



# Evaluation of Equivalence-Based Instruction to Teach Children about Elements of Music

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## Introduction

There are many benefits for children to receive music education. Research shows that note reading and music playing skills have been correlated with improved reading and math performance as well as overall higher IQ and social awareness (e.g., Graziano, Peterson & Shaw, 1999; Kaviani, Mirbaha, Pournaseh, & Sagan, 2014; Long, 2014; Sussman, 2009).

The purpose of this study is to evaluate the use of equivalence-based instruction (EBI) to teach elements of music to children who have no music background. EBI is grounded in basic learning research on stimulus equivalence (e.g., Sidman & Tailby, 1982), and has been shown to be efficacious for teaching elements of music to novice adults (e.g., Griffith, Ramos, Hill, & Miguel, 2018) but its use for this purpose has not been evaluated with children.

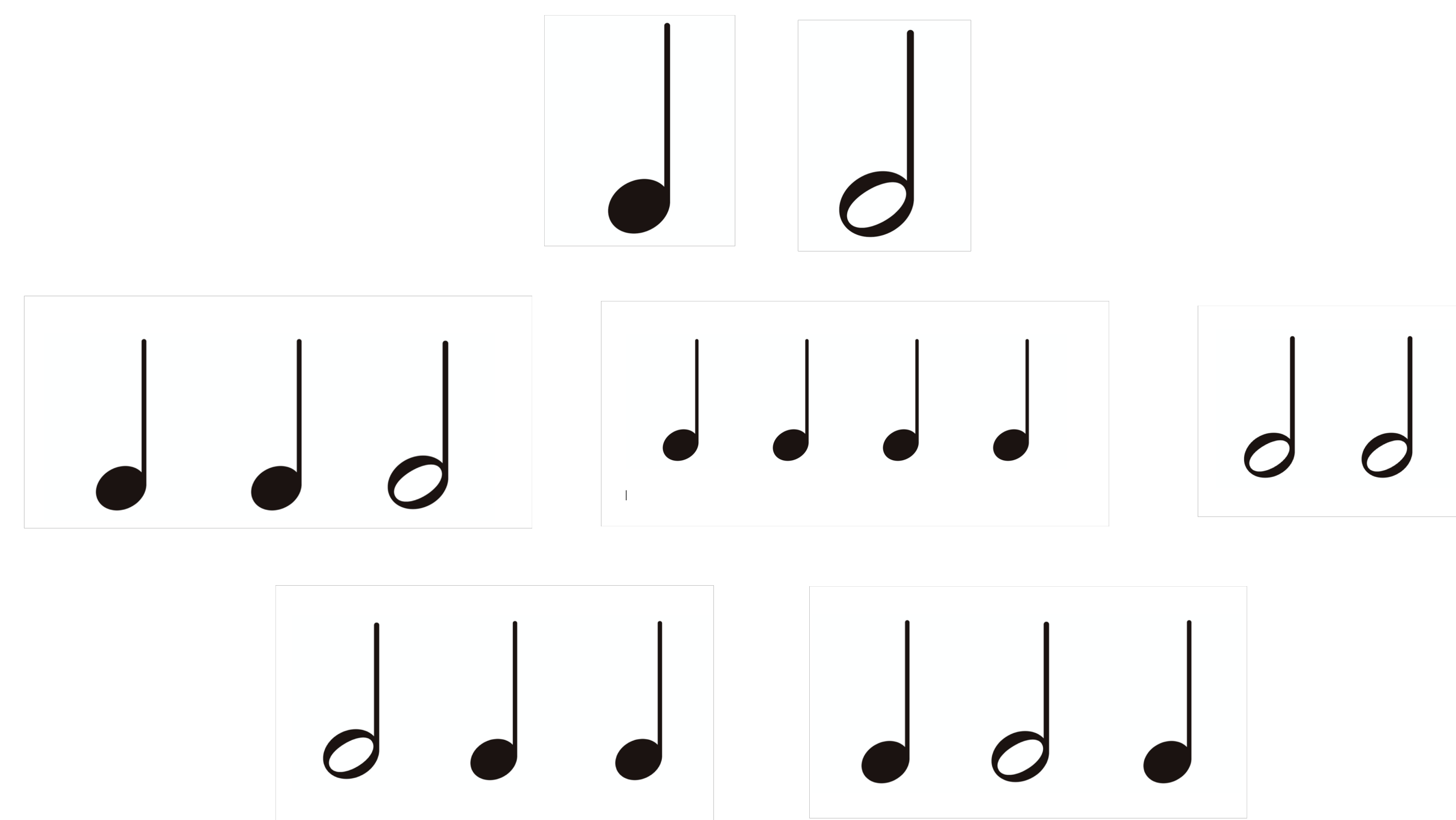
I used a multiple probe design across skills to evaluate the effects of EBI on identification of pitch, note length and finger placement on a keyboard with children aged 4. For the first part of the study, the children learned about note identity difference, such as a quarter note and half note in a similar manner. In the second part of the study, the children will be taught to relate pitch of a note to its letter name (e.g., "A") and keyboard placement; two relations will be taught directly for each pitch (e.g., pitch-"A", and keyboard-"A") and the emergence of the others (e.g., pitch-keyboard) will be tested. Finally, we will test for merging of information from both parts.

