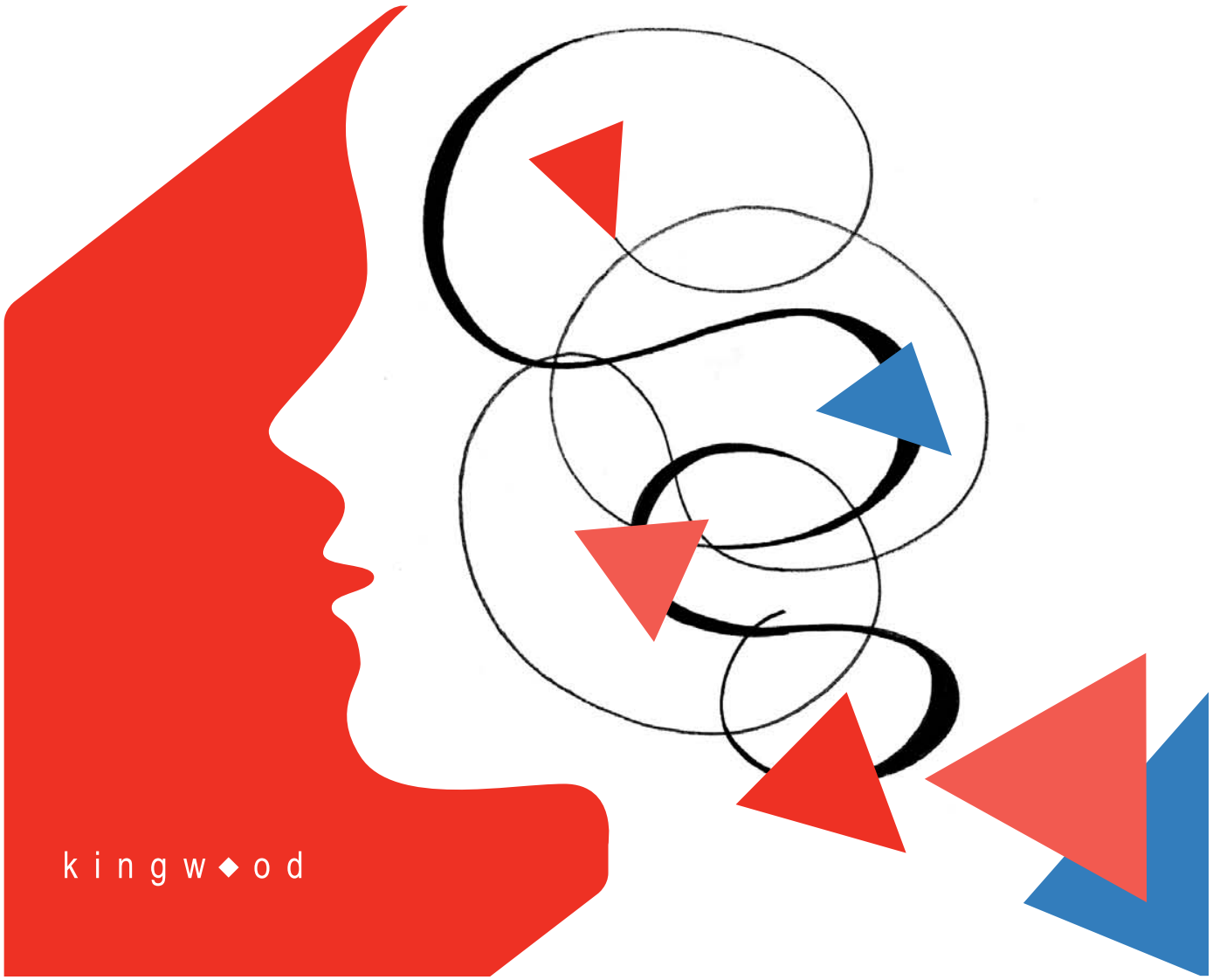
Exploring Sensory Preferences Living Environments for Adults with Autism

Andrew Brand and Katie Gaudion



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 graduate with business and voluntary sector partners.

www.hhcd.rca.ac.uk

BEING

BEING was commissioned by The Kingwood Trust to shape and manage this ground breaking project with the Helen Hamlyn Centre for Design. BEING is a specialist business consultancy that helps organisations in the public, private or charitable sectors achieve their goals through the effective application and management of design.

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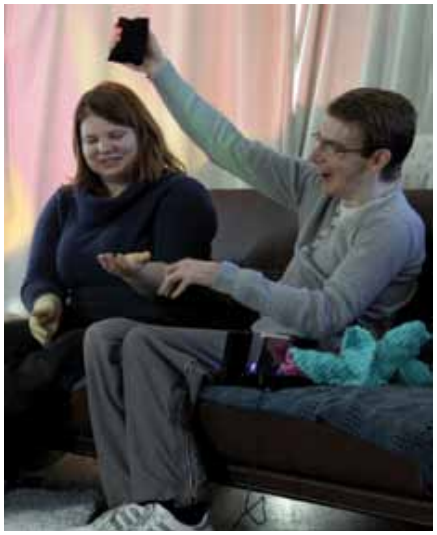
Foreword

Lady Hornby, Chair, Kingwood

At Kingwood we support people with autism. We also learn from them and together we pioneer best practice. Research is a vital part of the process and this report illustrates the way in which Kingwood staff, the people we support and Royal College of Art researchers work together.



In *Exploring Sensory Preferences* the two researchers were Andrew Brand and Katie Gaudion, graduates of the Royal College of Art and research associates in the Helen Hamlyn Centre for Design. The study came about as a result of our previous work with the Centre which researched *Housing Design for Adults with Autism*. This report has been widely published and already adopted as official guidance by the governments of Canada and Wales.

During the research into housing design it became clear that we needed to know much more about how people with autism experience the world through their senses, how they respond to sights and sounds, textures, touch and smell.

This report builds on research to give practical guidance for families and support workers. This was tested in sessions with Kingwood staff and with four of the people we support at Kingwood at their home in Reading. There are pages of ideas for families and support workers to use to find out the sensory preferences of the people they support. There are illustrated cards to act as prompts to those who find it difficult to articulate their preferences and step-by-step instructions on how to make a variety of sensory props and hold a stimulating session.

We are grateful to the researchers, to Kingwood staff and the people we support and to all who have contributed to this report. We hope it will increase understanding of how people with autism experience the world through their senses and help them to enjoy a better quality of life.

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, formal meetings were held at the Royal College of Art in London in March and July 2011.

Name	Role	Organisation
Sue Osborn	Chief Executive	The Kingwood Trust, UK
Kevin Charras	Scientific advisor	ARTZ, Artists for Alzheimer's, France
Monica Cornforth	Media Relations Consultant Parent of adult with autism	Independent, UK
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Matthew Goodwin	Director of Clinical Research	MIT Media Lab | Autism & Communication Technology, USA
Derek Hooper	Inclusive Design Advisor	Commission for Architecture and the Built Environment (CABE), UK
Richard Mazuch	Director of Design Research and Innovation	Nightingale Associates, UK
Marc Sansom	Director	International Academy of Design & Health, UK
Richard Seymour	Director	Seymour Powell, UK
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John Zeisel	President	Hearthstone Alzheimer Care, USA

Introduction

Adults with autism often live in environments that do not take into account their different and unusual responses to sensory input.

If their sensory responses and preferences are undersood better, then their families and the service providers who support them, may be more able to create housing that meets individual needs.

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 people[1] autism is not rare.

In addition to difficulties with communication and social interaction, people with autism often display unusual responses to sensory input. Studies using sensory profile questionnaires with people with autism have shown special sensory processing in over 90 per cent of the participants[2]. For many people with autism, normal everyday sensations might be experienced at unbearable levels, lead to excessive interest or appear not to be noticed at all, making their way of interacting with their environment unique. Some adults with autism seek out sensory experiences, whilst others try to avoid them. It is therefore essential to provide environments in which the visual, acoustic, olfactory and tactile qualities can be modulated to suit a person's preferences and to eliminate their sensory dislikes.

This publication describes a design research project aimed at developing ways to support adults with autism to better manage relationships with their home environments and other people by creating living accommodation that is more sensitive to their sensory needs. *Exploring Sensory Preferences* is the work of the Helen Hamlyn Centre for Design at the Royal College of Art in collaboration with the leading autism charity, The Kingwood Trust. The two partners are working together on a long-term research programme to learn more about how design can improve quality of life for adults with autism.

Key findings of the *Sensory Preferences* project are published here for a wide readership – from housing providers, architects, designers and academics in the field to service providers, support workers, as well as people with autism, their family and friends.

This publication is the second in a series. The first, *Living in the Community*, by Andrew Brand was published in September 2010. It provided guidance on the design of residential accommodation for adults with autism following a detailed observational study of people in their homes. Brand's work was timely and well-received. The estimated shortage of housing for adults with autism in the UK is in excess of 10,000 homes[3]; a deficit that was addressed on a strategic level by the Autism Act of 2010, but which is unlikely to be resolved in the near future due to financial cutbacks, poor access to support for many adults with autism and a lack of guidance about what

types of housing are needed. Brand's project took a first step in dealing with the last of these challenges.

