- **Children as flexible learners**
  - Learning flexibility in children includes:
    - Adjusting attention to stimuli that is learnable (Gerken et al., 2011; Kidd, 2011)
    - Using emotional expressions as cues for novel object exploration (Wu & Gweon, 2021)
    - Reasoning about environmental structure and goals to determine approach strategies (Meder et al., 2021)
- **Background noise and learning**
  - Acoustic noise is ubiquitous
  - Repeated noise exposure influences learning and development in critical ways:
    - Reduces speech perception and word recognition (Klatte et al., 2013; Bjorklund et al., 1990)
    - Decreases word learning (McMillan & Saffran, 2016)
    - Impinges on already limited cognitive resources for adaptive strategy building (Loh et al., 2022)
- **(Ecological) Active learning**
  - Traditional active learning:
    - Learners interact with individual stimuli within their environment (Settles, 2009)
    - Accurate stimuli labeling is a primary goal
  - Ecological active learning:
    - Children learn by tracking environmental features and adapt their exploration strategies accordingly (Ruggeri, 2022)
    - Exploratory strategies for learning are context-dependent
    - Exploit statistical regularities in the environment to reduce demands on cognition
- **Environmental selection**
  - Learners preferentially select acoustic environments that align with a set of goals
  - Emphasizes acoustic information
  - Goal-directed
  - Addresses variabilities across environments
  - Children can rely exclusively on acoustic information to make exploration decisions

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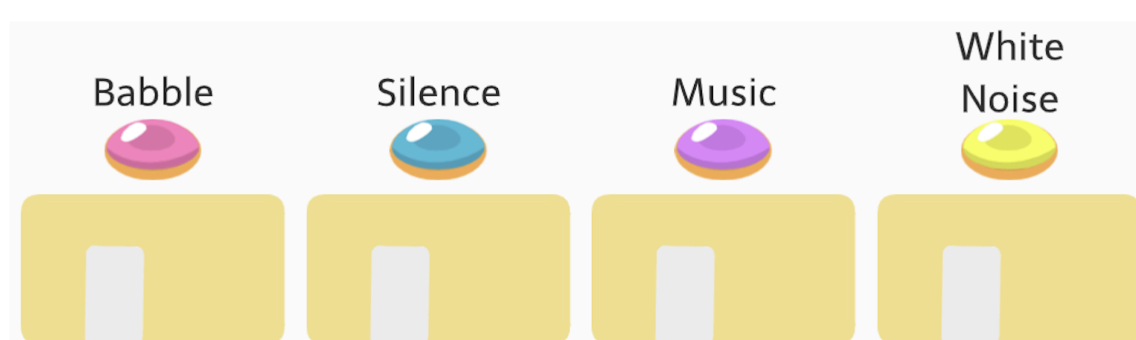
To what extent do preschool children use environmental selection as an adaptive strategy for learning in noisy acoustic environments?

cardinalred!80	**Experiment 1**	**Experiment 2**	
cardinalred!80	**Children**	**Children**	**Adults**
N	72	54	37
cardinalred!40 μ	4.46 years	4.55 years	40.43 years
African American/Black	4.2%	3.7%	4.2%
cardinalred!40 Asian American/Pacific Islander	23.6%	37%	x%
Caucasian/White	27.8%	31.5%	70.3%
cardinalred!40 Multiracial	26.4%	20.4%	x
Hispanic/Latinx	8.3%	7.4%	x
cardinalred!40 Other	8.3%		



