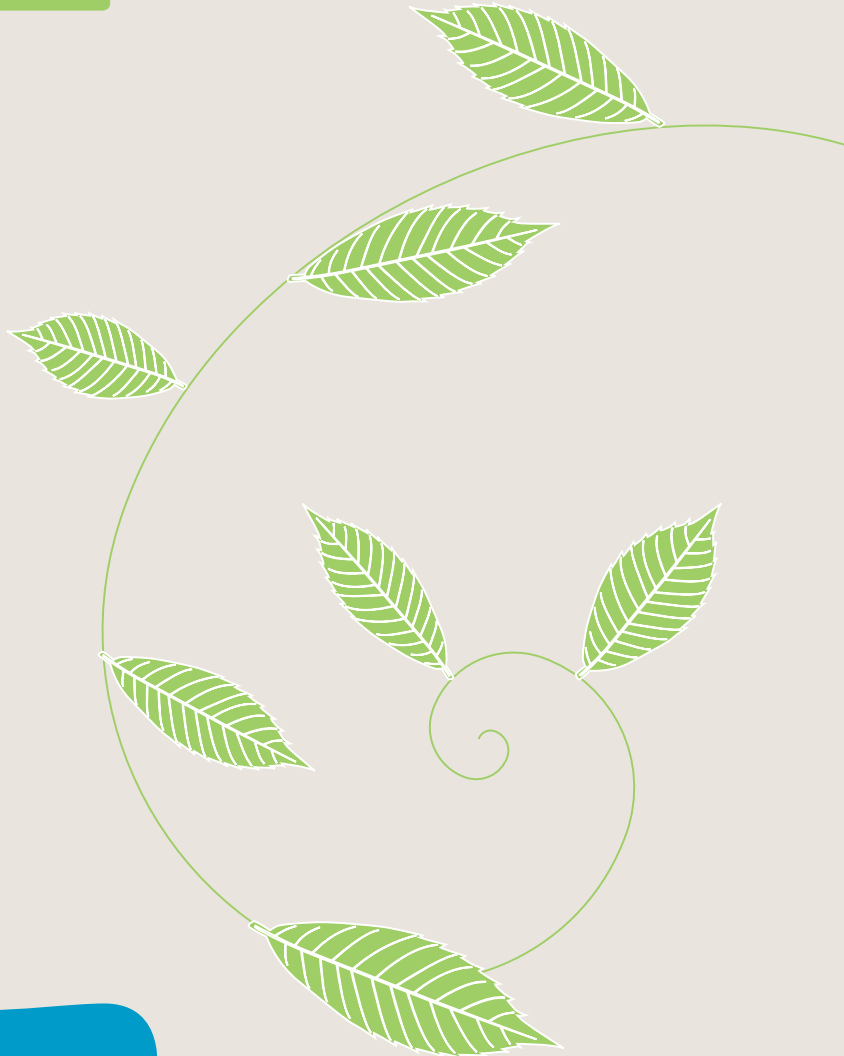


Green Spaces

Outdoor Environments for Adults with Autism

Katie Gaudion and Chris McGinley



kingwood

About the research partners

The Kingwood Trust

Kingwood is a registered charity providing support for adults and young people with autism. Its mission is to pioneer best practice which acknowledges and promotes the potential of people with autism and to disseminate this practice and influence the national agenda. Kingwood is an independent charity and company limited by guarantee.

www.kingwood.org.uk



Helen Hamlyn Centre for Design, Royal College of Art

The Helen Hamlyn Centre for Design provides a focus for people-centred design research and innovation at the Royal College of Art, London. Originally founded in 1991 to explore the design implications of an ageing society, the centre now works to advance a socially inclusive approach to design through practical research and projects with industry. Its Research Associates programme teams new RCA graduates with business and voluntary sector partners.

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Foreword

Lady Hornby, Chair, Kingwood

Gardens and gardening give enormous pleasure to many of us. People with autism are no exception. In this study our researchers looked at the many different ways in which the design of gardens and outdoor spaces could contribute to the wellbeing of people with autism.

As part of this study the researchers visited and consulted specialists in sensory gardens and therapeutic gardens, in horticulture and occupational therapy. They spent time with people we support in their garden in Reading, and at a meeting with Kingwood parents everyone had ideas to add to the wish list of what a garden might contain.

Gardens can have areas for activities, for privacy and for socialising. They can provide opportunities for being close to the natural world and offer the restorative powers of nature. The study includes detailed advice on linking the different areas of the garden, on materials, colour and surface textures. This is particularly important for people with autism who experience sensory sensitivities that limit the environments they feel comfortable in, for example, the supermarket might be too loud and bright and an air-conditioned shop too cold.

There is plenty of evidence to show how the exercise of gardening can have a positive impact on mood and enhance wellbeing. Kingwood's own 'Let's Grow' programme has undoubtedly added to the quality of life enjoyed by many of the people with autism we support. Not only have they enjoyed the fresh air and exercise and learned new skills but growing, picking and eating their own fruit and vegetables has given them a great sense of achievement.

This study draws upon both our previous research into the built environment and practical experience to expand upon the many ways in which outdoor design can improve the lives of people with autism. We are now in the process of creating what we believe will be the first garden designed specifically for adults with autism. It will be based on the findings of this study which we hope will be an inspiration to others.



Expert Reference Group

The role of the Expert Reference Group was to provide guidance and support for the project, broaden its perspective and assess the findings and results. In addition

to informal meetings and consultation with individual members of the group, a formal meeting was held at the Royal College of Art in London in March 2012.

Name	Role	Organisation
Kevin Charras	Administrator	ARPEnv (Association for Research in Environmental Psychology)
Valerie Fletcher	Executive Director	Institute for Human Centered Design, USA
Derek Hooper	Equality and diversity consultant and trainer	Derek Hooper Ltd, UK
Richard Mazuch	Director of Design Research and Innovation	Nightingale Associates, UK
Richard Seymour	Director	Seymour Powell, UK
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John Zeisel	President	Hearthstone Alzheimer Care, USA

Introduction

A well-designed garden can enhance focus and attention, and reduce anxiety, thereby improving quality of life.

This publication is the third in a series that describes design research projects carried out by the Helen Hamlyn Centre for Design at the Royal College of Art in partnership with The Kingwood Trust. The aim of the work is to improve housing for adults with autism spectrum disorder (ASD) through better understanding of their needs, aspirations and the physical environment.

Autism is a lifelong and complex neurological condition that affects the way a person communicates and relates to other people and the world around them. As a spectrum condition, it affects people in different ways. People with autism might have rigid routines and special interests, they can be very sociable or find social relations difficult; some have learning disabilities whilst others possess high levels of intellectual ability. With an estimated prevalence rate of one in 100 people¹ autism is not rare.

Currently research into garden design

and special interests within autism is limited and tends to focus on children. Here the research partnership explores how the design of outdoor areas or 'green spaces' are used to support the specific needs of adults with autism and so improve the quality of their lives. The research has also informed the development of the new garden at Kingwood College, resulting in a practical expression of its findings.

Access to gardens can enhance focus and attention, as well as reducing anxiety and boosting self-confidence. Additionally, the garden can be considered a dynamic environment offering diverse opportunities for learning. Garden-based experimental and environmental learning has evolved over a number of years, inspired by educational reformers of the past such as John Dewey (1859-1952), Maria Montessori (1870-1952) and Friedrich Froebel (1782-1852), who advocated 'learning by doing'.

We know gardens exert a positive influence on people's lives and in this publication we have explored how this is translated into the world of adults with autism. The result is this account of the key findings and design



On site at the Kingwood Horticulture Project

concepts related to the redesign of the Kingwood College Garden in Reading.

When designing any garden the first question should always be – who is this for? It becomes a crucial question when designing for people with autism. To the usual general considerations of the user's requirements (for example limitations of budget and plot size), we must add specific consideration of each individual autistic person's

needs. Consideration should be given to social interaction, communication, special interests and sensory preferences in an environment that is by nature dynamic and subject to unpredictable elements: weather, wildlife and seasonal change. The design of such spaces needs to actively encourage the pursuit of interests while offering the reassurance of comfort, security and a sense of control.

This potential paradox – stimulation and reassurance – lies at the heart of a well-designed garden to be used by someone with autism. Design can go a long way towards resolving that paradox, although it has to be borne in mind that since a person's experience of autism can vary considerably from person to person there is no rigid set of 'one-size-fits-all' design rules.

