

# The effects of social and therapeutic horticulture on aspects of social behaviour

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## Key words:

Social and therapeutic horticulture, STH, social interaction, learning disability, mental health, social inclusion.

**Introduction:** Social and therapeutic horticulture has been shown to be a useful intervention for a wide range of vulnerable groups, including those with a mental health problem and/or learning or physical disabilities. However, there is still a need for additional research that examines evidence of its effectiveness.

**Method:** This study analysed scores in four areas (*social interaction, communication, motivation, and task engagement*) collected as part of routine assessment during a programme of social and therapeutic horticulture. The sample comprised a heterogeneous group of participants and included a range of vulnerable people, predominantly those with a learning disability or a mental health problem.

**Findings:** Scores for social interaction were significantly higher after 90 days of participation. This effect appeared to be most evident in participants with a learning disability.

**Conclusion:** Social and therapeutic horticulture provides the opportunity for social interaction. Increased scores relating to social interaction suggest that the programme was effective in promoting such interaction and that it may, therefore, promote social inclusion among vulnerable and isolated groups.

## Introduction

As part of its practice of social and therapeutic horticulture (STH) for disabled and vulnerable people, the United Kingdom (UK) charity, Thrive (Thrive 2013), introduced a system of assessment and recording of participants' progress. The aim of this was to assist therapists in both setting goals for their clients and measuring progress and change. The assessments were intended to be recorded at every session attended by participants, and thus over time a large dataset has built up, which charts the change of over 100 participants with a range of difficulties and disabilities. The two largest groups attending are those with a mental health problem or a learning disability. The aim of this work was to conduct a secondary data analysis on the accumulated assessment data in order to explore the benefits of STH, particularly for those with a learning disability. These individuals represent a large proportion of STH participants in general, but there is less evidence of effectiveness for this group than for other disability groups.

## Background

STH is the use of plants and gardening in a structured and formalized way to promote health and wellbeing. It is often referred to as 'therapeutic horticulture' or 'horticultural therapy' (Sempik et al 2003, p3). Increasingly, however, the distinction between these terms is becoming blurred (Sempik and Adevi 2013); 'STH' is currently the favoured term in the UK.

STH is administered and supervised by trained therapists who are experienced in both horticulture and aspects of health and social care. Among STH therapists, there is a diversity of experience and qualifications, including some who are qualified in occupational therapy (Sempik et al 2005, p30).

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Gardening activities are frequently used in occupational therapy because they provide opportunities for meaningful occupation for people with a range of disabilities, and enable participants to overcome difficulties in their interaction with their physical and psychosocial environments. In their critical review of gardening as an occupation, York and Wiseman (2012) reported that they 'identified processes within the occupation of gardening in a natural environment, which offer satisfying and meaningful methods of recovery for people who are marginalised within society (p76).' This specific area of practice and study has been of interest in the field of occupational therapy, as evidenced by a small but regular flow of articles written by occupational therapists for their specialist journals: for example, Parkinson et al (2011).

Additionally, STH has been viewed within the context of other nature-based approaches for health — known collectively as 'green care' — and this has led to shared conceptual frameworks, as in the use of Christiansen's Person–Environment–Occupation–Performance model (PEOP, Christiansen et al 2005) within green care (Sempik et al 2010, p53–55), and greater integration of STH within occupational therapy (Fieldhouse and Sempik 2014).

The practice and pedagogy for STH has developed since the 1950s, alongside a growing body of research evidence. In recent years, STH has been the subject of greater research effort and the application of a wider range of research methods, including randomization and comparative studies (for example, Jarrott and Gigliotti 2010), and the use of physiological markers of stress (for example, Song et al 2010). However, there has been a lack of quantitative research in this area (Sempik et al 2005, p3).

STH participants include most, if not all, vulnerable groups (Sempik et al 2005, p17–18). The two largest groups are people with a mental health problem and those with a learning disability. In the UK, these each comprise around 40% of the client base (Sempik et al 2005). Research into effectiveness has shown that STH can reduce the symptoms of depression (Gonzalez et al 2009) and lead to greater group cohesiveness in depressed participants who consider social aspects to be particularly important (Gonzalez et al 2011). Other studies have also found that STH improves the self-esteem and social interaction of participants with a mental health problem (Sempik et al 2003, p7–11).

