However, a behavioral analysis may suggest that even if the child could now say bubbles under the assumed control of an MO for bubbles and the nonverbal visual stimulus of bubbles, discriminative stimulus and MO control may not exist. In other words, the result of the above procedure could be that the child calls every desired item *bubbles*. In order to demonstrate stimulus control (a true S^D) the must exist a contrasting stimulus condition where the response bubbles is not evoked. This condition is called an **S-delta** (stimulus-delta). In addition, eventually a second stimulus needs to evoke a different response. In order to establish a discrimination (and thus stimulus control) a second item that is not desired can be occasionally presented (e.g., a shoe). If this stimulus evokes the response *Bubbles* stimulus control over bubbles has yet to develop. There are a several procedures that may help to establish an S^D-S-Delta discrimination. The goal is to teach the child that response *Bubbles* will only produce the blowing bubbles when the bottle is presented, and not when other items are presented. In order to teach this discrimination, hold up the shoe and if the response *Bubbles* occurs ignore all responding (an extinction procedure) for a pre-set amount of time (e.g., 30 seconds). Then present the bubbles and if the response *Bubbles* occurs, blow the bubbles. Then present the shoe again and continue interspersing the two conditions and often differential responding will occur through this procedure.

Another method to establish discriminative stimulus control over a response is to introduce a new stimulus and teach a new response under the control of that new stimulus. For some children this new stimulus can initially consist of interspersing another type of trial such as a motor imitation or echoic trial. This can be easily accomplished by simply presenting a *Do this* prompt and a known motor response (e.g., clapping) and reinforce the imitative behavior, then hold up the bubbles and prompt with *Say*.... The goal again is to teach the child that in the presence of one stimulus a certain behavior gets reinforced, and in the presence of another stimulus a different behavior gets reinforced. This procedure also has the added bonus of teaching the child that he must do a little "work" before the opportunity to mands. Note that the focus here is on using the object to develop stimulus control with the assumption that MO control is not yet firmly established. The ultimate goal is differential MO control (i.e., a specific desire evokes a specific word), however, due to the private nature of this source of control (it is often hard to really know what a nonverbal child wants), the recommendation is use the object (the tact part of the early words) as a way to teach the child to emit different words at different times. The task of fading out the nonverbal source of control will be described in a later section.

Adding a New Mand-Tact Word

A third method of establishing stimulus control is to introduce a new mand-tact response. This should be done as soon as possible. The selection of the second word to teach as a mand-tact should be done carefully. The suggestions presented above for the selection of new words applies to the second word with a few additional considerations. The first issue is what MO will be used to establish the response. The MO should be as different as possible from the first targeted MO. For example, if a food item is used first, do not use a second food item (the MO is too similar). Given that bubbles was the example presented above, a food item may be an appropriate new responses. It is also important that the visual stimulus involved be distinctly different from the first stimulus (i.e., don't use anything that looks like a bottle of bubbles, is the

same color, or has the same picture on it). The consequence for the second item should also be significantly different. For bubbles there was a visual moving stimulus as a reinforcer, thus using a spinning wheel as the second reinforcer may be contraindicated. Food, for example, has a consumatory consequence that is clearly different from a visual reinforcer. The selection of the second targeted word is also important. The topography of the response should not be too close to the first word, so in this example it should not start with *b* or rhyme with *Bubbles*. The point here is that the probability of establishing a discrimination between two items will be higher if there is a clear distinction between the MOs/stimuli, the responses, and the consequences involved in the first two targeted verbal relations.

Mixed Verbal Behavior Trials (Mixed VB)

A final method of establishing stimulus control and differential responding involves a combination the three procedures described above. This would involve a set of trials that contain the two targeted mand-tact relations, an S-delta condition, and the known imitative, echoic, or matching-to-sample responses. This type of training ("mixed VB") consists of mixing up the verbal relations (e.g., mand, imitation, echoic and MTS trials). The value of this type of trial, versus those that are mass trials or a specific focus on a certain skill (e.g., imitation or tact only) is that not only is stimulus control strengthened, but eventually it becomes important for a child to be able to respond to a variety of antecedents, some of which may be visual, auditory, verbal, nonverbal or motivate. In addition, a child must be prepared to respond as a speaker or a listener. More advance verbal interactions are typically made up of mixed verbal interactions involving mands, tacts, intraverbals, echoics, etc. At some point in an intervention program a child must be able to respond to this variation of stimulus and motivational variables. The concept of mixed VB suggests that early language learners may benefit from training that involves variation in the presentation of teaching trials.

Data Collection

The type of data that should be collected for the acquisition of the first mands can vary substantially. The primary purpose of collecting data is to identify that learning is occurring, and that the observed learning is a function of the teaching procedures that have been employed. If the data show that learning is not occurring, changes need to be made in the teaching procedures, targeted goals, curriculum, or other variables such as the deprivation levels related to the MOs. The most optimal data would involve measures of the antecedents involved and the response topography on every trial. This level of data collection may only be possible if a second individual is available to record the data. However, in the absence of a second individual, data on the first and last trials of a 15-20 minute teaching session can provide the necessary and sufficient data to provide answers to the issues presented above (Cummings, 2005). First trial data probes consist of recording the child's response on the very first trial of the teaching session on each specific targeted mand. In addition, it may be helpful to record data on the level of prompt necessary to successfully evoke that mand (a sample data sheet is presented in Appendix 1). For example, on the first trial of the session the instructor should present the child with the bottle of bubbles and the verbal prompt *Say....* If the child responds with *ba* the prompt level of object present should be circled on the data sheet and the response form *ba* recorded. If the child fails to respond the next level of prompting (echoic) should be presented. If the child responds

at this level of prompt the level should be circled on the data sheet, and the topography of the response recorded. Following the first trial probe the correction and transfer procedure described above should be implemented. Following a teaching session of mixed trials, a last trial probe can be conducted. Often, change can be observed in a last trial probe before change is observed in a first trial probe.

