

Teaching Signs and Sign Language to Hearing Students with Developmental Disabilities Including Autism

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Brief overview of “*Verbal Operants*” and why they are important.

Skinner’s Analysis of Verbal Behavior

Skinner (1957) defined Verbal Behavior as:

**“Behavior that is reinforced
through the mediation of other persons”**

Skinner’s Analysis of Verbal Behavior

- Skinner’s behavioral approach analyzes language by its formal and functional properties.
- Formal properties consist of the physical description of specific response topographies (forms) such as: nouns, verbs, adjectives, and pronouns.
- Functional properties of verbal behavior consist of circumstances under which a response occurs.
- Skinner distinguished between several different types of functional control.

Skinner’s Analysis of Verbal Behavior

- This classification system allows for the identification of functionally different types of language.
- It is the functional properties of language that are sometimes overlooked or downplayed in language programs.
- By not taking the function of language into account you often end up with a child who can receptively identify or label hundreds of objects and pictures but never uses them in a functional way or demonstrates the concept of the object or picture.

Skinner’s Analysis of Verbal Behavior

- One of the primary premises of verbal behavior is that the meaning of a word is found in its function not in the word itself.
- Therefore, it is not enough that a child can label or point to an item when asked.
- It does not necessarily mean that he can use and react to the object in a functional way.
- This is precisely why we want to teach each word/object across all functional relations.

Skinner's Analysis of Verbal Behavior

- **Mand:** Asking for reinforcers. Asking for "shoes" because you want your shoes.
- **Tact:** Naming or identifying objects, actions, events, etc. Saying "shoes" because you see your shoes.
- **Listener:** Following instructions or complying with the mands of others. Touching a picture of shoes when asked "Touch the shoes."
- **Echoic:** Repeating what is heard. Saying "shoes" after someone else says "shoes."

Skinner's Analysis of Verbal Behavior

- **Imitation:** Copying someone's motor movements (as they relate to sign language).
- **Copying-a-text:** Writing "shoes" because someone else writes "shoes."
- **Intraverbal:** Answering questions or having conversations where your words are controlled by other words. Saying "shoes" because someone else says, "What do you need to put on your feet?"
- **Textual:** Reading words. Saying "shoes" because you see the written word "shoes."
- **Transcription:** Writing and spelling words spoken to you. Writing "shoes" because you hear "shoes" being spoken.

Augmentative Communication

- We talk about the importance of teaching all of these relations. That is, teaching a word across all functions (receptive, tact, intraverbal, mand etc.). Well, what if the child can't vocalize or echo?
- There is no problem when you are looking at the receptive repertoire. But how do you teach mands, tacts and Intraverbal if you don't have a response form?
- In many cases the echoic or vocal repertoire eventually develops and the kids start to speak. This usually takes a long time.
- What to do in the meantime?
- What happens if it doesn't develop?

Augmentative Communication

- In many cases you need to look at some type of augmentative communication system.
- Criteria for deciding whether to stick with vocals or seek an alternative.
 - **Unfamiliar listener**
 - **Out of context**
 - **With back turned**
- Once the decision is made, you still want to always work towards speech.

Augmentative Communication

- The hope is that the system will allow you to teach a verbal repertoire and promote speech.
- Eventually the system can be discarded.
- If the speech never really develops then you have a system in place so that the child can communicate.

Which system to choose

There are basically two types of systems.

- One is a selection-based system (SB) such as PECs
- One is a topography-based system (TB) such as ASL.

Advantages of Sign Language

- Motor imitation may already be strong in the child's repertoire. If not it is easier to shape than vocals
- Teachers can use, then fade, physical prompts to teach the sign.
- The stimulus and the response often resemble each other (an iconic relation), providing a built in prompt.
- Signs are free from environmental support. They are portable

Advantages of Sign Language

- Sign language constitutes a topography-based language, making it conceptually similar to speech.
- Signs may avoid a negative emotional history associated with speech.
- Sign language can be rapid. Signs can generally be formed much more quickly, especially in succession, than pictures can be selected.
- Signs can be used easily while participating in other activities (e.g., manding for a ball while in the pool).

