"Doing" Gardening and "Being" at the Allotment Site: Exploring the Benefits of Allotment Gardening for Stress Reduction and Healthy Aging

Jemma L. Hawkins, Jenny Mercer, Kathryn J. Thirlaway, and Deborah A. Clayton

Department of Applied Psychology, Cardiff School of Health Sciences, Cardiff Metropolitan University, Cardiff, Wales.

Abstract

The purpose of this study was to investigate the benefits to health and well-being of allotment gardening (in Wales, UK) in a community-dwelling older adult sample, with a particular emphasis on stress recovery. Semi-structured interviews were used to explore allotment gardener participants' personal beliefs and ideas of the benefits of their allotment gardening activity. The transcribed interviews were examined using thematic analysis. It was assumed that through the discussion of positive aspects of allotment gardening it would be possible to clarify specific benefits that relate to coping with stress in order to further an understanding of the mechanisms involved. Findings indicate that allotment gardeners appreciate both "doing" gardening activity as well as "being" at the allotment landscape for affording a wide range of benefits to their health and well-being. These benefits are discussed with reference to existing theory and research, including links to stress reduction.

1. Introduction

A growing body of evidence highlights the potential benefits of allotment gardening for health and well-being, including physical activity levels, quality of life, social interaction, community involvement, and psychological stress levels (Kingsley et al., 2009; Milligan et al., 2004; van den Berg et al., 2010). All these variables have been implicated in healthy aging theory and policy (Sugiyama & Ward Thompson, 2007); hence, allotment gardening (also referred to as "community gardening" in other countries) might be an important leisure activity to promote in later life. In the United Kingdom, allotment gardens are legally defined in the Allotments Acts as "a piece of land not exceeding 40 poles in extent which is wholly or mainly cultivated by the plotholder for the production of vegetables or fruit by him/herself and family" (Allotments Regeneration Initiative, 2007). An allotment site consists of a collection of allotment plots where plot holders garden individually but in close proximity to one another, thus offering the opportunity for social interaction (Milligan et al., 2004). Elings (2006) in reviewing the benefits of therapeutic horticulture stated that allotment gardening can be seen as a form of horticulture and described three mechanisms through which allotment gardens might promote health and well-being: increased physical activity, increased social cohesion, and reduced stress.

In our previous quasiexperimental field study (Hawkins et al., 2011), allotment gardeners over 50 years of age reported significantly lower perceived stress levels than adults of a similar age range who were members of indoor exercise groups. In an earlier study, researchers from the Netherlands observed stronger stress recovery in allotment gardeners who were assigned to gardening activity following a stressful task when compared to indoor reading activity (van den Berg & Custers, 2011).

The ways in which allotment gardening may be implicated in stress reduction are not yet understood; however, there is a likely link between the physical activity and social interaction that allotment

DOI: 10.1089/eco.2012.0084

gardening provides. We have previously speculated (Hawkins et al., 2011) that gardening on an allotment may have added benefits to health over domestic gardening because it offers a social context to the activity; this is supported by the findings of recent qualitative research into the benefits of allotment gardening. For example, Kingsley et al. (2009) interviewed plot holders at an Australian equivalent of an allotment garden to explore benefits to health and well-being. Their thematic analysis revealed several overarching themes related to social benefits where the gardening site was described as a "setting for social connectedness" and "a supportive environment" (p. 212). The work of Milligan et al. (2004) on the benefits of communal allotment gardening activity in a group of older people also identified key social benefits that they argued were enhanced by being in a natural environment. A study of the American equivalent of allotment gardens (usually termed "community gardens") interviewed 178 gardeners and found that after the benefits to their diet and finances, the participants rated socializing, personal satisfaction, and enjoyment as the next most important benefits of their gardening activity (Patel, 1991).

Similar findings have been highlighted in research into the benefits of domestic gardening (Bhatti et al., 2009; Catanzaro & Ekanem, 2004; Clayton, 2007; Dunnett & Qasim, 2000; Gross & Lane, 2007; Heliker et al., 2001; Infantino, 2005; Peace et al., 2006). These studies mainly used general population samples, most of which included older adults but did not comment specifically on findings for this population. Several intervention studies have been conducted specifically with clinical populations, where gardening activity was introduced as a form of therapy, and the findings generally support the idea that this "therapeutic horticulture" can improve clinical symptoms such as depression, and can also improve levels of social interaction and perceived physical and psychological health (MIND, 2007; Sempik & Aldridge, 2005; Waliczek et al., 2005). In a review of therapeutic horticulture projects Sempik, Becker, and Aldridge (2005) found very similar results as those reported from studies on domestic gardening but also highlighted benefits of the natural environment and being away from indoor settings, particularly those associated with institutionalization.

The existing evidence suggests that allotment gardening may offer a combination of several stress-buffering opportunities including moderate-intensity physical activity, active engagement with nature, and the opportunity for social interaction. While interacting with nature is thought to offer more relaxing experiences than challenging experiences (Korpela & Kinnunen, 2011), gardening offers a unique combination of both, where new learning and challenging experiences are often rewarded with successful outcomes that can boost older adults' self-esteem (Elings, 2006; Milligan et al., 2004). In short, gardening may facilitate or act as a coping resource or coping strategy, just as other forms of leisure have been shown to do (Iwasaki & Schneider, 2003).

There are two psychological theories that suggest explanations for how gardening might contribute to stress reduction—Attention Restoration Theory (ART; Kaplan, 1995) and Stress Recovery Theory (SRT; Ulrich et al., 1991). ART suggests that there are four main components of natural environments that are integral to the experience of attention restoration in that environment: fascination, being away, extent, and compatibility. For example, restorative environments can give an opportunity for "being away" from daily fatiguing features by allowing one to be physically in a different location or by allowing one to be away psychologically, such as by engaging in thoughts and activities that are distinct from the everyday experience. ART posits that natural settings which confer a sense of "being away" from things have a beneficial restorative impact on cognitive resources such as attention and concentration and can reduce stress and fatigue. Further, the presence of fascinating elements such as vegetation and other natural features in the environment is also thought to enhance relaxation and increase the likelihood of attention restoration (Morris, 2003). ART posits that the experience of fascination allows restoration to occur through the opportunity for reflection and allowing attention to rest through being engrossed in fascinating stimuli (Kaplan, 1995). This is because natural elements are neither boring nor overwhelming—they provide an optimal level of sensory stimulation (Clayton, 2007).

The importance of aspects of the environment for determining attentional or stress recovery is also a central element of SRT, which suggests that natural scenes can evoke the necessary affective responses required for psychophysiological stress recovery such as feelings of interest, pleasantness, and calm. Over a century ago, Olmsted (1865) stipulated the benefits of natural settings for stress restoration, commenting on the restorative effects of natural settings being pleasurable. Ulrich et al. (1991) wanted to incorporate emotional responses to nature into their theory of stress recovery, arguing that rapidly occurring affective reactions to natural elements can occur without consciousness. They demonstrated increases in positive affect following exposure to nature above that of baseline measures and those resulting from exposure to indoor and outdoor urban settings. Similar findings have been observed in more recent studies of the impact of exercise in natural settings, including gardening (Barton & Pretty, 2010; Pretty et al., 2007). Allotment gardening activity has the potential to offer the conditions necessary for restoration or stress recovery as stipulated by these two theories. For

example, the allotment garden landscape may offer an environment with optimal restoration qualities as outlined by ART such as an abundance of fascinating natural elements and the opportunity to be away from everyday physically and psychologically fatiguing environments. In addition, previous research has linked gardening activity to various positive affective responses including those central to SRT. The natural environment in which gardening activity is conducted may be particularly important for any benefits of the activity that might result in stress reduction or facilitate coping with stress.

