Strategies & Sequences of Motor Skills to Teach Functional Sign Language

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Comparing Topography-Based Verbal Behavior With Stimulus Selection-Based Verbal Behavior

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Michael (1985) distinguished between two types of verbal behavior: *topography-based* and *stimulus selection-based* verbal behavior. The current research was designed to empirically examine these two types of verbal behavior while addressing the frequently debated question, Which augmentative communication system should be used with the nonverbal developmentally disabled person? Four mentally retarded adults served as subjects. Each subject was taught to tact an object by either pointing to its corresponding symbol (selection-based verbal behavior), or making the corresponding sign (topography-based verbal behavior). They were then taught an intraverbal relation, and were tested for the emergence of stimulus equivalence relations. The results showed that signed responses were acquired more readily than pointing responses as measured by the acquisition of tacts and intraverbals, and the formation of equivalence classes. These results support Michael's (1985) analysis, and have important implications for the design of language intervention programs for the developmentally disabled.

of the verbal operants. Although, the current trend is to favor facilitated communication (typing) and pointing systems, both of these response forms have several disadvantages that impede the development of the verbal operants. It is suggested that for many nonverbal individuals sign language is a better alternative response form, and has a better chance of improving speech.

The recent interest in facilitated communication (FC), especially by the media, has drawn substantial attention to the language needs of nonverbal persons. However, many of the issues concerning how to best meet these needs remain unresolved. It is clear that many developmentally disabled (DD) individuals with severe language disorders can benefit from some type of augmentative communication (for a review, see Zangari, Lloyd, & Vicker, in press). But questions as to which augmentative system might be the most effective repertoires? There are four general options: (1) speech, (2) independent writing or typing, or facilitated communication, (3) pointing and exchange systems (including computer generated speech), and (4) sign language. There is an extensive body of research on each of these alternatives; however, there is relatively little empirical or conceptual research comparing them (for a review, see Shafer, 1993). Often decisions to use one system or another are based on the personal preference of the trainers, rather than on the student's individual

Why teach sign language?

- Motor imitation may already be present in the learner's repertoire.
  - If not, motor imitation can be taught through sign language.
  - Stronger imitation has been correlated with better speech and language (Sutera et al, 2007)

Why teach sign language?

- Signs often resemble their corresponding non-verbal stimuli (an iconic relation), which can function as an embedded prompt
  - Balloon, ball, drink, book, car, etc.
- The learner can sign at any time, in any setting, without environmental modifications
  - No equipment to carry, can sign in a pool, on a playground, etc.

Why teach sign language?

- Sign language is a topography-based form of communication, like vocal speech, and in many cases, leads to the development of vocal speech.
- Signs can be emitted at rates comparable to vocal speech, which is conducive to reciprocal conversation. Selection-based systems can be much slower.

Why teach sign language?

- Sign language can be used across the verbal operants, including the autoclitic.

Why sign language programs may be unsuccessful

- Lack of emphasis on the mand repertoire
- Generalized mands may be taught before specific mands
- Signs may be very similar topographically
- Failure to establish a community of signers in the learner's environment

Why sign language programs may be unsuccessful

- Difficulty with prompting and shaping signs
- Insufficient teaching trials across persons and settings
- Lack of a systematic, progressive curriculum

Motor Challenges in Learners with Autism

- The Autism Society of America (2007) lists deficits in motor skill as as one of the defining characteristics of autism
- Some specific challenges include motor imitation, finger to thumb opposition, and coordination (Lord & McGee, 2001)

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ORGINAL PAPER

A Comparison of Motor Delays in Young Children: Autism Spectrum Disorder, Developmental Delay, and Developmental Concerns

Beth Provost · Brian R. Lopez · Sandra Heimerl

Abstract This study assessed motor delay in young children 21–41 months of age with autism spectrum disorder (ASD), and compared motor scores in children with ASD to those of children without ASD. Fifty-six children (42 boys, 14 girls) were in three groups: children with ASD, children with developmental delay (DD), and children with developmental concerns without motor delay. Descriptive analysis showed all children with ASD had delays in gross motor skills, fine motor skills, or both. Children with ASD and children with DD showed significant impairments in motor development compared to children who had developmental concerns without motor delay. Motor scores of young children with ASD did not differ significantly on motor skill measures when compared to young children with DD.

