mental health service users (Parkinson et al, 2011; Perrins-Margalis, et al, 2000); and older adults in long-term care facilities (Detweiler & Warf, 2005); there was a lack of critical mass in terms of research with specific population groups and settings. Thus, my research sought to investigate four specific population groups to add to the knowledge within the field. Seventh, as a community member who has been proactive in developing and leading numerous local community development activities, it was of interest to me as to how far-reaching specific GE interventions could be, given a few extant studies had suggested positive impacts that extended beyond the individual, but, also, to groups and even whole *communities* (O'Brien et al, 2008). Could my own investigations suggest GE as a suitable social prescribing vehicle, and assist with community development objectives as well as personal health? Having a passion and desire to investigate something of meaning to you is an important facet of qualitative inquiry (Patton, 2014).

Personal perspectives & experiences of GE

So why an interest in this field of study? And why these specific forms of GE - conservation, gardening, and horticulture? As noted above, there were several factors driving my research focus. Moreover, from a personal perspective, I have always been an avid gardener, particularly as a homeowner of over twenty years standing, setting about the challenge of designing a garden and keeping it up to a good standard as a regular concern, with the enthusiastic input of other family members. This has naturally entailed devoted hard graft, an appreciation of how plants grow best (soil conditions, light, positioning), how wildlife can be supported, and the simple, joyful, restorative experience provided by the tranquillity of a garden environment, living as I have (since my first job in London in the early 1990s) in rural

locations with less exposure to negative human influences such as traffic, artificial light, and noise pollution to blight the conditions. My passion for nature extends to being a fully paid-up member of the Royal Society for the Protection of Birds, National Trust, and Butterfly Conservation, and a strong preference for exercising outdoors (trail running, wild swimming, mountain biking, fell running, hiking, windsurfing, archery) with the complementary benefits of the fresh air environment and stimulating views, recognising the motivational qualities these provided compared to indoor fitness settings. All the above constitutes a personal context in which I have typically felt physically, mentally, emotionally, even spiritually uplifted from involvement in nature-based activities and environments, with a sense of rejuvenation and recovery from the mental fatigue associated with work, family, and research commitments. Living proximally to two National Parks provided a perfect context for engaging in GE and a host of experiences that ignited, and continue to ignite, my passion for nature and the positive role I believe it can play in people's lives.

Career influences

Prior to entering academia in 1998, I had a successful career in the sport and fitness industry. This entailed working as both a sport development officer at a facility designed to maximise sport participation by disabled people; and subsequently for several years managing a community sports centre. This employment involved encouraging people of all ages, abilities, and backgrounds to become more physically active, with a core focus on those under-represented groups who have traditionally faced multiple exclusion factors mitigating against participation in sport and/or in wider society (Coalter, 2007; Collins, 2004). There was a pressing need from a public health perspective to use innovative practice to tackle inactivity, as governments of all political shades from the 1990s onwards expressed alarming concern at the rising burden upon the nation's healthcare system (Department of Health, 2010a; Eime et al, 2015; Health Education Authority, 1992; NHS England, 2019b). Globally, inactivity is a primary driver for obesity (World Health Organization, 2020). By 2018, it was estimated that

36% of the adult UK population were overweight, with a further 28% were classified as obese[2]. Whilst my initial focus as a sports professional was to drive up sports participation, it became apparent that the industry needed to broaden the appeal of programmes to people 'at risk' in order to raise PA levels and combat health issues (Besson et al, 2009; Department of Culture, Media & Sport, 2002). In response, I was a pioneer in setting up the first GP Exercise Referral programme in Wales in 1992, with a productive partnership involving nine GP practices referring patients with a variety of medical conditions. At this point, gardening, horticulture, and conservation activities were not on my radar as a PA intervention, but my mind was rapidly opening up to alternatives to engage low participation groups at risk of inactivity and relatable co-morbid conditions.

Continuing the passion for GE into academia

This committed approach to promoting good health through regular exercise continued with me into academia from 1998 onwards. Whilst at my first academic institution, I organised a range of partnership projects - involving the local authority, sports development officers and charities - focused upon the local community, including a weekly keep fit class for adults with mild to moderate learning disability, and a football project for 'youth at risk'. When joining my current institution, I facilitated a variety of specific GE health-related interventions: a health walk group for adults presenting with mental ill-health; corporate health walks for staff; and in 2011, a conservation-themed project in a public park which became a vehicle for two of the published papers, employing a similar concept and ethos to the 'Green Gym' initiative (TCV, 2014). Subsequently, I was involved with a new wellbeing gardening initiative on campus for staff and students which became a research vehicle for my final paper. These various experiences of working with people of all ages, backgrounds, and abilities, provided me with useful insight about how to tailor specific initiatives and programmes to meet

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[2] Where adult Body Mass Index (BMI) is recorded at 30 or higher over (Nuffield Trust, 2020; World Health Organization, 2020)

individual and collective needs, and as such chimed with my natural preference as a sports practitioner and sports scholar for learning 'by doing' – or experiential learning (Dewey, 1938). This, I believe, was a fundamental reason for my philosophical approach to conducting research by means of a pragmatic paradigm, as highlighted later, that emphasises experience as a central component in constructing knowledge and our worldview (Morgan, 2014).

In a personal capacity, I have also led on a variety of GE related initiatives proximal to my own home, including a walking group; organising park runs; launching cycling and archery clubs; outdoor boot camps; and obtaining funding for an outdoor gym. Anecdotally, I perceived that not only was the act of exercising of value to those participating in these varied pursuits, but also the utilisation of natural assets appeared to be an important factor in the enjoyment of those involved[3] (for example, two users of a fitness centre quit their membership to use the outdoor gym as they preferred exercising outdoors, and given this option was free and easily accessible, saved 'carbon footprint' in the process). Participants' enjoyment seemed to extend to the social interactions generated amongst the exercising groups, citing the uplifting qualities of the GE activities, settings, and interactions with nature.

Linkage to community development concepts

My practitioner work is relatable to a number of community development concepts: social and community capital; active citizenship; empowerment; collaboration; equality; and community resilience (Coalter 2007). Theoretically, there are also links here to community psychology, with its historical focus upon action that helps develop communities, either by ('bottom up') or in partnership with the community, or 'done' to the community through 'top-down' regeneration initiatives (Dalton et al, 2001; Somerville, 2011). This suggests an implicit need

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[3] My reflections on this recently published in the industry journal *'Fitness Matters'* – a publication by the Register of Exercise Professionals UK, which is now merging with the lead body for sport and physical activity in the UK, the Chartered Institute for the Management of Sport and Physical Activity, or CIMSPA (*note: see Chapter Eight*)

to understand individual and group behaviour, and the experiences that drive behaviours and actions within a sociocultural context, and how specific initiatives and support mechanisms can bring about positive change, potentially with significant, long-lasting impacts. It also entails understanding how specific actions can contribute to developing a *'healthy community'* (Hubley et al, 2013) - whereby a range of community assets can be utilised for utilitarian purposes (greater good). These assets include human capital in the form of skills, ideas, and creativity (as provided by volunteers); natural greenspace and built facilities (including support facilities for nature-based projects such as cafeteria in urban parks); and social capital (Putnam, 2001), in the forms of networks and opportunities for social interaction, that results through developing community gardens or other similar ventures (Martin et al, 2016; McVey et al, 2018). Researchers can assist this process through the development of socio-ecological models to evaluate community-level outcomes (Okvat & Zautra, 2011), which I will return to in respect of my own research when discussing impacts.

As such, to a large degree my contribution can be seen through the filter of an auto-ethnographic account (Ellingson & Ellis, 2008), whereby my own lived experience as an interventionist practitioner – throughout my career - is utilised to explore and explain the practices and experiences of others through my investigations (Ellis, 2004). This extends to the value I attached to my relationship with the participants (Råheim et al, 2016), central to the tenet of a pragmatic paradigm I adopted as an overarching philosophy across my research outputs (Morgan, 2014). This I believe enabled me to make sense of their world more acutely – and the ways in which the meanings they ascribed to their experiences, behaviours and actions may have some influence upon policy and practice in the field and the wider industry sector/s associated with it (Meyer, 2000). Thus, there was an additional, and fundamental, personal driver to ensure my research offered explicit *'real-world connectedness'*, so that the knowledge derived from the research was potentially transferable to other similar contexts, and even generalisable - despite a lack of consensus and clarity upon what 'rules' apply in generalising qualitative research findings (Guenther & Falk, 2019; Polit & Beck, 2010) – so

perhaps 'inferring' results to other contexts may be a less contentious term (Ritchie & Lewis, 2003). Therefore, my research was inspired not only by personal interest as a regular GE participant, but also from a professional perspective, and as an academic within a multi-disciplinary field of study (sport development).

Wider perspective and drivers for investigating GE's influence upon wellbeing

Beyond the personal perspective, there were numerous drivers for investigating the potential health impacts of specific GE and understanding how and why these outcomes happen. Obesity levels have been steadily rising in England since the 1990s, with 26% of adults classified as obese (Body Mass Index above 30kg/ m²) in 2016/17 (NHS England, 2019b) rising to 28% in 2018 (Nuffield Trust, 2020). 617000 hospital admissions were reported where obesity was a driving factor, up 18% on the year before (NHS England, 2019b). Further, including those who are classified as 'overweight' (BMI of 25kg/m² to 29.9kg/m²), the combined figures for adults rise to around 65% in England (Nuffield Trust, 2020). Concern extends to data suggesting 20% of children at end of primary schooling are classified as obese, with implied future health implications. The UK is ranked 6th in an international league table of adult obesity levels, behind the USA, Mexico, and New Zealand (NHS England, 2019b). Internationally, *'globesity'* is acknowledged as a major contemporary health concern (Lifshitz & Lifshitz, 2014; Wiklund, 2016) – mirrored by declining levels of PA across all age groups (WHO, 2020) - resulting in an increasing prevalence of a range of chronic diseases (Pietiläinen et al, 2008).

Regular PA has also been shown to be useful in ameliorating the symptoms of many chronic diseases (Lear et al, 2017; Penedo & Dahn, 2005). Sedentary lifestyles are associated with atrophy of brain function, a cause of dementia (Pretty et al, 2017). As people are living longer, but not necessarily healthier lives into old age (Office for National Statistics, 2018; Raleigh, 2019), the burden on frontline healthcare services is predicted to increase (Oliver et al, 2014),

providing fresh impetus for finding preventative solutions that appeal to members of the public, and, importantly, that *work* (Kimberlee, 2015). The UK economy takes a significant 'hit' from ill-health: £180bn associated with the seven leading ill-health conditions – all influenced by physical inactivity (Pretty et al, 2017). GE is increasingly mooted as a social prescribing route for GPs to pursue (Tester-Jones et al, 2020). Thus, my research aimed to provide compelling evidence towards the utility of GE in health promotion, as befitting a pragmatist approach to research (discussed further in Chapter 9).

Definitions, and role of gardening, horticulture, and conservation activity

Gardening is one of many activities that can be categorised under the GE umbrella, with varying levels of exercise intensity (Pretty *et al*, 2005). Further distinctions can be provided in respect of residential gardening; and 'community gardening', where groups of citizens work collaboratively (Yotti et al, 2006). Horticulture shares similar features, involving the cultivation of ornamental plants, fruit, and vegetables, but with the purpose of selling the home-grown produce, although not large-scale in terms of production (Shyr & Reily, 2017). It may involve the design, construction, and ongoing maintenance of gardens, and extend its activities to include conservation activities, including landscape restoration and soil management. Conservation is historically defined as protecting the environment from harm; preventing destruction of habitats; and the maintenance or enhancement of ecosystems to promote biodiversity. It is viewed as an active process that stresses our relationship with nature, whether enhancing/improving existing habitats, or establishing new areas for conservation (Sandbrook, 2015).

All three GE modes are viewed as making important contributions politically, socially, culturally, and economically.

Political and economic contributions

Politically, gardening as a low-risk, inclusive form of PA (Thomson, 2018), has demonstrated its contribution to reductions in healthcare costs, through reductions in mental ill-health (Liu et al, 2014) including depression (Clatworthy et al, 2013), prevention of later life susceptibility to disease (Infantino, 2004), and facilitating positive cardiovascular health outcomes for older adults[4] (Park et al, 2011) through both moderate and lower intensity tasks (Bellows et al, 2008), despite downsides including musculo-skeletal injuries (Buck, 2016). More broadly, 'greening' activities are associated with 'avoided' healthcare costs of £1bn, including less hospital admissions for cardio-pulmonary illnesses (Cleveland et al, 2017; Jones et al, 2017). An estimated 28m tonnes of CO^2 was removed from the atmosphere in 2018 through horticultural activity (ONS, 2020). By acting as advocates for nature, gardeners may persuade friends and neighbours to become 'green fingered' and contribute to climate change activism (Williamson et al, 2018). Over 65% of UK adults visit garden centres every year with horticulture and landscaping contributing £24.2billion to UK GDP (Ornamental Horticulture Roundtable Group, 2018) and acting as a significant source of employment[5]. A considerable upsurge in conservation volunteering activity has been noted recently, reportedly driven by society's concerns over the loss of biodiversity and climate change, with volunteer time commitments increasing by 46% between 2000-2017 (Department for Environment, Food and Rural Affairs, 2019). Studies of conservation work have variously demonstrated connectedness with nature and psycho-social benefits, and contributions to community resilience as key motivators, with reciprocity in the acquisition of key skills, and greater social connectedness (Guiney & Oberhauser, 2009; Jacobsen et al, 2012). Further, there is evidence of reduced mortality with frequency of volunteering with older adults (Konrath et al, 2012).

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[4] Specific tasks such as digging, weeding, and raking are commensurate with PA of a moderate level of exercise intensity (1.7–4.5 metabolic equivalents or MET)
[5] Approximately 500000 people employed in full or part-time jobs (many employed at an estimated 2,300 garden centres and nurseries

Social and cultural contributions

The role of a 'gardener' can be considered an 'active experience' (Sommerfield et al, 2010), that encourages social interactions, whether in a small, medium, or large space; on rooftops and balconies in accommodation without a designated garden; and in workplace, hospitality, and public park environments. Almost half of the adult UK population participate in gardening in their spare time, with private gardens representing around a quarter of urban space (Buck, 2016). Several social functions are synonymous with residential-based gardening: the networks fostered through growing plants, harvesting of produce, and enhancement of community aesthetics (Cumbers et al, 2018) – acting as 'bottom up' contributors to community development (Clarke, 2005; Fazal et al, 2020). Whilst distinctions can be made between community gardens and allotment gardening (the latter involving land rented by local authorities for cultivation, the former more of a recreational purpose), they share specific facets: productive places for social interaction, and health promoting activity (Bragg et al, 2014), whilst making good derelict land for the benefit of residents (Pourias et al, 2015). The highest uptake (70%) of gardening activity is amongst the 65-74 year olds, driven by the changes in leisure participation associated with the ageing process: the need for a focus in later life (Scott et al, 2020); a means to prevent social isolation; and an interest that can continue to nurture lifelong learning and reduce the onset of dementia (Hall et al, 2018; Hewitt et al, 2013; Raji et al, 2016). Culturally, gardening is also popular television viewing in the UK, with several millions viewing garden interest and makeover shows. The Chelsea Flower Show, and other regional events, attract thousands of people every year, serving as a platform for knowledge exchange via expert workshops. Communities across the country host their own gardening shows or participate in national initiatives including 'Britain in Bloom'. Community action groups and clubs undertake community projects, litter picking activity and organise educational workshops with knowledgeable guest speakers.

Conceptualising Health

Given the thesis focuses upon 'digging deep' to explore the impacts of specific forms of GE, it would be amiss not to clarify two often interchangeably used terms: 'health' and 'wellbeing'. Whilst related, there are tangible differences, with health as a particular 'state' and wellbeing considered a more emotive 'experience'. Not surprisingly, health is a contested concept. WHO (2006) offer a holistic health definition that accentuates *'a state of complete physical, mental, and social wellbeing'*. This contrasts sharply with an historically medical definition accentuating the avoidance of pain or disease, and its focus on 'complete' has been criticised as inadvertently reinforcing a medicalised definition, given that few people could ever be considered 'completely' healthy, and that the notion of 'complete' health is immeasurable and lacks operational application (Huber et al, 2011). Misselbrook (2014: 582) suggested the WHO definition is *'utopian'* in that it ignores *'the struggles of real people in an imperfect world'*, instead advocating a definition that accentuates a person's functionality.

Further, the inter-relationship of components of health have been recognised: for example, the strong links between one's physical and mental health – even if the precise mechanisms underpinning the links lack clarity and are complex in nature (Hays et al, 1994; Ohrnberger et al, 2017; Woods et al, 2013). Similarly, one's level of social capital (including social connectedness) is considered an important influence upon mental health (Kawachi & Bergman, 2001; Umberson & Montez, 2010), a contemporary issue with the rapid increase in social media (Schønning et al, 2020). McPhie (2019) disputes the tendency to treat physical health as a separate entity to mental health, suggesting health definitions have typically promoted a *'mind-body dualism'* that ignores both the inter-connectedness of one's physical and mental health, and the *'environmental forces such as politics, society, climate and materiality'*. These forces are conceptualised in a model by Whitehead and Dahlgren (1991), highlighting that some health factors are of a non-modifiable nature – age, gender, genetics; whilst others are modifiable, contingent upon personal attitudes, rights, and responsibility, but

also influenced externally through levels of social connectedness, income, political decisions and working conditions, amongst others.
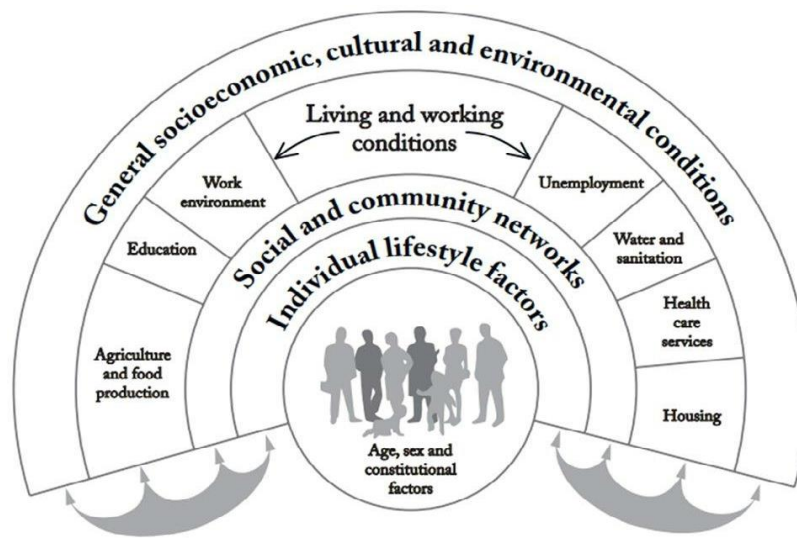
Determinants of Health model (Whitehead & Dahlgren, 1991)

Figure 1: Determinants of Health Model

But how accurate, or even useful, are these differing views? A social constructivist would open up to exploring and acknowledging the multiple views of health that people 'experience'. These experiences, may, for example, include living with long-term health complications, for example someone who manages their long-term heart condition with medication; or who has long-term musculo-skeletal pain managed by a mix of physiotherapy and painkillers. This could imply on the one hand that people with these 'conditions' are not in a state of 'complete physical, mental and social wellbeing' – but equally assumes they are 'unhealthy' and incapacitated which may not be how that individual actually perceives their state of health. They may embrace their condition and learn to live with it (part of 'me'), just as much as someone who grows up with a disabling condition from birth may accept any functional limitation as what makes them unique and individual. Further, as Huber et al (2011) assert, someone experiencing a chronic long-term illness may actually demonstrate high levels of personal autonomy and life satisfaction despite their illness. This suggests a

degree of 'acceptance' and personal 'resilience' that may be important in redefining health in a much more personalised way. For some people, however, 'health' may simply be about getting through to the end of the day.

Given we all face health related issues from time to time – whether a short-term sports injury; an unanticipated cancerous condition perhaps derived from an environmental or behavioural legacy; experiencing a depressive period due to work stress or other causes; or an age-related issue requiring medical interventions such as hip or knee replacement - a definition that emphasises self-management of one's health based upon individual circumstances and influences (social, physical, emotional, environmental) is arguably more realistic in the world we encounter today: where climate change; the risk of new diseases such as Ebola and Covid; lifestyle issues such as inactivity and obesity; and continuing levels of inequality; all present health challenges, whilst some previously dangerous diseases have been ameliorated by advancements in medical science. With people living longer than ever before, but not necessarily in good health (Jivraj et al, 2020), the traditionally accepted definitions of health and wellbeing are arguably outmoded (Oleribe et al., 2018) and fail to recognise the range of influences, temporary and permanent conditions, impacts of ageing and lifestyle behaviours, and new, emergent challenges to health. We might even go as far as to say health can be illusionary (imagining we are in better health than we actually are), or, indeed delusionary (denying the 'truth' about our actual health status): a pertinent example is where self-report measures are typically used in measuring sports participation and levels of physical activity amongst the general public, for example the 'Active Lives' survey used by Sport England (2020). Self-report measures have tended to be found inadequate in that people 'over-report' their levels of physical activity, whereas the true extent of their commitment to being active is much lower than the perception or their memory suggests – for example as noted in a study on obese adolescents by Elliot et al (2014). Similarly, in a systematic review by Prince et al (2020), people underestimated the amount of time spent in a sedentary mode.

Relatedly, such a repackaging of health from an individual perspective links to the subjective notion of 'resilience'. Even this term is contentious, with different perspectives regarding its meaning to individuals, practitioners, and organisations – including that 'resilience' is not always beneficial to people's health: the resilience of an oppressive force, for example, can promote negative consequences for populations (Walsh-Dilley & Wolford, 2015). Resilience can be considered a response to the unexpected or unknown: an obvious contemporary example exemplified by how Governments, health services, communities, families, and individuals coped or struggled with the challenges presented by the Covid-19 pandemic. Indeed, reference to the latter was made in my final research study, when lockdown forced the second tranche of data collection to be conducted virtually with the employees, who reflected on the absence of their collaborative efforts on campus, and the ways they were compensating for these in their own domestic gardens.

Wellbeing

Well-being is typically defined in terms of emphasising how individuals *experience* health - happiness, quality of life and feelings of positivity, life satisfaction, among other factors - suggesting a largely subjective condition accentuating a life that has meaning and purpose (New Economics Foundation, 2012). White (2010) highlights wellbeing as a holistic concept embracing mind, body, and spirit, with an emphasis upon people's strengths rather than deficits or needs; essentially how people feel they are 'doing' (linking to notions of resilience and social connectedness). Hence White promotes the notion of wellbeing through the prism of *'doing well, feeling good'*, suggesting an aspirational (objective) component, as well as *'doing good, feeling well'* – a moralistic, values-based component of wellbeing, that stresses the importance of social interactions. Wellbeing thus is inherently affective and emotive (Fretwell & Greig, 2019), although attempts to define it have failed to reach any consensus. Despite this, it is worth noting that in recent years some national Governments, led by New Zealand and France, have published national indices of wellbeing as a measure of a nation's

wealth, rather than simply viewing wealth in economic (GDP) output terms (Anderson & Mossialos, 2019; ONS, 2020), and thereby have attempted to offer an objective assessment of their own population's wellbeing, using measures such as life expectancy and socio-economic status. However, if we lack clarity over what wellbeing means, then arguably these objective assessments are at best inaccurate, at worst worthless. Indeed, Thomas (2009), in considering tools to evaluate children's wellbeing, suggested that it was an *'intangible, difficult to define and even harder to measure'* concept.

As with health, consensus has built towards the notion of wellbeing as being multi-faceted. In addition to emotive elements such as satisfaction, happiness, pleasure, contentedness, mood state and fulfilment, more recent emphasis has been placed upon functionality in terms of having a purpose in life, mastery, social connections, autonomy, and personal development (Dodge et al, 2012). There has been less emphasis on the *transitory* nature of wellbeing, in that at some point people will experience themselves languishing, whilst at other times they may be flourishing, with consequential impacts on another key ingredient: quality of life.

How 'health and wellbeing' definitions related to my research projects

My own perspective on 'health' and 'wellbeing' is derived from personal experiences and industry initiatives with a range of people of all ages and backgrounds. For example, when meeting the needs of patients with chronic disease referred by local general practitioners for exercise interventions, as well as my own sporting endeavours, it was apparent how important and inter-related 'total fitness' elements such as sleep, rest, relaxation, physical exercise, body image, nutrition, social networks, hydration, confidence are all influences upon physical and mental health status. We could argue our health is constantly in flux: with transitory impacts (flu, muscular strains or sprains, short term mental ill-health, poor sleep) as well as permanent aspects we learn to live with or 'manage' (living with a disability from birth, being diagnosed with cancer, having a longer-term diagnosis of mental ill-health, for example). These can

facilitate both positive and negative outcomes. For many years my chronic hip pain was not only physically painful, but also mentally debilitating in terms of frustration borne of not being able to engage in sport as *'I used to',* as I had to give up running entirely. However, adjusting my mindset to raising my levels of participation in other sports and activities including cycling, hiking, birdwatching, gardening, and archery provided a means of ameliorating the loss of running from my life, and an important influence not just physically but also mentally and from the perspective of social connectedness. After several years, however, even walking became too painful after just a couple of miles, and as the hip became more chronic my sleep patterns were more disrupted. Eventually, a hip operation was a necessary intervention. Since then, I have embraced open water swimming as a new activity choice, which has provided me with a whole new lease of life, and the surgery has meant I can operate functionally again to a comfortable level without pain. Thus, I accepted the need to make exercise adjustments with an ageing body, that circumstances change, but ultimately that in order to live longer in good health, there is a significant level of personal responsibility to managing your life in such a way as to promote longevity and minimise ill-health. All the afore-mentioned definitions of health have something to offer and have relevance – but ultimately it is the subjective view of one's own health status that matters – with the emphasis therefore upon individual experiences of what 'health' means and the circumstances which drive people's beliefs and actions relating to health (positive examples being taking more exercise, trying to lose weight, or reducing alcohol consumption).

The research I conducted with a variety of different groups appeared to draw out many different emphases and perspectives upon health. It was important to me that research participants defined or referred to their own perceptions of their 'health status' in their own terms and in their own way, which reinforced my own value and needs based orientation to a pragmatic paradigm for investigating the impacts of GE upon participants with different needs, motives and preferences, and in different contexts. My own world view will naturally have influenced the interpretation of these testimonies, although I attempted to manage this

process through familiarisation with participants and settings, fieldwork data collection, and member verification of transcriptions and research reports. Ultimately, I could never fully appreciate the perspective of an adult with LD, PD, and offending behaviour and how they conceptualise health; similarly, with the volunteers who had long-term mental ill-health conditions, I could only attempt to understand their health issues and how they manage these. As such, although I sought to get on the inside track with each study, there were caveats as to how far I was truly an 'insider' (more of this later) in terms of my relationship to participants and the context for each study. However, lengthy immersion in each context, building rapport with participants, and obtaining participant feedback on my interpretations of the data to minimise the influence of my own assumptions, all promoted key tenets of effective, qualitative research: credibility, dependability, and confirmability (Lincoln & Guba, 1985). In doing so, the research studies I conducted could, at least, shed light on participants' perspectives, and arguably provide useful insight for practitioners to develop potentially effective GE interventions in supporting people manage their physical and mental health.

Debates regarding defining health and wellbeing, and my own experiences and conceptualisations, were thus helpful in framing my investigations. The first study focused upon investigating the cardiovascular health impacts of conservation work. Pragmatically, the 'best fit' method (Wilson, 2010) – with overtures to a positivist framework – was to use quantitative measurements and analytical tools. This was to the most part driven by the positivist research preferences and experiences of my co-researchers and from an acceptance of positivism being the dominant paradigm in similar physiologically outcome focused research within the field. However, my subsequent studies embraced a desire to investigate subjective experience of specific activities, settings, and social dynamics, acknowledging people will have very unique experiences of GE interventions: what it means to them, how they feel about engagement and their interactions with nature, the activities, and their peers; and provide very individualised perceptions regarding the impact upon their own health status

and goals – whilst, from a pragmatist paradigm perspective, also offering up tangible shared understandings of broader issues and aspects of their engagement.

In summary, terms such as 'health' and 'wellbeing' were best explored from the perspective of 'experience', rejecting singular definitions which may have reinforced privileged, more dominant positions that may benefit specific interests such as the pharmaceutical industry (Huber et al, 2011). Thus, my research, as befitting a pragmatic paradigm, sought to prioritise the subjective experiences of health and wellbeing amongst vulnerable groups, employees, and older adults, contextualised in respect of their engagement in a specific intervention (GE), in specific contexts, and with specific activities.

Nature and nature-based activity

Two other important foci require some discussion at this point, notably how we define nature, and what constitutes 'natural' or 'green' environments in which GE occurs. Ducarme and Couvet (2020) regard nature as an elusive concept, which has defied definition across the centuries. There is a current preoccupation within public discourse for 'nature' to be viewed as something that essentially excludes mankind, or human interference, with the promotion of environmental agendas that demand the protection and nurturing of nature from man's activities including pollution, deforestation, mining, major infrastructure projects, and more. Arguably, however, one cannot remove mankind from being a *part of nature,* in recognising we are a species that evolved just like every other organism, living with dependency on the vagaries of Planet Earth. Notably, Vining et al (2008) suggest that whilst most people regard themselves as 'part of nature', their descriptions of natural environments tend to ignore any human involvement. McPhie and Clarke (2018) question whether we can separate man from nature, and all that man produces - whether aesthetic, material, destructive or technological - or anything else that has man's imprint upon it. They also offer up an engaging critique of

what we mean by *'connecting to nature'* suggesting that this is a romanticised, Westernised, largely white and class-driven concept, that ignores those who may struggle to access *'natural environments'* for social, cultural, and economic reasons, such as ethnic minorities and those on low wages within the UK (Natural England, 2019). Further, they suggest that nature has meant different things to people from ancient times to the current day, with many faces - including utopian (romantic visions of ideal settings such as lakes, green rolling hills and rainbows) and scenic (orderly, neat projections of nature, such as represented in oil paintings), but also, amongst other forms, *the scary* and *even scarier* versions - dark, gloomy, desolate locations; volcanic eruptions, tsunamis, floods; viruses, cancers and excrement, for example - therefore 'nature' can have positive and negative manifestations. Some cultures many even associate personality constructs with nature: for example, the Batek hunter-gathers who live in the rainforests of Malaysia view their 'thunder-god' as portraying both anger (with accompanying disruptive rainfall) and hilarity (rumbling sounds) (Lye, 2004), whilst the ancient Greeks viewed solar eclipses as 'harbingers of doom' (Joho, 2017). I can certainly testify to some 'scary' moments when out fell running in the middle of a thunderstorm; or being 'stalked' by a wild animal on a bushwalk overseas; or being caught in an absolute deluge of rain whilst out hill walking with the light fading fast – these very (if relatively rare) 'extreme' experiences usefully highlight the many dimensions of nature. And even these scary experiences are put into context on reflection as producing a sense of wonderment (in awe of power of nature) and fulfilment ('I got through it!').

Many authors, for example modern biologists and conservationists, typically shy away from a working definition of nature given its complexities, varied meanings, and its vagueness as an idea or concept (Ducarme & Couvet, 2020; Mimiko, 2017). This is highlighted by the multiple meanings provided in the Oxford English Dictionary, including nature as a human characteristic (such as the 'nature of an action', or a character); but also, one which depicts a natural world, whilst accentuating this in terms of fauna and flora, rather than including man

in such a definition. Morton (2007) adopts a blunter position: that either we view everything as nature, or nothing as nature – arguing you cannot have something that is ′nature′ or ′is not′ nature. This criticism extends to those that argue that we *'go into nature'* (for example, to reap the benefits of forest bathing) as if nature is somehow separate from man and man′s influences: thus creating a somewhat convenient, and artificial separation, whilst extolling a position that 'assumes' all sorts of made up 'stuff' - including what constitutes 'living' organisms (an animistic perspective 'everything' is alive), or the view that humans are not part of nature (that nature is replete with 'non-human' animals).