Advantages of Sign Language

- It is much easier to carry on a conversation with signs than with picture selection.
- Signs can be formed quickly. There is less tendency for a learner to stop communicating.

Advantages of Selection-based systems

- The listener does not need special training because many of the pictures are easy to understand, and the English word typically accompanies the symbols or pictures.
- May avoid negative emotional history involved with speech
- The response may already be strong in the person's repertoire (pointing or giving)

Which System to Choose?

- We prefer to teach sign language for a number of conceptual and practical reasons.
- The main disadvantage of sign language is that staff, teachers, and parents have to learn it.
- However, decisions on teaching methodology should not be based on what is easiest for the teacher. Decisions should be based on what is best for the learner.
- All you have to do is learn the signs as fast as the child.

Why Sign Programs May Fail

- First signs are not mands
- First signs that are taught are too complex
 - Please
 - Yes
 - No
 - Help
 - Thank you
 - More
 - Toilet

Why Sign Programs May Fail

- Specific problems with “more” and “Please”
 - They are to general and it is difficult to move beyond them.
 - They often become a generic sign for “I want something but I am not going to tell you what it is?”
- The child can get frustrated because the sign does not get the item that matches the motivation.
- First signs may resemble each other too closely
- Eat
- Drink

Why Sign Programs May Fail

- First signs may involve a complex response form
- Training is conducted under multiple sources of control and prompts are not faded so spontaneous responses can occur
 - Motivation
 - Picture or object
 - Physical prompt
 - Imitation prompt
 - Verbal prompt

Why Sign Programs May Fail

- Individual verbal operants are never established (i.e., mands, tact's, intraverbals), responses remain multiply controlled
- Stuck at one level too long, not a progressive curriculum in place
- Single verbal operant focused on almost exclusively (e.g., tact's, but limited Intraverbal or mand training)

Why Sign Programs May Fail

- Failure to establish a signing verbal community
- Failure to teach signs to everyone involved with the child
- Failure to require signs outside of the training session
- Failure to generalize to novel stimuli, staff, settings, times, etc.

Why Sign Programs May Fail

- Not enough training trials are provided
- Poor shaping skills on the part of the trainer

Can children with Autism Sign?

- What about poor motor coordination?
- Poor hand eye coordination?
- Auditory processing delay?
- Problems with fine motor?
- Etc.
- We say it is hard for our kids to move their muscles in a way to make signs.

Can children with Autism Sign?

- But isn't it also hard for adults or typical kids to learn how to play guitar or piano?
- How do you get your fingers to move that way?
 - It takes a lot of practice.
- With some kids, teaching them how to work their muscles to make signs and to perform other gross and fine motor activities may be like teaching a typical child to play piano or violin.

Can children with Autism Sign?

- Is it easy?
 - Not really
- Is it possible?
 - In many cases it is
- Does it take a lot of work and practice?
 - Absolutely

Can children with Autism Sign?

- How many hours per day does it take to be good?
- How many hours did it take for Eric Clapton to learn how to play like he does?
- How many hours a day do our kids get to practice fine and gross motor skills (in a systematic fashion like one would learn how to play piano).

Can children with Autism Sign?

- Probably not enough
- Why?
- Because it is often thought that they can't do it.

Can children with Autism Sign?

- Furthermore, "since they don't have what it takes", alternative and less useful ways of teaching are substituted.
- Often the strengths of the child are emphasized to the point where the weaknesses are abandoned prematurely.

Can children with Autism Sign?

- There wouldn't be any musicians in this world if all attempts to form chords were abandoned because the fingers "just won't move that way."
- Furthermore, people who become great musicians or great athletes, those who learn how to control and work their muscles in ways that put them in separate categories. They do so, not out of necessity, but out of pleasure.

Can children with Autism Sign?

- With our kids it is out of necessity. It should be a top priority.
- Perhaps the time spent working on gross and fine motor skills could be about the same as the time needed to become a virtuoso musician for a typical child.
- However, it is more critical, useful and directly functional for our kids to master (or at least greatly improve) motor control and dexterity.