Introduction

Autism or autistic disorder is a developmental disorder characterized by difficulties in social interaction and communication, as well as by repetitive, restricted interests, and behaviors (American Psychiatric Association, 1994). Many of the core characteristics of autism are shared by other diagnoses in the broader category called Pervasive Developmental Disorders (PDD). According to the National Institute of Mental Health, autism spectrum disorders (ASD) is another term for PDD, and includes the classic form of autistic disorder as well as Asperger's Syndrome (AS) and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) (National Institute of Mental Health, 2004). Although differences in motor development are not considered primary diagnostic catego-

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Sign Language and Motor Functioning in Students with Autistic Disorder[1]

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Sign language production of 14 low-functioning students diagnosed with autistic disorder was examined. Videotapes of the students signing with their

Journal of Autism and Developmental Disorders, Vol. 11, No. 1, 1981

Sign Language and Autism

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Research findings and issues in teaching sign language to nonspeaking autistic children are reviewed. Data on over 100 children indicate that nearly all autistic children learn receptive and expressive signs, and many learn to combine signs. These children also exhibit marked improvement in adaptive behaviors. Speech skills are acquired by fewer children and may be developed through simultaneous speech and sign training. Possible explanations for these results are given, together with suggestions for future research and data collection. Recommended innovations include exposure to fluent signers and training in discourse and code-switching. Different sign language teaching methods need to be investigated more fully, including emphasis on training sign language within the children's total environment and with greater staff and parental participation.

Overcoming Challenges

- Teaching learners with autism to sign may be challenging, but in many cases, it is an achievable and life-changing goal.
- The primary focus of this workshop will be programming and teaching signs, with a special emphasis on motor skills, to help learners become successful signers.

Establishing Motor Proficiency for Signing

- Teaching motor imitation
- Modifying signs
- Manding
- Strengthening fluency through intraverbal sign drills
- Strengthening fluency through precision teaching / maxi-guiding
- Teaching to generality / generalization
- Social validity checks

Why teach imitation?

- Research suggests that early motor imitation skills are an indicator of optimal outcomes in children with ASD (Sutera et al, 2007) including language development (Stone et al, 1997)
- Children with autism have more difficulty acquiring motor im than peers with DD of similar mental ages (Stone et al, 1997)

Why teach imitation?

- Imitation can be used to establish a mand repertoire (Ross & Greer, 2003)
- Fluent fine motor & oral motor imitation are correlated with fluent speech (Gernsbacher et al, 2007)
- Strong imitation with objects is correlated with spontaneous play skills (Stone et al, 1997)

Why teach imitation?

- Motor imitation is also extremely important for non-vocal learners who rely on sign language as their primary form of communication

The Analysis of Verbal Behavior 2011, **27,** 95–101

Acquisition of Mands, Tacts, and Intraverbals Through Sign Exposure in an Individual With Autism

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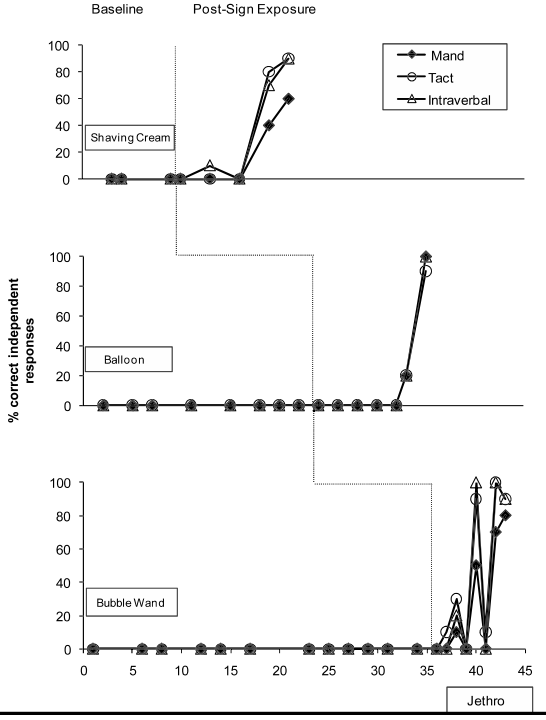
Many children with autism communicate through the use of alternative communication systems, such as sign language. Limited research has been conducted on the situations under which sign language will be acquired across verbal operants without direct teaching. The purpose of the current study was to evaluate exposure to sign language on the acquisition of signed mands, tacts, and intraverbals in a male child with autism. Results indicated fast acquisition of mands, tacts, and intraverbals without direct teaching. Results are discussed in the context of future research investigating exposure without direct teaching in individuals who communicate with alternative communication systems.



involving point-to-point correspondence but no formal similarity fall into the codic category. Echoic behavior and other relations with formal similarity fall into the duplic category. This arrangement results in useful category names for all elementary forms and prevents potentially confusing extensions, such as referring to Braille reading as textual behavior, or sign imitation as echoic behavior.

