

# Visual Feedback to Facilitate Language in a Child With Autism

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## RATIONALE

Use of the visual modality to facilitate vocal development may be particularly beneficial given the role of auditory processing difficulties in childhood language disability in general (Leonard, 2000) and ASD in particular (e.g., Paul, 2007). Visual skills appear to be a relative strength for most children with autism (e.g., Minshew, Goldstein, & Siegel, 1997) as does an interest in technology (e.g., Kerr, Neale, & Cobb, 2002).

## PURPOSE

The purpose of the present interdisciplinary study is to examine the use of contingent visual feedback as a strategy for facilitating speech-language development in children with autism spectrum disorder (ASD) using a single-subject alternating treatments design. Specifically this study addresses the following questions:

1. Do two different therapy conditions facilitate expressive vocabulary acquisition in a young child with ASD?
2. Does the use of computerized visual feedback facilitate goal acquisition to a greater extent than traditional visual feedback utilizing a mirror?

## PARTICIPANT

- Victor, a 5-year-old male with diagnoses of ASD and Childhood Apraxia of Speech (CAS).
- Fewer than 50 words at initiation of the study, based on the MacArthur-Bates Communicative Development Inventory (MCDI)

## PROCEDURES

This single-subject alternating treatments design focused on expressive vocabulary development through a combination of motor practice and developmental techniques. Fifteen target vocabulary words were selected and included:

- words that Victor reportedly understood,
- words that Victor had never imitated,
- words that were within his phonetic repertoire.

The targets were divided into three lists containing five words each. Each of the three five-word lists were then randomly assigned to three different conditions:

- **computer**: motor practice using the computer feedback paired with developmental therapy techniques,
- **mirror**: motor practice using the mirror paired with developmental therapy techniques,
- **control**: no treatment.

Each intervention was delivered once weekly. All sessions followed the same general schedule:

1. Probe
2. Motor practice period (either computer or mirror)
3. Structured play

Data were collected during the play portion of each session in addition to the data gathered from probe responses. Victor's spontaneous verbal productions, imitative verbal productions, and spontaneous Go Talk 20+ productions were recorded.

Baseline sessions were conducted until stability was reached based on visual inspection (Kazdin, 1982).

**Probe.** The ongoing probe procedure designed to assess Victor's expressive production of 15 target words was administered each session (See Figure 1).



Fig 2. Mirror used during motor practice in **mirror** condition.

**Motor Practice Period.** The clinician modeled and elicited imitation of each of the five target words assigned to the condition (either **computer** or **mirror**) two times during the motor practice period using the corresponding tool, either the computer or the mirror.

### Structured play.

Those five words were then targeted functionally in play activities with therapeutic strategies including modeling in meaningful contexts, eliciting (including use of carrier phrases), use of visual supports, and exaggerated prosody/intonation.



Fig 3. Motor practice with computer during **computer** condition

## RESULTS/CONCLUSIONS

Visual inspection of graphically represented data, consistent with evaluation of single-subject data, was performed to address the research questions.

**Question 1: Treatment Effect.** Victor's production of the treatment words (**computer** and **mirror**) during the probe and the spontaneous play period were evaluated (see Table 1).

Table 1. Average treatment word production vs. average control word production.

	Treatment Targets	Control Targets
Spontaneous Probe Average	0.70	0.05
Imitative Probe Average	1.00	0.50
Play Period Average	0.30	0.00

In sum, the two different therapy conditions did facilitate vocabulary acquisition to a greater extent than no treatment.

**Question 2: Treatment Comparison.** Table 2 includes Victor's average number of accurate productions during the spontaneous and imitative probe steps. Victor's production average increased slightly more for the **computer** condition than for the **mirror** condition.

Table 2. Probe spontaneous word production averages by condition

	Computer	Mirror
Baseline Average	0.25	0.13
Intervention Average	0.82	0.55
Intervention-Baseline	0.57	0.42

Figure 4 depicts Victor's spontaneous productions of different words for each condition spontaneously during play. His productions in each condition increased similarly as the intervention continued. Total number of target words used per session ranges from 0 to 4 for the **computer** condition and from 0 to 7 for the **mirror** condition.

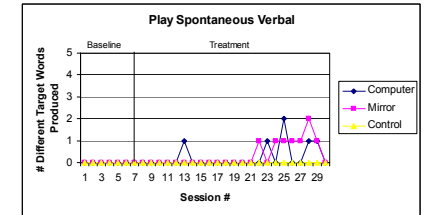


Fig 4. Number of Different Target Words Produced Spontaneously During Play

Figure 5 depicts the number of different target words Victor produced imitatively during play.

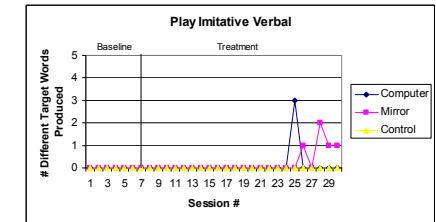


Fig 5. Number of Different Target Words Produced Imitatively During Play

These results indicate that neither type of visual feedback for motor practice demonstrates benefits above and beyond the other.

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