Can children with Autism Sign?

- It will be difficult if the motivation of the child is not accounted for.
- People are motivated to become good musicians or athletes.
- It is critical for a child with autism who can not communicate to have that same motivation.
- First order of business...Make it important!

The Motivating Operation (MO)

- The motivating operation is one of the most critical principles to consider.
- If you can master the concept of the MO you will become a master of taking advantage of and creating motivational situations for your student.

The Motivating Operation (MO)

- A reinforcer is only a reinforcer if it's related to what the person wants at any given time.
- Most things that can serve as reinforcers are not always serving as reinforcers.
- A motivating operation increases the reinforcing effectiveness of a given stimulus, and increases the likelihood you will behave in ways which resulted in you getting that stimulus in the past.

The Motivating Operation (MO)

- In simpler terms an MO makes you:
 - Want something
 - Behave in ways to get it.
- Is pizza reinforcing?
 - What would you do if you wanted pizza?
 - What would you do if you just had 6 pieces?

The Motivating Operation (MO)

Examples

- MO → You eat salty pretzels
- Reinforcer (What is now valuable that was not valuable before)
- Water, Juice, Beer etc...
- Behavior Evoked
 - Go to the refrigerator
 - Go to the sink
 - Flag down the waitress

The Motivating Operation (MO)

Examples

- MO → You get out the shower
- Reinforcer (What is now valuable that was not valuable before)
- A towel
- Behavior Evoked
 - Reach for a towel
 - Look in the cabinet
 - Call for someone

The Motivating Operation (MO)

Examples

- MO → You go to your car and it is covered with snow
- Reinforcer (What is now valuable that was not valuable before)
- A snow brush
- Behavior Evoked
 - Look in your back seat
 - Look in your trunk
 - Look in the closet, the garage etc.

The Motivating Operation (MO)

Examples

- MO → A waiter brings you black coffee
- Reinforcer (What is now valuable that was not valuable before)
- Sugar and cream
- Behaviors Evoked
 - Look around the table
 - Look at the next table
 - Ask the waiter

The Motivating Operation (MO)

Examples

- MO → Somebody tells you about a website that you are really interested in
- Reinforcer (What is now valuable that was not valuable before)
- Paper, pencil, pen
- Behavior Evoked
 - Look in your pocket
 - Look in your purse
 - Ask someone

The Motivating Operation (MO)

- What is critical here is that all of these items are only reinforcing under certain conditions.
- Would you work now for a towel?
- A pack of sugar?

The Motivating Operation (MO)

- The MO is really just a more technical, specific and useful way to talk about motivation.
- If you look at motivation as an internal process it is easy to get lost.
- If you look at the environmental factors you can capture and manipulate them to your advantage (to the students advantage).

Contriving and Capturing MO's to Teach the Mand

- Not only is the notion of the MO relevant to all teaching it is particularly relevant to the mand.
- By definition the mand is a type of verbal relation where the form of the response is controlled by a motivational variable (MO) and the consequence for the mand is specific reinforcement related to the motivation.

Contriving and Capturing MO's to Teach the Mand

- You have not had anything to drink for 6 hours (MO)
 - You say "Water please" (Response)
 - You get water (specific reinforcement)
- ❖ We like to start with mand training because it is the only form of language that directly benefits the speaker (the child).

Contriving and Capturing MO's to Teach the Mand

- The mand is the first type of communication that humans naturally acquire.
- Most of an infant's first forms of language are mands for reinforcers that are caused by different types of motivation.
- By developing a mand repertoire first it will be easier to develop all of the other types of verbal behavior such as tact's, receptive responding and intraverbals.

Contriving and Capturing MO's to Teach the Mand

- In addition, teaching the mand repertoire teaches the learner that verbal behavior is valuable.
- When the child sees the teacher he will be more likely to approach this person because it results in an opportunity to mand.
- Mand training is likely to replace many problem behaviors.