As outlined here, there is a growing body of research that explores the meaning, experience, and benefits of domestic gardening and allotment gardening to health and well-being; however, this is limited at present, and much is still to be understood about the particular aspects of these activities that are most important for experiencing beneficial outcomes (Infantino, 2005). Furthermore, much of the existing research has relied on psychometric scales consisting of a limited number of responses. While these methods have been shown to be robust in terms of reliability and validity, they can only convey information related to the specific questions that are contained within them. Less constrained methods are required in order to understand more about how the potential benefits of allotment gardening may arise, what conditions are required for their occurrence, and how they may differ from person to person. In addition, some of the benefits are likely to be fairly subjective and may be impossible to quantify using psychometric techniques (Grant, 2001). Qualitative methods have been recommended (Grant, 2001; Infantino, 2005; Shoemaker et al., 2000) because the focus on verbal or written dialogue facilitates a comparatively more in-depth and less constrained response. In addition, qualitative methods have been shown to be particularly effective in eliciting reflective responses from older adults on the subject of their health, well-being, and leisure (Cromby, 2012; Fee et al., 1999; Roberson & Merriam, 2005; Robertson & Hale, 2011).

There is a lack of research focused specifically on allotment gardening and a need to build on this with samples from a range of populations, in particular with an urban community-dwelling older adult sample on which there is a distinct lack of existing research. Gardening on an allotment has several specific differences to domestic gardening, including the tendency to grow predominantly fruit and vegetable produce, working on a plot of land of substantial size, the requirement to travel to the allotment site, and making a conscious choice to rent a plot, which may involve sitting on a waiting list for a considerable amount of time. For this reason, allotment gardening is a deliberate leisure pursuit in contrast to the occasional maintenance or chore-like activity that domestic gardening can be for some people.

It was the aim of this study to explore the benefits of allotment gardening specifically, among community-dwelling older allotment gardeners, in order to gain an in-depth understanding of these benefits. In order to explore the individual experiences of the participants, a semi-structured interview technique was used, and an inductive approach was taken to the analysis of the interview data. While there would be a focus on the benefits of gardening for stress reduction, it was also intended that the interviews would more broadly capture benefits outside of this in order to contribute to a holistic view of the benefits of allotment gardening.

2. Method

2.1. Design

The use of a qualitative approach to this study was deemed necessary to allow for the analysis of the participants' interpretation of their own gardening experiences. This was considered important, as gardening is a very individual experience (Heliker et al., 2001; Infantino, 2005), and as such perceived benefits are likely to differ from person to person. Shoemaker et al. (2000) highlight the use of interviews for exploring individual thoughts in depth when the interviewer is able to pick up on interesting insights for further exploration and identify ambiguous information for clarification. Semi-structured interviews consisting of open-ended questions and prompts were used in order to allow specific topics to be addressed but with a loose structure to allow for the personal experience and meaning of each gardener to emerge through conversation and storytelling. This balance between structure and flexibility makes semi-structured interviews arguably the most advantageous method of conducting interview research (Gillham, 2005).

The design of the interview schedule (see Appendix A1) was informed by the existing literature base regarding the benefits of gardening activity, as well as the findings of our previous research (Hawkins et al., 2011). The cross-sectional nature of our previous study does not allow for the causal direction of a stress-reduction effect to be determined; nevertheless the results were intriguing and warranted further exploration. In order to explore these results in more depth, it was necessary that the interview schedule queried the participants' perceptions and beliefs about how allotment gardening may be beneficial in terms of coping with or reducing psychological stress.

Typically, semi-structured interviews do not have a large number of main questions but are followed up with prompts and probes (Gillham, 2005). For the purpose of this study, only one main

question was included in the interview schedule, which asked participants to think about the importance of allotment gardening and what it means to them. It was anticipated that this would encourage discussion about a wide range of benefits of allotment gardening to health and well-being, without focusing on psychological stress from the outset.

Supplementary prompts were then included to bring focus to certain areas of interest. For example, due to our previous observation of lower levels of perceived stress in allotment gardeners (Hawkins et al., 2011), participants would be prompted to discuss their perceptions of the benefits of allotment gardening in terms of coping with stress in the event that a participant did not mention this unprompted. Prompts were also included to stimulate discussion of social benefits, in the absence of discussion of these.

While we had preconceived ideas about the benefits that participants might discuss, less specific prompts were also included in order to widen the focus of the interviews in an attempt to capture a range of perceived benefits. These were intended to encourage participants to think about why they first took on an allotment plot, different areas of their lives that might be benefited by allotment gardening, and whether these benefits differ from those of other leisure pursuits. The schedule was piloted with two participants along with a trial content analysis of the transcripts to identify any patterns in the text that might have suggested additional areas to focus on. Following this, minor amendments were made to the wording or ordering of some of the prompts prior to recruitment of the main sample. All amendments and the final interview schedule were verified with the project team, and these changes did not alter the topics or focus of the schedule as it has been outlined here.

2.2. Participants

All allotment gardener participants from our previous study (Hawkins et al., 2011) were contacted with an invitation to take part in the interviews; 14 out of the 25 participants responded and were subsequently recruited. It should be noted that the previous study comprised a quantitative field experiment consisting of physiological health measures and standardized psychometric scales that were not specific to allotment gardening activity. It is possible that participation in this quantitative research may have led participants to think about their health more than previously. However, as the measures did not focus on gardening, we felt it was unlikely that participation in the quantitative study could have acted as a primer for responses to interview questions in the current study. Additionally, a period of 12 months had elapsed since participation in the quantitative study. All participants resided in Cardiff, Wales, UK; demographic characteristics of the sample are displayed in Table 1. The allotment sites of the participants were all situated within the city of Cardiff, Wales, UK. Ethical approval was granted by the School of Health Sciences Ethical Committee at Cardiff Metropolitan University, Cardiff, Wales, UK, with all participants completing an informed consent form.

2.3. Procedure

All participants were interviewed individually by the first author. Twelve of the interviews were conducted at Cardiff Metropolitan University, and two were conducted in the participants' homes. An informal approach was applied, and the flow of the interview was determined very much by the participants' dialogues in order to allow them to explore their own understanding of their behavior (Kvale, 1996). Prompts from the interview schedule were referred to either to bring the conversation back on topic or to facilitate further discussion where the dialogue had come to a natural end. All interviews started with the question "Can you please tell me about why allotment gardening is important to you?" The questions in the interview schedule evolved as a function of ongoing reflection after each interview, so that pertinent topics suggested by the participants that were not originally included in the interview schedule could be incorporated into subsequent interviews. Each interview was ended when all topics in the interview schedule had been covered in sufficient depth and the participant did not have anything else to add. All interviews lasted between 30 minutes and 1 hour and were recorded on a Dictaphone, from which verbatim transcripts were produced in NVivo8.

2.4. Analysis

Initial analysis of the interview data was conducted by the first author, and at all stages of the analysis the emergent themes were discussed with the coauthors to establish credibility and appropriateness before completing the narrative. The transcripts of the interviews were analyzed using thematic analysis, a process of identifying patterns within qualitative data, also called themes, which capture important areas in relation to the research aim (Braun & Clarke, 2006). This approach requires that the analysis be developed from the standpoint of the experiencing participant and so allows for the exploration of the meaning and perceptions of their reality (Braun & Clarke, 2006). It was considered an appropriate method for the examination and explanation of the benefits of allotment gardening, while facilitating a deeper level of abstraction from the accounts to interpret the ways in which they related to existing theory and could be applied to ideas about reducing psychological stress.