While similar effects on social skills and social interaction have been reported for adults (Kim et al 2008) and children (Kim et al 2012) with a learning disability, studies have tended to be small. For example, studies by Kim et al (2008), and Kim et al (2012) both had 12 participants in each of the treatment and control groups. This is in contrast to studies of therapeutic horticulture carried out with some other groups: for example, Jarrott and Gigliotti (2010), who recently reported on a study of older people with dementia that included 75 participants in the intervention (treatment) group and 54 in the control group. Hence, there is a need for additional research that examines the effectiveness of STH in participants with a learning disability.

## Method

### Ethical considerations

The data used for this study had been collected as part of routine clinical assessment, and were anonymized and examined retrospectively. No prior allocation has been carried out for this study. The study was approved by the Research Ethics Committee, School of Sociology and Social Policy, The University of Nottingham.

### The intervention and referral

The data were pooled from assessments at two garden projects run by Thrive.

Participants at each garden engaged in general gardening activities that included planting seeds, potting on, taking cuttings, pricking out, sweeping and maintaining the garden, using and cleaning tools, and other similar tasks. Specific activities depended on the season, the weather, and the abilities of the participants.

Sessions lasted approximately 5½ hours; they started at a set time, with allocated times for breaks and lunch, were preceded by a briefing, and ended with a briefing and group discussion. The target attendance was one session per week. However, this did vary according to the individual and the time of the year.

The gardens received referrals from health and social services, and also by self-referral. All participants were screened and went through a formal approval process. As is typical of STH projects in the UK, the participants had a wide range of disabilities and vulnerabilities and were included in mixed groups according to comparable needs, rather than by diagnostic category. Each garden accommodated around 25 participants per session, working in small groups or individually. It was usual for one trained horticultural therapist to work with up to six participants. Volunteer helpers provided additional support. However, the number of volunteers varied between sessions, according to their availability.

A number of young people under the age of 18 years participated in the project. They were treated in exactly the same way as the older participants, so were included in the sample.

### Daily assessments

The routine clinical assessments that provided the data for this study consist of single item scores on a linear scale, with guidelines to assist in the scoring process, so providing a formalized and structured way for therapists to assess their clients over a range of functions. Different aspects of function are recorded according to the clients' disability and their targets, and might include, for example, social interaction, communication, motivation, task engagement, mobility, fine motor skills, stamina, time spent on tasks, and non-productive behaviour. All scores are recorded in a database (Microsoft Access) that also holds clients' personal data, and details of their condition, medication, and so on. The intention is to assess a client on each of their visits. However, due to practical considerations, such as the need for some participants to leave early on occasions, daily assessments are sometimes missed, meaning that not all clients are assessed on each visit.

The scoring is designed to show the therapists how clients engage with the process of STH and how they interact with staff and colleagues. Scores from the assessments relating to the functions of *communication*, *social interaction*, *motivation*, and *task engagement* were analysed for this study. A key purpose of STH is to provide meaningful (horticultural) activity within a community setting in order to promote wellbeing through the development of skills and social integration. Therefore, scores in these areas could be expected to improve over the course of the intervention, hence the choice of these four as the subject of this analysis. In addition, in the assessment process these scores are recorded for most clients, generating ample data for analysis. More specialist scores, such as those relating to fine motor movement, are used for fewer clients and would generate insufficient data for useful analysis.

### Assessment score sheets

In developing the assessments, Thrive's horticultural therapists developed and used the following definitions to construct the scales:

- **Social interaction** — co-operation, sociability, attempts to gain or retain the attention of another person, or the giving of attention, as evidenced by proximity or orientation towards another person.
- **Communication** — talks or gestures (or attempts to) to convey wants or information to others.
- **Motivation** — deciding for self about design/plants, selecting tasks, carrying out tasks on one's own, pride, positive outlook, expressed enthusiasm, and creativity.
- **Task engagement** — getting ready for, and undertaking, tasks correctly, and pacing tasks.

The assessment sheets were treated as Likert scales by the Thrive therapists, and additional descriptors were provided to help with the scoring process. For example, a social interaction score of zero indicated that the participant showed no interest or response to any of those present; a score of five indicated that he or she would work collaboratively with familiar clients; and a score of nine showed that they were prepared to speak with unfamiliar people (including members of the public, who often came to buy plants and flowers).