In *Verbal Behavior* (1957) Skinner identified and named five types of functional relations between controlling variables and verbal responses. These are the mand, tact, intraverbal, textual and echoic relations. In the section on transcription (pp. 69-71) he almost named two more, which can be usefully referred to as *copying a text* and *taking dictation* (see paragraph 2 and 3 of page 70)[1]. Skinner's general analysis of verbal behavior has greatly facilitated our ability to talk effectively about human behavior, and these elementary behavioral units are an essential aspect of this analysis.

In teaching from *Verbal Behavior* I have found it convenient to add two more special

MAND

When the response form (topography) is controlled by a current unlearned or learned motivational variable (an unconditioned or conditioned establishing operation) such as deprivation or the warning stimulus in an avoidance situation, the relation is called a mand. Said another way, the response form is most closely related historically to what has previously functioned as reinforcement for responses of that form. The response can consist of speaking, writing, signing (as with the sign language of the deaf), finger spelling, sending Morse code, etc. Skinner classifies mands as requests, commands, entreat-

Mimetics

- Duplic
  - Response form is controlled by a verbal stimulus
  - Point-to-point correspondence
  - Echoic, identigraphic, mimetic
- Mimetic – imitating signs
- We should teach verbal behavior across the operants with our signers, just as we do for our vocal speakers

The Analysis of Verbal Behavior 2008, **24,** 63–67

A Functional Analysis of Non-Vocal Verbal Behavior of a Young Child With Autism

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The functions of an American Sign Language response were experimentally evaluated with a young boy diagnosed with autism. A functional analysis procedure based on that reported by Lerman et al. (2005) was used to evaluate whether the target sign response would occur under mand, tact, mimetic, or control conditions. The target sign was observed most often in the mand and mimetic test conditions, very seldom in the tact test condition, and never in the control condition. These results support those reported by Lerman et al. and extend previous research by evaluating a non-vocal verbal response using a brief multi-element arrangement with a single control condition. The implications for language assessment and suggestions for future research are discussed.

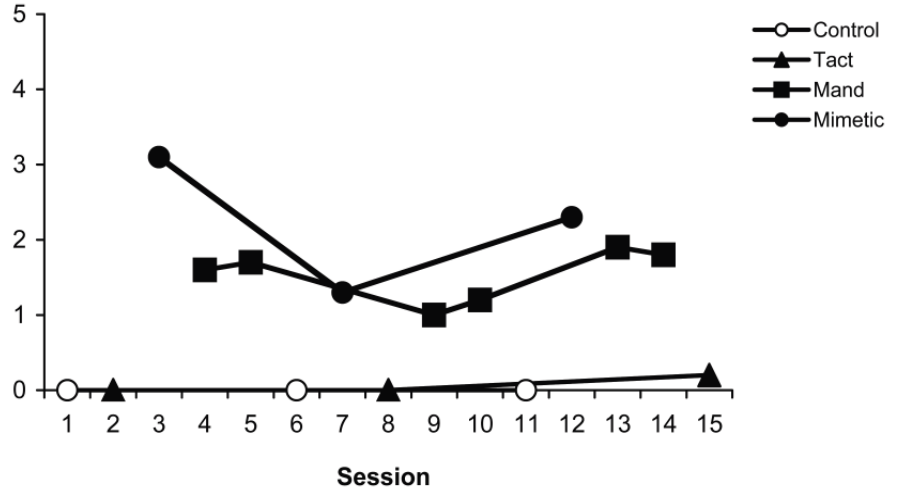

Figure 1. Rate of signs per minute observed under each of the four experimental conditions.

