TEACHING EYE-GAZE MOTOR SKILLS OUTSIDE OF THE CONTEXT OF COMMUNICATION

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HELLO!

- First year doc student
  - Special Education
  - Mentor: Dr. Susan Johnston
- Public School SLP for 9 years
  - California- resource rich district
  - New Mexico- resource poor district

"COMMUNICATION IS NOT ONLY THE ESSENCE OF BEING HUMAN, BUT ALSO A VITAL PROPERTY OF LIFE."
-JOHN A. PIECE

BACKGROUND

- Severe motor impairments limit all aspects of development (Raghavendra, Olsson, Sampson, McInerney & Connell, 2012).
- AAC can mitigate these adverse effects (Henderson, Skelton, Rosenbaum, 2008).

BACKGROUND

- Eye-gaze controlled assistive technology (AT):
  - Valid, evidence-based intervention. (Henderson, Skelton, Rosenbaum, 2008).
  - Widely available and practical (Majaranta, 2012; Pfieffer, 2014).
  - Can mitigate limitations from severe motor impairment and improve quality of life. (Borgestig et al. , 2016; Berry and Ignash, 2003).

CASE REPORT (HEMMINGSON AND BORGESTIG, 2017)

- Infant with severe motor impairments (C1 quadriplegic)
- Unable to speak due to respiratory factors
- Eye-gaze AT introduced 9 months of age
- At 26 months of age, he was able to
  - Spontaneously interact with parents and siblings
  - Label objects using eye-gaze controlled AAC system.

BACKGROUND

- Operation of eye-gaze controlled AT is typically taught within the context of communication.
- This approach may have limitations (Karlsson et al., 2019)
- A systematic instructional plan is key. (Van Niekerk & Tongsing, 2015)

STUDY OBJECTIVE

Is systematic instruction of eye-gaze motor skills practiced outside the context of communication effective in increasing eye gaze control?

METHODS & STUDY PARTICIPANT

- Single case study investigation
- 17-year-old male with Aicardi-Goutieres Syndrome
  - Cortical visual impairment
  - Spastic cerebral palsy
- Non-ambulatory, requires total assistance for activities of daily living.
- Motor impairments preclude verbal speech- nods head to communicate yes/no

PARTICIPANT CHARACTERISTICS

- Demonstrates understanding of spoken language in both and home and school
- Understands and enjoys humor
- Interested in and follows peer conversations
- Motivated by social interaction and practicing skills in community settings

STUDY INTERVENTION

- *Look to Learn* software: 40 eye-gaze controlled video game activities
- We identified activities that:
  - Practice skills necessary for eye-gaze controlled AT
  - Elicit an observable and measurable behavior
- 20 *Look to Learn* activities met criteria
  - Organized into 7 levels based on complexity and learning objective
- Easiest skills introduced first with progressive difficulty/complexity

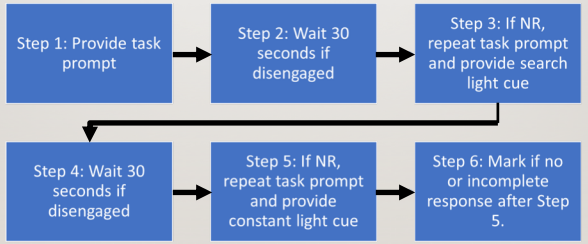
INTERVENTION LEVELS

Level/Objective	Activities Within Level
Level 1: Screen Initiation	Magic Mouse, Canon, Magic Squares
Level 2: Large Target Selection	Egg, Reveal Shapes, Real Shapes, Reveal Blocks, Custard Pies
Level 3: Medium Target Selection	Face Splat, Hose, Shoot, Video Wall
Level 4: Large Target Selection with Dwell Function	Farmyard
Level 5: Medium Target Selection with Dwell Function	Musical Squares
Level 6: Indicate a Choice Using Dwell Function	Dinner Time, Javelin, Snowman, Tyres, Opinions
Level 7: Indicate a Series of Choices Using Dwell Function	Monster Factory

INTERVENTION

- Goal: daily *Look to Learn* sessions
- Each session has five "opportunities"
  - Sequence of prompts to complete a *Look to Learn* task
- Session scored from 0-5 for number of opportunities completed
- Mastery required to progress to next level
  - Mastery defined as score of ≥ 4 in 2 of 3 consecutive sessions
- Asses inter-observer agreement, intervention fidelity in 20% of sessions

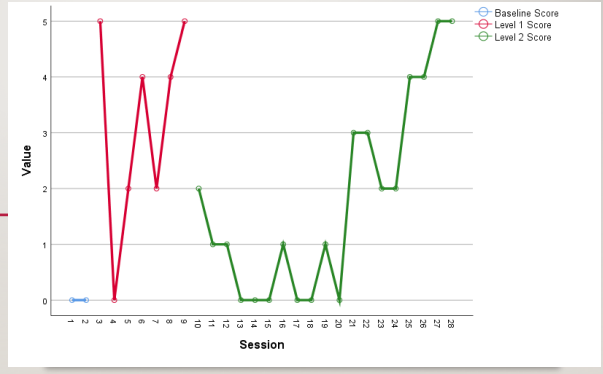
PROMPT SCHEDULE



PRELIMINARY RESULTS

- 28 sessions completed
- Levels 1 & 2 mastered
- 100% inter-observer agreement and intervention fidelity

PRELIMINARY RESULTS



INTERPRETATION OF RESULTS

- Eye-gaze motor skills can be acquired outside the context of communication
- Participant motivation is key to success
- Consistency of implementation plays a role in success
- Rate of level mastery may slow as objectives become more difficult

FUTURE DIRECTIONS

- Reproduce study with single-case design with 3-6 participants
- Assess generalization of eye-gaze motor skills for communication application
- Identify optimal level/timing for introduction of eye-gaze AAC

DISCUSSION

Participant-related research barriers among low incidence populations in public school context

- Inconsistent school attendance due to health issues
- Participant recruitment
- Inclusion and exclusion criteria

DISCUSSION

Systems-related research barriers among low incidence populations in public school context

- School personnel
- District/Administrative support
- Availability and function of technology