Using auditory narratives to measure listening engagement in children with normal hearing

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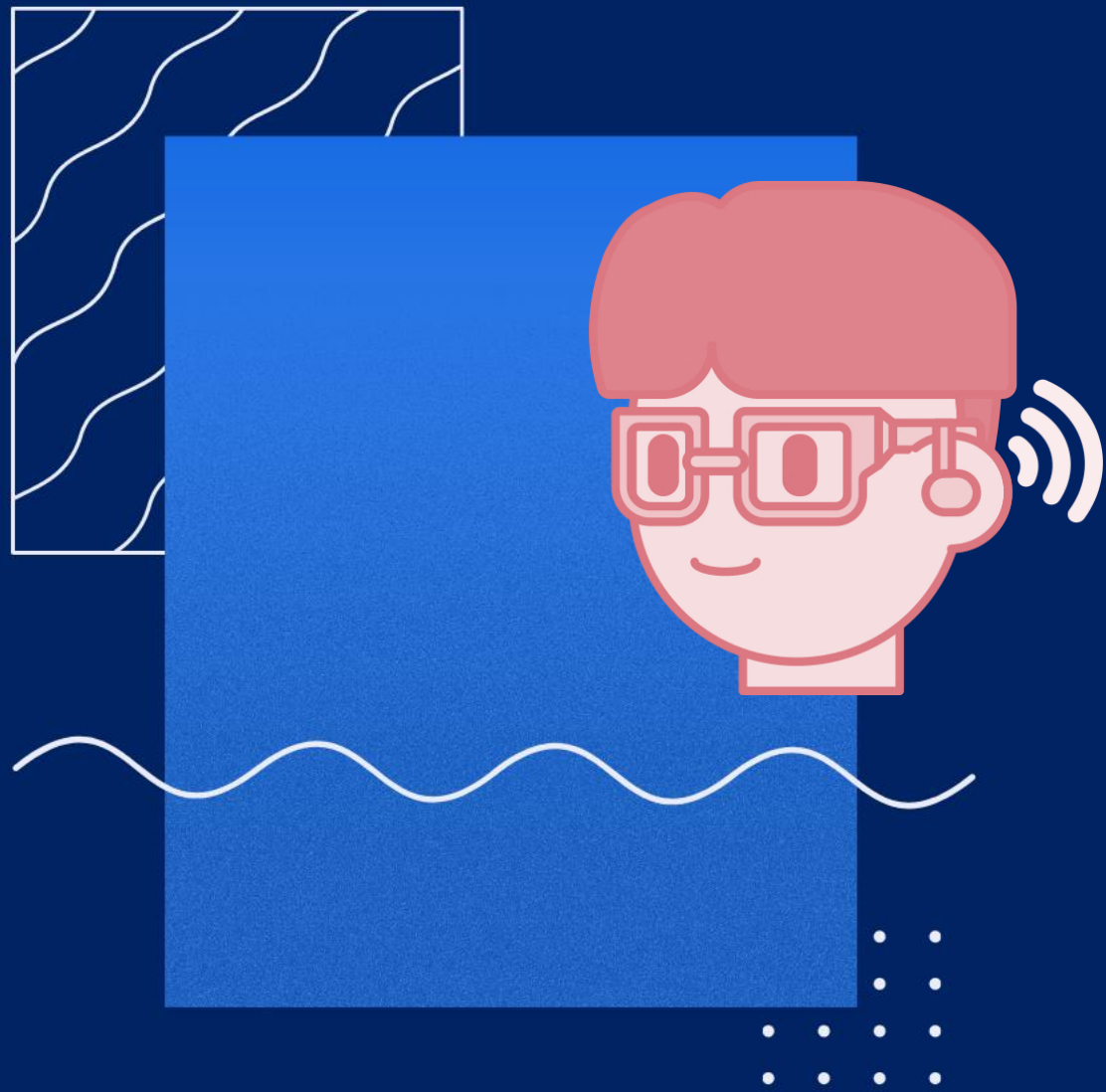
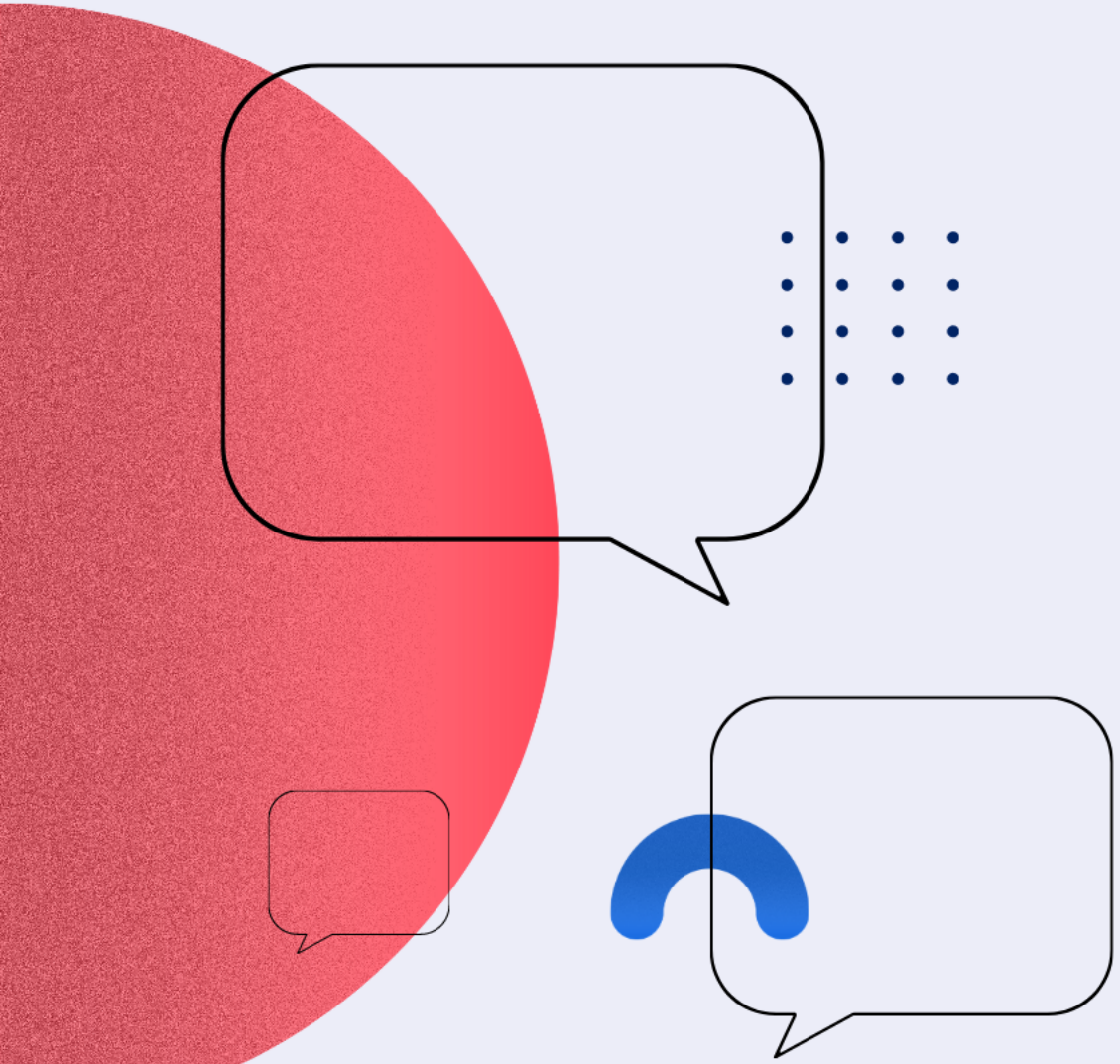
DEC 1, 2020