Expanding the mand repertoire

Once a child has two mand-tact words (or approximations to those words), a new word should be added. The same criterion suggested above for selecting words should be applied. In addition there should be an increased focus on the other beginning repertoires, specifically, motor imitation, echoic, receptive language and matching–to-sample (see chapters 7-10 for these procedures). The third, mand-tact word should become the target of the intervention and the other mand-tact trials interspersed, along with trials on the other four repertoires. If a child successfully acquires a third mand, and is demonstrating some reasonable echoic behavior, it may be appropriate to begin teaching a few tacts (see Chapter 11). It is important to consider each child individually, rather than applying a rule like "three mands then add a tact." The goal is to teach several mands and several tacts and each learner will progress at his own rate. Careful consideration and analysis should be given to individual progress and errors when expanding the repertoires.

Generalization

Early on in the intervention program every effort should be made to program for **generalization**. The point of generalization is that a specific word should occur under a wide variety of circumstances, and not be limited to any single set of circumstances. A simple type of generalization involves conducting the training in different settings. If the child learned the response *bubbles* in the living room, conduct training in the kitchen, bedroom, outside, at grandma's house etc. In addition, conduct the training at different times of the day (e.g., morning, afternoon, evening). The noise level and outside distractions should also vary, so the child doesn't learn to only respond when it is very quite, and no one else is in the room. Then, different people should be able to evoke the mand-tact from the child. If a child has learned to say *bubbles* as a mand-tact with his mother, his father should require he mand-tact bubbles, as should any significant person in the child's life (e.g., siblings, teachers, babysitters, friends). The various carrier phrases (e.g., *What do you want?" Say.... Look its....*) should also be changed if possible, as should the instructor's tone of voice, pitch, intonation, prosody, and volume of any accompanying verbal stimuli. Finally, and sometimes the hardest form of generalization for children with autism, is generalizing to different materials. Bubbles do not always come in the same size blue bottle with the same label. Change these variables with a variety of different bottles of bubbles. All of the above variables should eventually be combined. For example, after learning *bubbles* at home with mom before school with a blue 4-inch bottle of bubbles, an instructional assistant at school should ask the child to mand-tact a large red bottle of bubbles in an afternoon group setting, assuming, of course there is a current MO for bubbles. The point is that the response *bubbles* should be primarily under the control of the target variables, which in this case is an MO and object. The response should not be primarily under the control of an irrelevant variable such as a specific teacher, the color of the bottle, time of day, tone of voice,

etc. It is important that generalization be incorporated intro the training program as soon as possible, and with each new word.

Teaching sessions

At this point in the intervention, a teaching session should be short (anywhere from 1 to -15 minutes, depending on the child), and made as fun as possible. Training can be conducted on the floor, at a table, on a bed, playground, or in any conducive environment. The intervention would be essentially the same whether it was conducted in a home or school environment. However, for some children, control of the physical environment may be critical for success. If a child has free access to other reinforcers and adults have very limited instructional control (see Chapter 4), some restrictions (e.g., cornered at a table) may be important. Each brief session may look very similar, with the specific goals relatively straight forward—1) teach the child to mand with as little prompting as possible, 2) teach the child that he must do something (e.g., motor imitation) to get an opportunity to mand, 3) teach the child that the relevant initiating stimulus may be visual, auditory, or both, he may be asked to be a speaker or a listener (mixed VB), 4) gain instructional control over the child, 5) establish the instructor as a conditioned reinforcer (make learning fun, in part by teaching a child that manding gets him desired reinforcers, at a fair price).

Basic Elements of a Verbal Behavior Approach to Language Training

Mark L. Sundberg

Applied Behavior Analysis and advancements in the treatment of children with autism

Language intervention is a major goal of most programs

Most language programs are based on nonbehavioral theories of language, but many use behavior modification techniques

What constitutes a behavioral analysis of language? (Skinner, 1957)

Language is learned behavior under the functional control of environmental variables

The verbal operant is the unit of analysis (e.g., mands, tacts, & intraverbals)

The verbal operants are separate repertoires and each must be taught

Speaker and listener skills are separate repertoires and both must be taught

Applications to Language Intervention

The verbal operants are used for language assessment, IEP development, tracking language acquisition, and the basis of the curriculum

The mand is extremely important and should be first type of language to teach

Echoic, imitation, tacting, receptive language, and matching-to-sample should be added ASAP

Sessions contain a mixture of the verbal operants (mixed verbal behavior) with the opportunity to mand as the main reinforcement for the target response

Establish a strong and generalized mand, tact, and receptive repertoire prior to moving on to multiple responses, complex concepts (e.g., adjectives, pronouns, prepositions)), RFFC, or intraverbal training.

Training should be done in formal training sessions and in the natural environment as often as possible (create a "language based" learning environment)

Use typical language development as a guide for advancement in the program

The teaching procedures consist of the basic techniques (e.g., prompting, fading, shaping, transfer of stimulus control, differential reinforcement) derived from behavior modification (or applied behavior analysis--ABA)

Training should be made as fun as possible by
- using lots of mand trials
- pairing yourself with free reinforcers
- errorless learning procedures
- vary pacing, materials, settings, tone of voice, people, context, etc.
- minimize the use of aversives and punishment

Discrete trial training, ABA, and verbal behavior are all based on the work of B. F. Skinner and developments in the area of psychology known as Behavior Analysis (www.abainternational.com)

Speech and Language Developmental Milestones
By
Megellan Health Centers
www.magellanhealth.com

Birth to 5 months

Reacts to loud sounds.
Turns head toward a sound source.
Watches your face when you speak.
Vocalizes pleasure and displeasure sounds (laughs, giggles, cries, or fusses).
Makes noise when talked to.