Our senses are in constant dialogue with our surroundings. The colour of a wall, the texture of a chair cover, the intensity of lighting, the build-up of odours, or the breeze from an open window are examples of sensations that we can experience at the same time.

The second publication in the series, *Exploring Sensory Preferences*, co-authored by Brand with Katie Gaudion, builds on the work of the first project, and suggests ways to identify and design for sensory needs as a route to improving quality of life for people with autism. There is particular focus on working with adults with autism and learning disabilities.

Responding to an individual's sensory preferences in a research activity

The project has three main outputs: a profiling tool that helps adults with autism play a more active part in expressing their sensory preferences; a collection of sensory props and design guidance to show how lighting, fabrics and other materials may be used to create temporary, affordable and adaptable sensory-focused spaces for occupational play within the home environment; and a staff development workshop for support workers on the theme of 'Ready Steady Make', which promotes the development of skills in understanding sensory challenges and making sensory props.

Terminology
The term autism is used throughout this publication to refer to all Autistic Spectrum Conditions including Asperger's syndrome. The report refers specifically to people with Asperger's when referring only to individuals who have this diagnosis.

Context

Research into the unusual sensory responses of people with autism is becoming increasingly common. In many ways, researchers are rediscovering a recent history of successful sensory interventional methods.

Many people with autism experience special reactions to sensory inputs, which affect the way they perceive the world around them. Living in a world that does not take into account their particular sensory responses can give rise to high levels of anxiety, which in turn may trigger unusual behaviours in the form of aggression, self injury, repetitive actions or disruptive and destructive behaviour. It is recognised that these behaviours are largely involuntary and may also be caused by communication challenges.

This project took the view that if an individual interacts with an environment that has been adapted and furnished with sensitivity to the way they perceive and respond to sensory input, many stress and anxiety triggers can be minimised.

Although both Kanner (1943) and Asperger (1944) described unusual reactions of their patients to sound, touch, sights, taste and smell – and Wing (1969) identified sensory and perceptual difficulties in children with autism – 'unusual responses to sensory input' has not been included in the clinical criteria for diagnosing autism. Perhaps as a result of this omission, sensory differences in people with autism has remained a relatively neglected area of research and there are few empirical studies. Scientific studies that have been conducted have focused on perception and on the integration of perceptual input rather than the whole sensory experience.

The pioneering work of Delacato (1974), together with a succession of autobiographical accounts, has contributed to a better understanding of autism and unusual sensory experiences, including reported insensitivity to pain and atypical responses to auditory, visual, tactile and olfactory input.

Clinical practitioners have responded to the increase in research in this area. The fifth edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), due to be published in May 2013, makes significant revisions to the diagnostic criteria for autism, including statements relating to unusual responses to sensory input[4].

This project sought to extend knowledge through a design point of view rather than a scientific or sociological perspective. It builds on pioneering work in the field.

'The distant noises on the main road that ran about sixty metres from our house were always present. They sloshed against the day-day sounds of my own home in sort of wave-on-the shore effect. I could feel the sensation of cars and a newly laden truck pass, and also feel my own physical response to the noises that the vehicle made from its tyres, its engine and the wind of its passing. That wind could suddenly drown out a nearer sound, but not consistently.'[5]

Blackman (2001)

Practical Sensory Interventions

Early studies into sensory processing patterns in autism gave rise to more hands-on research activities, which resulted in various practical interventional techniques. The most widely used are described here as they provide tangible reference to the outcomes of this research project.

The Montessori Method
Maria Montessori (1870-1952)

Although the Montessori Method originated from Montessori's experience of working with children with mental disabilities, it has been predominantly implemented in schools for typically developing children. Today there is a revival of interest and a realisation that Montessori's sensory-based educational activities can benefit people with neurological conditions of all ages, including adults with autism. Katie Gaudion completed a short course with the charity Montessori Education for Autism[6] as part of this project, studying various teaching methods that emphasise the development of motor skills, hand-eye coordination, ordering and sequencing.

The Wilbarger Approach
Wilbarger & Wilbarger (1991)

The Wilbarger approach was developed to address sensory defensiveness, which is described as 'a constellation of symptoms that involve avoidance reactions to sensation from any sensory modality'[8]. It involves the application of deep pressure through a special brushing technique and an individualised treatment plan for families. Wilbarger coined the term 'sensory diet' to describe a treatment programme for families to help adapt activities and their homes to meet their children's sensory needs to improve functional behaviour.

Sensory Integrative Therapy
Dr A Jean Ayres (1972)

Sensory Integration (SI) is a therapeutic approach that has been adopted by many occupational therapists. According to Dr Ayres: 'The essential principle in sensory integrative therapy is to provide the child with experiences rich in sensory input, in a guided manner, to produce an adaptive response (that is functional behaviour) deemed more effective than previously observed behaviours' [7]. SI therapy has been shown to decrease tactile defensiveness and address poor discrimination of body position, body movement and tactile perception in people with autism who have sensory processing difficulties.

Snoezelen® or Multi-Sensory Environment
Ad Verheul & Jan Hulsegge (1978)

The Snoezelen® or Multi-Sensory Environment (MSE) was created in 1978 by two Dutch therapists. The MSE began in the form of an activities tent installed at summer fêtes, as a means to provide leisure and relaxation for adults with profound disabilities. The tents were furnished with sensory props and equipment designed to stimulate the primary senses, creating a multi-sensory experience for visitors. Responses to the installations were overwhelmingly positive, leading to the first permanent MSE being constructed in 1983[9]. Today MSEs can be found internationally in hospitals, residential homes, day centres, domestic environments, school and prisons for a wide range of care scenarios including dementia, obstetrics, management of chronic pain, adult psychiatry, stroke and traumatic brain injury, paediatrics and autism. Since 2001 research has begun to directly explore the effectiveness of the MSE for people with autism[8].

Research Methods

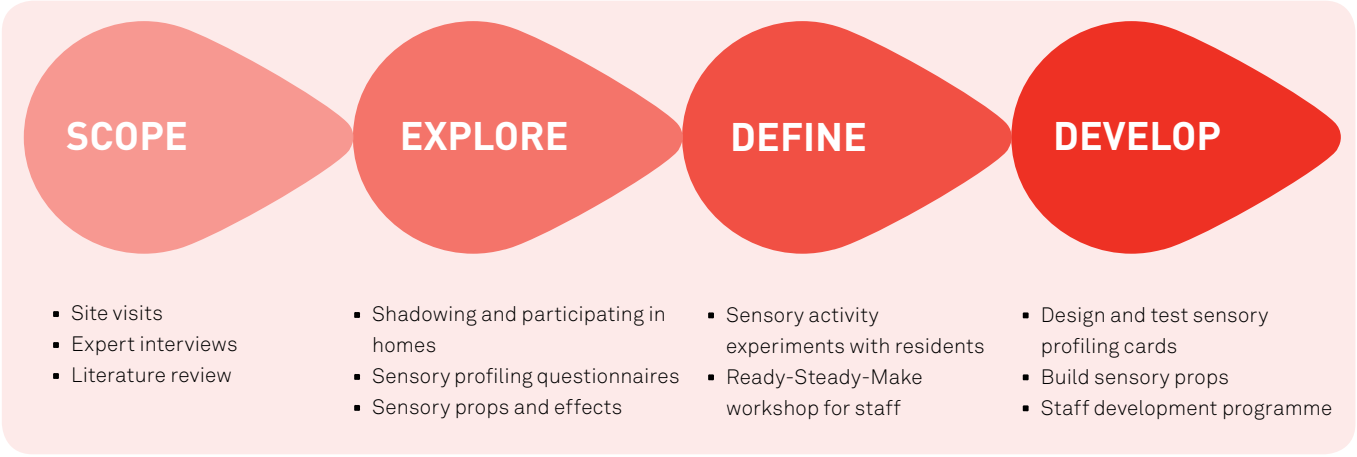
When designing for people with autism, it is essential to have an understanding of how they might experience the environment and perceive people and objects in it.

The project drew on a number of complementary research activities:

- Visits to supported-living housing to observe how people with autism are currently supported in their home and how they respond to sensory information in their home.
- An extensive literature review of sensory interventions for people with autism and interviews with experts in the field.
- Visits to three controllable sensory environments, which have been created specifically for adults with autism.
- Use and adaptation of existing sensory profile questionnaires.
- Prototyping of sensory props and improvised sensory spaces.
- Planning and delivery of sensory activities with four adults with autism, each with different needs and abilities.

A key aspect of the research was the use of sensory profile questionnaires, commonly used by psychologists and occupational therapists, to discover and categorise sensory difficulties. Two widely used questionnaires: Professor Winnie Dunn's Adult/ Adolescent sensory profile ® (2002) and Dr Olga Bogdashina's sensory-perceptual profile checklist (2003), were used as references for creating a visual card-based profiling tool.

An extensive literature review of sensory interventions for people with autism was conducted (see Context) and the research team visited three controllable sensory environments



Participant interacting with sensory props

that had been created specifically for adults with autism. These included the Golden Horn Sensory House in Solund, Denmark, a complex for around 200 adults with learning disabilities, a sensory environment at Stars and Rain, China's first non-governmental educational programme for children with autism.