Contriving and Capturing MO's to Teach the Mand

- Regardless of where you are with your child or the students you are working with, if the child is not manding hundreds of times per day under various motivational conditions with various response forms, then mand training will most likely need to be a primary target.

Mand Analysis

- If you do an analysis of mands you will find that they comprise a large part of our verbal behavior. They occur across many settings and conditions and are of various types.

Mand Analysis

Mands for actions:

- Jump, stand, open, push, stop, go.

General mands for human contact or to intervene for a specific purpose:

- Look
- Tap arm
- Raise hand
- State name e.g.: "mom", "Bob" look at me
- Watch me
- Listen to me

Mand Analysis

Mands for the removal of aversives:

- Go away
- Don't
- Stop
- Leave me alone
- Take it
- Help

Mands for moving physical objects to or from specific locations (prepositions):

- "I want the one on top of the shelf"
- "Put it in the car"
- "Give me the one behind the door"
- "Put it under the tray"

Mand Analysis

Mands for Adverbs:

- Run faster
- Jump high
- Hit it harder

Mands for Pronouns:

- My turn
- You do it
- Give it to me

Mand Analysis

Mands for Information

- ❖ What is that?
- ❖ Who is that?
- ❖ Where are my shoes?
- ❖ What's in the box?
- ❖ When are we going?
- ❖ How did you do that?
- ❖ Why did you do that?

Mands for Permission

- ❖ Can I?
- ❖ May I?

Where is my motivation?

- A lot of mand training can be conducted by manipulating or capturing the MO
- There are two ways to use the MO make the child motivated to engage in a language trial.

Capturing the MO

- Once you master the concept of the MO, you will learn to be an effective observer of your child. You will learn to recognize that situations occur throughout the day where the child has an EO for something.
- For example, you see the child reaching for or pointing to the cupboard, the toy closet, the video shelf. Right there, the child is telling you that he is motivated for something (there is an MO).
- This is a perfect chance to conduct a mand trial

Contriving the MO

- Capturing MOs offer great opportunities but they don't occur frequent enough to really get in enough mand trials.
- Contriving MOs may allow for more frequent training trials, as well as provide opportunities for a greater variety of mands.
- This takes a little thought, but once you get the hang of it and practice it the idea will flow.

Contrived Mand Examples:

- Stopping a child when swinging
- Giving the child tape player with no tape in it
- Giving the child Mr. Potato head with no eyes
- Giving the child a juice box with no straw
- Ask the child to draw a picture with no crayon
- Give the child a bun with no hotdog in it

Contrived Mand Examples:

- Give hotdog with no condiments
- Giving the child a puzzle with a piece missing
- Tell child to brush teeth but toothbrush is missing
- Bed has pillow missing
- Give the child an un-inflated balloon
- Give the child a hotdog without a bun

Contrived Mand Examples:

- You can also set up activities and intentionally manipulate the objects.
- In these cases you would want to reinforce the activity with a tangible reinforcer. Then withhold one of the critical components needed to complete the activity.
- The child then needs the object to complete the activity and get the tangible reinforcer.

Contrived Mand Examples:

- **Activity:** Ask the child to draw or cut
- **Potential Mands :** Crayon, Paper, Scissors
- **Activity:** Ask child to put items in a box but withhold the items (e.g., shoe, cup, spoon)
- **Potential Mands:** Shoe, Cup, Spoon

Contrived Mand Examples:

Ask the child to push a car down the track but withhold the car

- Car

Teach a chain involving (for example), putting a cup on a plate, a spoon in a bowl and a block in a pail.