There are however some general guiding principles to be considered in every design choice made for such a garden. One such principle is to try to cater to those who need to be able to read a coherent, predictable layout in which, for example, the end of the path they are about to take is visible from the outset. Such clear layouts are best positioned at the front of a garden.

'A garden is a grand teacher. It teaches patience and careful watchfulness; it teaches industry and thrift; above all it teaches entire trust.'

Gertrude Jekyll 1843-1932²

For those seeking a more adventurous experience in a looser, more 'natural' wilderness layout, such areas are best placed beyond the more structured pathways so that everyone can choose whether or not to venture into them.

Of course, the space available for designing any garden will vary greatly, and this is another reason why informed general principles are more useful than strictly prescriptive rules. Modest private gardens, generous shared ones or even simple balconies and window boxes all offer some degree of opportunity to create a benign touch of the natural environment with its associations of welcome respite from the anxieties of everyday life.

This book is primarily intended to help anyone redesign gardens and green spaces for the benefit of those with autism. Despite that focus we believe

it may also help to concentrate the mind of anyone wanting to create a new garden. The exercise of analysing personal needs and organising spaces to prioritise and accommodate their interest is important for any designer of outdoor spaces.

In this book you will find a record of processes and methods. There are examples of spaces inspired by our conversations with people with autism and those who support them. Our findings were also influenced by existing material on this subject (although limited – see bibliography).

A critical point is that we are proposing a collection of spaces that respond to common themes and characteristics of autism while catering for different individual needs. When this balance is achieved in the design mix, those with autism are not only able to enjoy the simple pleasures of a garden but also benefit from the improved sense of personal wellbeing conferred by any well-organised green space.

Design Themes

Key Principles

Research material for this book was used to uncover patterns, decipher common themes and define a structure for understanding how the design of gardens and green spaces can affect people with autism.

Building on the design themes established for the first book in this series, *Living in the Community: Housing Design for Adults with Autism* (2010)³, we noted that although some of the same principles apply to gardens, there are of course significant distinctions to be made between the built and natural environment. Accordingly we have modified and adapted some of those original themes.

The key differences identified were related to the garden being an experiential space made up of natural elements with intrinsic power to stimulate the senses. A garden comprises multiple components that are experienced together; these components can be explored both individually and as a whole spatial organisation. Foreground, middleground, background and the sky above make the garden a three-dimensional space that can be experienced from different

viewpoints, angles and perspectives. The garden is therefore a dynamic space, somewhere that can stimulate mind and body to action or encourage relaxation. The project explores ways in which the design of a garden can stimulate someone's active interests without adversely affecting their sensory perception, especially if that perception happens to be exceptionally sensitive.

To help establish useful design themes, research was first undertaken in order to understand the various ways in which adults with autism

'Glancing at the ground as I walked along, I noticed some movement at my feet and saw the last exit moments of a cicada crawling out of a hole in the ground.'

Wendy Lawson⁴

experience garden spaces. 'Triggers', 'Growth' and 'Support' were ultimately identified as the key design themes for this project. 'Robustness' is also included, a design theme that largely relates to conventional safety considerations such as the use of non-toxic materials. 'Robustness' is of most relevance to the planning and execution of maintenance.

Insights gained are expressed here both as general guidance and as specific concepts. They may take the form of broad conclusions or empirical examples supported by the realised garden at Kingwood College, which demonstrates how they might be used in practice.

Growth

Enhance communication, independence and the development of skills by connecting garden spaces with a person's strengths, interests and aspirations to create occupation, exercise and leisure opportunities.

Triggers

Reduce triggers of agitation and anxiety by considering a person's hyper or hypo sensitivities in outdoor spaces.

Robustness

Keep residents and staff safe in a robust garden that is tolerant of unintended use.

Support

Give staff the tools to deliver people-centred care and ways to facilitate occupation, exercise and leisure activities in outdoor spaces.



Design Themes

Growth



To improve the quality of life for adults with autism, there must be opportunities for them to make free choices, to

be independent and to develop skills in communication and social interaction, skills that can be used in the wider community.

A garden offers the perfect space for this, enabling adults with autism to take a break from indoor routines and participate in leisure, occupation and exercise activities. Occupational activities like growing vegetables foster a sense of ownership and independence. Group or solo outdoor activities like playing frisbee or simply watching the movement of leaves in the wind can relax and encourage social interaction. Exercise activities like pushing a wheelbarrow or jumping on a trampoline strengthen muscles and joints and help with coordination, balance and body awareness, so improving navigation skills.

Key topics within this theme

Many adults with autism can resist participating in new and different activities because they may become focused upon a special interest, for example spinning objects. Small steps are therefore required to introduce them to something new, particularly something leading to a wider social experience. Special interests and activities are an important part of diagnostic criteria and are a dominant characteristic found in more than 90 per cent of children and adults with

autism (Atwood, 2003)⁵. The garden setting offers a useful arena in which to augment someone's narrow existing interests with new leisure, occupation and exercise activities. The predominant challenge of growth therefore is to identify a person's special interests and then design a personalised and flexible green space in which those interests can be carefully expanded to promote better social interaction and personal fulfilment.

Design Themes

Triggers



People with autism can be prone to acute anxiety, resulting in unusual reactions and complex behaviour. Over-

sensitive to certain external triggers, they can become overwhelmed as a result of the way they process and interpret them, for example the sound of a lawnmower. Through careful selection, layout and orientation, it is possible to identify and so remove or reduce common triggers that lead to agitation or increased anxiety in a garden setting.

Gardens contain predictable patterns of nature interspersed with unpredictable and spontaneous characteristics. With the fifth edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5, due to be published in May 2013)⁶ to include hypo and hyper-sensitivities as a diagnostic criteria, a person's sensory perceptual experience is a critical design consideration in planning a garden area. Everything possible must be done to introduce structure, order and predictability. The layout should lead people logically through the space

Key topics within this theme

with appropriate signage and transitional spaces as well as elements of continuity. Signposts should be clear and multi-modal (images and words) and limited in number to avoid confusion. A process of gradual immersion is advisable. Simplifying the immediate sensory stimuli that are apparent when

stepping into the garden is important. Equally, providing accessible sensory spaces elsewhere in the garden for those seeking them (or looking to challenge themselves) is also desirable. People with autism can be particularly sensitive about personal space and may feel threatened if crowded.

Design Themes

Robustness



The garden provides an excellent space in which to stretch and exercise and in particular in which to assess issues of balance

and one's own sense of space and bodily positioning (vestibular and proprioceptive functions). People with autism may experience difficulty with understanding where their bodies are in a given space and this can cause unexpected body movements, collisions with objects or the exertion of inappropriate force.

By their nature gardens are less susceptible to damage than indoor locations; however, the need for robust design in green spaces should be given careful consideration to ensure features are safe yet subtle. Personal safety is best achieved by a garden in which all elements are robust. Where

Key topics within this theme

robustness leads to durability this further serves the aim of creating an unchanging setting that will not alter due to frequent replacement or renovation. Ideally this robustness should be inherent in the choice of materials, furniture or plantings and not achieved by the use of industrial-

style design that can look threatening.

Durable fences, hardy plant choices and delicate flowers offset from the paths; good design can discretely resist misuse and offer robustness of fitting to withstand deliberate or unintentional abuse.

Design Themes

Support



Supported-living accommodation is not only a person's home but also a place of work for staff. The garden can be a welcome space

that invites everyone to pause and take a break from the demands of the day. It also has the potential to provide an informal setting for the development of meaningful interactions between staff and the people they support.

The garden setting may also be of value to those with autism who have difficulties with social interaction and communication who may use gestures and sounds to communicate. In the more organic setting of a green space it is possible to observe things quietly, or

Key topics within this theme

tacitly to share them with other people without the problematic constraints of a more conventional dialogue. That said, social preferences will always depend upon the individual and so flexible provision will make for an easy choice between social interaction and remaining private.

Support is about creating good working environments that both enable staff to provide good care and as well as creating opportunities for rest and relaxation. In this respect the garden can be a powerful setting.

Research Methods

The researchers used a variety of methods to understand the needs of residents and support staff.

Research methods included: examining the existing timetabled activities of three residences; spending time with adults with autism who have learning and communication difficulties to identify their special interests using interactive profiling tools; conducting workshops with family members and support staff; shadowing a horticulturist who works with adults with autism, identifying best practice by interviewing experts on-site; and conducting a workshop called 'Ready Steady Make' to enable staff to create stimulating garden activities, props and layouts.

Timetables were examined in order to understand typical day-to-day activities and interests of adults with autism as well as the environments in which these activities take place. This research route eventually led to a focus on special interests, as one of the defining characteristics of autism.