SPEECH COMPREHENSION CAN BE DIFFICULT

Engagement
(recruitment of resources)

Motivation
(willingness to recruit)

Experiences
(Enjoyment, effort, etc.)

Herrmann & Johnsrude (2020)

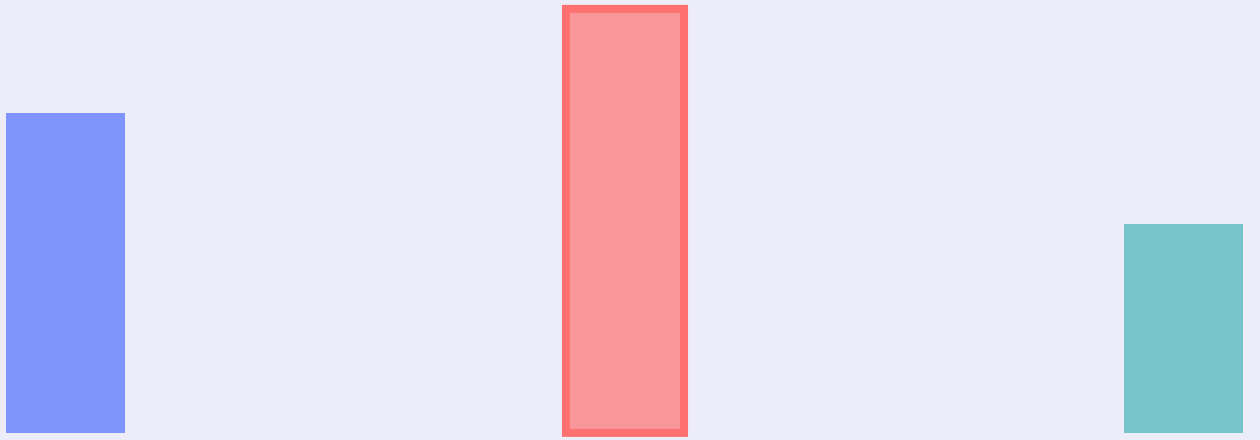
Engagement
(recruitment of resources)

Motivation
(willingness to recruit)

effort is too high

Herrmann & Johnsrude (2020)

DUAL-TASK PARADIGM



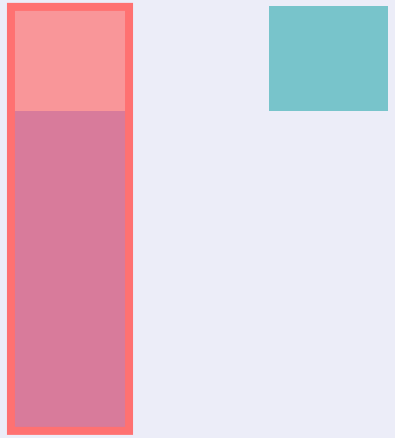
Resources required for **primary** task

Total available resources

Resources required for **secondary** task

Broadbent (1958)