Table 1. Demographic Characteristics of the Sample

ID	SEX	AGE	MARITAL STATUS	EMPLOYMENT STATUS	HIGHEST EDUCATIONAL ATTAINMENT	SES*	ETHNICITY	ALLOTMENT TENANCY DURATION
1	M	54	Married	Retired	High School	3	White British	4 years
2	M	63	Married	Retired	Postgraduate	1	White British	5 years
3	M	65	Married	Retired	Undergraduate	1	White British	30 years
4	M	66	Married	Retired	High School	4	White British	18 years
5	M	67	Married	Retired	High School	2	White British	3 years
6	M	67	Married	Retired	High School	4	White British	18 years
7	M	67	Married	Retired	None	4	White British	13 years
8	M	70	Married	Retired	High School	5	White British	11 years
9	M	81	Married	Retired	High School	1	White British	35 years
10	M	82	Divorced	Retired	Postgraduate	3	White British	3 years
11	F	53	Married	Part-time	High School	1	White British	2 years
12	F	54	Married	Unemployed	High School	3	White British	2 years
13	F	65	Widowed	Retired	Postgraduate	1	White British	30 years
14	F	67	Married	Retired	High School	2	White British	3 years

*Socioeconomic status was measured using the Townsend Index (Townsend et al., 1988) based on participants' postcode and reflects level of area deprivation, where 3 is average deprivation, <3 is below average deprivation, and >3 is above average deprivation.

Braun and Clarke (2006) highlight the ongoing debate around whether thematic analysis is a stand-alone qualitative method or represents a generic skill of thematic coding that is present in all the major traditions within qualitative analysis. In this study, we did view it as a stand-alone method. However, we acknowledge the importance of linking it to a particular epistemological stance. This research employs a critical realist position (Madill et al., 2000), with the findings being driven by the participants' accounts, which are viewed as reflections of their experiences. Yet the researcher also plays a role in interpreting the accounts and coding them into categories. These categories would, to some extent, be determined by the background knowledge and perspective of the research team, which in this instance was made up of academic psychologists.

The thematic analysis process was also broadly informed by procedures of grounded theory outlined by Flick (1998) and Ezzy (2002), the stages of which are outlined in more detail below, with Table 1 providing an illustration of the coding process used. We do not consider this to be a full grounded theory approach as we did not seek to develop an exploratory model from the findings. Rather, the findings are discussed in relation to past research and theories of stress reduction (see Table 2 in Section 4), as well as highlighting the specific nuances of this study and their implications. This illustrates the flexibility of the thematic analytic approach.

The initial coding stages involved reading and rereading of the transcripts to develop open codes of meanings and patterns within the data that were regularly informed by the process of constant comparison. This process involves all coding possibilities being compared against others for similarities and differences and can lead to some codes being broken down into separate codes or the grouping of two existing codes into one. The next stage of axial coding then involved codes being refocused based on relationships between them into the broader level of themes by identifying the conditions

Table 2. Illustration of the Data Coding of Emerging Patterns in the Analysis of the Interview Transcripts

QUOTES	OPEN CODES	AXIAL CODES	CATEGORY
At the allotment I could do something rather than sit at home and mope	Not sitting at home	Doing Something	DOING: "Benefits of Doing Gardening Activity"
There's always something up there to do, always something	Being busy		
Well, I think, you focus while you're busy, it makes you focus on something different	Focus on something else	Distraction	
When I'm up there it's, that's all you're concerned about... you get lost in it	Getting lost in what you're doing		
The reason I started the allotment was to keep myself fit, 'cos I wasn't! I'm a bit fitter than I was when I first started	Keeping active/fit	Physical Activity	
You're bending, pulling and pushing and things like this, I mean to me it's the best all-round exercise going	All-round exercise		

associated with each code and by then comparing this to existing theory and evidence. The final stage of selective coding involved the fitting of the themes around core codes central to the main message of the data. Consequently, an overall coding scheme was built that was then interpreted in relation to preexisting theory and literature.

3. Findings

During analysis, emergent themes were incorporated into two central categories that explained the overall benefits of allotment gardening as two main functions: The Benefits of "Doing" Gardening Activity and The Benefits of "Being" in the Allotment Landscape. Figure 1 shows how each of the themes related to these two central categories. Some fell entirely under one category, and others spanned both categories as they appeared to be a function of doing gardening activity while being in the allotment setting.

From the analysis it became clear that the benefits that participants were talking about were either a result of "doing" gardening activity or a result of non-activity-related elements of "being" at the allotment site. For example, many of these benefits were either direct or indirect results of the task of gardening itself, such as the physical activity that is a result of digging, raking, and harvesting crops. Some of the benefits that participants described, however, could not be attributed to gardening activity but appeared to be related to aspects

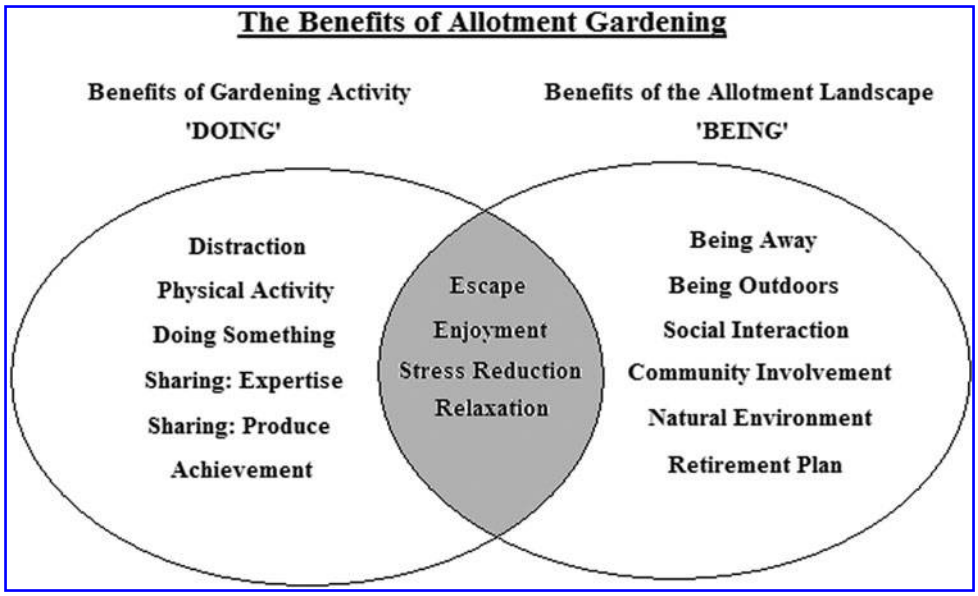

Fig. 1. Central categories and theme associations.

of the environment at the allotment, such as the benefits of being outdoors in fresh air, which can be enjoyed even when one is not doing gardening. It was also clear that several of the benefits were interlinked, such that one often led to or was made possible because of another. For example, the opportunity for escape from daily frustrations or problems was discussed as a major benefit of becoming engrossed in gardening activity; however, this was linked to a benefit of being away from the home physically in addition to the mental escape of distraction.

The main themes from the two central categories will be discussed, relating these to relevant evidence and theory where applicable and using quotes from the interviews to illustrate them. Pseudonyms have been used in place of participant names for the quotes reported in the findings.

3.1. Doing gardening

3.1.1. Doing something and distraction. The participants valued their allotment gardening for having something to do to get out of the house, for example, to avoid sitting around doing nothing or spending a lot of time watching TV. They stressed the importance of this particularly for retirement and highlighted that the allotment always has something for them to do. Doing something physical was emphasized along with the benefits of this for tiring you out and helping lift a bad mood:

> *Simon:* You go over there, you work for a couple of hours, and you forget all about it. I think if you have got something niggling inside you then yeah going over and doing a bit of hard digging sort of works off the frustration.

Gross and Lane (2007) interviewed gardeners of a range of ages about the meaning of and psychological involvement with domestic gardens across the life span. The older gardeners in their study described a therapeutic benefit of gardening that appeared to be a result of becoming absorbed in gardening activity, which was absent from the discussions of their younger participants. They specifically highlighted distraction as a benefit of gardening activity, resulting from concentration on and immersion in the task at hand, as did the allotment gardeners in this study. Specifically, our participants discussed how gardening can take their mind off things, make them focus on something different, and help them problem solve as a result:

> *Malcolm:* The allotment gets you away from the day to day, erm, it's a chance to think about something else and I think if you do that the brain sort of regenerates…well, refreshes itself, and you know, it can make finding answers to what appear to be tricky problems, blindingly obvious sometimes.