These special interests were further investigated through interacting with adults with autism, support staff and parents. Initially a number of visits were made to discuss such interests

with adults with autism and the people they support. This was followed up by studies which helped identify patterns within special interests.

Ways of nurturing the special interests identified were explored. These included how they might be turned into opportunities for social, emotional, academic and vocational growth within the garden. Best practice case studies were conducted at Thrive and The Glasgow Homeopathic Hospital with the designers and managers of their green spaces being interviewed. Shadowing was carried out with Kingwood's horticulturist while adults with autism were working in the horticulture facility.

As ideas and themes emerged, co-design workshops were organised and these were attended by adults with autism, their parents and Kingwood staff. This led to useful understanding of how garden layouts might best cater for the needs and special interests of people in shared supported living accommodation.



Activities at one of the co-design workshops



A resident gets to grips with Kingwood 'Let's Grow' project

Research

Special Interests

Interests and hobbies play important roles in everyone's lives. They can make us feel happy, keep us stimulated, spark conversation, initiate friendships and help us grow and define who we are.

They can even take us to interesting places and encourage us to seek new experiences which in turn open up new possibilities for knowledge and enjoyment. Many adults with autism have a special interest where they become focused with – or strongly attached to – specific objects or phenomena.

Garden interests

The garden is an active space capable of hosting a variety of leisure, occupation and exercise activities. The layout of a garden space can be made to reflect and encourage a special interest. Someone who likes to jump up and down may enjoy finding part of a garden set aside for a trampoline. Someone fascinated by moving water is likely to enjoy a water feature. Clearly the starting point for creating a personalised garden is to identify a person's interests and hobbies. This informs the choice of specific features and greatly increases the likelihood of active engagement with the garden.

Series of booklets produced

A series of booklets was produced to help codify the special interests and pastimes of adults with autism. Each booklet was a visual extension of the questionnaire and taxonomy of special interests (Baron-Cohen and Wheelwright 1999)⁷ in which 18 topics of popular special interests relating to people with autism were catalogued.

The pocket-sized booklets were simple in design, each containing 20 pages dedicated to one of the 18 interests. Each page was designed with ample room for the participant to describe or draw their interests with visual prompts that represented the subject of interest.

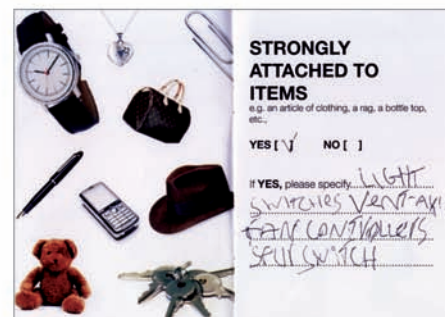
The booklets were sent out to everyone that Kingwood supports. The aim of the booklet as a research method was to gain, in a non-obtrusive way, some insight into the kinds of things that Kingwood clients like to do in their free time.

Results

Responses to the booklet mail-out revealed an exceptionally broad range of special interest topics ranging from kangaroos to washing machines.

To help identify patterns and correlations, each of these responses were visually represented using the image of a tree sporting 18 colour-coded branches each representing a broad area of interest. Leaves were added to respective branches to identify more specific points of interest.

The choice of the tree as an image was intended both as a metaphor for growth and as a device that encouraged the person represented to add more leaves to a branch, so introducing the idea of identifying related interests that might be worth exploring.



Interests and hobbies booklet

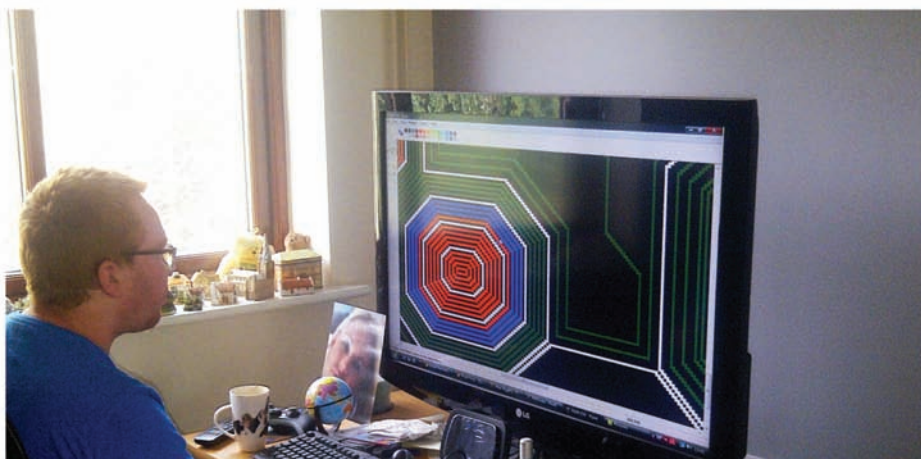


A tree of opportunity illustrating the broad range of special interests that individuals have

Research

Special Interests

Several residents were also selected for in-depth observation and interviews to enable the researchers to learn more about their particular interests.



Daniel

This is Daniel (left, above) and he loves maps, spending most of his free time drawing maps on a computer. This interest started when he developed a fascination for Ordnance Survey maps as a child. Before he started using a computer, Daniel would hand draw maps, and knew exactly what each colour-coded contour line represented.

'I am interested in colour because I like colour coding. When I painted my old flat I got the colour of the paint closest to the world atlas – sandy colour represents 1000 metres above sea level.'

Daniel, Kingwood resident



Paul

This is Paul (left, below) and he spends a lot of his free time tearing magazines. He particularly enjoys looking at people's faces in magazines and will tear around them very meticulously. Paul loves objects that spin and has a collection of more than 200 of them. He also likes rubber objects that bounce and pop up, enjoying the suspense of waiting for them to flip up.

From passion to action

It is important to create opportunities for people with autism to develop new skills such as communication, socialisation and independence. Many people may resist participating in new and different activities and small steps are required when introducing them to something new. Using existing special interests as a central theme may help with this transition as it provides a familiar strand to which new activities and experiences can be added. Here are some useful suggestions of how to extend someone's special interests into a garden environment:

Spinning

Car wheels, tornados, washing machines and windmills – many things involve the motion of spinning, a popular interest for many adults with autism. The garden is a good space for spinning activities. Not only is there space to move and less chance of injury or breakage than indoors, but the wind can power things to spin.

Examples of spinning-themed garden activities that encourage communication, social interaction and motor skills:

- Composting household waste using a compost tumbler
- Watching sycamore seeds spinning through the air
- Using rotary washing lines to dry out clothes
- Spinning an umbrella, as it covers you from the rain.

Organising

Organising and sorting is a popular interest for people with autism. Books, clothes, food tins and photographs can all be sorted and the process of putting things in order or formation can calm and relax as it introduces serenity to what can seem unpredictable surroundings.

A garden offers many opportunities to sort and organise objects.

Examples of organising-themed garden activities that can stimulate a range of communication, social interaction and motor skills:

- Collecting and lining-up gravel, pebbles and leaves
- Labelling vegetables and plants
- Arranging plant pots by colour and size
- Counting and sorting out seeds and sowing them in rows
- Arranging the plants, flowers and herbs in colours, textures and smells.



Spinning objects in the garden



Organising activities in the garden

Research

Co-design workshop

Kingwood residents, staff and family members participated in a co-design workshop to generate new ideas for garden spaces.

Defining the components of the space

First of all, designing a successful garden demands a clear understanding of what a person's needs and preferences might be. If the space is to be shared, some discussion will be needed to identify and avoid potential conflicts. Obviously the size of the available space will also be crucial to what can be put in it. Addressing simple preparatory considerations like these must precede more detailed schemes.

To generate design concepts, the researchers held a garden co-design workshop inviting the people that Kingwood support, staff and family members to imagine how a proposed shared garden space might look and feel and how it might be populated through the exploration of someone's special interests.

Process

As a hypothetical garden was being discussed, a simple layout was presented in the form of a rectangular grass patch – essentially a blank

canvas. A pack of cards illustrating possible garden features, spaces, furniture, flooring, partitions, utility, wildlife and activity ideas was given to each participant, each of whom was asked to select those that they thought would be most appropriate to them or their family member.

They were also given stickers representing either themselves or the person they support to be placed on the areas or features they thought would be most appropriate. This quickly gave an indication of the popularity of each space. Additional blank cards could be written or drawn upon to represent new features or activities, as they emerged.