Hartig et al (2014) also recognised the many ways in which researchers have wrestled with defining 'nature' when investigating the relationship people have with it and the beneficial impacts upon human health. But it would, I believe, also be erroneous to ignore the human 'on human' factor within this relationship. For example, some of the influences upon both positive and negative experiences of nature may be related to the social interactions we have as human beings within shared endeavours such as gardening and conservation work (Barton et al, 2012), which are ostensibly aimed at developing aspects of nature such as growing plants and enhancing wildlife habitats (leaving aside what may be perceived as errant behaviours such as the use of pesticides at this point, relevant though they are!). Even this is contentious: we could argue that 'true nature' is a wilderness landscape, untouched by man (despite the fact we could argue nowhere is really untouched, given that pollutants respect no borders); whilst a managed forest is more 'artificial'; and, further down the line, that manicured gardens and urban parks are even less 'natural' and more 'artificial', given the way man shapes such environments to suit specific needs such as recreation (Ducarme & Couvet, 2020). We eventually end up with 'imitation nature' – plastic versions of plants – and yet these are still constituted of materials that originate from Earth′s resources. One exemplar of the human element upon nature in a testimony by a volunteer in the urban park in referencing a planted roadside verge:

"I love seeing all the daffodils along the road every year, but they weren't so good this

year. But every single year I take a picture of them, they're amazing, and I love it

when all the trees come out, as I'm walking down, like over there, and it all looks such

a fresh green. And it makes you feel really good. You can see right across to the Lake

District too, so it is a lovely place up here."

Further, our experiences may be shaped by human influences of a political or cultural nature, such as the norms and values within social groups and cultures (Muers, 2018); and may even be a moderating factor between engagement in urban nature settings and beneficial health outcomes including restorative effects (Shanahan et al, 2015).

This is a clearly complex, philosophical debate, and it is beyond the scope of this thesis to even *attempt* my own definition of nature: a fuller debate for another time, but an important one, nonetheless. However, whilst I acknowledge the conflicting views and arguments that surround any attempt to define it, and that 'mankind' is as 'natural' as anything else on this Earth, here I prefer to focus upon a *contextual* approach to my research based upon the types of settings, who is interacting with these, and why. This helps identify, through my studies, people's relationship with their own perceptions of what constitutes 'nature' and the 'natural world', which almost universally, tended to be with what I will refer to as *'other nature'* - i.e., nature that is 'not human' (even if I am contributing to the aforementioned 'convenient, artificial divide') – plants, birds, animals, soil, streams, lakes, trees, landscapes - whilst also recognising human interference has shaped many opportunities to engage with nature, for example in respect of urban gardens, allotments, parks, forests and agricultural land. A few participant quotes from the four projects may be useful illustration here of this effect:

"I don't think there is another place like this, it's unique, it offers so much. Like today, when we were clearing the weeds, (Alan) said that's a walnut tree – I've never seen a walnut tree, it's so big." (Woodlands Study)

"It's the fresh air and the sort of the fact that things are, it's the organic nature of it, inside buildings everything is square and rectangular and out here everything is just, is just wild and even if it isn't a wild place, the trees are just in different directions and it's a bit different. I don't know, it's the diversity of it, and there are so many different little creatures and birds and the more you look at them the more you realise what an amazing planet we live on" (Greenfingers Study)

"...it (nature) works on so many levels doesn't it, for me on a creative level and artistic level thinking about colour, shape and structure but also that therapeutic feel, the joy of planting something, watching it grow, develop – or not" (Corporate Study)

"I've enjoyed the garden, cleaning the footpath, and watering the plants, and going to let the hens out in the morning... (and) because you are handling plants that are delicate and they need care and things." (NHS Study)

Thus, with the caveat that my own culturally constructed view of nature (expressed previously) was a lens through which I would view others' testimonies, I preferred to let the participants disclose their own perceptions of their relationship with 'nature' and the 'natural world', within their own individualised conceptions of what nature constitutes: what it means to them, the experiences it creates for them, its influence on their lives, how and why they interact with it, and in what way. This resonates with the embracement of pragmatism as my researcher position, discussed later, whereby *experiences* are emphasised as the means of constructing knowledge. Thus, this thesis settled upon exploring the testimonies of

respondents and their own subjective 'take' on nature and their 'nature experiences' with the contexts being investigated, whilst seeking to minimise my own bias when interpreting accounts, through a robust process of member verification of interview transcripts; poster dissemination of results; and reviews of draft papers to promote trustworthiness, further supported by the use of open, non-leading questions.

The concept of 'green care' activities

Whether undertaking gardening, horticulture or conservation work, there is contact with nature (Kaplan, 1973; Wood et al, 2016) – and *with people,* in a bottom up and top-down sense: people who share the same interests, and those in authority who may support GE activities. There has been a burgeoning interest in researching GE health impacts since the 1990s. Developing the utility of GE modes from a therapeutic standpoint, McGeeney (2016) groups a range of activities under the over-arching term 'Green Care' (Table 1). Green care is defined as therapeutic interventions within natural settings that value the *'instinctive connection between nature and health'* (Green Care Coalition, 2016).

Green care sub-group	Key features
Social and therapeutic horticulture	**Gardening**
Animal-assisted interventions	Pets, horses, and other domesticated animals
Care farming	Farm and agricultural work
Environmental conservation	**Conservation work**
Green exercise	**Walking and other physical exercise in nature**
Nature, arts, and crafts	**Art therapy, dry-stone walling, landscaping**
Wilderness therapy	Individual group work in remote locations
Ecotherapy	**Therapy outdoors or contact with wild nature**
Nature therapy including wilderness therapy	Contact with wild nature

Table 1: The 'Green Care' umbrella of activities (adapted from McGeeney, 2016: 31)

Individuals formally referred to these programmes have clearly defined needs and are encouraged by trained practitioners to regularly engage in meaningful nature-based activities to facilitate explicit patient-focused goals, supported by a meticulous person-centred approach designed to maximise benefits and promote safety. Outcomes fostered in this way include enhancements to personal agency, psycho-social wellbeing, and social inclusion (Sempik & Aldridge, 2006; Stewart & Craik, 2007).

Green care interventions, including gardening, have been typically used with vulnerable adults and children as target populations (Ambusaidi et al, 2019; Chiumento et al, 2018; Flagler, 1995; Twill et al, 2011). Other researchers categorise gardening, horticulture, and conservation activity under the GE label (Barton & Pretty, 2010; Loureiro & Veloso, 2017). There can be overlap between the features presented for each and the sub-groups identified, but nonetheless Table 1 demonstrates a means of classifying activities associated with the outdoors from a green care perspective (Haubenhofer et al, 2017). Those modes of green care (highlighted in bold) are most representative of the broad types of GE activity involved in my research. Vulnerable adults were directly associated with two of the research projects (NHS Study, and Woodlands Study); and, whilst not interviewed, youth offenders, and adults with mild learning disability occasionally attended the Greenfingers project. Similarly, again not interviewed, staff or students at risk of mental ill-health could be referred to the campus-based project. Therefore, all four projects were representative of the green care umbrella. Arguably several green care modes can be in play at once: in the Greenfingers study, activities included significant amounts of walking between sites, and to and from the venue; landscaping work; constructing bird boxes; enhancing 'wilder' areas through tree and bulb planting; and developing new flower borders. Therefore, whilst McGeeney's sub-groups suggest discrete forms of green care, the nature of many interventions may involve multiple combinations.

Conceptually, green care is said to perform numerous functions for participants: mental restoration and positive impacts upon attentional capacity (Kaplan, 1993; Ulrich et al, 1991);

reductions in stress (Bowler et al, 2010); enhancements in mood and self-esteem (Barton & Pretty, 2010); promoting calm, contentedness and a sense of security (Hewitt et al, 2013); and social connectedness in the form of being part of a group, social interaction, social inclusion and a sense of belonging (Sempik et al, 2010). Further, it engages people in meaningful activities, with associated impacts upon skill attainment, sense of achievement, enhancements to personal agency and self-esteem (Genter et al, 2015), as noted here in previously unpublished testimonies from my studies:

> *"I've learnt the names of a few birds that I didn't know before, cos there are people who go 'oh a Greenfinch', you know, to me it's always been just a small bird, I had no idea what it was!"* (Woodlands Study)

> *"We've had lots of food out of it [the garden], like potatoes, courgettes, other veg…we've done different tasks, and made our own potato salads"* (NHS Study)

> *"Yeah, it is [rewarding], you can plant a tree and know you'll never see it grow at all, but just knowing you've done that, er… yes it's gratifying. Even though you'll not ever see it grow, or the results intended."* (Greenfingers Study)

Specific forms of green care related to my own studies

Social horticulture (SH) can be differentiated from 'therapeutic horticulture' (TH) and 'horticultural therapy' (HT). SH is akin to a recreational gardening/horticulture, accentuating inclusive community participation, whereby *explicit* therapeutic goals are absent, whilst the fostering of social connectedness is a natural outcome (Yotti et al, 2006). The 'Green Minds' project (Chapter Eight) is representative of SH in practice. In contrast, TH is a process that utilises the growing of plants to facilitate enhancements to individual well-being (American Horticultural Therapy Association, 2012), with engagement facilitated through a trained

leader with the aim of achieving broad, physical, and psycho-social wellbeing goals for participants, through passive or active forms of participation (Gonzalez et al, 2011). This differentiates it from HT, whereby explicit, clinical treatment goals are combined with facilitation by a trained therapist (Brown *et al*, 2011; Gulczyńska, 2017; Howarth et al, 2018). The accent is upon the rehabilitative process as opposed to the end product per se (Burls, 2008). Thus, there is a deliberate and structured use of nature-based activities to promote 'healing' (Sempik, 2008) and to manage specific conditions, such as dementia (Jarrott et al, 2002). Hitherto, both TH and HT programmes have been located in a broad range of residential, healthcare and rehabilitation settings (Nicholas *et al*, 2019). SH, TH and HT activities essentially are designed to connect people with nature, resulting in beneficial cognitive, physical, emotional, and even *spiritual* stimulation (Kamitsis & Francis, 2013; Schauer et al, 2016), and have relevance to the active and passive modes of nature engagement as defined in Table 2.

Mode	Engagement with nature	Examples
Passive	Watching, observing, viewing	Looking out of an office, hospital, or house window onto nature
Passive or Active	Whilst present in a natural setting	Active transportation, including walking or cycling to workplace along 'green' lanes, reading a book in nature, casual play in a public park
Active	Actively participating in nature-based activities	Conservation work, gardening, horticulture, allotment work, cross-country runs, horse-riding, open water swims

Table 2: Engagement with nature – forms and types. Adapted from: Pretty et al (2005)

My studies were focused upon *active, participatory* forms of therapeutic intervention. Whilst some 'downtime' occurred within the study contexts - typically for reflection or having a break - the majority of the time participants were actively occupied. Whatever way we

categorise engagement with the natural world, proponents of GE engagement provide evidence strongly associating such contact with positive contributions to health and wellbeing, citing its potential to restore attention, promote resilience and assist recovery from pre-existing conditions (Loureiro & Veloso, 2017). It is suggested that the special properties of green spaces enable these outcomes, in contrast to urban life, where there can be a profound disconnect and separation of people from nature associated with higher stress levels and reduction in health status (Barton et al, 2009; Kamitsis & Francis, 2013). Even interaction with plants indoors can prove helpful from a wellbeing perspective, although the dividends are considered to be much higher with a more natural setting (Grinde & Patil, 2009; Thompson Coon et al, 2011), and more wide-ranging with physical engagement, given the benefits PA can bestow upon physical and psycho-social health indicators (Saxena et al, 2005; Scully et al, 1998). Five specific settings for GE and their particular focus are depicted in Table 3. A project is typically cited in a specific area (geography based); have a specific focus (issue based); assist with conservation efforts (habitat based); involve specific population groups (group-based); and use a specific activity. These GE modes are not exclusive: my projects combined several characteristics as noted in Table 4.

Type	Characteristics
Geography based	Projects in a specific natural setting
Issue based	Projects addressing specific health issues, or combination of
Habitat based	Projects with a specific habitat to enhance and sustain
Activity based	Initiatives encouraging participation in specific GE
Group based	Projects focused upon a specific target group

Table 3: Settings and characteristics of different GE projects
(Adapted from Pretty et al, 2007: 213)

My research journey began by focusing upon exploring the physical benefits of conservation work, then considered more holistic benefits of a physical and psycho-social nature, involving other GE modes, themselves evaluated for their effectiveness. As investigations progressed,

the qualitative enquiries *'dug deeper'* into identifying the mechanisms and processes
underpinning the reported beneficial outcomes for specific population groups, ostensibly
providing 'thick' small-scale 'case studies' (Tight, 2017) of specific contexts, and participant
experiences, conversant with a pragmatic, ethnographic approach that embraced a variety of
methods and appropriate research rigour (Rashid et al, 2015). A set of case studies are
transferable, and potentially generalisable, strengthening empirical research (Gomm et al,
2009), and providing insights of value to practitioners (Johnson & Waterfield, 2004).

Project	Type as defined by Pretty et al (2007)	Example/s
Greenfingers Project	Geography, habitat, activity, group	Urban Park; conservation theme; 'open access' but included people with health issues, linkage with youth offending groups, and mental health services (SH)
NHS Project	Geography, issue, activity, group	Purpose built garden at NHS medium secure unit; rehabilitation focus for adults presenting with LD, PD, and offending behaviour. Service users and staff collaborative horticultural activity (HT)
Woodlands Project	Geography, habitat, issue, activity, group	Philanthropist owned private woodland in an Area of Outstanding Natural Beauty. Conservation, horticulture, and gardening. Other activities such as dry-stone walling. Mental health focus (TH)
Corporate Project	Geography, habitat, issue, activity, group	Staff and student open access group aimed at enhancing health and wellbeing on a university campus. Primarily gardening. Campus in Bloom competition; development of nature and orienteering trails (SH)

Table 4: Type, setting and therapeutic mode of the research projects

The next section provides an overview of the extant research at the outset of my research
journey, thus iterating an historical timeline to the thesis, and acknowledging the apparent
gaps that existed in the literature. Later the studies undertaken by other researchers during the
course of my own inquiries, and up to the current day, will be considered and reviewed to
promote a critical reflection on the value and contribution my studies have made to the field.

CHAPTER TWO

Extant literature, and identified research 'gaps'

Introduction to this Chapter

A thorough literature review enables an appreciation of how people have pursued their investigations, in its simplest form in terms of either quantitative, qualitative or a mixed methodological approach; or more precisely, through specific deployed methods including questionnaires, established inventories, scientific testing in laboratory conditions, or use of interviews (Maggio et al, 2016). These choices are heavily influenced by a researcher's ontological and epistemological position (Al-Ababneh, 2020; Berryman, 2019), that leads to the development of a research agenda – with a purpose, justification, and workability (Knight, 2002) - and, in my case, the stimulus to devise and conduct the studies. For example, hitherto, most research investigating GE, and, relatedly, connectedness to nature, had been quantitatively oriented, often involving controlled, laboratory experimental studies (Groenewegen et al, 2008; Pretty et al, 2005) that seemed incongruent to researching an outdoor phenomenon. Research was also characterised by inconsistency in results pertaining to wellbeing impacts: for example, whilst nature-based activity has been comprehensively shown to provide positive wellbeing effects, it is less transparent regarding longer term protective effects (Berto, 2014). Fretwell and Greig (2019) more recently argued that even today there remains a lack of clarity over the relationship people have with nature, and by association involvement in GE, that facilitates wellbeing outcomes, and the influence this may have in developing people's pro-environmental behaviours (Nisbet et al, 2009). Further, although the literature to the current day has employed a plethora of methods, there persists a lack of qualitative, and more innovative, investigations to explain wellbeing impacts and underpinning mechanisms (Wakefield et al, 2007). Without this knowledge, we may lack the essential means to devise effective wellbeing interventions utilising nature-based activities, a key outcome for pragmatist driven researchers.

Thus, my thinking extended to the way in which my methods *worked* for the various research investigations, building in specific components, such as familiarisation with the research

settings; use of field notes and photographs; and field-based interviews. Further, I became acutely aware that whilst an increasingly diverse range of GE settings, and population groups involved with GE-related interventions were being researched up to 2011, there was a lack of research involving the specific population groups and settings my research focused upon: older adults, employees, and service users in secure settings, hence promoting a pioneering element to the research. Although more research had emerged regarding the utility of gardening and horticultural activity impacts upon people with long-term mental ill-health conditions, including clinical depression and schizophrenia (Gonzalez et al, 2011; Son et al, 2004; Townsend, 2006), the settings for engaging this important demographic were insufficiently explored or restricted in respect of modes of GE involved. Therefore, more research on specific groups, settings and specific GE modes was required.

Doctoral theses typically include a dedicated chapter regarding historical and contemporary literature of relevance. Here, given that the published papers feature in their own right a focused literature review – each one evolutionary in nature given the numbers of years that have elapsed from the first to the last – it would therefore be unnecessary to provide a detailed review which duplicates that content. Therefore, this chapter includes a short literature review up to and including 2011, when my first project was under way; considers relevant theoretical concepts; and concludes by suggesting the research 'gaps' since I began my investigations.

Theoretical concepts involved in GE

At the opening of my investigations, there was a developing interest in exploring the beneficial impacts of exposure to nature, and, more pertinently, exercising in nature. Interest in green issues including climate change, plastic pollution, and the loss of wildlife habitats/species has increased markedly in the last three decades, mirrored by an expansion in urbanisation, which have been key drivers for more people seeking natural experiences (Okvat & Zautra, 2011). The increasing influence of the green movement in Western society also

promoted an interest in utilising natural environments for health promotion, although this was not a new phenomenon – indeed, many authors cited historical anecdotes about mental health being improved through contact with nature, utilising gardening-related activities, or through the provision of green spaces (Soderback et al, 2004). Extant literature noted a number of theoretical explanations for people's experiences of connecting with nature through GE, and how these may variously contribute to outcomes including stress reduction, restorative attention, and enhancements to personal agency. These included the Biophilia Hypothesis (Wilson, 1984), Attention Restoration Theory, and Stress Recovery Theory as posited by Kaplan (1995) and Ulrich et al (1991) respectively.

Biophilia hypothesis

The biophilia hypothesis is a relatively simple concept: that as humans we have an innate evolutionary affiliation with the natural world, born out of the need as hunter-gatherers to co-exist with the rhythms of nature in order to survive – thus we have a hard-wired connectedness to nature (Kellert & Wilson 1993). This affiliation to nature, and the health and wellbeing benefits it bestows, has been documented across thousands of years, from ancient Egypt through to monastic hospitals across Europe including 19th century 'asylums', with gardens viewed as a valuable source of social interaction (Grinde & Patil, 2009). In the 20th century, healing gardens for wounded military became commonplace as part of the physical and mental rehabilitation process (Atkinson, 2009). The establishment of urban parks was to a large extent a means of enhancing public health during the early part of the last century (Dreher, 1993), and 'greening' of urban environments was shown to have positive impacts upon residents in communities (Duhl, 2002), compared to where little or no greenery exists (Kellert & Wilson, 1993). In contrast, urban environments, dominated by physical infrastructure, can mitigate against our health in terms of associated hazards such as air (Samet, 2007), light (Chepesiuk, 2009), noise pollution (Chepesiuk, 2005), and the dangers of cycling on busy roads (Reynolds et al, 2009). Man's own actions, according to Kellert and

Wilson (1993), may drive a wedge between humans and nature, as we become more urbanised, almost reliant upon materialistic inventions that feel more comfortable to exist with, than what nature might offer. The 'throw-away society' is a manifestation of how some people have become *biophobic* in their behaviours, creating polluted environments that people are motivated to avoid and abandon. Therefore, the environment can work *for* us or *against* us, either promoting personal health and community resilience, or delivering negative consequences including respiratory disease, sleep deprivation, and stress (Hartig et al, 2003).

Attention Restoration Theory (ART) and Stress Reduction Theory (SRT)

Two prominent theories in shaping research investigations are ART and SRT. Both acknowledge an *evolutionary* connection, and so have synergy with the biophilia hypothesis. SRT posits that we are physically and psychologically adapted to natural settings through evolution, whilst ART provides a psycho-functionalist explanation in suggesting humans have a natural predisposition to attending to natural landscapes and settings such as water, plants, and forests associated with supporting our means of survival (Mackay & Neill, 2010). Both theories promote the restorative effects of natural environments (Herzog et al, 2003). ART concerns the restorative needs of humans as a result of mental fatigue resulting from stress, whilst SRT represents an arousal driven theory, whereby humans seek out nature for stress reduction. With ART, immersion in nature (whether active or passive) promotes involuntary 'soft fascination' engagement, relaxing the mind, disengaging fatigued directed attention, and offloading negativity. More positive feelings become prominent, facilitating a sense of escape from the demands of life. In SRT, the lower arousal properties inherent in nature acts to neutralise the heightened arousal levels provoked by factors including our fast-paced urbanised existence. Immersion in nature reportedly delivers a calming effect which reduces stress levels to manageable levels (Mackay & Neill, 2010). Not every natural setting may be perceived as restorative and arousal reducing, however: extreme weather conditions can lead to dangerous, slippery surfaces and disorientate individuals, whilst some wild animals may be

perceived as dangerous. Conversely, some man-made environments may be perceived as restorative, including art galleries, museums, and libraries (Kaplan et al, 1993), however, research suggested the restorative effects are weaker than those promoted through nature (Hartig et al, 2003). Further, more benign, restorative urban environments are apparently only effective if they are perceived as offering 'soft fascination' and are 'comfortable' to engage with (Kaplan, 1993) - thereby not requiring *directed attention* - and if users of these environments have frequent access (Packer & Bond, 2010).

GE: specific population groups and settings

There was noticeable divergence within the research field in terms of the populations and contexts studied. For example, people diagnosed with chronic schizophrenia on an HT programme in Korea (Son et al, 2004); HT for psychiatric patients in Hong Kong (Kam & Siu, 2011) and a children's hospital treating cancer and blood disorders (Fried & Wichrowski, 2008); an allotment project for people presenting with mental ill-health in the UK (Fieldhouse, 2003); conservation projects with volunteer groups (Birch, 2005) and primary school pupils (TCV, 2009); group gardening for mental health service outpatients (Rappe et al, 2008); gardening therapy for older women (Infantino, 2004); HT for older adults with Alzheimer's disease (Gurski, 2004), gardening programmes in residential care homes (Hill & Relf, 1982); HT inpatient cardiopulmonary rehabilitation programme (Wichrowski et al, 2005); HT for children with cerebral palsy (Ackley & Cole, 1987); and gardening activities for children with behavioural disorders (McGinnis, 1989). Therefore, it was a useful 'jumping in' point for contributing to this emergent field of knowledge, initially with a focus on an open access conservation themed project in an urban park, but subsequently with specific population groups and diverse contexts, including a woodland site backing onto a public house within a designated Area of Outstanding Natural Beauty. I hoped these varied foci would offer up new insight into new population groups and contexts to strengthen the evidence base.

A growing interest had developed in promoting accessible nature for therapeutic purposes, whether this involved passively experiencing nature, or active engagement (Hartig & Marcus, 2006; Hartig et al, 1991). Some tentative evidence through largely experimental controlled studies existed for the restorative benefits of plants within built environments including offices (Bringslimark et al, 2007) or simply viewing nature from a window in workplaces (Sop Shin, 2007) and hospital settings (Ulrich, 1984). However, Grinde and Patil (2009) maintained this was a weak substitute for actually *being in* nature. Whilst the visual aesthetics of nature is considered a potential mediating factor behind health improvements in both indoor and outdoor settings, doubts existed over exactly *'what is actually causing the benefits'* (Grinde & Patil, 2009: 2335). One explanation as to why gardening activities can be *'powerful catalysts for positive human development'* (Haller & Kramer, 2006:33) is via the stimulation fostered from the sights, sounds, fragrances, and touch that nature provides, and the positive emotions evoked, assisting people with specific health needs achieve new life perspectives, including development of pro-environmental attitudes and behaviours through nature connectedness.

GE and physical health

It was noteworthy that generally there remained insufficient research regarding the impact of GE on physiological health markers, and even less with specific modes such as gardening (Wilson & Christensen, 2011) or undertaken in natural settings (Pretty et al, 2007). Notable research included a study on 'forest bathing'[6], that produced empirical evidence for lowered resting heart rate, blood pressure, sympathetic nerve activity and concentrations of cortisol, with greater parasympathetic nerve activity, compared to urban environments (Park et al,

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[6] Forest bathing refers to 'bathing' or immersion in forest environments. It is both a physical and psychological form of green exercise with a two-fold purpose: to reduce stress and burnout from the modern world, and to inspire and encourage people to reconnect with nature to help protect the natural world. It involves a slow walk-in nature followed by experiencing a series of 'invitations' to experience a range of natural stimuli including bird song, listening to flowing streams, walking barefoot, meditating beneath a tree and cloud watching (Park et al 2010; National Trust 2020).

2010). Forest bathing has become widespread through the Far East and is viewed as an important contributor to preventative healthcare, for example Ohtsuka et al (1998) found benefits in reduced blood glucose levels in 87 non-insulin-dependent diabetic patients - even though the forest bathing took place infrequently over six years. Meanwhile, O'Brien et al (2008) signalled support for both physical and psycho-social benefits from conservation volunteering. Specifically, in terms of physical health, qualitative data from fieldwork interviews revealed volunteers felt physically fitter, were more active, and more in control of their body weight. Moore et al (2007) discovered that all age groups involved in their volunteer conservation study reported visiting the GP less frequently, with male volunteers reporting the largest dividends.

In respect of HT programmes, Scherder et al (2010) established that dementia patients became more agitated through physical inactivity, and so therapeutic gardening interventions were essential for promoting better health outcomes. This was supported by Connell et al (2007) involving very light touch HT in a study whereby the physical activities dementia patients engaged with in a therapy garden promoted inclusion, attachment to others, and positive affective states such as feelings of comfort. There was also emergent evidence that gardening can act as a facilitator of healthy aging (Ashton-Shaeffer & Constant, 2006). Nonetheless, an imperative remained for further investigations into the physiological outcomes of specific GE modes to strengthen the extant research base.

GE and mental health

Relatedly, there was gathering interest in researching the mental health benefits from active and passive immersion within natural settings, or 'greenspace' environments. Studies generally related to ART, SRT, but also the concept of *flow* (Nakamura & Csikszentmihalyi, 2002) - essentially a state of happiness evoked by complete absorption in a task, with nature-based activities viewed as an ideal mechanism for eliciting this emotive response. Mental

fatigue from excessive voluntary, directed attention is held to lead to stressful responses including irritability, impatience with self/others, decreased task performance, more risk taking and generally weakened functional capability (Kaplan & Kaplan, 1989; Ulrich et al, 1991). Mackay and Neill (2010) found that a wide variety of GE modes had beneficial impacts upon anxiety, although none of those specific modes related to my research.

Notably, gardening, horticulture, and conservation activities within natural settings have previously been cited as useful mediums for restoration with concomitant reductions in stress and anxiety (Birch, 2005; Van den Berg & Custers, 2011). Sop Shin (2007) and Stigsdotter and Grahn (2004) provided evidence for the benefits accruing to employees of simply having an attractive view from an office window onto green and blue natural features. This was equated not only with reduced stress but also reciprocal benefits to the employer of less presenteeism at work, greater productivity, and a happier workforce. de Vries et al (2003) highlighted that access to green environments promoted numerous psychological benefits, including greater levels of happiness, better mood states, enhanced levels of concentration, and reductions in stress, anger, depression, and tension; whilst Cervinka *et al* (2011) claimed greater subjective personal wellbeing was attained from *being in,* and *connected with*, nature. Similarly, Hartig et al (1991) highlighted how gardens and the act of gardening could provide stimulation of all the senses that evoked positive subjective states, including happiness, satisfaction and calming, particularly important for treating mental ill-health conditions. A quantitative study by Morita et al (2007) utilising forest bathing demonstrated advantageous outcomes regarding acute emotional states such as hostility among subjects experiencing chronic stress disorders, suggesting landscapes could have effective therapeutic impacts. Townsend (2006) investigated the impact of engagement in woodland conservation tasks on people presenting with depression, with reported benefits including reductions in GP visits and enhancements to personal agency and security.

Again, the focus on mental health in GE studies was primarily on health *outcomes*.

GE and social health

From a social health perspective, Mummery et al (2008) found a clear association between low social capital and physical inactivity, suggesting interventions that encourage bonding, networking opportunities and regular social interactions can be beneficial for individual health. Parr (2007) demonstrated HT promotes healthier relationships and development of pro-social behaviours and skills that facilitate vulnerable people becoming accepted into, and feeling part of, a community. Similarly, Allen et al (2008) argued that unkempt environments promote negative perceptions of a neighbourhood, potentially mitigating against good health (lack of physical use, unpleasant to look at, encouraging anti-social behaviour), and so beautifying such areas through co-ordinated community efforts encourages civic engagement. In turn, where a lack of trust and cohesion exists within communities, a sense of pride and togetherness can be instilled, with concurrent enhancements to health and wellbeing, through higher levels of self-efficacy and self-esteem.

Groenewegen (2006) noted the therapeutic properties of greenspace in not only providing opportunity for regular PA, but also encouraging social interactions with peers and other community members, with consequential building of social capital (Putnam, 2001). Hence group activities have the potential to act as positive health improvement vehicles. However, in concluding this short section, Mackay and Neill (2010: 244) suggested that in order to fully understand health and wellbeing impacts, differing levels of GE physical intensity, greater diversity in social groups and varied contexts of 'greenness' required investigation. Further, they acknowledged that regular outdoor exercisers may be pre-disposed to a preference for natural environments, and so irregular exercisers – for example, the socially excluded - should be researched, ideally with longitudinal and experiential sampling studies. Therefore, there was an explicit need for more qualitative and quantitative enquiry, and to strengthen the evidence base for the therapeutic role of gardening, horticulture and conservation work with specific groups and settings. Further, adopting an ethnographic approach would plug gaps in

respect of a lack of longitudinal studies, and the under-utilisation of specific methods including field-based interviewing, field notes, photography, and auto-photography.

Identification of research gaps

Knight (2002) highlights the importance of 'finding holes' in the research base to provide a focus for formulating, thinking, and writing about specific research questions. Whilst an increasing number of researchers had attempted to explain the potential benefits of GE with specific populations and contexts, there existed a prominent gap in explaining *how* such outcomes were achieved, as noted in systematic reviews of GE which included gardening (T Bowler et al, 2010; Thompson Coon et al, 2011; and reinforced later by Clatworthy et al, 2013; and Gladwell et al, 2013). A good early example of this concern was raised by Ozer (2008) when assessing the impact of school gardens in the USA. The researcher highlighted not only the lack of studies but also the need to understand the influential factors underpinning the health outcomes at individual, family, school, and community level. This lack of appreciation of the essential processes for beneficial outcomes was an issue highlighted later by Lachowycz and Jones (2013) in proposing a theoretical framework for the moderating and mediating factors involved in health enhancements through access to green spaces. They argued there was a need for more longitudinal research to further clarify these influences, including with older adults – a key approach in my own studies where immersion in contexts ranged from a year to five years, and where one study focused on older adult conservation volunteers making the transition from work to retirement.

