



Effects of Repeated Sample Presentation in Receptive Identification Trials

Hailey McMaster and Anna Ingeborg Petursdottir
Texas Christian University

Introduction

Receptive discrimination procedures are used in early intervention programs for children with neurodevelopmental disorders to teach skills that range from early vocabulary building to pre-academics, as well as in educational software applications for children and adults. Receptive discrimination procedures are often conceptualized as matching to sample (MTS; e.g., Green, 2001). The learner listens to a spoken word or sentence (sample stimulus), then views several visual stimuli (comparison stimuli) and indicates which visual stimulus corresponds to the sample.

In laboratory research, an MTS learning trial usually begins with the presentation of the auditory sample stimulus, followed by the presentation of the comparison stimuli (a sample-first sequence). In applied research and clinical practice, by contrast, it is common to present the visual comparisons first and give the learner an opportunity to view them before the auditory sample is presented (a comparison-first sequence). Research from our lab suggests that in general, the sample-first arrangement produces faster acquisition of receptive discriminations for typically developing children (Gee, Hiatt, Devine, & Petursdottir, in preparation; Hiatt, Devine, Aguilar, & Petursdottir, in press; Petursdottir & Aguilar, 2016).

Our previous results are consistent with Green's (2001) recommendation to model MTS implementation in clinical practice after laboratory procedures. However, Green (2001) actually recommended presenting the auditory stimulus twice in each trial, once ahead of the visual comparisons and again simultaneously with the onset of the comparison stimuli (repeated sample presentation). By contrast, our lab has presented the auditory sample only once in each sample-first trial.

The purpose of this study was to evaluate whether repeated sample presentation enhanced acquisition relative to a sample-first condition. Also included in the evaluation was a sample-first condition in which the auditory sample was presented once, but simultaneously with the visual comparisons.

Method

Participants. To date, only one pilot participant has been recruited. She is a six-year-old female kindergarten student. Sessions were conducted in the student's home.

Procedure. Visual stimuli were three sets of four bird images, which were randomly assigned to the sample-first, simultaneous, and repeated sample conditions. Auditory stimuli consisted of audio recordings of the spoken names of the birds, recorded in a female voice.

Receptive instruction sessions alternated across the three stimulus sets and acquisition under the three conditions compared in an adapted alternating-treatments design. In baseline probes, no feedback was presented on correct or incorrect responses. During instruction, a correct response, defined as clicking the positive comparison, resulted the presentation of a celebratory computer animation for 4 s, followed by advancement to the next trial. An incorrect response resulted in a black screen for 4 s, followed by advancement to the next trial.



Figure 1. The stimulus sets used in the experiment. The top row shows the set assigned to the sample-first condition for the current participant, the middle row shows stimuli assigned to the repeated-sample condition, and the bottom row stimuli assigned to the simultaneous condition.