Outcomes

The exercise proved very useful in identifying recurring themes and the needs of those being considered. It was also a good tool for engaging people and eliciting sometimes revealing anecdotes.

As the participants had to negotiate

shared spaces, there was discussion and consensus on what should and should not be included, what should be grouped and what should stand alone. From the workshop several desirable spaces naturally emerged:

- Social space
- Private space
- Exercise space
- Horticulture space
- Utility space

Some more unusual suggestions emerged too. A mother described how her son had a special interest in cars and suggested a car chassis might be a fun idea for the garden. The use of the space at night was also highlighted.

Overall the consensus was that several spaces should be provided, and that clear options should be in place. The need for both social and solitary spaces was highlighted several times.

One of the interesting outcomes was that although the garden was being designed with adults with autism in mind, what was emerging was a desirable space for all, a space where people with autism, their family members and support staff would

enjoy spending time with one another. In this sense it became clear that the garden should include the needs of as many people as reasonably possible.

The workshop also revealed that sensory preferences and sensitivities are very important design considerations. Seating out of direct sunlight, for example, was thought desirable to avoid the glare of sunlight.

One parent described how her son would find walking on pebbles too unstable and unpredictable, yet would enjoy interacting with them by picking and sorting them.

'I think it's a really important point to make sure the garden is open at night. The darker it gets some of the sensory inputs are distorted; it's actually good that people can be more focused as you don't have the distraction of everything around you, and you can focus more on touch and smell than you do on sight.'

Kingwood staff member

'There's different sections, different areas. Maybe a communal area, if people want to be together and they choose to, that's fab, but if they don't they can go into little individual parts of the garden, so we grouped some activity ones and sensory ones.'

Parent of Kingwood resident

'Evenings often get cut short for our chaps, and it would be nice to sit out in the dark... maybe having lights maybe on the trees.'

Kingwood staff member

'It has only just occurred to me, but at our old house I had the closest I've experienced to conversations with our son around the pond. We'd sit there and talk, while we watched the goldfish.'

Parent of Kingwood resident



Parents participating in the co-design workshop

Research

Ready Steady Make workshop

Ready Steady Make in the garden is the second in the series of Kingwood staff development workshops.

The first in the series explored the development of skills in mapping sensory preferences and making sensory props for inside the home. This year was followed by a workshop to explore ways to enrich the garden experience through a similar process. Here sensory preferences and special interests were mapped with a view to creating stimulating garden activities and props to be used all year round.

Two Ready Steady Make workshops were held. Six participants at each were presented with a variety of cheap and easy-to-find objects such as wooden spoons, bottle tops, marbles, CDs, flip flops, pencils, bamboo sticks and sink strainers. These materials were imaginatively transformed into six garden props with the aim of personalising their appeal to the person that each participant supported. The props were designed to encourage opportunities for connecting with special interests. CD spinners connected to a popular interest in rotating objects; DIY bird feeders and personalised woven peg baskets connected with those seeking creative occupation; wind chimes and

bamboo bubble blowers were created to afford sensory pleasure.

An important aim of the workshop was to explore how the process of making something can help to encourage communication and trigger memories and ideas. Staff discussions about sound (prompted by the making of the sink strainer wind chimes) triggered talk about drills and car engines, sources of sounds problematic for some of the people they support.

The making of the CD spinners sparked conversation about a man who loves spinning objects and has an impressive collection of windmills. This train of thought prompted his support worker to plan a trip to a field of wind turbines, which proved a great success. The participants left the workshop full of ideas to be tried out in green spaces with those they support.

'Thanks for a very informative workshop. It made me more aware of how we can use things in the environment to create varying sensory experiences for the people we support.'

Participant feedback





Katie Gaudion (left) facilitating the Ready Steady Make workshop for Kingwood staff

Sensory Garden

Overview



The garden is a space that makes us keenly aware of our senses. The simple experience of being in a garden teaches us about our sensory preferences – whether we love the smell of lavender or dislike the taste of mint, enjoy sitting in the sun or prefer pushing around a wheelbarrow. In appreciating and experiencing a garden fully, all of the senses are engaged: sight, smell, hearing, taste and touch.

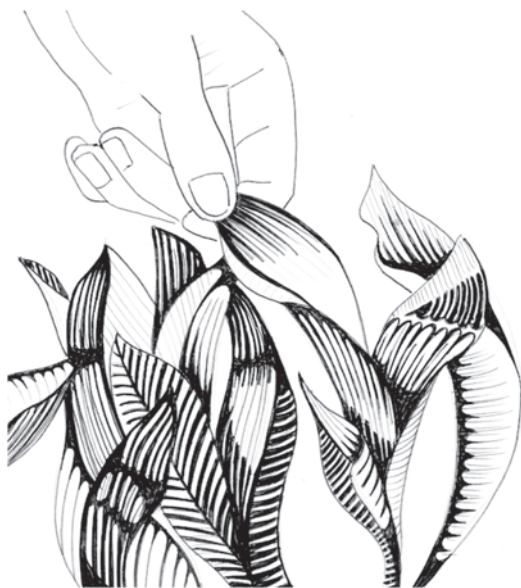
The important distinction between designing for indoors and outside is that inside the home we have control over much of the sensory quality of our environment. We can turn down a loud TV set or pull down a blind if the sun gets too bright. Outdoor spaces, however, feature many sensory experiences over which we have little control. The weather, wildlife and the changing of the seasons are difficult to adjust.

Studies have shown that over 90 per cent⁸ of people with autism experience unusual sensory processing. In this case a person may have extreme reactions to sensory input; some seeking it (hypo-sensitivity) others avoiding it (hyper-sensitivity). It is therefore essential to design outdoor spaces flexibly enough to offer a range of experiences that can be enjoyed both by those seeking sensory stimulation and those who wish to minimise it.

It is of paramount importance to recognise this in all exterior design situations so that we can help people with autism feel more comfortable, relaxed and secure in their surroundings. Sensory profiling cards developed by the research team were the starting point for the garden design process, as they enable individual sensory preferences to be incorporated into the planning, layout and general flow of a garden space.

Sensory Garden

Touch



Walking along a carpet of grass, gripping a garden spade, brushing past climbing plants, feeling the tickle of a ladybird, twisting off fruits and berries, cupping vegetables in our hands... the garden is a tactile journey, full of textures that we can choose to touch and explore.

In a garden a person with autism may respond to textures in contrasting ways. A person who experiences hypo-sensitivity may want to touch and feel everything around them while someone who experiences hyper-sensitivity may want to avoid touching things altogether, becoming distressed by unexpected contact with a plant or even the anticipation of it.

Accommodating hyper-sensitivity

- Group plants into types of textures (i.e. coarse, fine, medium) or forms (i.e. spiky, round, oval) and introduce them gradually, one type at a time
- Avoid lining pathways with long grasses or fast growing plants to prevent them brushing against anyone passing by who would find the light touch uncomfortable
- Choose materials for furniture, flooring and partitions that are consistent in texture and non-heat absorbent as unfamiliar textures and temperatures may trigger anxiety.

Accommodating hypo-sensitivity

- Create a wild garden with a mix of coarse, fine and medium textures, and include touch-reactive plants such as mimosas
- For someone who may enjoy pressure and crawling under things, provide heavy picnic blankets or create nature tunnels
- Include different types of tactile surfaces along the walkways – for example sand, crushed gravel or stone slabs.

'My son likes very much to lay on the grass and pick blades of it, he also likes to drop grass or feathers into the wind and chase after them.'

Parent of son with autism

Sensory Garden

Sound



The sound of rain, whistling wind, a chorus of birds, murmuring voices, the crackle of leaves, the rustle of grass, the crunching of gravel, the snap of a twig and the buzz of a bee... the garden's multiple ambient sounds can be punctuated with the snip of a plant being cut, the hum of a lawnmower and the roar of an aircraft above.

The garden is a source of many sounds different in rhythm, tone and pitch. Some are man-made (for example the snipping of weeds, reeling a hose or mowing the lawn, laughter from a neighbouring garden), while others are ambient (for example the rustle of trees amplified in the wind or birdsong).

A person with autism may respond to such sounds in a variety of ways. A person who experiences hypo-sensitivity will enjoy background garden sounds and actively make their own sounds such as scrunching leaves, snapping twigs or running a stick along a corrugated fence. A person who experiences hyper-sensitivity may find the lawnmower or even the buzz of a bee too loud, while the tweet of a bird, nearby laughter or the sound of thunder could cause anxiety due to their unpredictability.