6-11 Months

Understands "No, no."
Babbles (says "ba-ba-ba" or "ma-ma-ma").
Tries to communicate by actions or gestures.
Tries to repeat your sounds.

12-17 Months

Attends to a book or toy for about two minutes.
Follows simple directions accompanied by gestures.
Answers simple questions nonverbally.
Says two to three words to label a person or object (pronunciation may not be clear).
Tries to imitate simple words.

18-23 Months

Enjoys being read to.
Follows simple commands without gestures.
Points to simple body parts such as "nose."
Understands simple verbs such as "eat," "sleep."
Correctly pronounces most vowels and n, m, p, h, especially in the beginning of syllables and short words. Also begins to use other speech sounds.
Says 8 to 10 words (pronunciation may still be unclear).
Asks for common foods by name.
Makes animal sounds such as "moo."
Starting to combine words such as "more milk."
Begins to use pronouns such as "mine."

2-3 Years

Knows about 50 words at 24 months.
Knows some spatial concepts such as "in," "on."
Knows pronouns such as "you," "me," "her."
Knows descriptive words such as "big," "happy."
Says around 40 words at 24 months.
Speech is becoming more accurate but may still leave off ending sounds.
Strangers may not be able to understand much of what is said.
Answers simple questions.
Begins to use more pronouns such as "you," "I."
Speaks in two to three word phrases.
Uses question inflection to ask for something (e.g., "My ball?").
Begins to use plurals such as "shoes" or "socks" and regular past tense verbs such as "jumped."

3-4 Years

Groups objects such as food, clothes, etc.
Identifies colors.
Uses most speech sounds but may distort some of the more difficult sounds such as l, r, s, sh, ch, y, v, z, th. These sounds may not be fully mastered until age 7 or 8.
Uses consonants in the beginning, middle, and ends of words. Some of the more difficult consonants may be distorted, but attempts to say them.
Strangers are able to understand much of what is said.
Able to describe the use of objects such as "fork," "car," etc.
Has fun with language. Enjoys poems and recognizes language absurdities such as "Is that an elephant on your head?"
Expresses ideas and feelings rather than just talking about the world around him or her.
Uses verbs that end in "ing," such as "walking," "talking."
Answers simple questions such as "What do you do when you are hungry?"
Repeats sentences.

4-5 Years

Understands spatial concepts such as "behind," "next to."
Understands complex questions.
Speech is understandable but makes mistakes pronouncing long, difficult, or complex words such as "hippopotamus."
Says about 200-300 different words.
Uses some irregular past tense verbs such as "ran," "fell."
Describes how to do things such as painting a picture.
Defines words.

Lists items that belong in a category such as animals, vehicles, etc.
Answers "why" questions.

5 years

Understands more than 2,000 words.
Understands time sequences (what happened first, second, third, etc.).
Carries out a series of three directions.
Understands rhyming.
Engages in conversation.
Able to describe the use of objects such as "fork," "car," etc.
Sentences can be 8 or more words in length.
Uses compound and complex sentences.
Describes objects.
Uses imagination to create stories.

Center for Disease Control (CDC)
(www.cdc.gov/ncbddd/autism/actearly/milestones)
Verbal operants, listener skills, imitation, matching-to-sample, and automatically reinforced vocal behavior identified in **bold** by Mark Sundberg

Babies develop at their own pace, so it's impossible to tell exactly when your child will learn a given skill. The developmental milestones listed below will give you a general idea of the changes you can expect, but don't be alarmed if your own baby's development takes a slightly different course.

Important Milestones: By the end of Three months

Social and Emotional
- Begins to develop a social smile
- Enjoys playing with other people and may cry when playing stops (**Mands**)
- Becomes more expressive and communicates more with face and body (**Possible Mands**)
- Imitates some movements and facial expressions (**Imitation**)

Movement
- Raises head and chest when lying on stomach
- Supports upper body with arms when lying on stomach
- Stretches legs out and kicks when lying on stomach or back
- Opens and shuts hands
- Pushes down on legs when feet are placed on a firm surface
- Brings hand to mouth
- Takes swipes at dangling objects with hands
- Grasps and shakes hand toys

Vision
- Watches faces intently
- Follows moving objects
- Recognizes familiar objects and people at a distance
- Starts using hands and eyes in coordination

Hearing and Speech
- Smiles at the sound of your voice
- Begins to babble (**Automatic reinforcement**)
- Begins to imitate some sounds (**Echoic**)
- Turns head toward direction of sound

Important Milestones: By the End of 7 Months

Social and Emotional

- Enjoys social play
- Interested in mirror images
- Responds to other people's expressions of emotion and appears joyful often

Cognitive
- Finds partially hidden object
- Explores with hands and mouth
- Struggles to get objects that are out of reach

Language
- Responds to own name (**Listener Skills**)
- Begins to respond to "no" (**Listener Skills**)
- Can tell emotions by tone of voice
- Responds to sound by making sounds (**Early echoic attempts**)
- Uses voice to express joy and displeasure
- Babbles chains of sounds (**Automatic reinforcement**)

Movement
- Rolls both ways (front to back, back to front)
- Sits with, and then without, support on hands
- Supports whole weight on legs
- Reaches with one hand
- Transfers object from hand to hand
- Uses hand to rake objects

Vision
- Develops full color vision
- Distance vision matures
- Ability to track moving objects improves