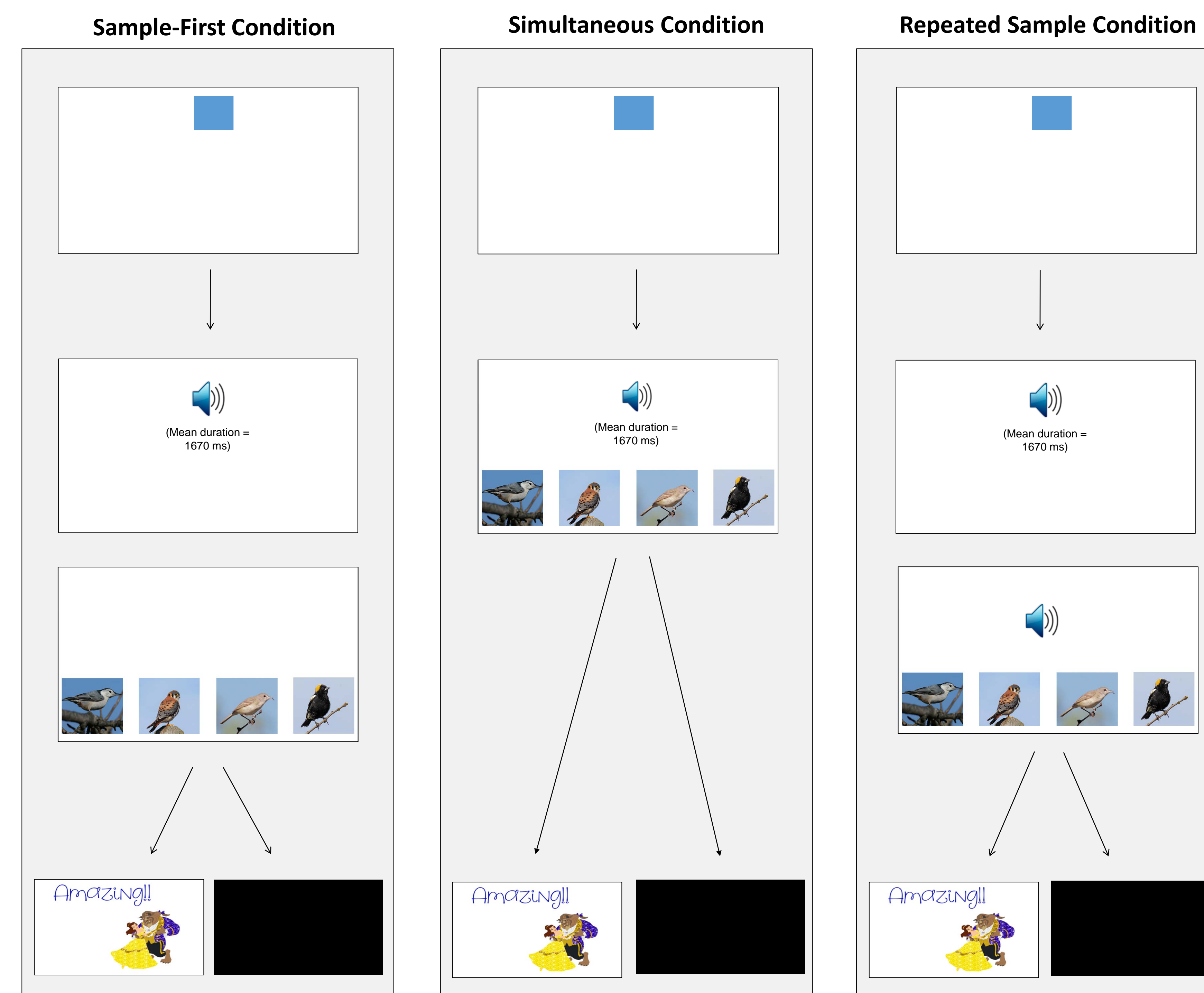


Figure 2. Stimulus presentation arrangements in the three conditions. The auditory sample stimulus is presented once in the sample-first and simultaneous conditions but twice in the repeated sample condition.