Accommodating hyper-sensitivity

- Create an enclosed quiet space that is calm, restful and undisturbed. Position it away from the social areas of the garden.
- Avoid creating too many sounds at the same time, i.e. mowing a lawn with music playing in the background
- Be mindful of the materials you use for ground cover in communal spaces, avoiding noisy substances such as gravel, and consider using sound-absorbent alternatives (for example cork, bark or sand)
- Mask unwanted noise with soothing sounds such as water or swishing grasses.

Accommodating hypo-sensitivity

- A person who seeks sensory input may not be able to tolerate silence and will create their own sounds by tapping and banging. Consider the materials used for garden features and furniture from this point of view.
- Tapping on wood, metal and plastic will all produce different sounds
- Introduce sculptures and focal points made of materials that amplify the sound of the rain
- Include nectar-producing plants and feeders to attract birds.

Sensory Garden

Smell



Herbs, plants, flowers, vegetables, raked gravel, a mown lawn, a smoky bonfire and fresh soil after the rain... the garden is a rich source of varied scents which permeate the air we breathe.

Smell can take us on a journey that transports us back to early memories, give us our sense of taste and help us feel relaxed. In a garden we can often choose what to smell as we reach for a rose or fresh mint, or breathe in the aroma of freshly-turned soil. Garden smells can therefore give us pleasure, but they can also take us by surprise. Accordingly someone with autism may respond to smells in different ways.

A person who experiences hypo-sensitivity may seek strong odours and take pleasure in the fragrant mix of a herb garden. In contrast to hyper-sensitivity a person may want to avoid or distance themselves from certain smells, being made anxious or uncomfortable by them.

Accommodating hyper-sensitivity

- Choose scented plants and flowers that will only release their scent when rubbed. This gives the hyper-sensitive person control over what they would like to smell and what they would like to avoid
- Shield scented plants and composters from the direction of the prevailing wind and direct sunlight. This inhibits the widespread pervasion of scents across the garden.
- Group fragrant plants into types (fresh, floral, spicy and sweet) and place them into pots so that they are movable. This makes them easy to take away or introduce in response to individual sensitivities.

Accommodating hypo-sensitivity

- Position seating close to scented plants so that olfactory memory aids navigation. For example the smell of rose next to a bench helps a person to locate that bench next time
- Consider planting non-slip creepers or herbs near the path edges so that when you walk on the plant, it will release an aroma – for example pennyroyal, mint or thyme. Many herbs are very aromatic but only release their scent when the leaves are rubbed or grazed
- In the summer many flowers release their scent at night, making it desirable for someone who is hypo-sensitive to take an evening stroll.

Sensory Garden

Sight



Colours, forms, shapes, light and shade: the garden is composed of multiple visual events viewed beneath an infinitely variable canopy ranging from luminous daylight blue to star-studded night-time darkness.

The garden is a three-dimensional space filled with visual phenomena that are constantly shifting and changing in response to the time of day, the weather and the seasons. There is always something new to catch one's attention: a trail of ants on the ground navigating obstacles; an unusual bird flitting through the trees. As we have seen, people with autism may respond to external stimuli in quite different ways and this is certainly true in the case of visual events. A person who experiences hypo-sensitivity may seek rich visual input, actively enjoying an open plan

garden with a broad vista containing brightly-coloured flowers. The same aspect might make the person who experiences hyper-sensitivity anxious and overwhelmed by too much visual information. Their preference would be for a visually muted garden with plenty of shade and little distracting detail.

Accommodating hyper-sensitivity

- Avoid plants and trees that secrete pollen such as pine trees and dandelions. It is possible for a person who experiences hyper-sensitivity to become focused even by a small grain of pollen landing on their clothing
- Create visual consistency and predictable patterns, massing plants with similar tones and colours together and only using contrasting coloured plants to provide visual emphasis or markers at strategic points
- Someone sensitive to the glare of sunlight needs easily accessible shade, for example patios, porches, arbours, tree canopies, trellises and gazebos. Offer shade for seating and consider positioning chairs so that they do not demand eye contact.

Accommodating hypo-sensitivity

- Create different vantage points – mounds or slopes to offer an improved view of the garden. Create an elevated space with a telescope to view an aircraft or moon and stars. Someone attracted to bright lights will benefit from strategic lighting around the garden placed at different levels to encourage visual exploration from different perspectives.
- Hang white sheets in direct sunlight to show shadows of plants and trees. Those fascinated by reflections and shadows will enjoy the changing shapes. Latticed partitions and sculptures also cast interesting shadows.

Sensory Garden

Proprioception



Pushing a wheelbarrow, using a lawn mower, digging in the soil, lifting a watering can or a heavy basket of fruit, pulling weeds from the ground, raking through the soil, stretching up to reach a tree branch, a washing line or a bird feeder... the garden is a fertile space for providing proprioceptive input which can help to calm the nervous system, strengthen muscles and joints and help us to learn more about how bodies move in space.

The garden environment can be a challenging and stimulating environment to help a person understand how their bodies move in spatial terms. Different people require different amounts of proprioceptive input to provide appropriate feedback for their joints and muscles.

A person who experiences hypo-sensitivity is likely to gravitate towards physically challenging activities such as lifting objects, and often enjoys working in groups. The person who experiences hyper-sensitivity may prefer more passive, quiet and solitary activities requiring less body movement.

Accommodating hyper-sensitivity

- Ensure that pathways are clear and consider 'soft' dividers, such as bushes, trees, and slopes
- For those with a short attention span, provide plants or vegetables that grow quickly and require little attention, for example courgettes and marigolds
- If garden activities are timetabled and arranged to take place at the same time each day, the predictability will reduce anxiety.

Accommodating hypo-sensitivity

- Designing a garden with large open spaces will encourage those who want to stretch, jump and move around, which activates their proprioceptive systems
- For those who find it difficult to sit still, a basket of sensory props from the garden (twigs, leaves, feathers) may provide a focused sensory activity
- Climbing hills, stumps and boulders offer opportunities to exercise and use body muscles.

A garden of mystery: A promise that one can learn more

Kaplan, R & Kaplan, S. (1989)⁹

Sensory Garden

Vestibulation



Bouncing on a trampoline, swinging on a tree branch, using a hammock or swing, riding a bike, rolling down a hill, balancing on stepping stones... the garden environment provides many opportunities for vestibular input that promotes awareness of balance and coordination.

While the person who experiences hypo-sensitivity may actively enjoy a garden with an open space so that they can spin around or bounce on a trampoline, the person who experiences hyper-sensitivity can be disorientated by these balance-challenging activities that involve sudden movements.

Accommodating hyper-sensitivity

- As some may find it challenging to walk along uneven or unstable surfaces, ensure that flooring is sturdy, smooth and continuous. Gravel and pebbles may feel too unstable
- Those anxious about heights will respond better to slopes than steps, appreciate sturdy seating and feel more comfortable when a garden swing is of a height that allows the feet to touch the ground
- For those who need to avoid excessive head movement, provide raised flower beds that involve little bending, and supply a clutch stick to pull the apples from a tree or pick up the leaves. A watering hose requires less tilting of the head to use than a watering can.

Accommodating hypo-sensitivity

- Provide a garden space for running. A perimeter garden path may be a convenient solution
- Consider providing a trampoline and exercise ball. The movement of bouncing up and down can produce a very calming effect for those who enjoy it
- Provide a space with safe, soft flooring for spinning activities. The rotational movement of spinning can be very activating.

'Lots of times I'm surprised by what other people said they saw and heard, because it is not what I saw and heard... I don't know why my head picks things to focus on, but I know it is usually not the same things other people pick to focus on. My head gets very interested in ticking clocks or little spiders or reflections of the sun on water.'

Experiences in Autism¹⁰

Sensory Garden

Perception



Space and Layout

People with autism may have poor depth perception and this will affect the way they orientate, navigate, judge distance and manoeuvre around objects and other people. In outdoor spaces, paths and visual markers such as signposts, obelisks and visual orientation maps can provide visual cues and so enhance predictability. Desirable areas should be easily accessible while less desirable ones should be made harder to encounter by accident.

As we enter a garden, information is acquired and processed. Our understanding is based upon our spatial interpretation, memory, imagination and experiences. Everyone has unique perceptual experiences of their surroundings but adults with autism may interpret and perceive the world in general – and the garden in particular in significantly different ways.

On entering a garden people may encounter difficulty distinguishing between foreground and background information. They may feel bombarded with too much sensory information and be unable to perceive the garden as a whole or break it down into meaningful units.