- **Experiment 1**


Figure 1. Dance


Figure 2. Read


Figure 3. Sleep


Figure 4. Talk

- **Experiment 2**


Figure 5. Dance


Figure 6. Read


Figure 7. Sleep


Figure 8. Talk

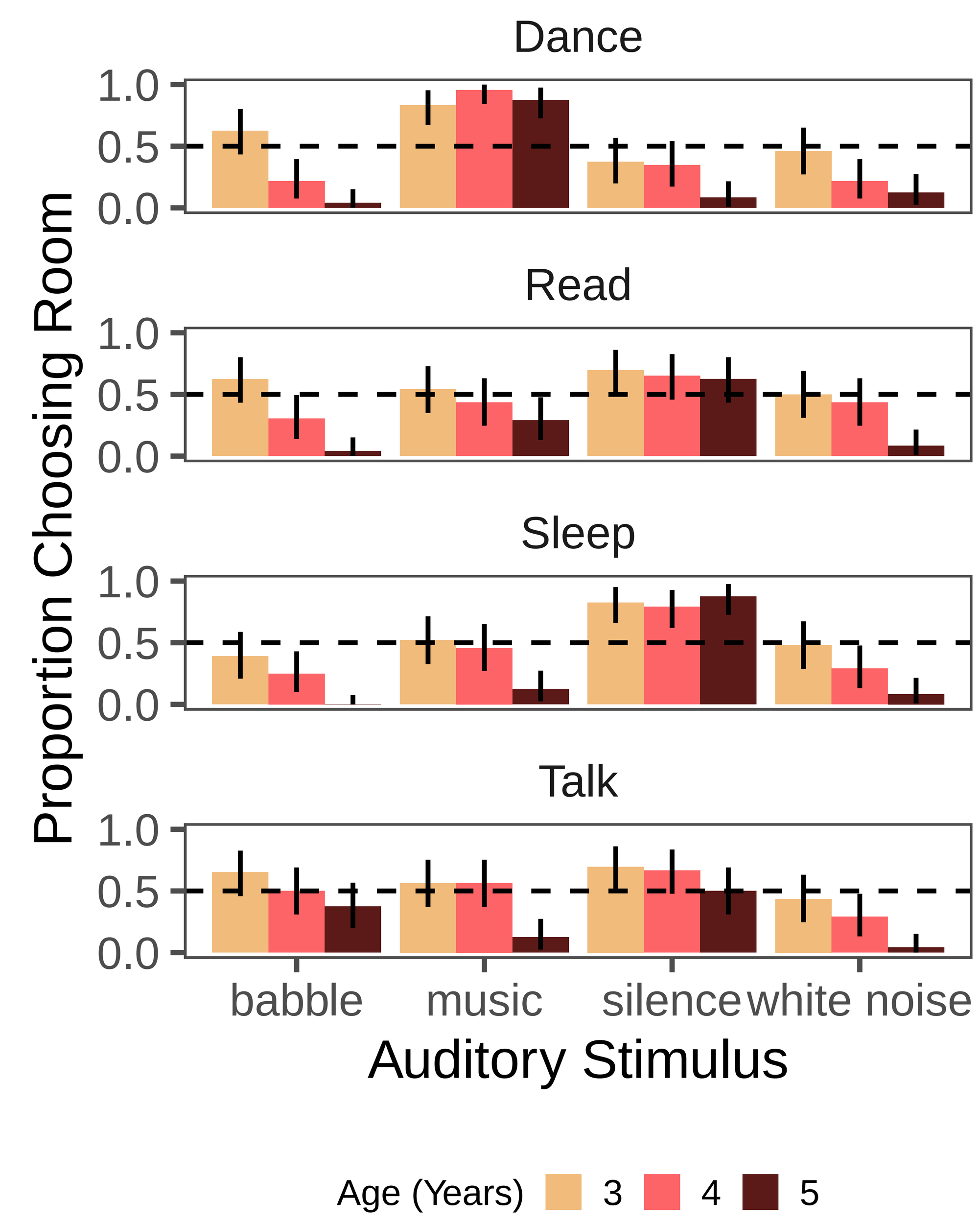


Figure 9. Figure 2: Results from Experiment 1. Participants' rating of the appropriateness of an auditory stimulus and activity pairing. Individual bars correspond to one age bin of 3, 4, or 5. A rating score of 0 indicates a rejection of the pairing [Joe and Mandy should not complete a particular activity in this environment] while a score of 1 indicates an affirmation of the pairing [Joe and Mandy should complete a particular activity in this environment]. at 50%. Error bars show 95% confidence intervals.