Sempik et al. (2005) also highlight the capacity for distraction that gardening provides, interpreting this as a result of being absorbed in the task at hand. Enjoyable distraction provided by "simple, non-competitive activity" is thought to be important for enhancing restoration (Johansson et al., 2011). It is also thought to be an important emotion-focused coping strategy that may mediate the stress response by drawing attention away from a stressor to minimize resulting distress (Glanz & Schwartz, 2008). In this study, participants talked about being in their own world when on the allotment plot, linked to the solitary and unpressured nature of their gardening, which seemed important for becoming absorbed in the activity, described by some participants as "switching off."

Kaplan (1995) argues that an environment must have "extent" in order to facilitate restoration, suggesting that the richness and coherence of an environment can provide the feeling of being in a whole other world. As mentioned above, an important factor in being able to create their own world on the allotment plot for the participants was the solitary nature of gardening activity; this would make sense, as solitary activities have been shown to enhance reflection and spiritual insight (Leary et al., 2003). Solitary activities have been linked to various forms of healthy aging; for example, Menec (2003) reports that solitary activities appear to be linked to psychological improvements such as enhancing feelings of happiness and a sense of engagement in later life. Johansson et al. (2011) also found that participants who took a walk in a park alone felt more revitalized than when they did the same in company. For the participants of this study, it appears that the solitary nature of their gardening activity was valued for the feeling of becoming lost in another world and thus distracted from other thoughts, rather than elements of the environment. However, the environment may offer other benefits that complement this experience, as discussed in Section 3.2.

3.1.2. Physical activity. Gaining physical activity from their gardening was mentioned by all participants of this study as a positive benefit in terms of health, fitness, well-being, and stress reduction; and for many it was the primary reason for taking on an allotment garden. The physical activity was described as an all-around form of exercise due to the range and intensity of body movements involved in tasks such as digging, raking, carrying water, bending, pruning,

and chopping, for example. The perceived benefits of their gardening activity included weight loss, increased fitness, staying supple and trim, feeling good, and reducing sedentary time:

> *Kevin:* Well it's good for a number of reasons, the main one being that it provides good exercise, you know, I mean to me it's the best all-round exercise going.
>
> *Alan:* I wanted to keep the allotment on because I wanted to be able to do things…I don't want to spend all day in the chair, I would rather wear away than rust away.

The health benefits of the physical activity involved in gardening have been recognized in several studies (Cameron & Taylor, 2008). In terms of the benefits of being active for stress reduction, the allotment gardeners talked about being able to tire themselves out to the point that they did not think about the thing that was causing them stress. Some, however, did not articulate this explicitly and instead just talked about how they would feel rejuvenated and in a better mood after a strenuous session on the allotment.

As already discussed, SRT emphasizes a link between increases in positive affect and reduction in autonomic arousal and psychological stress. The element of enjoyment also factored into the benefits of physical activity; some participants explained that exercising by gardening was more enjoyable than other forms of physical activity:

> *Margaret:* I think I just enjoy all of it, you know, I enjoy digging because, digging it takes a long time to dig because…to get every weed out, so it does take a time. But then there's the satisfaction.
>
> It is possible that the effect of exercise on improved mood is enhanced when the exercise itself is enjoyable and perhaps enhanced further when this exercise involves active engagement with nature (Pretty, 2004).

3.1.3. Achievement, sharing expertise, and sharing produce. Among the participants there appeared to be a common love for growing things—both observing things growing and actually being involved in the process which makes that happen. People talked about the benefits of this in terms of feelings of achievement when something works, a sense of satisfaction that results in other good feelings such as being pleased with themselves. Most participants in this study talked of their anticipation and excitement at the prospect of witnessing these outcomes and how getting something back from the work put in provides a sense of satisfaction and achievement:

> *Jane:* When everything starts to grow, it's probably one of the best feelings in the world—to know that three months before it was barren earth, now it's full of crops, that's a satisfaction. It looks nice down there as well; it looks like my mind's eye's picture of what an allotment should look like. I'm very pleased with it at the moment…and with myself.

Milligan and colleagues' (2004) analysis of allotment gardeners' diaries acknowledged similar benefits of doing gardening activity such as satisfaction and tangible rewards. The researchers described an intimate and direct involvement and commitment associated with gardening that requires time and emotion. It is not surprising therefore that the allotment gardeners talk so fondly of the enjoyment and satisfaction that they experience when their efforts are rewarded through the production of crops.

The satisfaction experienced through gardening has also been linked to the demonstration and confirmation of skills and expertise (Clayton, 2007; Tse, 2010) as well as an enjoyment of observing the growth of plants that one has nurtured (Gigliotti et al., 2004; Milligan et al., 2004). The demonstration and confirmation of skills were also discussed by allotment gardeners in this study, either in the form of compliments or as an outcome of sharing expertise with fellow gardeners. This involved receiving advice and tips that they then successfully put into operation as well as being able to provide that same assistance to others. Receiving compliments about their plot or produce may bolster any sense of achievement experienced:

> *Jane:* We just sit on my bench and have a bit of a chat and just enthuse over how clever I am 'cos I've grown such nice things…And the old gardeners help the new gardeners and there's always somebody willing to give you a few of these plants in exchange for some of those you've done better. You swap produce and you exchange.

Clayton and Myers (2009) suggest that nature can fulfill the basic identity need to feel competent through the opportunity for self-sufficiency, an opportunity that allotment gardening specifically provides, which can also foster self-esteem. Patel's (1991) study of the American equivalent of allotment gardeners found that sharing with and helping fellow gardeners and feeling self-sufficient were perceived by the participants as important benefits of their gardening activity.

3.2. Being at the allotment

3.2.1. Being away, being outdoors, and being in the natural environment. As well as providing "something to do," the idea of getting out of the home was discussed as a benefit of going to the allotment site, regardless of whether it was to garden or not. One participant,

when asked what was important about gardening on an allotment, simply replied "getting out." Two participants mentioned that going to the allotment is a healthy break for their relationships now that they are retired; otherwise they would be spending a lot of their time sitting at home with their spouses. Others related getting out of the house specifically to coping with stress:

> *Margaret:* Sometimes, it is lovely to just get away, you know, if one was really cross about something or if something was really stressful it is nice to just go over and then it just calms you down.

In addition to the perceived benefits of getting out of the house, most of the allotment gardeners talked about the benefits of being outdoors specifically. This was partly linked to enjoyment of the sights and sounds of the natural landscape. However, separate to the impact of being in the presence of natural contents such as plants, vegetation, and wildlife was an appreciation of the benefits of being outdoors in the fresh air for their health.

Ottosson and Grahn (2005) emphasize that this is a commonly cited reason for wanting to get outdoors that is distinct from wanting to be in nature. Clayton (2007) also found that for home gardeners getting outdoors is perceived to be the main benefit of engaging in gardening activity. Sempik et al. (2005) highlight the importance of getting outdoors for escaping the constraints of indoors, which may be particularly important for older adults who spend a lot of time at home or who are living in institutional settings:

> *Simon:* I mean, it is different to sitting in the house, I'm not the sort to sit down and look at the television all day, I couldn't stand that. I mean, I do like being outdoors, I spent all my working life indoors, working in an office so it is something different.

A couple of participants explicitly acknowledged the benefits of being in the sunshine when outdoors, one of whom related this to increases in serotonin levels, which was assumedly linked to improved mood.