The ability to recognise a garden may be limited and navigating this space may also be a challenge. Therefore it is important to provide contrasts, distinguishable objects, furniture and visible boundaries, so that a person with autism may perceive them and feel secure to explore. Consider individual perceptual experiences when planning the layout and flow of a shared garden space.

Sensory Garden

Vestibulation



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Experiences in Autism¹⁰

Design Concepts

Green Spaces



Kingwood College design concept

Design Concepts

Space 1: Escape

Most people enjoy secluded spaces and areas where they can occasionally hide away.

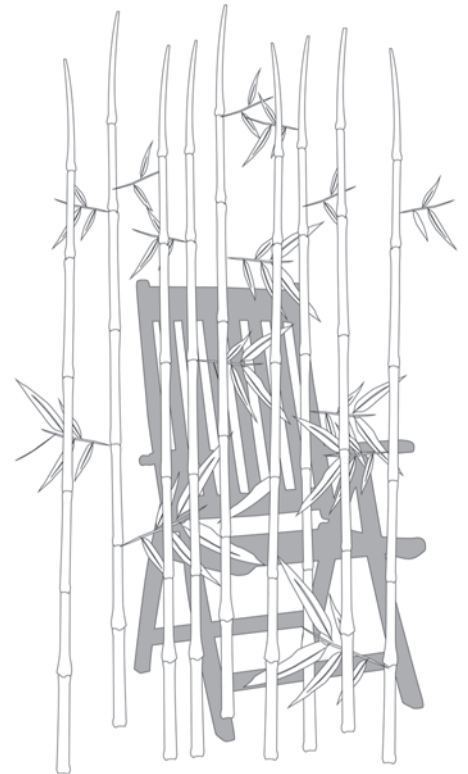
A frequent trait of adults with autism is the challenge of communication and social interaction so wherever possible it is reassuring to provide the option for escape to recentre, relax and contemplate.

In the research team's design three 'escape' spaces were included, positioned in different areas of the garden. In two of these the team took advantage of natural canopies provided by mature trees, simply adding seating underneath. In one instance a circular bench was wrapped around the tree trunk in the other a man-made canopy provided additional shelter for chairs.

For the third space in a corner of the garden away from noise and activity, the team created an organic den-like structure formed with fast-growing willow. This low-cost structure is large enough to stand up in and features soft lounge seating. Lighting can also be integrated into the structure for use at night.

Principles

- Allow some level of transparency, so people can see through and stay aware of their surroundings and people nearby
- If the garden has natural hidden areas, take advantage of them by making them into spaces for escape. Augment them with furniture screens, tunnels or hills, so adding variety to the space
- If the garden space is shared, including more than one 'escape' space is advisable
- Plants can make an excellent screen if selected. Bamboos and long grasses can be placed around a seated area to provide additional privacy
- More solid structures can also be used; sheds or arbours can be both effective and relatively cheap. Once plants have grown over such structures they can be both beautiful and subtle additions to a garden
- Temporary shelters make a good change when variety is required. Try ideas such as poly-tunnels, tents or even a simple cover over a clothes line.





Design Concepts

Space 2: Exercise

Exercise is crucial to good health, improving mood and enhancing a sense of wellbeing.

A thoughtfully appointed garden can encourage involvement in a variety of physical activities. Gardening allows opportunities for proprioception through tasks such as pushing a lawnmower or shovelling compost into a wheelbarrow and transporting it to a flowerbed. For those with lower muscle-tone, activities such as weeding, pruning and picking fruit can promote coordination skills.

In the research team's design a designated exercise area was included with age-appropriate equipment to take full advantage of the outdoor location. Activities such as jumping are encouraged by the provision of a sunken trampoline. The area is floored with rubber mulch and subtly fenced with curved sections that guide the person to the equipment.

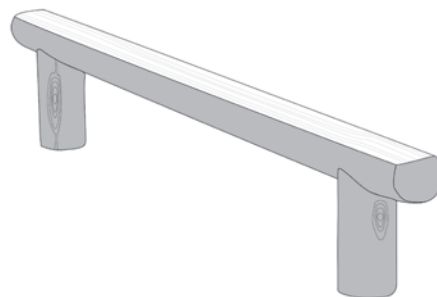
Foliage on the fence helps to filter sound from the rest of the garden. Storage arbours in each section and the provision of drinking water encourage rest and refreshment as well as providing an area for support staff to relax while observing those they support in an unobtrusive manner.

Principles

- 'Designing in' activities that incorporate resistance – for example climbing, lifting, pulling or pushing – promotes deep pressure for relaxation which is well-documented as a positive stimulant
- Provide a garden space where people can circulate and run. A perimeter path is a good idea if there is sufficient space
- Provide space with safe, soft flooring for a person to spin. The rotational movement of spinning can be very captivating for adults with autism
- Gardens have great potential to offer opportunities to practice motor skills, balance and coordination. This can be achieved by using objects such as spinning plates or balance beams
- Interactive equipment can be dotted along pathways throughout the garden to intrigue and encourage exercise and engagement (for example large exercise balls or balance beams)
- In a shared garden it is a good idea to contain exercise areas as the sights and sounds generated

may be distracting for others. A well-shielded and designated location is therefore desirable

- Exercise equipment can be both expensive and heavily used. Create timetables to allow everyone some time on the equipment of their choice.





Design Concepts

Space 3: Occupation

Occupation is where 'special interests' have greatest potential to be incorporated.

Identifying activities that incorporate individual special interests into outdoor occupation can lead to positive growth for an adult with autism. Outdoor activities such as gardening can contribute to a sense of achievement, boost self-esteem and improve concentration, and communication.

The research team's design included a horticulture space which offers a host of occupational possibilities. Garden maintenance and embellishment is multi-faceted, offering many opportunities to incorporate people's natural interests and abilities; indeed, certain traits of autism can be a positive asset in tending a garden: routine, pattern, repetition and attention to detail are all desirable qualities in a gardener. By accurately gauging an individual's inclination towards tasks you can maximise positive and beneficial development based upon their natural interests.

Principles

- Provide systematic and clear visual instructions for all garden activities. Timetables, activity charts and well-organised spaces all help to get maximum value from the garden's assets
- Consider that some people may prefer more solitary garden activities that require little movement, for example pruning, planting seeds and picking up leaves, sticks or pebbles
- A person may have a short attention span, so consider working with plants that grow quickly
- Visiting garden centres can be an enjoyable day out, and selecting items and plants of interest can add to an individual's sense of ownership
- Eliminate distractions by siting occupational space away from busier areas
- A person may prefer activities that involve little head movement. Raised beds remove the need to bend over and a hose is preferable to a watering can
- Remember that options can expand beyond gardening. Craft pursuits – such as making hanging baskets

or birdfeeders – can be undertaken in sheltered spaces in the garden. Herbs grown in the garden can be brought indoors and used in cooking

- Consider whether occupational tasks will be carried out one-to-one or in groups. Make spaces to reflect this consideration and ensure that they have plenty of room.





Design Concepts

Space 4: Sensory

A garden can be an excellent place to explore the senses but care must be taken not to overwhelm people.

It is important to be mindful of individual hyper and hypo-sensitivities to sights, sounds and smells, which will vary. However, with that caveat, the garden can become the perfect environment to help adults with autism experience and explore a rich variety of sensory stimuli.

The research team considered specific senses in their design and created a divided space into a series of sensory 'rooms' that cater to each sense, helping people to focus upon one sense at a time. Paths, signposts and other forms of orientation offer clear indication of the possibilities for exploration, allowing a person to select the sensory space that appeals to them and avoid those that do not.

Principles

- There is huge potential for visual expression in gardens through plant, furniture and paving choices. Colour, composition, form and light all interact to create a range of moods. Care should be taken to select and use colour in a way that creates an inviting but not over-stimulating environment

- A calming mood can be created by the use of harmonious plants having similar textures and characteristics. To create a visually stimulating mood, use contrasting combinations such as large and small leaves or shiny and matt leaves
- The familiar grass underfoot can be studded with the occasional paving slab to aid orientation through textural contrast
- A texture zone might be included as part of your garden – perhaps a wall with a wide variety of plants and mosses, or even a table where a variety of cuttings from the garden can be explored by touch
- Natural sounds can be 'designed in' and orchestrated (for example water features, swishing grasses, birdsong) to mask external noises from the street or neighbouring gardens
- Consider the positioning of sensory spaces, particularly ones involving sound or smell, which are likely to 'leak' into other spaces. Be sure to place such spaces away from more neutral ones designated for escape or solitude
- The floral scents of a garden are

one of its great pleasures; however this aspect has to be carefully considered and managed for the benefit of those who might find it overwhelming

- Remember temperature and location can exaggerate the effects of scent. A rose during a cold morning produces a much subtler scent than it does in a warm mid-afternoon breeze.





