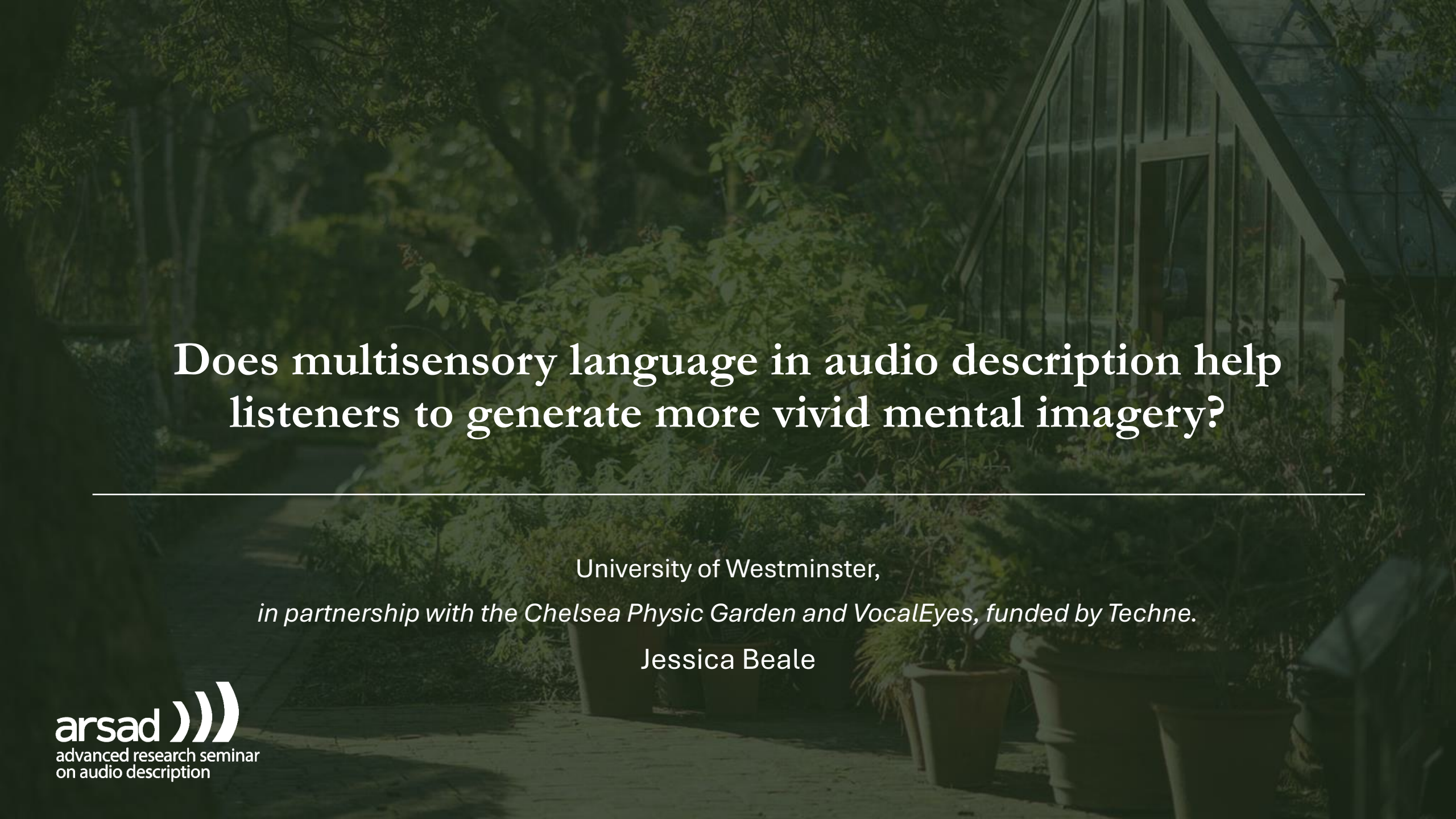


Does multisensory language in audio description help listeners to generate more vivid mental imagery?