- Cup, Plate, Spoon, bowl, Block, Pail

Contrived Mand Examples:

- Make a game out of dressing a doll
 - Shirt, Pants, Shoes, Hat etc.
- Put together Mr. Potato Head
 - Eyes, Nose, Ears, Arms, etc.
- Put one object in each of three baskets (e.g., Book, toothbrush, fork)
 - Book, Toothbrush, Fork

Mand Chains

Start as a backwards chain

- **Place child in front of swing**
 - Child mands "swing" → Gets swing

Place child a few feet from swing

- Child mands "Walk" → Walk to swing
- Child mands "Swing" → Gets to swing

Mand Chains

- **Place child behind door leading outside.**
 - Child mands "Open" → Gets door open
 - Child mands "Walk" → Walk to swing
 - Child mands "Swing" → Gets to swing
- **Require shoes on before going outside**
 - Child mands "Shoes" → Gets shoes
 - Child mands "Open" → Gets door open
 - Child mands "Walk" → Walk to swing
 - Child mands "Swing" → Gets to swing

Mand Chains

Example 2

- **Open the refrigerator**
- **Pop**
- **Cup**
- **Pour**
- **Drink**

Mand Chains

Manding during natural events

- Making a hotdog
 - What do we need to do? (open)
 - What do we need? (hotdogs)
 - What do we put the hotdog in? (pan)
 - Where do we get the pan? (cupboard)
 - Now what do we put in the pan? (water)

• **Repeat with utensils, drink, condiments etc.**

More Contrived EO Examples

- Give child a straw but no juice box
- Give the child a juice box but don't open it
- Give paper with no marker (ask him to draw)
- Marker with no paper
- Bowl of ice cream with no spoon
- Bowl with no ice cream (give him one spoonful at a time so you can repeat)

More Contrived EO Examples

- Give him a toothbrush but no toothpaste
- Set the table with missing plate (cup, fork, spoon etc...)
- Bed has a pillow missing, a blanket, a sheet
- Give cereal without milk
- Put needed items out of reach in bedroom or bath

More Contrived EO Examples

- Put desired items in closed see-through container
- Don't get out of the car when you get to McDonalds
- Tell child to get in the car but it is locked
- Dip the bubble wand but don't blow
- Put toys in high places
- Give him a locked box with no key (a toy inside box)

More Contrived EO Examples

- Peanut butter... No knife
- Peanut butter and jelly...No bread
- Bread...No peanut butter and Jelly
- Chip, no drink
- Computer...no mouse

More Contrived EO Examples

- TV...no remote
- Game gear...no batteries
- Drum...no drum stick
- Tupperware container won't open (reinforcer inside)
- Toy stuck...help, fix, broken

MOs for Action

- Stand in front of the door without opening it
- Sit in the car without starting it.
- Tickle and stop.
- In a store (or anywhere reinforcing) pause from time to time during walking.
- Turn off the water periodically when filling the tub

MOs for Action

- Push child in a swing, wagon etc... and stop
- Play jump games then stop...Jump
- Socks are wet....off
- Mud on hands.....water, towel
- Friends outside....shoes, coat
- Fire truck outside.....open door

Issues to Consider when picking the First Words as Mands

- Select words that are for reinforcers (existing motivation). Especially for those reinforcers that adults can easily control the access to and have the ability to use the items as a reinforcer.
- Reinforcers that are consumable (e.g., food, drink)

Issues to Consider when picking the First Words as Mands

- Reinforcers that easily allow for short duration of contact (bubbles, tickles)
- Reinforcers that are relatively easy to remove from the student (music, video)
- Reinforcers that can be delivered on multiple occasions (e.g., small candies, sips of juice, a small piece of cookie)
- Reinforcers that always seem strong (stim toy, outside)

Issues to Consider when picking the First Words as Mands

- For vocal children start with words that involve a relatively short and easy response.
- For signing children, start with words that are iconic, which are signs that look like the object (ball, book).
- Select words that are salient and relevant to the child in his daily life and are heard many times (ball may be heard more often than elephant).

Issues to Consider when picking the First Words as Mands

- Select items that all trainers can agree upon naming.
- Avoid selecting words or signs that sound or look alike (e.g., the sign for eat and drink are very similar).
- Select a set of words that will eventually be associated with a variety of motivators. For example, don't select all foods as the first set of mands or progress will stop when the child is not hungry.
- Avoid words and signs that might have a negative or aversive history (bed, toilet, no)

Teaching the Tact

- Using a sign to teach a tact is done the same way you would teach a mand. Except that the controlling stimulus is the item or picture, rather than an MO to receive the item.
- Using sign to teach a tact is done the same way as with a vocal tact. However, you have the added advantage of a physical prompt.

