

Science in the time of COVID-19: The Feasibility of Online Data Collection in Developmental Populations

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Introduction

- COVID-19 social distancing restrictions and state regulations required many scientists to cease in-person data collection (Magan et al., 2020).
- Virtual data collection sites, like MTurk, have been used for over a decade for adult research experiments (Buhrmester et al., 2016).
- Remote data collection eliminates lab visits and interaction with researchers, thus COVID-19 precautions can be maintained (Rhodes et al., 2020).
- Developmental studies, especially those with infants and toddlers, pose unique challenges for virtual data collection as child experiments usually require:
 - Specially constructed physical spaces;
 - Recording equipment to monitor behaviors;
 - Interactions with visual and perceptual stimuli. (Sheskin et al., 2020).

Objective

- To evaluate the feasibility of virtual data collection in a toddler population using a well-studied word-learning paradigm.

Methods

Participants

- Toddlers ($N = 49$), 18-36 months of age ($M = 28$ months, $SD = 5.5$ months).
- ~ 50% of the sample was male.

Materials

- Six novel spoken word-shape pairs (see Fig. 1).

Experiment

- Cross-situational word learning paradigm (Smith & Yu, 2008; see Fig. 2) using preferential looking.
- Participant's eye movements were recorded during the training and test phases.
 - Training. Two novel words and two novel shapes were presented in each trial. Word-shape mapping was ambiguous within trials.
 - Test. Two novel shapes were presented along with a verbal direction ("Look at the boasa, boasa, boasa, boasa!").
- Participant's gaze to each shape will be coded to evaluate if the word-shape mappings are learned.

Methods (cont.)

Figure 1. Stimuli

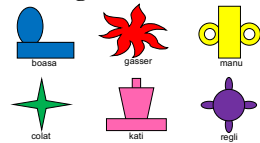
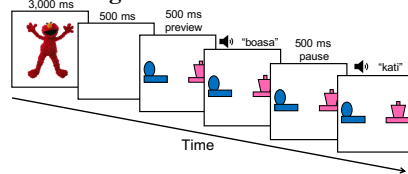


Figure 2. Trial structure



Data acquisition

- Data were collected on the National Science Foundation funded Lookit online data collection platform for developmental scientists (Kim & Schultz, 2017).
- Parents were given written directions on experimental set up then completed the study online with their toddler using their home computer and webcam (see Fig. 3).
- Video recordings of the experiment sessions were downloaded and submitted for analysis.

Figure 3. Toddler participating using home computer and webcam



Video quality assessment

- Videos were coded to evaluate their potential for useable preferential looking data.
- Parental adherence to study directions: Dichotomous Yes/No
- Interference & Technology issues: 5-point Likert scale of frequency of distraction and technology issues
 - 0 = Did not occur; 5 = Present throughout video
 - Higher values represent poorer video quality
- See Table 1

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Table 1. Video quality categories

Description	
Parental Adherence to Directions	
Correct Positioning	Parent used requested position (participant in a high chair or booster seat)
Repeated Trials	Parent repeated study trials
Incomplete Study	Parent aborted study or study trials were not completed
Interference and Technology Issues	
Parent Interference	Parent pointed to the screen, repeated spoken words, directed the child's attention
Participant Interference	Participant was fussy, crying, asleep, inattentive
External Distraction	Siblings, pets, ringing phone, television or other external stimuli that distracted the participant
Lighting Issue	Video was too bright or too dim
Tech Issue	Participant was too far from the screen and/or video was pixelated

Results

- Most parents followed the study directions (between 60% and 96% adherence; see Fig. 4)
- Lighting issues ($M = 2.43$, $SD = 2.09$) and participant interference ($M = 2.88$, $SD = 1.51$) occurred most frequently during video recordings as evidenced by highest ratings (see Fig. 5).
- Parent interference ($M = 1.56$, $SD = 1.60$), external distractions ($M = 0.83$, $SD = 1.23$) and technology issues ($M = 0.70$, $SD = 1.32$) occurred least frequently during video recordings (see Fig. 5).

Figure 4. Parent adherence to procedures

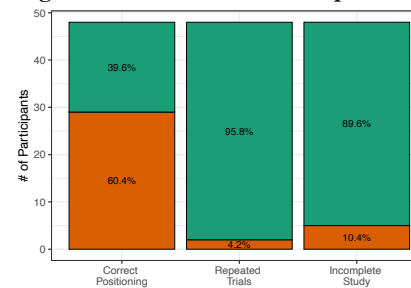
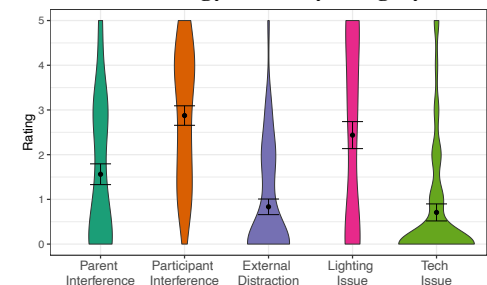


Figure 5. Frequency of interference and technology issues by category



Discussion

- Parents were generally able to follow study directions relative to experimental set up and procedures which will allow for maximal data use during preferential looking coding.
- Most participants completed the experiment although fluctuating attention was noted yet not uncommon in toddler research.
- The greatest barrier to video quality and usability was inadequate or poor lighting.
- Virtual data collection appears to be feasible for even very young participants.

Next steps

- Videos with appropriate lighting will be prioritized for preferential looking coding.
- Experimental directions will be updated to include an instruction about ambient lighting.

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