Important Milestones: By The End Of 1 Year (12 Months)

Social and Emotional
- Shy or anxious with strangers
- Cries when mother or father leaves (**Mands**)
- Enjoys imitating people in his play (**Imitation**)
- Shows specific preferences for certain people and toys
- Tests parental responses to his actions during feedings
- Tests parental responses to his behavior
- May be fearful in some situations
- Prefers mother and/or regular caregiver over all others
- Repeats sounds or gestures for attention (**Mand/echoic/imitation**)
- Finger-feeds himself
- Extends arm or leg to help when being dressed

Cognitive
- Explores objects in many different ways (shaking, banging, throwing, dropping)
- Finds hidden objects easily
- Looks at correct picture when the image is named (**Listener skills**)
- Imitates gestures (**Imitation**)
- Begins to use objects correctly (drinking from cup, brushing hair, dialing phone, listening to receiver)

Language
- Pays increasing attention to speech
- Responds to simple verbal requests (**Listener skills**)
- Responds to "no" (**Listener skills**)
- Uses simple gestures, such as shaking head for "no" (**Mand**)
- Babbles with inflection (changes in tone) (**Automatic reinforcement**)
- Says "dada" and "mama" (**Mand/tact**)
- Uses exclamations, such as "Oh-oh!" (**Mand/tact**)
- Tries to imitate words (**Echoic**)

Movement
- Reaches sitting position without assistance
- Crawls forward on belly
- Assumes hands-and-knees position
- Creeps on hands and knees
- Gets from sitting to crawling or prone (lying on stomach) position
- Pulls self up to stand
- Walks holding on to furniture
- Stands momentarily without support
- May walk two or three steps without support

Hand and Finger Skills
- Uses pincer grasp
- Bangs two objects together
- Puts objects into container
- Takes objects out of container
- Lets objects go voluntarily
- Pokes with index finger
- Tries to imitate scribbling

Important Milestones: By The End Of 2 Years (24 Months)

Social
- Imitates behavior of others, especially adults and older children (**Social imitation**)
- More aware of herself as separate from others
- More excited about company of other children

Emotional
- Demonstrates increasing independence
- Begins to show defiant behavior (**Mands**)
- Separation anxiety increases toward midyear then fades

Cognitive
- Finds objects even when hidden under two or three covers
- Begins to sort by shapes and colors (**Matching-to-sample**)
- Begins make-believe play

Language
- Points to object or picture when it's named for him (**Listener skills**)
- Recognizes names of familiar people, objects, and body parts (**Listener skills**)
- Says several single words (by 15 to 18 months) (**Mands/tacts**)
- Uses simple phrases (by 18 to 24 months) (**Mands/tacts**)
- Uses 2- to 4-word sentences (**Mands/tacts**)
- Follows simple instructions (**Listener skills**)
- Repeats words overheard in conversation (**Echoic**)

Movement
- Walks alone
- Pulls toys behind her while walking
- Carries large toy or several toys while walking
- Begins to run
- Stands on tiptoe
- Kicks a ball
- Climbs onto and down from furniture unassisted
- Walks up and down stairs holding on to support

Hand and Finger Skills
- Scribbles on his or her own
- Turns over container to pour out contents
- Builds tower of four blocks or more
- Might use one hand more often than the other

Important Milestones: By The End Of 3 Years (36 Months)

Social
- Imitates adults and playmates (**Social imitation**)
- Spontaneously shows affection for familiar playmates
- Can take turns in games
- Understands concept of "mine" and "his/hers" (**Listener skills**)

Emotional
- Expresses affection openly

- Expresses a wide range of emotions (**Some are Mands**)
- By 3, separates easily from parents
- Objects to major changes in routine (**Mands**)

Cognitive
- Makes mechanical toys work
- Matches an object in her hand or room to a picture in a book (**Matching-to-sample**)
- Plays make-believe with dolls, animals, and people
- Sorts objects by shape and color (**Matching-to-sample**)
- Completes puzzles with three or four pieces (**Matching-to-sample**)
- Understands concept of "two" (**Listener skills**)

Language
- Follows a two- or three-part command (**Listener skills**)
- Recognizes and identifies almost all common objects and pictures (**Listener/Tact**)
- Understands most sentences (**Listener skills**)
- Understands placement in space ("on," "in," "under") (**Listener skills**)
- Uses 4- to 5-word sentences (**Mand/tact/intraverbal**)
- Can say name, age, and sex (**Intraverbal**)
- Uses pronouns (I, you, me, we, they) and some plurals (cars, dogs, cats) (**Mand/tact**)
- Strangers can understand most of her words

Movement
- Climbs well
- Walks up and down stairs, alternating feet (one foot per stair step)
- Kicks ball
- Runs easily
- Pedals tricycle
- Bends over easily without falling

Hand and Finger Skills
- Makes up-and-down, side-to-side, and circular lines with pencil or crayon
- Turns book pages one at a time
- Builds a tower of more than six blocks
- Holds a pencil in writing position
- Screws and unscrews jar lids, nuts, and bolts
- Turns rotating handles

Important Milestones: By The End Of 4 Years (48 Months)

Social
- Interested in new experiences
- Cooperates with other children
- Plays "Mom" or "Dad"
- Increasingly inventive in fantasy play

- Dresses and undresses
- Negotiates solutions to conflicts (**mand/Intraverbal**)
- More independent

Emotional
- Imagines that many unfamiliar images may be "monsters"
- Views self as a whole person involving body, mind, and feelings
- Often cannot tell the difference between fantasy and reality