DUAL-TASK PARADIGM



Resources required for **primary** task

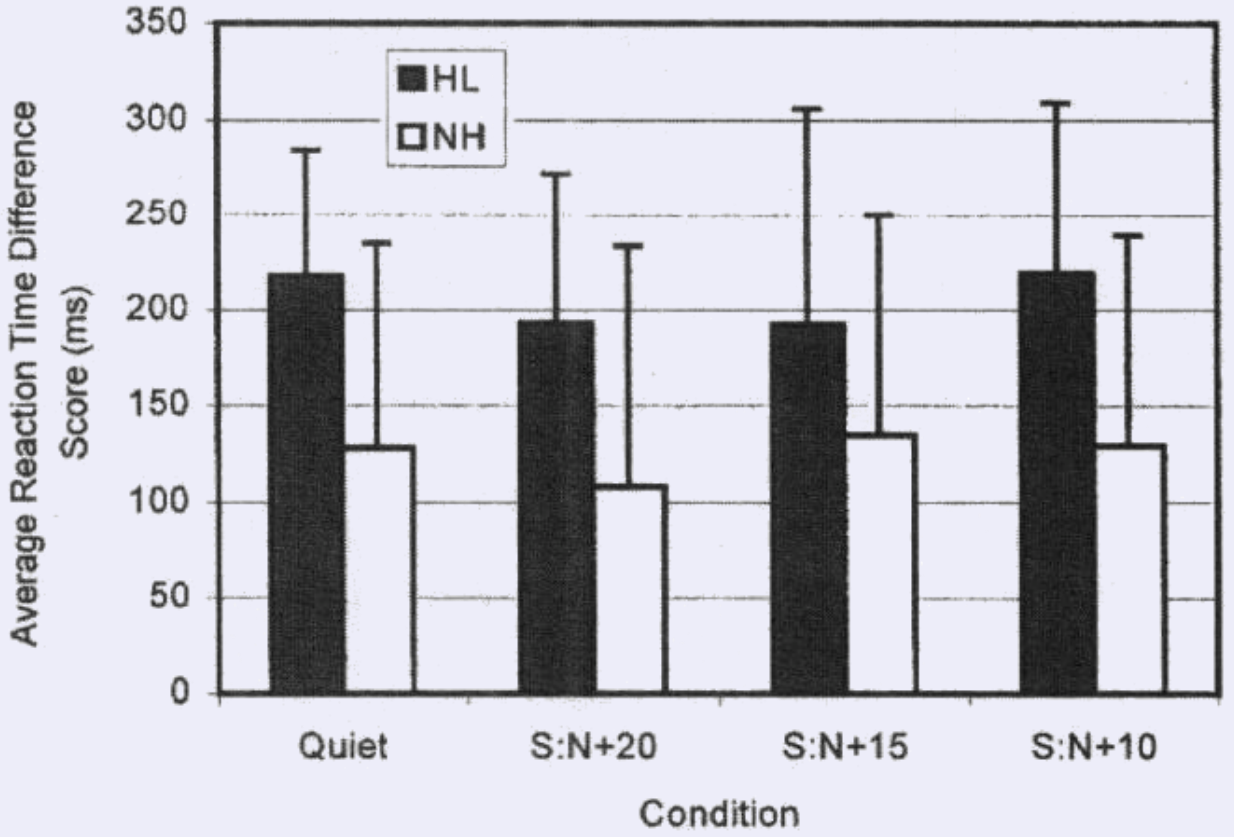
Total available resources

Resources required for **secondary** task

Broadbent (1958)

HICKS AND THARPE (2002)

- **Primary Task**: listen to and repeat single words
- **Secondary Task**: quickly press a button every time a light flashes



Engagement
(recruitment of resources)

Motivation
(willingness to recruit)

Experiences
(Enjoyment, effort, etc.)

Not interesting

"They are buying some bread."

ENGAGING STORIES FOR CHILDREN

- Content?
- Length?
- Complexity?

RESEARCH AIMS

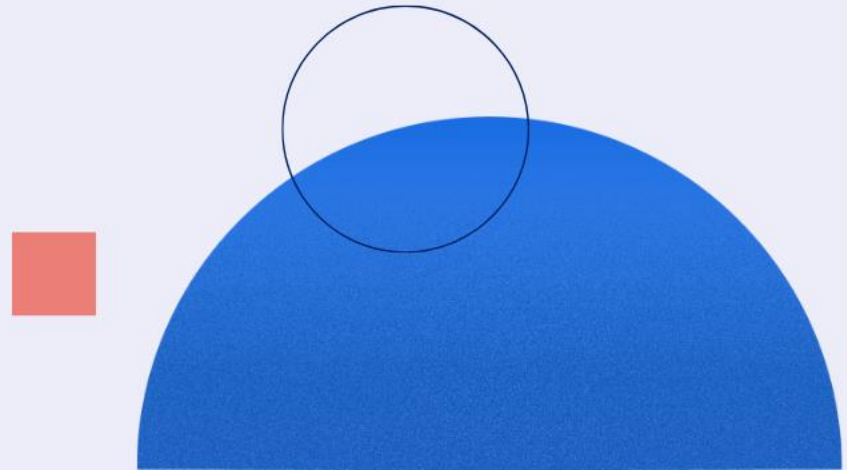
- **Aim 1**: develop **narrative-driven listening materials** that can be used to provide an ecologically valid measure of listening effort and narrative engagement in children