Teaching the Tact

- Prompts include:
 - ✓ The nonverbal stimulus (the object or event)
 - ✓ Physical
 - ✓ Imitation
 - ✓ Intraverbal ("What is it? Or "Sign cat")

Teaching the Intraverbal

- Using a sign to teach an intraverbal is also similar to teaching a sign tact or a vocal intraverbal
- With intraverbals you have the added advantage of a tact prompt
- Teaching intraverbals
 - The sign is equivalent to the vocal.
- You can say “ you sleep in a _____)” and the child can sign bed.

Teaching the Intraverbal

- Prompts include:
 - ✓ The verbal stimulus (e.g., “You sleep in a _____”)
 - ✓ Physical
 - ✓ Imitation
 - ✓ Tact

General points

- Be careful about teaching too many signs in one category.
- If a child has 50 signs and 30 of them are animals that won't be very useful. Don't teach signs that are not likely to be used?
- How important is it for a child with 20 signs or words to be able to tact a goat?
- I see kids who can label 30 animals but can't ask for shoes, socks, toys, tickles, fun activities, etc.

Getting Better Motor Responding

- Practice
- Break it down
- Teach the components
- Strengthen the foundation
- Practice with physical prompts
- The student may benefit from more physical guidance to help teach the muscles how to move the right way

Getting Better Motor Responding

Find other ways to get the response you are looking for then transfer/fade

- E.g., putting a cylinder shaped block in the students hand may help him close his fist
- Taping two fingers on the table is easier than holding two fingers in the air
- Grabbing a broom stick to get the students arms up/out

Getting Better Motor Responding

- Prompt from behind
- Video modeling
- OT exercises
- Pulling tokens out of play dough
- Picking up chips
- Stringing beads
- Clothespins
- Etc.

Getting Better Motor Responding

Fine motor activities:

- Puzzles
- Form boxes
- Cutting
- Keyboard
- Mouse click

Can you combine systems?

- Some suggest you can't or shouldn't
- However, you can if it is done systematically and one system is the main system
- We all use both systems. Primarily we are talkers (topography based system) but often we look at menus

Can you combine systems?

- You can teach some signs that will lead to specific choice options much like teaching to ask for a menu.
- For example, there may be a particular box that contains many items that the child finds reinforcing.

Can you combine systems?

- The items are not yet taught as specific mands.
- Either because there are too many to teach at once or they change too frequently.
- ❖ By the time you teach the mand the toy is no longer a favorite and is replaced by another one.

Can you combine systems?

- In this case we might teach the child to sign something like "box" as a way to gain access to the grab bag of items
- At least one of which is most likely going to currently be reinforcing.
- We may also teach a sign for a specific shelf or closet that contains a variety of items that have not yet been taught specifically.

Can you combine systems?

- If one is repeatedly selected we would teach a sign for it.
- We would also say and sign the item (if we have the sign) and perhaps do an echoic or sign prompt while we are delivering the choice.

Can you combine systems?

- The child could also sign for a menu of activities that are not yet learned as signs.
- This way the kids learn that if they have the specific sign they will use it. If not, they can sign for some choice options.

Can you combine systems?

- Once the child learns the specific sign then the sign for the choice options (e.g., box of toys, dessert menu) they will most likely discard the general sign.
- Why would we go through the trouble of asking for a menu if we know we want the filet, loaded mashed potatoes, green beans and a house salad with ranch?
- Do you need to look at the menu in order to select Pepsi or iced tea?

Signs for Students who are Fluent at PECS

- Why not?
- Don't take away the PECS
- Simply try teaching a few mand signs for most preferred reinforcers
- Typically once the student learns a sign he will use the sign rather than flip through the PECS book.
- If they don't have a sign they will use the PECS

Signs for Students who are Fluent at PECS

- If I know what I want, I am going to ask for it before I will ask for a menu.
- If I am not sure what is offered I will look at a menu.
- If I can't pronounce the food I think I want, I will ask for a menu and point to the selection (to save embarrassment).