To complement this broad overview, a series of sensory props were designed and prototyped ahead of a series of sensory activities undertaken with four adults with autism, who are supported by Kingwood.

Each of the participants had different needs and abilities, but all have profound communication difficulties. They were invited to participate in an improvised sensory space with the aim of providing stimulating sessions for them that would potentially reveal some of their sensory preferences. In the planning of these activities, sensory profile questionnaires were completed for each resident as a guide to how to dress the room and select or create props that might appeal to individual needs.

Each activity focused on stimulating the primary senses and the process of simply engaging with objects rather than achieving specific tasks. Levels of engagement were carefully monitored. These sessions were then repeated twice to check the results, to pilot new methods for support staff to engage and, ultimately, facilitate similar activities.

'The props that they have used during the sensory activities have been wide and varied and always fun to use.'

Support worker

Research Findings

A series of sensory activities involving four adults with autism and learning disabilities showed that settings and props that respond directly to an individual's sensory preferences may help to improve concentration, communication and social interaction.

A central thrust of the research was to conduct a sensory activity pilot with four adults, who are supported by Kingwood. During the session, individual participants were invited to interact with various sensory props. Inexpensive props that offer a range of sounds, smells, textures, shapes and colours were selected or created. The intention of each prop was to stimulate one sensory modality over and above the other senses, to help participants focus and engage without having to filter out other sensory information.

The aims of the sensory activity pilot were to:

- Verify results from Bogdashina's and Dunn's sensory perceptual profile questionnaires and help identify gaps and ambiguities in the questionnaires.
- Establish participants' sensory thresholds and abilities.
- Provide a stimulating, 'physical' activity for participants and their support workers that could be repeated ad-hoc in their home.
- Encourage both verbal and non-verbal communication, socialisation and interaction between participants and support workers.

The entire sensory activity experiment was filmed and the footage analysed. The results were very positive. Participants showed enhanced and, in some cases, new levels of concentration, communication and social interaction as measured by the accumulative time, in which they showed these behaviours. Three of the four residents participated throughout the whole activity, spending up to two hours engaged with the sensory props and other participants. Support staff, some of whom had known participants for many years, reported that conduct during the activity was both atypical and unexpected, as the participants had often found it difficult to remain focused and rarely occupied the same space. The activity was repeated twice and compared to the results of the first. In the repeat sessions, high levels of engagement and concentration were again recorded.

The sensory activity pilot revealed a number of important factors:

- Sensory profiling can help identify an individual's preferences in advance of creating a sensory space or activity, but an individual could be more actively involved in expressing their likes and dislikes.
- Providing the right sensory props in the most appropriate sensory setting for the individual can promote concentration and social interaction during the activity
- Residential support staff may need to be encouraged and instructed how to facilitate sensory activities.

These findings influenced the development of a range of design outputs from the project.

Design Elements

The research has generated three main design outputs, which have been piloted as part of the project:

- A profiling tool that helps adults with autism to express their sensory preferences in partnership with those supporting them (below).
- A collection of sensory props and design guidance to show how lighting, fabrics and other materials may be used to create temporary, affordable and adaptable sensory spaces for occupational play within home settings (above right).
- A staff development workshop for residential care workers and family members on the theme of 'Ready Steady Make', which supports the development of skills in mapping sensory preferences and making sensory props (opposite page).

Together these outputs form a holistic, design-led approach to creating home environments that are sensitive to the sensory needs of adults with autism, embracing the identification of sensory difficulties and the development of support staff skills in this area.

Ready Steady Make sensory props

Visual sensory profiling tool

Ready Steady Make workshop

Visual Support Cards

To help identify the sensory preferences of adults with autism, the research team designed a set of 75 cards, entitled What Do You Like? Each card shows a different type of sensory experience, which is described in simple words and illustrated by photographic images.

The cards act as visual prompts for adults with autism, who may be unable to verbally articulate their preferences. Together with a family member, friend or support worker, the cards may be used by an individual to express whether he or she likes, dislikes or is neutral about the subject of each card. This activity aims to involve adults with autism in their own sensory profiling as active participants rather than relying on others to express preferences on their behalf.

Once categorised into groups of 'likes', 'dislikes' and 'neutral', the cards create a visual sensory profile of an individual that may be used to make decisions about their support and housing options. Photographs are used in a literal way rather than drawn illustrations, in order to make it easier for participants with communication difficulties to understand what is being asked of them.

Research has shown that people with autism may receive visual information from the world around them all at the same time. They may be unable to filter this information and develop coping strategies to minimise the amount of visual stimuli they must process, which may manifest as 'fragmented perception', 'singular attention' or monotropism[10]. The card images try to accommodate these abnormalities by reducing the amount of visual information and by amplifying the characteristic that is being questioned through use of colour, contrast, composition, line quality and line intensity.

For family members, friends, support workers or design professionals who may be facilitating the use of this sensory profiling tool, tips and guidance on how to ascertain, interpret or respond to participants' sensory preferences are shown on the reverse side of each card. In

Top: The reverse sides of the cards are colour-coded by sensory system, providing a quick-reference, visual indication of the participants' preferred sensory system(s)

Above: An individual participants' selection of sensory experiences and activities which he likes

some cases, the participant may not know or have revealed his or her preference in relation to a particular experience. When this happens, those facilitators are charged with helping the individual to create the sensory experience and discover together whether he or she likes, dislikes or is neutral about that form of stimuli. This process may lead to ideas for conducting sensory activities.

The sensory inputs and activities depicted on the cards are derived from various sensory profile questionnaires and from the experiences of the researchers. A key focus is on characteristics that may lead to useful insights for designing the living environment. Thus topics that are unrelated to variables in the built environment have been excluded, for example, food preferences.

In addition to using the What Do You Like? visual support cards, it is important for support staff to establish an individual's 'sensory history' by communicating with them, their family members and previous care-providers, as these conversations may reveal information that may not be articulated from using the cards.

Visual Support Cards

The sensory preference cards actively involve the adult with autism who may be unable to verbally articulate their preference in building their own sensory profile. They also provide simple information on which interior design decisions can be made.

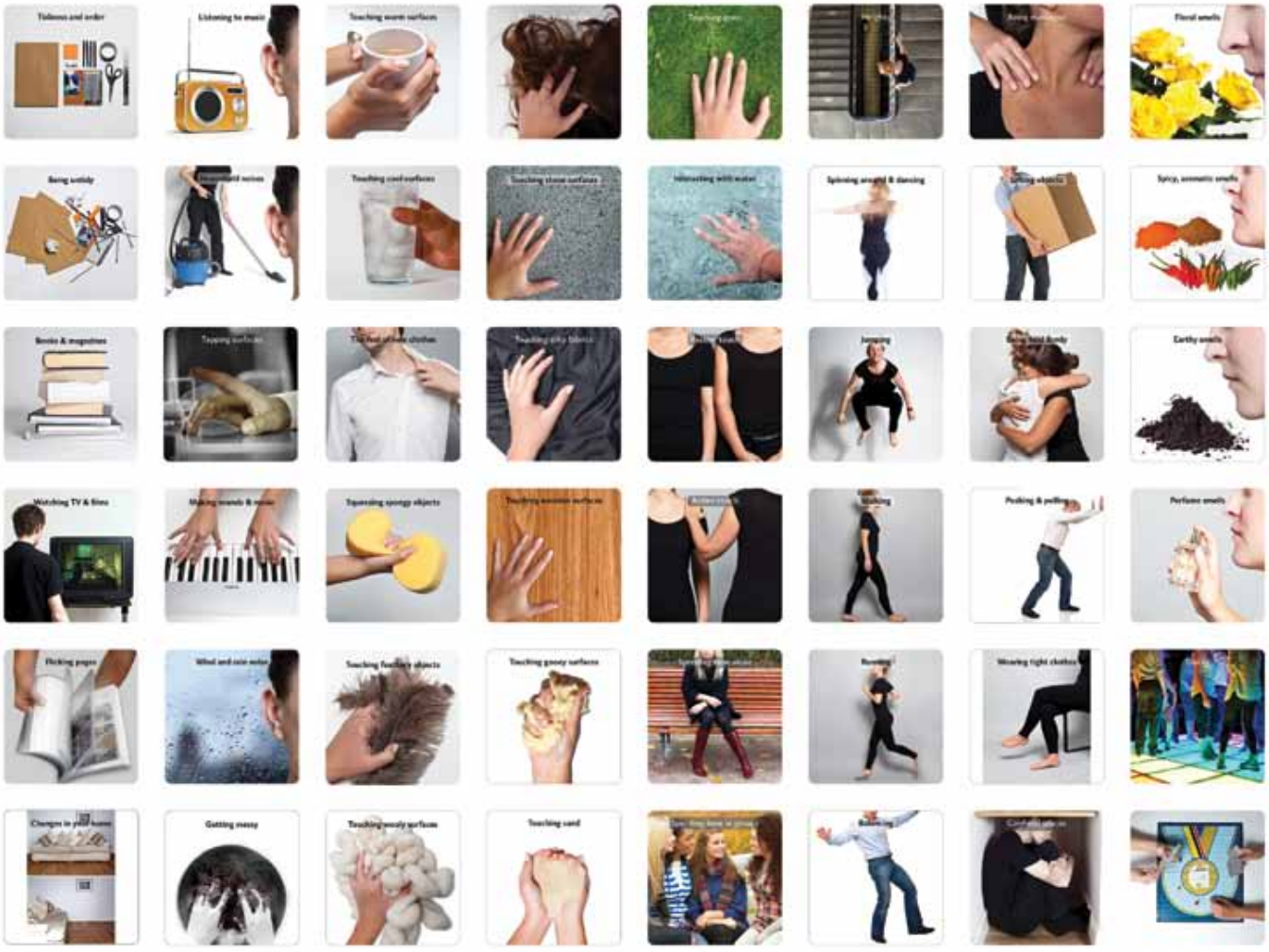
Once sensory likes and dislikes have been agreed through interaction between participant and support worker or family member, the results can be translated into a profile for making interior design choices. For example, if a card selection reveals that a resident prefers his home to be neat and tidy, that he is sociable and likes being with people, and that he enjoys listening to music and looking at twinkling lights, shiny surfaces and reflections, then those cards form a 'mood board' to adapt living space to meet his sensory needs.

