TEACHING VERBAL BEHAVIOR TO CHILDREN WITH AUTISM AND RELATED DISABILITIES

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TABLE OF CONTENTS

	Slide number
Brief history of Applied Behavior Analysis (ABA) and Verbal behavior	3
Language Acquisition- Traditional Accounts of Language Development	5
Behavioral Account of Language	12
Pairing and Teaching the Mand	31
Social Skills and Play Skills	119
Length of Utterance	144
Mands for Information	153
Assessment of Basic Skills	177
Discrete Trial Instruction	203
Discrete Trial Instruction Data Recording	263
Data-Based Decision Making	286
Natural Environment Teaching (NET)	331
DTI to NET Generality	350
Performance Management	359
Topography and Selection Based Verbal Behavior (AAC)	375
Increasing Speech Production	422
Teaching Advanced Verbal Behavior	567
Teaching Group Responding	621
Teaching Independence and Life Skills	632
Problem Behavior Reduction	634

Clinic Video\clinic.wmv

BRIEF HISTORY OF APPLIED BEHAVIOR ANALYSIS (ABA) AND VERBAL BEHAVIOR

1938 – Skinner wrote *Behavior of Organisms*
(reinforcement, extinction, motivation, punishment, stimulus control)
1950 – Keller and Schoenfeld wrote the textbook *Principles of Psychology*
1953 – Skinner wrote *Science and Human Behavior*
1957 – Skinner wrote *Verbal Behavior*
1958 – *Journal of the Experimental Analysis of Behavior* started
1959 – Chomsky wrote a critique of *Verbal Behavior*
1959 – Michael and Ayllon wrote "The Nurse as a Behavioral Engineer"
1960's – Lovaas begins research at UCLA with children with autism using operant conditioning methods (discrete trial training)

1968 – Baer, Wolf, and Risley publish "Some Current Dimensions of Applied Behavior Analysis" in the *Journal of Applied Behavior Analysis (JABA)*
1970's – Michael begins teaching verbal behavior at Western Michigan University
– Sundberg begins researching verbal behavior with Michael and Partington
1982 – Sundberg started the *Analysis of Verbal Behavior* journal
1984 – Shook started the Florida Certification of Behavior Analysts
1998 – Shook started the National Board Certification of Behavior Analysts
– Sundberg and Partington published *Teaching Language to Children with Autism or Other Developmental Disabilities* and *The Assessment of Basic Language and Learning Skills (ABLLS)*

Language Acquisition

Non-Behavioral Accounts of Language Development

- Traditional theorists (such as Chomsky, Piaget, Pinker, Brown, Brunner, etc.) view language development as an innate, biological process, not due to environmental factors, but instead controlled by internal cognitive mechanisms which accept, classify, code, encode, and store information.

- According to these theories, ***words and sentences***, or the ***form of language***, are the important units of analysis.

- Emphasis is placed upon the topography or form of language such as:
  - Syntax (ordering of words)
  - Grammar (conventions or rules)
  - Morphemes (smallest unit of meaning e.g.-ed, -ing, -s)
  - Phonemes (sounds)
  - Semantics (word meaning)
  - Pragmatics (social use of language)
  - Mean Length of Utterance (MLU)
  - Lexicon (collection of words)

  - Words are typically classified into nouns, verbs, adjectives, etc.

- This traditional account classifies language into two categories:
  - Expressive language
  - Receptive language

  - The traditional account of language dominates the field of language assessment as well as the treatment approach for children who are language disordered or delayed.

SUMMARY OF THE NON BEHAVIORAL ANALYSIS OF LANGUAGE

1. Verbal behavior is explained in terms of underlying mental causes and activities
2. Persons use words in order to express themselves, convey ideas or to expressing meaning.
3. The word is regarded as a symbol that is used to represent the ideas it is designed to convey.
4. The meaning of the word is defined by its referent.

5. The meanings of words are stored in the lexicon which is accessed prior to speech.
6. Language is regarded as the output of various "cognitive mechanisms" that manipulate the symbols and generate the language according to rules.
7. There are various aspects of speech (nouns, verbs, adjectives, adverbs, prepositions, etc.)and various rules of grammar and syntax regarding the usage and manipulation of these parts of speech.
8. These rules are thought to be mental and innate. This includes Chomsky's idea of innately acquired universal transformational grammar that resides in the Language Acquisition Device.