University of Westminster,

in partnership with the Chelsea Physic Garden and VocalEyes, funded by Techne.

Jessica Beale

arsad
advanced research seminar
on audio description

Presentation outline

- Introduce the potential of multi-sensory audio description
- Outline the rationale, methodology and results from a linguistic experiment exploring different approaches to sensory language in audio description

I am only presenting a small part of this study – I also explored differences based on level of visual impairment and the age of onset of visual impairment

Why multisensory description might be more effective

While visual information is important, multisensory approaches to audio description might be more effective than typical visual-only approaches because **language based on multiple senses** could help people to develop **richer mental imagery**.

(Fryer, 2016)

This is supported by:

- Cognitive research, showing how **language comprehension is grounded in sensory mental simulations.** *(Barsalou, 2008)*
- **Sensory Linguistics** (Winter, 2019) which illustrates the connection between the senses, the mind and language

Mental imagery as a measure of audio description impact

- Generating imagery is often cited as one of the goals of audio description (e.g. ADLAB guidelines, 2014)
- It has been suggested as a cognitive measure of audio description (Holsanova, 2022)

It's also how some people who are blind describe audio description:

'Yes, it's very much the audio description can become my eyes. It becomes what I'm looking at so if it's described well, I form picture in my head.'

(Blind participant from my walking interview data)

Linguistic experiment

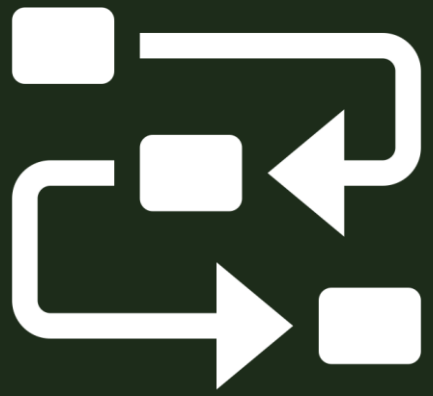
This online study explores the cognitive role of **sensory language** in audio description, focusing on the description of plants.

Research questions:

1. Is multisensory audio description more effective than visual-only audio description in helping listeners generate imagery (across all modalities)?

2. Which sensory modality should multisensory audio description lead with?

Methodology



Independent groups

Level of visual impairment + age of onset of visual impairment (five groups) – not covered in this presentation

Conditions

(1) Visual-only

(2) Multisensory (visual-led)

(3) Multisensory (tactile led)

Dependent variables

- Imagery vividness scores (across 5 modalities on an adapted version of the Plymouth Sensory Imagery questionnaire) (Andrade et al., 2014)
- Enjoyment, usefulness and level of effort
- Free-text response box for participants to describe imagery generation

Rationale for different sensory approaches

1. Visual-only

Purely visual description of the plants.

Rationale: This is typical audio description and therefore a good point of comparison

2. Multisensory (visual-led)

This keeps the focus on the visual, but brings in tactile, olfactory and auditory description where relevant.

3. Multisensory (tactile-led)

This focuses on the experience of touching the plant, whilst including sensory description where relevant.

Rationale for using vision and touch as lead senses:

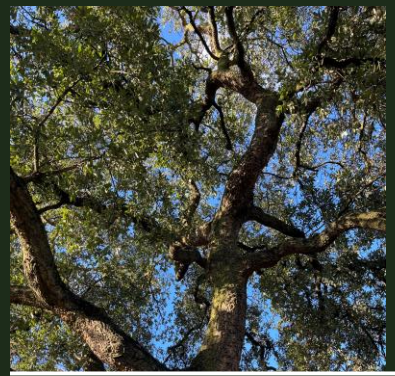
- These were the two senses most frequently used and discussed in my walking interviews
- Visual description and tactile models are the most frequently used to provide access
- Vision and touch are often integrated in perception and in language (Winter, 2019)

Study plants

Century plant
Agave americana

Tree houseleek
Aeonium volkeri

Chocolate soldier
Kalanchoe tomentosa



Cork tree
Quercus suber

Fern
Dryopteris affinis

Paper Bush
Edgeworthia chrysantha

Moon valley
Pilea mollis

Prickly pear
Opuntia

Greater burdock
Arctium lappa

Audio description examples for fern

1. Visual-only

‘These large, patterned leaves are known as fronds.

