

Can Experiential Media
Engage Children with
Sensory Processing Disorders?

What is Experiential Media?

*"...one of the most common and powerful models of interaction is what might be called the experiential model of interaction. These are often computer games, reactive drawings, or eye-catching graphics displays that engage and entertain without a set purpose. They often use novel connections between audio and visual stimulation and create either spectacles that entertain users or have entertaining interactions. ...Many interactive installations use a similar model of interaction, where **the interaction is playful but often lacks the goal-driven nature of gaming and instead focuses on enabling the viewing of a spectacle or playing with some engine that creates a sound or graphics. The goal of this kind of interaction is often simply to entertain or engage.**"*

Programming Interactivity – Joshua Noble (2009) (p. 16)

Autistic Spectrum Disorder (ASD)

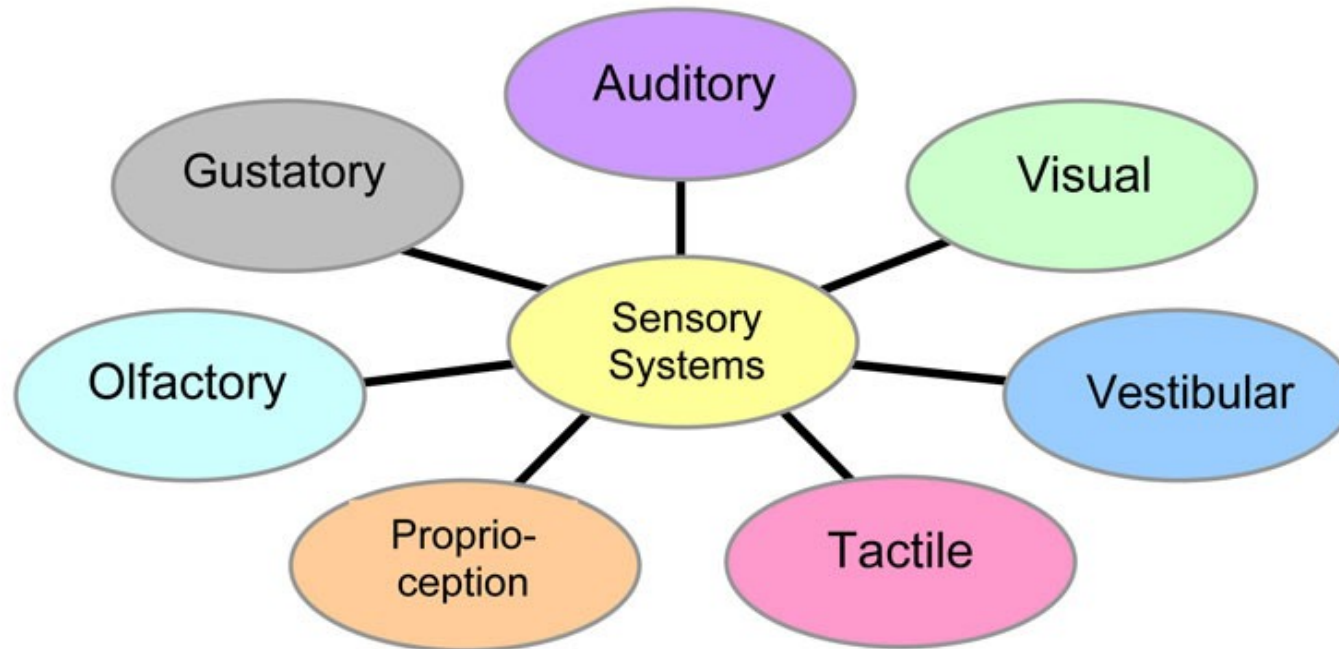
- Vast spectrum of symptoms
- Affects 1 in 160 students between the ages of 6-12 in Australia
- Generally diagnosed by the age of 3
- Diagnosed by behavioural observation (trained psychologist), based on the 'Triad of Impairments'
 - Difficulty with social communication
 - Difficulty with social interaction
 - Difficulty with social imagination, evident in rigid and repetitive behaviour

Autistic Spectrum Disorder (ASD)

- Children with ASD generally display sensory processing difficulties
- *“Sensory processing is the ability to organise and interpret information we receive through our senses. We use our central nervous system to process sensory information.”*

A Teacher's Manual for Sensory Processing – Ashleigh Kendall (2009)

Autistic Spectrum Disorder (ASD)