Using this information, simple changes can be made to the home environment that may improve a person's quality of life. For example, in communal spaces, specifying seats that provide different sitting positions and can be repositioned to create smaller seating areas may encourage the individual in question to participate in social activities with other people. By providing more seats than the number of people that may use this communal space, people will have more choice of where to sit, providing a greater sense of freedom. Inserting thin slivers of mirror between bookcases or shelving can make reflective light dance, which may provide subtle forms of visual stimuli and encourage the individual to explore and appreciate their home environment.

A further development, beyond the scope of this project, may be the assembly of the sensory profile created by the What Do You Like? visual support cards in digital form that could be sent immediately to service providers and designers who are working within the individual's circle of care.

When the cards were tested *in situ* with residents, feedback from support workers was positive.

'The pictures seem to make what we should be asking more precise, which makes me feel more confident about providing an answer. I also like how the picture cards will help towards involving the people we support. It is about them after all, and it's important to give them the tools to be heard and to contribute opinions and input.'
Support worker



Sensory profiling cards

Visual Support Cards

Bright natural light

People who are drawn to bright natural light may benefit from using sunlight lamps, especially in winter months.

People who avoid bright natural light may be over-sensitive to visual stimulation. Small changes to the home environment, such as the addition of dimmable lights, black-out curtains, shutters or self-adhesive window film, can make a difference to their comfort. Wearing sunglasses may also help.

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Listening to music

If there are types of music that you enjoy listening to, list them here:

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Getting messy

The colour pink

Getting messy

People who dislike getting messy or having things on their hands or feet may be over-sensitive to tactile stimulation.

Gradual introduction of different material surfaces may help these people to gain confidence in anticipating the sensations they will get from touching different objects.

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Colours

In shared spaces, different visual preferences and sensitivities can be satisfied by using muted, matt and harmonious colour schemes. Colour can be added as appropriate by using decorative objects, pictures and textiles.

In private spaces, people can experiment with their use of colours.

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Sensory Props
Design ideas

Sensory props have a key role to play in enhancing the living environment for adults with autism.

Sensory props are objects that stimulate the primary senses. For people with autism, who often display unusual reactions to sight, hearing, smell, taste and touch, the process of simply engaging with objects rather than having to achieve specific tasks can help them explore and test the boundaries of their sensory sensitivities in a safe, fun and relaxed manner. Sensory props can also be created to help develop skills in motor movement, cognition, communication and socialisation.

Through this occupational play, people with autism of all ages and ability may gain confidence and ultimately transfer newly acquired skills to practical situations.

Based on research gathered throughout the project, the research team generated a large number of concepts for sensory props. These concepts were assessed against the qualities shown in the table below and shortlisted to produce a collection of props that appeal to the range of sensory systems and can be used in the development of the listed skills. Selected concepts were then taken forward and developed into physical propositions.

With the exception of Curvy Curtain, which was developed for an exhibition at the Royal College of Art, prototypes of these pieces of equipment were successfully tested with residents at one of Kingwood's residences.

Concepts included do-it-yourself props, which led to the development of a creative workshop for people with autism and their support staff to teach skills in how to make their own sensory props.

Concept Name	Curvy Curtain	Vibro-Block	Zzzip	Sheema	Fiddle Block	DIY Props
Sensory System						
Visual	■					
Tactile	■	■	■	■	■	■
Audio		■				■
Olfactory						■
Proprioception		■				
Vestibular					■	
Skills						
Fine-motor movement			■			■
Gross-motor movement					■	
Visual tracking	■		■			■
Audio tracking						
Interaction / Communication				■	■	■
Creativity					■	
Proximity	■			■		
Hand-eye coordination						■
Independence				■		■
Relaxation	■	■				

Left: The Table showing how the selected props relate to sensory systems and skill development.

Fiddle-Brick
Inspired by the building blocks and construction games devised by Friedrich Froebel and Maria Montessori, Fiddle-Brick invites participants to stretch, push, pull and rotate the individual brick elements to create novel shapes. More bricks mean more people can join in!

Vibro-Block
Wrapping your arms around Vibro-Block makes it vibrate. Designed for people who enjoy squeezing, stroking and tapping objects and resting them on their lap.

Original sketch of concept for Vibro-Block (far right).

Sensory Props
Design ideas

Sheema
Sheema creates a space in which a person can feel safe whilst enjoying the company of others. It comprises a series of knitted pockets that slot neatly over chair-backs and free-hanging, plush, patterned bands that invite touch.

'During the last visit Katie showed the resident a large piece of yellow patterned knitting which had large pockets in it to place over the backs of three chairs, creating an enclosed den like space. Once he had seen Katie fit the knitted pockets over the chair backs he very quickly took charge and, using both hands, proceeded to do as she had.'
Support worker

'I have supported this resident for over 10 years and have never seen him so willingly use his left hand. This has shown that, with the right props, support and encouragement, he may be able to develop greater use of his left hand. '
Support worker

Zzzip
Zzzip is a fun prop to introduce the self-help skill of zipping. With contrasting colours it challenges and motivates the participant to visually track the directions for the zip and exercise fine motor movement.

Detail of Zzzip prototype showing zip fastener

Sensory Props
Design ideas

Curvy Curtain (left)
Hanging fabrics create interesting spaces, hide away visual detail and distractions, and reduce sound transmission. Curvy Curtain helps to transform and soften the edges of a domestic room, making it more inviting and comfortable for sensory-focused activities. The curtain has two sides – one with black fabric that darkens the space for ultra-violet sessions and the other with white fabric that provides a canvas for colour-changing lights and projected images. It also has twin rails and the rail connectors have a load release mechanism to preclude the risk of ligature.

Rattle Rack (right)
Rattle Rack is a knitted textured prop filled with rice, lavender or other materials – participants are encouraged to stretch their arms and make special sounds when the prop is shaken or moved from side to side.

Tambour Trolley

Some people with autism can be distracted or overwhelmed by the visual information from a disordered environment. So it is important to provide lots of storage. Mobile and easy to access, Tambour Trolley provides separate storage compartments for five of the primary sensory types: sight, sound, smell, touch and body movement.

Do-It-Yourself Props

These objects demonstrate how to make sensory props from everyday items sourced in the home or from high street shops. These props can be created in minutes and are affordable, easy and fun to make. Interaction with physical objects and different materials can stimulate the imagination and help to improve the motor skills, communication and confidence of adults with autism. The following pages describe how a workshop activity and a quick reference guide were produced on the theme of 'Ready Steady Make' to encourage support staff to make their own props for assisted living.

Sensory Props
Making your own

Ready Steady Make is a creative workshop for adults with autism, service providers, support staff and family members.

Ready Steady Make was developed as part of the project to support the development of skills in:

- identifying sensory preferences
- creating props that will help to develop skills in motor movement, communication and socialisation
- making small changes to the home that will make it more stimulating and relaxing to live in.

A key message for people attending the creative workshop is that the right home environment – one that has been adapted and furnished with sensitivity to people's sensory perceptual differences – can minimise certain triggers of stress and anxiety. The recommended number of attendees for each workshop is six people. Each attendee will need a desk space for making props. At all times, attendees are encouraged to ask questions and share their thoughts and experiences.

Workshop programme

1. About Sensation and Perception
2. Introduction to Sensory Processing in adults with autism
3. Evolution of Multi-Sensory Environments
4. Making Sensory Props
5. Resources.

A pilot Ready Steady Make workshop was tested with five Kingwood staff. The feedback was positive.

The following five pages describe how five sensory props can be simply assembled from everyday items.

'I thoroughly enjoyed the workshop, you covered a lot. What was so good about it was that it was formal but not too formal because it was quite hands-on. ...it was good to have all the different senses explained as it is such a major part of this job and of autism.'