Underneath each frond, there are circular brown spores, creating an intricate pattern.’

2. Multisensory (visual-led)

‘These large, patterned leaves are known as fronds. They **look** very thin and rough.

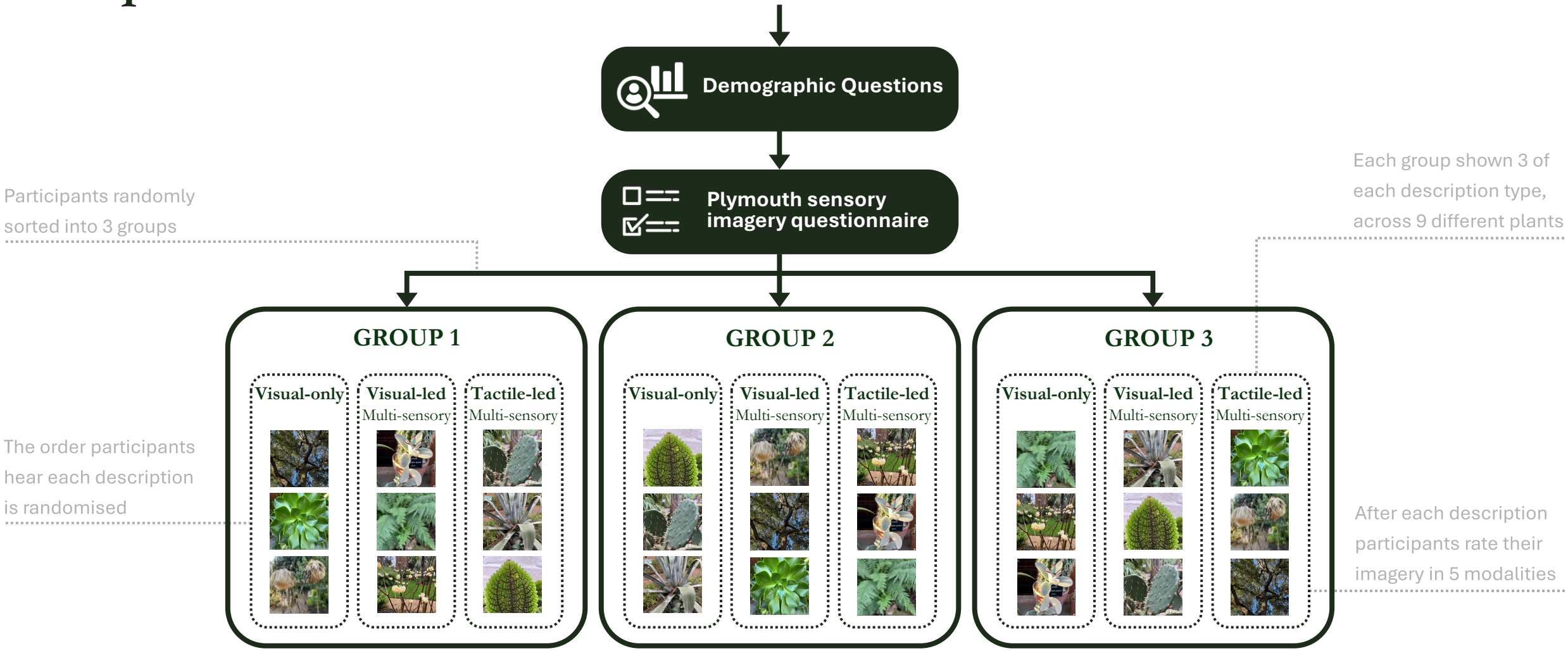
Underneath each frond, there are circular brown spores, creating an intricate tactile pattern.’

