

ADAPT_preregistration_study3

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Study Information

Title

Integrating auditory information and changing goals for environmental selection

Description

This study explores how 3-5-year-old preschool children make decisions about optimal auditory environments given changing goal states. In this study, we introduced children to a pair of friends with a list of activity goals to complete in one or more rooms. We manipulated the sound type in each room and then asked children to decide whether the selected activity appropriately matched the sound type. We hypothesize that children will use auditory information to evaluate activity-sound mappings, and that this ability is driven by both learned conventions and a desire to reach optimal outcomes where possible. The purpose of this study is to explore children's understanding of noise's differential impact on goals.

Contributors

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Affiliated Institutions

Stanford University

Design Plan

Study Type

Experiment: A researcher randomly assigns treatments to study subjects, this includes field or lab experiments. This is also known as an intervention experiment and includes randomized controlled trials.

Blinding

For studies that involve human subjects, they will not know the treatment group to which they have been assigned.

Study Design

Participants will complete the experimental session in-person at either a local nursery school or children's museum. All participants will have been previously consented and the experimenter will collect assent from the child prior to testing.

Participants will first meet 2 3-inch plastic figures named Joe and Mandy who have a list of activities they want to complete- (1) reading a book, (2) dancing to music, (3) talking to each other, and (4) going to sleep. Participants will then be shown 4 5-inch wooden houses with two other figures inside. Experimenters will open the lid on each house to show participants the two figures and explain that each house already has two

people inside. The houses will be lined up and equidistant from each other on a table. Each house has a recordable button attached to the back that plays a unique sound when pressed. The sounds include (1) 5-talker babble (5TB), (2) instrumental music, (3) white noise, and (4) silence. All sounds are equalized to a root mean square (RMS) of 65 dB and are 7s long.

In this task, experimenters will move through each house by activity by opening the door and playing the sound attached to that house before asking, “Should Joe and Mandy [read a book/dance to music/talk to each other/go to sleep] inside?” Experimenters will then ask a follow-up question, “Why did you say they [should/shouldn’t]?” In total, there will be 16 trials, 4 trials for each activity x 4 trials for each sound type.

Randomization

The four activities and sound types will be presented and counterbalanced under 4 conditions as documented below:

Condition 1: Activities: 1. Dance to music 2. Read a book 3. Talk to each other 4. Go to sleep Sound Type: 1. 5TB 2. Instrumental 3. White 4. Silence Condition 2: Activities: 1. Talk to each other 2. Go to sleep 3. Dance to music 4. Read a book Sound Type: 1. White 2. Silence 3. 5TB 4. Instrumental Condition 3 (Counterbalance of Condition 1): Activities: 1. Go to sleep 2. Talk to each other 3. Read a book 4. Dance to music Sound Type: 1. Silence 2. White 3. Instrumental 4. 5TB Condition 4: Counterbalance of Condition 2): Activities: 1. Read a book 2. Dance to music 3. Go to sleep 4. Talk to each other Sound Type: 1. White 2. Silence 3. 5TB 4. Instrumental

Sampling Plan

Existing Data

Registration prior to creation of full dataset.

Data Collection Procedures

Participants will be recruited through an IRB-approved recruitment channel established at both a local nursery school and children’s museum. Participants will be between 3;0 years and 5;11 years at time of test, must have normal or corrected-to-normal vision, typical hearing, no reported cognitive or neurodevelopmental delays/disorders, and must be exposed to English at least 75% of the time at home.

Sample Size

For this study, we will recruit a total of 72 participants with replacement- 24 3 year-olds, 24 4-year-olds, and 24 5-year-olds.

Sample Size Rationale

We selected a sample size of 24 participants per age group given previous developmental studies run by this preregistration’s authors as well as other similar developmental research.

Variables

Manipulated Variables

We will manipulate the sound type/activity pairings to ask whether preschool children recognize that auditory information influences goal outcomes. In addition, the presentation order of the activities and sound types will be randomized and counterbalanced across conditions.

Measured Variables

The primary outcome measure of interest is participants’ response to the question, Should Joe and Mandy [read a book/dance to music/talk to each other/go to sleep] inside?” Given this binary, forced-choice design,

each room/activity pairing carries a 50% weight on participant selection. We will also use participant age as a predictor variable, such that we measure whether age influence's participants' responses to the task.

Analysis Plan

Statistical Models

We will run the following Bayesian generalized linear model in the `rstanarm` package to determine whether preference for certain auditory environments is a function of the current activity:

```
stan_glmer(formula = choice ~ activity + sound_type + age_centered + (1 | subject_id), family = binomial, data = data)
```

where “choice” corresponds to participants’ response on whether the sound type/activity pair is an appropriate match, “activity” corresponds to the four activities presented, “sound_type” corresponds to the four sound types presented, “age_centered” corresponds to participants’ age centered on the mean to facilitate data interpretation, and “subject_id” corresponds to individual participant performance.

Inference Criteria

We will use the coefficient estimates, as well as whether the credible intervals cross zero to determine whether activity type and age have significant effects on preference for particular auditory environments.

Data Exclusion

Trials with caregiver interference (caregiver points to the screen or tells the child how to respond), experimenter error (e.g. large deviations from experiment script), and severe lapses in attention (e.g. looking away/being distracted for more than 50% of the total experimental session) will be excluded.

Exploratory Analysis

We have no pre-registered exploratory analyses to report.

References