### Participants

It would have been ideal to include only those participants who had joined after the introduction of the assessment system. In those cases, their first assessment (day 0) would have been carried out on their first day of attendance. However, the number of such participants was small. Therefore, in order to increase the sample size and consequent power of the analysis, it was decided, after initial examination of the data, to include all those who had been at the project for 3 months or less prior to their first assessment. In practice, this resulted in a mean length of attendance of around 3 weeks or substantially less for each group and measure, and these values are shown below. Separate values were calculated for each measure, as on any given day of attendance not all measures were used. Hence, there was some variation in the mean number of days before the first score of each measure.

A total of 143 participants were included: 108 males (mean age 35 years, SD  $\pm$  16.1) and 35 females (mean age 38.5 years, SD  $\pm$  16.5); 27 participants (24 male and 3 female) were under 18 (mean age 15.9 years, SD  $\pm$  1.6) at the time they started attending the project.

As a primary diagnosis, 61 participants (43%) had mental health problems, 56 (39.2%) had a learning disability, and 10 (7%) had autism. The remainder (16) had a variety of physical disabilities and cognitive impairments. Participants with a mental health problem had a range of diagnoses, such as schizophrenia and depression.

### Attendance prior to first assessment

For the whole sample, the mean number of days of attendance and the standard deviation prior to the first assessment was  $5.8 \pm 15.9$  (N = 114) for social interaction,  $4.7 \pm 13.6$  (N = 79) for communication,  $6.7 \pm 16.7$  (N = 107) for motivation, and  $10.6 \pm 21.8$  (N = 131) for task engagement. For those with a learning disability the mean number of days of attendance prior to the first assessment was  $2.9 \pm 10.7$  (N = 50) for social interaction,  $1.0 \pm 4.3$  (N = 38) for communication,  $3.2 \pm 11.1$  (N = 46) for motivation, and  $3.5 \pm 11.9$  (N = 50) for task engagement. For participants with mental health problems these were  $4.9 \pm 16.2$  (N = 39) for social interaction,  $0.4 \pm 1.6$  (N = 19) for communication,  $6.9 \pm 17.3$  (N = 46) for motivation, and  $15.0 \pm 26.2$  (N = 56) for task engagement.

### Data extraction and analysis

Assessment data were entered into a database (Microsoft Access) as part of the usual procedure at each STH session. These data were extracted into an Excel spreadsheet, anonymized, and formatted for analysis using SPSS (Version 21) statistical analysis software. Statistical analysis consisted of descriptive statistics (that is, frequency, mean, and standard deviation) and comparison of means using ANOVA and t-test as appropriate.

Assessments were analysed at the start (day 0), and then at 30, 60, 90, 180, and 365 days. Since participants could not be guaranteed to be visiting the garden project on those precise days, a window of 5 days either side of the nominal date was used for 30 and 60 days, and 10 days either side for the later time periods. The assessment falling closest to the nominal day within the time window was used for the analysis. The time periods thus represent approximately 4, 8, 12, 26, and 52 weeks of participation.

Social interaction and communication were each scored on a scale of 0 to 9; motivation and task engagement on a scale of 0 to 5. To enable comparisons of changes, results (see Table 1) are presented as 'effect sizes' rather than as changes in scores. The effect size was calculated by the difference between the mean 'day 0' score and intervention time scores divided by the pooled standard deviation of the 'day 0' score (Coe 2002, Durlak, 2009). This can be considered to be the change in scores expressed as units of standard deviation. Using effect sizes enables comparisons to be made with different studies that use different outcome measures or with different scales (as in this case). In order to visualize the

changes in scores over time, Fig. 1 presents the data (actual scores) for the learning disability group as a bar chart.

In the first instance, analysis was conducted on the full sample containing a mix of client groups. Subsequently, data for the two largest groups — those people with a mental health problem and those with a learning disability — were extracted and analysed separately.

## Findings

### Assessment scores

#### *Assessment scores: all disability groups*

There was no difference between the scores of any of the measures taken at day 0 compared with those at 30 days. Scores for social interaction were significantly greater ( $p < 0.05$ ) at 90, 180, and 365 days compared with day 0. For motivation, scores were significantly greater at 90 days. There were no significant differences for the scores for either task engagement or communication.