Observation by a participant at the pilot Ready Steady Make workshop

'Everything we learn we learn better when it seems to have no particular purpose, when it is pure fun and when we do not merely grasp it with our minds but also with our hands.'

Bruno Marini, Italian artist and designer (1907-98)

MARBELOUS

This sensory prop is easy to make. Find the ingredients below and follow the step-by-step guide to create a prop that instantly appeals to the sense of vision and equally entices touch, with its brightly coloured and bobbly textured surface.

Handling Marbelous causes the marbles inside to move, roll and tap against one another, providing aural stimulation. Place Marbelous on your lap or your shoulder and allow the marbles' weight to apply deep pressure to your body. For some people, the sensation of deep pressure can help develop body awareness, relax them and even improve concentration.

Tip: Experiment with a range of fillers for the mitt such as rice, lentils or foam to create a range of tactile and aural experiences.

You will need:
Cleaning mitt
Handful of marbles
Sticky-Back Velcro (about 10cm)
Scissors

01 Fill the cleaning mitt with marbles

02 Cut Velcro to the width of the cuff

03 Affix a strip of hooked Velcro to the upper side of the cleaning mitt's cuff

04 Turn over the mitt and affix a strip of looped Velcro to the lower side of the cleaning mitt's cuff

05 Insert the cuff into the mitt opening, then close by attaching the Velcro strips

SNAP WRAP

Snap-Wrap is a playful and reactive sensory prop; place your hand, arm or foot onto the prop to activate its snap.

Snap-Wrap can be repeatedly uncoiled and re-set, challenging fine motor skills in the process. This prop may appeal to people who like animated and surprising responses from objects.

Tip: Experiment with different textures and weights of fabrics, which will make Snap-Wrap react at different speeds.

You will need:
Four (4) Snap Wraps
Thick fabric (approximately 25 x 18 cm)
Double-sided tape

01

02

03

04

05

06

1. Lay the fabric out on a flat surface and cover with double-sided tape. Remove the tape backing
2. With the fabric in landscape orientation, affix snap wraps to the left half of the fabric
3. Affix double-sided tape to the tops of the snap wraps. Remove the tape backing
4. Peel off the tape
5. Fold the fabric in half as shown and press firmly together

SPRINGY THINGY

Springy Thingy celebrates and accentuates the unique behaviour of the slinky. Enveloped in a pair of tights, the slinky cannot become tangled and is transformed into textured plaything that invites touch and motor movements.

Stretch and release or wrap Springy Thingy around your arms and legs. By attaching the two free ends together, Springy-Thingy becomes a hoop that you can independently roll along your limbs to massage and relax.

Tip: Remove a gravy lid and place objects inside the slinky that will generate sounds when you shake or stretch Springy Thingy. Place coffee granules or lavender inside to appeal to your sense of smell.

You will need:
Two (2) Gravy pot lids
Tights
Handful of small bells
Slinky (approximate diameter of 7 cm)
Electrical tape
Sticky-Back Velcro
Pliers
Scissors

01 Using the pliers, cut the slinky to leave a compressed height of approximately 3.5 cm. Affix tape to the free ends of the slinky to cover any sharp edges

02 Cut a pair of tights in half. Insert the trimmed slinky inside one of the tights' legs and pull through to the end

03 Take a gravy pot lid and fit it over one end of the slinky

04 Place bells inside and attach a second gravy pot lid to the other end of the slinky

05 Affix Velcro to each gravy lid. Press together to create a ring

FLIP FLOP

Tap, press and squeeze Flip-Flop to watch it wobble; roll it along the floor or play throw and catch with a friend.

We've used bright colours, which look fascinating as Flip-Flop springs back and forth, but may be overwhelming for some people. Flip-Flop is an excellent prop for developing your vestibular (balance) system.

Tip: Place a marble inside the egg cups before you fix them together to create noise as Flip-Flop wobbles.

You will need:
Pair of flip-flops
Two (2) metal spiral egg cups
Strong tape
Clear tape
Scissors

1. Remove bands from flip-flops. Draw one circle; slightly larger than the diameter of the base of your egg cups; onto each of the flip-flops. Neatly cut out two discs
2. Place and align an egg cup to the centre of one of the flip-flop discs
3. Affix the egg cup to the flip-flop disc with strong tape. Trim the tape, removing loose ends
4. Repeat steps 2 to 4 for the other egg cup and flip-flop disc
5. Affix the two pieces at the tops of the egg cups with clear tape

PINGY THINGY

Pingy-Thingy provides visual stimulation and makes a wonderful boing sound in response to flicking, flipping or tapping. Its fabric cover provides a soft textured handle through which you can feel the subtle vibrations of the spring.

Pingy-Thingy may appeal to people who like light pressure and those who enjoy making sounds with musical instruments and household objects.

Tip: Before step 3, place objects inside the sock that will generate sounds when you shake or flick Pingy-Thingy.

You will need:
Gravy pot
Sock
Doorstop
Double-sided tape
Scissors

01 Using the threaded end of a door stop, puncture a hole in the centre of the base of the gravy pot. Screw the door stop into the hole

02 Wrap double-sided tape around the walls of the gravy pot

03 Remove the gravy pot lid. Remove tape backing and fit sock over the gravy pot

04 Insert the loose end of the sock into the gravy pot

05 Place the lid back on the gravy pot

Design Guide

Creating sensory-focused spaces and activities

This section offers basic instruction and ideas for how people with autism, their families and support staff, can create sensory-focused spaces and activities within their home environment.

Introduction

It is beneficial for adults with similar sensory needs and abilities to live in the same building, or in cases where an adult has extreme sensory sensitivities, to provide a single-person household. However the access to suitable accommodation and locations is limited in the UK. Thus adults with very different sensory preferences may find themselves living together in small groups.

Communal spaces in shared accommodation should be designed and furnished to meet the preferences of the most sensitive residents. This may result in uniform and low-arousal interiors that simply do not provide the level of sensory input sought by other residents. Naturally, residents should be encouraged to personalise their private spaces, such as bedrooms, in the way they want.

However it may be more appropriate to provide space within or around the home that can be transformed into an area where very relaxing or highly stimulating 'sensory-focused' activities can take place and where the level of stimuli can be modulated to meet the needs and preferences of individuals.

In schools and specialist facilities, this space may be called a Multi-Sensory Environment (MSE). A multitude of MSE equipment is available from various specialist suppliers, but in general this equipment is not practical or economically viable for domestic settings. But a 'sensory-focused' activity space can, be readily achieved at reasonably low cost and look like it belongs in a home environment. This section provides guidance and tips on how this might be achieved.

A sensory-focused space can be a room or part of a room that is accessible to residents at all times. Providing space(s) in which the lighting, acoustics, furniture and layout can be easily controlled gives the person a sense of empowerment and a place for satisfying his or her individual sensory needs without disturbing other residents. It also provides space for semi-structured activities, in which support staff can help adults with autism to develop their sensory responses.

There are a number of advantages in using a sensory-focused activity space rather than, for example, a kitchen or garden:

- Unexpected and unplanned stimuli may be minimised, helping participants to relax, focus and concentrate on the activity.
- Stimuli can be presented more clearly.
- A sensory-enriched environment that is new and exciting may be provided.

Space Plan

- A sensory-focused activity space does not have to be an entire room. It may be a corner or portion of a room which is partitioned from the rest. Sensory-focused activities are likely to be conducted one-to-one so the allocated floor space may be reasonably small: 3m x 2m is sufficiently large for relaxing sessions and activities that focus on fine motor abilities and cognitive skills.
- Noise and unplanned interruptions may be minimised by locating the sensory-focused activity space away from main circulation spaces, communal rooms and utility areas such as the laundry.
- A larger space may be required for activities that incorporate large body movements such as jumping, pacing and dancing. These activities are likely to generate noise, which may be distressing to some residents, so it is good practice to locate the more physical activity spaces on the ground floor and away from bedrooms.
- Activity spaces should be accessible to all residents.

Furniture and Finishes

- Hanging fabrics can be used to redefine larger spaces and soften hard features such as room corners. Hanging fabrics can also be used to block visual distractions such as patterned or brightly-coloured surfaces, windows and doors, and provide tactile surfaces on to which colour and imagery can be projected.
- The placing of furniture can be used to define smaller spaces within a room, but it is equally important to arrange objects so that movement is not obstructed. By providing different types of seating – some low and relaxed and some upright to promote alertness – residents are given choice and can exercise their preference. If items of furniture are easy to move spaces can be reconfigured for different types of activities.
- Specifying furnishings that are toxin-free will ensure safety for those who may put objects in their mouth. Similarly, materials with strong odours may make the space unbearable for those with an over-sensitive sense of smell. It is therefore good practice to select inert materials that will not give off gas. Fabrics can be coated with odourless flame retardant sprays for improved safety.

Storage

- People with autism may lose focus and concentration when there is a large amount of detail or disorder in their environment. By providing plenty of accessible, fixed storage for sensory equipment, activity spaces may be kept free of clutter. Storage may be built into architectural features such as under stair spaces or used as a room partition. To help maintain a low-arousal visual environment, storage units may be covered or fitted with doors.
- Sensory equipment may need cleaning after each activity so it is helpful to have cleaning products stored in or near to the sensory activity space.
- For ease of access during sensory-focused activities, it may be helpful to separate equipment by the sensory modality that each item appeals to: visual, audio, tactile, olfactory, and balance and movement.