Thus, there appeared to be another, explicit, research field gap that merited investigation, driven, as noted earlier, by imperatives from my own personal, industry and academic perspective. In this respect, Okvat and Zautra (2011) and Wakefield et al (2007), amongst others, highlighted numerous studies linking GE (more specifically gardening) to mental wellbeing benefits, but also argued the case for more qualitative research to understand the

relationship people have with nature and the meaning and value it provides. Similarly, the somewhat limited approaches utilised to investigate the effects of GE on health outcomes were noted by Pretty et al (2007), in that the majority of studies typically employed quantitative methodologies. Klassen (2010) also demonstrated the need for qualitative methods when investigating youths and their connections with nature. It was only when they used interviews that a relationship between connectedness to nature and living in rural areas emerged, as quantitative data had failed to highlight any differences between rural and inner-city youths in this relationship. These are again important justifications for my own approach (articulated further in Chapter Nine). Therefore, as my studies evolved, it became apparent that a range of questions required further exploration, including: if we accept that GE produces significant health and wellbeing benefits, then what might the influential processes be? Are these specific to settings, population groups and GE mode? What might prevent GE having a positive impact, and why? Can impacts be far-reaching, extending beyond the individual, and reflecting people's engagement with political, economic, and environmental issues such as climate change? Insight into these questions could then inform the design and ultimately the effectiveness of GE interventions from a health promotion policy and practice perspective.

As noted in Table 5, one major gap in the research involved understanding the mechanisms and processes involved in GE health outcomes. These are referred to (in positivist terms) as the moderators and mediators that enable us to understand the interaction between the influencing factors upon participant behaviour, resultant actions and thus how outcomes are brought about. It is useful to note at this stage that there are subtle differences between these terms: moderators refer to a variable that affects the *strength* between an independent (predictor) variable and a dependent (criterion) variable; whilst mediators refer to the *relationship* between the predictor and criterion variables or a *reason* for an effect (Bennett, 2000).

Research gap	Issue	Approach to resolving the issue
Knowledge	Insufficient physiological studies of GE impacts	GE research involving heart-rate monitoring conducted in the real-life setting (Chapter 3)
Method	Insufficient longitudinal studies within GE research	Study periods of at least one year in duration
Method	Need for more qualitative research investigating GE	Use of a broad ethnographic, interpretive methodological framework (Chapters 4-8), including innovative use of interviews whilst 'doing' activities
Knowledge	Under-researched modes of GE: gardening, horticulture, conservation	Gardening, horticultural therapy, conservation GE modes employed (with some overlap)
Knowledge	Under (or rarely) researched population groups and participation in GE	Medium secure service users; employees; older adult conservation volunteers; long-term mental ill-health self-referrals
Knowledge	Need for investigations into real-life GE settings (as opposed to laboratory or other controlled research designs)	Corporate gardening project; purpose-built garden in a medium secure unit; urban park conservation project; private, philanthropist owned woodland site
Knowledge	Lack of understanding of mediating and moderating influence upon GE outcomes	Development of a socio-ecological schematisation derived from the thematic mapping provided by research projects

Table 5: Typology of research gaps in the GE field, nature of the gaps, and subsequent approach to contributing to the field

The under-explored: influences (mediators and moderators) upon GE outcomes

Whilst quantitative research has historically identified mediators and moderators, qualitative research can also provide insight into these factors, for example using focus groups or

interviews as in my research studies (Bate et al, 2012; Lucksted et al, 2000; Queen et al, 2016; Sormanti et al, 2001; Veen et al, 2021). Lin (1998) suggests positivists are best placed to identify causal *relationships* (the 'what'), whilst interpretivists can expose causal *mechanisms* (the 'why'). In respect of a GE scenario, a potential mediating influence could be as a result of the restorative properties of a park that links participation in a social gardening group within that setting to reductions in depression experienced by individuals within that group. Meanwhile, the amount of time spent in the park may be a potential moderating factor – less time in the park, or less frequent visits, or problems with accessing the group (transport, weather, park closures) may interfere with the potential benefit of the group to the individual's reductions in depression. Therefore, moderating factors are *contextual* in nature, and can increase, decrease, or even reverse the relationship between the independent and dependent variables. This could occur, for example, by the quality and extent of the social support offered by the gardening group (Gerber et al, 2017), and the effectiveness of its leadership, key elements noted by Englefield et al (2019) in respect of conservation work. Someone struggling with depression may have better outcomes as a result of the encouragement, rapport, and bonding experienced from being part of a garden club, as opposed to someone who is not as integrated within the group or lacks the social skills to integrate (Fakoya et al, 2020; Lodder et al, 2016;).

Previewing the studies presented in subsequent chapters, influences akin to moderating factors typically involved the design of the projects that participants engaged with, and their accessibility, including levels of empowerment; routine; time available to attend; proximity to home; extent of social support; and quality of leadership. Influences that were representative of potential mediators largely focused upon the experience of 'being' in and connecting with nature, and the general restorative effects that took them 'away' from their personal problems and 'to' something regarded as special, meaningful, and uplifting. Further, there was great emphasis upon the social interactions, with associated feelings of connectedness, forging new friendships, teamwork, and the camaraderie of group activity (Semedo et al, 2019). Enhanced

personal agency was also a strong theme across the different social contexts (Slater, 2001). These factors lent themselves directly to motives for engagement, which helped to facilitate beneficial health outcomes, which in turn created a reciprocal effect of increased motivation to engage, further leading to productive outcomes.

An update on the literature since 2011 features in Chapter Ten, as I draw together the key strands of my research findings, compare and contrast these towards developments in the field, and emphasise the academic and social impact my studies have contributed towards.

The next chapters include the six published papers.

CHAPTER THREE

Christie, M., Dewhurst, S., & Miller, P.K. (2015).

Green exercise and cardiovascular health: quantitative evidence

from a community conservation intervention in the UK.

European Scientific Journal, 10(5), 21-35

Link:

https://eujournal.org/index.php/esj/article/view/6250

CHAPTER FOUR

Christie, M., Thomson, M., & Miller, P.K. (2016). Personality disorder and intellectual disability: the impacts of horticultural therapy within a medium-secure unit. *Journal of Therapeutic Horticulture, 26*(1), 3-17

Link:

https://www.jstor.org/stable/24865273?seq=1

CHAPTER FIVE

Christie, M., & Cole, F. (2016). The impact of green exercise on volunteer's mental health and wellbeing: findings from a community project in a woodland setting. *Journal of Therapeutic Horticulture, 26*(2), 3-15)

Link:

https://www.jstor.org/stable/26111989?seq=1

CHAPTER SIX

Christie, M. (2017). Benefit Nature, Benefit Self, and Benefit Others: Older Adults and Their Volunteer Experiences of Engagement in a Conservation Themed Urban Park. *Journal of Therapeutic Horticulture, 27*(2), 19-38

Link:

https://www.jstor.org/stable/26598031?seq=1

CHAPTER SEVEN

Christie, M., Cole, F. & Miller, P.K. (2020). A piloted think aloud method within an investigation of the impacts of a therapeutic green exercise project for people recovering from mental ill-health: reflections on ethnographic utility. *Journal of Therapeutic Horticulture, 30*(1) 20-34.

Link:

CHAPTER EIGHT

Christie, M., Hulse, L. & Miller, P.K. (2020). Time for a (gardening) break: investigating a specific green exercise initiative for staff health and wellbeing in a corporate environment. *Journal of Therapeutic Horticulture, 30*(1), 1-15.

Link:

http://insight.cumbria.ac.uk/id/eprint/5644/

CHAPTER NINE

Reflections on approach to the research

using a pragmatist paradigm

Chapter Introduction

The purpose of this chapter is to provide a rationale for the adoption of methodology that served to promote robust and rigorous research that could contribute to the gaps in the field noted earlier. Further, it seeks to describe the personal trajectory in respect of my evolving research approach that characterised the adoption of specific methodological tools at various points in the research timelines. The review of extant literature at the initiation of my first project presented in Chapter Two serves a useful purpose in benchmarking my subsequent research, and the outline of my personal, practitioner and academic drivers for the research (the why do it?) has been considered in Chapter One. However, an important part of any contribution to the field should include an appreciation of methodology and methods, as the deliberate adoption of specific forms of enquiry, underpinned by my developing philosophical stance, clearly has a major influence upon both the conceptualisation of problems, identification of core issues pursued within the research agenda, and the approach to data collection and subsequent analysis (Larkin et al, 2019; Ponterotto, 2005).

Thus, this chapter reflects upon my journey as an early years' researcher and the design, delivery, and evaluation of the six studies featured earlier. I also reflect upon the influences upon the research derived from the perspective of an experienced sports development practitioner – still involved in community development outside of my academic work - and as a passionate exponent of green exercise in a personal capacity. I discuss my position as a naturally inclined pragmatist and how this determined the overall research approach with each successive study – despite my lack of awareness of pragmatism as an established paradigm at the outset - and the opportunities and challenges involved. I propose that all of these elements combined effectively to enhance both the research outputs but also the academic and social contribution, as explored further in the final chapter.

A Question of Ontology and Epistemology

Mason (2002) argues that being conversant with one's own ontological and epistemological position prior to initiating research enquiries assists in the process of identifying relevant methodological tools to conduct insightful and meaningful studies, thus promoting research that is 'fit for purpose' (Knight, 2002: 33). My inexperience as a researcher was perhaps exposed at the outset by a lack of clarity over my own ontological and epistemological perspective. Such inexperience meant I was unable to consciously throw my weight behind declaring myself to be either a positivist or interpretivist. Initially, I felt somewhat constrained by a perception that conventional research was dominated by positivist ontologies that typically favoured quantitative techniques (Chalofsky, 1996; Henderson, 2011), given the long tradition of positivist research and the value accorded to it (Maxwell, 2020; Mosselson, 2010). Increasingly, however, such hegemony has been challenged by researchers highlighting the value of qualitative enquiry in providing deeper insight into, and thick description of, specific issues and contexts through investigating individual lived experiences and group cultures (Trainor & Graue, 2012; Williams & Morrow, 2009). Essentially, quantitatively focused experimental methods were challenged as holding scant value when researching more complex social issues and phenomena, in ignoring the contextual element from understanding human behaviours.

Initially, whilst trying to make sense of the claims of the competing paradigms of positivism and interpretivism, I needed experienced colleagues to act as influential advisors and co-researchers. This supportive academic network helped me to navigate the wide body of relevant, cross-disciplinary literature that informed my project work, but also promoted confidence in developing my own skills set in relation to the conduct of studies that, in turn, arguably facilitated appropriate research rigour. This considered and pragmatic approach to my research was congruent with the small-scale studies I embarked upon, with a focus upon specific populations, settings, and GE modes (Carey, 2013). Further, my instincts as a

practitioner, combined with my current status as an academic, meant I could ostensibly bridge two distinct worlds: practice and research. This was arguably a unique and somewhat privileged position, given my ethnographically framed studies could potentially enhance the accessibility of the research to practitioners, and its applicability and transferability to real world contexts.

However, from the start of my research journey, I displayed a strong preference, driven by my interventionist roles in industry, for adopting a pragmatic, real-world approach to the conduct of the research, ensuring methodology was appropriately tailored in each case to the specific study context (for overview, see Appendix One). Looking back with the benefit of ten years' hindsight, I believe that I aligned from the outset with a pragmatic paradigm, which contends that the nature of knowledge acquisition is not the preserve of any one established tradition (Wilson, 2010): rather, it promotes the view of knowledge as a process which is open to revision and which develops improvements to our understandings and, importantly, to practice (Kaushik & Walsh, 2019). As such it values both the social world (constructivism) and natural world (positivism/post-positivism), whilst being more pre-occupied with approach and method than any single philosophy (Morgan, 2014). Therefore, there is no necessary tension between adopting approaches akin to one philosophy (as in the first Greenfingers study focused on heart rate monitoring) and a combination of interpretivism, phenomenology, constructivism, constructionism, or naturalistic enquiry (as in the other studies involving largely qualitative methods).

Pragmatism emphasises the need to evaluate the processes, rather than simply the outcomes, of specific interventions – a prominent element of my research studies and one that filled a considerable research gap (as identified earlier). It may utilise the contribution of both quantitative and qualitative methods for knowledge advancement (Pansiri, 2005), or mixed methods, and focuses first on the optimal approach to researching a specific issue, problem, or phenomena, using pre-existing thoughts (in my case, from my practice background) to drive

the research focus, based upon specific problematic issues of interest (how GE can benefit

people's wellbeing, and the processes that underpin any enhancements). In this respect, it

allows room for manoeuvre in choice of methods and methodology (Kaushik & Walsh, 2019),

reflected in my choice of a more objective, quantitative approach to the first study, and the

subsequent choice of interviews, focus groups, photography, auto-photography, field notes,

reflective diaries, and observations within subsequent studies to construct knowledge. Further,

it allows for the incorporation and consideration of eclectic, and potentially conflicting

philosophies, theories, concepts, and perspectives (Kaushik & Walsh, 2019), as noted above.

Hence, my first foray into GE investigations was to a large degree influenced by a concern

that with a relatively under-researched subject, there was a need to begin with quantifying the

impacts on health and wellbeing, and an obvious place to start, it seemed, given my sporting

background, was with physical health indicators. Therefore, this first paper utilised heart-rate

monitoring of over forty volunteers in three distinct age groups. However, I was determined to

make the data collection 'real world', with explicit overtures therefore to ethnographic

enquiry, by conducting data collection 'in the field' as people engaged in the conservation

tasks. This is in contrast to many prior studies that had investigated nature-based impacts

through tightly controlled experimental research designs (Groenewegen et al, 2008; Howarth

et al, 2020), including viewing natural features through a window (Ulrich, 1984), looking at

pictures of nature (Berto, 2005), videos of nature (Laumann et al, 2003), or exposure to floral

and foliage displays indoors (Adachi et al, 2000; Park et al, 2004). Incorporating quantitative

methodology within ethnographic study may at first appear incongruous. However,

ethnographic research is not beholden to qualitative enquiry alone (Krane & Baird, 2005;

Taber, 2010). Rather, the focus upon quantitative data collection was later found to be

complementary in triangulating the reported physical health benefits of the volunteers through

qualitative data in the study in Chapter Six, and thus represented a means of bridging an

essentially positivist design with the interpretivist approach in the follow-up study involving

older adults. Drawing upon both disciplines and their preferred methods (quantitative and qualitative) is a key feature of pragmatist work.

Thus, this first paper demonstrated that quantitative methods can be employed within ethnographic inquiry (Cook, 2005; Denscombe, 2014; Savage, 2000). The findings empirically demonstrated that cardiovascular benefits could be derived from conservation activities. Not only did all the groups attain the moderate levels of intensity commensurate with cardiovascular health, but in the case of the older group, they often realised more vigorously intense levels. As a project, therefore, it laid the initial foundations, as befits a pragmatist researcher, for a case to be made for social prescribing projects involving GE and demonstrated convergence with more recent literature on quantitatively proven GE health benefits (Howarth et al, 2020; Rogersen et al, 2020). What was then required, given the burgeoning extant literature on GE health outcomes, was to further elaborate on the health benefits in a broader sense (psycho-social as well as physical), utilise previously under-employed qualitative techniques, and importantly begin the process trying to unpack the potential underpinning influences upon reported health outcomes (Jenkinson, 2013), regarded as a 'black box' in the field (Rogersen et al, 2016: 178). In turn, this may promote utility in the future design of interventions if we can have better insight into how and why things work, and the conditions that both promote and sustain engagement.

Being a pragmatic researcher with a social action orientation

Within the social sciences, pragmatism as a means of creating knowledge and assisting in promoting effective interventionist work (for example, allied to social justice) has gained traction in recent years (Kaushik & Walsh, 2019). As such it is closely aligned with research that is action-oriented, draws upon relevant concepts that support such an action orientation, and promotes empowerment of disadvantaged and under-represented groups (Morgan, 2014). From my researcher perspective, and my desire to bridge the practitioner-researcher divide, I

was motivated therefore to pursue an agenda that could produce research that supported the case for GE interventions and their design, should the research findings point in that direction. Therefore, the studies were essentially goal-oriented, reflecting the seven core drivers outlined in Chapter One, and focused on developing future practice derived from appropriately designed evidence-based interventions, albeit small-scale, which could, in turn, promote positive, effective changes to real world contexts involving disadvantaged groups using GE activities.

Pragmatist oriented research therefore can assist with making the case for policy level discourse and changes to practice. Creswell (2013) highlights pragmatism as a means of bridging the recognised divide between two essentially mutually exclusive philosophies regarding the source and nature of knowledge acquisition: positivism – or the scientific method – and the interpretivist, constructionist, and naturalistic approaches that favour qualitative methodology. In doing so, pragmatism espouses a worldview that on the one hand sees the world as comprising an independent reality, whilst acknowledging knowledge is socially constructed given it emphasises people's subjective states in relation to experience (Pansiri, 2005; Yefimov, 2004). If we consider paradigms to be the effective toolkits to the way we attempt to solve problems or gain deeper insight into specific phenomena, I view pragmatism as an ideal *'third way'* to essentially demonstrate flexibility - akin perhaps to research gymnastics - when seeking insight into specific questions. This is reflected in the way in which I essentially modified my approach with each successive study, driven foremost by the needs of the research inquiry, and utilising either positivist or interpretivist frameworks as and when it suited. Pragmatism allows for utilising deductive or inductive approaches, subjective and objective ontology, value-free and biased axiology, and quantitative and qualitative strategies (Deforge & Shaw, 2012; Wilson, 2010): essentially akin to a 'pick and mix'. Why should there be an either-or approach to the acquisition of knowledge as opposed to research that values a blended approach to enquiry? We can acknowledge therefore how positivist oriented enquiry gives us useful facts about a given phenomenon (cardiovascular

health improved through conservation working), whilst subjective elements can be understood through more interpretivist means, appreciating both collective (shared) experiences (highlighted by the broad themes derived from data: social connectedness, restorative effects of nature, personal agency enhancements) and individual accounts (for example, specific elements of nature that promote individual restoration, and the perceived extent of that feeling). As such, pragmatic oriented studies can integrate quantitative, qualitative and action research methods, despite the potential for conflicting outcomes and mixed messages arising from the research.

Pansiri (2005) identifies how pragmatism is derived from 'πράγμα' or 'pragma', an ancient Greek word meaning 'action'. A central tenet of pragmatism as a philosophy is that our actions are based on prior experiences and the meanings derived from those experiences (Morgan, 2014). We take actions based on the perceived consequences of those actions, and subsequently use that experience to predict future behaviours. Researchers (and by association, practitioners) can thus highlight the logical relationships between people's actions and the consequences that flow from these (as suggested in my attempt to discern the key influences and processes upon health outcomes discussed further in Chapter Ten). Fundamentally pragmatism is driven by a belief that reality is shaped by events, and so the world is constantly in flux, evolving, changing, adapting, becoming (Kaushik & Walsh, 2019). Logically, this means actions can change events and therefore the way the world is shaped. I see so much of myself in this philosophy in my desire to take actions in industry that could lead to positive change within communities, whether through new sport development projects, funding initiatives, setting up new activities and programmes tailored to specific groups, using events as a catalyst for new services to be developed or simply providing suitable opportunities to enhance people's personal health and social capital. Pragmatism was therefore an essential tenet of my interventionist work in industry, as there was always a need to juggle scarce resources, seek out specific joined-up solutions through 'best-fit' partnership work, and adapt to changing circumstances (for example, legislative requirements,

government policy, industry best practice) to maximise benefits for all those concerned (including myself in respect of work-related performance indicators). This work has continued in academia in developing local interventionist activities with specific partners that also act as important learning opportunities for students.

Pragmatism therefore contrasts with the emphasis upon the nature of reality espoused by other paradigms: pragmatists stress instead how actions are embedded in situations and contexts, and our beliefs are driven by experiences that are unique to each person. Further, the consequences of actions change if the situational contexts in which actions occur alter. Thus, exactly the same situation cannot be experienced more than once: which essentially means our understanding of how to act in any given situation is merely provisional, not certain (Morgan 2014). Fundamentally, this also suggests that if no two individuals can have exactly the same experience, then they cannot either have the same view of the world around them. However, there can be *similarities* in experience, whether these are very close or more marginal in nature. This is important as it suggests therefore that whilst our individual world views may be unique, they can in varying degrees be shared with others. Therefore, in a community garden project, gardeners will always have unique experiences of their own actions within the garden, whether undertaken individually or with others; however, they will also share more general similarities of experience (such as the restorative qualities derived from nature interactions). This has important implications for myself as a researcher; I can thus represent both individual difference in testimonies about a phenomenon (GE) but also provide insight into shared experience and the shared capital derived from the actions that underpin this activity within a given context (the broad themes).

Pragmatism as an overarching approach to my research

Pragmatism, I believe, provides energy and challenge with researching an intervention such as GE: that, for example, as people's engagement continues over time, their experiences do too,

and so for my research journey, this was reflected in the way I personally invested so much time within each context to facilitate the capture of influences, feelings, and meanings people attached to involvement, place and 'being' in nature. This required me to be attentive, but also reflexive, and aware of the ways in which actions shape experience. Whilst positivists focus on specific mechanisms of interest, at the expense of others, pragmatism offers the opportunity to discern more complex processes and mechanisms, through an eclectic mix of methods that can shed light on an array of factors which may not simply be 'observable': for example, individual choices and resulting actions; environmental influences; social interactions; events; settings; collectively shared endeavours; and organisational factors (ostensibly unpacking the mediating and moderating influences as key research objectives noted earlier). As such, pragmatists embrace different approaches and tools to interpret the world and accept there can be multiple realities as opposed to a single worldview when attempting to understand specific issues and phenomena (Saunders et al, 2012). This is clearly relatable to the studies I pursued after the first (quantitative focused) study, given for example, the varied settings; GE modes and autotelic activities on offer; group activity and social interactions fostered; level of organisational support (and constraints upon project delivery); accessibility issues; and, of course, the role of nature in enhancing health and wellbeing. Essentially, with hindsight, I can discern that with successive studies there was a transparent fluidity in progression regarding my research approach: I shifted along a paradigm continuum between the two established and alternative philosophies of positivism/post-positivism, and interpretivism, as I became more experienced as a researcher and developed my understanding of optimal methods to investigate each context.

Whether my pragmatic research paradigm was driven by a subconscious as opposed to a conscious choice at the time is hard to be sure; I think it was more akin to a 'gut feeling' at the beginning and developed apace from there; but only with hindsight have I been able to truly reflect on the proximity of my journey as akin to a pragmatist paradigm. However, as my studies progressed, I certainly became more aware of the efficacy of utilising certain

methodologies and methods, embraced more of an overt action-oriented philosophy, and thus made conscious choices based on 'fit for purpose' but also 'fit for circumstance' given the natural constraints on small-scale researchers that exist (Knight, 2002). In such a way, I was more concerned with the necessary approach to each study, rather than consciously being beholden to a specific overarching ontological and epistemological position. Later, some examples of how pragmatism guided my work will be provided to illustrate.

Challenges with my approach

However, such an explicit concern also brought challenges: specifically, to ensure the research was rigorous, robust, and promoted social value; to produce evidence that was sufficiently acceptable to the communities of practice that are capable of implementing change (Bryson et al, 2014); and to have sufficient skills to adopt a range of methods relevant to the study designs – although I saw this latter issue as an opportunity to enhance my personal development. Further, I needed to recognise potential bias in seeking insight into issues that may result in fruitful practical application. I had to therefore consider how to minimise this risk, through leaning on supervisory support, questioning what I was doing and why throughout the study timeline; but also, through conversations with co-researchers on collaborative papers, some of whom had different academic disciplines - for example, occupational therapy, medical sciences) to my own field. These conversations - regarding study design, implementation, and data analysis/interpretation, for example – were then supported through a process of reflexivity (Berger, 2015) – a concept closely aligned with both social constructionism and constructivism (Guterman, 2006; Lynch, 2008; Nobel & McIlveen, 2012) - that involved diaries, logbook entries, photographic evidence, revisiting the transcribed data for sub-themes and core themes, participant verification and independent analysis of data where other researchers were involved (in all but one paper). As I became more confident and experienced with successive studies, my ability to engage and employ efficacy in respect of reflexivity contributed to my confidence in the research process as being

robust and rigorous. I was better able to articulate my research with peers and supervisors, reinforcing the notion that I was able to employ an 'outsider' perspective as a researcher to produce quality, peer-reviewed outputs (Sangasubana, 2011), which complemented the feelings I had as a more competent 'insider' (Berger, 2015; Mays, 1995) when it came to researching each group, context and mode of GE involved with each study, given the longitudinal nature of each project. Further, this was achieved by researcher colleagues discussing notions of 'bias' ahead of immersion and data collection in the various projects, so that conversations with participants were 'organically' developed – essentially ensuring the participant described their relationship with 'place', 'doing', and the 'meaning' of their experiences, with few structured questions conceived beforehand. Even then, questions were open-ended, using *'What is…?', or 'Why did you…?', or 'How does…?'* etc., in very general terms, to elicit their own views, avoiding any 'leading' questioning (Chenail, 2011). Providing an audit trail, supported by raw data such as field notes and reflexive diaries to examine one's own stance and interpretations, ensures a range of trustworthiness factors in respect of credibility, dependability, and confirmability (Johnson et al, 2017; Xerri, 2018). But some of this requires trust on behalf of the reader, trust that may be strengthened by appreciating the lengths I went to ensure trustworthiness in terms of factors such as triangulation, member checking, and independently reviewing data to compare sub and core themes that emerged from the fieldwork (Galdas, 2017; Shenton, 2004).

Arguably, the concept of bias has typically been synonymous with quantitative rather than qualitative studies, or at least is an issue for both forms of inquiry (Pannucci & Wilkins, 2010). Qualitative research is more concerned with representing the accounts of the participants in a way that truly reflects their experiences (Patton, 2014). As Galdas (2017) contends, within qualitative research – particularly an ethnographic methodology – acknowledging reflexivity and subjectivity is an inherent part of the research process (Mosselson, 2010), whereby gaining the trust of participants is an important element (Krane & Baird, 2005). Essentially bias is managed through reflexivity, achieved through the researcher

having self-awareness about what he or she 'brings to the party', and what is derived from the participant. Therefore, critiquing findings from a 'bias' perspective is a false argument, as it is impossible to be fully divorced from proceedings, and not desirable either, given – in my case - the adoption of an insider perspective meant I was effectively the research instrument (Berger, 2015; Chenail, 2011; Mays, 1995). I needed to recognise therefore that I was integral to the research, that I was very much a part of it, shaping it, influencing it, immersed in it – and embrace that as a necessary element of the process. Another researcher will have a different lens through which he/she would interpret the participants' accounts, whilst still acknowledging the health benefits that result – yet may suggest different reasons or emphasise certain factors more prominently that were influencing these - than I did. Indeed, with each successive study I became more acutely aware of the fact that I was effectively co-constructing knowledge of each context, the group dynamics and GE mode, and participant/researcher experiences within, through the longitudinal nature of each piece of research and the methods employed to investigate these, including repeat interviews (Vincent, 2013) in all three qualitative studies.

Thus, in a retort to accusations of bias, qualitative researchers should claim the moral high ground, in asserting that by taking responsibility for the pursuit of a transparent verification process - with specific measures to promote trustworthiness, and thus the integrity of research – research rigour is achieved (Morse et al, 2002; Nowell et al, 2017). In my studies, this involved researchers keeping field notes, taking photographs, having discussions about observations, and discussing with academic colleagues who were not present in the fieldwork: essentially allowing me to better appreciate my own function within the research process (Lincoln & Guba, 1985). Thus, providing a transparent audit trail in each study about how the research was conducted, data processing, and findings derived, is an essential tenet of qualitative research, in addition to being open about one's own preconceptions and research focus (Tuval-Mashiach, 2017).

Facilitating a robust research process

To facilitate trustworthiness, I adopted a range of measures that promoted credibility, dependability, and confirmability, and addressed issues around transferability, all common terms associated with qualitative research designs (Johnson et al, 2017). These measures variously included member verification of data, immersion in the settings prior to data collection, use of unstructured interviews, clarity over data collection process, independently analysing data sets, and presenting the findings of the studies back to participant groups (Nowell et al, 2017). By general consensus, an essential element to facilitating trustworthiness is through the quality of the study write up, and the description and meaning derived from the data – essentially *what it says and does* (Mays, 1995). Therefore, providing clarity regarding context, sampling strategy, methods, data analysis procedures, and findings, so that another researcher could conceivably reach similar conclusions from your data, is essential (Lincoln & Guba, 1985). In my qualitative studies, data analysis typically followed a 'trustworthiness trail' process familiar to those employing thematic analysis (Figure 2). I also employed recognised software packages which was not only conducive to more efficient data analysis but also made data more accessible to independent scrutiny (including sharing between co-researchers to independently arrive at study findings). Similarly, acknowledging within each published study the limitations in your own (and extant) methodological approaches, provides confidence in your work.

Triangulation is also an important contributing element in research rigour (Reeves et al, 2013): within qualitative research, which was facilitated through the adoption of a range of complementary methods, including researcher field notes (Patton, 2014), researcher photographs, and the photographs from the research participants themselves (Noland, 2006).
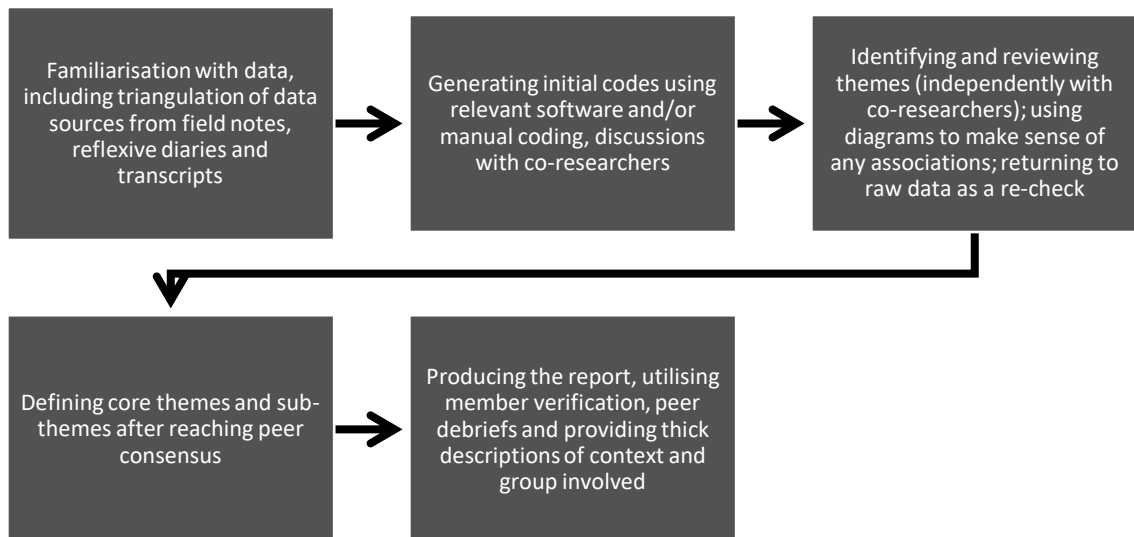
Figure 2: 'Trustworthiness trail'

Balancing subjectivity and reflexivity

Subjectivity and reflexivity are an inherent part of the qualitative, ethnographic process (Mosselson, 2010; Weenink & Bridgman, 2017). Finding the right balance between subjectivity and reflexivity is not an easy one, but it is relevant here in the discussion of trustworthiness. Have I interpreted the participant accounts and their actions accurately? The need to engage in reflexivity was, of course, complementary to accessing the 'inside track' through lengthy immersion in context and with each group as much as practicably possible; and ensuring vigilance and awareness of my role in relation to the participants as both an industry practitioner and academic researcher. This was essential in the process of interpretation of participant accounts, including any occasions where I sought clarity about my written interpretations where I was uncertain about the meanings, beliefs, actions, or attitudes expressed by project participants. Thus, I was effectively able to be aware of any risks of data contamination, given I had developed familiarity with context (place, people, tasks, constraints, access issues) as opposed to an outsider who may inadvertently fail to recognise important facets of participant experiences (Lincoln & Guba, 1985). Perhaps the optimal way

of achieving 'accuracy' in representing the accounts of participants – and therefore credibility and dependability - is through participant verification, also known as 'member checking' (Mays, 1995). Opportunities within my research for this occurred naturally on numerous occasions. In doing so, it strengthened relations, and thereby trust, between both parties. Such (essential) feedback therefore gives an appropriate balance between the voice of the participants (subjectivity) and the researcher's interpretation (reflexivity), and also minimise my own influences upon the data. One study can give some illustration to these points. In the qualitative Greenfingers study, transcripts from DVD interviews, and audio-taped focus group and individual interviews were provided to the research participants at each stage. A draft and final paper were also made accessible (this also served as a final means of ensuring photograph permissions were confirmed). On one occasion, there was a private but (thankfully) light-hearted moment between me and one of the older female participants. I had misinterpreted her narrative regarding 'losing' her longstanding partner as due to bereavement. When she read my interpretation, as I had wrapped the quote in with a narrative about 'loss' of a partner leading to social isolation (which she had described as an impetus for her involvement), she laughed and politely put the record straight: *'Oh no, he didn't pass away, he left me!'.* A good lesson in ensuring participant verification was used!