Problems with Motor Imitation

- Learner's motor skills are generally delayed
- Learner's motor skills and imitation skills do not match
- Learner lacks precision in imitation
- Inappropriate source of stimulus control
- Generalized imitation has not been established

Developmental Sequence for Early Motor Imitation

- Motor imitation with objects
- Gross imitation of arm or leg movements
- Generalized imitation of "novel" movements
- Imitation of fine motor movements
- Imitation of sequences
- Delayed imitation

Neurologically typical children acquire new fine/gross movements continually and simultaneously

Selecting Targets for Imitation

- Choose AT LEAST 2 targets to teach simultaneously
- Consider:
  - Chronological age
  - Developmental norms
  - Functionality / social validity of skill

Basic Intervention Strategies

- Physical prompting
- Shaping
- Intensive teaching & natural environment teaching
- Continue teaching until generalization occurs

Imitating Simple Actions with Obj.

- This is likely the first objective you will teach to a learner who lacks a motor imitation repertoire
- Teach "meaningful" actions before non-meaningful actions (Stone et al, 1997)
- Use objects that provide visual or auditory feedback (Ingersoll et al, 2003)
- As soon as possible, begin teaching conditional discrimination:
  - Vary the verbal Sd
  - Selecting object from field
  - Multiple actions with one object

Imitating Arm/Hand Movements Without Objects

- Teach at least 2 targets at a time
- Teach "meaningful" actions before non-meaningful actions (Stone et al, 1997)
- Most common prompt procedure = physical prompts, faded by topography and time
- Alternative procedures for transferring stimulus control

Imitating Arm/Hand Movements

- Research on the acquisition of sign language in young children offers helpful information (Bonvillian & Siedlecki, 1998, 2000)
- Acquiring aspects of sign language:
  1. Location (easiest)
  2. Movement
  3. Hand shape (hard)

Location Aspect of Sign

- Highly contrasting locations are acquired first
  - Forehead, chin, on / in front of the trunk
- More difficult locations:
  - Surface area allows smaller point of contact
  - Active signing hand must cross midline to reach point of contact
  - Active signing hand must contact a hand shape on opposite hand (Bonvillian & Siedlecki, 1996)

TABLE 2 Acquisition Order of ASL Locations Using Three Measures

Location	Measure: Accuracy of Production	Measure: Ordinal Position	Measure: Production Frequency	Mean
neutral space	5.0	2.6	1.0	2.9
trunk	4.0	4.4	3.0	3.8
chin	8.0	3.1	2.0	4.4
forehead	7.0	3.4	5.0	5.1
5 hand	2.0	6.7	8.0	5.6
cheek	6.0	7.1	4.0	5.7
mid-face	9.0	7.5	6.0	7.5
pronated wrist	2.0	12.1	12.0	8.7
neck	2.0	12.2	13.5	9.2
whole head	10.0	8.5	9.0	9.2
B hand	16.0	7.5	7.0	10.2
A hand	11.0	11.6	10.0	10.9
forearm	12.0	11.8	11.0	11.6
G hand	14.0	11.3	13.5	12.9
C hand	14.0	13.0	15.5	14.2
V hand	14.0	13.1	15.5	14.2

Note. Adapted from Bonvillian and Siedlecki (1996).

JSLHR, Volume 41, 588–602, June 1998

Young Children's Acquisition of the Movement Aspect in American Sign Language: Parental Report Findings

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The acquisition of the movement aspect of American Sign Language signs was examined longitudinally in 9 young children of deaf parents. During monthly home visits, the parents demonstrated on videotape how their children formed the different signs in their lexicons. The parents also demonstrated how they formed or modeled these same signs. Overall, the children correctly produced 61.4% of the movements that were present in the adult sign models. Although the production accuracy of the movement aspect of signs did not improve over the course of the study, the number and complexity of movements produced by the children did increase as they got older and their vocabularies grew in size. Of the different sign movements, contacting action was by far the most frequently produced. The children were also relatively successful in their production of closing action and downward movement. The order of acquisition for the remaining ASL movements, however, was quite variable, with the exception that bidirectional movements tended to be produced more accurately than unidirectional movements. The relationship between children's early rhythmical motor behaviors and the development of sign movements is discussed.