9. What a person says emerges when various rules are applied to the underlying grammatical structure.
10. All people are born with these universal underlying structures that account for the development of language.
11. The language one ultimately speaks results from exposure to the sounds of a language early on in life which then trigger the underlying structures to enable the individual to speak consistent with the rules of grammar.

Jay Moore (2007, p. 166)

Behavioral Account of Language

- In 1957, Skinner wrote the book *Verbal Behavior* where he offered a behavioral interpretation of language.
- In contrast to traditional theorists, B. F. Skinner argued that language is not some innate, cognitive or developmental process but rather language is behavior, verbal behavior, and is best explained by same environmental variables that explain all other behavior.

Behavior Analysis

- Antecedent: before behavior
  - Stimulus control
  - Motivation (MO)
- Behavior
  - Response form (all kinds of behavior)
- Consequence: immediately following behavior
  - Reinforcement: increases behavior
  - Extinction: weakens behavior
  - Punishment: decreases behavior

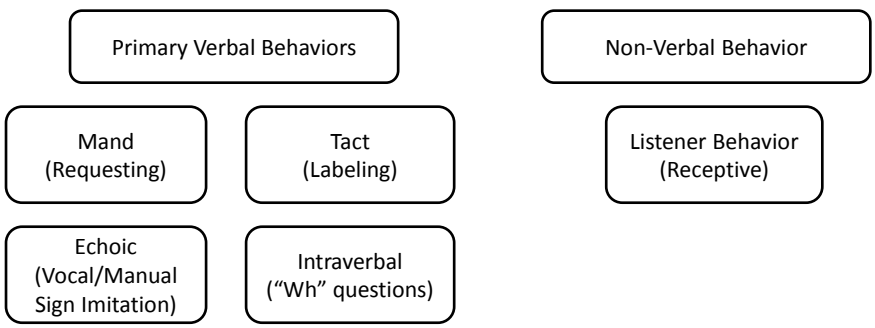
Behavior Analysis

- Behavior is analyzed through the three-term contingency.

Antecedent	Behavior	Consequence
A	B	C
MO/S^D →	Response →	Reinforcement Extinction Punishment

- Therefore as behavior, verbal behavior is best analyzed and explained by considering the environmental stimuli that preceed it, or its antecedents, and stimuli that follow it, or its consequences.
- In a behavioral analysis of language, a word is not defined by its form rather a word is defined by its ***function*** or controlling variables.
- Language is classified into functional categories which are referred to as verbal operants.

Behavioral Classification of Language



NONVERBAL BEHAVIOR

Want Water -----walk to the refrigerator-----Get Water

VERBAL BEHAVIOR

Want Water----------say water----------Person Delivers
sign Water Water
point to water
whine
exchange a picture
kick someone
scream
write water

Saying Water is Behavior- Movement of Muscles of the Vocal Apparatus that Produces Acoustic Stimulus.

17

Skinner's (Nature's) Verbal Behavior Categories

Verbal Responses

- Mand (Requesting) : Asking for reinforcers that you want. Saying "candy" because you want candy. (Birth to 12 months-non-vocal mands in the form of crying; pointing, 12 months first word, then 2 words (noun & verb) at 24 months; mand for information at @ 36 months)
- Tact (Labeling): Naming or identifying objects, actions, events, etc. Saying "candy" because you see candy. (12 months- 1 word; 24 months- 2 word (noun & verb) at 24 months; 36 months- at least 500 words)
- Echoic (Vocal Imitation): Repeating what is heard. Saying "candy" after someone else says "candy". (Birth -6 months universal sounds; 6 months-12 months- sounds heard during daily activities; 12 months- echo some phonemes and phoneme combinations & word approximations)
- Intraverbal ("wh" Questions") : Answering questions or having conversations where your words are controlled by other words. Saying "candy" when someone else says "What do you like to eat?" (30 months- 1 word responses; complexity & length of utterances increase over time; full sentences by 48 months)

Non-Verbal

Listener Responses

- Listener Behavior (Receptive): Motor responses to what someone says.