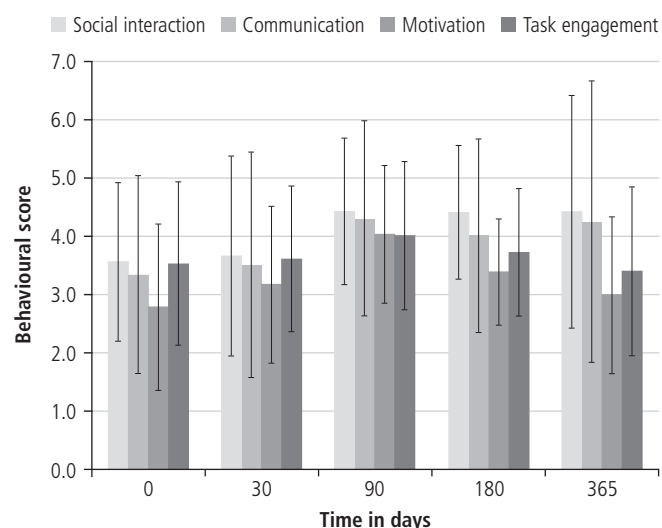
#### *Assessment scores: participants with a learning disability*

All of the assessment scores for this group showed higher values at 90 and 180 days. Significant differences ( $p < 0.05$ ) relative to day 0 were seen for social interaction at 90 and 180 days; and for motivation at 90 days. The p-value for communication was 0.057 at 90 days, and the p-value for social interaction was 0.055 at 365 days. Both of these, therefore, just fell short of the significance level.

#### *Assessment scores: participants with a mental health problem*

In general, behavioural scores showed an upward trend over the course of the year. However, the numbers in the sample were small for the data at 90, 180, and 365 days. Significant differences were only seen for measures of social interaction at 365 days. No other significant differences were observed.

Fig. 1. Assessment scores for participants with a learning disability.



Note. Thin vertical bars represent the Standard Deviation.

### Onset of change

The analyses suggested that no effect was present at 30 days into the intervention. To investigate this further, scores were compared for those participants with a learning disability for whom assessment results were available for both day 0 and for 30 days, using a paired samples t-test. The learning disability group was selected, as this both showed the greatest (and most reliable) change at the other time points and had approximately twice the magnitude of change seen in the combined sample. Hence, this would be the most sensitive indicator if any effect were to be present. The N-values for the score groups for social interaction and task engagement were both 33, and for motivation and communication were 29. While the scores at 30 days were slightly higher than those at day 0, with effect sizes of 0.09–0.16 (around 5–7% difference in mean scores) for social interaction, communication, and task engagement and 0.29 (15%) for motivation, the differences were not statistically significant.

## Discussion

### Effects on social interaction

The analysis showed that the measure of social interaction increased during the period of assessment. This was evident for the complete heterogeneous sample and also for the subsamples of participants with learning disabilities and those with mental health problems. The effect was greatest (and most consistent) for those with a learning disability where a change of 0.56–0.65 was seen for each of the three time periods (90, 180, and 365 days). This was approximately twice that seen in the overall sample. Whilst participants with a learning disability form one of the largest groups within STH (see Sempik et al 2005), there is a lack of empirical data that demonstrates its effectiveness for this group of people. This is one of the first studies to show a significant difference in a quantitative measure of social functioning in this group, recorded over a relatively long period of time (12 months).

No changes in social interaction scores were seen at 30 days in any of the groups. Additional analysis using a paired t-test on the scores of participants with learning disabilities (who showed the greatest response) also failed to show a change in the social interaction score at 30 days. By this time, participants had attended around 4 sessions (approximately 22 hours).

The extent of participation in STH before change occurs is an important issue within this field. Some researchers have reported seeing changes early in a programme. For example, Gonzalez et al (2009) reported a significant improvement in Beck Depression Inventory scores 4 weeks into a 12-week therapeutic horticulture programme which comprised two 3-hour sessions each week (that is, after 24 hours). However, Barnicle and Midden (2003), who used a 7-week intervention period of 1 hour per week, observed a rise in psychological wellbeing in a group of older people at the end of the programme, but this failed to reach significance ( $p = 0.08$ ).