There was some discussion of the benefits of being away from traffic, partly in regard to the quality of the air but also with regard to this enhancing the feeling of being in a natural environment. This was intriguing, as all the allotment gardeners were tenants at sites that were not outside the urban landscape of the city; however, it appears that the scenery and scope of their surroundings contributed to feeling like they were in a more rural setting:

> *Jack:* It's a green space, I mean, you're not walking on tarmac and there are no cars, it's almost like being in a small bit of the country really.

Milligan et al. (2004) also found that the allotment gardeners in their study perceived the site as a retreat into nature away from urban scenes. They reported several themes relating to benefits of the natural environment in particular. The allotment landscape was linked to feelings of peace, tranquility, and enjoyment regardless of whether the participants were actively engaging with the landscape through their gardening or simply passively experiencing it. Milligan emphasized the apparent importance of nature for enhancing stress restoration, stating that part of the benefit might be a function of escaping negative aspects of the urban environment and retreating into nature. In the data reported here, the benefits of being outdoors and being in the natural environment were all important aspects of the allotment landscape, and some participants discussed these in relation to coping with stress:

> *Jane:* The location is great if you're stressed…I just think it makes you focus on something different, and just the peace and quiet of the area, on a cerebral level it's very relaxing.

The perceived benefits of the natural environment, either for distracting the attention or providing feelings of calm and pleasantness, relate to specific components of both ART and SRT. The natural environment of the allotment garden may therefore be key to the opportunity for recovery from stress while gardening there.

3.2.2. Social interaction and community involvement. Being at the allotment site provides opportunities for social interaction, which was described as an important benefit by most participants. Most recognized that this had subsequent benefits to their well-being and enhanced enjoyment, and for some this was a major reason for them deciding to get an allotment in the first place. The benefits of social interaction extended to meeting new people and making new friends; some commented that this is especially important in older age if social networks have been diminished by retirement or bereavement:

> *Wendy:* I think well maybe it is good to go out, 'cos you might just wave to somebody but it's…you've seen somebody else through the day you know, especially as I'm not working at the moment. It replaces work in a way, it gives you another circle of people, where I've lost the circle I was working with, you've got another circle.

Other researchers have commented on the importance of interacting with like-minded people in various outdoor pursuits for the perceived benefits that this brings (Clayton, 2007; Peacock et al., 2007). Milligan et al. (2004) found that the development of a peer group at the allotment site was perceived to be one of the most

important benefits of allotment gardening; however, it must be pointed out that the participants of Milligan's study all gardened together on the same plot of land rather than on individual plots, and this may have enhanced the social benefits that were observed. Among the participants of our study, while these social benefits were discussed by most, it was also noted that sometimes the social interaction with fellow allotment keepers can be a disturbance, particularly when you go along to the allotment for a set amount of time with a job in mind that you want to complete.

> *William:* You chat with people sometimes, yeah, sometimes too much, because you go down there and you think "Oh, go away" I came up here to do some work, not to talk! I'm not a sociable person, I'm quite happy to be on my own, lots of us down there are, we just like to sort of mind our own business and you say "hello" and that's it. There are others who like, you know, go down for a good chat, and you see them coming and you dive into your shed!

3.2.3. Retirement plan. For some of the allotment gardeners in this study, being physically active on the allotment was also a means for them to reduce the time they spent sitting around the house, which was increasing as a result of retirement and the effects of aging on their physical functioning. While many participants referred to gardening as work, this was mostly in reference to the physical exertion required in cultivating an allotment plot; however, some explicitly talked about how the social group, time commitment, and routine that was involved in allotment gardening served as a replacement to their previous employment. For some participants, this had been specifically planned either as a way to fill their time or because they now felt that they were able to commit the time required, which they were not capable of when they were working. Having something to do is another theme that ties into this idea of trying to fill time in retirement; this theme was also linked to being productive and keeping active:

> *Kevin:* Retirement is something I've spoken to a number of people about, who are coming up to retirement, I've sort of suggested to people "You need a plan." You really do need a plan, 'cos you can't suddenly stop working so many hours, you need to have some means of occupying part of your time, and I always intended as soon as I retired, to go back to the allotment.

Retirement is a time of change and adaptation, and the idea that working continues in other ways during this time has been acknowledged in previous research (Hobbis et al., 2011). Gardening has been suggested as a useful activity for helping people adjust to life after retirement (Dunnett & Qasim, 2000). In addition, studies have reported the importance of gardening for providing a purposeful activity (Heliker et al., 2001), and Elings (2006) suggests that working with plants provides the opportunity to make decisions and be responsible for something. Kaplan (1995) highlights the importance of a purposeful and productive life for a feeling of accomplishment and life satisfaction and suggests that the restoration of directed attention is essential to achieving this. Bhatti and colleagues (2009) discuss the idea of the domestic garden becoming a project that one labors on, which they referred to as a form of "embodied vocation" (p. 67). Similarly, Dunnett and Qasim (2000) found that retired participants valued gardening as a productive way to spend their time, an activity they could spend the whole day doing and through which they could establish a routine. Allotment gardening therefore can be seen as a valuable activity for enhancing feelings of responsibility, purpose, and productivity during retirement, while the natural setting it is conducted in may facilitate this through an enhanced opportunity for attention restoration.

3.3. Doing and being

3.3.1. Relaxation, enjoyment, and escape. The experience of escape and distraction was reported as important for enjoyment, relaxation, and stress reduction. Enjoyment was discussed in terms of enjoying the sights and sounds of the allotment environment as well as in relation to the enjoyment of gardening itself and the process of growing things:

> *Margaret:* Pruning things is brilliant, there's nothing better than just chopping things down, it's brilliant!…You feel better afterwards than beforehand…sometimes its an effort to go to the allotment, but I just feel so much better when I've been, better mood.

Studies on the benefits of gardening activity have demonstrated links between the natural environment of the garden and resulting enjoyment and positive affect (Bhatti et al., 2009; Clayton, 2007) but also highlight the impact of the growing activity itself on improving mood (Peace et al., 2006). Catanzaro and Ekanem (2004) showed that the majority of domestic gardeners rate planting in particular as their most enjoyable gardening activity, followed closely by harvesting. Regardless of which activity was rated as most enjoyable by Catanzaro and Ekanem's participants, the main reason for enjoying it was when it provided a sense of accomplishment. Thus it appears that enjoyment and achievement are closely linked. This was evident in the dialogue of the allotment gardeners here and perhaps is

specifically linked to witnessing the outcomes of gardening activity and being able to harvest the produce that is grown:

> *William:* I like growing things, I like creating things, anything from just buying a packet of seeds and putting them in a seed tray or something and one day you have a look and there's lots of little green spikes.

Enjoyment of gardening tasks has also been linked to relaxation. Dunnett and Qasim (2000) found that domestic gardeners enjoy the various elements of gardening activity because they are relaxing and provide an escape from routine. Sempik and colleagues' (2005) review into the benefits of therapeutic horticulture also linked improvement in mood to relaxation, enjoyment, and escape. The opportunity for relaxation, either as a result of gardening or as a result of elements of the allotment environment, was acknowledged by our participants as a significant benefit in both respects. Being away from the home at the allotment site was also implicated in the experience of relaxation. A few people talked about the tranquility and peacefulness of the allotment site and the benefits of peace and quiet for relaxation and feeling at peace with oneself:

> *Jack:* The allotment is quiet, and everybody just gets on with their work there, it's quite, sort of, peaceful, no stress involved really. Very Relaxing. You can work at your own rate, you're not being pressurised to get something finished. You can be there on your own and be in your own little world, nobody to hassle you.

The opportunity for relaxation spans the two central categories because of the similarity in the ways in which doing gardening and being at the allotment were associated with perceived benefits. Participants talked about their experiences of feeling calm and at peace both as a result of being in the natural environment of the allotment and as a result of gardening activity. This is something that is reflected in much existing evidence, particularly from research into the benefits of contact with nature. Korpela and Kinnunen (2011) found that the relationship between time spent interacting with nature and recovery from work stress was mediated by the experience of relaxation, and Laumann, Garling, and Stormark (2003) demonstrated an effect of simply watching a video of a natural environment on the relaxation of autonomic functions.