18

VERBAL & NON-VERBAL OPERANT RESPONSES

MAND

Mand (requesting): Asking for reinforcers that you want. Saying "candy" because you want candy.

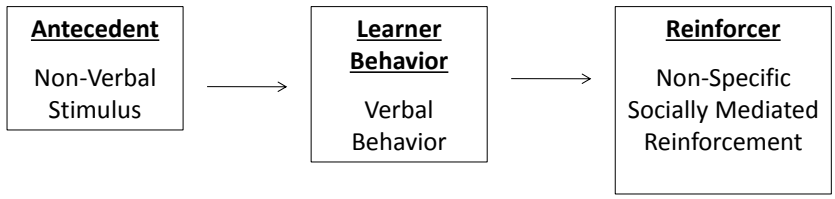
Antecedent	→	**Learner Behavior**	→	**Reinforcer**
Motivation (MO)		Verbal Behavior		Specific to the MO

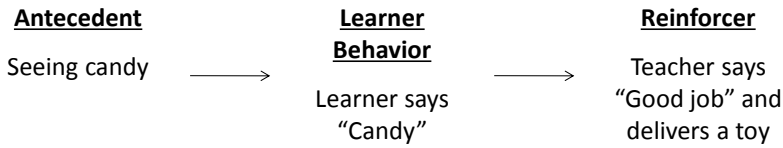
Antecedent	→	**Learner Behavior**	→	**Reinforcer**
Motivation for candy		Learner says "Candy"		Delivery of candy

Video - Mand

TACT

Tact (labeling): Naming or identifying objects, actions, events, properties, etc. Saying "candy" because you see candy.

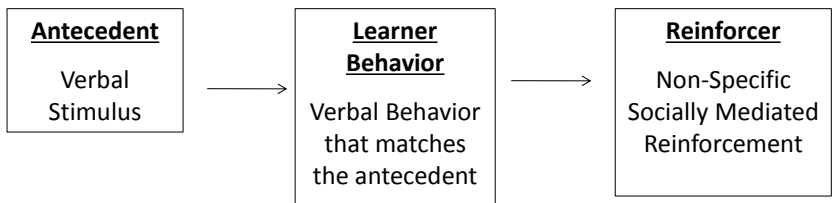


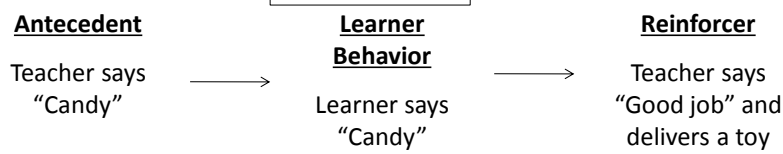


Video - Tact

ECHOIC

Echoic (vocal imitation): Repeating exactly what is heard. Saying "candy" after someone else says "candy."

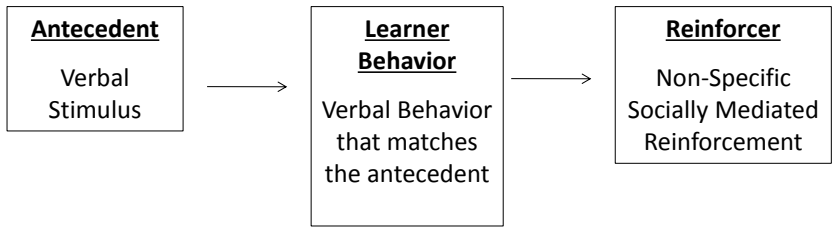




Video - Echoic

MIMETIC

Mimetic (imitating manual signs): Copying someone's motor movements. Signing "candy" after someone else signs "candy."