Further, trustworthiness can be enhanced through the impact of the research. From an action-research perspective, one judgement could be: does the research improve outcomes for individuals or groups? Does it lead to further enquiry by sparking further debate? Does it make logical and necessary recommendations for further research? And, finally, does it provide value to stakeholders and contribute to social change/justice – essentially promote social value (Morrow, 2005; Snodgrass et al, 2018)? In this respect, studies can promote a 'bottom up' approach in terms of policy formulation and contextual practice, grounded in the views of those who use the services in question (Somekh & Lewin, 2009: 17) or the community members involved (Somerville, 2001). Whilst research may provide findings that are problematic in terms of generalisation (Guenther & Falk, 2019; Savage, 2000), they can be

context, topic and situationally specific, and indicate directions for future research (Mason, 2002). Instead, any generalisations regarding applicability and relevance to practitioners can be left to the reader to judge (Polit & Beck, 2010).

Reflexivity and the status of an 'insider'

Complementary therefore to my pragmatic approach was the use of a reflexive process. My practitioner background (and continued involvement in practice) provided numerous perspectives to my research. Firstly, I could claim the status of an 'insider', achieved through prior experience of working with a range of participant groups, GE modes and contexts. Even though I was entering some new terrain (for example the NHS medium secure unit study) I was able to draw upon experiences from industry to help me make sense of these new groups and settings. Secondly, therefore, this meant I brought with me pre-existing views of sport development practice, for example how projects were typically designed, promoted, implemented, and evaluated, which could help with subsequent 'sense-making' of data generated in each study. Third, there was a major caveat to this position, in that despite engagement in each project for extended periods of time, some settings were arguably more 'accessible' than others which perhaps compromised my ability to fully appreciate an insider perspective. This was essentially the case in the NHS study: I had to acknowledge that, despite fortnightly visits to the secure unit, I had limited experience of the complexities associated not only with the participant group (adults with LD, PD, and offending behaviour) but also the notion of a secure setting with all the security issues this involved for researching the intervention. Although I had previous experience of delivering sports initiatives, activities, and events for adults with LD (from mild to more severe) – and so at least felt partly connected to the context at hand - I was very reliant on my co-researcher from the NHS, who worked on a daily basis with the group, to be able to gain the necessary insight into their experiences of the gardening project and promote appropriate rigour in respect of research design, analysis, and findings. This represented a power imbalance in researcher positionality,

whereby I was very much reliant on the co-researcher for the project's successful implementation, and her support with the research outputs. That said, I really valued her role as the 'gateway' for me to access the group, add her independent eye to my analysis and interpretation of the data, and her valuable insight into the workings of the unit to help me appreciate more appropriately the challenges (and opportunities) the intervention created (for example, empowering the group in designing the garden space, but also the need for Easy Read information guides to gain participant willingness to engage).

At the time in that study, I also reflected on the fact that given my inexperience as a researcher, and unfamiliarity with more interpretivist-oriented investigations, I tended to be more outcome-focused and recognising more 'surface' level aspects of engagement in my diary entries, such as the freedom the garden appeared to provide, the satisfaction gained and the tangible achievements from each visit. The co-researcher was more able to discern, with the input of unit staff, the deeper impacts that the garden intervention was producing, especially in respect of key elements of their treatment pathway, including the enhanced relationships being fostered as a result of the garden intervention. This was important as I was naturally concerned with how far the garden was making an impact as a new factor in the service users' treatment programme. The co-researcher and staff stressed that despite other outdoor (and indoor) activity options being available, that the garden was the most popular choice for service users on a weekly basis, and how it promoted the opportunity for much more than simple recreation: it was a safe space to discuss difficult issues; to develop otherwise poor social skills; to create more positive relationships that previously had been problematic between service users, whereby splitting or colluding within the group was commonplace, even more so when new transfers in arrived; reduce the denigration of clinical staff who were best placed to aid their rehabilitation (Howells & Tennant, 2010), in fostering greater relational security that promoted a trouble-free working environment (which had not been the case with other activities that had often led to conflict); and developing work-related skills through the replication of 'normal' everyday work and associated work ethic to promote

normalised behaviours (Fieldhouse & Sempik, 2014). This insight, coupled with her more acute awareness of the complexities associated with their prior unsettled biographies, including regular transitions between care institutions, being segregated from mainstream schooling and, at best, accessing insecure, low paid employment, was essential to the data collection and analysis process, identifying important aspects and nuances within the data I may have not been alert to. This extended to the missed experiences I had away from the unit – I often went away with the feeling that the garden offered untroubled impacts, as every time I visited the experience always seemed to be a positive one; yet this was not always universally the case: tensions did arise occasionally, as noted in the study's findings and highlighted by the co-researcher in her reflexive diary, and by the service users themselves when discussing the divisiveness caused by allowing chickens in the garden:

> *"The chickens have been a real problem. Like they keep digging up the vegetables, knocking the netting over. Means it delays things happening."*

The addition of colleagues with a more objective eye on the data, but coming from occupational therapy and social psychology backgrounds, added to the extra (necessary) lens on the data.

In the other studies, I could also reflect on my role within the research process, with co-researchers and the research participants. In the Woodlands study, my co-researcher in the field, an occupational therapist, brought an extra insight into the needs of mental health service users from her academic and industry experience. This complemented my own knowledge from industry in programming exercise interventions for mental health referrals from general practice. We valued each other's inputs and perspectives, and often sat around at the end of our visits (and even during) discussing what we had witnessed and our interpretations. This was valuable in addressing our own potential biases whilst offering the strength of two pairs of eyes and ears within the situational context, as often we worked

separately from each other with individuals and small groups on site. Whilst the second study was underway, I was continuing to gather data in the Greenfingers Study through interviews and focus groups. My passion for gardening and relatedly green issues, ensured easy access to the volunteers, and meant the trust I developed from attending every week (except on occasion where teaching clashed) facilitated a deep understanding of their motives, preferences, behaviours and interactions with others and the setting. The volunteers really valued the opportunity to read the transcripts and drafts of papers, strengthening the dependability and credibility of each part of the research process. Although I was now on my own conducting this research, I drew upon the experience from the prior studies to be confident in my own right in conducting and analysing data, whilst recognising I was still not, by any means, an accomplished or experienced researcher. The irony was not lost on me in the last study, where I was the mentor to an undergraduate field co-researcher, passing on my own recent experiences, but giving her as much responsibility as she was willing or able to manage. Whilst she lacked experience in data analysis, this alternative eye on the data was nonetheless useful, and supported by the other researcher who considered the data from an outsider (and more independent) perspective. This essentially provides a 'joint ticket' that plays to its strengths: for example, one researcher may be more suited to analysis, the other possessing more empathetic interviewer skills - and so balancing the skills and qualities of a research 'team' and deploying them to best effect is an important element in pursuing, and producing, effective research (Fernald & Duclos, 2005; Whitehead, 2002).

Value of an insider perspective

Having an insider perspective is useful in several respects. First, my industry background and academic researcher role meant that it was relatively straightforward to set up the projects with relevant partners and resources, especially given my experience of forging multi-agency partnerships within sport development practice. Second, it meant I could quickly establish rapport with each group, despite some reliance on others as noted above to facilitate this in

every project. I found in every case the gatekeepers to accessing participants were supportive and motivated to provide such access: whether the NHS co-researcher and the team at the NHS facility; the park management and rangers in the urban park; the departmental heads at the corporate study; and the philanthropist owners of the Woodlands site who themselves had previously battled with mental ill-health. Third, and by association, this facilitated trust with participants and the support networks, given they understood my prior experiences of being relevant to them and the intervention being pursued. I also like to think my engaging, informal style, and democratic approach to project leadership, meant that this process was easier to make happen (supported by the comments received in every project about how approachable and accessible I was). Fourth, this potentially brought with it extra responsibility to ensure such relationships were not disrupted in any way, and the need to be sensitive to the participants involved, but also those supporting the studies in implementation. Fifth, a further challenge for me personally: the risk of being too subjective, especially given my personal investment in the research, not just in terms of time commitment, but also in respect of the personal, professional, and academic drivers noted in Chapter One, including my desire to produce research that could positively impact on practice. This is perhaps especially important given I also had a desire to make the research process empowering where I could: the most obvious example was with the NHS Study, where participants were fully involved in the garden design (Figure 3), working with NHS staff to determine the layout ahead of the intervention starting. Drawings such as these can be useful in supplementing data from more common research methods such as interviews (Woodhouse, 2012), as, in this case, it held relevance and value to the service users when discussing their hopes and fears for the project throughout the three focus group data collection sessions conducted across the year – the first, a 'looking forward to' account; the second, a reflection on progress thus far, and issues that had arisen; and third, the 'look back' on the year, including whether their personal rehabilitation had been influenced through participation. As such, their garden plan provided a three-dimensional value to my enquiries, offering further spatial insight into the cultural dynamics of the group (Reeves et al, 2013).
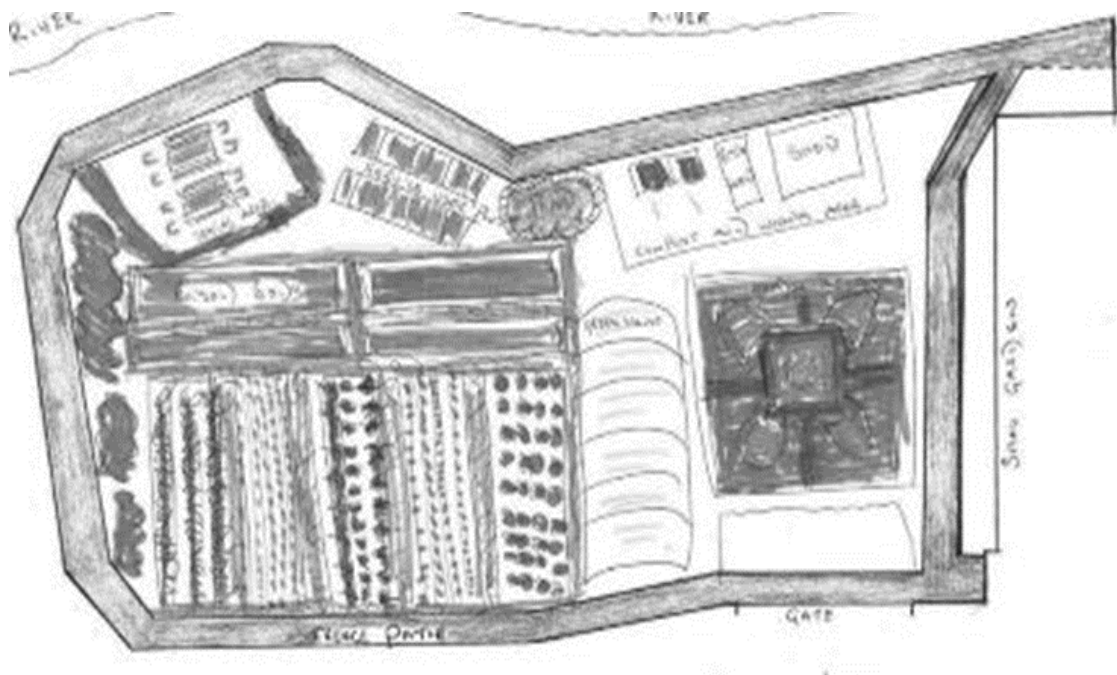
Figure 3: Plan of the NHS Study Garden by the service users

Being given the opportunity to exert control over the garden's design was an empowering moment for the service users, exhibited in their increasing adoption of pro-social behaviours (more responsible, better relationships with peers and staff) and the narratives of their experiences. This extended to expressions of both individual and collective pride in the garden's transformation, including the establishment of a flower bed, but perhaps most importantly, the vegetable produce they harvested for the hospital's kitchens (used in their cookery classes). The sense of empowerment in turn fostered a motivational climate that was manifest in the number of engagements service users had with the garden, far outstripping the participation in other indoor or outdoor sport and leisure activities offered as part of a rehabilitation menu of options across a typical week. The service users also assisted with dissemination of research outputs to NHS practitioners at regional conferences.

In the Greenfingers study, the process was more of an organically developed one: volunteers became empowered through their long-standing volunteering on site, eventually establishing

their own Friends of the Park group that independently devised improvements to the park, many of which were implemented with the permission of the park authorities. In the corporate health study, volunteers had complete choice over activities, length of engagement and ownership of their own garden spaces to cultivate. In the Woodlands study, it was more of a case of supporting empowering processes which were already in place: where the participants attending could freely select tasks and work either individually, in pairs or small groups, and stay for the morning, afternoon or whole day (typically the latter).

Issues in being a reflexive researcher

As an exemplar, reflexivity was achieved in the NHS Study in several ways: repeated interviews with (largely) the same participants – although only seven were present at all three focus groups across the year, hence only their data was used; the prolonged engagement (as noted above); peer review by co-researcher and the other academics who were not present in the fieldwork; discussing research issues in the Speak Up group sessions; reporting the initial findings back to the service users and staff at the unit; both fieldwork researchers keeping diaries and reflective notes, which also discussed actions and our reactions to the intervention and the impacts it appeared to be having. These are all valid strategies to maintain reflexivity within study designs (Fonow and Cook, 2005; Padgett, 2008). That said, I was also acutely aware that this population group and setting were 'out of my comfort zone'. Thus, I needed to acknowledge how my own past experiences – and identity as a practitioner, academic and someone with personal investment in the mode of activity employed here (gardening as a therapeutic intervention) – might be both an assistance, and hindrance, to the data collection and analysis process. Certainly, there was a reliance upon the NHS researcher for the practical advice on managing my time and interaction with participants, and the relational security issues that entailed; I therefore saw her as the 'expert' in the study compared to my relative ignorance of the participants and their troubled backgrounds. I could not, for example, be a true 'insider' no matter how often I visited across the course of a year, compared to her day-

to-day involvement over several years. And I certainly could not realistically comprehend a 24/7 existence on the unit as experienced by the service users. Thus, this was a potential power imbalance given my life held (thankfully – although this word in itself speaks of potential prejudices) no comparison to the difficulties of having not only a learning disability, but also personality disorders, and a history of offending behaviour. However, my unfamiliarity could be seen as an advantage, in bringing a new and fresh dynamic into the study, with a different lens as such, and so arguably the researchers' respective positions were a strength, providing appropriate checks and balances throughout the research process (Lincoln & Guba, 1985). And from the service users' perspective, I hoped that the empowering elements involved – designing the garden, being involved in decisions about its ongoing development, and the opportunities to literally 'speak up' about issues with the research team on a regular basis – addressed some of the researcher-participant power imbalance in the study. This relates to the efficacy of 'co-operative inquiry', in that where researchers are from the 'outside', they can promote a methodology designed to facilitate an equal partnership *'with'* the research participants, and others who share your research interests (Heron, 1996).

I had to rely on advice on numerous occasions. For example, how to break the ice with the group (although I like to think that came naturally to me, based on working with disadvantaged groups over many years). Equally, adapting my language to the level of the service users' comprehension – which extended to the support given to me in devising an Easy Read participant information and consent form (it was nice to be allowed to go away and compose this, rather than having one imposed on me). Being aware of any language sensitivity around the service users – avoiding notions of 'incarceration', or referencing their offending history, for example (Xerri, 2018). And constant reminders that these were unpredictable men given their PD status; so 'don't let your guard down' was a regular refrain (which initially unnerved me, but subsequently did not, as, perhaps naively, I perceived myself to be 'safe' given we were using plastic tools, had effective staff: service user ratios,

wore alarms on our clothing, and perhaps more importantly, I felt I had developed a rapport and been accepted quite quickly by the group, who were eager to discuss gardening matters and their personal development progress during the year). From a research perspective, it also meant being mindful of how to not only phrase questions within the focus groups, but also how to manage these to promote maximum engagement. Thus, as I had no previous experience of secure units, PD or working with clients with offending behaviour, I did feel less of an insider, and much more of an *outsider* in this study. This was effectively cancelled out by the familiarity the NHS co-researcher had with the unit and its occupants, and who was explicitly identifiable as offering the inside perspective. So, all the issues that would have posed a major challenge conceptually in research design: from ethics, use of Easy Read information, recruiting sufficient participants, gaining trust, developing research questions, being language-sensitive, relational security, conducting focus groups, and so much more – were somewhat mitigated by the collaborative research that resulted. It was, nonetheless, still challenging enough to gain sufficient competency in all of these areas, even with support, but was an important learning experience and one I valued in my academic researcher journey.

The other key advantage of this outsider-insider relationship in collaboration was the ability of the NHS researcher to draw out issues, indeed themes, from the data that might have gone unnoticed or misinterpreted. Although my fresh perspective as more of an outsider could be useful, here the value of insight from an experienced internal advocate was crucial in the data analysis process. I may have been more judgemental in my interactions with participants, perhaps overemphasising certain narratives at the expense of hearing or seeking out others, given the fact that I was ostensibly researching offenders involved in a treatment programme; whilst my co-researcher would implicitly understand the interactions, mannerisms, behaviours and relationships, and the motives behind these actions, within a rehabilitative process. This was important as reflexivity demands the need to situate oneself both socially and emotionally in relation to the study participants. How could I have possibly achieved that here without the input of the co-researcher? I had some prior industry experience of working with adults with

LD; but that was only partially of use here given the full range of complexities associated with medium secure settings. Hence these were conflicts and difficulties I needed to be aware of and reflect upon through the study, and, with hindsight, were under-represented in my journal entries at the time.

Use of ethnography within an overarching pragmatic (and action research) approach

As I became more conversant with the GE literature, the identification of research gaps, including the lack of qualitative methodologies employed in GE research, propelled me after the first (quantitative) fieldwork study to turn my future efforts towards employing ethnographic *qualitative* inquiry. Goldbart and Hustler (in Somekh & Lewin, 2009:16) define ethnography as involving *'writing about people'*, with a focus upon understanding how individuals interpret a specific context, culture, or situation. This necessitates the researcher utilising a participant observer role to explore and make sense of a setting, and the social exchanges within (Atkinson et al, 2001), thus gaining a unique, deep, and rich insight into the social and cultural dynamics of 'place', and the meanings people ascribe to their experiences. There is a rich tradition of utilising ethnography within health research (Cook, 2005), which has made a significant contribution to changing professional practice, influence organisational change and inform policy discourse. Importantly, it provides an insight into factors that drive health-related behaviours and arguably addresses the inadequacy of quantitative approaches in placing research findings into relevant spheres of political and economic discourse (Hansen et al, 2013; Maxwell, 2020). Further, Cook (2005: 136) argues for the adoption of 'critical ethnography', in going beyond the participant experience by explaining the social and cultural factors that contribute to health outcomes in different settings and with different populations, whilst also making the case for future interventions through the involvement of participants in identifying meaningful issues and influences upon their health – thus promoting social value in the process (Fawcett, 1991; Snodgrass et al, 2018) – a key tenet of pragmatist research.

Within this broad ethnographic framework, subtly different approaches were utilised: use of loosely structured, *in action and post-action,* study-specific and open-ended audio-taped interviews in the field (Chenail, 2011); focus groups and video interviews on location; auto-photography; researcher's photographic representations; and use of field notes – all recognised as classic and more contemporary ethnographic methods (Atkinson et al, 2001). An ethnographer, in utilising and deploying whatever research methods are accessible to gain insight into the specific phenomena under investigation, can essentially become a *'jack of all trades'* (Whitehead, 2002: 7). These methods, taken together, were congruent with a pragmatic, ethnographic methodology that promoted deeper meaning of contexts and cultures (Savage, 2000). Further, there was an appreciation that the populations under study, and associated issues and contexts being investigated, merited embracing an action research orientation, as noted earlier (Dicks et al, 2006; Hansen et al, 2013). Ethnography is well suited to an action-research orientation, given the length of immersion involved in researching the experiences of at-risk groups, and promoting outputs of potential value to a relevant field of practice (Snodgrass et al, 2018). Action research examines specific settings or situations, assesses the efficacy of interventions, and evaluates outcomes with a view to positively influencing practice (Tekin & Kotaman, 2013). As such it is also closely aligned with a pragmatist approach. A study by Marsh et al (2017) with an end-of-life care community garden adopted a similar action-research focused approach. This can be a difficult route to follow, given action and/or emancipatory research by its very nature suggests you are on the side of the participants in the study, essentially promoting advocacy (Larkin et al, 2019), and brings into question researcher neutrality (Layder, 2013). However, as a mature industry professional, used to maintaining an objective stance on many issues over the years (for example, when implementing change management, or seeking to effect compromise between competing parties), I was at pains to ensure that the empowerment issue was dependent upon the outcome of the research – rather than driving it. Only if the research made a compelling case for 'action' would - or could - there be a recommendation for policymakers to consider. A pertinent example of someone being able to highlight potential failings, and what possible

alternatives those in authority could adopt for future practice, was highlighted by one of the Woodlands study volunteers who contrasted his lack of support from traditional mental health services with the beneficial impact his involvement in the project had bestowed upon him, not only finding a place of calm and solace away from his troubled world, but also enabling him, in small incremental steps, to pursue a path to recovery. His view appeared to be corroborated by others at the regular tea break conversations, identifying either a lack of support or ineffective remedies offered through medication or cognitive behavioural therapies.

Seeking insight into the how and why GE promotes health outcomes

The emphasis became an enterprise directed towards investigating not just 'what' was happening with different population groups, contexts, and modes of GE from more of an interpretivist perspective; but, also, *the how and why* GE worked akin to a social constructionist lens (Holstein & Gubrium, 2006). As such, there was a combination of (attempted) detachment through field notes, diaries, own photographs, and verbal reflections with co-investigators - essentially an *etic* element to my research (Astalin, 2013) - coupled with immersion through social interactions, 'doing' activities with the participants, chatting over tea breaks, and gaining their perspectives through an *'emic'* perspective (Olive, 2014; Spiers, 2000). Thus, through reflexivity and 'laying bare' my own judgements, beliefs, and practices before and during the research process, I attempted to find a way of being both immersed (Reeves et al, 2013) and detached (Maier & Monahan, 2009) – whilst recognising this is a difficult tightrope to walk in practice. Arguably, taking photographs and composing field notes, given these were typically done 'in situ' rather than away, can also be considered as being immersed and connected, but I found these were often moments I could have on my own to reflect 'on actions' before re-engaging with each group, activity and setting more actively. Further, whilst anthropological studies were often designed to promote full immersion within a cultural context, living day-to-day with the participants, more modern ethnography can involve less intensive, and more rapid, engagement (Vindrola-Padross &

Vindrola-Padross, 2018) whilst nonetheless promoting sufficient immersion to gain the insider view - if via a more tightly focused research inquiry (Reeves et al, 2013).

Emphasis upon qualitative methods within the pragmatic approach

Embracing ethnography as the over-arching approach to my research appeared to be the most appropriate fit, especially as each study setting, population group and mode of GE involved essentially acted as a series of 'case studies' (Tight, 2017). The conduct of the research also demonstrated a naturalistic approach to enquiry (Cohen et al, 2013), eliciting rich data from participant experiences relating to their interactions with the various nature-based environments. Whilst differences can be identified between a naturalistic, interpretive approach to researching given social contexts, compared to a social constructionist lens, whereby the latter emphasises the social world as in a process of constant flux (Ritchie & Lewis, 2003; Schaffer, 2015), they are complementary in gaining insight into people's lived experiences – as far as that is practically possible to do. Thus, we can accept that mechanisms and processes exist to explain the impact of interventions such as GE on an individual's health, but there may be variation in respect of contextualised experiences (Green & Bridges, 2018). As such, there can be many different influences in play - for example: project accessibility, leadership, interaction with flora and fauna, motivational climate, group relationships and levels of empowerment - and manifest contrasts in the meanings, and value, derived from immersion in nature-based activities by participants, which can alter over time - hence the deliberate use of familiarisation with each project participant group, from several weeks to several months, in order to gain sufficient access and insight into the participants' 'world' (Barley & Bath, 2014). Pretty et al (2017) argue that *'places are dense with meaning, stories, memories, and morals'* which facilitates reflections and positive engagement with places that promote good health outcomes – by means of example, this was very pertinent to the recollections of the volunteers in the Woodlands Study, most vividly manifest in one

respondent's photographic interpretation of the 'place' in which he (Dan - pseudonym) was beginning to navigate a more positive future for himself.

As a naturalistic means of investigation, ethnography embraces several well-established philosophies: phenomenology, interpretivism and social constructionism. Phenomenology in respect of studying the impact or effects of a specific activity, issue, practice, or event (happening) – for example, green exercise activity in a specific context (medium secure unit) with a specific population (adults with ID, PD & offending behaviour). Interpretivism highlights through enquiry the 'what' is going on in a specific context, in terms of the interactions, engagement and experiences of participants. Given the studies I pursued investigated individual and collective experiences of group-based GE activity, both social constructivism (focused on the individual perspective) and social constructionism (with a focus upon the interactions between people) are relevant here (Guterman, 2006). Both can describe the 'what' is happening in a given context, but also extends our understanding of the 'why' and 'how' things happen – essentially, insights into the processes that are involved. Essentially (and primarily) my pragmatic approach could therefore be characterised as variously utilising and emphasising naturalistic, interpretive, phenomenological, social constructionist and constructivist principles – I return to the apparent contradiction in coherence of these qualitative research stances later in this section.

Being over ambitious with mixed methods

An extra component within the NHS Study, perhaps characterised by some naivety on my part and a falsely perceived pressure to maintain an element of positivism within the research design, was to combine some quantitative methods with the qualitative approach. Whilst pragmatist research accepts that different methodologies can be combined within studies to help achieve depth, breadth, and enhanced credibility, and effectively complement each other (Creswell & Clark, 2017), there are potential risks through, in my case, over complicating the

process through too many methods being employed: a key lesson learnt and exposing my relative naivety (although there were insufficient words of caution from more experienced perspectives). These methods included periodic heart rate monitoring of service users whilst undertaking HT, a throwback to my first GE study; to monitor blood pressure; chart progress on their individualised Recovery Star tools (an NHS instrument that tracks progress on a number of wellbeing indices); and to monitor the number of critical incidents (self-harm, aggression towards other service users, aggression towards staff). The mixed methods approach quickly unravelled, however, as the nature of the service - with patients transferring out as they had achieved the final stage of their treatment programme or transferring in as a newly interred service user - meant that there was a non-static population, making statistically analysis difficult at best, untenable perhaps at worst. Issues also arose with the inconsistent data collection on some of these indicators by the on-site staff, and, despite my regular attendance throughout, the problems with some of the technology being applied consistently, accurately, or due to malfunctions (heart-rate monitors, blood pressure) when I was not always present. Tentatively, however, the heart-rate responses suggested some service users regularly achieved levels of physical intensity commensurate with cardiovascular health benefits. However, there was insufficient data to draw any statistical significance.
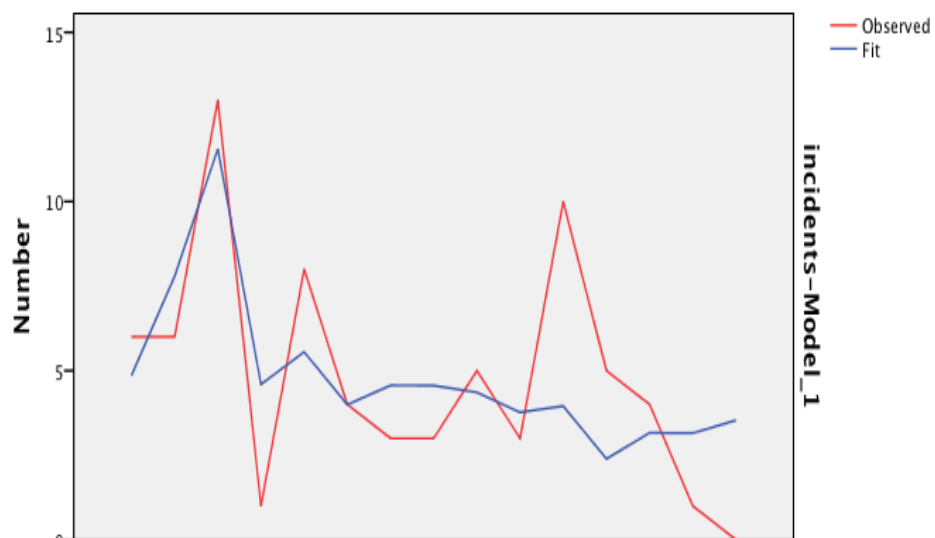
Figure 4: Trend line in critical incidents

Although data on critical incidents on the unit was successfully tracked over the 12-month engagement, and compared to pre- and post-intervention levels, only complete data sets were possible with n=7 service users. This again compromised the efficacy of the data from a significance perspective. However, the general trend line (unpublished) did suggest an effect was apparent (Figure 4), in that there was a steep reduction in critical incidents from the time patients accessed the horticultural therapy intervention compared to pre-intervention levels. The one 'blip' in the observed line was in June. Staff on the unit maintained that the extreme heatwave that month was a contributory factor in service users becoming restless and bad-tempered. Whilst future research could focus upon 'incidents' data in respect of garden interventions it may prove difficult in similar contexts if the available population is too small at the outset to acquire statistically relevant data. It may be a prison garden would offer a better opportunity to monitor such effects given the larger numbers typically incarcerated in prison settings. Therefore, the published paper could only merely recommend future investigations within secure units to focus upon the numbers and types of incidents. The raw data however did triangulate with the narratives of service users, directly referring to the lack of incidents of self-harm or assaults on others; the more positive collaborations between service users; the enhanced personal agency that comes with having responsibilities; and the calming effect invoked by the garden which may have promoted persistent, cumulative effects on reducing anti-social behaviours. Service users described how they could 'walk away' from their troubles in the garden, and the somewhat claustrophobic indoor environment of the unit. Others valued the bonds forged through HT, based upon newfound cooperation and the autotelic tasks they collaborated on. This also prompted pro-social behaviour in terms of responsibilities to others whilst operating with forks and spades. Similar pro-social impacts were noted by Timler et al (2019) in a recent study involving a prison garden in Canada.

Another service user referenced to the stress reducing properties the garden afforded, as relating to SRT (Ulrich et al, 1991):

"It [the garden] chills you out in the sense that if you are stressed it can just release stress and makes you all laugh."

Combining quantitative and qualitative methodology within a research design can be problematic, even *'technically impossible'* (Mason, 2002: 4). It may seem a plausible means of making for more robust and rigorous research - but mixing ostensibly opposing ontologies and epistemologies has the potential to create confusion, through conflicting data, and findings pointing in different directions, ultimately making any 'claims' problematic (Knight, 2002). This was not the case here, as the raw findings of the limited quantitative data supported the service user testimonies, but the complications around resources, transfers in and out, and consistency in data collection, was a relevant matter. Thus, a learning curve in the trials and tribulations of combining mixed methods had been very much appreciated and promoted caution in attempting to do similar with future research!