Movement Aspects First Acquired (Bonvillian & Siedlecki, 1998)

- Level 1
  - Contact
- Level 2
  - Close
  - Downward

Difficulty of Movement Aspect

- Level 3
  - Twist
  - Nod/bend
  - Side-to-side
  - To-and-fro
  - Up-and-down

Most Difficult Movements

- Level 4
  - Wiggle
  - Link
  - Away
  - Toward
  - Cross
  - Upward
  - Right / left
  - Circular
  - Interchange
  - Converge
  - Open
  - Pronate*
  - Supinate*
  - Diverge

Palm Orientation

- Palm orientation involves pronation / supination
  - Forward – palm is facing away from your body
  - Inward – palm is facing toward your body
  - Horizontal – palm is parallel to the floor
  - Palm toward palm – palms facing each other
  - Palm to palm – palms touch each other

Hand Shapes Acquired by Young Signers (Bonvillian & Siedlecki, 2000)

- Level 1
  - 5
  - G (index finger pointing)
- Level 2
  - B
  - A

Hand Shapes Acquired by Young Signers (18 mo)

- Level 3
  - "Baby O"
  - O
  - C
  - L
- Level 4
  - V
  - K
  - X
  - 3
  - H
  - E

More Advanced Hand Shapes

24-36 months

- L
- F
- Q
- D
- Z
- Y
- L
- J

36-48 months

- M
- W
- U
- T
- P
- R
- 6, 7, 8,

Children who are exposed to sign from birth can generally form all hand shapes by 48 mo

Calculating Frequency of Occurrence of ASL handshapes

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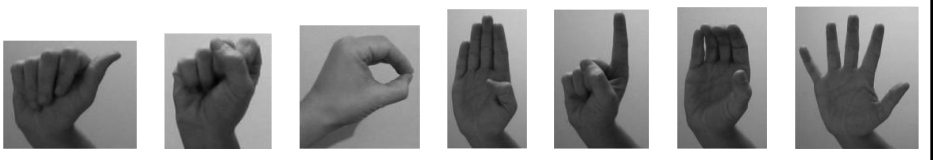
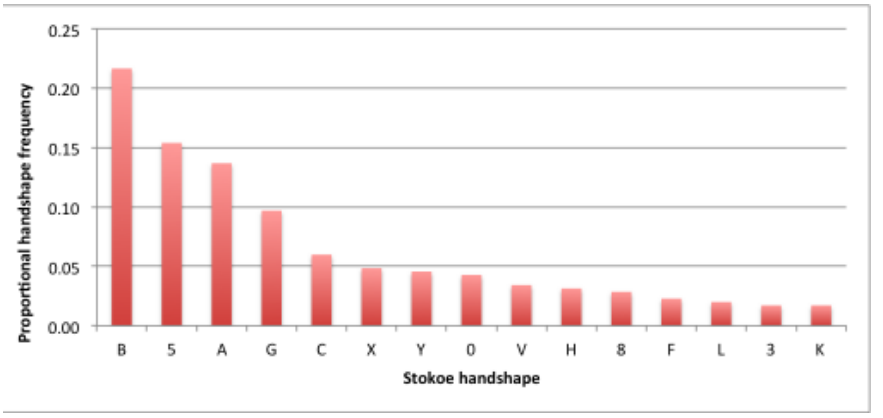
Abstract

Here we discuss an investigation of handshape markedness based on frequency of occurrence in an ASL database. Using a database of the most frequently used signs in a corpus of child language and other early-acquired signs we examined the handshapes of approximately 1000 signs by using two annotation systems, BTS and Stokoe annotation. Results indicate that the distribution of handshape use on the dominant and non-dominant hands is consistent with the predictions set forth by previous researchers in their examinations of handshape markedness. Our findings are also consistent with investigations handshape frequency in other sign languages, suggesting some cross-linguistic comparability in handshape markedness.

Most Frequently Used Hand Shapes



a s o b 1/ g c 5



Modifying Signs

- Initially, it may be necessary to make signs topographically different, but whenever possible, keep as close to standard ASL sign as possible.
- Modifying aspect of signs
  - Location
  - Hand shape
  - Movement

Modifying Signs: Location

- "Ground" the sign so that it contacts part of the body
- Move to forehead, chin, on / in front of the trunk
- Expand surface area (e.g. forearm vs. wrist)

Modifying Signs: Hand Shape

- Simplify the hand shape to 5, g, a, b
- Ground the hand shape so that fingers contact another part of the body
- Modify isolation of 4th and 5th digits (ring & pinky finger)

Modifying Signs: Movement

- Substitute a bi-directional movement ("bounce" the sign)
- Move towards a point of contact
- Simplify signs to a single movement, rather than a chain of movements
- Rely on gross rather than fine movements
- Rely on mass rather than specific movements

Long-Term Signers

- Remember that modifying a sign should be a temporary step, and can alter the effect on an unfamiliar listener.
- If a learner will be using sign language throughout their life, it will be important to gradually shape the signs to the standard ASL topography

Mand

- The verbal response of requesting (i.e. saying “juice” because you want juice)
- Teaching a learner to mand will lead to a higher rate of self-initiated talking and will support the development of the other classes of verbal responses (i.e. tacts, intraverbals, etc.)