Cognitive
- Correctly names some colors (**Tacts**)
- Understands the concept of counting and may know a few numbers (**Math**)
- Tries to solve problems from a single point of view (**Mand/intraverbal**)
- Begins to have a clearer sense of time (**Intraverbal**)
- Follows three-part commands (**Listener skillls**)
- Recalls parts of a story (**Intraverbal**)
- Understands the concepts of "same" and "different" (**Listener skills**)
- Engages in fantasy play

Language
- Has mastered some basic rules of grammar (**Mand/tact/intraverbal/listener**)
- Speaks in sentences of five to six words (**Mand/tact/intraverbal**)
- Speaks clearly enough for strangers to understand
- Tells stories (**Intraverbal**)

Movement
- Hops and stands on one foot up to five seconds
- Goes upstairs and downstairs without support
- Kicks ball forward
- Throws ball overhand
- Catches bounced ball most of the time
- Moves forward and backward with agility

Hand and Finger Skills
- Copies square shapes
- Draws a person with two to four body parts
- Uses scissors
- Draws circles and squares
- Begins to copy some capital letters (**Copy-a-text**)

Important Milestones: By The End Of 5 Years (60 Months)

Social
- Wants to please friends
- Wants to be like her friends

- More likely to agree to rules
- Likes to sing, dance, and act
- Shows more independence and may even visit a next-door neighbor by herself

Emotional Milestones
- Aware of gender
- Able to distinguish fantasy from reality
- Sometimes demanding, sometimes eagerly cooperative (**Mands**)

Cognitive Milestones
- Can count 10 or more objects (**Math**)
- Correctly names at least four colors (**Tact**)
- Better understands the concept of time (**Listener/intraverbal**)
- Knows about things used every day in the home (money, food, appliances)(**M/T/L/IV**)

Language
- Recalls part of a story (**Intraverbal**)
- Speaks sentences of more than five words (**Mand/tact/intraverbal**)
- Uses future tense (**Intraverbal**)
- Tells longer stories (**Intraverbal**)
- Says name and address (**Intraverbal**)

Movement
- Stands on one foot for 10 seconds or longer
- Hops, somersaults
- Swings, climbs
- May be able to skip

Hand and Finger Skills
- Copies triangle and other shapes
- Draws person with body
- Prints some letters
- Dresses and undresses without help
- Uses fork, spoon, and (sometimes) a table knife
- Usually cares for own toilet needs

Teaching Intraverbal Behavior To Children with Autism: A New Assessment Tool and Curriculum

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What is Intraverbal Behavior?

- Much of our day-to-day language involves emitting words, phrases, and sentences that are in response to the words, phrases, and sentences of others
- Verbal behavior evoked by other verbal behavior
- Intraverbal behavior is essential for conversations, social interactions, memory, thinking, problem solving, and entertainment; and it is the core element of academic and intellectual behavior

Examples of Intraverbal Behavior Emitted by Children

Verbal Stimulus	Verbal Response
Twinkle twinkle little...	*Star*
A kitty says...	*Meow*
Mommy and...	*Daddy*
Knife, fork and...	*Spoon*
What do you like to eat?	*Pizza!*
What's your favorite movie?	*Sponge Bob Square Pants!*
Can you name some animals?	*Dog, cat, and horse*
What's your brother's name?	*Charlie*
Where do you go to school?	*Harvest Park*

Examples of Adult Intraverbal Behavior

Verbal Stimulus	Verbal Response
How are you?	*I am fine.*
What's your name?	*Mark*
Where do you live?	*Concord, CA*
What do you do?	*I'm a behavior analyst...*
What is ABA?	*B F. Skinner...*
What do I do about SIB?	*The first step...*
Should I attend Dr. Iwata's talk?	*Yes, Dr Iwata...*
Is there research to support ABA?	*Yes, there is...*

Technical Definition of Intraverbal Behavior (Skinner, 1957)

- Chapter 1 of Verbal Behavior is titled "A Functional Analysis of Verbal Behavior"
- Verbal behavior that is evoked by a verbal discriminative stimulus (S^D) that does not have point-to-point correspondence to the verbal response (i.e., the stimulus and the response do not topographically match).
- Verbal S^D Response Reinforcement W/O a match

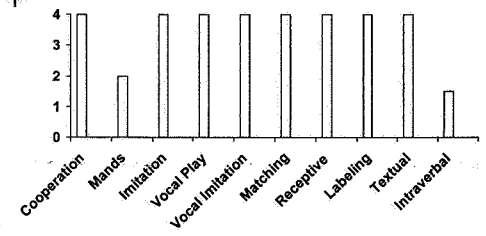
How is the Intraverbal Relation Different from the Mand, Tact, & Echoic?

Antecedent	Behavior	Consequence
Motivation (EO)	Mand	Specific reinf.
Nonverbal S^D	Tact	Social reinf.
Verbal S^D with a match	Echoic	Social reinf.
Verbal S^D without a match	Intraverbal	Social reinf.

