**Generalized Motor Imitation (GMI) Protocol**

**Lesson summary:**

The acquisition of imitation skills is critical for the development of language and social repertoires as it establishes not only critical observing responses but also social reciprocation. Imitation can be defined as a behavior that follows another individual's behavior in which the form is controlled by the behavior of other individuals and reinforcement is contingent upon point-to-point correspondence. Thus, imitation is based upon the premise of observational learning. In contrast, generalized imitation is the result of direct reinforcement of a *class* of responding and is not behavior controlled by the observation of the contingencies related to single responses by others. Generalized imitation involves the continued performance of a response for which the *child has never received reinforcement*. This proves pivotal when educating children because once a child has acquired generalized imitation, he or she does not need to be explicitly taught each new motor action separately with response prompts. In this manner, generalized imitation meets the criteria for acting as a behavioral cusp (Ruiz & Baer, 1997). A teacher can simply demonstrate novel behaviors for a child and then teach the relevant antecedent and consequent relations that are needed to learn new operants that were previously unavailable. Children who master this Generalized motor imitation (GMI) protocol can imitate novel motor actions without explicit training or reinforcement.

**Protocol overview:**

The child imitates sets of 4 motor movements while watching the therapist's reflection in a mirror. As the child meets criterion for a given set, the therapist probes the child on a set of novel motor imitations to determine when/if child acquires generalized motor imitation (GMI) as per long term objective (LTO) criterion. Training continues with sequential sets of 4 novel target actions taught in the mirror until GMI is established or the LTO is achieved during the probe sessions Child performance on any existing motor imitation program prior to and after program implementation serves as a measure of program efficacy. All other instructional programs involving imitation are paused while implementing this protocol.

**Materials:**

A full length UN-BREAKABLE mirror measuring approximately 13.5 X 50 inches.

**Target behaviors:**

CORRECT RESPONSE:
Mirror trial: The child looks at mirror and imitates the instructor's motor actions in reflection (represents point-to-point correspondence with model in mirror ) within 5 seconds of the model and a concurrent verbal Sd (e.g. "Do this", "Copy me", "Do what I'm doing", or similar).

Probe trial: The child looks at instructor and imitates his/her motor actions (represents point-to-point correspondence) within 2 seconds of the model and a concurrent verbal Sd (e.g. "Do this", "Copy me", "Do what I'm doing", or similar).

INCORRECT RESPONSE
Mirror trial: The child looks at mirror but incorrectly imitates the instructor's motor action in reflection (i.e. action does not represent point-to-point correspondence with model in mirror), orients on

instructor and imitates (instead of mirror), fails to respond to model and verbal Sd within 5 seconds, and/or engages in interfering behaviors (e.g. looking away.

<u>Probe trial:</u>
The child incorrectly imitates the instructor's motor action (i.e. action does not represent point-to-point correspondence with model), fails to respond to model and verbal Sd within 2 seconds, and/or engages in interfering behaviors (e.g. looking away).

**Data collection:**

Per opportunity (trial based) – 20 trials /session. Total % responses correct per session

**Mastery criteria:**

- 90% correct responses for two consecutive mirror sessions
- 80% correct trials for probes for one session, which is the long-term objective (LTO) for this protocol

**Procedures:**

PROGRAM STRUCTURE AND SEQUENCES

1. Begin with probe.
    a. If the child meets LTO criterion, do not run program
    b. If child does not meet LTO criterion, introduce the first set of 4 target actions to be taught in the mirror.
2. Run 20 trial sessions until criterion is achieved.
3. Conduct a post-probe session for novel actions.
    a. If child meets LTO criterion, end program
    b. If child does not meet LTO criterion, continue mirror sessions with next set of 4 targets
4. Continue sequence until LTO is achieved

TEACHING SESSIONS IN THE MIRROR

5. Establish a place to teach the imitations. This does not necessarily have to be a desk/chair.
6. Select any previously mastered, directly taught motor actions as initial targets for mirror training. This will make it easier for a single person to run the program.
    a. If none, you can teach novel actions in the mirror (not part of the probes). However, you may need an additional person to prompt responses initially.
7. Ensure that the child is looking at the mirror and not at the teacher by pointing to the mirror as part of the antecedent during instructional sessions.
8. Use a progressive prompt delay and graduated physical guidance procedure to evoke correct responding
    a. Use a 0-second delay and full physical prompting on initial imitation targets
        i. If available, a 2nd person would be helpful during early stages of instruction
    b. Begin prompt fading by using a 2-second delay before prompting and partial physical guidance
    c. Continue to fade delay to prompting interval, but do not exceed 5 second delay

ERROR CORRECTION

9. Upon incorrect response, the instructor will:

a. Terminate trial
b. Re-present antecedent (model and verbal Sd)
c. Manually guide the child to perform action
d. Offer verbal affirmation of correct response (e.g. “yes, that is copying me” or similar)
    i. Do not make this praise, just affirmation
e. Re-present the antecedent (again)
    i. If child emits CR, reinforce
    ii. If child emits IR, repeat error correction procedure

10. If child makes 3 consecutive errors (i.e. therapist runs error correction 3x consecutively), move to next target is action set.
    a. Make note and discuss with BCBA

PROBE SESSIONS

11. Reserve a set of 20 novel motor actions that are not in the student’s repertoire (do not teach these actions in the mirror).
12. Conduct unconsequated probes (20 novel actions) directly facing the student (do not use the mirror).

**References:**

Charlop, M. H., Schreibman, L., & Thibodeau, M. G. (1985). Increasing spontaneous verbal responding in autistic children using a time delay procedure. Journal of Applied Behavior Analysis, 18, 155–166. doi: 10.1901/jaba.1985.18-155

Collins,A., Parker,S., Thorne,J. & Peak, E. (2019). The effects of the mirror protocol on generalized motor imitation and Early observing responses. Paper presented at the Association for Behavior Analysis International, 45th Annual Convention; Chicago, IL.

Miller,S., Rodriguez, N.M. & Rourke, A.J. (2015). Do mirrors facilitate acquisition of motor imitation in children diagnosed with autism? Journal of Applied Behavior Analysis, 48, 194–198.

Ruiz, J.R., & Baer, D.M. (1997). Behavioral Cusps: A developmental and pragmatic concept for behavior Analysis. Journal of Applied Behavior Analysis, 30, 533-544.