Design Guide

Creating sensory-focused spaces and activities

Floor Coverings

- Choosing floor coverings that are suitable for the function of the space and will reduce maintenance and extend the life of the covering. In spaces for more relaxing sessions, a floor covering that is easy to walk on and is comfortable to sit on may make the space more inviting and give more choice in where to sit or stand. Spaces for highly stimulating activities may require more durable and waterproof floor coverings that are easy to clean and slip resistant.
- Different floor materials, textures and colours can be used to define spaces within a larger room. Soft, porous floor materials may help to reduce noise transmission.

Lighting and Projection

- Using multiple, directional light sources with overlapping light beams creates a soft and bright effect. Indirect lighting on reflective surfaces will minimise glare, which some people may find to be distracting. Providing colour-changing lights throughout the space and easy-to-reach control switches enables everyone to adjust light levels and modify the colour of the whole environment. For best effects, use neutral colours on walls and off-white fabric hangings.
- Fitting recessed downlighting provides an unobtrusive appearance on the ceiling. Fitting non-flickering lighting such as electronic ballast fluorescent lamps, which flicker at an imperceptible frequency, is less likely to aggravate light-sensitive individuals.
- Provision of a digital mini-projector is very valuable as it allows colours and moving images to be projected onto any surface in the room.

Acoustics

- It may be necessary to minimise noise transmission both to and from sensory-focused activity spaces. The noise reduction performance of a building can be enhanced by separating floors and walls, using suspended ceilings, sound absorption materials, cavities, sound resistant plasterboard or acoustic tiles. Acoustic glass may be required for road-facing windows.

Ventilation

- Using a whole-house mechanical ventilation system will augment passive systems. Specifying central ventilation systems and acoustic insulation will minimise extractor fan noise.

From space to activity

A well-designed sensory space provides an ideal facility for conducting semi-structured, non-directive sensory-focused activities in which support workers can help adults with autism to develop their sensory responses through interaction with props, such as the ones described in this publication. This next section presents suggestions for how to prepare for, conduct and respond to sensory-focused activities.

The ways in which participants with extreme communication difficulties respond to stimuli during sensory activities can provide valuable clues and sensory-based reasons for what helps them to relax or become enthusiastic, as well as what may trigger unusual behaviours. This information may help adults with autism, their families and support staff to anticipate reactions to certain situations and events inside and outside of the home.

Conducting a sensory-focused activity
In addition to creating the right environment and choosing appropriate sensory equipment, it is essential that sensory activities are attended by another person, whose task it is to facilitate the session. A sensory activity is a shared experience and is about building relationships so participants should not be left alone. The role of the facilitator is to:

- Create an environment suited to the temperament and needs of the participant that is clean and safe
- Take an enabling and non-directive approach to encourage the participant to explore the space and sensory equipment at their own pace
- Record and respond to observations
- Be creative and have fun!

Preferably, the facilitator is someone who is known to the participant. If the facilitator also supports the participant on a regular basis, then he or she is more likely to make links between everyday observations and events that happen during sensory activities and vice versa. Above all, the facilitator must be calm, patient, enthusiastic and empathetic.

There is no standardised training for conducting a sensory-focused activity. The guidelines described here are inspired by the work of Ad Verheul (2007) and on the personal experiences of the research team.

Design Guide

Creating sensory-focused spaces and activites

Before starting an activity
In preparation for a sensory activity, it is good practice not to wear scent or clothes with patterns and bold colours, as these can be distracting for the participant. Taking off shoes helps facilitators and participants feel more relaxed and experience the textures of floor coverings; it also helps to reduce transport of dirt and unwanted germs into the sensory space. When preparing the space, consider how the participant is feeling and create a total environment that reflects their mood. It may be appropriate to produce either a very relaxing or a highly stimulating session – the choice of music and lighting and layout of the space will have significant effect on this.

To help establish the participant's colour preferences, try using different coloured lights or filtering elements as appropriate. Selecting audio with appropriate tempo, rhythm, and melodic motion and pitches can set the atmosphere for the activity. If playing music, consider the cultural and personal relevance to the participant.

The placing and types of seating determine the participant's body positioning, their proximity to sensory equipment, the facilitator and other people, and what they can and cannot see. Consider what the participant might wish to look at during a session and ensure they can clearly see the exit.

During an activity
The start of an activity can be signalled by playing the same music at the beginning of each session. Encouraging participants to explore the space and choose sensory equipment at their own pace, with no pressure or expectations, promotes t heir free choice and independence.

Participants may take time to absorb, register and respond to new sensory experiences; so it is essential to be patient, introduce each prop one at a time, and give the participant sufficient time to engage with each prop before removing them.

If one piece of equipment is introduced at a time, then it makes it easier to relate the individual's responses to specific objects or events. In addition, by presenting participants with equipment sequentially, the facilitator can more readily respond to changes in their attention or tolerance to a particular form of stimulation. Participants' sensitivity thresholds may change from session to session, or even during a session. If a resident is familiar with the props and space, then it may be appropriate to present props in combinations. Recreating similar experiences by using the same props over several sessions will provide continuity for the participant and help to verify his or her responses as genuine preferences and not simply a one-off event.

If the participant becomes fixated with a particular prop, then it is good practice to encourage them to disengage with that particular object by introducing a different prop. Before removing any prop, the facilitator must assess if the participant is using it to help to alleviate tension, as taking away props at the wrong time may increase anxiety.

Presenting participants with two objects of different qualities may encourage active choice making. Another method for fostering choice making is to place props to the side, but within the reach of the participant.

Activities are always led by participants, who decide the duration of a session and indicate in their own way when an activity should end. However, as a rule of thumb, a good session will last for up to 45 minutes. Once the activity has finished, remember to clean the equipment and fill out the logbook.

Notes of caution

- Beware of taking a participant from dark to light suddenly and vice versa
- Flashing lights may cause seizures
- Ultraviolet light can cause damage to the eyes and headaches. Use for approximately 5 to 10 minutes. Where there is risk of seizures, some physicians advise against the use of UV light
- Some participants may be very sensitive to certain sensory inputs and find activities to be uncomfortable. It is important to note and act upon negative responses.

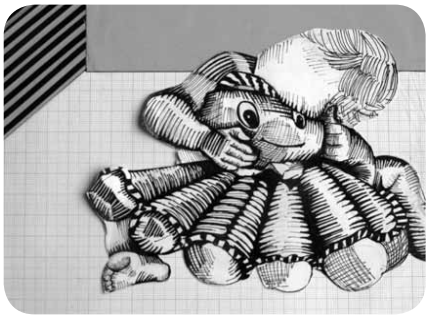
After an activity

It is essential to observe how participants interact with props, the environment and other people during sensory activities. By watching the ways in which people engage with stimuli – visually, by tapping, stroking, smelling or other – insights into their individual sensory preferences might be revealed. The information gained from sensory activities will be rich and plentiful, but facilitators must be mindful that the causes of certain behaviours and responses will not always be immediately apparent. Patience and some detective work will be required. Recording observations is important. Being able to refer to documented accounts of what happened in each activity will enable trends to be identified as well as unusual events. These notes help guide towards building a sensory profile for the participant and indicate how sensory activities might be developed for them, in terms of choice of props and how the space is curated.

It is helpful to have a logbook for each individual. This logbook can simply be a diary or scrapbook. There is a variety of ways in which one can record observations, through writing, drawing or taking photographs. The key things to record are:

- Names of facilitator(s)
- Start time and duration
- The participant's temperament at the start of, during and after an activity.
- Patterns of use and connections between the sensory qualities of objects that may have been heavily used or discarded.

Consider 'use' in terms of a hierarchy of engagement: Awareness – Attention & Response (passive) – Engagement (active) – Interaction.



Design Guide

Creating sensory-focused spaces and activites

Tips for conducting a relaxing session

Space Plan

- Entering a big space can be intimidating. Create a feeling of security by reducing the size of the space the activity will take place by using space dividers, such as hanging fabrics or moveable furniture.
- Provide a choice of comfortable seating, such as big cushions and beanbags, which can be readily moved by the participant. These types of seating also provide a large contact area with the participants' body, which may help to develop body awareness.
- It is important that the participant does not feel too enclosed so place seating so he or she can clearly see the exit.
- Use fabrics and furnishings with soft textures to create a comfortable environment; these materials will help to reduce noise transmission.

Colour and Lights

- Some participants may feel more comfortable entering a brightly lit space, then gradually dim the lights. Use target lighting to focus attention.
- Use mute, matt and harmonious colours; beware of using geometric or repeating patterns
- Project slow-moving imagery, such as nature scenes, onto different surfaces.

Audio

- Minimise noise from external sources and from neighbouring rooms.
- Play audio at a low volume. Use sounds with a low tempo, a gentle rhythm and contain few high-pitched, shrill notes.