Design Concepts

Space 5: Social

A garden can help people with autism who experience difficulties with social interaction and communication.

A space in the garden that promotes social development is therefore an important design consideration that may help a person to converse, share, play and work with other people. Group activity is one of the greatest potential benefits of garden spaces, so building in visible and accessible opportunities for socialising is important, as is including opportunities to interact or to use space in turn.

In the research team's design an open area connected to a summer house is provided in the centre of the garden. This space would not only be used for crafts and games but also for barbecues since dining and relaxing can be important garden activities.

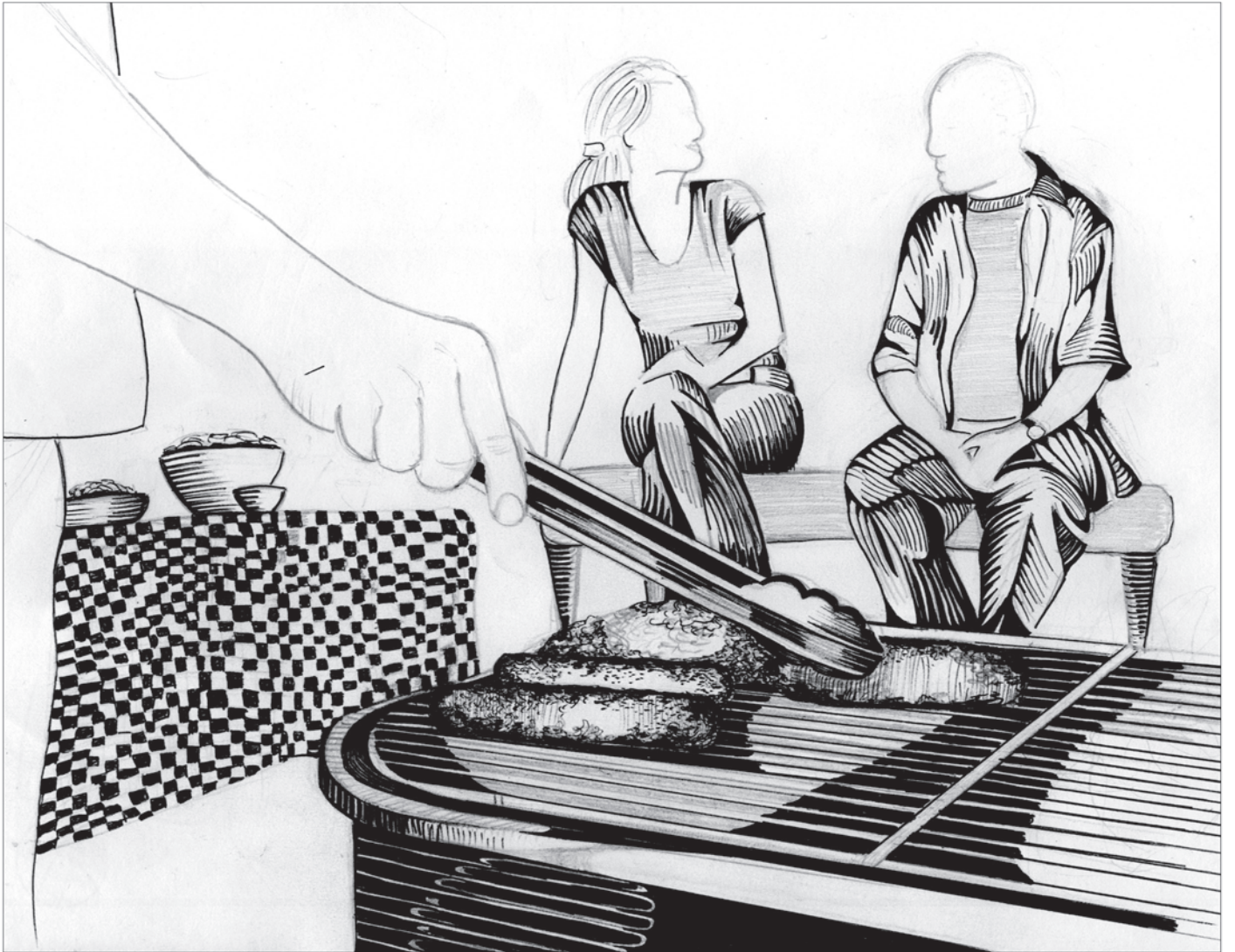
To help with arranging additional activities, a section of the summer house stores a range of furniture and props to be taken out as needed. A canopy can also be drawn out from the summer house and extended over the open area, creating a more intimate communal space in which to enjoy summer meals.

Principles

- Position social spaces in ways that allow several approaches and exits, as this enables people to come and go independently as they please
- Some people with autism prefer to avoid bright sunlight. If possible provide shading, particularly in areas where people will be spending a lot of time. This can be achieved through natural surroundings such as trees, or by adding structures or a canopies
- Those who might not immediately want to participate in social activities should not be excluded completely. They may appreciate options that allow them to sit a little apart from the main social space
- Consider all-year garden use and provide a shelter. This can be as modest as a shed or as lavish as a summer house to host indoor activities that can be temporarily relocated to the garden for variety
- Shared spaces can be contested; if including raised plant beds or similar in your garden, ensure that there is provision for both shared and single use

- A person may feel uncomfortable in open spaces, so provide spaces where a person can interact in smaller groups (i.e. 2-3 people).





Design Concepts

Space 6: Transition

An important consideration in the design of areas for outdoor activities concerns thresholds between different spaces.

Allow for gradual acclimatisation to the outdoors by bringing in elements such as houseplants to encourage contact with natural elements in a familiar setting to begin with.

Such transitions are equally important between different outdoor spaces, which is why there should be plenty of indicators when a new space is being approached so that there are no unsettlingly abrupt experiences. As far as possible, alleviate unpredictability and support people in ways that enhance their experiences.

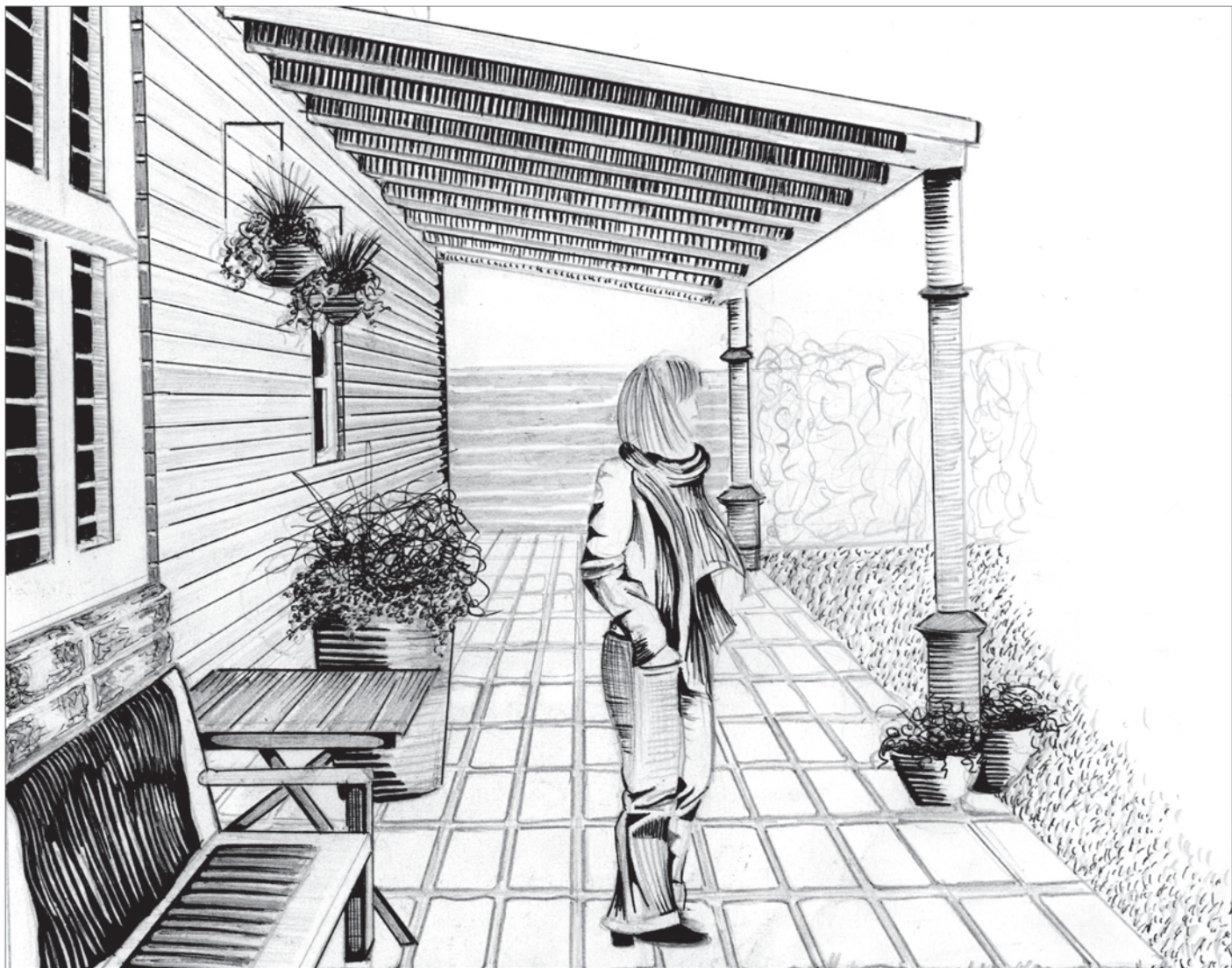
In the research team's design there is a veranda allowing people to make the transition from indoors to outdoors. The immediate layout visible from the window and first experienced when entering the garden is that of an uncluttered space with low stimulation, minimal detail and limited palette. The design of the garden is deliberately graduated making the entrance serene before progressing to the more stimulating social and activity spaces. The most arousing sensory and wildlife spaces are located at the back and around the perimeter of the garden.