- **Aim 2**: use these engaging narratives to provide a **continuous measure of listening engagement** over the course of a story in children

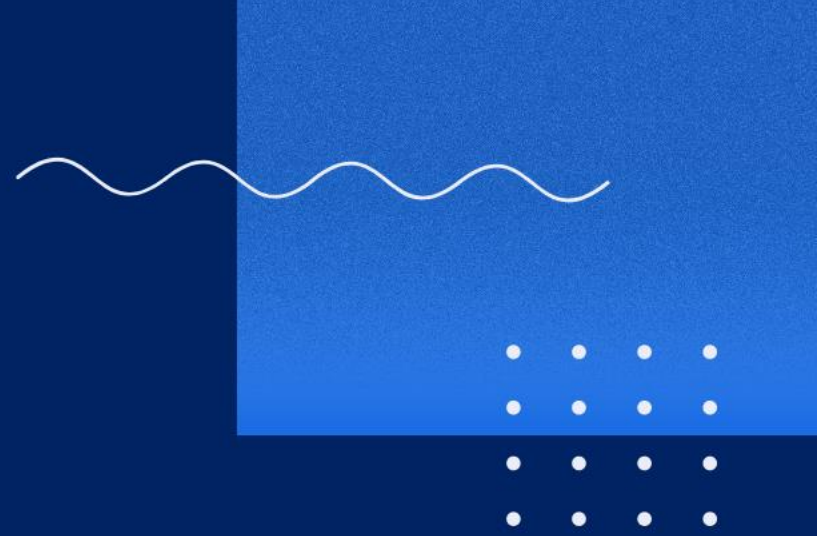
HYPOTHESES

- using **stories** as listening materials will elicit an **intrinsic motivation** to engage in listening, which will drive the recruitment of **cognitive resources**

- in children with normal hearing, the **pattern** of engagement across the time course of a narrative will be **consistent** across participants



- Pilot a variety of pre-existing short narratives for children
- Engagement questionnaire
- Online: built in PsychoPy, hosted on Pavlovia



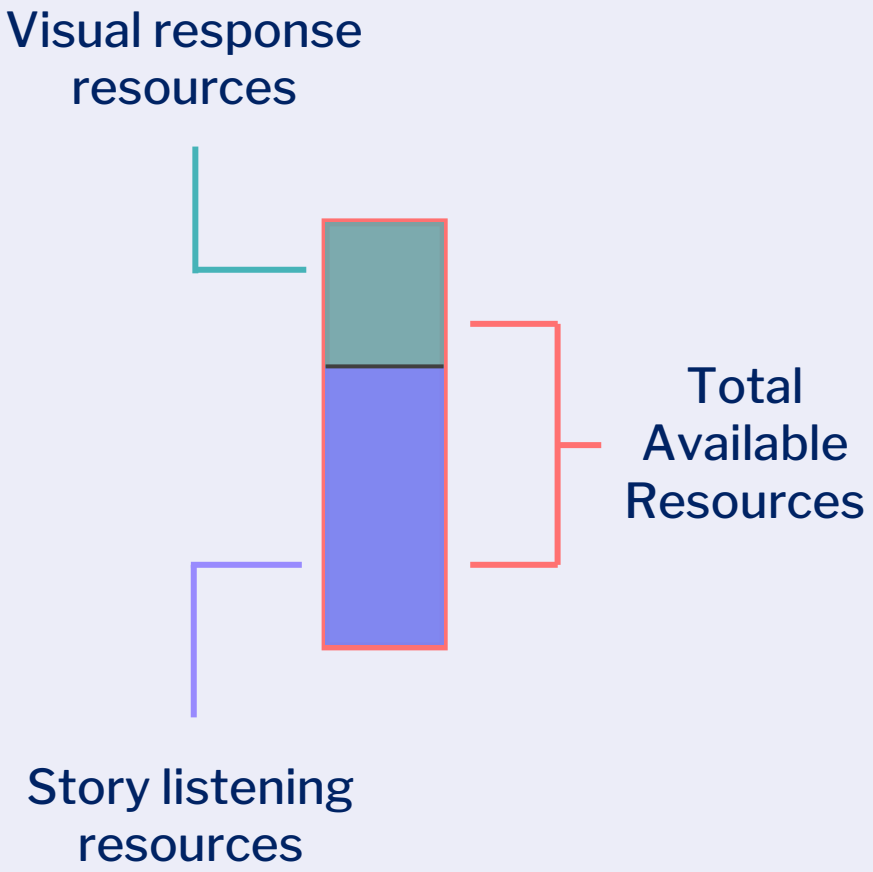
Aim 1:
Develop narrative driven-listening materials that can be used to measure listening engagement in children