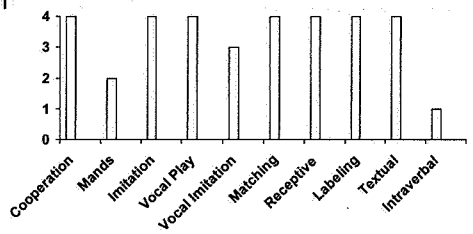
Defective Intraverbal Behavior

- One of the most common problems faced by children with autism is an absent, weak, or defective intraverbal repertoire, often despite a strong tact and receptive discrimination repertoire

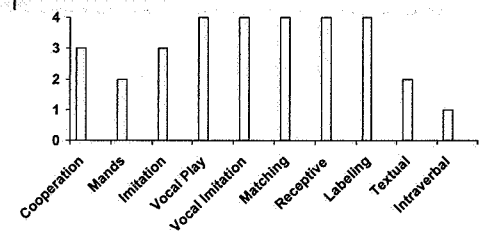
Charlie: Quick Assessment



Nathan: Quick Assessment



Matt: Quick Assessment



Defective Intraverbal Repertoires

- Intraverbal training is not part of the curriculum
- Content of the verbal stimuli too complex
- Training is provided out of developmental sequence
- Verbal conditional discriminations not established
- Training has produced rote responding
- Child does not have a strong enough mand, tact, and RD repertoire to conduct IV training
- Child doesn't attend to verbal stimuli (S-deltas)

Defective Intraverbal Repertoires

- Nonverbal stimuli control response form (tact prompt bound)
- MOs control response forms (strong IVs on favorite topics)
- Single stimuli and single responses over-conditioned
- Not enough training trials/time
- Echoic repertoire too strong (echolalia)
- Verbal stimulus classes not established
- Verbal response classes not established

Teaching Early Intraverbal Behavior

- The focus of this presentation will be on **what** IV behavior to teach, rather then **how** to teach IV behavior
- The acquisition of IV behavior by typically developing children can provide a general guide for the sequencing of an IV curriculum for children with language delays.
- When do typical children begin to acquire IV behavior?
- What types of IV behavior do they acquire?
- What types of errors do typical children make, and at what age?

Intraverbal Assessment

- The following intraverbal assessment was developed to determine where intraverbal training should begin for a child. There are 8 levels of the assessment, with 10 items in each level
- The assessment has been revised many times and will continue to be revised as data come in from more children
- The current version was the result of scores from 19 typical children and 15 children with autism
- A new version will soon be available based on the data from the following group of children (28 typical, 12 ASD)

Intraverbal Assessment:

Level 1: Animal sounds, songs and other fill-ins

Verbal S	Score	Response
A kitty says...		
Twinkle twinkle little...		
Peek-a...		
The wheels on the...		
Head, shoulders, knees and...		
open the...(when near a door)		
You wash your.... (when near a sink)		
The itsy bitsy...		
Meow says a...		
Five little monkeys jumping on the...		

Intraverbal Assessment:

Level 2: Out-of-context and association fill-ins

Verbal S	Score	Response
You eat...		
Table and...		
Shoes and...		
Mommy and...		
You drink...		
Knife, fork, and...		
You sleep in a...		
One, two...		
Socks and...		
Dog and...		

Intraverbal Assessment:

Level 3: Verb-noun fill-ins and What questions

Verbal S	Score	Response
What do you eat?		
You ride a...		
What can you kick?		
You spin a		
What is your name?		
What do you do with soap?		
What can you wear?		
You pour some...		
What flies in the sky?		
You climb a...		

Intraverbal Assessment:

Level 4: Function and class

Verbal S	Score	Response
What's in a kitchen?		
What do you do with crayons?		
Can you name some shapes?		
Can you name an animal?		
What do you do with glue?		
What do you find on a playground?		
What do use to draw a picture?		
Can you name a color?		
What's in mommy's purse?		

Intraverbal Assessment:

Level 5: Multiple responses, Where and Who questions

Verbal ^{D}S	Score	Response
Who is your teacher?		
Where do you bake cookies?		
Can you name some furniture?		
Who takes you to school?		
A dog, cat, and monkey are all...		
Who do you see on TV?		
What color is a banana?		
Where is your mommy (or daddy)?		
Can you name some body parts?		
Where is the milk?		

Intraverbal Assessment:

Level 6: Two-component S^{D}s, features, yes-no

Verbal ^{D}S	Score	Response
What has wheels?		
What do you pour that is white?		
Is a banana a vegetable?		
What do you wear that has a zipper?		
What do you smell in the oven?		
What furniture is soft?		
What has paws?		
Is a banana a fruit?		
Can you name a little animal?		
What do you see outside?		

Intraverbal Assessment:

Level 7: Two S^{D}s with prepositions or adverbs, negation

Verbal ^{D}S	Score	Response
What do you eat with?		
What animal moves slow?		
Tell me something that is not a food		
What do you write on?		
Where do you talk quietly?		
What is something you can't wear?		
What do you sit at?		
What is between the blankets and the bed?		
What animal goes fast?		
What's something that is not a musical instrument?		

Intraverbal Assessment:

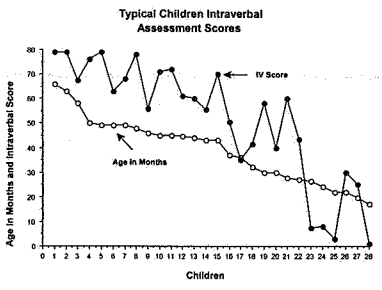
Level 8: When, Why & How questions, time, sequences

Verbal ^{D}S	Score	Response
What did you do this morning?		
What comes before seven?		
How do you clean your hands?		
Why do you open the refrigerator?		
What are you going to do tonight?		
What come after seven?		
When do you eat dinner?		
How is a dog different from a cat?		
What day is today?		
Why do we sweep the floor?		

An Assessment of Typical Children's Intraverbal Behavior

- 28 typical children served as participants
- Most were from the Seattle area
- Ages ranged from 17 months old to 5 1/2 years old.
- Parents administered the assessment
- Instructions were given to the parents, including to write down exactly what the child said following the presentation of the verbal stimulus

Typical Children Age and Scores on the Intraverbal Assessment



Error Analysis of the Typical Children's Intraverbal Behavior

- The mistakes that typical children make can help us sequence the intraverbal curriculum for children with autism.
- Errors demonstrated by 5 year olds....
- Who & When questions: The oldest child (66 mo.) missed one item "Who takes you to school" evoked "bus." (You're not listening!)
- Before and after, time concepts
- "What day is today" (almost everybody miss it), including the five year olds.
- The word "different" as a verbal stimulus was hard for many kids.
- All these questions involve **verbal conditional discriminations** where one word (e.g., "before") alters the evocative effect of the following word(s). The tendency is to intraverbally respond to the last word or a word that is salient for some reason.