Teach Mands Extensively

- Manding should be taught extensively with early learners, and throughout verbal behavior programs
- Many learners first signs function as mimetics or mands

Manding Guidelines

- Teach manding in the natural environment, across many settings and contexts
- Contrive opportunities to teach many mands per day (several hundred)
- Always be a giver, not a taker
- Have a systematic, progressive program in place

Manding Guidelines

- Prompt as necessary to prevent errors
- Gradually fade prompts
- Shape and differentially reinforce better responding (deliver more reinforcement for better/more independent responses)
- Avoid speaking first to prevent stimulus control problems (i.e. Do NOT ask "What do you want?" or say the name of the item prior to the mand)

Manding for Items

- Goal: The learner will ask for items that s/he wants when the item is visibly present, without an adult speaking first.
- Choose specific targets (typically between 3-10 at a time)

Choosing Mand Targets

- Choose items from a variety of motivational categories (foods, drinks, toys, etc.)
- Avoid topographically similar responses
- Do NOT teach these first:
  - More/Please
  - Yes/No
  - Food/eat/drink
  - Potty
  - Help
  - Stop,move, go, all done

Manding with Sign Language:
MODEL----PROMPT----GIVE

- Teaching mands with sign:
  - Establish MO (learner WANTS reinforcer)
  - Model the sign
  - Physically prompt sign (if necessary)
  - Give the reinforcer
  - Be sure to say the word at least 3x

  - Gradually fade prompts with reinforcer present
  - Fade the reinforcer from sight

Scrolling

- Scrolling – occurs when a child wants an item/activity, but uses the incorrect sign or chain of signs
- Correction procedure:
  - Prompt hands down to neutral for 3 sec.
  - Model correct sign (if possible)
  - Prompt correct sign
  - Give the item, but give a lesser amount than you would have if they had not scrolled

Manding for Actions

- Goal: The learner will ask for actions that s/he wants without an adult speaking first.
- Many ASL action signs are iconic, which may function as an embedded prompt
- Choose specific targets to work on
- Teach across multiple activities

Manding Actions: Sign

- Teaching action mands with sign:
  - Establish MO (learner WANTS the action)
  - Model the sign
  - Physically prompt sign (if necessary)
  - Perform action or allow learner to perform action
  - Be sure to say the word at least 3x
  - Gradually fade prompts

Intraverbal Signs

- Intraverbal
  - Verbal behavior in response to verbal behavior
  - Lacks point-to-point correspondence
  - Not under the control of a non-verbal stimulus
- Intraverbal sign
  - Antecedent: "Sign apple"
  - Behavior: signs apple
  - Consequence: generalized social reinforcement

Intraverbal Signs

- Intraverbal signs are important for signers
  - "Translating" for a listener / audience
  - Opportunity to develop increased fluency / dexterity

Intraverbal Signs

- Most common transfer procedure: mimetic to intraverbal
- Alternative ways to transfer stimulus control
- Using intraverbal sign drills to develop fluency (dexterity)

Motor Skills: Strength

- In addition to dexterity and coordination, all motor skills require some amount of strength
- Examples of tasks that require greater amounts of muscle force include:
  - Sit-ups (gross)
  - Push-ups (gross)
  - Writing with pencil using adequate pressure (fine)
  - Opening a jar (fine)
- Muscle strength and muscle tone are not the same

Strength vs. Tone

- Strength – amount of force exerted by a muscle
- Tone – amount of tension in a muscle
- Normal tone = passive partial contraction of the muscle when at rest
- Hypotonia = muscle is extended at rest, latent response to quick stretch (“floppy”)
- Hypertonia = muscle is contracted at rest, fast and excessive contraction in response to quick stretch (“stiff”)