Such research findings have been referred to when analyzing the benefits of domestic and communal gardening activity, to suggest that it is the natural elements of the garden that promote relaxation (Kingsley et al., 2009; Milligan et al., 2004). However, researchers have also acknowledged the relaxing qualities of gardening activity itself (Clayton, 2007). For example, in a survey on the roles and values of domestic gardens, Dunnett and Qasim's (2000) participants reported that working in the garden on tasks such as watering plants and weeding was relaxing. This can be linked back to the tenets of ART and in particular the idea that natural scenes can have a tranquilizing effect on attention thus leading to restoration (Kaplan, 1995). This suggests that the relaxation experienced when gardening or just being on the allotment site may also lead to stress reduction. The idea that scenes which elicit feelings of calm can lead to stress recovery is also a central element of Ulrich's SRT (Ulrich et al., 1991).

According to ART, in order to benefit from "being away" in a natural environment, the individual must experience a conceptual escape from taxing mental activity, and in the data reported above it can be seen that the allotment gardeners appeared to value the distraction afforded by gardening activity for escape from stressful thoughts over and above that afforded by the allotment landscape. In Gross and Lane's (2007) study of the meaning of and psychological involvement with domestic gardens across the life span, the term "escapism" was used to refer to patterns in the data linked to going outdoors and coping with stress. They noted that it is the activity of gardening itself that provides opportunity for escape in later life, whereas for younger participants being in an outdoor space was more important than gardening for escapism.

Attention Restoration Theory does not stipulate that restoration can only take place in natural environments but that natural environments are more likely to comprise the four components that are required for an environment to be restorative. It might be the case that the active engagement with nature that is an integral part of gardening activity is important to achieving the escape that the allotment gardeners described. As mentioned previously, the participants discussed the importance of feeling like they were in their own world on the allotment plot and being able to lose themselves in the gardening activity:

> *Graham:* When I'm up there it's, that's all you're concerned about…you get lost in it…you know. Lost in doing what you've gotta do on the allotment.

Being able to lose oneself in, or be distracted by, gardening activity is probably facilitated when one can become easily engrossed by the natural, fascinating stimuli of the allotment landscape that hold attention involuntarily.

In this study, the enjoyment of gardening activity and the allotment landscape was discussed in the context of improving mood. This linked into several other themes, such as the benefits of being physically active during gardening activity for making you feel good, as well as the pleasantness and attractiveness of the natural landscape

having an effect on how you feel. SRT links positive emotions that are evoked by natural contents to the opportunity for recovery from stress, suggesting that these affective reactions can occur without consciousness and thus may be implicated in attention restoration (Ulrich et al., 1991). In stressed individuals, reductions in arousal are associated with increases in pleasure, and several studies have demonstrated significant correlations between autonomic arousal and measures of positive affect following time spent in natural environments (Barton & Pretty, 2010; Pretty et al., 2007; Ulrich et al., 1991). Finally, in the domain of leisure-coping research, the enjoyment of relaxing leisure and outdoor leisure in particular has been found to have a significant positive association with stress levels, coping effectiveness, and mental health, suggesting that the positive emotions arising from leisure experiences such as gardening are important for coping with stress (Iwasaki et al., 2005).

4. Discussion

The findings of this study have furthered the understanding of how allotment gardening activity may have benefits for health and well-being, including stress reduction, in later life. By using semi-structured interviews with a group of older allotment gardeners, it was possible to explore the experiences that are valued for providing these benefits. While gardening activity itself seemed to provide benefits that were discussed as driving factors for pursuing allotment gardening, the participants also acknowledged the added benefits of the environment in which this activity takes place.

The allotment gardeners showed an appreciation for the social interaction that takes place at the allotment site and enjoyed being able to go to the allotment to meet and talk to people. However, it was clear that social interaction can have negative effects when it interferes with gardening activity on the allotment, perhaps as a result of interruption of the positive experience of escape. This illustrates the major difference between the two central categories that emerged from the data analysis, the difference between "doing" gardening and "being" at the allotment site. Both of these appear to have benefits to well-being, stress reduction, and so on, but the mechanisms through which they arise can be quite different. In the case of social contact, when engaging in gardening activity at the allotment, some gardeners require solitary time in order to become engrossed in the task and achieve escape and distraction.

This study has identified that allotment gardening may differ considerably in its benefits to health and well-being from other forms of gardening, notably domestic gardening and more communal gardening such as that on shared garden plots. Unlike domestic gardening, allotment gardening offers an escape from the home environment while also allowing gardening of a solitary nature. In contrast to this, allotment gardening can also offer social interaction opportunities when one is not absorbed in gardening activity. Being able to interact with fellow gardeners was valued by our participants for enjoyment and sharing purposes, which in turn may result in other benefits such as increased positive affect and self-esteem. This is something that may also be offered on communal gardening plots, such as that described in Milligan and colleagues' study (2004); however, the individual allotment plot may have an added advantage of offering a place to retreat to and conduct solitary gardening activity that may not be possible on shared garden plots. In this way, allotment gardening is more flexible to the varying needs of the individual by offering an environment compatible with the need for solitary time to escape from things as well as the need for social interaction and conversation with like-minded individuals.

The results reported here complement and serve to cement many existing findings relating to the benefits of gardening in general, and allotment gardening in particular, for healthy aging. The relationships between aspects of gardening activity and the allotment landscape that result in benefits and the impact of these benefits on others is clearly complex and requires additional quantitative and qualitative analysis to further the understanding of these interlinking relationships. However, this study has provided insight into how some of these relationships may operate and has enhanced the understanding of the results of our previous work. The parallels with previous research on the meanings and importance of gardening at home are compelling; however, it has also highlighted several differences between allotment gardening and domestic gardening, which may result in differing effects on health.

Clayton (2007) questioned whether the benefits of general gardening activity are due to the process of gardening or whether the benefits are an aspect of the garden environment that could still be experienced if one did not engage in gardening but spent time in the garden nevertheless. The results reported here have shown that, for allotment gardening at least, there are separate but also synergistic benefits of both the process and the setting of this activity. While the thematic analysis process used here was conducted independent of relevant theories, notably ART and SRT, there are obvious similarities between the components of each and the themes that emerged from the data (see Table 3).

The perceived benefits of allotment gardening for stress reduction have been mainly discussed in relation to the restorative effect of nature, whether this is part of engaging with nature during gardening activity or simply passively experiencing nature by being at the allotment site. However, other mechanisms that are not linked to

Table 3. Links Between Components of ART and SRT and Themes From This Data

ATTENTION RESTORATION THEORY (ART, KAPLAN, 1995)	
Theory components	*Themes*
Compatibility	Retirement Plan, Enjoyment
Being Away	Being Away, Being Outdoors, Natural Environment
Fascination	Natural Environment, Distraction
Extent	Being Outdoors, Natural Environment, Community Involvement
PSYCHOPHYSIOLOGICAL STRESS RECOVERY THEORY (SRT, ULRICH ET AL., 1991)	
Theory components	*Themes*
Interest	Enjoyment
Positive Affect	Physical Activity, Sharing Produce, Achievement
Pleasantness	Social Interaction, Enjoyment, Natural Environment
Calm	Natural Environment, Doing Something, Distraction, Relaxation

exposure to nature were discussed by the participants of this study in relation to stress recovery. Ulrich et al. (1991) acknowledge these other mechanisms, such as physical exercise and achieving a sense of control, suggesting that they have advantages to stress restoration in natural environments. Participants valued the benefits of doing gardening for a distraction or escape from stressful situations and for giving them something to do that was routine and productive. They also valued the environment of the allotment site for providing a relaxing outdoor setting and fresh air, within a social context. Relaxation and escape in particular were highlighted as beneficial outcomes of both doing gardening and being at the allotment; these are known motivators for leisure activity (Iwasaki & Schneider, 2003) and may be particularly important features of gardening activity for construing health and well-being benefits.