Error Analysis of the Typical Children's Intraverbal Behavior

- Errors demonstrated by 4 year olds....
- All of the above, for example
- "When" "When do you eat dinner" evoked "At the table" for one child (49 mo. old, scored 69), "Wendy's" for another child (46 mo. old, scored 56).
- In addition, errors occurred with....
- Where questions
- Intraverbal Yes-no questions
- Categories, e.g., errors on animals, furniture, colors, body parts (for a 49 mo. old, who scored 63.5)
- Prepositions at the end of sentences "with," "at," "on,"; or in the middle "between"
- Conditional discrimination errors were common: "What do you smell in the oven?" evoked "nose." IV control with "smell" and "nose" but "what" and "oven" had no effect.
- "Not" was a problem for most kids "Not a musical instrument" evoked "drum"

Error Analysis of the Typical Children's Intraverbal Behavior

- Errors demonstrated by 3 1/2 year olds
- Same as above plus...
- Echoic responses occurred more frequently when no intraverbal occurred
- Conditional discrimination errors very common. "What animal moves slow?" evoked "fast"
- Several children had favorite "error words" "Orange," "Sandwich," "Grace"
- Negation in a conditional discrimination was major problem: "can't wear" evoked "jacket"

Error Analysis of the Typical Children's Intraverbal Behavior

- Errors demonstrated by 3 year olds
- All of the above plus....
- Verbal conditional discrimination errors more prevalent. What do you find on a playground"... "outside"
- Pronoun reversal "What your name" ... "your name is Spencer"
- Functions ("do with") of items in a verbal conditional discrimination "What do you do with soap" evoked "soap is in the tub."
- Most "WH" questions caused problems (Who, Where, What, When, & Why)

Error Analysis of the Typical Children's Intraverbal Behavior

- Errors demonstrated by 2 1/2 year olds.
- All of the above errors plus...
- Much more echoic than older kids, repeated key words in question
- "Knife fork and..." Evoked "Fork and"; "Dog and" evoked "Dog and"; What can you wear?" evoked "What can you wear"
- When some intraverbal control was demonstrated, often simple IV relation, no conditional discrimination, last few or prominent word source of stimulus control "A dog, cat and monkey are all..." "Jumping on the bed"
- Rote responses were evident. "What day is today" ... "Rainy" (when it was sunny)
- Many errors with classes and verbs

Error Analysis of the Typical Children's Intraverbal Behavior

- Errors demonstrated by 2 year olds.
- All of the above errors plus...
- Minimal intraverbal behavior
- Some song fill-ins, lots of echoic, no WH, except some can do "What's your name", but if you say "What's my name?" your likely to get the child's name.
- Errors demonstrated by 1 ½ year olds
- All of the above errors plus...
- Generally no IV behavior, but some exceptions (e.g., mom is trained in VB and works with children with autism)

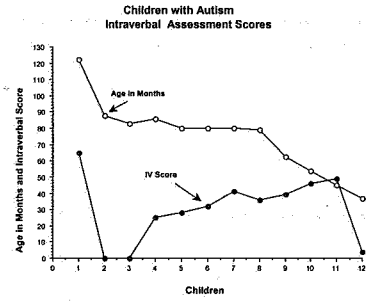
Funny Intraverbal Responses: "Kids say the darnd'est things"

- "What can you kick?" ... "We only kick balls"
- "What do you write on?" ... "We only write on paper"
- "What day is it? ... "Football day (Sunday)"
- "What do you do with soap" ... "In my mouth"
- "What's in the kitchen?" ... "Lot's of junk"
- "Where do you sit" ... "In the time-out chair"

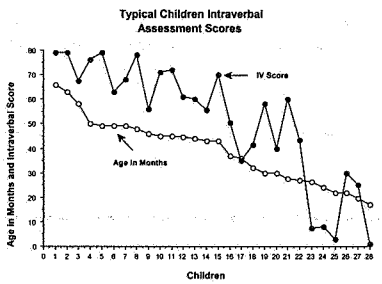
Assessment Results for Children with Autism

- 12 children served as participants
- Most were from PUSD
- Ages ranged from 37 months old to 10 1/2 years old.
- Classroom staff administered the assessment

Children with Autism Age and Scores on the Intraverbal Assessment



Typical Children Age and Scores on the Intraverbal Assessment



Error Analysis of the Children with Autism's Intraverbal Behavior

- The children with autism made the same types of errors as typical children who scored at their level
- Verbal conditional discriminations were hard for all children especially those involving "WH" questions ("Where do you bake cookies?" evoked "mommy"; "What do you smell in the oven?" evoked "flower"; "Where do you buy food?" evoked "apples")
- Rote responding was more obvious, and more firmly established
- Echoic responses more frequent
- Frequency of favorite "wrong response" higher (13 "animals")
- Negative behavior higher with increasing complexity of the verbal stimulus

Conclusions

- Typical language development can serve as an important guide for curriculum development for children with autism
- A functional analysis of the errors made by typical children with varying levels of IV tasks, can help us understand the errors made by children with autism
- Children with autism made the same intraverbal errors as typical children who scored at their level

Conclusions

- The biggest problem children with autism face regarding intraverbal behavior is the failure to include specific IV training in a language intervention program
- When training is provided, the most common problem is that the content of the verbal stimuli are too complex
- The intraverbal assessment tool seems like a reliable predictor of intraverbal level, and where to start intraverbal training
- A functional analysis of verbal behavior, like a functional analysis of nonverbal behavior, is essential for effective intervention.