- Children aged 9-12 will engage in a dual-task paradigm
- Online: built in PsychoPy, hosted on Pavlovia

Aim 2:
Use these engaging narratives to provide a continuous measure of listening engagement over the course of a story in children

AIM 2
DUAL-TASK

- **Primary Task:** Listen carefully to a story
- **Secondary Task:** quickly respond to visual stimuli



AIM 2
DUAL-TASK

- **Primary Task:** Listen carefully to a story

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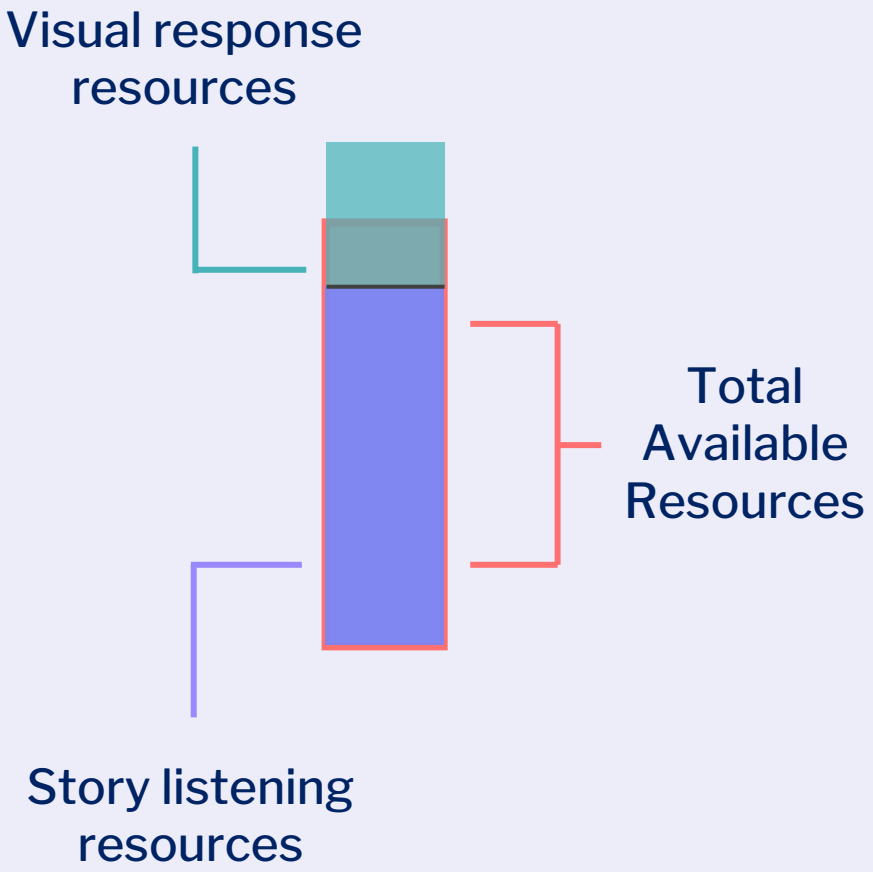
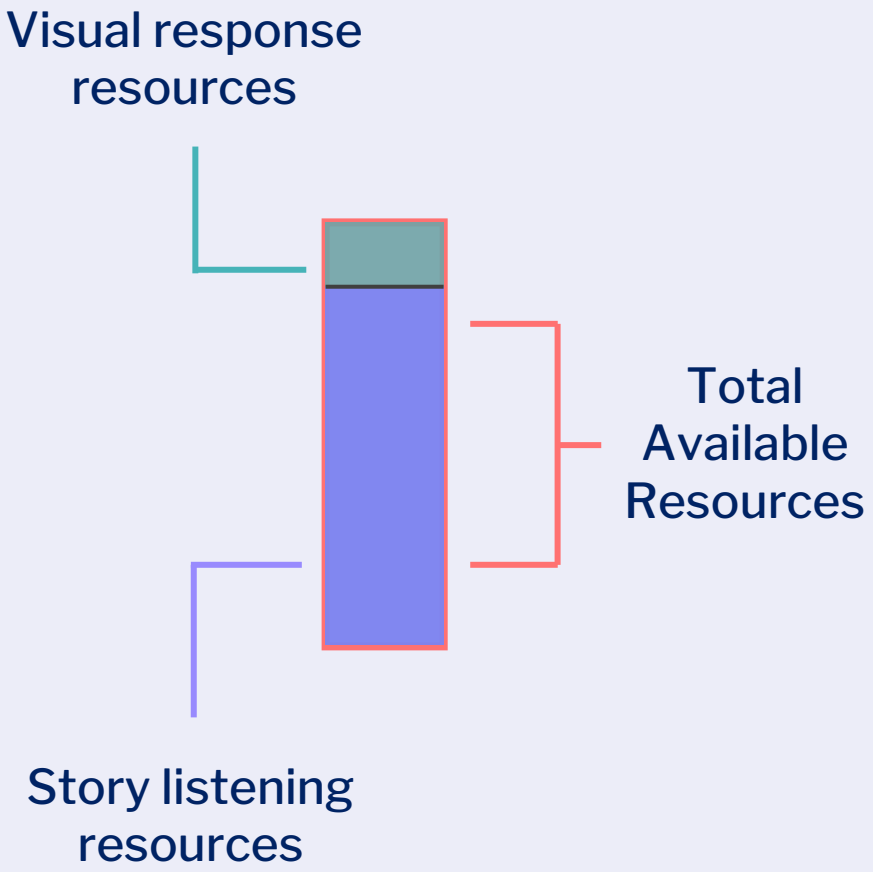


AIM 2
DUAL-TASK

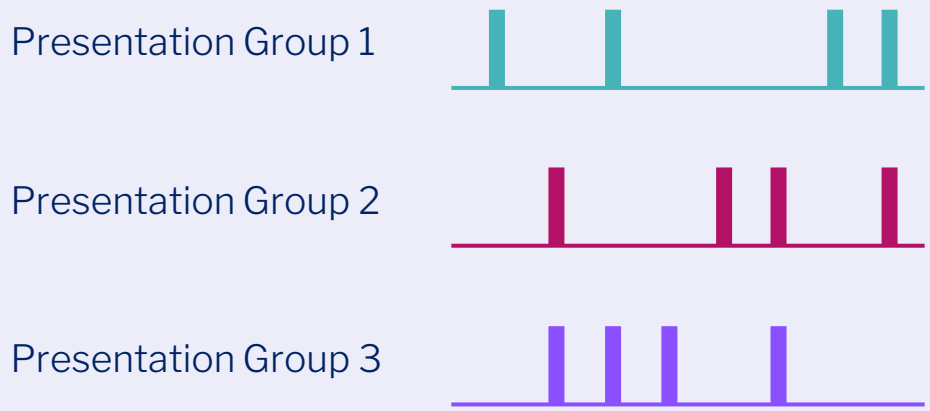
- **Primary Task:** Listen carefully to a story