Regarding the benefits reported in terms of stress reduction, it is possible that the promotion of gardening activity in later life would be best aimed at stress management. Following the findings that doing allotment gardening and being at the allotment site are thought to be beneficial in terms of relaxation, promotion of gardening for stress management might be best targeted as a relaxation strategy. Such strategies have been shown to lead to improvements in mood and quality of life (Glanz & Schwartz, 2008), and this may be as a result of stress reduction effects. Park, Shoemaker, and Haub (2008) argue that gardening activity may be a particularly beneficial activity to promote among the older population, as it can address older people's reasons for avoiding physical activity. Its popularity as a leisure pursuit with the older population and the fact that it provides interest, change, and long-term focus make it an ideal target activity for health promotion initiatives.

Milligan et al. (2004) offer advice for tailoring "healthy gardening interventions" to address specific health needs, such as supported gardening schemes and garden plots in sheltered housing complexes. As a result of their research into the benefits of communal gardening, they concluded that this activity can lead to the development of social relationships and thus combat social isolation, as well as enhance physical and mental well-being. It has been argued that interventions aimed at improving symptoms of anxiety and depression should be targeted toward increasing social support as well as stress reduction (Dunkley et al., 2000), and the evidence is starting to mount for the use of gardening initiatives to accomplish both of these.

In short, encouraging participation in allotment gardening activity in later life may help enhance health through several pathways including coping with stress. This may occur through the opportunity for escape and renewal of depleted resources (Iwasaki & Schneider, 2003) and improved mood. Other pathways might include a lifestyle in which other healthy behaviors are more likely (Warburton et al., 2006), such as the consumption of fresh fruit and vegetables grown on the allotment. However, in interpreting the findings reported here it should be noted that the participants of the study were all of "White British" ethnicity; thus the results cannot be generalized to older adults of other ethnic backgrounds. It should also be noted that participants were recruited to take part in a study exploring the benefits of allotment gardening; therefore, we acknowledge that volunteers for this study are likely to have a positive perspective on allotment gardening. It may be beneficial for future research to explore the challenges of allotment gardening with a different sample.

Elings (2006) stated that allotment gardeners may not be aware of the potential therapeutic effects of their gardening activity, but the participants in this study appeared to have considerable insight into this. Although the word *therapy* was rarely used in discussions, the allotment gardeners reported improved mood, coping with stress, and well-being that they attributed to their gardening activity and the allotment landscape. This is important to acknowledge so that future research can also make use of these methods for exploring individual perceptions and experiences of the beneficial impact of allotment gardening.

5. Conclusion

While doing nothing in the allotment garden and simply being there can bring substantial benefits, for the allotment gardeners in this study the gardening activity itself was valued most for the benefits to health and well-being that it provides. It is important to note, however, that the participants in this study may have attributed most benefits to the gardening itself without perceiving how the natural environment contributed to this. The effects of the natural environment may be more subtle or unconscious and therefore should not be underestimated.

Appendix A1: Semi-structured Interview Schedule

Introduction to the study and its purpose. Explain consent procedures, that all data is anonymized/confidential, and that participation is voluntary (right to withdraw at any time without affecting rights).

Main Question:

Tell me about your allotment gardening and what it means to you.

Prompts:

What led you to getting an allotment plot?

What benefits do you feel allotment gardening gives you?

Are there any negative aspects?

Specific prompts for benefits/negatives:

- Being Active/Health? WHY?
- Social? WHY?
- Stress? WHY?

How well do you know your plot neighbours at the allotment? Do you interact with them much?

Do you feel supported at the allotment site? Do you feel part of a social group?

Do you share your produce with anyone? How does that make you feel?

Do you feel different at the allotment site than when you are anywhere else?

Do you take part in any other leisure activities/hobbies? Same/different benefits?

Do you garden at home as well as on an allotment? Which do you prefer? WHY?

To finish:

Ask if they have anything else to add, and thank them for their time.

Acknowledgments

The authors thank the allotment gardeners who took part in the research for their valuable time and input, as well as the allotment site secretaries for disseminating information about the research study. We would also like to thank Dr. Karianne Backx for her advice on an earlier draft of the paper, and the reviewers for their helpful comments and suggestions.

Funding

This research was funded by the Academic Development Fund of Cardiff Metropolitan University. The funding source had no involvement in the study design, in the collection, analysis, and interpretation of data, in the writing of the report, or in the decision to submit this article for publication.

Author Disclosure Statement

The authors declare that they have no conflicts of interest with respect to authorship or publication of this article and that no competing financial interests exist.

REFERENCES

Allotments Regeneration Initiative. (2007). Allotments: A plotholder's guide. Retrieved July 6, 2011, from http://www.farmgarden.org.uk/ari/documents/plotholdersguide.pdf

Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science & Technology, 44*, 3947–3955.

Bhatti, M., Church, A., Claremont, A., & Stenner, P. (2009). I love being in the garden: Enchanting encounters in everyday life. *Social & Cultural Geography, 10,* 61–76.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77–101.

Cameron, R., & Taylor, J. (2008). *The benefits of green space.* Plant for Life Briefing Report 17. Reading, UK: University of Reading. Retrieved June 1, 2011, from http://www.bordbia.ie/aboutgardening/GardeningArticles/ScientificArticles/The%20Benefits%20of%20Green%20Space.pdf

Catanzaro, C., & Ekanem, E. (2004). Home gardeners value stress reduction and interaction with nature. *Acta Horticulturae, 639,* 269–275.

Clayton, S. (2007). Domesticated nature: Motivations for gardening and perceptions of environmental impact. *Journal of Environmental Psychology, 27,* 215–224.

Clayton, S., & Myers, G. (2009). *Conservation psychology: Understanding and promoting human care for nature.* Oxford, UK: Blackwell.

Cromby, J. (2012). Feeling the way: Qualitative clinical research and the affective turn. *Qualitative Research in Psychology, 9,* 88–98.

Dunkley, D. M., Blankstein, K. R., Halsall, J., Williams, M., & Winkworth, G. (2000). The relation between perfectionism and distress: Hassles, coping and perceived social support as mediators and moderators. *Journal of Counseling Psychology, 4,* 437–453.

Dunnett, N., & Qasim, M. (2000). Perceived benefits to human well-being of urban gardens. *HortTechnology, 10,* 40–45.

Elings, M. (2006). People-plant interaction—the physiological, psychological and sociological effects of plants on people. In J. Hassink & M. Van Dijk (Eds.), *Farming for health: Green-care farming across Europe and the United States of America* (Vol. 13, pp. 43–55). Wageningen, the Netherlands: Springer.

Ezzy, D. (2002). *Qualitative analysis: Practice and innovation.* London, UK: Routledge.

Fee, L., Cronin, A., Simmons, R., & Choudry, S. (1999). Assessing older people's health and social needs: Qualitative research investigating health beliefs and social factors relevant to older people's health. London, UK: Health Education Authority. Retrieved September 2008. from http://www.nice.org.uk/nicemedia/documents/assess_older_health.pdf

Flick, U. (1998). *An introduction to qualitative research.* London, UK: Sage.

Gigliotti, C. M., Jarrott, S. E., & Yorgason, J. (2004). Harvesting health: Effects of three types of horticultural therapy activities for persons with dementia. *Dementia, 3,* 161–180.

Gillham, B. (2005). *Research interviewing: The range of techniques.* Maidenhead, UK: Open University Press.