Auditory – sense of hearing

Vestibular – sense of balance

Gustatory – sense of taste

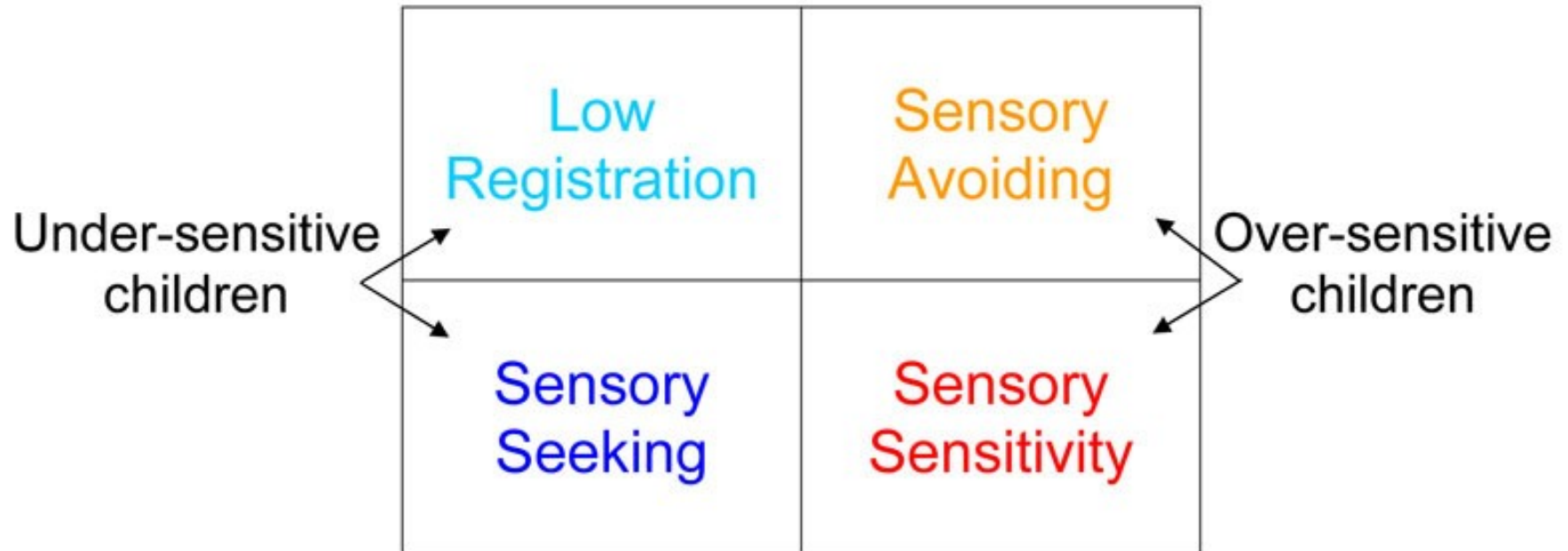
Proprioception – sense of body position

Visual – sense of sight

Tactile – sense of touch

Olfactory – sense of smell

Autistic Spectrum Disorder (ASD)



Low Registration

Do not notice what's going on around them

Sensory Seeking

Generate extra sensory input for themselves

Sensory Avoiding

Sense more frequently and intensely than normal

Sensory Sensitivity

Notice and react to all sensory experiences

Sensory Therapy (technology-based)

Includes, but not limited to:

- 'Snoezelen' rooms (multisensory environments)
- Modular interactive products (eg SpaceKraft)
- Repurposed consumer technology (eg iPad)

Snoezelen Rooms



Image: Holland Bloorview Kids Rehabilitation Hospital – www.hollandbloorview.ca

Snoezelen Rooms

- Multisensory Environments (Rooms)
- Developed in the Netherland's during 1970's as a relaxation environment
- More popular in Europe (1200 rooms in Germany*)
- Problems...
 - Static
 - Expensive
 - Not tailored to users' specific needs
 - Requires guidance
 - Focused on sensory stimulation – not relaxation
 - Generally can only be housed in an institution (scale)
- Currently, no conclusive evidence surrounding impact of Snoezelen/Multisensory environments – most reports are anecdotal

*according to ISNA – International Snoezelen Association (2005)

Modular Interactive Products

- Targeted at parents with ASD children
- Expensive



SpaceKraft FanLite £845
- Simple decibel metre



SpaceKraft LED Colourbox £345
- Colour cycles, not 'interactive'

Repurposed Consumer Technology

- Software – rather than hardware – focused
- More flexible than other physical solutions
- Often limited to being screen based interaction



Kristy Logan, award recipient, and students experiment with the new technology.

\$240 for Proloquo2go: a learning-based application: associates images with speech and communication

What Areas Could be Investigated?

- Look at sensory technology in the home. Most of these technologies are now mobile and ubiquitous, eg iPhone, Wii.
- By using mobile/consumer-grade technology, devices could be more accessible for parents and carers.
- Can interactivity *enable* engagement not only with the device, but with the parent/carer?
- Can engagement be measured?
- When should measurements be taken?
 - Only when the participant is calm?
 - Specifically when the participant is agitated?
 - Compare and contrast both?

Project Structure

- Case study: 3 participants (children under 7 – early intervention), each with unique and specific sensory requirements
- Iterative process, updating devices based on the feedback from parents/carers (eg questionnaires, arousal/valence space, Likert Scale)
- Not technology specific. Could use any combination of the following:
 - Processing
 - Max/MSP/Jitter
 - openFrameworks
 - Arduino
 - Consumer devices, eg iPhone

Research

- Human research papers on ASD in children / sensory processing / effect of multisensory environments
- Interaction design research
- Response to interactivity (physiological measurements)