Antecedent

Teacher signs "Candy"

Learner Behavior

Learner signs "Candy"

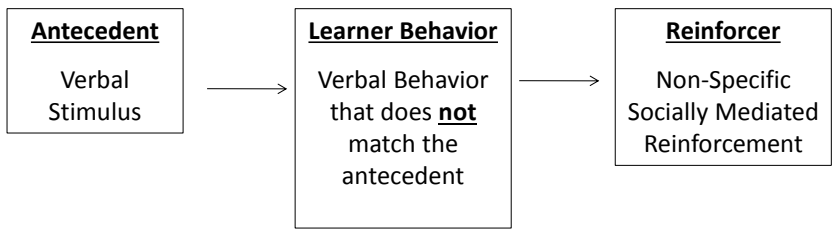
Reinforcer

Teacher says "Good job" and delivers a toy

Video - MI

INTRAVERBAL

Intraverbal ("wh" questions): Answering questions, fill-ins, or having conversations where one's words are controlled by another person's words. Saying "candy" when someone else asks "What is something you eat?"



Antecedent

Teacher says: "What do you eat?"

Learner Behavior

Learner says "Candy"

Reinforcer

Teacher says "Good job" and delivers a toy

Video - Intraverbal

LISTENER BEHAVIOR

(Non-Verbal Behavior)

Listener Behavior (receptive): Following instructions or motor responses to what someone else says. Handing someone candy after another person says "Give me some candy."

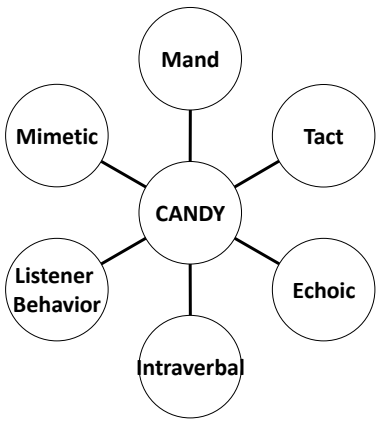
Antecedent	→	**Learner Behavior**	→	**Reinforcer**
Verbal Stimulus		Non-Verbal Behavior (motor responses to antecedent)		Non-Specific Socially Mediated Reinforcement

Antecedent	→	**Learner Behavior**	→	**Reinforcer**
Teacher says: "Give me the candy?"		Learner hands candy to teacher		Teacher says "Good job" and delivers a toy

Video – Listener Responding

Video – LRFFC

Teach All The "Meanings"



CHILD LANGUAGE DEVELOPMENT

Approximate Age	Expressive Language	Auditory Comprehension
2 to 4 months	Verbal play through cooing, gooing, and laughing. Vowel sounds heard such as ooohh, eee, and ahhh.	Turns head toward sounds and can begin to discriminate one sound from another.
4 to 8 months	Babbling begins. Some consonant sounds can be heard.	Anticipates an event (e.g. peek-a-boo) and follows a line of regard (e.g. visually follows toy moving across floor) as well as joint attention (i.e. is capable of visually attending to object with caregiver).
8 to 12 months	Syllable variation (e.g. badugatadudah). First word approximations (e.g. dada for daddy). Non-verbal communication. Jargon (i.e. unintelligible speech) is present. Uses most sounds in vocal play. Babbling (bababa). Uses m,n,t,b,p,y in babbling multiple syllables.	Relates words with physical objects (e.g. understands that the word "ball" actually means the object ball). Responds to simple phrases such as "no."
1 to 2 years	10-15 words at 18 months, 40-50 words at 24 months. Uses mostly nouns and pronoun me/mine. Jargon (i.e. unintelligible speech) still present. Appearance of CVC (hot). @ 65% intelligible words	Increased attention to toys. Changes behavior in response to comments made to him/her. Knows a few simple commands with gestures needed at times. Understands simple questions. Points to simple pictures.