The findings from this study, and those from the published research, highlight the importance of considering the duration



Table 1. Data analysis results

Days	All disability groups											
	Social interaction			Communication			Motivation			Task engagement		
	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI
0	114			79			107			131		
30	90	0.15	-0.12, 0.43	74	0.11	-0.21, 0.43	84	0.11	-0.18, 0.40	101	0.06	-0.20, 0.32
90	63	0.31	0.00 <sup>a</sup> , 0.62	47	0.33	-0.03, 0.70	60	0.38	0.06, 0.69	69	0.15	-0.14, 0.45
180	46	0.39	0.04, 0.73	36	0.30	-0.10, 0.69	42	0.33	-0.03, 0.68	56	0.15	-0.16, 0.46
365	44	0.38	0.03, 0.73	32	0.33 <sup>*</sup>	-0.05, 0.78	33	0.33	-0.06, 0.72	45	-0.04	-0.38, 0.30
Days	Learning disability group											
	Social interaction			Communication			Motivation			Task engagement		
	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI
0	50			38			46			50		
30	37	0.07	-0.36, 0.49	36	0.10	-0.36, 0.55	30	0.28	-0.19, 0.74	36	0.00	-0.46, 0.46
90	22	0.65	0.13, 1.16	17	0.57	-0.02, 1.14	19	0.92	0.35, 1.46	21	0.31	-0.24, 0.85
180	19	0.65	0.10, 1.18	18	0.40	-0.17, 0.96	15	0.45	-0.14, 1.04	17	0.09	-0.49, 0.67
365	16	0.56	-0.02, 1.12	13	0.48	-0.16, 1.11	12	0.14	-0.50, 0.78	16	-0.17	-0.75, 0.43
Days	Mental health group											
	Social interaction			Communication			Motivation			Task engagement		
	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI	N	Effect size	CI
0	39			19			46			56		
30	31	0.15	-0.32, 0.62	17	0.11	-0.55, 0.76	39	-0.14	-0.57, 0.28	42	-0.04	-0.43, 0.37
90	26	0.25	-0.25, 0.75	15	0.23	-0.46, 0.90	29	-0.10	-0.56, 0.37	31	-0.02	-0.45, 0.42
180	13	0.53	-0.11, 1.16	4	0.89	-0.25, 1.96	19	0.13	-0.40, 0.67	23	0.29	-0.20, 0.78
365	13	0.82	0.16, 1.45	3	0.78	-0.49, 1.99	13	0.32	-0.30, 0.94	13	0.38	-0.23, 0.99

Note. Significance levels: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; CI = 95% confidence interval; that is, the range in which the mean would be expected to fall 95 times out of 100; <sup>a</sup>CI = 0.0014; that is,  $> 0$ .

of the intervention (in terms of both number and length of sessions) and of allowing a sufficient length of time for a response, in both research and in practice. While the total duration of the intervention in this study was comparable to that described by Gonzalez et al (2009), her participants had more sessions and, consequently, spent more time anticipating the activities, travelling to, and preparing for, the sessions. Such differences may be important in designing and researching STH.

The practice of therapeutic horticulture, as described in the research literature, varies greatly. In many cases, weekly sessions of 40–60 minutes are used, which represent concentrated periods of interaction between the therapist and the client. The model of STH that was the focus of this study (and which is used by Thrive and many other UK STH projects), however, takes the form of day-long activity that resembles a working day in many ways, and provides many of the ‘latent’ benefits associated with employment. These include social interaction, opportunities for meaningful occupation, development of skills, daily routine, and structure, amongst others. It has been proposed that the benefits of this model of STH are mediated, in part, through the development of social inclusion (Sempik et al 2005), in which social interaction is a key element (Burchardt et al 2002). Much of the discourse around the social exclusion of people with a learning disability has focussed on lack of employment; however, employment by itself may not be sufficient to prevent social exclusion, as Redley points out:

While many citizens with learning disabilities do enjoy their work (Papworth Trust 2007), it is unlikely they enjoy many of the opportunities for geographical mobility or the various forms of professional, political and social association usually connected with it. Employment for those who have it does not redress their social exclusion. (Redley 2009, p492)

STH projects are specifically designed to offer extensive social support and guidance that enables participants to

develop new skills, make friends, and take part in the running of the project ('political engagement'), and thus promotes their social inclusion (Sempik et al 2005). Hence, the ability to measure social interaction and show that it improves during a programme of STH is important in evaluating the programme.