Results and Discussion

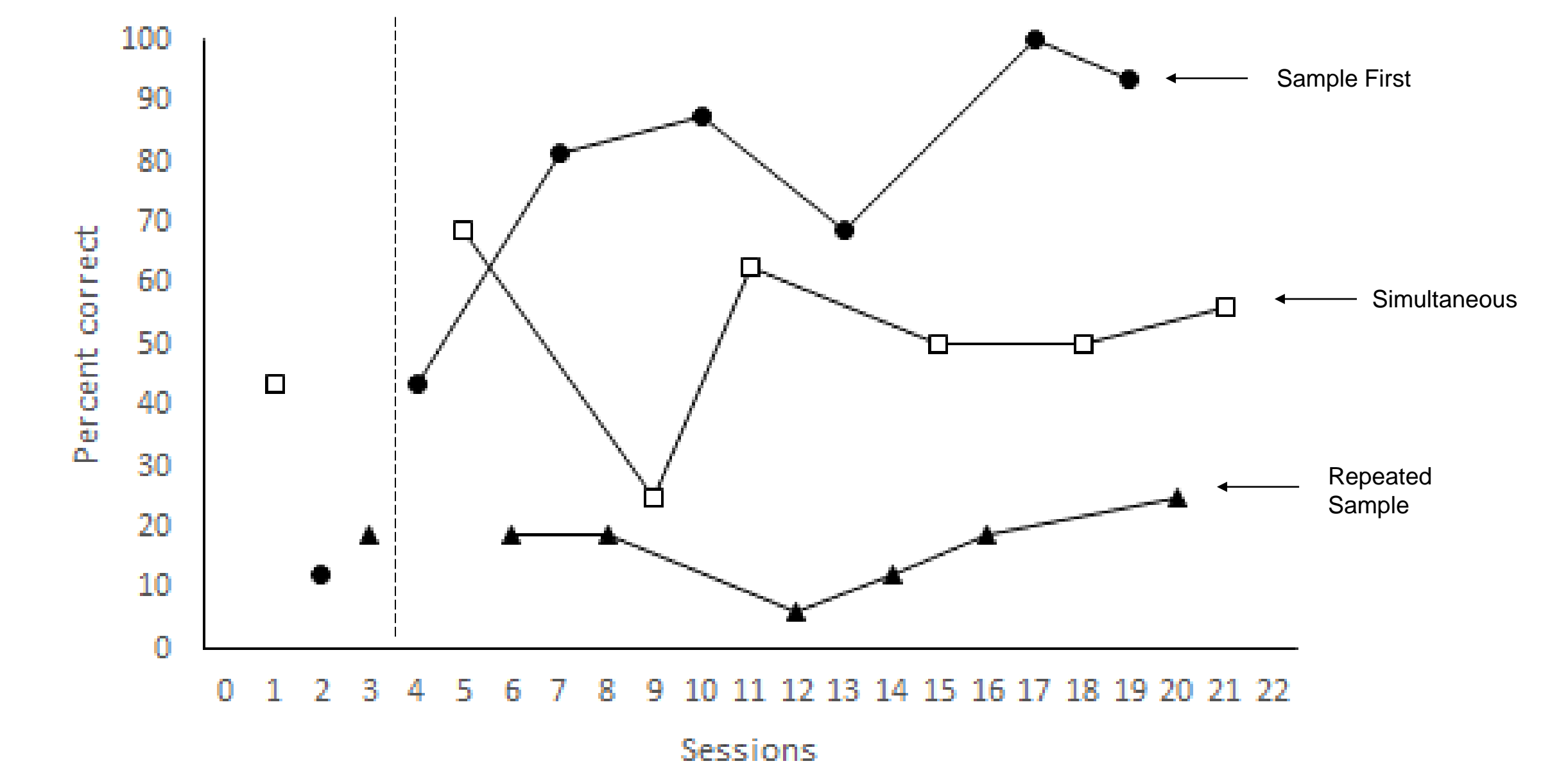


Figure 3. The participant's session-by-session accuracy in receptive instruction trials.

At this time, the participant has completed 18 instructional sessions and is close to reaching mastery in the Sample-First condition. In the Simultaneous-First Condition, she is performing above chance level in the Simultaneous condition but not showing improvement across sessions. In the Repeated-Sample condition, she is still performing at chance level with little improvement across sessions. These results are contrary to our predictions, because we expected the Repeated Sample condition to either enhance learning compared to the other two conditions, or to at least produce a similar rate of acquisition as the Sample-First condition.

It is possible that presenting the sample twice in close succession in a single trial disrupts acquisition; for example, by distracting the participant's attention from the visual stimuli. However, we speculate that more likely, some feature of the stimulus set that was randomly assigned to the Repeated-Sample condition for this participant is disrupting acquisition. In the adapted alternating-treatments design, it is necessary to replicate an effect across or within participants, while counterbalancing or varying the stimuli assigned to each condition, in order to separate an effect of the independent variable from an uncontrolled effect of the task or stimulus set assigned to each condition. The current plan is to run additional participants while counterbalancing stimulus sets across conditions, to determine if the potentially disruptive effect of repeated sample presentation seen with this participant is replicable.

By contrast, faster acquisition in the sample-first relative to the simultaneous-first condition is consistent with prior research showing an advantage of presenting the sample in isolation in receptive trials (Gee et al., in preparation; Hiatt et al., in press; Petursdottir & Aguilar, 2016).

References

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- Hiatt, K. A., Devine, B., Aguilar, G., & Petursdottir, A. I. (in press). Stimulus presentation order in receptive identification tasks: A systematic replication. *Journal of Applied Behavior Analysis*.
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