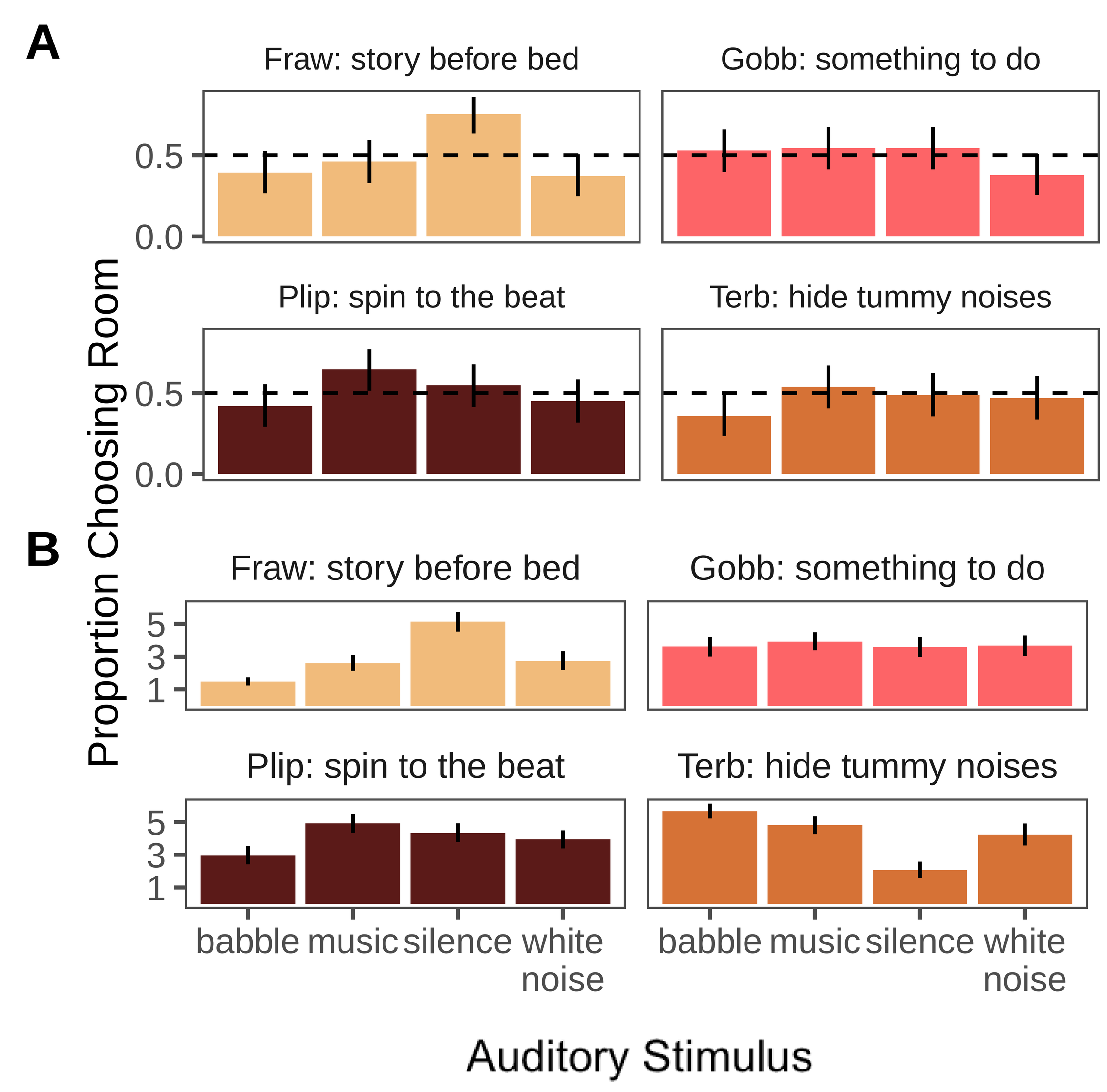


Figure 10. Figure 3: Results from (A) children and (B) adults in Experiment 2. While children made binary judgments, adults used a seven-point likert scale indicating complete match (7) to complete mismatch (1) between sounds and activities.

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[1] Claude E. Shannon.
A mathematical theory of communication.
Bell System Technical Journal, 27(3):379–423, 1948.