## Effects on communication, motivation and task engagement

A significant difference in motivation score was only seen at 60 days for the whole sample, and at 90 days for the learning disability group, but no significant differences were seen for communication scores. The effect sizes for communication and motivation were similar to those for social interaction. However, measures of communication were not made as frequently as those of social interaction; consequently, the number of observations at some of the time points was low. The tests, therefore, may have been underpowered and this may explain the lack of statistical significance for communication.

Effect sizes for changes in task engagement were small, and sometimes negative, throughout the groups and time periods. No statistical differences were seen even when numbers of participants were high. This suggests that task engagement did not change over the STH intervention. It might be expected that, over the course of such an intervention, participants would develop the specific skills and enthusiasm that would be applied to their tasks, and hence measures of 'task engagement' would rise. This does not appear to have been the case. There is a need, therefore, to re-examine the construct of task engagement and the method of its measurement if this is to be useful in the future. This is of particular importance given that it is the aim of therapists to promote participants' interest and engagement in the various activities of STH.

## Limitations of the study

This was an observational study that drew on the daily assessments by horticultural therapists of clients participating in the project. The assessments had been carried out for clinical reasons; that is, to plan and monitor the intervention programme and not for the purpose of research. The number of participants was lower at the later stages of the study. This was due to a variety of reasons, such as participants leaving the programme and moving on to other activities, thus reducing the statistical power of some parts of the analysis. As an illustration of this, the group size necessary to show an effect size of 0.4 (SD) for an alpha value of 0.05 and 80% power was calculated using a computer program (Lenth 2006), which returned a value of 78 participants per group. This highlights the difficulties of working in an area where effects are small, statistical dispersion — standard deviation — is high (as evident in Fig. 1), and it is often difficult to recruit an adequate sample. Such problems have been experienced by many of those working in the field of STH; this is discussed by Sempik (2007). In addition, the measures were single item scores; scores had not been validated, as they had been designed with the purposing of assisting therapists with the management of their interventions, rather than as research tools.

Although the sensitivity of the measures is uncertain, changes were detected, particularly in scores of social interaction for the whole heterogeneous sample of participants, and also for the sub-sample of those with either a learning disability or a mental health problem. In their critical review of gardening as occupation, York and Wiseman (2012, p83) have highlighted the need for more research that focuses on psychosocial interaction. This study goes some way in meeting that need, yet more research is still necessary, particularly research using validated measures that are familiar within occupational therapy, such as Goal Attainment Scaling (GAS).

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### Key findings

- Social and therapeutic horticulture (STH) was shown to promote social interaction, particularly among participants with a learning disability.
- Evidence of this was seen at 90 days into the intervention (after approximately 12 sessions).

### What the study has added

This study provides further evidence that horticulture, used in a structured manner, can serve as a tool to promote social inclusion among vulnerable groups.

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## Thesis abstracts

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### Jillian Turner

**Hidden barriers to wayfinding: assessing the impact on independence for older people.**

University of Salford, 2011, MSc.

Exploring the nature and effects of wayfinding for older people in neighbourhoods is complex, and existing research relating to external environments has, until recently, been limited. Assessing the impact of these barriers is essential in order to determine how well the design of external environments meets the needs of older people. Inclusive design guidance, equality legislation, and good practice are all significant elements explored within this research. Understanding the effects of ageing and disability provides important insights into how wayfinding can help, or hinder, independent living.

To capture the real life experiences of older people, ten residents of Bolton Borough Council were interviewed using a flexible approach, one that is ideally suited for studies of an

essentially qualitative nature within social research. Investigating the views and perspectives of older people, through detailed interview techniques and using pre-determined themes, allowed for robust findings.

Participants provided evidence that physical, attitudinal, social, and environmental barriers are still very much in existence in our neighbourhoods. Elements such as pedestrian dropped kerbs, lighting, and assistive technology were considered beneficial in assisting wayfinding, whereas parked cars, lack of disabled parking bays, and poor pavement condition were regarded as unhelpful obstacles. All participants had, at some time, experienced negativity, prejudice, and/or discrimination within society, the effects of which were potentially quite damaging.

Whilst the ability to access the outdoors is undoubtedly an essential part of life, more effort is required to address and reduce the barriers to access for older people. Ongoing work is needed to raise awareness of the impact of wayfinding, inclusive design, and the needs of our changing population in order to ensure our neighbourhoods remain, safe, enjoyable, and accessible. [Author Abstract: Edited]