Using IPA in two study designs

In two studies, interpretive phenomenological analysis (IPA) was employed. Whilst IPA inherently involves an idiographic approach that also embraces verstehen and interpretivist principles, it is typically referred to as a discrete form of qualitative inquiry compared to other qualitative methodologies including ethnography, grounded theory, and case studies (Chan & Wong, 2016). Although the NHS Study made no explicit reference to an ethnographic approach, it nonetheless had the hallmarks of a fieldwork, ethnographic study, given the 18-month engagement I had with the service users, including pre-, post-familiarisation and dissemination activity, and the regularity of contact the research team had in respect of an *'insider perspective'*. Therefore, adopting IPA in both of these studies may be viewed as incompatible with my developing interest in adopting ethnography as a means of investigating GE experiences. However, this is to ignore voices within the literature that argue there are many similarities between ethnography and phenomenology - more than separates them

conceptually (Astalin, 2013), and that pragmatism allows for embracing a range of methodologies. For example, sampling approaches may be very similar in terms of the logic employed by the ethnographer to that used by a researcher adopting IPA; similarly, generalisations are not easily made until further research has been conducted with other groups and cultures (Ritchie & Lewis, 2003). In a sense, every ethnographic or phenomenological study can act to compile a set of case studies on specific populations and their experiences (Tight, 2017). Theoretical generalizations may be possible rather than more generalized empirical claims, hence the development of my socio-ecological schematic in Chapter Ten, thus providing tacit common ground with another qualitative approach in grounded theory. Jones (in Scott-Jones & Watt, 2010: 51) argues that there is significant overlap between ethnography and IPA disciplines, which, on the one hand, provides a *'complementary'* comparison, but on the other can be viewed as somewhat *'frustrating'*. Both methodologies involve an active, dynamic researcher role, getting on the 'inside track', and interpreting lived experiences of specific phenomena, although generally it is acknowledged that ethnography involves longer immersion within a group or cultural setting (Della Porta & Keating, 2008), although shorter ('rapid') timescale ethnographic studies do exist (McNall & Foster-Fishman, 2007; Vindrola-Padros & Vindrola-Padros 2018). Jones further suggests:

> *'...however frustrating qualitative methods terms are across the social sciences, with their confusion of 'isms', 'ologies' and interchangeable meanings, we are no longer bound by scientific rigour and instead we seem to adopt a 'pick n' mix' approach that is adaptable to the circumstance and needs of the research question'.* (Jones in Scott-Jones & Watt, 2010: 51)

The double 'hermeneutic' involved in IPA studies – whereby research seeks to reveal how the participants make sense of their world, and the researcher attempts to make sense of the participants' narratives – is not explicitly at odds with ethnographic inquiry, whereby researchers adopt an empathetic but questioning insider perspective. Verstehen principles

(empathetic understanding of human behaviour) are thus similarly aligned to both approaches (Markula & Silk, 2011). If a dual methodological approach is used that is complementary, there is no reason the approaches cannot co-exist and add value to investigations (Della Porta & Keating, 2008), through triangulation of methods as argued by Colahan et al (2012) and Maggs-Rapport (2000). Indeed, Maggs-Rapport supports the case for combining the two methodologies in research studies, in that this provides an even more effective means of interpreting a given phenomenon, whilst concurrently considering the impact upon the participant group, and their cultural context. In their study of satisfaction of partners within long-term, heterosexual relationships, and their lived experiences, Colahan et al (2012) proposed that these two specific foci within their research could be more effectively explored through employment of two distinct qualitative approaches (IPA and discourse analysis) upon the same interview data obtained from twelve participants. Whilst they recognised the challenge from a theoretical perspective of different epistemologies associated with each methodology, they concluded that the assumptions of both were compatible through the adoption of a critical realist position that promoted complementary insights from each perspective. Therefore, a dual position in terms of methodology at different timelines in one's research journey is a tenable, even desirable, approach, especially given the need to be flexible, and driven by circumstances, including the contextual factors and the specific research issues you are developing investigations upon (Della Porta & Keating, 2008), which again sits comfortably with a pragmatist researcher.

Thus, in the studies referred to in Chapters Four and Six, I appreciated more the complementary nature of IPA within an ethnographic framework, given there is more that unites, or overlaps these approaches (Chan & Wong, 2016). Employing an insider perspective active researcher mode; phenomenology and use of interpretation; conducting open-ended, partly structured group or individual interviews with study-specific questions; understanding the lived experiences through adopting a self-conscious and empathetic stance; the sense-making process; avoidance of generalisations; use of exploratory and naturalistic inquiry;

seeking themes in the data; recruiting relatively small sample sizes; and the researcher as the data collection instrument (Chenail, 2011) – are features common to both IPA and ethnography. Further, in terms of data analysis, both seek out the common themes within transcribed accounts and through ordering and simplifying data expose both the participants' meaning of their experience and provide sufficient insight into the cultural influences upon behaviour. But nuanced differences do exist: whilst IPA attempts to discern the '*concealed meaning in phenomenon, embedded in the words of the narrative'* (Maggs-Rapport, 2000: 220), ethnography seeks to prioritise the individual or shared views within a specific cultural context. Further, there exists an emphasis within ethnography upon the collective experience of a community under study, as opposed to a focus upon understanding individual experiences as with interpretive phenomenology (Smith & Eatough, 2006). As such, ethnography explores, in appreciable depth, the culture, beliefs, attitudes and behaviours within a setting (Figure 5), and the meanings participants attach to them – an emic perspective (Olive, 2014), supported by reflexivity on behalf of the researcher (etic perspective), via the use of photographs, field notes and reflective diary entries. An exemplar is provided here by the NHS co-researcher reflecting on the complexities of the secure setting and group in a diary entry:

> *"I had arranged a group session today for the Tuesday horticulture group but I was unable to undertake it because of circumstances on the ward and associated staffing levels. One of the clients had been admitted to hospital as an emergency and required 2 people to escort him. Another client had toothache and had a dental appointment on the main site, which required 2 members of staff for escort. A further client was unsettled and was in seclusion requiring one staff on observation at all times. I will re-arrange the session for another time but wanted to capture the complexities and difficulties in researching within a medium secure service."*

Figure 5: Researcher photographs of the initial development of the garden by service users

Generating rich data from interviews

In both studies referred to above, I deployed semi-structured interviews, typically utilised

within IPA studies (Smith & Osborn, 2008). This can be used with individual interviewing

and with focus groups (Tomkins & Eatough, 2010), exploring and giving voice to participant

experience (an empowering process in itself). In both cases, the interview schedule was not

always rigidly adhered to, so conversation was allowed to flow naturally, whilst avoiding

errant discussions at length and, where necessary, to bring the interviewees back to the

research agenda at hand. Refining the language and phrasing to suit the audience was an

important extra consideration, especially in the case of the NHS study with adults presenting

with ID and PD, whereby problems might arise with comprehension of questions; and so, on-

site staff offered guidance for me to devise Easy Read resources (Department of Health,

2010b) to inform the participants. Thus, flexible, and appropriate handling of interviews offers

the opportunity to pursue effective lines of inquiry as they emerge. I found this is often when

the richest data is offered up (Kvale, 1996; Wertz et al, 2011).

In the NHS Study, the interviewing focused upon participants' experiences of their

relationship with the purpose-built garden ('being' and 'doing' activity in the garden and the

value they attributed to the opportunity), their relationship with others (peers/staff), and the

influence of the garden upon their own personal rehabilitation goals. Importantly, an historical timeline captured their thoughts, feelings and emotions before the project started, during, and at the twelve-month research endpoint – essentially utilising a future, present and past profile of experience. This began with the service users' input to the design of the garden, how it would function, and the roles they would have within it: essentially, they expressed their hopes and fears. This was followed by their reflections on experiences during the project, but now using similar questions phrased in the 'here and now' and exploring the influences upon these; finally, adopting a 'looking back' perspective, on what the project had meant to them, and why.

There was a similar approach in the Greenfingers study with older adult volunteers in the urban park – although that study involved a far longer timespan, and thus involved more data collection points. First, a year into the project's timeline, DVD interviews were employed to largely explore drivers behind engagement in the project. Subsequently, six months later, the research focused more on recent experiences. Three years on from their initial participation on the project, five of the original volunteer group were still attending, along with intermittent others, and were then interviewed, and repeat interviewed eighteen months later, an important element in the reflexivity to promote trustworthiness (Xerri, 2018). This scenario was somewhat fortuitous and unplanned, as no one could crystal ball at the outset that a small group of volunteers would still be connected with the project several years later. I anticipated with each set of data collection that it might be the last. However, to my delight and surprise, and, perhaps not unexpectedly given I was familiar with the group and their passion for the project, the same five committed volunteers were present five years on (in fact, as I write this in 2020, nine years since the project's inception, the 'original five' are now four, but have increased volunteer numbers back up to over twenty, if not all with the same level of regularity of participation).

Therefore, the testimonies that resulted were not only of considerable value as reflections on experience, but also represented a longitudinal study, with concomitant impacts upon trustworthiness of data and its effective transferability (Polit & Beck, 2010). To add to this effect, interviews were conducted in different seasons throughout the year, thus providing insight into seasonal influences upon experience, and enabling me to examine whether participants were deriving the same positive experience regardless of weather, temperature, and park aesthetics – which, perhaps surprisingly given the vagaries of northern weather, they were!

Using field notes

One specific research tool to support a triangulation process with was the practice of taking field notes (Whitehead, 2002). This seemed a natural thing to do, documenting the behaviours exhibited by the participants; the variety of activities undertaken; pertinent and unattributed phrases from random conversations; and my own thoughts and feelings in the role of an 'insider' researcher about 'place', 'doing' and 'being'. Becoming more conversant with an ethnographic approach led me to value the role of field notes and diaries within the process (Reeves et al, 2013), a key component in reflexive research practice (Nowell et al, 2017). Indeed, the practice of composing notes *per se* became something of a habit across all my projects, as it naturally seemed congruent in supporting the other elements of the data collection process, and act as the forum for discussions with the co-researcher. This therefore became a useful adjunct to other data sources. For example, in observing the gardening group in the corporate health setting, participants often shared personal anecdotes about their lives and gardening experiences, as captured in one notebook entry:

> *"The banter at the gardening sessions is truly varied. It often starts with a discussion*
> *of what to do, and how to do it best, and what we might hope an end result might look*
> *like. Then it quickly goes onto either a discussion of plants, things that have worked*

or not worked in gardens at home, what our gardens look like, favourite birds, all

sorts…or other personal anecdotes, maybe about holidays, or hobbies… for example

we were doing some work by the old military barrack dog graves today. We soon got

chatting about the names of the dogs, people's own pets, what breeds these dogs

might have been, what duties they did whether patrolling or more ceremonial, but

also ended up reflecting on how few people probably knew that these graves were

even here! The time passed so quickly!"

The entry was later found to be highly relevant to the key themes derived from the interview data, whereby the social interactions and group bonding ensured the exchange of knowledge, ideas, and suggestions to develop specific gardening projects, within a supportive milieu which fostered satisfying, enjoyable and essentially restorative experiences for those involved – suggesting the social interactions may be driving the restorative elements as much as the immersive experience of being in nature. It also demonstrates how much of an 'insider' I was, easily assimilated within the group's activities, despite the issues that entails for being too close to the data. Similarly, in the same project, another extract not only portrayed the strength of the group dynamics and connectedness, but also how I was very much integrated into the activities at hand as an ethnographer, even bringing in my own plant cuttings for use on a specific aesthetic enhancement to flower beds bordering a teaching block:

"It's been good to hear people coming up to the group and take a real interest in

what is going on. We soon get into discussions about the plants, their names, what

soil they prefer…within the group, there's been several occasions where we've

brought cuttings in of a variety of plants to help establish new borders. Sometimes we

get things wrong – one of the estate workers who supplies the equipment is always

telling me or others off if we get the names wrong or think something prefers shade

when it would struggle to survive if we'd just gone ahead and planted it! So, we're

learning all the time!"

Arguably, the adoption of an ethnographic framework to my research was already providing a degree of innovation in researching GE experiences, especially given that historically the majority of research had emphasised quantitative approaches or relied on a single qualitative method such as interviewing.

The paper in Chapter Seven however extends the level of innovation through the adoption of an adaptation of a 'think aloud' method (Lewis, 1982; Fonteyn et al, 1993), which involves research participants verbalising their thoughts whilst doing an activity (Charters, 2010). This again tied in with my preference for researching participant experiences in the field, whilst they were actively engaged 'doing' GE. I preferred to use the term *'reflect aloud'* for this technique (adopted in the last paper). The adaptation does not run counter to the original concept, in that whilst think aloud involves a process of reflection upon decisions, it also encompasses a rationalisation of experience of a given context and the sets of actions within (Smagorinsky, 1994). Further, the concept involves participants being made as fully conversant with the research process as possible. The volunteers in this study were given ample access over a six-week familiarisation period to question the researchers about their intended aims, discuss any concerns, and probe the purpose of the investigation. The researchers remained receptive throughout to discussing the project's progress, and sharing the initial findings, including use of member verification (Shenton, 2004). This is an important tenet of think aloud, whereby researchers should have clearly defined roles, ensure activities are compatible with the participants needs, make appropriate judgements upon sampling, and ensure triangulation of data is achieved (Charters, 2010). Here, triangulation was made possible through the employment of other ethnographic methods, such as field notes and photographic representations of the contexts, activities and, essentially, the *experiences,* and the independent analysis of data by co-researchers.

Use of photography

Finally, my research embraced photographic records to enhance the experiential accounts of the research participants. This was a conscious choice, given photographic records are prominently used within ethnographic inquiries, supporting the narratives that emerge (Harper, 2003; Schwarz, 1989), although Knight (2002) cautions that narratives can be undermined by the overuse of images. I chose to use them primarily to reinforce aspects of 'place' – for example, the typography of the outdoor space involved in the studies, including factors such as size, accessibility, layout, scale, features, landscape, views, density of foliage, and whether it was devoid of man-made influence or promoted a mix of assets. A typical critique of health promoting natural spaces is that researchers' accounts provide insufficient contextual information regarding the study's location (White et al, 2015). I found images therefore helped to 'painted the picture' of each setting, but also provided depictions that reinforced the cultural and social milieu within these contexts. Images also illustrated the range and types of activities volunteers engaged with. Rather than 'take over' the narrative, the images emphasised the narratives regarding activities, equipment, group accomplishments, bonding, and the personal meanings and value to individuals of specific accomplishments and favourite natural features (Copes et al, 2018). A similar methodology was employed in a study by White et al (2015), illustrating specific environmental conditions, type of equipment used in the study, and its orientation. In Figures 6-8, the images effectively capture the social bonds of the Greenfingers group, their collective identity, and the relaxed, convivial atmosphere promoted at the project between park staff and the volunteers. The images also correlate to participant testimonies regarding the satisfaction and enjoyment derived from activities, even the more mundane ones such as weeding and clearing debris, whatever the weather involved. The group's collaborative outputs were recognised in Figure 7 by a permanent interpretation board, detailing the contributions of the volunteers to the park's grounds, and acknowledging the research study's findings in layman's terms. Press reports further illustrated this work, promoting stronger collective bonds within the group through such recognition. The photo

captures not just the sense of pride in their work, but also the conviviality with the park manager and myself as the participant observer researcher. The camaraderie (or *'craic'* as described by volunteers) is evident in Figure 8.

Figures 6, 7, 8 & 9: Clockwise from top left: Greenfingers group developing a wildflower meadow; local authority park manager and researcher with volunteers; a new flower border; literally getting to grips with invasive non-native rhododendron

The illustrative material was helpful in triangulating the data derived from both the field notes and unstructured interview transcripts, facilitating trustworthiness (Galdas, 2017). The process of taking photographs, and sharing the moments with the participants, assisted my cultural assimilation within the setting and group, enabling me to feel more tuned in to their experiences, and, importantly, revealed, through discussions, my understandings of their experiences and the meanings they attached to these (Ponterotto, 2005). Logically, this meant the images supported the *'sense-making'* process (Knight, 2002) referred to earlier.

Auto photography

A related approach is 'auto photography', whereby the research participants take their own photographic records of the context they are immersed within. Such a process gives a meaningful insight into their world as seen through their own eyes. In turn, this adds further depth to the personal narratives obtained through interviews, and thus the production of knowledge from the perspective of the researcher (Copes et al, 2018; Glaw et al, 2017). This occurred almost by accident in the Woodlands Study, where initially both researchers took photographs of the site in order to add a descriptive layer to the research. These images included an eclectic mix of unusual man-made artefacts, or follies, spread randomly around the twelve-acre grounds, but also the wilder parts of the woodlands, and the more cultivated areas such as the vegetable patch. Photographs also captured people undertaking their chosen occupations, as well as their various achievements, including digging out a new wildlife pond. Ultimately, these were not merely of use in terms of 'description', but also in triangulating volunteers' accounts, where they spoke of their fascination with flora and fauna, satisfaction with tasks, and the sense of escape the site offered from their troubled backgrounds and current crises. But when Dan (pseudonym), who had hitherto struggled to convey his thoughts in words in casual conversation with researchers through the interview process, brought his own visual depictions of 'place' to share with peers at the regular tea breaks, this acted as a means of giving voice to his inner feelings, thoughts, and personal journey through his engagement with this quirky, non-aligned to formal services retreat (Figures 10-13). The photographs Dan produced, often very creatively, had not been elicited to form part of the research – but we immediately appreciated the value of these as an insight into the value Dan placed on his own connection to this natural woodland setting, and how it was enabling recovery from his personal battles with mental ill-health (Harper, 2003).

Figures 10-13: by Dan in the Woodlands Study

Similar applications were involved in a study by Copes et al (2018) involving vulnerable populations. Dan himself acknowledged that the photographs facilitated communication with the researchers and his peers that he found difficult to provide in other mediums. When asked by my co-researcher to compose some thoughts about what the images meant to him, he found he could conjure up the words he wanted to use in his head, but when sat at the computer, *'couldn't remember a word of it'*, and that subsequent attempts to convey his thoughts in writing became *'too contrived'*. Instead, he preferred the images to *'speak for themselves'* and used them to help him frame his thoughts when we interviewed him using the think aloud method. He used his own photographs to reflect positively upon his day's work at the site ('*something worthwhile', 'made a difference'*), and the progress achieved in collaboration with peers. This evoked feelings of satisfaction in respect of his personal accomplishments, which he compared more favourably to his previous experiences in paid employment.

Sharing photographs with peers at the refreshment breaks also prompted interesting exchanges regarding childhood experiences, or more recent experiences with specific past-times,

including beachcombing, art, fishing, and craftwork. This often led to reflections upon current circumstances, including personal struggles, but also a sense of hope about the future, based upon the mutual support offered at the centre, and the value attached to the developing or established relationships forged there - as relating to the concept of hope developed by Snyder (2002). Thus, the photographs provided another important gateway into their problematic lives, slowly being rebuilt through their regular participation in GE, even if this was in small, incremental steps, and demonstrated to me how other forms of data collection could be as powerful as data derived from a focus group or interview.

Final thoughts on methodology

There has been a long running debate regarding the relative merits of positivist approaches to research that focus upon proving a hypothesis or theory. Randomised controlled trials (RCTs) are considered 'gold standard' research, and examples of scientific rigour (Hariton & Locascio, 2018; Johnson & Waterfield, 2004). More recent, or 'younger' academic disciplines such as sport development, however, have instead pursued more qualitative means of inquiry, with a view to promoting deeper insight into specific phenomenon and issues. Mason (2002:1) claims qualitative research has *'unrivalled capacity'* in this respect, qualifying this by arguing that credible research outputs are deliverable through highly engaged researchers expending high levels of emotional, practical, and intellectual capital. My own research journey has resonance with this contention: a steadfast commitment to having a regular presence at the various projects, that fundamentally provided an exciting, stimulating, satisfying, and uplifting experience across all the study contexts. This extended to feelings of pride in the unintended legacies that were created along the way, including the Friends of the Park's reconstitution (and subsequent efforts to revitalise the park). The journey also offered the opportunity to interact with some fun, inspiring, and dedicated 'green fingered' participants, a process that in itself extended my own understanding of various real-life issues, including specific medical conditions, treatment pathways and working practices. In parallel, I

developed confidence in my own research abilities and knowledge of methodological

frameworks, employing specific research tools, engaging with a reflexive process, and

managing data, that assisted in the promotion of appropriate research rigour and research

outputs that could contribute to the knowledge base within relevant communities of practice.

The published papers thus suggest the efficacy of an ethnographic approach for investigating

an eclectic mix of GE modes, participant groups and settings; with project timelines varying

from a year through five years – akin to a 'deep engagement' from the perspective of an

ethnographic continuum (Somekh & Lewin, 2009). Whilst this meant expending considerable

effort on my part to sustain such engagement, it also promoted optimal insights into the social

and cultural milieu under investigation (Green & Bridges, 2018). Whilst there can be

divergence over exactly what constitutes an ethnographic study, including length of

engagement and the methodology involved, nonetheless each method creates specific data

points that assist the research investigation. Ritchie and Lewis (2003) contend that the more

data points created, the more thorough and rigorous the research becomes. Qualitative data

sources can highlight perspectives upon participant experiences, whilst essential facts

regarding a local context are derived from quantitative data, including that pertaining to

population group and setting (Schaffer, 2015). Chapter Three's focus upon heart-rate

monitoring created 'facts' about the intensity of the conservation work, whilst participants

alluded to perceptions of wellbeing, and how these were enhanced, through the qualitative

approach in Chapter Six. Combined, both data sets can usefully situate the local, micro

context dimension within a broader, macro-level political and socio-economic context. In this

example, the cardiovascular health outcomes could be matched to UK Government

recommendations for adults to exercise[7], and the potential efficacy of social prescribing

projects[8] to meet public health targets (Howarth et al, 2020). The twinned approach also

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[7] 150 minutes of moderate to vigorous physical activity per week as per Chief Medical Officer guidelines (DOH 2016).
[8] Social prescribing, defined as: *'...a way for local agencies to refer people to a link worker. Link workers give people time, focusing on 'what matters to me' and taking a holistic approach to people's health and wellbeing.*

provides a level of triangulation within the research framework, here demonstrated where volunteers related to physical health improvements from engagement in GE…

> *"Just walking up here, and climbing up the steps, I find that's very beneficial, I find it getting easier all the time, and I do feel like I'm really doing some hard work, getting a bit of a sweat on and feel like my heart's beating a bit faster than it normally does"*

> *"It's the stamina, keeping going, and [it's] muscular [work] too… it keeps me fit"*

…that these accounts are confirmed by empirical findings in respect of cardiovascular health benefits across all three participant age groups, as detailed in Chapter Three.

With each successive paper, the research focus evolved to provide a platform for resolving a significant gap in the literature field – the need to 'dig deep' to better understand the mechanisms and processes behind reported enhancements to health and wellbeing from GE. After the first project's focus on physiological GE outcomes, it was evident that focused exploration into psycho-social wellbeing elements would provide a more holistic overview of the therapeutic effectiveness of GE. Importantly, this involved the inclusion of largely unresearched populations and settings. Further, the research contributed to investigating the efficacy of specific GE modes that had previously received relatively low levels of attention compared to other GE modes such as walking. This tailored approach facilitated the later development of a socio-ecological model to explain a number of related factors: the motives for engagement in GE, the health impacts, and suggest potential moderating and mediating influences upon health outcomes. As such, the published papers can be viewed as enhancing the extant literature in this specific field of study. Arguably, then, my pragmatic approach to research has blended a nod to the conventional rigour of objectivist research with its inherent

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They connect people to community groups and statutory services for practical and emotional support.' (NHS 2019a).

scientific validity (Long et al, 2000), with the insights of contextual, subjectivist research that subsequently dominated my work (Cunliffe, 2010) – whilst firmly rejecting the notion that qualitative inquiry lacks rigour (and even relevance) compared to hitherto more widely used quantitative designs. Whilst the shifting sands of my approach could be criticised at a philosophical level, my emergent position was symptomatic of an adaptable, pragmatic researcher who develops their inquiry through informed reading and identification of notable research gaps. This in turn promotes the adoption of specific methods optimally designed to promote necessary insight into key issues and contexts, and thereby effectively contribute to the research field (Carpiano & Daley, 2006), and inform social policy/practice (Bornmann, 2013).

CHAPTER TEN

CONTRIBUTIONS TO THE ACADEMIC AND PRACTITIONER FIELD

Chapter Introduction

'Digging deep' as a thesis represented a specific focus upon a range of GE contexts, with the involvement of diverse groups participating in a variety of GE activities. The combined research contributes towards filling identifiable research gaps. There was a deliberate emphasis upon conducting innovative research utilising an ethnographic approach, previously under-utilised within the field. Further, as my research drew to its' collective conclusion, I appreciated the apparent commonality in wellbeing outcomes across groups and contexts, which confirmed the utility of GE as a vehicle for enhancing individual health. The social impact of my research also pointed to positive outcomes that extended beyond the individualaccruing collective benefits that potentially permeated into the community. As such, this cumulative insight may hold utility for industry practitioners in designing GE health-related interventions with specific populations at community level, thus promoting social value (Barbosa & Murta, 2019; Snodgrass et al, 2018).

The research motives, and overarching pragmatist approach, were described in depth in the preceding chapters, followed by the presentation of published papers. Further, my earlier narrative covered a brief historical overview of the existing literature at the time of beginning my research journey into this field which was supplemented by the literature reviews associated with each of the papers. These reviews relate transparently to the specific GE modes focused upon in this thesis, with an overview of the theory and justification for the methodological approach. This section provides an update on the literature since 2012, and how it complements or contrasts with my own work. Therefore, the purpose of this concluding chapter is to outline the six main contributions to the field (Table 6) and suggest lines of enquiry for future research. In doing so, it features unpublished extracts from interview transcripts to further enlighten specific issues. The chapter concludes with a short summary of the thesis as a whole.

Research impact is represented by quality research making a notable contribution to society, as well as politically and economically (Economic & Social Research Council (ESRC), 2020). Two distinct types of research impact are involved: academic impact, that influences theoretical developments and applications in respect of research disciplines; and broader, social, political and/or economic impact contributing to community development practice (Table 6) – for individuals, but also to groups and whole communities (even nationally). Whilst it may be difficult to quantify the impact of qualitative research efforts, especially when so much health-related research historically has demanded and been represented by positivist oriented 'evidence-based' measures, articulating its unique value is instead an important consideration when disseminating findings to relevant audiences (Galdas, 2017).

SOCIETAL IMPACT: POLICY & PRACTICE	Influencing new project development and practice/policy within communities
ACADEMIC IMPACT: KNOWLEDGE	Confirming GE promotes positive physical and psycho-social health outcomes
ACADEMIC IMPACT: KNOWLEDGE	Insight into the utility of GE amongst under-researched population groups and settings and with specific modes
ACADEMIC IMPACT: KNOWLEDGE	Revealing potential mediating and moderating factors underpinning GE impacts
ACADEMIC IMPACT: THEORETICAL	Towards identifying a 'Green Transformational Ripple Effect' and a socio-ecological model of GE and its effects
ACADEMIC IMPACT: METHODOLOGICAL	Innovative methodology to investigate GE impacts and influences on outcomes using 'real-life' contexts

Table 6: Contribution of the research

Impact 1: Social Impact

Firstly, and reflecting the pragmatist paradigm's association with action research, is the question of social impact. I had no idea at the outset how my research outputs would contribute locally, even nationally. Although this can be hard to quantify in precise terms, this

next section will give a brief overview of the known facts at least, of which I am particularly proud. Always at the back of my mind when designing my research investigations, was how my work would finally be disseminated to practitioners and policy makers. 'Claims making' is a continual process of reflection upon how your work can make a difference and be of relevance to your intended audience (Knight, 2002). Explaining your findings in an accessible way, and its relevance, develops greater resonance with your audience; therefore Mason (2002:4) encourages researchers to be emboldened and seek to have 'a presence'. Although generalisability sits more comfortably with positivist research (my first study could at least tentatively suggest generalisable findings), my qualitative studies could more realistically promote *transferability* through thick description of group, GE mode and situational aspects (Lincoln & Guba, 1985). Thus, the process of researching GE projects can facilitate opportunities for *'active collaboration among researchers, practitioners, and community members'* (Okvat & Zautra, 2011), whereby impact is supported through factors including: networking and developing positive relationships with all those involved in the research, including stakeholders and participants (Xerri, 2018); a good understanding of the policy and practice context and using this to support the development of robustly designed investigations; space and time to reflect upon the research design and process; and having the means to make research happen - equipment, facilities, leadership and managerial support (ESRC, 2020). A few illustrative examples of these supportive mechanisms that facilitated impact from a conceptual, capacity building and instrumental perspective follow here.

Greenfingers Project impact

The local authority and other stakeholders used the Greenfingers findings at senior management level to help shape future wellbeing policy, resulting in the development of further GE projects under the auspices of their exercise-referral initiative and voluntary sector led schemes. Given its humble beginnings as a project that ran initially as a six-week pilot, with no guarantees it would recruit volunteers, and with no funding to support it, it has acted

as a remarkable catalyst for local change. Members of that original group have since become instrumental players in a re-established *'Friends of the Park'* not-for-profit organisation that was moribund prior to the Greenfingers project. The project was then influential in facilitating a range of local initiatives involving a burgeoning array of public and voluntary sector organisations: suggesting a *'green transformational ripple effect'* is possible given effective dissemination of project outcomes to the key stakeholders and communities of practice with an interest in nature-based therapeutic interventions. No less than sixteen 'Friends of Parks' groups, and several community orchards, were subsequently established locally with local authority support. A local website focused on 'greenspaces' now offers opportunities for potential new volunteers to engage with this burgeoning range of local projects.

NHS Study impact

The NHS study's findings were disseminated to immediate audiences including on-site staff via internal workshops, but also to two regional NHS conferences: the 14th International Conference on the Care and Treatment of Offenders with an Intellectual or Developmental Disability, and a regional Mental Health themed event. Feedback at these events highlighted the efficacy of empowering service users in the study design and process, right through to assisting in person with dissemination at two events.

Further, although I cannot claim to have any direct evidence of the influence of the NHS project study influencing other NHS secure sites in establishing their own garden projects, it may not be coincidence that several NHS sites have since incorporated garden facilities for similar purposes, including in Southern England, Scotland, Merseyside, West London, Cornwall, the Humber, and Northumberland. Further, NHS staff cited several service users' accelerated progress to move on to the next stage of their rehabilitation as largely due to the positive affirming effects on personal development and mental health that the purpose-built garden promoted.

Woodlands Study impact

The Woodlands Project was disseminated primarily through a local third sector agency that supported mental health service users within the local district. To a lesser degree than the Greenfingers project, nonetheless this initiative has encouraged new user groups to access the site since the research was published including local educational, mental health and charitable organisations. It continues to operate on the basis of self-referrals and local third sector organisations transporting small groups to engage with the multiple activities on site, supervised by the husband-and-wife team who own the premises.

Corporate Health project impact

And finally, my developing research profile did not go unnoticed at my university, given dissemination of provisional and summative results of all papers within internal academic workshops and conferences. As a direct result, support was given by senior managers to develop the 'Green Minds' initiative on campus in partnership with the university's sport and health development unit, campus mental health service and Human Resources department. Green Minds quickly became established as a vehicle to enhance staff wellbeing through a sociable gardening group that concurrently could begin transforming parts of the campus for collective good, including developing new flower borders, a World War One Remembrance Garden poppy display, and the creation of a sensory outdoor classroom space. As the project became more established, the Vice-Chancellor offered to judge a 'Campus in Bloom' competition, adding extra impetus to the effective volunteer contributions to the campus aesthetics and drawing in more staff participants. Discussions with participants highlighted the extra value they attributed to their working environment as a result of the new opportunity, including the development of a campus nature trail with interpretation board, and an orienteering trail to British Orienteering Federation standards. These new additions devised by volunteers were subsequently utilised for induction activities in freshers' week, team building

and recreational use by other groups outside of the university including schools. Research highlights how a healthier, happier, more productive workforce can be facilitated through embracing a holistic approach to wellness interventions, including PA oriented initiatives (Baker et al, 2008; Mulchandani et al, 2019; Naidoo & Wills, 2009). These programmes can be mutually beneficial to employee and employer, with enhancements accruing to the businesses through higher productivity, lower absenteeism and reduced presenteeism (Michaels & Greene, 2013). The apparent success of Green Minds as a health promotion vehicle for staff was afforded considerable capital internally, as I was asked to contribute to the university's evolving wellbeing agenda in terms of two specific bodies: the sport & health development unit, and a university-wide wellbeing committee chaired by senior managers. The project was also highly valued by the Mental Health & Wellbeing Officer, himself an occasional project participant, with interest also shown by the Student Union from a student mental health referral perspective. I have also recently been co-opted to engage with a new, collaborative TH research project for young people at risk of exclusion from education, with £75k of funding in a joint enterprise with health authorities in Northeast England and Cumbria.