3. Multisensory (tactile-led)

‘These large, patterned leaves are known as fronds. They **feel** thin, yet rough.

Underneath each frond, **you can feel** circular spores, which create an intricate tactile pattern.’

Experiment structure



Participants

Pilot phase - 16 participants to test functionality and accessibility

Main study

157 participants primarily recruited through Prolific (mean age: 35 ± 13.6)

Grouping variable: level + age of onset of visual impairment

1. Severe visual impairment from under the age of 5: 11
2. Severe visual impairment from age over the age of 5: 20
3. Moderate visual impairment from under the age of 5: 22
4. Moderate visual impairment from over the age of 5: 41
5. No visual impairment: 63

Levels of visual impairment based on the functional levels of vision scores (Douglas et. al., 2006), combined with onset - with the age-based distinction for early onset based on (Leporé et al., 2010).

Multi-level regression

Fixed effects

- Controls: plant, gender, age, PSI score, plant knowledge
- Main effects: condition, level/type of visual impairment

Interaction effects

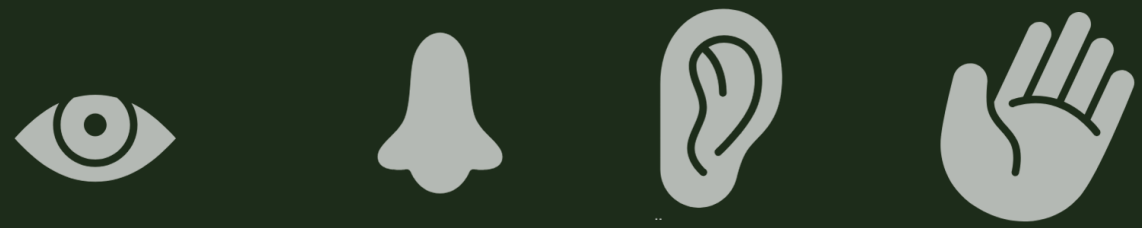
- Condition * level/type of visual impairment

Random effects

- Intercept (between groups)
- Residual (within groups)