Props

- Reduce the amount of visual information in the space by storing away props. Introduce each prop one at a time and give the participant plenty of time to engage with it before introducing something new. Though some people may enjoy buzzing and flashing lights, be cautious when using props that are brightly-coloured and those that behave in surprising ways, such as buzzing or lights flashing.

Aroma

- Introduce subtle, relaxing smells such as lavender. One way to achieve this is by placing scents inside props that may be used during the session.

Facilitator

- Speak softly, quietly and slowly.
- Try not to make unexpected or sudden movements.
- Introduce various forms of stimuli gradually.
- Offer one prop at a time, with gentle transitions from one prop to the next.

Tips for conducting a stimulating session

Space Plan
- Provide a clear floor space so there is sufficient space for people to move around. Mirrors on the wall can help to make the room feel more spacious.
- Provide seating that promotes good posture, alertness and allows the participant to move easily.

Colour and Lights
- For sessions that may involve large body movements such as jumping and dancing, ensure the space is clearly lit. Stimulating sessions may also include the use of ultra violet lighting. Before turning off the main lighting, it is important to ensure the participant is seated.
- Consider using bright, vibrant colours in the lighting and projected imagery and in the selection of props.
- Using projections with moving imagery and repositioning target lighting and projections within the space promotes visual tracking and may encourage the participant to explore different parts of the space.

Audio
- Minimise noise from external sources and from neighbouring rooms. This will also help to minimise noise transmission from the sensory activity, which could disturb other residents.
- Play audio that has higher tempo and strong rhythm and minimal high pitch content.

Props
- Introduce a variety of props that move in surprising ways or create unusual sounds and visual effects.
- Props that invite the participant to solve problems or create his or her own games may encourage interaction. Introduce large and weighted props to promote gross body movements such as bending and stretching.

Facilitator
- Be prepared with plenty of props to give participant new experiences.
- Be enthusiastic.

Conclusions

The outcome of this project is a holistic, design-led approach to understanding the sensory challenges of adults with autism.

There are three main contributions: the first, a new card-based resource for profiling sensory difficulties and revealing sensory preferences, which uses visual supports so that adults with autism and learning disabilities are better able to express their needs; second, guidance on making sensory props and on creating temporary, affordable and adaptable sensory-focused spaces in domestic settings, with particular focus on providing tactile stimuli; and third, a series of creative workshops for Kingwood staff to support the development of skills in understanding sensory challenges and making sensory props.

The guidance presented in this publication is not intended to be mandatory or prescriptive. Rather it is hoped that the work will build awareness and inspire service providers, support staff, professional designers and family members to consider the behaviours of adults with autism in terms of the way they may be experiencing the world through their senses. Many of the ideas shared here are drawn from evidence based on working schemes that are currently in existence, whilst those piloted during the project will continue to be evaluated.

The methods developed throughout this project serve as a series of demonstrations that, having yielded initial evidence, merit further study. Participants of the sensory activities clearly enjoyed the sessions, which has encouraged Kingwood to develop an informal programme of regular sensory events with these individuals. The effects of these activities will continue to be monitored.

Throughout the project, observed patterns of behaviour were attributed to sensory interventions made by the research team and Kingwood staff. Links between outcomes, such as enhanced levels of concentration and social interaction, and variables, such as the type of sensory prop or changes to the participants' home décor, have been inferred by the individuals providing the intervention – the effect on these individuals themselves needs to be evaluated in order to assess if the results can be generalised. By their nature, interventions were multi-component and so the effect of specific components is unknown. Further studies will be required to validate the impact of these factors and quantify how specific design elements and activities translate to functional behaviour changes in the participants at home.

In considering the wider application of recommendations and suggestions made here, it will be essential to involve adults with autism and no learning disabilities in future projects. It is expected that guidance on domestic settings would be beneficial for many of this user group, for whom research and biographical accounts reveal that sensory differences may be commonplace across the spectrum. Indeed, people in the wider population may delight from living in homes that are laid out and decorated in ways that relate to their sensory preferences.

The next phase of this project, taking place between October 2011 and September 2012, will use the sensory profiling cards and build on the

workshops with Kingwood staff to develop new approaches to providing opportunities for leisure and occupation within domestic settings for adults with autism. There will be particular focus on developing skills and exploring the sensory potential of outdoor spaces.

The design of residential buildings clearly makes a difference to the quality of life of adults with autism, but should not be considered in isolation. A holistic approach should be taken that includes the design of people-centred support plans, models for financing accommodation and inclusion in the community – such as meaningful employment and help developing friendships and relationships.

No singular model of housing or support will meet all the needs of this population. Planners and design professionals are encouraged to stay up-to-date on literature in the field and consult adults with autism, their families and service providers to meet their individual conditions and circumstances.

Footnotes

[1] The National Autistic Society, *www.autism.org.uk*

[2] Leekam S R, Neito C, Libby S J, Wing L & Gould J. Describing the Sensory Abnormalities of Children and Adults with Autism. Journal of Autism and Developmental Disorders. 37 (2001) pp.894-910

[3] Higgins B. Good Practice in Supporting Adults with Autism: guidance for commissioners and statutory services. The National Autistic Society (2009)

[4] American Psychiatric Association, DSM-5 Development, 26 January 2011 *www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=94*

[5] Blackman L. (2001). Lucy's Story: Autism and Other Adventures. London: Jessica Kingsley Publishers. p.35

[6] Montessori Education for Autism *www.montessorieducationforautism.com*

[7] Ayres AJ. Sensory Integration and Learning Disorders. Los Angeles: Western Psychological Services (1972) 11. *Image:* Koomar J A, & Bundy AC. (1991). Creating direct intervention from theory. In Bundy AC, Murray EA, & Lane S. (Eds), Sensory integration: Theory and practice, second edition. FA Davis, Philadelphia (2002) pp.261–308, p.267

[8] Wilbarger J. & Wilbarger P. The Wilbarger Approach to Treating Sensory Defensiveness. In Sensory Integration: theory and practice, cited in Bundy AC, Murray EA, & Lane S. (Eds.. Sensory Integration: Theory and Practice, second edition. FA. Davis, Philadelphia (2002) pp.335-341, p.335 *Image:* Koomar, J A, & Bundy AC. (1991). Creating direct intervention from theory. In Bundy AC, Murray EA, & Lane S. (Eds), Sensory integration: Theory and practice, second edition FA. Davis, Philadelphia, (2002) pp.261–308, p.266

[9] Verhuel A. Snoezelen Materials Homemade. (Ed) Ad Verheul (2007) p.6

[10] Murray D, Lesser M, Lawson W. Attention, Monotropism and the Diagnostic Criteria for Autism. SAGE publications and The National Autistic Society, 9(2) (2005) pp.131-156

Bibliography

Asperger H. Die Autistischen Psychopathen im Kindesalter. Nervenkrankheiten p.117 (1944) pp.76-136. Translated by U Frith in U Frith (ed), Autism and Asperger Syndrome (Cambridge, UK: Cambridge University Press, (1991) pp.37-92

Ayres AJ. Tactile Functions: their relation to hyperactive and perceptual motor behaviour, The American Journal of Occupational Therapy 18 (1) (1964) pp.6-11

Ayres AJ, Tickle L. Hyper-responsivity to Touch and Vestibular Stimuli as a Predictor of Positive Response to Sensory Integration Procedures by Autistic Children, American Journal of Occupational Therapy 34 (6) (1980) pp.375-381

Beaver C. (2006) Designing Environments for Children and Adults with ASD. 2nd World Autism Congress and Exhibition, Cape town, 22 August 2006 [online]. Available at: *www.nas.org.uk/nas/jsp/polopoly.jsp?d=1562* [accessed 12 May 2008]

Bogdashina O. Sensory Perceptual Issues in Autism and Asperger Syndrome, Jessica Kingsley Publishers (2003)

Bogdashina O. Sensory Perceptual Issues in Autism and Asperger Syndrome: different sensory experiences, different perceptual worlds. London and Philadelphia: Jessica Kingsley Publishers (2003)

Brown C, Tollefson N, Dunn W, Cromwell R, Filion D. The Adult Sensory Profile: measuring patterns of sensory processing, The American Journal of Occupational Therapy 55 (1) (2001) pp.75-82

Chan S, Fung MY, Chien WT, Thompson D. The Clinical Effectiveness of a Multi-sensory Therapy on Clients with Developmental Disability. Research in Developmental Disabilities. 26 (2) (2005) pp.31–142

Csaky M (ed). How Does it Feel?: exploring the world of your senses. London: Thames & Hudson (1979)

Cuvo AJ, May ME, Post TM. Effects of the Living room, Snoezelen room, and Outdoor Activities on Stereotypic Behaviour and Engagement by Adults with Profound Mental Retardation. Research in Developmental Disabilities 22 (3) (2001) pp.83–204

Delacato C. The Ultimate Stranger, The Autistic Child. Noveto CA. Academic Therapy Publications, (1974) pp.208-217

Donna W. Autism and Sensing, the Unlost Instinct, Jessica Kingsley Publishers, (1998)

Dunn W. Adolescent / Adult Sensory Profile. *www.pearsonassessments. com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=076-1649-700* (2002) [accessed Dec 2010]