Collective impacts

Further afield the cumulative research outputs facilitated invites to a regional conference entitled *'Heart, Mind, Body & Soul'* and even to the Health Select Committee at Westminster in its deliberations concerning social prescribing. Unfortunately, my appearance on BBC Parliament was scuppered by the calling of a snap UK general election, at which the enthusiastic social prescribing advocate who chaired the Committee lost her seat! Within the virtual academic community through web forums including Research Gate, my profile, and connections within the broad field of GE were also developing in a positive way with research interest levels rapidly rising based upon the number of reads, downloads, and citations. I was asked to review new book publications and my research was signposted to the broader fitness

industry through the lead body for sport and physical activity in the UK – the Chartered

Institute for the Management of Sport & Physical Activity - CIMSPA's industry journal

'Fitness Matters' (Figure 14) and featured nationally in *'The Big Draw'* event (The Big Draw,

2020).

Figure 14: Article in Fitness Matters: 'The Great Outdoors'

Implications for society and health services provision and future research

Given the social dynamics participation in greenspace activities can afford to community

development and health, it would seem an obvious and essential planning requirement to

safeguard greenspace and facilitate more urban greening (Berto, 2014; World Health

Organisation, 2017). Further, since a large body of research in recent decades has

demonstrated beyond doubt the links between improved physical health and mental health

(Chekroud et al, 2018; Knapen et al, 2014; Morgan et al, 2013; Sharma et al, 2006; Stubbs et

al, 2018; ten Have et al, 2011), group-based GE activity appears to have an important role to

play within broader health promotion strategies in local contexts. Nature-based initiatives can,

if well designed, contribute to better life outcomes and expectancy, whilst also promoting

social capital and green behaviours (Martin et al, 2016; Pretty et al, 2017). Indeed, a healthy community (Hubley et al, 2013) is characterised by strong social capital, the nurturing of community assets, and the sense of community pride evoked from the interactions fostered through increased levels of active citizenship and, by association, democratic social capital (Hemingway, 1999; Okvat & Zautra, 2011). Such civic engagement has been noted by Kaplan and Kaplan (1989) in studying the impact of a New York City Housing Authority flower competition that has operated for decades – an initiative that engaged thousands of community members in friendly competition. Okvat and Zautra (2011) speculated that successful projects of this ilk could persuade policy makers to see the health value in creating a network of sustainable community gardens that provide opportunities for residents to be positively engaged within their communities, develop skills and knowledge, and build social capital (Ruggeri et al, 2016; Scheromm, 2015). Gardening, horticulture and conservation activities can thus facilitate multiple empowerment processes including local activism in tackling issues of local concern. There is also tentative support for the view that greener areas including community gardens report lower levels of criminal activity (Bellows, 2008; Kuo & Sullivan 2001). Strengthening the evidence base for these effects, can only assist the process of health authorities embracing social prescribing initiatives (Howarth et al, 2020) and encouraging the formation of gardening groups, reinvigorating allotment sites, and supporting the case to maintain public spending on local park infrastructure for community health. If my research has made some contribution to real change, even in a purely local context, it will have been worth the time invested, and reflecting the values and outcomes associated with a pragmatist approach (Morgan, 2014). Future action could involve nature-based activities which encourage social interaction being implemented in schools, care, and health settings, supported by public and third sector organisations, as well as employers utilising such activities for employee wellbeing. Ideally low participating groups, so called 'hard to reach', should be targeted, especially where traditional solutions have not worked. I hope my own research is viewed through this prism given the target groups involved.

Role of group-based GE initiatives

Supportive group-based activities appear to be an important consideration. These not only provide opportunities for development of social capital, but also help elicit the sharing of experiences, and through such an intimate process, promote a supportive social milieu facilitated by motivational group leaders. Within this supportive network, personal goals can be determined, with, where necessary, the support of specialist services as part of a broader treatment plan (Haller & Kramer, 2006). This can be represented in Figure 15, whereby the existence of tailored group-based nature activity programmes or initiatives encompass a range of potential contributions. Although this model suggests distinct activities, these need not be mutually exclusive: indeed, groups may well display characteristics akin to a hybrid of these elements, for example as a social-task-communication support group, which perhaps summarises my impression of the 'Greenfingers' initiative, whereas the NHS and Woodlands projects were arguably a mix of all four components, with some sub-elements emphasised more than others (such as the clinical treatment goals for service users at the NHS study, whilst personal goals were not explicit at Woodlands given the non-clinical nature of the project and setting).

Policymakers, and those who hold the purse strings to public health budgets, need to consider very carefully how programmes and initiatives can take inspiration from research in this field in respect of the interconnections between wellbeing and natural environments (Chatterjee et al, 2018; Richardson et al, 2013; Shanahan et al, 2015). For instance, a study by White et al (2015) noted that in both green and blue exercise environments post-menopausal women were more motivated to repeat PA more often, suggesting a better return on investment as opposed to campaigns that focus on built exercise environments such as gyms and sports centres. Specific local contexts can also benefit from GE interventions and more quality 'greenspace' (Berto, 2014). Areas suffering from high crime, overcrowded housing, noise pollution and a

lack of quality greenspace, and relatable social exclusion factors, are typified by a lack of 'social glue' (Kuo et al, 1998). Community garden projects, or simply 'greening' areas within communities, can thereby offer a bi-dimensional function, in not only enhancing the general aesthetics of an area, but also promoting more social connectedness, and, by consequence, better health (Armstrong, 2001; Martin et al, 2016; Moore et al, 2007). Everyone potentially benefits from such a process – individuals, communities and indeed the wildlife - through a deliberate rebalancing of the economic elements of urban life with the social and ecological needs of communities (Evelly, 2014).

Social activity:

Interaction; co-operation; having fun; togetherness; shared experience; connectedness; building social capital

Communication support:

Sharing and valuing experiences; supportive environments to provide space to discuss issues, feelings, and personal journeys

Social & Horticultural Therapy groups

ACTION

SUPPORT

Task activity:

Creativity; completion; co-operation; satisfaction; vocational; project related; cognitive; achievement; contribution

Psychotherapy support:

Focus on mental health; development of personal goals; exploring feelings, emotions, life perspectives; personal development

Figure 15: Role of HT groups: adapted from a model by Haller & Kramer (2006: 61).

Urban regeneration schemes should therefore consider imaginative ways of 'greening' more deprived urban communities and the concomitant social projects such a process might foster, and appreciate the relatedness of this to solving a myriad of social problems - as an area that is

attractive to live in can stimulate economic activity, raise active citizenship, reduce crime,

improve health and boost the environment (Allen et al, 2008; Cumbers et al, 2018; Pretty et al,

2017). Friends of the Park groups are representative of a 'bottom-up' community approach to

using gardening and related-activity in communities – including those with areas of high need

- to galvanise civic engagement and enhance the local greenspace for community benefit.

Harnessing ecosystem services

There are also potential implications for how ecosystem services are more appropriately

focused to promote public health. 'Green corridors' can be designed into new housing estates,

and 'green infrastructure' including ponds, community gardens, play areas and general

landscaping (such as tree-lined avenues) which can have a positive impact on residents' health

(Barton & Rogerson, 2017; WHO, 2017), including physiological markers such as blood

pressure and lower heart rate response (Koehler et al, 2018; Zhang et al, 2019). This can assist

with local goals to reduce pollution, promote play, and generate produce for consumption to

reduce carbon footprint. Natural spaces and urban greening should thereby be viewed through

the prism of ostensibly offering 'healing places' that encourage social interactions, and,

relatedly, strengthen the social fabric and resilience of communities (Vaeztavakoli et al,

2018). Relatedly, and conversely, questions are raised regarding how far factors such as

increased environmental pollutants in our lives impact negatively on our health and wellbeing

– and how as humans we respond to a deficit of nature in our lives. The rise in 'guerrilla

gardening' groups is one example of 'localised action' in response to the concreting of

landscapes (Adams et al, 2015), as well as efforts by community members to raise funds to

develop derelict sites into community green spaces for people to socialise and engage with

horticultural activity, suggesting that where biophobic and man-made influences have

previously dominated, it is often countered by motivated people in pursuing a biophilic

response to a lack of nature in our lives (Crane et al, 2013; Patuano, 2020). It was interesting

to note how respondents in my own research were motivated by their perceptions of a world

in which nature was suffering through human impacts, most notably raised by the staff in the corporate health project. One spoke of her alarm about encroaching urbanisation, including the tarmacking of garden spaces, and the loss of wildlife including pollinators such as bees. She likened the distress caused to the eco-system as *'fundamentally…not good for us',* whilst another hinted at the need for everyone to take responsibility to protect the natural world:

> *"…the pleasure of nature, the pleasure of birdsong, seeing animals, and understanding that complex ecology of the need for everything at a different level, and the balance of it…it comes from a core belief that if everybody does a little something then lots of little 'somethings' benefit; I think that's a key driver for me"*

Although I had substantial experience of being a domestic gardener, I found being involved in the various projects enhanced my own knowledge of broader environmental concerns, how human activities could adversely impact eco-systems, and specific ways in which we can all do our own 'little bit' to help. The first few months of the Greenfingers project involved volunteers essentially doing what ostensibly appeared to be destructive work – literally uprooting a large area of non-native rhododendron shrubs – some ten feet tall or more – from a section of the park. At first, this unsettled me, as these plants offered up a beautiful vista in springtime when in flower. But, as I and the research participants came to appreciate, replacing these plants with native species was essential to rebalance the park's eco-system, and so as our awareness and knowledge of this grew, we were more able to articulate what was going on to bemused passers-by, as well as appreciate how our efforts would eventually bear fruit a few years down the line. Further, I could see how the process of renewing the park, and enhancing it as a wildlife habitat, was clearly valued in the personal testimonies of the volunteers, and which appeared an inherent factor in feelings of pride, achievement, and satisfaction – something I also derived from my contributions as part of the group. It was noticeable, too, how the public became more aware of the group's endeavours, and appreciated the enhancements being made, and referenced how it made their visits to the park

more enjoyable and interesting. I became more aware therefore of not only the individual and group impacts from participation, but also the community impacts on both eco-system and park visitors, which enabled me to later conceptualise, with the findings of the other studies, the socio-ecological model which appears in Figure 22. It also spurred me on to ensure that any planting I used in my own gardening efforts was tailored to supporting wildlife – including leaving some areas to grow wild.

This next section considers five academic impacts resulting from the collection of studies.

Impact 2: Confirming GE promotes positive physical and psycho-social health outcomes

Secondly, my research supported the contention that GE promotes beneficial health outcomes. A wide body of literature already existed more generally around the improvements in both physiological and psychological markers through GE related contexts and activities, mostly derived from quantitative, positivist-oriented enquiry. This early experience gave the momentum to investigate further how and why people appeared to benefit in other (psycho-social) ways from GE experiences and awakened me to the utility of employing an eclectic mix of qualitative methods. As the research evolved, there was remarkable consistency in the core themes arising from the collection of qualitative research papers. Whilst all the research projects supported both physical and psycho-social enhancements, there were also notable themes as regards the shared desire to interact with nature and the perceived restorative effects of 'being' in nature; the fostering of social capital via social interactions and consequentially more social connectedness; and the personal value attached to 'doing' meaningful activities. Similar findings have recently been found within other green care contexts, including care farming where O'Neill (2020) identified being outdoors, purposeful work, and social interaction were all pertinent factors in promoting beneficial impacts; and in school garden settings, as noted by Passy et al (2010). This is represented and summarised in Figure 16, based upon the themes presented in Chapters 3-8 (detailed overview in Appendix Two).

Figure 16: Summary of the recurrent core themes across the research papers

Respondents frequently framed their accounts of GE immersion, and the positive dividends, within the parameters of 'being' and 'doing' in nature, as well as their relationship 'with' nature. Here, one participant spoke of a variety of nature elements having a 'musical' connotation in promoting relaxation and restoration:

> *"For example, in winter, it could be music represented by the silence of snowflakes,*
>
> *or…the sound from the wind and gales blowing through the trees, or even the sound*
>
> *of heavy downpours. It's something you work with, work to. In spring it would be the*
>
> *birds singing, or lambs bleating…[even] the farm machinery and tractors working*
>
> *away…in summer again the sheep in the fields baaing… the swallows and swifts*
>
> *dashing about. With autumn then you get the combined harvesters gathering corn,*
>
> *and winter flocks of birds in the sky. To me that's all music while I work in nature."*

(Greenfingers Study)

In reference to the earlier discussion in Chapter One regarding defining health and wellbeing, it was notable how the collective studies reinforced the notion of both concepts as multi-faceted, with many influences upon these from their personal perspectives. For example, there was recognition of the interplay between mental, social, and physical health, in that social

connectedness through the group activities, the interactions, sense of belonging and positive relationships these fostered, were important contributors to overall health and wellbeing. This contrasted with respondents' prior experiences of being socially isolated, lacking social support, feeling judged by others, and struggling to cope alone with sources of stress in their lives. The value of finding something challenging, purposeful, achieving new things, and using nature-based activity as the catalyst for personal development were also key factors. 'Escaping' stress – for example heavy workloads, or financial and domestic pressures, and having a safe space to engage with that held meaning to them, were again important issues. Successfully managing important life transitions, for example into retirement, were again highlighted. Making appropriate lifestyle changes, for example taking more regular exercise, embracing more active transportation methods, changing diet, and losing weight, were cited as being changes prompted through their engagement in gardening, horticulture, or conservation activity, which, for some, was their main source of exercise. A few pertinent examples from the studies follow here.

My first study made the case for the physiological health benefits from conservation work, with volunteers attaining moderate or vigorous intensity levels over a two-hour period, akin to a *'really good workout'* as one respondent enthused. A recent study by Soga et al (2017b) with allotment gardeners demonstrated similar results in respect of achieving moderate intensity levels of physical activity; an intensity level at which provides long-term preventative benefits in reducing onset of chronic disease (Bucksch & Schlicht, 2006; Moore et al, 2012). Recently, other studies demonstrated further physiological health improvements associated with GE modes, including gardening to increase PA and reduce hypertension (Cox et al, 2017); gardening as an effective vehicle for tackling heart disease, diabetes, and obesity, whilst also enhancing muscular strength and endurance capacities (Bellows et al, 2008); and gardening interventions for all ages that promoted improvements in nutrition, decreased diastolic blood pressure, engaging in regular PA and reductions in BMI (Zick et al, 2013).

Physical benefits were attested to by participants across the four project contexts, including

some who referenced how the GE activities had motivated them to adopt healthier lifestyle

habits, including being more active. This was perceived as a perfect antidote to stressful

factors in their lives, or, in the corporate health study, a means of taking time out from

sedentary office jobs that had contributed to musculo-skeletal problems. Others advanced the

potential of gardening as an alternative workout, for example if there was insufficient time for

other forms of exercise:

> *"I get exercise here, I mean some of the stuff we've done has been very hard physical*
>
> *stuff, you know moving big rocks and slabs."* (Woodlands Study)

For some, it was a gentler option, but exercise nonetheless, and for those who usually found

exercise a chore, gardening proved more liberating, and something that required less

conscious effort to get involved with. Other respondents across the studies cited the delayed

onset of muscle soreness associated with heavy exercise, particularly after digging or a longer

stint of gardening, but also noted the typical endorphin promoting feel good effect of

exercising as a *'good feeling'.* Often the concurrent physical and psycho-social benefits were

noted:

> *"I find it enjoyable, the exercise, it's given me more confidence, just enjoyed the*
>
> *whole environment. Everyone is so friendly and you don't have to prove yourself in*
>
> *anyway, you just go and do what you can and if you don't want to work very hard one*
>
> *day that is fine…overall it has been a really, really good experience for me."*
>
> (Greenfingers Study)

Psycho-social health enhancements from GE were emphasised in my subsequent papers, with

reported improvements in mood states, satisfaction, happiness, self-esteem, stress reduction,

positivity and generally 'feeling good'. These were allied to positive changes in personal

development, socialisation, and personal agency factors. Perhaps one of the most powerful

testimonies, and almost an advertisement for GE as a social prescribing vehicle for mental health and wellbeing, was from a volunteer in the Woodlands Study, who claimed his mental health had been enhanced far more through his time volunteering than from the traditional mental health services that had offered talking therapies and medication. The contrast to the benefits obtained through immersion at the Woodlands Centre, compared to traditional service interventions, was shared by others, including being respected and treated equitably:

> *"I think one thing that is characteristic of here is that we work with each other on an equal basis and we work alongside each other. There is nobody who is above or below, its equity and its working in partnership with people, that may be a simple thing to say but actually within [traditional mental health] services that is not always the case."*

Across all studies, the 'escape' from stressful sources was a constant reference point for many in their engagement, whereby restoration and quiet contemplation assisted their mental health status, an exemplar here:

> *"...you're sat at your desk in the morning... I sometimes can't see the wood for the trees if I've got too many things coming in… it's what do I need to prioritise… what can wait… and sometimes just taking a step away from it… it'd be less stressful to (go gardening) even if you might not feel like it...give yourself some time to de-clutter your mind and when you come back to it (work) you might have a fresher perspective on stuff"* (Corporate Health Study)

In the Woodlands Study, both myself and the co-researcher referenced how we too found the setting therapeutic and restorative. Part of this, we surmised, was the rather quirky feel to the layout, with the mix of vegetation including more manicured and the wilder aspects, and the incongruent follies dotted around the woods that in some cases were being reclaimed by

nature with vegetation starting to envelope them. We readily shared the positivity the largely male clientele was deriving from participation in a host of autotelic activities on offer within such a setting, and the consequential sharing of experiences at tea breaks. It was not lost on either of us that for these volunteers presenting with a history of mental ill-health, that the gains were potentially far more considerable than we were experiencing. That said, I wondered as to how long lasting such effects might be, and whether the impacts were merely transient (a mere distraction), or actually having a gradual, more cumulative effect in building individual resilience and hope for the future. The testimonies appeared to support the latter, but we were only getting a limited insight into their lives.

Such psycho-social GE impacts have since been supported by Berto (2014), Buck (2016); Howarth et al (2018); Rogersen et al (2020), and York and Wiseman (2012). Alaimo et al (2010) and Christensen (2019) demonstrated how community gardening facilitates more social interactions, and stronger bonds between residents, including through bridging with others within a community (Perkins et al, 2015), acting as an important contributory factor in participatory health outcomes. Conversely, a quantitative study by Rogersen et al (2017) with GP referral patients, including older adults and people with mental ill-health, found that whilst generally wellbeing was enhanced through woodland-based projects, there was no tangible impact in respect of enhanced social health factors.

Whilst I had a strong preference for nature-based activities, I often questioned whether others might not reap the same level of health benefits from traditional indoor fitness settings such as gyms and sports centres. However, respondents in all projects seemed to share the view that the outdoors was a preferential mode of engaging in physical activity to benefit their health. Indeed, the literature contends that outdoor-based exercise bestows much *stronger* impacts compared to indoor alternatives (Bowler et al, 2010; Thompson Coon et al, 2011). Further, MacKerron and Maurato (2013) argue natural rather than built environments promote greater levels of happiness, improving mood and lowering levels of depressive episodes, whilst

Houlden et al (2019) and Maas et al (2006) suggest that close proximity to greenspace is an important predictor of wide-ranging health improvements, including the reduction of health inequalities in deprived neighbourhoods, with concomitant cost savings in respect of healthcare and work absenteeism. Combining greenspace engagement with PA can therefore be a powerful combination. The benefits derived from *biophilic* environments contrast sharply with the negative health impacts derived from *built* environments (Koehler et al, 2018), widely documented within research literature: for example, medium to long-term exposure to traffic pollution sources (Laumbach & Kipen, 2012; Samet, 2007) including poor air quality from congested vehicle routes and urban locations causing physical and mental health problems (Sram et al, 2017; Vert et al, 2017; Zhang & Batterman, 2013), and rail and car traffic noise and air pollutants also related to mental ill-health (Klompmaker et al, 2019).

Impact 3: Insight into population groups and contexts relating to my investigations

Third, there existed a lack of comprehensive insight into the utility of GE amongst specific population groups and specific settings.

People diagnosed with mental ill-health and its varied conditions (depression, anxiety disorders, schizophrenia, for example), and how they can benefit from GE activities, is perhaps the most explored of the four population groups that featured within my studies. However, researching this issue within a private woodland site, with no formal referral programme, was, in itself, an unusual context for a study, and thus involved a novel investigation into the impacts of GE on this population group of self-referrals presenting with a longer-term diagnosis of psychological ill-health. Some pertinent studies with similar foci have recently highlighted how horticulture and gardening can be effective interventions, through de-stigmatising mental illness, and providing the social space to facilitate new friendships and constructive dialogue to promote recovery (Bishop, 2013; Howarth et al, 2018), factors that relate closely to my own findings. Meanwhile, Toepoel (2013) argued that

projects and initiatives that facilitate social interactions can make important contributions to both enhancing mood states and bolstering self-esteem among participants. Pedersen et al (2016) articulated the benefits of group HT in care farm settings for people with chronic depression: organised by a philanthropist (similar to my study in Chapter Five), using quantitative tools to evaluate impacts on depression, anxiety, stress, attentional function, group cohesion and restoration. Positive impacts were noted across all indicators, but although participants described their experiences as valuable and meaningful, these experiences were assessed only by means of four open-ended questions. Whilst the authors acknowledged the complexities involved in researching these experiences, they perhaps erroneously concluded that more randomised controlled trials would enhance knowledge of impacts, overlooking the potential for rich data to be obtained through qualitative inquiry (Patton, 2014).

Whilst there have been a few notable studies involving conservation work, including Moore et al (2007), these have not focused upon exercise intensity per se, or conducted over a longitudinal time-period to investigate *experiences*, hence the value of my approach with each study. The need for longitudinal studies to appreciate experiences is noted by Hartig et al (2014) in highlighting the extant evidence-base regarding restorative impacts has typically involved only single encounters with natural environments. Husk et al (2016) suggested in their review of conservation projects utilising quantitative methodologies, that there remained insufficient evidence of psycho-social beneficial impacts, adding their voice for more qualitative research into examining the mechanisms underpinning health outcomes derived through conservation activities.

Studies involving GE with employees remain rather absent, despite an earlier investigation focused upon wellbeing derived from viewing natural features from an office window (Kaplan, 1993; subsequently confirmed by Chang et al, 2020), and a recent study by Wagenfeld et al (2019), which found beneficial emotive impacts for employees potting up succulent plants to brighten up their indoor workspace areas. And yet the cost savings to

employers from embracing forms of PA (including GE) within a corporate health strategy, in addition to the dividends for employee health and motivation, are potentially considerable (Bertera, 1990; Calogiuri et al, 2016). Therefore, the study featured in Chapter Seven makes an important contribution.

The medium secure unit investigation clearly involved a high degree of sensitivity and, indeed, security for researchers to investigate. I still recall being fitted with a personal alarm and handing over mobile phone and keys on entry, and being warned of sudden, unexpected changes in behaviour that could lead to injury given I was working in close quarters with service users. Such safety concerns may be a major barrier that has prevented similar research projects being undertaken in such settings. A few studies with young offenders (Pretty et al, 2013; Twill et al, 2011), and in prison gardens (Timler et al, 2019) have emerged, however, with similar beneficial outcomes noted.

Continuing gaps in the field

Therefore, my own GE research has either enhanced, or pioneered, research with specific groups and contexts. It is, however, important to acknowledge that since the start of the last decade, the field has expanded rapidly: GE studies involving horticultural, gardening and conservation related activities have highlighted physical and psycho-social benefits for a broad range of population groups and in different contexts: school pupils (Ambusaidi et al, 2019), post-menopausal women (White et al, 2015), Green Gym volunteers in the UK (TCV, 2016), dementia patients (Zhao et al, 2020), war veterans with PTSD (Poulsen et al, 2016), those recovering from strokes (Barello et al, 2016; Patil et al, 2019), people with disabilities (Wilson & Christensen, 2011), people with mild to chronic mental health conditions (Bragg & Atkins, 2016; Kim & Park, 2018), schizophrenia patients (Liu et al, 2014), immigrant families (Hordyk et al, 2015) and people within different stages of rehabilitation (TCV, 2016). A few studies have also attempted to evaluate the different impacts on wellbeing resulting from

exercise by comparing different environmental settings, including indoor, urban, park, river, beach, and coast, as identified by Rogersen et al (2016) and White et al (2015). Whilst Pretty et al (2017) suggest that there *is* now comprehensive coverage of impacts and outcomes associated with GE and interventions in the presence of nature within the literature, across a wide demographic of the population, including age, gender, social income and ethnicity, and, to a lesser degree, with contexts, the literature continued to highlight two concerns: firstly, a need for more research on health and wellbeing measures related to specific GE modes, including gardening, and addressing physiological health markers (Forgeard et al, 2011; Nicklett et al 2016). Secondly, that whilst positive GE health outcomes were arguably substantially proven, there remained a lack of insight into the essential *mechanisms* supporting these impacts (Jenkinson, 2013; Lachowyz and Jones, 2013), reinforcing the need for the foci in my qualitative studies.

Impact 4: Suggested mediating and moderating factors underpinning GE impacts

The fourth contribution relates to highlighting the numerous influences upon reported positive health and wellbeing outcomes. These influences were manifest in each setting and with each group, establishing a common denominator of factors present. Whilst it would be erroneous to claim comprehensive coverage of mediating and moderating influences upon GE outcomes as a result of my investigations, nonetheless I believe important insight into these elements has been achieved which could assist the development and efficacy of future GE interventions with populations, especially those 'at risk' of health inequalities and social exclusion.

Suggested mediating influences

In Figure 17, I seek to demonstrate how the act of participation in group GE produced beneficial outcomes mediated by numerous factors evidenced through the combined study outputs. The most prominent suggested mediators oriented around respondents' affinity for

the outdoors, the reciprocity gained from nurturing nature, and the satisfaction, sense of achievement and enjoyment involved in GE participation. One notable earlier study by Barton and Pretty (2010) found similar mediating effects between green environments and mental health benefits, with mediators including the range of biodiversity and tree cover in greenspace, weather, people's connectedness to nature and social interactions within.

A further (palpably) strong theme that linked all the research projects related to the positive social interactions, and fostering of positive relationships, which led to a combination of associated psycho-social health and wellbeing outcomes, including improved mood states, and reduced social isolation. This is effectively evidenced across all study settings whereby new friendships, co-operative working, group camaraderie, shared purpose, and a sense of pride was engendered (even when their efforts did not always realise immediate dividends, or became problematic – for example, plants becoming waterlogged in the Greenfingers project, or the chickens digging up the vegetables in the NHS garden: but the challenges that were occasionally thrown up in this respect actually added to the sense of achievement). Recently, there has been support for the role of social interaction as a mediator between exposure to greenspace and health enhancements as noted in a systematic review (Vanaken & Danckaerts, 2018). Although there was a distinct lack of BAME participation across my own studies – a potential and important area for future GE related research - Hoffman (2018) nonetheless contends that community gardening, with the inherently close contact associated with group activity of this type, proffers an inclusive, collaborative activity that enhances opportunity for social networking, that cuts across cultures and socio-economic status - with consequential impacts on health. Triguero-Mas et al (2015) concur, in reflecting that thus far it appears the research suggests that regardless of gender, socio-economic status or degree of urbanisation, that participation in greenspace activities bestow enhancements to overall wellbeing; however, they cautioned that levels of PA and social support are *unlikely* to be the mediating influences in this relationship. Similarly, in earlier research, Maas et al (2008) found scant evidence that PA mediated the relationship between greenspace utilisation and health outcomes. More

recently however, Barton and Pretty (2010); Belanger et al (2019); Bojorquez and Ojeda-Revah (2018); Richardson et al (2013); and Vanaken and Danckaerts (2018) suggest there is at least tentative support for either or both PA and social interaction as potential (or merely partial) mediators in such a relationship.

Potential mediators:

Social interaction

Exercising in natural surroundings

Restorative outdoor environments

Care of plants

Enjoyable, satisfying autotelic tasks

Sense of belonging

Escape from sources of stress

Achievement; having fun

Connectedness to nature

Engagement in gardening, horticulture, conservation activities delivered in group formats

Health impacts (physical, mental, social) including personal development enhancements

Figure 17: Mediating factors (note: not an exclusive list)

The lack of explicit and more widespread support for PA and social support as mediating factors appears at odds with my own research findings, whereby the physical exercise was often cited by respondents as an important factor in feeling 'better', with associated hedonic (satisfaction) and eudemonic (happiness) impacts, some referring to GE thereby as a preferable means of *'working out'*. The social interaction, and the perceived support derived by such interactions, as also noted by Gerber et al (2017) with gardening groups, was viewed universally as integral to participants' sustained engagement, levels of enjoyment and perceived wellbeing, driving efforts to achieve, with the corresponding positivity that resulted from their efforts:

"Another nice thing I heard somebody say was, they were talking about 'my friends at the Woodlands'... To think that they have people who care about them here and are interested in them, is, you know, another good aspect" (Woodlands Study)

High levels of social support were demonstrably visible in all studies, and the verbal exchanges, or 'craic'/'banter' as often referenced between participants, was highly valued, from the point of joining a group through the various cooperative activities undertaken and the sense of achievement, pride and satisfaction gained from proximal, collaborative working - akin to the *'forming, norming, storming and performing'* mantra suggested by Tuckman (1965). An exemplar from the Greenfingers study:

"Massively. Yeah massively. It's the socialising, we've got a good crew... it's a social thing, there's an end result like you see with this (pointing), we've just made a propagation tunnel for the ladies up there, put some flagstones down, end result, which enhances the park, it's just yes, end result, so it's the craic, and the purpose."

Whilst respondents clearly valued the collaborative nature of GE activity, it is possible some may, at times, prefer to work in isolation, as noted by Hawkins et al (2013). This did not go unnoticed in reflective accounts:

"Whilst the [Woodlands] project appears to encourage group working, there are some who, on occasion like today, prefer to work individually and have their own space. I noticed this in particular with Tom, who preferred to work in isolation clearing weeds and generally tidying up borders. He said that it very much depended on his mood state on the day whether he wanted to be alone or with others, but whichever he did he still felt connected to nature and felt a degree of accomplishment with his efforts. Despite the occasional participant working alone, they all appeared to value the 'coming together' at the tea and

lunch breaks, where they could hear about what others had been doing, or simply discuss a range of issues either related (or not) to their endeavours. And so, the social aspect appeared to be an important component even for those who went about sole occupations, but it was not always something they wanted… to satisfy their day"

<p align="right">*(Diary entry: Woodlands Study)*</p>

Hence, the importance of offering choices is an important consideration for GE interventions and an area of useful comparison regarding whether the health impacts are similarly derived from lone working compared to group working.