Fine Motor Activities

- There is no research to suggest that performing random fine motor activities will improve signing
- It is more likely that targeting specific movements (corresponding with specific hand shapes, movements, or locations of signs) will produce behavioral change
- Remember that the movement may be under a different source of stimulus control, which would limit generalization

Examples of Activities that Correspond with Hand Shapes

- F – pincer grasp activities
- G – index finger isolation activities
- 6,7,8, – opposition activities
- C – scooping, pouring
- O – web space activities
- 5, B – tapping, pushing
- I, J, - finger isolation activities

Examples of Activities that Correspond with Sign Movements

- Away – pushing
- Wiggle – piano, typing, finger puppets
- Pronation / supination – scooping
- Circular – stirring, hand bike, drawing circles, rolling ball out of clay

Big 6 + 6

- Haughton (1980) described precision teaching as a strategy to build composite behaviors by building the fluency of component movements
- The Big 6 + 6 (Haughton, 1980; Binder & Haughton, 2002) are the basic fine motor movements that must be fluent in order for individuals to manipulate objects, complete self care skills, and sign

Big 6 + 6

Big 6	Plus 6
1. Reach	1. Push
2. Touch	2. Pull
3. Point	3. Shake
4. Place	4. Squeeze
5. Grasp	5. Tap
6. Release	6. Twist

Behavioral Interventions
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THE EFFECTS OF FLUENT LEVELS OF BIG 6 + 6 SKILL ELEMENTS ON FUNCTIONAL MOTOR SKILLS WITH CHILDREN WITH AUTISM†

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Functional motor skills are often taught using chaining procedures. Research suggests that chaining procedures are not likely to be effective if they do not focus on the accuracy and speed of composite skill completion. Precision teaching (PT) research suggests that improved performance of a composite skill can be achieved if the performance speed of the component behaviors is increased. This study assessed the effects of repeated timed practice of component motor skills on speed and accuracy of composite skills and the effects of fluent component motor skills on the completion of daily living composite skills. Three children with autism participated. The results suggest that all participants were able to perform the component skills at their individual aims and performed most of the component skills at fluent levels as assessed by retention and endurance checks. Each participant increased the number of composite skill steps performed independently and one decreased the overall time to complete the composite skill.

Table 2. Description of Big 6 + 6 Skill Procedures.

Skill	Stimulus	Procedure
Reach	Preferred stimulus	Presented instruction (i.e., 'Lets see how fast you can reach.') and started timer. Moved the object to a different location in front of the participant each time he reached for the object while simultaneously directing the participant to 'reach.'
Grasp	Small bag clips with soft pads for fingers and thumb	Gave participant the stimulus (if necessary, helped with finger position), presented instruction (i.e., 'I want to see you grasp really fast,') and started timer. Continued to direct participant to 'grasp' If participant dropped the stimulus, the experimenter picked it up, gave it back, and instructed him to continue.
Pull (Billy)	Easy resistance therapy bands	Placed the stimulus around participant's shoulders. Instructed him to grasp ends of band with corresponding hands. Presented instruction (i.e., 'pull down fast with both hands') and started timer. Continued to direct participant to 'pull' (bands down toward waist).
Place	Colored top hats	Gave participant stimulus and directed him to hold it over his head. Presented instruction (i.e., 'let's see how many times you can place the hat on your head') and started timer. Continued to direct participant to 'place' (hat on head).
Pull (George)	Sock	Gave participant stimulus and directed him to grasp each side of the opening (if necessary, helped with positioning). Presented instruction (i.e., 'pull the sock apart really fast') and started timer. Continued to direct participant to 'pull.'