Outcome variables

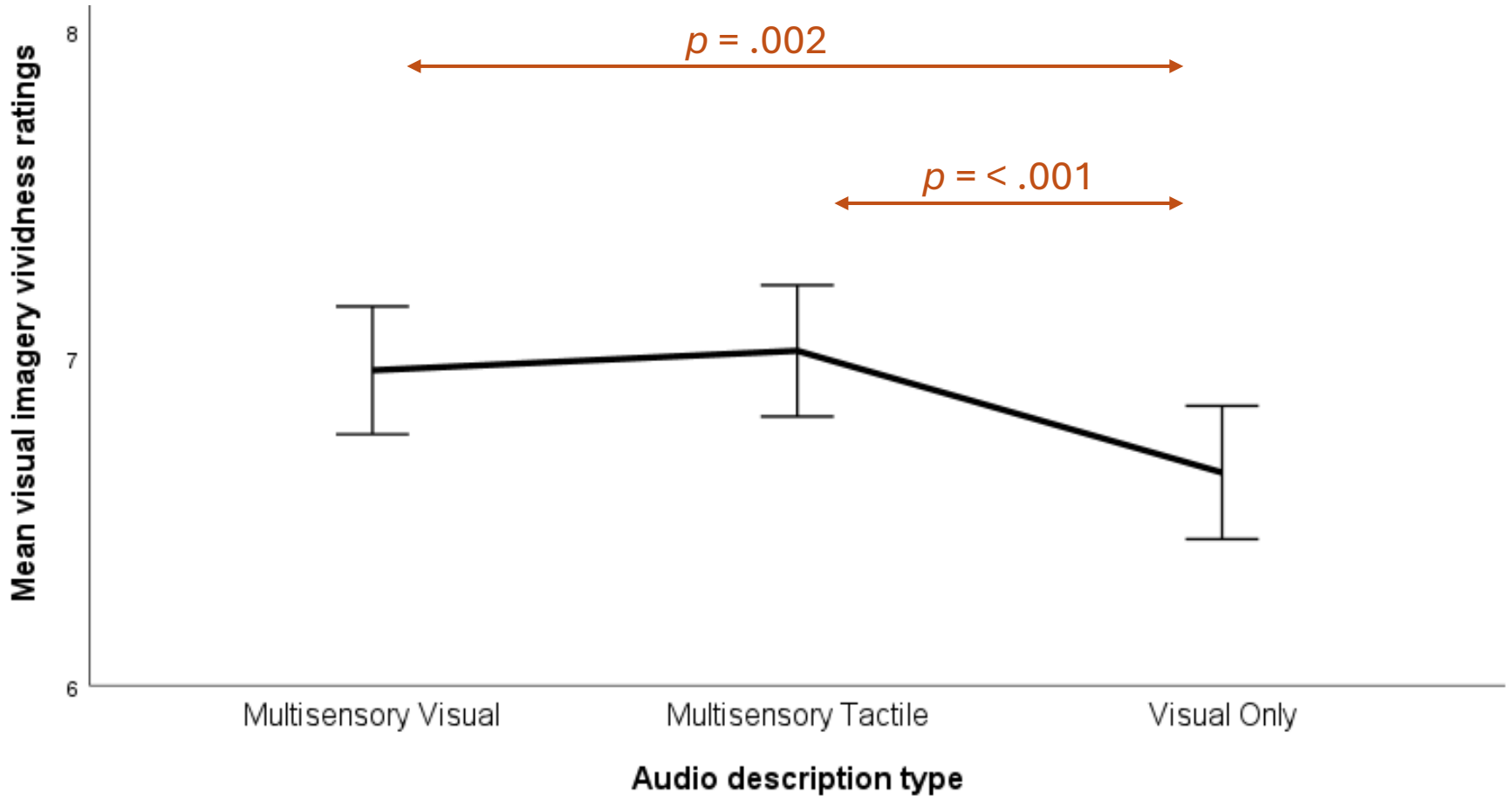
- Imagery vividness ratings (across five senses).
- Usefulness of description
- Level of effort required to imagine plant
- Enjoyment of description