Several mediating factors related directly to the natural settings, including the act of exercising outdoors, a factor noted by Barton and Rogerson (2017) as a contributory mediator between active use of greenspace and enhancements to health. These factors appeared to bestow wellbeing effects including restoration, stress reduction, and a greater commitment to regular exercise. Further mediators included a sense of escape from daily stressors, such as work or troubling thoughts; having time to reflect, and clear the mind (restoration); simply 'being' outside in natural light and fresh air; the peace and calm associated with the settings, which promoted feelings of contentment, enjoyment, and satisfaction; and the almost spiritual experience evoked by nature, for example:

> *"I suppose …it's being in it, seeing it, enjoying it, enjoying the actual visual, and working with it, which is a nice experience…hard to say why, it's one of those things, you know, like when you do gardening… it's almost a meditative thing… it's very pleasant"* (Greenfingers Study)

Similar mediators have been noted by Korpela et al (2014) whereby restorative experiences were shown to mediate average time spent in active recreation within natural settings and emotional wellbeing enhancements. Gladwell et al (2013) argued that at least part of the explanation for enhanced levels of physical activity resulting from engagement in activities

such as gardening may be because of 'escapism' from everyday worries. These findings align with research conducted by Fretwell and Greig (2019), who identified that retired, volunteer, and unemployed participants felt the most connected to nature: similar participant demographics to my own research subjects (many of those presenting with mental ill-health were registered unemployed). It was also apparent how often volunteers on all the projects referred to the pride associated with beautifying and tending to specific areas, their perceived contribution, and the appreciation of others within their own community for their efforts:

> *"…well I just think you see other people coming into the park…and people have said that it's looking better, people who've been up here for years, and you see all these people enjoying the park, and you think, not that you're doing it for [just] them, but you're doing it for everybody really, just helping the community I suppose, and making it a better place to live and come and do things"* (Greenfingers Study)

Potential moderating influences

Part of this connection to nature related to several *moderating* factors (see Figure 18) and involved participants' reflections upon how their own actions could make a positive impact on their own community context, including reciprocally for themselves in terms of personal agency, and in recognising a responsibility to nature - to protect it, and nurture it. Equally, a recognition by many respondents that choices needed to be made about how they conduct their lives and altering behaviours damaging to nature. Essentially, people were either motivated by a sense of duty to help the environment or became increasingly conversant with this discourse through their participation in GE – in that everyone could play a role – essentially developing green pro-social behaviours (Pretty et al, 2017). These profound considerations about participation were frequently articulated by respondents and were often cited as drivers for initial and ongoing engagement. The desire to assist nature through GE

participation was also associated in the various projects with generating people's sense of personal agency and skills development:

> *"...it needs preservation, it is a beautiful wood... there is lots of interest in what we do, we learn a lot from what we do and we enjoy the camaraderie and teamwork, banter... It is a beautiful thing... if you look at the site, it also offers something for everybody... I have learnt something about puddling... it's a natural way of creating a pond without have to buy expensive liner... we are going to monitor and study what life turns up in the pond. You have got a project there"* (Woodlands Project)

Potential moderators

Project design and accessibility factors
Quality of leadership
Extent of social connectedness
Activity choice & variety
A safe space to engage with
Time available to engage
Proximity to abode/work area
Childhood experiences of nature
Level of empowerment
Regular routine
Environmental concerns/awareness
Motivation for lifestyle changes

Social & therapeutic GE activities (gardening, horticuilture, conservation) in group formats

Physical and psycho-social health impacts including personal development

Figure 18: Moderating influences on GE outcomes

Such an awareness of the 'green environmental' agenda, and present or emergent activism associated with it, is perhaps not surprising given the heavy emphasis within the media and ongoing campaigns to raise awareness of climate change, damage from pollutants and global warming. A recent report on British Social Attitudes by Phillips et al (2018) found that 93% believed climate change was definitely or probably occurring, although only 36% believed it

was largely caused by human activity, with the lowest number thinking this (27%) amongst the 65+ age bracket (the numbers rise considerably amongst all age groups when both human and natural causes are viewed as jointly responsible). Whilst these figures may well have changed since 2018 as the public become more informed and more aware of dramatic weather events, nonetheless it is a major issue within public consciousness compared to the late 20th century. Harnessing such passion for the environment, across all age groups, and the educational process it can afford, may be an important consideration for health intervention projects to consider in attracting people already tuned in to such agendas, and to provide a platform for others to play an important role in promoting pro-environmental outcomes whilst simultaneously enhancing personal health (Koehler et al, 2018).

It is perhaps no coincidence that the rise in GE related interventions and accompanying research have mirrored the momentum behind the broader 'green' movement within Western society since the late 1990s. Governments across the world have begun to ascribe increasing value to social prescribing initiatives including *'green prescriptions'* at community level in addressing major health concerns within populations (Chatterjee et al, 2018), including the obesity epidemic, the rapid rise in reported mental ill-health and other health disorders (Fretwell & Greig, 2019). Even at school-age level, increasing efforts have been made to engage pupils in GE opportunities such as forest schools, lunchtime gardening, nature trails, adventure sports and 'back to nature' activities, with research suggesting promising impacts upon physiological and psychological markers (Duncan et al, 2014), enjoyment of exercise (Reed et al, 2013), dietary habits (Ambusaidi et al, 2015), and academic success and relatable life chances (Miller, 2007).

Participants provided numerous mentions of nature and their connection to it, in terms of aesthetics as well as flora and fauna, and identified preferences for specific aspects of the natural world, whether viewing birds, insects, flowers, trees, or simply the evocation of the senses such as the fragrance of certain flowers. Future research could examine which of these

many variables has the strongest impact to benefit health, and how often does the interaction need to be to derive health benefits (Hartig et al, 2014).

Role of childhood memories

It was noteworthy in several cases respondents across the various projects spoke of another moderating influence in respect of childhood memories (Capaldi et al, 2014). These were reflected upon as having first promoted an interest in safeguarding nature, which, in some cases, had remained dormant for many years until being reawakened by a change in life circumstances, growing concern for the environment or due to other sources (friends, family, work colleagues, or the instigation of a new local project that attracts enquiries from curious potential participants). In the Corporate Health study, 'Oliver' referenced his grandmother buying some plants for an old trough in the small terraced (concreted) back garden he lived in as a youngster. The project represented not only a reconnection with those 'old times', but also a reaffirmation of the value of gardening in the present. Fretwell and Greig (2019) and Thompson et al (2008) suggest that the visits made as a youngster to greenspaces such as forests, parks and woodland partly predicted the re-engagement in adulthood for these experiences, whilst Barton and Pretty (2010) noted prior experiences and childhood memories as a mechanism to explain the mental health benefits of a 'dose' of GE. One volunteer at the Woodlands project recalled working alongside his father and learning about dry stone walling, a craft he rekindled through engagement as an adult at the project - whilst, in the corporate health study:

> *"I suppose… it's always been a passion since early childhood. I was fortunate…at the primary school I went to they had a strong emphasis on environment and nature which I think was quite forward thinking in the 70s so I learnt a love of nature and the environment through that and I think also as a child because my parents were secondary school teachers so we did a lot of going to the Lakes, walking, we moved*

up here after a while to live and so I think yeah that's been a key part of the driver for me it's very close to my heart anyway, definitely, and I'm very interested in environmental issues and the science of it…so I think it's multi-layered definitely for me, just er, mental health and wellbeing issues but also the passion for it."

Similarly, in the Greenfingers project:

"It's [being] outside. It's outside. Which is what my childhood was, like it was all outside, on the fells of [place], so it's bringing back memories, not that I'm old yet, I'm only advanced middle age, yet you remember what you used to do as a kid, when you were younger, because work was great when I did it, I really enjoyed it".

I reflected on these testimonies at the time, and considered how my own upbringing in a leafy, suburban area, with a large back garden backing onto a private estate, meant I too had a preference for the outdoors instilled in me from an early age, reinforced by regular weekend walks at local woodlands with the family, and my own running training in similar terrain. I wondered if my preferences would have been altered if I had grown up in an inner-city environment, with a paved backyard, or no yard at all. Nature deficit disorder (Louv, 2008) has become a significant issue of interest to researchers and policymakers in recent years, and it may be my experience – and that of others I interacted with – reflects a more privileged upbringing in terms of access to greenspace, and that those who grew up in less 'green' environments may have less inclination for involvement in GE activity, or, conversely, a greater impulse to seek it out. Such a lack of opportunity also speaks of wider inequalities for some in our communities, with consequential impacts on health outcomes.

Access issues

Further, having easy access to greenspace and activities therein correlates positively with social contact and networking between neighbours (Sullivan et al, 2004). As in my studies, it was manifestly apparent that GE facilitated the participation and subsequent collaboration between local residents that promoted social capital and the development of associated pro-social behaviours through the sharing of ideas, expertise, tools, plants, seeds, and culture (McVey et al, 2018) - thereby promoting *'a participatory approach to community development'* (Somerville, 2011).

Gladwell et al (2013), in discussing GE participation and health benefits, Hartig et al (2014), in evaluating the natural environment and health outcomes, and Borjorquez and Ojeda-Revah (2018) in discussing women's active use of urban park settings, assert that *ease of access* is an important moderating factor – whether being able to access activities on foot, by bus, by bike or other transport to greenspace. An equally important moderator involves the need for places to feel 'safe' (Hartig et al, 2014) and that any negative perceptions of greenspace being perceived as 'risky' can mitigate against participation (Barton & Pretty, 2010). Across my studies the notion of *'feeling safe'* extended to perceptions of a non-pressurised environment, not being judged by others, and escaping sources of stress via a place whereby sanctuary and social support was on offer.

Bojorquez and Ojeda-Revah (2018) and Fretwell and Greig (2019) suggest that 'time' available can be a major barrier to people accessing GE and immersion in natural settings more generally, even if people are motivated towards engagement. This was a common 'access' issue in two of my projects, although the motivation to attend typically resulted in people finding time, rather than allowing any obstruction to participation. Further, I noted that volunteers appreciated set days and times as essential accessibility factors – at one point the conservation volunteers were upset when the regular Thursday session was swapped to a

Wednesday at short notice without consultation. They felt undermined and some appeared to feel snubbed over the decision. After representations, the decision was reversed, but it demonstrated how a regular time and routine being disrupted could not only cause conflict, but risk participation too. Fortunately, within a few weeks the group's relationship with the park staff blossomed again and developed even stronger bridging ties as the volunteers took up the reins of the moribund Friends of the Park group, raising funds for specific projects to complement the habitat renewal and aesthetic changes the park authorities were concerned with (Figure 19). These ties remain to this day, nine years on, testimony to the group's cohesion, and the mutual respect between the managers and the volunteer group.

In the case of the employees, the time issue was linked by two volunteers to a working culture which mitigated against 'taking a break' from the office. Whilst line managers were mostly supportive of people taking time to attend the project, some volunteers felt the pressure of work at times conflicted with their desire to participate, particularly at times when their 'in tray' was piling up. Ironically, I surmised, this was perhaps the time they most needed to get away and restore directed attention capacity, and the irony was not lost on those who suggested it as a barrier given the restorative dividends they typically received when attending. There was also a feeling that as a corporate entity, the university did not do enough to prioritise staff wellbeing. When the 'Campus in Bloom Challenge' however was organised by the Green Minds group, involving departmental teams, it was noticeable how this created space for employees to become more involved, almost as if the sanctioning of the competition by senior management gave them a necessary 'green light' to participate more often. This may be an important consideration for employee-based health strategies, particularly when the evidence for enhancing staff wellbeing through PA whilst promoting positive outcomes for the employer - more productivity, less absenteeism, more motivated workforce, less staff turnover - has been noted by many researchers in recent years.

A range of other accessibility issues were offered up across the projects, including project proximity to their abode/place of work; activities offered; and the supportive relationships within the project groups. Here, one volunteer suggested that distance to the project was not necessarily a barrier:

"Given that it is as rewarding as this particular scheme is, socially and work wise, yes I think you would commute".   *(Greenfingers Study)*

And identified further components as contingent on participation, highlighting the attraction of the park as a primary motivator:

"...if I didn't like the sort of work, and I didn't like the people, I wouldn't be here. It doesn't matter so much that I can see it from my front window, I use the park a lot, so it's more about a place I like, I'm interested in, I'm happy to do something in."

Figure 19: Tackling the invasive non-native rhododendron plants in the park

Thus, highlighting the importance of positive relationships being forged and the crucial role of project leaders in creating the optimal conditions for fruitful interactions to occur, balancing individual needs and preferences within group-based interventions.

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Empowerment and leadership

There was also a tangible sense of being empowered, another moderating influence that appeared to strengthen commitment to participate with resultant health impacts:

> *"...It (the project) can give people a sense of ownership of the park and be more connected to where they live...and their environment. And I think especially for young people, I think it would give them...I don't know, pride in where they live, some responsibility for it...make it better"* (Greenfingers Project)

Being empowered and having choice in the selection of tasks and offering creative ideas for garden developments were also important elements in fostering personal development, pride, satisfaction, enjoyment, as well continued participation. This was a pertinent factor in achieving a high level of engagement from service users in the NHS Study, but also featured in other projects as exemplified here:

> *"There doesn't have to be an immediate result. As long as you are working towards a result, like we've just been talking about the bird boxes... earlier this year, we chopped them all to size, that was part of the end result, the next one was to put them together...and then it's put them up here, and then the next end result is the park gets some money as well, so we've had fun, we've had pleasure, we've enhanced the park and we've got some money to boot. So yeah, there doesn't have to be an end result to every visit, as long as you're going towards somewhere. It's like the concerts we do here...the last concert had made some money, the end result of that is that we want to get the cascade working in the lake which hasn't worked for [ages]...it's never been flowing, and the cost to get that going is about £1000, so that's our next goal"*
> (Greenfingers Study)

Meanwhile this participant recognised the interplay between team dynamics, leadership and getting the best results for everyone from the experience:

> *"...and that comes back to your team dynamics doesn't it, respect for each other, people willing to work for each other - so having the right kind of leadership and the right kind of delegation in terms of who wants to do what, to make sure it matches their kind of interests and wants"* (Corporate Health Study)

Indeed, the leadership aspect was seen as pivotal by many respondents in their enjoyment and commitment to the projects. For instance, there was effusive praise for the site owners at the Woodlands project in providing a *'no nonsense set up'*, not *'overly organised'* or *'driven by monetary values'*, but rather by the *'personal satisfaction'* of the owners and *'their values'*. Therefore, the quality and extent of leadership can either promote and sustain participation or mitigate against involvement by disrupting the enjoyment derived from the experience.

Further considerations

More recently, Pretty et al (2017) and Rogersen et al (2016) asserted that whilst there has been an improvement in understanding influences upon health impacts through nature-based activity, a lack of insight remains, as much contemporary research has continued to be focused upon outcomes. Fretwell and Greig (2019) reinforced this view, with the recommendation to investigate hedonic factors such as joy, satisfaction, and pleasure relating to underpinning mechanisms. Although some recent research enquiries into GE outcomes have utilised either mixed methods or qualitative approaches to give clarity to the causal mechanisms behind GE wellbeing outcomes (including hedonic and eudemonic elements), CTN, and motivations for GE participation, generally, the consensus remains that the field lacks exploration of the fundamental mechanisms involved in eliciting GE benefits, and it appears most attempts to

identify these processes have continued to rely on quantitative methodology, rather than explore the use of qualitative approaches and the richer insights these can afford.

In Appendix Three, a flowchart suggests the possible inter-relationships between a selection of the moderating influences and mediating factors highlighted previously. Further research to confirm these influences (or others), and their inter-relationship, would be useful for future study foci.

Impact 5: A proposed 'Green Transformational Ripple Effect' concept

Fifth, my research contributes a socio-ecological model framework to highlight how regardless of context, population group and type of project, similar wide-ranging physical and psycho-social benefits appear to accrue to individuals, groups, and communities. This not only helps to confirm that GE contributes positively to health and wellbeing, but also appreciates how these impacts can be represented within a specific framework. The 'ripple effect' was apparent across all projects, with individual enhancements; at group level, consistent findings in terms of collective benefits manifest in levels of social capital; and broader community impacts, as noted in Table 7, and identified within each project (Figure 20).

Coincidentally my model was initially proposed just prior to the emergence of the 'Green Minds Theory' by Pretty et al (2017) which similarly referenced impacts that can extend to individuals, groups, and whole communities through GE engagement. Their theory also suggests that therapeutic GE-related health outcomes are influenced by environmental factors, which promote changes to our behaviours, including our interactions and ability to connect with others, thereby creating a social inclusion impact. Essentially, they are describing a ripple effect – which I initially proposed in the Woodlands Study published a year earlier in 2016 and developed further in the second Greenfingers paper in 2017 – that extends from individual benefits of engagement in GE to the facilitation of positive impacts upon natural assets within

communities, nurtured and cared for by community members (McVey et al, 2018). My

proposed socio-ecological model (Figure 22 below) however goes much further in identifying

potential influences on these impacts and their inter-relatedness.

Project	Community impacts
Greenfingers Project	Establishment of Friends of the Park group; hundreds of new trees planted; renovation of woodland habitats and park amenities including new adventure playpark; fundraising events for new projects, including a 'Friends Garden'; bridging social capital with young offenders' services, schools, mental health services; establishment of fifteen extra 'Friends' groups and community orchards within the local authority district.
NHS Project	Enhancements to relationships between service users and staff. Vegetable produce harvested for hospital kitchens. Roll out of similar NHS low/medium secure 'gardens' in other NHS sites across the UK.
Woodlands Project	Vegetable produce used in public house kitchens. Educational and charitable organisations visiting the Woodlands project.
Corporate Health Project	Campus in Bloom departmental competition organised involving over fifty staff members judged by the Vice-Chancellor. Outdoor classroom area, nature trail and orienteering trails created for use by the campus community, members of the public, and visiting organisations such as school groups.

Table 7: Community wide impacts resulting from the research projects

Recently, other research has supported my notion of a 'ripple effect'. A green care study

(Davies et al, 2020) involving 93 disadvantaged young people not in education, employment,

or training, noted that individuals derived mental health benefits but also became more

socially connected beyond the group 'bonding' stage, considered an important precursor to the

mental wellbeing outcomes. Participants also made purposeful contributions to sustainable

community construction projects. The works by Cumbers et al (2018), Guerlain and Campbell

(2016), McVey et al (2018), and Rogersen et al (2020), amongst others, also resonate with the

ripple effect concept, supporting the notion that community gardens facilitate health outcomes

at an individual level but also generate enhanced social capital through collaborative efforts that, in the process, enhance volunteers' skills sets and collective self-efficacy. An excellent example of this effect is the Friends Garden in Figure 21.

Health and Wellbeing Enhancements		
Individual	**Group**	**Community**
Cardiovascular fitness Feeling fitter Weight control More regular exercise Stress reduction Lower levels of depression Life satisfaction Improved self-esteem Resilience Better mental health Lifestyle improvements Less social isolation Personal agency Personal development Restoration Relaxation 'Me' time	Increased bonding social capital through: Social connectedness Group camaraderie Social interaction Task and social cohesion Collaboration Social networking Shared experiences Teamworking Exchange of knowledge and ideas Pooling expertise Empowerment Helping others Collective achievements 'Craic'	Enhanced bridging social capital through collaboration across the community Enhanced linking social capital with relevant agencies (funding, support, ideas, dissemination) Development of community assets Enhancing local environment Contribution to bio-diversity Appreciation of local area Community activism More active citizenship Fundraising activities

Figure 20: Individual, group or community impacts

These collective efforts can thus create the dynamic that results in positive actions that facilitates tangible community-wide benefits, and enhanced community capital: for example, contributions to the local economy through sales of grown produce; local families accessing healthier food options; and the community cohesion that reciprocally promotes collective achievements and individual self-worth associated participation. This has important

implications for how public policy can be shaped through such actions and initiatives (Buder, 1990). Relatedly, Kuo et al (1998) highlighted that where numerous structural issues exist (high crime environments, over-crowding, noise pollution and barren common land), this is correlated with a lack of social capital. Thus, by improving the local environment, through GE initiatives, it is possible to enhance both social and physical neighbourhood elements, promoting harmony and balance between the oft competing forces relating to social, economic, and ecological concerns within communities.

Figure 21: The Greenfingers Project 'Friends' Garden

My proposed socio-ecological model aims to represent the totality of GE health and wellbeing benefits, but also relatable factors in personal agency (Cumbers et al, 2018), social connectedness (Martin et al, 2016), quality of life (Howarth et al, 2020), and community-wide benefits such as improvements to local habitats and aesthetically pleasing transformations of specific sites (Bellows et al, 2008). The model was first proposed in the qualitative Greenfingers study and has been refined to appreciate the totality of the studies (Figure 22).
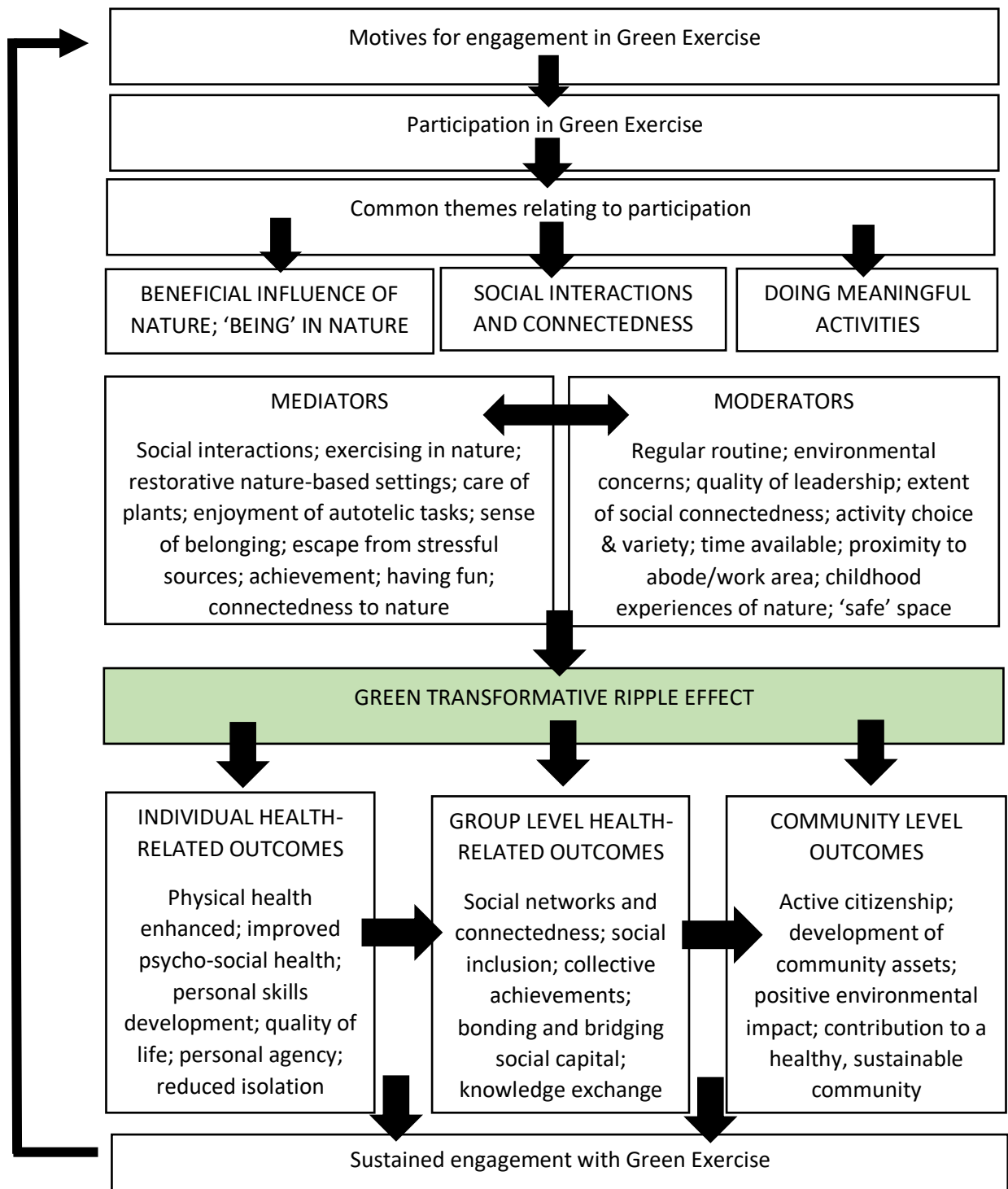
Figure 22: GE socio-ecological model including the 'green transformational ripple effect

The model begins with the motives, or drivers, for initial engagement and proceeds to suggest

a range of mediating and moderating factors upon participatory health and wellbeing

outcomes. The beneficial outcomes provide the motivation to sustain engagement, akin to the

'maintenance phase' of participation described in the trans-theoretical behaviour change model (Prochaska et al, 2002). Therefore, the model provides a 'start-middle-end' process of GE engagement: the motives to participate, the specific influences, leading to health and wellbeing enhancements – or the 'end product'. Except, in reality, there is not necessarily an 'end point', as the outcomes encourage continued participation, leading to the reinforcement of benefits (and potentially new ones), driven by the influences involved. In essence, the projects not only acted as therapy for individuals, but were ostensibly therapeutic for the group (social capital), local community (assets) and the environment (habitat).

Notably, even the field researchers testified to deriving therapeutic dividends from their own engagement: personally, I found it an uplifting, touching and at times very moving experience, and when immersed in the environments and group activities, a chance to unwind from work and domestic pressures and 'reset' myself.

Within the projects, it was especially interesting to see how individuals contributed to group dynamics, and 'bonding capital'. In the NHS Study, two of the service users reflected upon how their prior community work experiences assisted with an educational process for others about growing plants (top-dressing with manure, rotavating soil, providing optimal growing conditions). One respondent in the corporate study referenced his own passion for gardening in contributing ideas including a community orchard, a meditation maze, and a grass amphitheatre for watching sports fixtures on campus. Several of the original Greenfingers volunteers (Figure 23) became a tight knit group that resurrected a 'Friends of the Park' charity organisation, raising several thousands of pounds for transformative park and community environmental, sporting and arts projects, thus making a tangible and positive contribution to a healthier and more vibrant community (Hoffman 2018). One volunteer enthused:

> "It's (the project) probably (been) quite huge for me, as I had just moved to (the area)
>
> … and this was the first thing I saw and thought 'ooh I can join that' because I have

been involved with conservation volunteers before, I was organising volunteers for

years. It was a chance to go and be a volunteer myself for a change which was

smashing, and it got me out, something to do every Thursday morning, meet new

people, started networking, got to know the local authority people, so that's good"

Figure 23: Friends of the Park Group

Through fostering bridging social capital with the local council's Parks Department, and

conservation organisations, the group continues to sustain a long-term commitment to

nurturing the park's natural and man-made features for the benefit of the community; and

providing a social support function through networking with mental health services and youth

offending teams, thus offering bridging capital opportunities for others to engage with the

park's development and facilitate personal needs. A local garden centre provided resources for

the NHS garden, whilst in the Woodlands project visits by mental health support networks and

educational institutions assisted the landscaping developments.

Linking social capital, whereby residents connect with organisations that can support

community development, was most notable in the Greenfingers project with wider city and

county council recognition, advice and support, which, in turn, supported the linkage with the national *'Green Gym'* initiative for another 'Friends' group to collaborate with over a new project within the city. Thus, tangible impacts upon the local community are possible from collaborative GE projects (Figures 24-27), further developing community assets: human, social, natural, and built. Volunteers' skills, ideas, experience, and expertise can transform hitherto moribund areas into places people can enjoy and assist with biodiversity efforts.

Figures 24-27 clockwise: 'outdoor classroom' on campus; vegetables from NHS garden; 'Friends' Garden; renovated pond at Woodlands (researcher's own photographs)

The Greenfingers group also made tangible improvements to other features including renovation work on the popular butterfly house and erecting new wildlife enclosures. Such a process evokes a dynamic, inclusive participatory approach to community building (Somerville, 2011), although claims that such inclusivity cuts across all demographics such as socio-economic status, ethnicity and cultural boundaries is open to question, as the evidence for involvement of BAME populations is less forthcoming thus far, and merits further investigation, despite some promising research with immigrant families (Hordyk et al, 2015),

refugees (Fazal et al, 2020; Hartwig & Mason, 2016) and enhancing racial harmony through community gardening (Stewart & Kagan, 2008).

Impact 6: Innovative methodology to investigate GE impacts

Sixth, and finally, extant literature on GE emphasised quantitative investigations and lacked longitudinal qualitative enquiries. Embracing an ethnographic approach to my work charted new territory congruent in researching experiences GE contexts and was an ideal means of elucidating the insider perspective to evaluate the efficacy of each intervention. Rogersen et al (2016: 178) underscored the complexities in researching the *'lived experience of exercise'*, suggesting that methods more complex than quantitative approaches were required to extend understanding, particularly around the *'black box'* regarding the mechanisms and processes underpinning GE health dividends. Pertinently, they concluded that a phenomenological approach, using interviews, reports, and auto-ethnography would be advantageous to pursue, given the real-world agency it provides in terms of ecological validity.

Efficacy of combining approaches

As noted previously, there are robust debates concerning combining ethnography with interpretive phenomenology as a dual perspective within a research design. Similarly, it can be argued that only nuanced differences in emphasis exist between ethnography and participatory action-research. Cook (2005), and Reeves et al (2013) highlight how ethnographers compose unobtrusive field notes and journal entries, focused upon participant experiences, recorded from the researcher's own perspective. This suggests a contrast to participatory action research whereby a researcher works co-operatively and as an equal with participants to raise awareness of key issues with emancipatory outcomes in mind. However, there is an acknowledgement that ethnographic accounts also allow participant voices to be represented through reflective dialogue whereby participants may take a different view to that

of the researcher posing the questions. Whilst it can also be argued that within action-oriented studies the researcher can change the dynamic of the setting through their engagement with participants, this is not necessarily incongruous to ethnographic inquiry, whereby participants are encouraged to explore and analyse their own personal situation, including factors that mitigate for and against their health, suggesting changes that might benefit themselves and others (Cook, 2005).

This latter issue was perhaps most apparent when I undertook the NHS Study. There were nerves on all sides with my involvement with the unit – the service users having an external agent entering their world; the service staff concerned the project may not recruit participants and concerns it might disrupt behaviour; and my own insecurities about entering a secure setting and lacking experience of PD and the rehabilitative process involved at the unit. Therefore, as both field researchers reflected at the time, there were no guarantees the study would 'have legs' operationally. The very first group meeting was a big test for all those involved – and one in which was deliberately staged during the regular 'Speak Up' group meetings service users attended on the unit, where they could express their thoughts and feelings concerning the activity programmes that formed an integral part of their personalised treatment plans. I was invited to discuss with the fifteen male service users the project's aims, and, using approved *'Easy Read'* participant information sheets (Department of Health, 2010b), explain the research tools and how participants would be involved (Appendix 1).

Having an on-site research assistant was crucial to this initial meeting proving successful, not only in breaking the ice between myself and the group, but also for gaining their participation. I soon found the relationship with the group to be a positive and productive one (although I was often reminded by staff not to let my guard down when in the garden given their troubled biographies). This first meeting even ended up with a push up challenge which I readily accepted to help 'break the ice', establishing a level of rapport with the group that ultimately led to gaining useful insight into group dynamics and their response to the HT intervention

(Maier & Monahan, 2009). If that is what it takes to gain acceptance into a group's world, then so be it! Therefore, I see no obvious contradiction in adopting elements of phenomenology and participatory action research within a wider ethnographic approach that represents my stance as a pragmatic, active participant researcher with a passion for the field I was investing my time and energy towards - with a view to potentially influencing policy and practice if the research findings pointed in such a direction.

Real time interviewing

A major facet of the ethnographic approach concerned the use of real time interviewing. I believe this elicits more natural conversations, and arguably more accurate (immediacy of experience) and meaningful recollections (contextual recall) compared to interviews conducted post-activity, where interviews are often undertaken in venues removed from the experience context. I particularly noted the effectiveness of reflection-in-action in terms of the quality of data provided by respondent interviews, often deep and rich insights into their thought processes regarding GE engagement. In the Greenfingers study, one data collection session involved a set of DVD interviews conducted at the park cafeteria. It was noticeable that these were shorter in length, and thereby prompted less detailed, arguably more tidied up, and less specific accounts (Knight, 2002), possibly, I surmised, in part due to their removal from the specific experience of 'doing' conservation, and that the interview itself had more of a sense of formality (sat opposite each other, more staged) as opposed to the informality of the 'here and now' of the 'in-action' field interviews. Therefore, my natural preference was for the latter mode of interviewing, despite the risks of recordings picking up interference within the working area (wind, other conversations, sounds of tools in use). This subsequently led to reflecting on the efficacy of 'think aloud' methodology in Chapter Seven.