## Participants

*Participants.* Participants were recruited from a local preschool and had no language or developmental delays according to parent report. Caysen is a girl that is 4 years 6 months of age and Logan is a boy than is 4 years, 4 months of age.

## Stimuli

Visual stimuli were presented on laminated paper held up by the researcher. The stimuli used in this study are shown below. Pictures of quarter and half notes were used for AB and AC training and the various shown sequences were used for sequence training and testing.



### ABC

AB: Labeling the name of the notes (quarter or half)

AC: Labeling the length of the notes ("ba" or "ba-a")

BC: Labeling the length of the notes with verbal instruction

### DEF

DE: Finger associated with note name.

Note Name C: Thumb

Note Name D: Pointer Finger

Note Name E: Middle Finger

DF: Note name associated with key on the keyboard  
Notes will be C, D and E

EF: Placing finger on correct key on keyboard

### Baseline ABC

**AB Training**  
"What is the name of this note?"

**AC Training**  
"What is the length of this note?"

### AB/AC Probes

B-C: "What is the length of a quarter note?"

B-A: "Can you draw a quarter note?"

C-A: "Draw the note that has the length "ba"."

C-B: "What is the note you just heard?"

### AB Sequence Probe

Present all 5 sequence stimuli one at a time and ask "What are the names of these notes?"

### AB Sequence Training

Choose 2 sequences that the participant did not respond to correctly and train. Once mastery is reached (10/12 trials correct) probe remaining sequences. Train any remaining sequences missed.

### AC Sequence Probe

Present all 5 sequence stimuli one at a time and ask "What are the lengths of these notes?"

### AC Sequence Training

Choose 2 sequences that the participant did not respond to correctly and train. Once mastery is reached (10/12 trials correct) probe remaining sequences. Train any remaining sequences missed.

### Baseline DEF

### DE Training

"Show me "C" on your hand"  
C: Thumb, D: Pointer, E: Middle

### DF Training

"Which note is this?" while pointing to the note on the keyboard

### EF Training

"Which note does this finger go on?"

### DE/ED Probes

D-E: "Show me which finger goes here" while pointing to designated note on the keyboard.  
E-D: "Show me where this finger goes on the keyboard" while holding up designated finger.