Overview of main effects

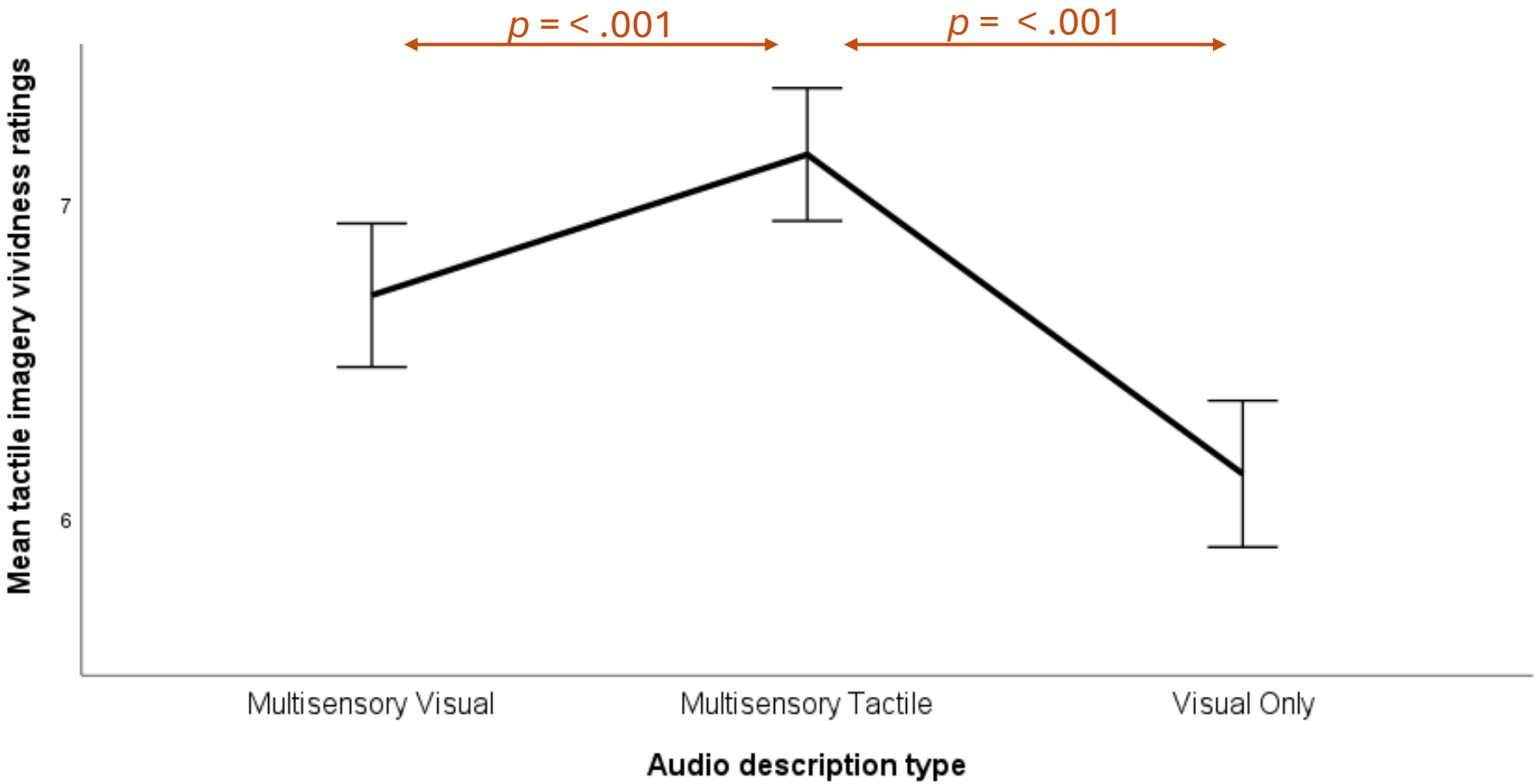
Outcome variable	Audio description type	Visual impairment type
Visual imagery	✓	✓
Auditory imagery	✓	×
Olfactory imagery	✓	×
Tactile imagery	✓	×
The feeling of being there	✓	×
Enjoyment	✓	×
Usefulness of description	✓	×
Level of effort required to imagine description	✓	×

Mean *visual* imagery ratings by audio description type



Error Bars: 95% CI

Mean *tactile* imagery score ratings by audio description type



Results supported by free text responses

Theme 01

Cross-modal understanding

Many participants described how description in one sense helped them to imagine in another sense (primarily other senses aided visual imagery). For example:

- Tactile description helps build a visual understanding
- Scent description helps listeners to visualise
- Multisensory description helps build a visual understanding
- Visual details helped to create auditory understanding

‘I found, surprisingly, that when a description of the smells were included, it was much easier to visualize the plant.’

Results supported by free text responses

Theme 02

Multisensory language compensates for lack of imagery ability, visual experience or plant knowledge

Multisensory description was often described as enabling listeners to understand or imagine a plant despite either a lack of imagery ability, little plant knowledge or little to no visual experience.

‘*Yes, the involvement of all my senses made it better for me to imagine the plant… even in instances where I had never seen or heard of the plant before.’*

‘I can't create images in my mind so I really find the descriptions of smells, sounds, feeling helpful.’

Summary

- Multisensory description leads to more vivid imagery in all modalities – **even visual imagery**

- Multisensory description is most useful for generating imagery, most enjoyable, and requires less effort than visual-only AD

- Tactile-led description helps listeners generate the most vivid tactile imagery

Summary of group differences

- Visual impairment does not affect how people imagine audio description in most sensory modalities – except in relation to visual imagery where those with more severe, early onset visual impairment report higher scores

- The negative effect of visual-only condition was accentuated for some visual impairment groups in relation to olfactory and tactile imagery

Thank you for listening

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