Principles

- A veranda or patio can be used to provide transitional ground between being indoors and outdoors, and give shelter from poor weather conditions
- Lighting can make a garden accessible for more hours. The transition from dark to light should not be abrupt, so the use of timed lighting rather than motion sensitive lighting should be used
- Winding paths are known to bring a sense of calm and create a flow that promotes calm progress through a space. Curves and slopes are gentle ways of transitioning spaces and can be used as an alternative to steps or angular paths
- Vertical features interspersed through the garden can help draw the eye upwards and take advantage of the three-dimensional space
- Obelisks and other structures can be used to mark points of interest and ought to be visible from other garden vantage points as well to orientate people and prevent them from ever feeling lost
- Simply entering the garden should feel like a celebration. Providing

- 'small wins' (such as enjoyable plantings or objects throughout) is a good way to encourage progress
- For a person who experiences hyper-sensitivity, it is important to introduce the space in a low-stimulus manner. As far as possible a clean design should be encountered first, gradually increasing the stimulus in a predictable way further into the garden.





Design Concepts

Space 7: Wilderness

The garden is about connecting with the natural environment, something which engages people and awakens their curiosity.

A garden that captures and cultivates the more natural elements found in wild spaces brings a new dimension to the garden for exploration and engagement.

The research team made a feature of the space surrounding two mature trees. This area could not be built upon due to the potential risk of damaging their roots. It was therefore the obvious choice for a wilderness area. A group of small hills was introduced as a simple and cost-effective way to add interest to the space. They were left to grow wild, with grasses and wild flowers adding to their appeal as places to lie and relax. A bird's nest swing, big enough to accommodate more than one person, was also included to further reinforce the experience of being in an open space while encouraging vestibular input. Finally two escape spaces to take advantage of the natural garden was added.

Principles

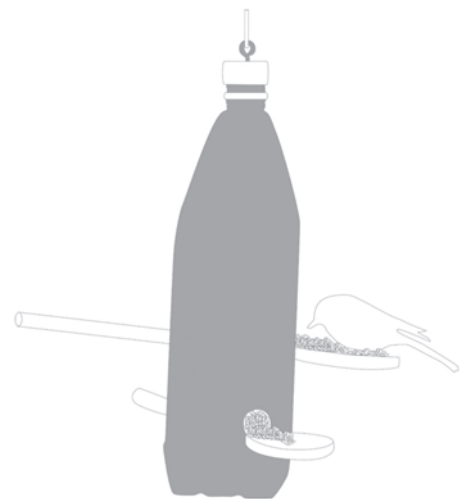
- Elements can be introduced to a garden that will encourage wildlife. Bird feeders and birdbaths can

be crafted and then deployed to encourage birds while plants such as foxgloves can be grown to attract insects

- People should feel that they can wander freely in their garden. Natural partitioning such as shrubs, hedges, fences softened with climbing plants or bamboos can help enhance the sensation of being in a wilderness rather than a strictly landscaped location
- Include opportunities for people to immerse themselves in such spaces. Dens can be great additions in this space where one can retreat and enjoy the secluded atmosphere
- Provide seating that moves back and forth or encourages a person to enjoy the garden from different perspectives. An arbour swing or a hammock is ideal
- Hills and tree stumps provide opportunities for gross motor movement: climbing upwards to experience height or enjoying the liberating sensation of rolling down a hill
- Provide seating that encompasses the body (for example beanbags that are good for deep pressure and body

mapping, or heavy picnic blankets)

- Providing items around the garden such as wooden trunks, tyres and movable ramps encourage opportunities for lifting
- Create different viewpoints, using mounds or slopes, or even a telescope, to maximise all possible views of the garden.





Conclusions

The outcome of this project is a design-led, inclusive exploration of the potential of outdoor spaces to positively impact the lives of adults with autism in ways that are meaningful to them.

The study also considers the related needs of those they regularly interact with, such as parents and support staff.

The guidance presented in this publication is not intended to be mandatory or prescriptive and it should be noted that the research is not representative of the full spectrum of autism. It is intended that the work will build awareness and inspire service providers, support staff, professional designers and family members to consider the many elements that make up the experience of adults with autism in terms of their sensory preferences, social communication traits and special interests, and how these, combined with a person's hyper and hypo-sensitivity, can be related to outdoor space.

Many of the ideas contained within the work are drawn from evidence based on working schemes that are currently in existence. Those piloted during the project will continue to be evaluated.

The special interests of people with autism was given particular attention in the research as a means of identifying possibilities to transition individual passions into actions in the form of exercise, leisure or occupational pursuits in the garden.

The seven green spaces presented demonstrate how these can be developed to meet distinctly different desires, and how furnishing and planting can support positive growth catering to individual need. Careful consideration was given to location, orientation and the concept of a gradual transition through an increasingly experiential space as one way to make a space accessible to a broad range of people.

The research processes described are intended as examples of how to engage with a range of stakeholders (predominantly adults with autism, their family members and support staff) in creative ways, and ensure that the outcomes are inclusive.

The guiding concepts within this publication have been applied to the design of Kingwood College garden, which will serve as a test bed for the proposed green spaces. This garden will continue to evolve, exploring how gardens can make a positive impact on the lives of adults with autism. Further studies will be required to examine and validate the impact of the spaces, and to establish how they might be expanded.

No prescriptive set of green spaces will meet the needs of every adult with autism; the key is to consider individuals and elements that could feature in their wish list and to negotiate spaces that offer the best fit to different needs.

By taking this approach outdoor spaces can be created in a truly inclusive way offering a unique combination of escape, exercise, occupation, sensory, social, transition and wilderness spaces.

The next phase of this project, starting in October 2012, will build upon the learnings from this year to further investigate other areas around design and autism.

Bibliography

About the Authors

Katie Gaudion holds a Master of Philosophy in Textiles Design from the Royal College of Art. She received the Helen Hamlyn Design Award for Creativity in 2010. She has presented her design research at a number of international conferences including China and the USA. Katie's specialist interest lies in co-designing with adults and children with learning disabilities and neurological conditions. She is interested in learning and discovering the latent needs of people whose perspective and experience of the world is individual and unique. Katie is the founding member of *Angles between Curves*, a design research practice that focuses on materials development and people-centred design to create tactile, interactive and performance textiles for product and environment.

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Footnotes

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This publication describes how design can create beneficial green spaces for adults with autism to enjoy being out in the garden, while at the same time anticipating and managing the inevitable challenges of the unpredictable outdoors. Underpinned by in-depth research and the parallel creation of a real-world garden embodying its findings, it looks in particular at leisure, occupation and exercise activities, offering design guidance on how to create green spaces that will enrich individual lives. It follows two earlier books in this series that explore housing design and issues of sensory perception in relation to the built environment for adults with autism.