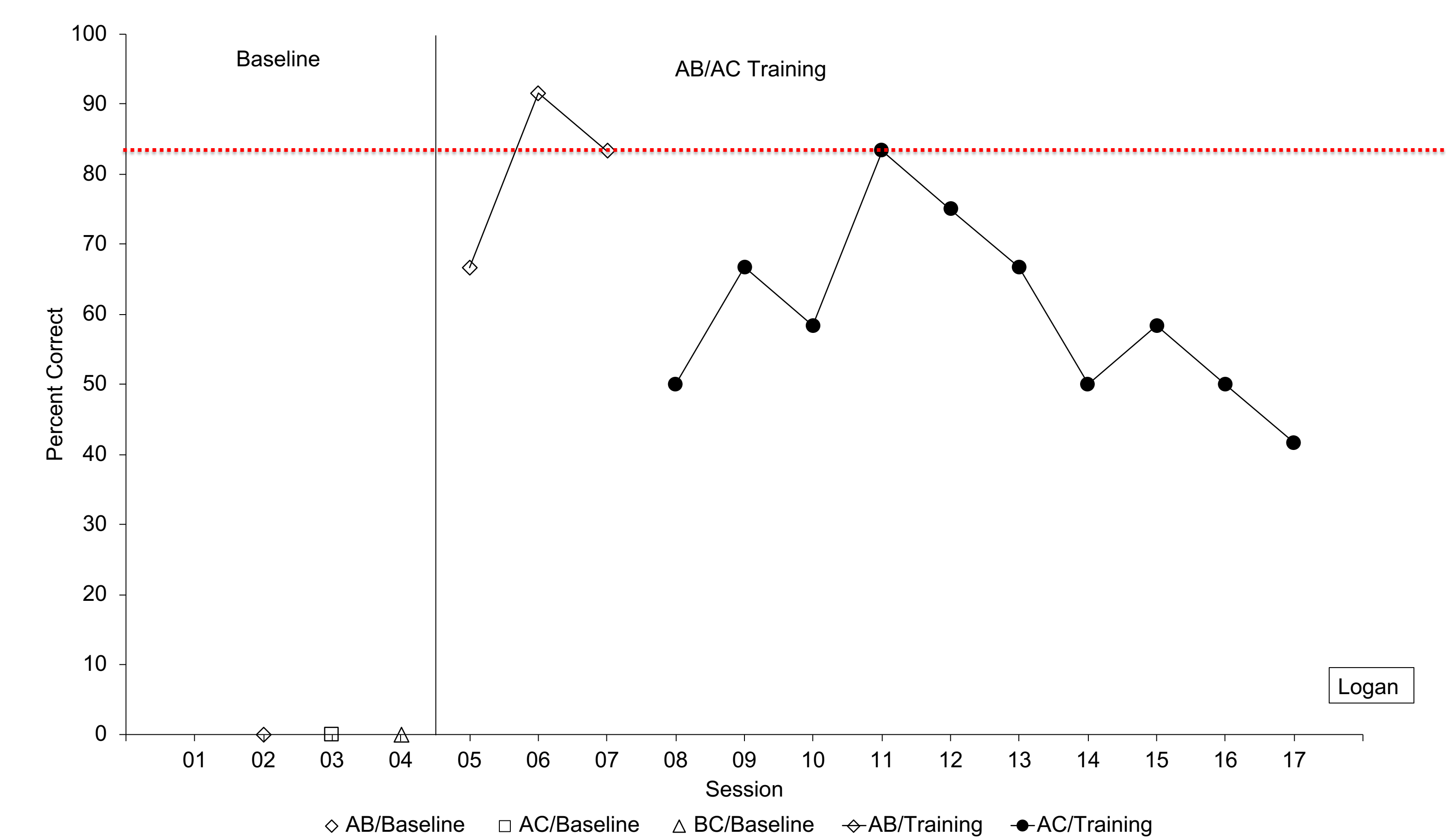
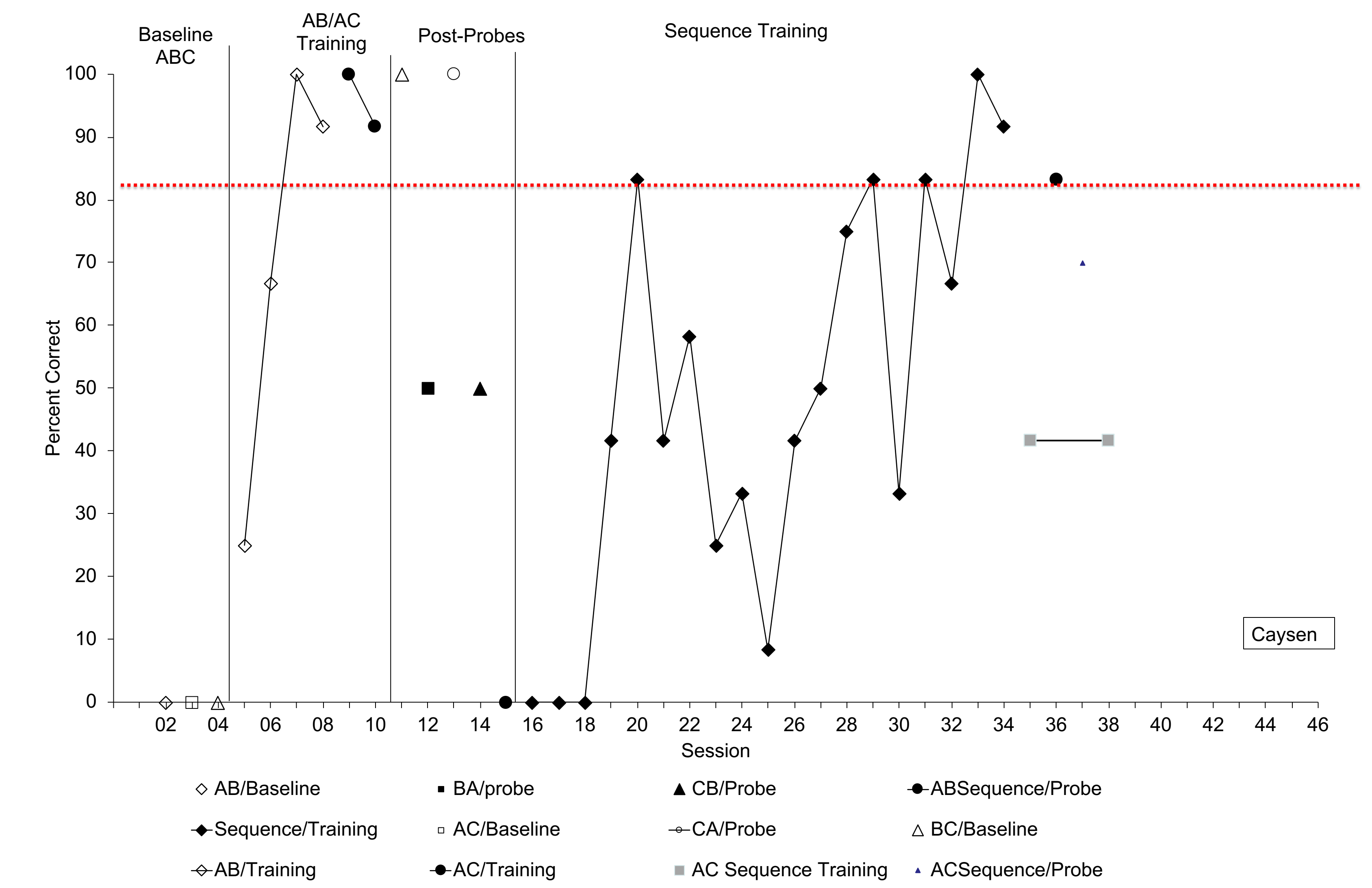
### Tests

**EDF:** Ask participant "Can you play "C"? Repeat each note (C, D, or E) twice.

**ACDEF:** Show participant one of the note cards used in sequence training containing 3 notes and ask "Play this sequence on specified note (C, D, or E)."

**ACDEF Combined Sequences:** Show participant two of the note cards used in sequence training containing 3 notes and ask "Play this sequence on specified note (C, D, or E)."

**BCDEF:** Participant will be asked to play one of the 3 note sequences from sequence training on specified note when asked.  
"Play "half, quarter, quarter on C."



## Results and Discussion

These data are preliminary as data collection for this study is ongoing. At least one more participant will be added, and sessions are currently still being run with Caysen.

Logan's participation was terminated due to his unwillingness to continue.

The post-probes that occur immediately following AB/AC training test for the emergence of untaught stimulus relations. Passing of these probes would indicate that the participant does not need training of all relations for these to emerge. Caysen, however, did not pass all of these probes suggesting that more training would be needed for all relations to emerge. However, with the additional training that will be conducted, it is still quite possible that she will pass the final tests.

## References

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