Dunn W. The Sensations of Everyday Life: Emphirical, Theoretical, and Pragmatic Considerations, The American Journal of Occupational Therapy 55 (6) (Nov/Dec 2001) pp.608-613

Dunn W. Living Sensationally: understanding your senses. London and Philadelphia: Jessica Kingsley Publishers (2009)

Fowler S. Multisensory Rooms and Environments, London Jessica Kingsley Publishers (2008)

Fowler S. Sensory Stimulation, London, Jessica Kingsley Publishers (2007)

Grandin T & Scariano M. Emergence: Labelled Autistic. Novato CA: Arena (1986)

Grandin T. Thinking in Pictures, and other Reports from my Life with Autism. Doubleday, New York (1995)

Hara K. Haptic: Awakening the Senses, in: Hara K, Takeo K, Haptic. Tokyo: Masakazu Hanai (2004)

Hawkins J. Voices of Voiceless, Person-centred Approach and People with Learning Difficulties, PCCS books LTD, Herefordshire

Jones RSP, Quigney C, Huws JC. First–hand Accounts of Sensory Perceptual Experinces in Autism: a qualitative analysis, Journal of Intellectual & Developmental Disability, 28 (2) June (2003) pp.112-121

Kanner L. Autistic Disturbances of Affective Contact. Nervous Child, 2 (1943) pp.217-250

Kern KJ, Trivedi HM, et al. The Pattern of Sensory Processing Abnormalities in Autism, Autism, September (2006) 10, pp.480-494

King H. How might Sensory Profile of a Young person with autistic spectrum disorder provide meaningful information for their educators? [online], Available from: *www.shu.ac.uk/faculties/ds/education/theautismcentre/.../hazelking1.doc* [accessed 3 October 2010]

Kwok H, To Y, Sung H, The Application of Multisensory Snoezelen room for people with learning disabilities – Hong Kong experience, Hong Kong Medical Journal, (2003) 9, pp.112-6

Lane SJ.Structure and Function of the Sensory Systems, In: Bundy AC, Lane SJ, Murray EA. (eds) Sensory Integration: theory and practice, (2nded.) Philadelphia: FA Davis, (2002) pp.35-70

Leekham S. Describing the Sensory Abnormalities of Children and Adults with Autism, Autism Developmental Disorders 37, (2007) pp.894–910

Liss M, Saulnier C, Fein D, Kinsbourne M. Sensory and Attention Abnormalities in Autistic Spectrum Disorders. Autism, 10(2), March (2006) pp.155-72

Luescher, A., 'Experience field for the development of the senses: Hugo Kukelhaus' phenomenology of consciousness', International Journal of Art and Education, 25 (1) Feb (2006) pp.67-73

Malner, J.M., Vodvarka, F., Sensory design. Minneapolis, MN: University of Minnesota Press (2004)

McKee, S, Harris, G, Rice, M, Silk, L., Effects of a Snoezelen Room on the behaviour of three autistic clients, Research in Developmental Disabilities, 28 (3) May-June (2007) pp.304- 316

Merleau-Ponty, M., (1962): Phenomenology of perception, translated by Colin Smith. London: Routledge (2002)

Messbauer, L. Multi-sensory environment – a protocol for individuals with autism (2008) *http://lmessbauer.com/content/multi-sensory-environment-%e2%80%93-protocol-individuals-autism* [accessed 10 Nov 2010]

Munari, B., Design as Art. London: Penguin (1966)

O'Riorhan, M., Passetti, F., 'Discrimination in autism within different sensory modalities', Journal of Autism and Developmental Disorders, 36 (2006) pp.665-675

Pallasmaa J. (1996), The Eyes of the Skin: architecture and the senses, Chichester: John Wiley and Sons (2005)

Pernon E, Pry R, Baghdadli A. Autism: tactile perception and emotion, Journal of Intellectual Disability Research, 52 (8) (2007) pp.580-587

Ploog BO. Stimulus Overselectivity Four Decades Later: a review of the literature and its implications for current research in autism spectrum disorder, Journal of Autism and Developmental Disorders, 40 (2010) pp.1332-1349

Talay-Ongan A, Wood K. Unusual Sensory Sensitivities in Autism: a possible crossroads', International Journal of Disability, Development and Education 47 (2) (2000)

Tomcheck DS, Dunn W. Sensory Processing in Children with and without Autism: a comparative study using the short aensory profile, American Journal of Occupational Therapy, March/April (2007) 61(2) pp.190-200

Wiedenhoff J, Bingham M, Harris R. Sensual Building, in: Oosterhuis K, Feireiss L. (eds) The Architecture co-laboratory: game, set and match II: on computer games, advanced geometries, and digital technologies. Rotterdam: Episode (2006) pp.360-369

Wing L. The Handicaps of Autistic Children: a comparative study. Journal of Child Psychology and Psychiatry, 10 (1969) pp.1–40

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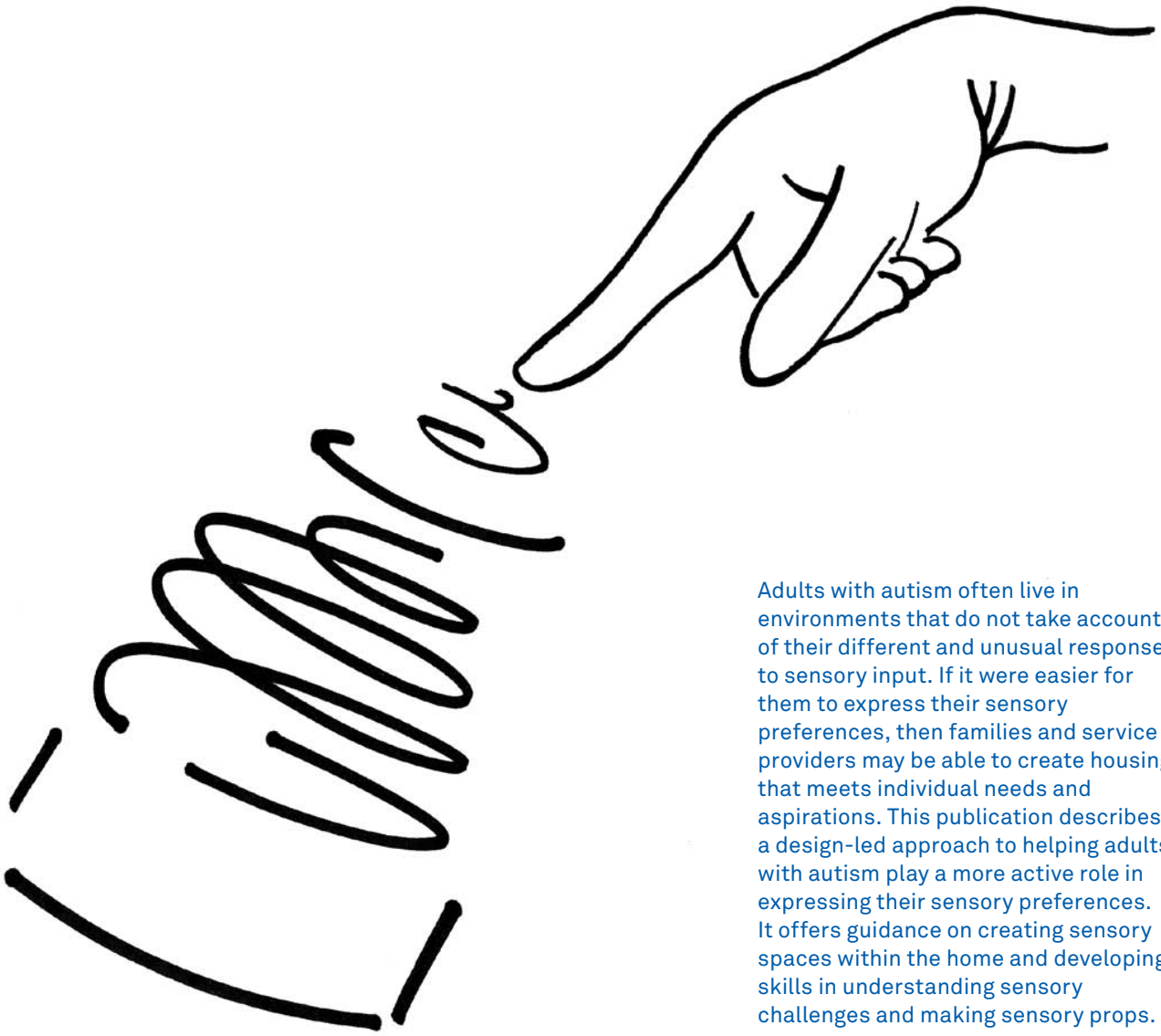

Adults with autism often live in environments that do not take account of their different and unusual responses to sensory input. If it were easier for them to express their sensory preferences, then families and service providers may be able to create housing that meets individual needs and aspirations. This publication describes a design-led approach to helping adults with autism play a more active role in expressing their sensory preferences. It offers guidance on creating sensory spaces within the home and developing skills in understanding sensory challenges and making sensory props.