Glanz, K., & Schwartz, M. D. (2008). Stress, coping and health behavior. In K. Glanz, B. K. Rimer & K. Viswanath (Eds.), *Health behavior and health education: Theory, research and practice* (4th ed., pp. 211–236). San Francisco, CA: Jossey-Bass.

Grant, B. C. (2001). "You're never too old": beliefs about physical activity and playing sport in later life. *Ageing and Society, 21,* 777–798.

Gross, H., & Lane, N. (2007). Landscapes of the lifespan: Exploring accounts of own gardens and gardening. *Journal of Environmental Psychology, 27,* 225–241.

Hawkins, J. L., Thirlaway, K. J., Backx, K., & Clayton, D. A. (2011). Allotment gardening and other leisure activities for stress reduction and healthy aging. *HortTechnology, 21,* 577–585.

Heliker, D., Chadwick, A., & O'Connell, T. (2001). The meaning of gardening and the effects on perceived well being of a gardening project on diverse populations of elders. *Activities, Adaptation and Aging, 24,* 35–56.

Hobbis, S., Thirlaway, K., Sanders, L., & Hendry, L. (2011). Retirement and lifestyle behaviours: A thematic analysis of a pilot study. *Health Psychology Update, 20,* 2–8.

Infantino, M. (2005). Gardening: A strategy for health promotion in older women. *Journal of the New York State Nurses Association, 35,* 10–17.

Iwasaki, Y., MacKay, K., & Mactavish, J. (2005). Gender-based analyses of coping with stress among professional managers: Leisure coping and non-leisure coping. *Journal of Leisure Research, 37,* 1–28.

Iwasaki, Y., & Schneider, I. E. (2003). Leisure, stress and coping: An evolving area of inquiry. *Leisure Sciences, 25,* 107–113.

Johansson, M., Hartig, T., & Staats, H. (2011). Psychological benefits of walking: Moderation by company and outdoor environment. *Applied Psychology: Health and Well-Being, 3,* 261–280.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15,* 169–182.

Kingsley, J., Townsend, M., & Henderson-Wilson, C. (2009). Cultivating health and well-being: Members' perceptions of the health benefits of a Port Melbourne community garden. *Leisure Studies, 28,* 207–219.

Korpela, K., & Kinnunen, U. (2011). How is leisure time interacting with nature related to the need for recovery from work demands? Testing multiple mediators. *Leisure Sciences, 33,* 1–14.

Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing.* Thousand Oaks, CA: Sage.

Laumann, K., Garling, T., & Stormark, K. M. (2003). Selective attention and heart rate responses to natural and urban environments. *Journal of Environmental Psychology, 23,* 125–134.

Leary, M. R., Herbst, K. C., & McCray, F. (2003). Finding pleasure in solitary activities: Desire for aloneness or disinterest in social contact? *Personality and Individual Differences, 35,* 59–68.

Madill, A., Jordon, A., & Shirley, C. (2000). Objectivity and reliability in qualitative analysis: Realist, contextualist and radical constructionist epistemologies. *British Journal of Psychology, 91,* 1–20.

Menec, V. H. (2003). The relation between everyday activities and successful aging: A 6-year longitudinal study. *Journal of Gerontology: Social Sciences, 58B,* S74–S82.

Milligan, C., Gatrell, A., & Bingley, A. (2004). "Cultivating health": therapeutic landscapes and older people in northern England. *Social Science & Medicine, 58,* 1781–1793.

MIND. (2007). *Ecotherapy - the green agenda for mental health:* MIND. Retrieved July 2011 from:http//www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf

Morris, N. (2003). Health, well-being and open space (literature review). Edinburgh, UK: OPENspace Research Centre. Retrieved January 2011 from http://www.openspace.eca.ac.uk/pdf/appendixf/OPENspacewebsite_APPENDIX_F_resource_31.pdf

Olmsted, F. L. (1865). The Yosemite valley and the Mariposa big tree grove. Reprinted in Dilsaver, L. M. (Ed.) (1994). *America's national park system: The critical documents* (pp. 12–27). Lanham, MD: Rowan & Littlefield Publishers. Retrieved July 2012 from http://www.nps.gov/history/history/online_books/anps/anps_1b.htm

Ottosson, J., & Grahn, P. (2005). Comparison of leisure time spent in a garden with leisure time spent indoors: On measures of restoration in residents in geriatric care. *Landscape Research, 30,* 23–55.

Park, S. A., Shoemaker, C. A., & Haub, M. D. (2008). Can older gardeners meet the physical activity recommendation through gardening? *HortTechnology, 18,* 639–643.

Patel, I. C. (1991). Gardening's socioeconomic impacts: Community gardening in an urban setting. *Journal of Extension, 29,* 7–8.

Peace, S., Holland, C., & Kellaher, L. (2006). *Growing older: Environment and identity in later life.* Maidenhead, UK: Open University Press.

Peacock, J., Hine, R., & Pretty, J. (2007). *Got the blues, then find some greenspace: The mental health benefits of green exercise activities and green care.* Essex, UK: University of Essex. Retrieved March 2012 from http://www.greenexercise.org/Papers_Reports.html

Pretty, J. (2004). How nature contributes to mental and physical health. *Spirituality and Health International, 5,* 68–78.

Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N., & Griffin, M. (2007). Green exercise in the UK countryside: Effects on health and psychological well-being, and implications for policy and planning. *Journal of Environmental Planning and Management, 50,* 211–231.

Roberson, D. N., Jr., & Merriam, S. B. (2005). The self-directed learning process of older, rural adults. *Adult Educational Quarterly, 55,* 269–287.

Robertson, L., & Hale, B. (2011). Interviewing older people: Relationships in qualitative research. *The Internet Journal of Allied Health Sciences and Practice, 9(3),* 1–8.

Sempik, J., & Aldridge, J. (2005). *Social and therapeutic horticulture in the UK: The growing together study* (Vols. 1–5). Leicestershire, UK: Centre for Child and Family Research.

Sempik, J., Becker, S., & Aldridge, J. (2005). *Health, well-being and social inclusion: Therapeutic horticulture in the UK.* Bristol, UK: The Policy Place.

Shoemaker, C. A., Relf, P. D., & Lohr, V. I. (2000). Social science methodologies for studying individuals' responses in human issues in horticulture research. *HortTechnology, 10,* 87–93.

Sugiyama, T., & Ward Thompson, C. (2007). Outdoor environments, activity and the well-being of older people: Conceptualising environmental support. *Environment and Planning A, 39,* 1943–1960.

Townsend, P., Phillimore, P., & Beattie, A. (1988). *Health and deprivation: Inequalities and the north.* London, UK: Croom Helm.

Tse, M. M. (2010). Therapeutic effects of an indoor gardening programme for older people living in nursing homes. *Journal of Clinical Nursing, 19,* 949–958.

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology, 11,* 201–230.

van den Berg, A. E., & Custers, M. H. G. (2011). Gardening promotes neuroendocrine and affective restoration from stress. *Journal of Health Psychology, 16,* 3–11.

van den Berg, A. E., van Winsum-Westra, M., de Vries, S., & van Dillen, S. M. E. (2010). Allotment gardening and health: A comparative study among allotment gardeners and their neighbors without an allotment. *Environmental Health, 9,* doi:10.1186/1476-069X-9-74.

Waliczek, T. M., Zajicek, J. M., & Lineberger, R. D. (2005). The influence of gardening activities on consumer perceptions of life satisfaction. *Hortscience, 40,* 1360–1365.

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: The evidence. *Canadian Medical Association Journal, 174,* 801–809.

Address correspondence to:
Jemma L. Hawkins
Department of Applied Psychology
Cardiff School of Health Sciences
Cardiff Metropolitan University
Western Avenue
Cardiff, Wales
CF5 2YB
UK

E-mail: jhawkins@cardiffmet.ac.uk

Received: December 3, 2012
Accepted: April 19, 2013