Whether post-action reflection in a setting, or reflecting whilst actively engaged in occupations (Schon, 1983), both are viewed as useful modes for exploring practical contexts,

including often under-researched contexts such as corporate environments (Ladner, 2014). Three examples illustrate the effectiveness of reflection-in-action from the Woodlands Study:

"This is an ideal place [for mental health] because it's got a garden so you've got garden type things like flowers if you want to grow, and then you've got the wild, woodland bit to 'go' at"

"I'm learning as well. I learn from people. And you can see, what have we got, we've got 1, 2, 3, 4, 5, five different jobs going [on] today and everyone is doing a job that they like to do… because of the vastness of the place we can do, we can do, horticulture, a bit of building and everyone teaches each other."

"You know, there isn't that pressure to get a certain task finished by a certain time! Another thing that I really like about the place is I have always worked indoors before and no matter how hard you have worked in an office, when you leave it, it looks exactly the same as when you walked in first thing in the morning. It looks the same again the next day, so you can't actually see the results of the work you have done. Whereas even what we have been doing this morning, you can see that at 10.30/11 whatever time we started, there was this stuff that needed chopping down and even by lunchtime, you can see that some of it [has gone]"

It is arguable as to whether the same responses would have been elicited by interviews conduct post-activity or in a different place such as a nearby building. On occasion, however, even preferences are trumped by the need for pragmatism. In the NHS Study, although conducting interviews in the field may have been the preferred mode, service users were often

easily distracted in the garden by interactions with peers and staff, and so the more familiar 'Speak Up' sessions were best placed to maximise their contributions. A further consideration was of course the security aspect, which meant only a handful of service users could access the garden at any one time, so an 'outdoor' focus group was not feasible. This pragmatic approach proved the right choice, as service users were more readily able to discuss their engagement in HT and make appropriate connections to the rehabilitation process, including personal development factors and pro-social behaviours which were captured more routinely within the unit through the NHS Recovery Star tool.

Although Covid19 necessitated a change of interview strategy in the corporate health project's second tranche of interviews, as lockdown prevented the Green Minds campus-based project from continuing temporarily, this actually had a silver lining, in that the suspension of activities allowed the employees involved to reflect upon their achievements thus far, but also how much they missed the face-to-face interaction. Rather, they had been resourceful enough to pursue online means of maintaining social connections developed over the project timeline, discussing their existing, re-kindled or new-found passion for gardening through regular 'Zoom' meetings. It also provided space to appreciate their own personal journey and connections with nature, which had, if anything, been strengthened as a result of the impact of the pandemic (for example, being motivated to do more gardening at home, using the knowledge and skills obtained from Green Minds project participation). Thus, it provided a useful contrast to the 'in action' data that had been collected in the first tranche of data. Here, trustworthiness was also facilitated through the use of repeat interviews (Vincent, 2013).

Familiarisation phases

Pragmatism extended to the use of familiarisation phases in each study to promote acceptance with each group of participants, develop rapport and embed my role as an active, participant

observer, optimising the conditions for accessing the insider perspective and capturing rich data (Barley & Bath, 2014; Whiteley & Whiteley, 2006).
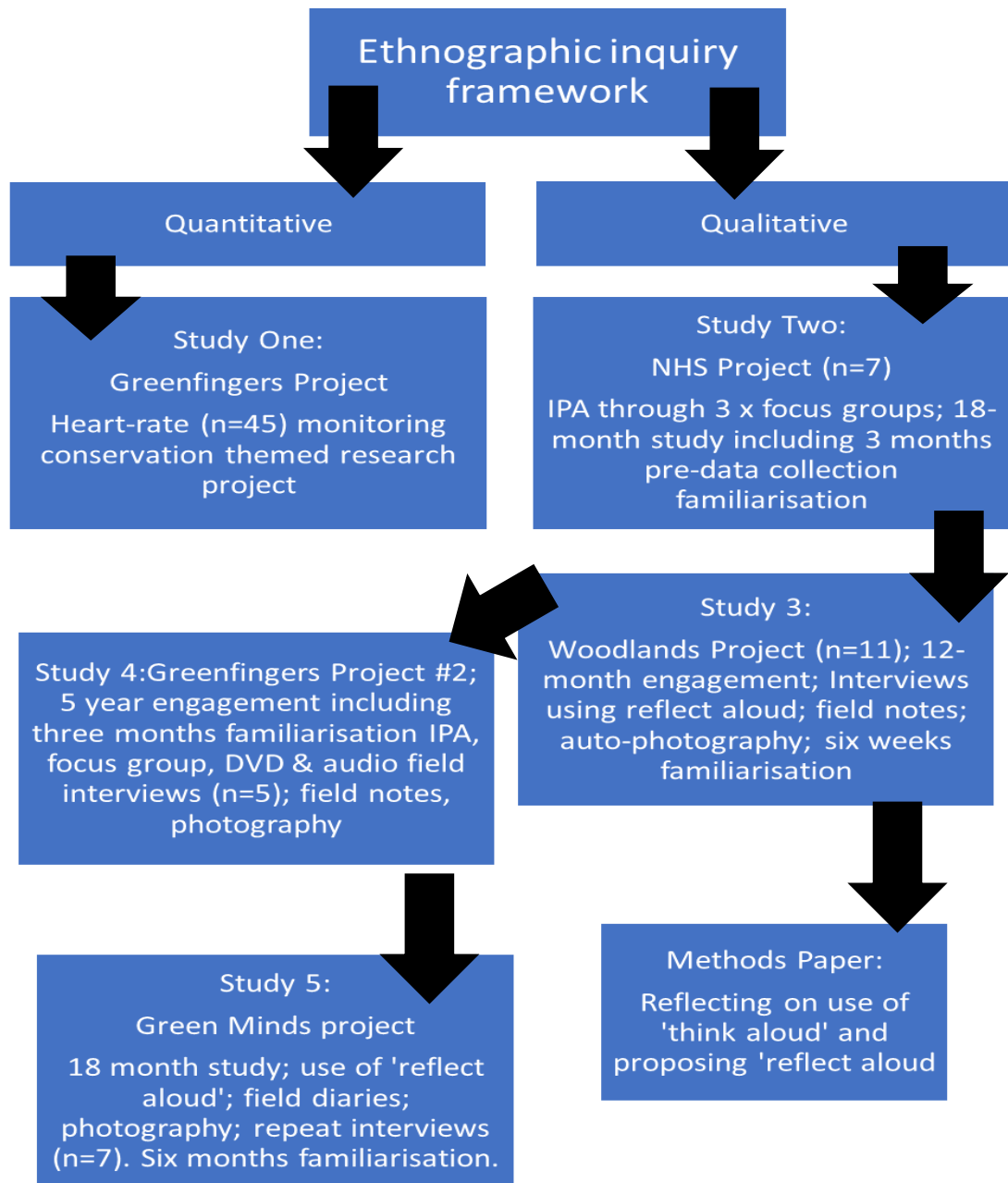

Figure 28: Research flowchart

This was enhanced through the longitudinal engagement I had with each project (noted in Figure 28) as the primary research instrument in the process, essentially building trust and understanding of my role, essentially creating a partnership with the study participants

(Ritchie & Lewis, 2003). Familiarisation typically entailed several weeks, followed by study immersion extending from one year to up to five years with frequent scheduled visits as noted in each paper. Daily engagements ranged from two hours on each occasion at the Greenfingers project, to five or six hours in the Woodlands study. This considered approach was further enhanced through the systematic use of member verification in all the qualitative studies (Birt et al, 2016; Shenton, 2004), strengthening the trustworthiness of the data. This took multiple forms, including PowerPoint presentations with handouts to the participants; providing transcribed data for participants; providing a less sophisticated version of findings via a poster presentation to the volunteers featured in Chapter Four; and providing draft copies of the papers to participants. In doing so, such a process promotes credibility, dependability, and confirmability, and, in turn, the potential for transferability of findings given the existence of a robust audit trail (Nowell et al, 2018).

Final thoughts: Considerations for future research

Some important questions arise from my studies, which may be pointers to future investigations. Firstly, how long do people need to be engaged with GE to reap the benefits? My studies involved extended engagement by participants in all four project contexts, ranging from a year to over five years. The NHS study involved participants having over twelve months' exposure to the gardening experience. The qualitative Greenfingers project involved a small group of volunteers that had been connected with the project for five years representing a truly longitudinal opportunity to reflect upon and appreciate the utility of GE. Similarly, the other projects had timelines that can be considered 'longitudinal', involving between a year and eighteen months of researcher engagement. So, the essential framework to evaluate 'impact' over a long duration with frequent participation by research subjects was facilitated in all cases. The positive, consistent commonality of responses obtained from the studies were important insights into the long-term effects of exposure to GE. And yet, according to some researchers, it may be that only *short-term* exposure to GE and natural

environments may be sufficient to bestow considerable psychological benefits. Indeed, the first five minutes of each engagement can have the greatest proportionate impact upon mood states and other psychological measures such as confidence, according to Pretty et al (2010), whilst a 'short dose' made a significant contribution to reductions in depression scores amongst inpatients (Fruhauf et al, 2016). Soga et al (2017a) highlighted that there were relatively immediate and long-term benefits to health from gardening, and that *'regular'* doses were beneficial to health, however there is generally a lack of quantification of any such dose. Therefore, further research on 'dose' and length of exposure to GE required to elicit lasting health benefits would be welcomed to enhance our understanding of GE psychological impacts (Rogersen et al, 2020; Vanaken & Danckaerts, 2018), and, indeed, physiological benefits, given my studies lacked specific insight into how quickly benefits were obtained.

Existing theories

ART and SRT as extant theoretical concepts can be further held up to scrutiny in relation to my studies, as did Hawkins et al (2013) when reviewing their qualitative study of allotment gardeners. There is similar convergence here as 'mapped' to each theory in Tables 8 and 9, drawing upon examples of key themes from the combined projects. These concepts clearly 'work' for people where perceptions of greenspace and natural environments as non-threatening, 'safe' spaces, and places to 'escape to'. For example:

> *"...if you get a gentle breeze... bamboo and all that kind of stuff but also listening to the birds that are using the garden... the bees buzzing around... you can use all of your senses as well so... it's about being able to connect [with nature] and forget about all your worries that go on in your life"* (Corporate Health Study)

Attention Restoration Theory (Kaplan 1995)		
Theory Component	**Description**	**Thematic mapping from studies in Chapters 2-7**
Being Away	Away from current preoccupations and problems	Being away; being outdoors; fresh air; Natural environment; escape 'from' and 'to'; switching off; headspace; 'me' time.
Soft Fascination	Environments that promote restoration through effortless attention	Distractions; connecting with nature; natural environment; flora & fauna; scenery; quiet; calm; inspiring.
Extent	Immersion and engagement derived from a restorative setting	Being outdoors; accessibility of nature; non-threatening environment; natural settings; greenery; abundance of flora and fauna.
Compatibility	Feeling enjoyment and congruence with natural environment. Compatibility is higher when engaging in familiar activities.	Enjoyment; satisfaction; childhood memories evoked; attraction to nature (biophilia); autotelic, satisfying tasks that 'help' nature.

Table 8: adapted from Hawkins et al (2013)

Stress Recovery Theory (Ulrich et al 1991)		
Theory Component	**Description**	**Thematic mapping from studies (Chapters 3-7)**
Interest	Curiosity, wanting to know or learn about something or someone	Enjoyment; learning something new; meeting new people; 'doing' varied and motivational tasks/activities; challenge.
Positive Affect	Elicitation of positive emotive states through connectedness with others and the promotion of resilience in coping with life's challenges	Sharing ideas, expertise, experiences, and the produce from collective efforts; pride and achievement; empowerment; social support; social interaction; connectedness to people; creativity; personal agency; personal development; self-worth and self-esteem.
Pleasantness	A feeling caused by agreeable stimuli within the environment	Enjoyment; satisfaction; fun; endorphin release from PA; connectedness to nature (CTN); being in nature; hedonic impacts from GE.
Calm	Feelings of tranquillity, at peace with oneself; not experiencing negative emotions	Doing something worthwhile; nurturing nature; relaxation; distraction; restoration; escape 'from' and 'to'; eudemonic impacts of immersion in nature.

Table 9: adapted from Hawkins et al (2013)

A major element of 'Green Minds' Theory (Pretty et al, 2017) contends that we have a

restorative oriented 'blue brain' function, and, in contrast, the 'red brain', which is associated

with adrenalin-driven responses, typically associated with stressful triggers such as workplace pressures. A balance between the two is considered optimal for human functioning, as excessive red brain activity leads to ill-health. To ensure equilibrium, generating more blue brain functioning is required, and nature-based activity such as that provided by GE can reduce the burden of stress and promote restoration; thus, the theory has synergy with both ART & SRT. My investigations found convergence with these functions: respondents frequently referenced the need to escape from sources of stress, finding sanctuary in the perceived safe spaces provided by the garden, park, or wilder woodland areas. This was notable particularly in the testimonies of the volunteers attending the Woodlands project, effectively manage, albeit perhaps in a temporary sense, to navigate away from their troubled thoughts, for example as expressed by Dan:

"I think one of the main benefits (attending here) is (the) dignity and sense of achievement. You know it is a very non-threatening environment. Very, very pleasant. Very tranquil. You know, again just being around people, who are non-judgemental and in most cases who are in a similar situation to myself… it is just nice to know that you are not going to be subjected to any bullying. You know, singled out to be the odd one, that strange person!"

And elaborated by Geoff:

"People won't get neglected here, they're usually buddied up… because everybody needs somebody, and everybody helps somebody and we work out what people need. People that have suffered mental health… understand probably better than those that just do it for a living, because they just seem to know when people are genuinely in need of help. And that's what we do, we just keep our eyes and ears open as everybody does here and everybody helps each other."

Whilst with the Corporate Health project participants, a 'safe space' in the Green Minds project was provided by finding time away from the desk, the office politics, and the pressures of an in tray that seemed to be forever filling up:

> *"One of the really key things I've noticed is that there's a lot of negativity here (at work)... a lot of negativity with people not being happy and stuff, but none of it gets discussed when we're gardening, ever... there's no negativity... there's no talk about not being happy in the office – it's all about people's private lives... what they're up to... the here and now... what we're doing with the garden... you know somebody was telling me about their upbringing and stuff... there's never been any talk about work."*

Is nature always perceived as beneficial?

There can, however, be circumstances wherein 'nature' is perceived as quite the opposite: threatening, or simply uninspiring. So, we might ask if all nature and natural settings are 'good', 'pleasant' or 'safe' places for people (Hartig et al, 2014; McPhie & Clarke, 2020). Perceptions, arguably, have changed over centuries – in medieval times in Britain, forests and woods may have been considered dangerous, whereby people may perceive risk of attack by bandits, wild animals, or witchcraft. Even today, some 'wilderness' areas may be featured in horror or crime-related movies as places where 'things happen'. Conversely, forests and woods are nowadays embraced for the meditative, stress reducing and restorative dividends that result from 'forest bathing', a phenomenon that originated in the Far East and increasingly popular in the West. Therefore, for many, including myself, a socially constructed discourse of nature being good for you may well hold true – but for others, perceptions may exist that are very different, perhaps derived from an unpleasant experience in nature, or from having no experience of nature at all. Busy urban dwellers whose lives may revolve around the city for work, rest, and play, and who may have no time, inclination, or

awareness of natural settings as places that can bestow are at risk of 'nature deprivation', as noted earlier. Indeed, there is concern about the lack of connection children have for nature (Zhang et al, 2014), driven in part by the distractions of computer games and smartphones even at increasingly younger ages (Kesebir & Kesebir, 2017), although there is a lack of research over this issue to fully quantify the extent of this apparent disconnect.

Further, for a small number of people, there are major barriers in the form of phobias, including fear of open spaces, or insects such as spiders. Whilst we have all probably attested to 'scary' or uncomfortable experiences in nature, these are typically relatively rare events – such as extreme weather – and the settings used in my research, and indeed in the majority of published studies (save perhaps wilderness settings), have been benign natural contexts for engagement. Only twice in five years at the Greenfingers project were sessions cancelled due to torrential rain and gale force winds which represented a danger to volunteers from falling debris. These days, risk assessments are the norm, so any context used was one in which hazards were mitigated - perhaps in itself a question about 'controlling conditions' and therefore not fully 'natural'. Nonetheless, the settings used could be viewed as where restorative properties might be experienced. Any danger, arguably, was more likely to be a result of human indiscretions, such as misusing equipment, or unpredictable and errant behaviour towards others (as was a concern initially with the medium secure environment).

How green does a setting need to be?

A large body of research has compared PA in natural settings (GE) with PA in man-made environments such as fitness centres, with findings supporting the notion that GE is more powerful in terms of wellbeing impacts, especially from a therapeutic, stress reduction and attention restoration perspective (Thompson Coon et al, 2011). For further exploration, we might choose to investigate the *strength of GE effects* in contexts of different natural landscapes (wilderness, manicured parkland, forests, hills, mountains), and differing levels of

greenness (and indeed blueness – coast, rivers, lakes, streams, ponds). My work comprised notable differences in 'greenness': the relatively small, purpose-built garden at the secure unit (but which, beyond the high security fencing, bordered woodland and a river); the twelve acre woodland with scattered man-made follies within; the campus with its mix of flower beds, football pitches, scattered trees, pond and hedges, but also historic buildings, modern build offices, teaching and living accommodation, and sports facilities; and, finally, the large urban park, with its scenic views to the coast, woodland, and formal flower beds, amongst playgrounds, an orienteering trail, butterfly house, cafeteria and historic building. None of these settings, as such, were devoid of man-made influences; yet the impacts of GE activity, and underpinning influences, appeared common to groups and settings. I found each setting provided nuanced differences in emotional response: the inspiration of a blank canvas in the medium secure unit, developing the garden piece by piece, as part of a genuine collaborative exercise with service users and staff; experiencing and being inspired in other ways by the mostly wild terrain of the woodlands setting, which somehow was a metaphor for the troubled backgrounds of the participants there, and yet also promoted a safe space for them to open up about their problems, reflect on their individual and collective efforts, or simply listen to others and perhaps derive comfort or inspiration from their gradual recovery; the pleasure and satisfaction in developing the campus grounds with university colleagues, learning from each other in the process, and valuing the 'me' time it afforded away from the office grind; and the sense of making a difference to the park's eco-system and levels of enjoyment by other park users in the Greenfingers Study. As such, there is much to be gained from further exploration of diverse settings in determining the prevalence and strength of these effects on our mental health, and the key elements driving these.

How inclusive is GE?

In terms of access and connectedness to nature (CTN), and GE participation, is the issue of inclusivity. My studies showed a wide age range were engaged in GE in the first Greenfingers

Study, with a good gender balance and mix of socio-economic status backgrounds present. The NHS Study involved only male service users, with a range of ages from young adult to middle age. Whilst the Woodlands Study was 'open access', it had a predominantly male profile in terms of mental health self-referrals. And yet women experience higher levels of mental disorders (20% compared to 12% of men), whilst men are disproportionately at risk of suicides - 75% of all suicides in England & Wales - a figure that has remained relatively stable for two decades or more (McManus et al, 2016). Retirees were the volunteers involved in the longitudinal qualitative Greenfingers study and represented a balanced gender perspective. The age profile in the Corporate Study was over 52 years, skewed towards more female representation, but this was representative of the broader Green Minds volunteer group involving over forty employees. But one major demographic was absent, except for one student volunteer in the Greenfingers heart-rate monitoring study. All participants were white. Coincidence? Or does this speak to an 'exclusivity' problem for BAME groups accessing nature and the benefits it provides? Is nature unattractive to BAME populations, of all ages and backgrounds? Or is there something cultural about accessing nature and natural landscapes that prevents more BAME participation? Some studies have shown broader ethnicity engagement in GE, and good practice regarding how to engage: more generally amongst BAME groups (Federation of City Farms & Community Gardens (2007), and with immigrant families (Hartwig & Mason, 2016; Hordyk et al, 2015), or highlighted issues relating to CTN (Taylor, 2018). But there remains a distinct lack of studies explicitly involving BAME populations (Hawkins et al, 2013).

Anecdotally, this lack of representation has been acknowledged recently in the case of the prolific teenage ornithologist Mya Rose-Craig, whose memoir at the tender age of 18 has just attained a six-figure publishing deal (The Times, 2020). Mya's passion for birdwatching (arguably an exceptionally low intensity form of GE in itself) has nonetheless been a problematic hobby to pursue. A British-Bangladeshi by birth, she had been trolled following the online 'Bird Girl' blog she had been posting on the internet (which had attracted a five

million plus audience). Mya recognised how 'white' nature-based activity appeared to be and established her own 'Black2Nature' youth organisation, offering birdwatching and rambling camps for young people. Similarly, two young London-based men from BAME backgrounds instigated 'Flock Together', a birdwatching and walking group specifically aimed at raising BAME participation in nature-based activity. The very fact these innovative opportunities have had to be created suggests that there may well be a disconnect between BAME interest in nature and actually accessing it. Why should it be the domain of a white, and perhaps primarily middle to upper class, demographic (in itself an interesting investigative topic to pursue)? Nadeem Perera, the co-founder of Flock Together, who admitted to a rather flawed educational background, says that as a sixteen-year-old the 'turning point' was when he first set eyes on a woodpecker in a churchyard. The soft fascination this evoked sent him on a personally fulfilling road to exploring nature, which was a major element he believes in managing his own mental health, much of which had been blighted by racial discriminatory attitudes towards him (The Times, 2020). This would be an important research focus for future work, to investigate attitudes more fully to nature and GE activities amongst BAME groups, especially urban dwellers, given that BAME populations are located in higher proportions in large urban conurbations within the UK (UK Government, 2020). There is also a need to investigate further the inclusivity of GE on social class lines (Christensen et al, 2019).

How essential is the social dynamic fostered by GE?

Further, even if we choose to view nature as 'other than man', we cannot ignore the social interactions contributing to beneficial GE outcomes, findings recently replicated elsewhere, and reflected in a variety of models of relevance to GE research (as in Tables 4 & 5). Having a shared interest, *nay passion*, for supporting and nurturing nature, can produce reciprocity in respect of creating bonding, bridging, and linking capital from collective efforts, with concomitant reductions in social isolation (Wakefield et al, 2007). GE appears to be a vehicle

for the organic development of positive relationships, essentially acting as a catalyst for improved psycho-social and, by association, physical health. Many studies support the key role social interactions play in GE outcomes (Barton et al, 2012; Bishop, 2013; Buck, 2016; Flachs, 2010; Page, 2008; Rogge et al, 2018). The proximal working involved in gardening, horticultural and conservation work appears an important element in driving this interaction. Further exploration of the mechanisms in which social health is derived from GE would be useful for a future focus, and investigate whether the social aspect is as much, or even more important, than the restorative effects of being in nature. My observations suggested that the natural settings, and desire to be 'in' nature, were important drivers that then facilitated the benefits of social interaction and collaboration – in other words, that was essentially a precursor to the other benefits unfolding. From there, it was then hard to discern the relative contributions of the impacts of nature connectedness, the satisfaction derived from meaningful tasks, and the social bonds that developed. I often discussed this with colleagues, typically ending any debate with the essentially consensual view that *'does it really matter, if the benefits are generated from the totality of these experiences?'* Indeed, is it possible to unpick this? Can other disciplines such as community psychology, evolutionary psychology, environmental ethics & psychology, bio-psycho-social models help or hinder explanations?

Other questions

Other questions to pursue could involve examining exactly what specific elements of nature work for health? There are numerous clues in my own research findings – interaction with flora and fauna, nurturing plants, working the soil, viewing landscapes, the seasonal changes, the elements, for instance. How much are benefits derived from nature itself, as opposed to the interactions arising from groupwork in nature, or the specific (and meaningful) tasks? And, finally, although my collection of studies has made progress in identifying potential mediating and moderating factors between GE participation and health outcomes, there remains a need to deepen our understanding of these factors in order to more confidently tailor GE-focused

social prescribing initiatives for 'at risk' population groups. Although my studies highlighted a preference for ethnographic investigations, in truth it would be errant not to suggest that there is a role for further varied and innovative *quantitative and qualitative* methodologies to answer these and other pertinent questions.

Covid pandemic

Finally, given the recent Covid19 pandemic, it would be erroneous to fail to mention this contemporary issue, given it was occurring whilst I was composing this bridging thesis. One notable benefit from the comprehensive UK lockdown in March-June 2020 concerned people having less time given over to work commutes, and consequently more time to engage with outdoor activities, with increased participation noted in both England and Wales in GE activities compared to indoor options (Sport England, 2020; Sport Wales, 2020; Nuffield Health, 2020). However, the positive headlines masked numerous inequalities in the statistics: people from lower income households, BAME groups and those with mental ill-health undertook less exercise. Women were still doing less physical activity than men (as was the case pre-lockdown) and were even participating less than prior to lockdown recorded activity levels (Sport England, 2020). People with obese profiles struggled with both eating healthily and exercising regularly during the crisis (Robinson et al, 2021). In Wales, children's activity levels were lower than prior to lockdown (Sport Wales, 2020), and temporary closures of public parks in urban areas impacted negatively on adult and child participation rates. Gardening appeared to experience a significant boom in lockdown, including in Northern Ireland (Keys & Taylor, 2020), with the Royal Horticultural Society (RHS) reporting huge interest in web searches for 'how to compost'. Community schemes including 'Green Island Veg Economy' engaging 5000 more people in offering free vegetable produce from their gardens for the community (The Guardian, 2020). A study on re-allocation of time usage amongst 50000 UK citizens during the pandemic found gardening and exercising bestowed substantive mental health benefits for people across a number of psychological indicators,

with greatest effects in excess of 30 minutes duration (Bu et al, 2021). Conversely, more sedentary activities, including watching TV had negative impacts on psychological wellbeing (Bu et al, 2021). Similar benefits were noted by the charitable organisation National Garden Scheme (2020) with 90% of 2400 adults reporting the stress relieving qualities of gardens, 79% feeling more connected to nature, 69% citing the keep fit benefits derived from using gardens or public spaces, and 86% using their gardens more during lockdown, appreciating the relaxation, socialising and productive properties of gardens. Other psychological wellbeing enhancements were noted in Australia in a qualitative study involving twelve gardeners (Katz, 2020), and in Spain (Fullana et al, 2020). This contemporary data, emergent as it is, may have useful directions for future research and for organisations that encourage GE opportunities to analyse population behavioural responses from the current crisis to help tailor future messages.

Summary

In conclusion, my research has demonstrated six important academic and social contributions to the GE field, resulting from an innovative set of four projects and the production of six empirical enquiries mirroring my pragmatic approach to the nine years of research publications.

The first study contributed to a lack of physiological data regarding this specific form of GE. My focus turned to psycho-social impacts, and pursued other contexts and population groups, including a developing interest in the mediating and moderating factors involved, enabling the development of a socio-ecological model to illustrate these effects. Existing theory has been evaluated in terms of my own findings. The broad ethnographic enquiry contributed an innovative approach to researching GE. The combined small-scale research outputs offer an important insight into both impact and process, which can be transferable, and arguably generalisable, as a result of a transparent process that demonstrated rigour and trustworthiness

through a range of verification approaches. The research as a whole demonstrates not only the efficacy and utility of GE for use with specific population groups and specific contexts, but also that there are common outcomes that suggest a universality to beneficial health outcomes as possible through GE interventions – a point recently substantiated by Pretty et al (2017) and Rogersen et al (2020). Further, the research identified a range of mechanisms and processes for these outcomes, shared across groups and contexts, leading to the development and refinement of a socio-ecological model labelled the 'green transformative ripple effect'.

Methodologically, the research innovation in the use of 'reflect aloud' that assisted authentic 'in the moment' data collection to reveal participant experiences. And finally, the research offered some pointers for future research direction that can plug other gaps in the field. Beyond the academic contribution, I have also outlined how the projects have had a localised, societal impact. Given the concerns over the UK population's health, with people living longer, yet ironically in poorer health (Jivraj et al, 2020), and the increasing costs of disease to the healthcare system, GE interventions may prove to be an important, accessible, inclusive, low-cost, and effective option for social prescribing by innovative health practitioners. And from my own personal perspective, I believe I now know *who I am* as a researcher – and, indeed, '*what I am'*. I have always been a pragmatist, as a practitioner, and now as an academic researcher. I approached the investigations with a 'best fit' approach but have realised pragmatism as a paradigm is reciprocally a 'best fit' for me. I am looking forward to continuing my work in the field, investigating new settings, groups, and modes of GE, including care farming, wild swimming, and forest bathing, all relatively under-researched, and considering some of the continuing gaps in the field noted previously.

I began with a poem about the joy of gardening, thus would be fitting to end with one, that effectively captures 'being' in and with nature, and 'doing' meaningful activity. The poem evokes the sense of purpose and physical endeavour that the act gardening provides, whereby nurturing plants promotes reciprocity for the gardener's own health and wellbeing, through

the sense of wonder, knowledge acquisition, and ultimately the reward derived from engagement with nature:

This is the garden's magic,

That through the sunny hours

The gardener who tends it, Himself outgrows his flowers.

He grows by gift of patience,

Since he who sows must know

That only in the Lord's good time

Does any seedling grow.

He learns from buds unfolding,

From each tight leaf unfurled,

That his own heart, expanding,

Is one with all the world.

He bares his head to sunshine,

His bending back a sign

Of grace, and ev'ry shower becomes

His sacramental wine.

And when at last his labors

Bring forth the very stuff

And substance of all beauty

This is reward enough.

'Garden Magic' - Poem by Marie Nettleton Carroll (1941)

CHAPTER ELEVEN

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APPENDIX ONE: OVERVIEW OF PROJECTS

Paper/ Project	Duration	GE mode	Setting	Group	Frequency of attendance	Methods	Outcomes
Greenfingers (Chapter 3)	3 years	Conservation work (SH)	Urban Park	Volunteers N=42 Age range 19-73	2 hours per week Thursdays	Heart rate monitoring in the field	All groups achieved moderate to vigorous heart rates whilst active. Contributes effectively to Government guidelines of 150 mins of moderate or higher intensity exercise per week for cardiovascular health benefits
NHS Study (Chapter 4)	18 months*	Horticultural therapy (HT)	Medium secure unit garden	N=7 male service users (with LD, PD & OB)	2-6 hrs per week	3 x Focus Groups across 12 months	Core themes of: Escape & rejuvenation; Motivation, productivity & hope; Occupational reward; reductions in harmful incidents recorded
Woodlands Project (Chapter 5)	12 months	Therapeutic horticulture (TH)	12-acre woodland in private estate	Mental health self-referrals and site owners (n=11) age 35-67	4-6 hours twice a week	Fieldwork interviews using 'think aloud'	Core themes including Beneficial (restorative) environmental influences; Social connectedness; Doing meaningful occupations; suggested mediating and moderating influences

Greenfingers (Chapter 6)	5 years	Conservation work (SH)	Urban Park	N= 5 older adult volunteers mean age 65.6 years	2 hours per week Thursdays	Fieldwork interviews with two repeat interviews; focus group	Core themes: Health benefits derived from nature-based activities; development of personal, social and community capital; motives for engagement and sustained participation; suggested mediating and moderating influences in a proposed socio-ecological model
Methods Paper (Chapter 7)	Related to Woodlands study						Critique of use of 'think aloud' method: suggested 'reflect aloud' adaptation
Corporate Health (Chapter 8)	2 years	Gardening (SH)	Campus grounds	N= 7 employees Mean age 52.3 years	Twice monthly sessions		Core themes: Escaping sources of stress; Social connectedness; Deriving health and wellbeing benefits from engagement; Empowerment; Exclusivity & Inclusivity factors in GM

Appendix Two:

Overview of the collective overarching and underpinning themes across the qualitative research studies

Escape

Environmental awareness & action

Childhood experiences

Physical fitness

Restoration

Connectedness to nature

Shared desire to interact and be with nature

Stress reduction

Green Exercise

Reduced social isolation

Making a difference (community capital)

Bonding capital

Achievement, productivity, hope

Friendships

Social connectedness

Doing meaningful activities

Empowerment

Collaboration

Satisfaction, fun, pride

Bridging capital

Social interactions

Choice & Variety

Enhanced personal agency (personal capital)

3