Teaching Early Intraverbal Behavior

- The acquisition of intraverbal behavior by typically developing children can provide a general guide for the sequencing of an intraverbal curriculum for children with language delays.

Teaching Early Intraverbal Behavior

- Some types of intraverbal control are relatively simple and some children acquire a few intraverbal responses shortly after a few spoken mands and tacts are acquired (typically around 12-16 months).
- For example, children learn to provide the sounds that favorite animals make when asked to do so, fill-in-the blanks of favorite songs, or fill-in-the-blanks related to favorite activities.
- "Favorite" suggests motivational (MO) control

Starting Intraverbal Training for Children with autism

- In general, formal intraverbal training should not be a part of an intervention program for a child with autism until the mand and tact repertoires are established, and the child can emit good echoic, imitation, receptive, and matching-to-sample behavior (the six basic skills).
- There certainly are exceptions, and an individual analysis of each child can provide guidance.

Starting Intraverbal Training for Children with autism

- The simplest types of intraverbal behaviors are the same as those that occur early for many typical children.
- Animal sounds fill-ins
- Song fill-ins
- Fun activities fill-ins
- In-context fill-ins
- Reverse fill-ins

Intraverbal Assessment:

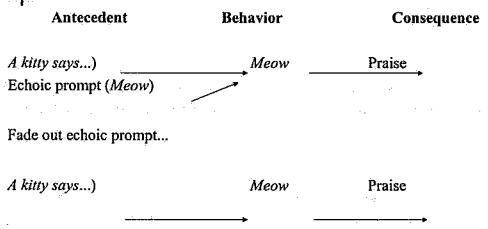
Level 1: Animal sounds, song and other fill-ins

Verbal S	Score	Response
A kitty says...		
Twinkle twinkle little...		
Peek-a...		
The wheels on the...		
Head, shoulders, knees and...		
open the...(when near a door)		
You wash your.... (when near a sink)		
The itsy bitsy...		
Meow says a...		
Five little monkeys jumping on the...		

Intraverbal Training procedure

- For these early intraverbal responses, echoic prompting and fading procedures may work best
- First present the target verbal stimulus such as *A kitty says...*
- Then provide an immediate echoic prompt (*Meow*)
- Then pre-present the target verbal stimulus and delay the echoic prompt (the transfer trial using a delayed prompt procedure).
- Reinforce a correct response (*Meow*) with praise, or an opportunity to mand.
- Incorrect responses (e.g., the child echos *A kitty says...*) should be followed by repeating the trial with the slightly delayed prompt and attempting to more carefully time and fade the echoic prompt (e.g., partial prompts, reduce volume, reduce delays).

Echoic to Intraverbal Transfer with Animal Sounds



Goals of Early Intraverbal Training

- Break verbal responding free from echoic and tact control
- Use motivational variables to begin to establish intraverbal control
- Less of a focus on "understanding" what is said

Expanding, Strengthening, and Measuring the Early Intraverbal Repertoire

- Verbal stimulus discrimination (2 or more close S^Ds)
- Add more sounds, songs, fill-ins, etc.
- Increase frequency of trials
- Generalization (different people, places, material, etc.)
- Conduct "cold probes" in the absence of an MO and visual context

Defective Intraverbal Development

- Red Flags...
- Errors
- It takes a lot of training trials
- Rote responding
- Negative behavior (escape/avoidance)
- Long latencies
- Weak retention of trained responses
- Failure to totally break free from prompts
- Failure to generalize

Moving to Level 2 Intraverbal Training

- The child should have demonstrated good success with the Level 1 procedures
- The child should be able to emit well over 100 nouns and verbs as tacts and receptive discriminations
- The child should have strong mands, echoics, and MTS skills
- The child should be showing success with the RFFC training procedures

Intraverbal Curriculum:

Level 2: Out-of-context and association fill-ins

- Noun-noun association fill-ins
- Out-of-context fill ins
- Eat and drink classification fill-ins
- Reverse fill-ins

Intraverbal Assessment:

Level 2: Out-of-context and association fill-ins

Verbal S	Score	Response
You eat...		
Table and...		
Shoes and...		
Mommy and...		
You drink...		
Knife, fork, and...		
You sleep in a...		
One, two...		
Socks and...		
Dog and...		

Intraverbal Curriculum:

Level 3:Verb-noun fill-ins and What questions

- Verb-noun fill-ins (verb as S^D)
- Reverse noun-verb fill-ins (noun as S^D)
- What questions (verb as S^D-noun as response)
- What questions (noun as S^D-verb as response)
- What questions (eat/drink classification)

Intraverbal Assessment:

Level 3: Verb-noun fill-ins and "what" questions

Verbal S	Score	Response
What do you eat?		
You ride a...		
What can you kick?		
You spin a		
What is your name?		
What do you do with soap?		
What can you wear?		
You pour some...		
What flies in the sky?		
You climb a...		

Intraverbal Curriculum:

Level 4: Function and class

- Tact-intraverbal function (object present)
- Provide noun given function (object absent)
- Provide function given noun (object absent)
- Intraverbal categories, Fill-ins
- Intraverbal categories, WH questions

Intraverbal Assessment:

Level 4: Function and class

Verbal S	Score	Response
What's in a kitchen?		
What do you do with crayons?		
Can you name some shapes?		
Can you name an animal?		
What do you do with glue?		
What do you find on a playground?		
What do use to draw a picture?		
Can you name a color?		
What's in mommy's purse?		