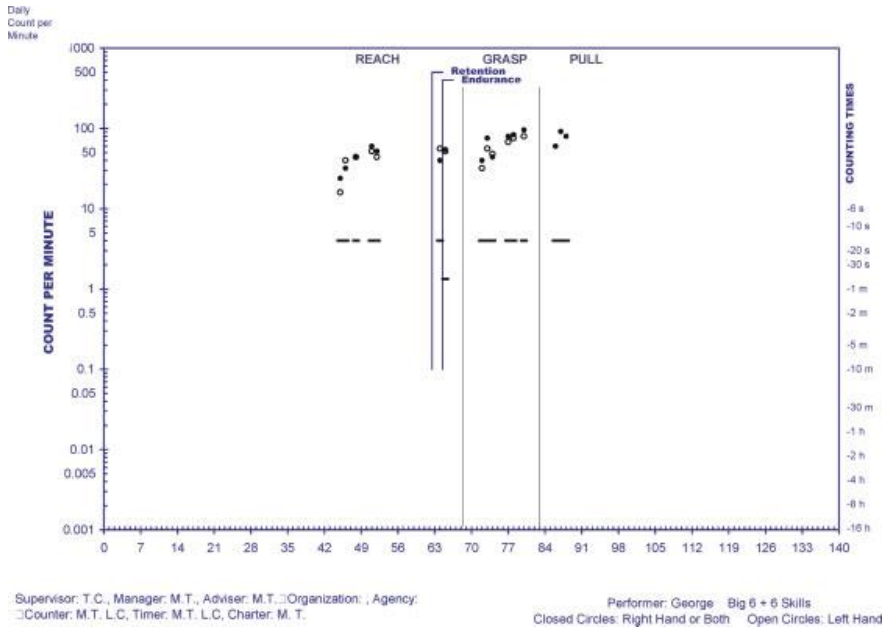

Figure 3. Component skill performance results for George.

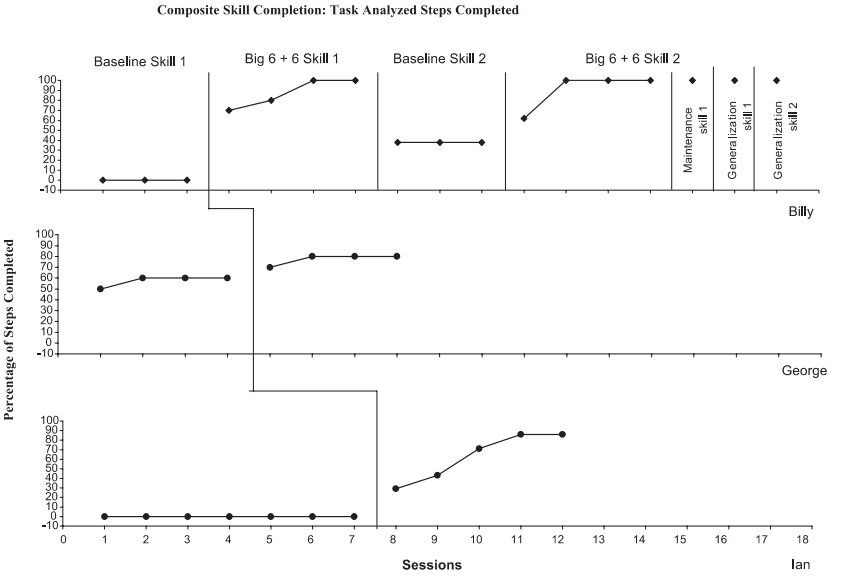

Figure 4. Percentage of composite skill steps performed before and after composite skill practice.

Reach

- Learner follows an object moving in front of them with their eyes and one hand
- Data are recorded separately for each hand
- Require continuous visual tracking, not use of peripheral vision
- Can use an object that produces light or sound
- Suggested fluency aim: 90-100 movements per minute

Pinch

- Pincer grasp can be helpful for signing as well as fine motor tasks like buttoning
- Medicine dropper
- Suggested aim = 200 pinches per min.

Point

- Index finger isolation
- Data are collected separately for each hand
- Model how to touch the object, lift the hand up, and then touch the object again
- Suggested aim = 200-250 per min.

Shake

- Holding an object and shaking it side to side or front to back. A shake consists of two moves: back/forth or up/down.
- Helpful to use material that produces sound (x2)
- Data are collected separately for each hand.
- Suggested aim = 200-250 per min.

Squeeze

- Hold an object in palm and squeeze repeatedly
- Data are recorded separately for each hand
- Small squeaky toys or horns
- Suggested aim = 200 per min.

Turn

- Turning a stationary object side to side
- Data are recorded separately for each hand
- Turning a door knob and count the sounds x2
- Suggested aim = 200 turns per min.

Generality & Generalization

- Generalization vs. generality
  - Across verbal operants
  - Across settings
  - Across listeners

Social Validity Checks

- For signers who will likely use sign language long-term, can an unfamiliar person who knows ASL recognize their signs?
- Social validity checks in person or via video