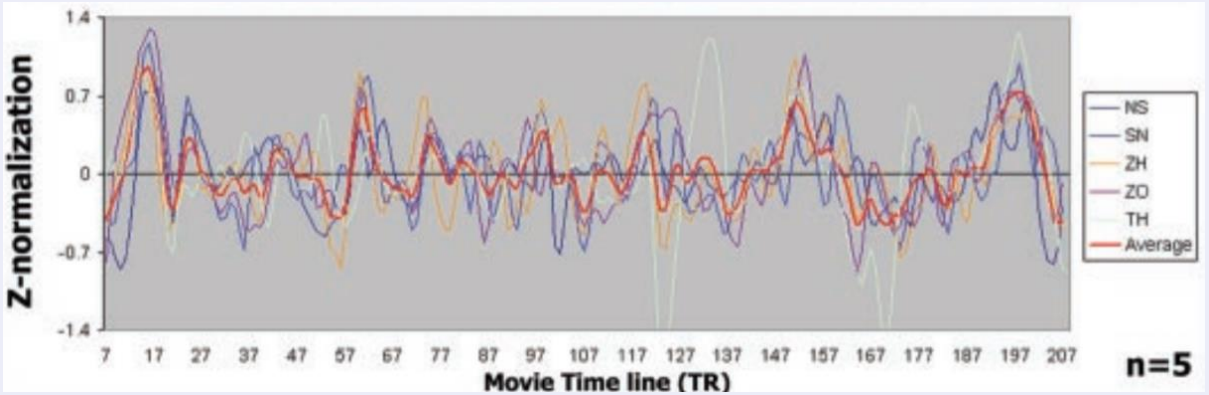
- **Secondary Task:** quickly respond to visual stimuli
  - Longer RTs = **more** engaged in story
  - Shorter RTs = **less** engaged in story



Aim 2: Intersubject Correlation

- ISC: neural activity is **synchronized** among participants across the time course of a narrative
- Relies on **engagement**





Hasson et al. (2004); see Nastase et al. (2019) for review

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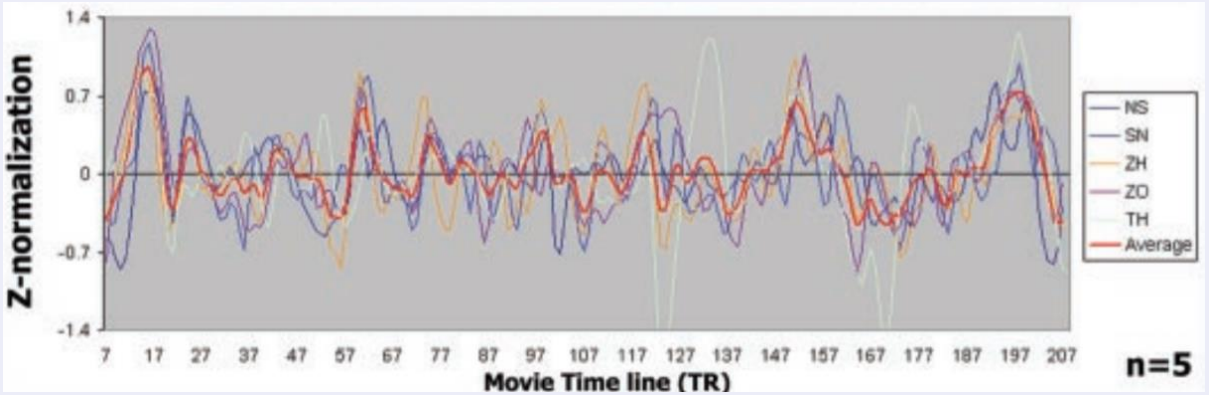
Cohesive Time Course



Hasson et al. (2004); see Nastase et al. (2019) for review

Aim 2: Intersubject Correlation

- **Time course** of reaction times across the narrative will be **correlated** in normally hearing children

- First **baseline** measure of listening engagement

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