27

2 to 3 years	150 words at age 2; 300-400 at age 3 years. Uses 2-3 word phrases frequently. Asks simple questions. Fluency can be poor. Jargon (unintelligible speech) mostly gone. Vowel sounds intact. @ 80% intelligible words Omits some final consonants, Consonant substitutions.	Comprehension shows rapid increase. Responds to more 2-step commands with prepositions (e.g. "pick up the ball and put it on the table").
3 to 4 years	Uses 600-1000 words and 3-4 word sentences. Pronouns and adjectives are used as well as some adverbs, prepositions, past tense and plurals. Answers what, where, and when questions. Very good intelligibility.	Understands 1500 words. Recognizes gender differences, plurals, pronouns, adjectives, and colors.
4 to 5 years	Vocabulary increases to 1000-1600 words and 4-6 word sentences. 3-4 syllable words are being used. Articles appear. Uses more adjectives, adverbs and conjunctions. Fluency improving.	Comprehends 1500-2000 words. Understands if, because, why, and when. Follows complex directions.
5 to 6 years	Vocabulary of 1500-2100 words. Uses complete 5-6 word sentences. Fluent speech. Many multi-syllabic words are used.	Understands 2500-2800 words. Understands more complicated sentences.

28

The Importance of the Behavioral Classification of Language

- A word is not defined by its form. A word is defined by its functional category (e.g. mand, tact).
- For example the same word "candy" has many different meanings based upon the conditions under which you learned to say it (antecedents and consequences).
- Many children with autism do not have verbal repertoires that include responses within each category for the same word.

- This happens because the categories (e.g. mand, tact) are functionally independent and responses (words) may not transfer across the categories without explicit training. For example, it can not be assumed that because a child tacts "candy" when they see candy that they will mand for "candy" when they want it.
- A common profile of children with autism includes a large receptive repertoire and many tacts but very few mands and almost no intraverbals.
- This problem may be the result of instruction that failed to assess the language repertoire of a child according to a behavioral classification and then failed to recognize the need for explicit teaching.
- Frequently, the child's "cognitive abilities" and not the teaching is said to account for the failure to develop spontaneous language and conversation skills.

Pairing & Manding

Pairing

- Pairing is the process by which we condition ourselves, the teaching materials, and other stimuli as reinforcers.

- Before we can begin teaching skills, we need to begin the pairing process with the learner.

- The most useful way to increase cooperation is by using the learner's motivation.

- Through pairing the learner should gain access to a wide variety of reinforcers with little effort.

- To begin pairing, the instructor should surround themselves with many reinforcers and deliver the reinforcers non-contingently (without requiring any demands).

- Pairing typically starts in the natural environment.

Pairing

- During this process the instructor should take note of what items and activities serve as reinforcers for the learner, and what things the learner seems to have the strongest motivation for.
- The instructor should be associated with the delivery of reinforcement, and not the removal of reinforcement.
- If the child is already engaging in an activity that he or she seems to like, and you are ready to begin your session, do not remove the item or activity. Instead, the instructor should try to make that activity more fun by engaging with the learner.

Video: *Marc with Emily in NET*
Video: *Christy with Anthony in NET*

- Pairing can look different depending on the child. Not every child has the same reinforcers, and some children require more pairing than others.

Pairing

- Requiring the First Response: Transitioning to the Table
  Make sure that you have strong reinforcers available.

  Video: *Emily P. pairing at the table with Marc*

- It is important to realize that pairing is an on-going process that may take hours, days, or weeks.
- The goal of pairing is that the sight of the instructor signals that good things are about to happen, not that the sight of the instructor means the removal of fun things.

The Mand

What is the Mand?

- A mand is essentially a request.
- Mands are emitted when we are motivated for something.
- Manding is verbal behavior that produces immediate benefit for the learner and therefore strengthens it.
- This is the first repertoire learned by all children.

Why is the Mand Important?

- Development of a strong manding repertoire may be essential for the development of all other types of verbal behavior.
- Manding teaches a child that verbal behavior is valuable; other repertoires teach what to say once the learner "wants to talk."
- By teaching a mand repertoire you may replace some problem behavior.
- It is unlikely that you will be able to develop a verbal behavior repertoire in an early learner by just requiring the child to label items (tact) or talk about things (intraverbal).

When to Teach the Mand

- Teach mands at times when the motivation is the greatest for the item or activity.
- It is imperative that you begin teaching the child to ask for his or her strongest reinforcers.

Rules For Teaching Manding

- Teaching must occur in the natural, everyday environment where motivation is strong (NET).
- Make sure the child has a motivating operation (MO) for an item before prompting a mand.
- Capture and contrive as many opportunities per day to teach mands.

Rules For Teaching Manding

- Count the number of mands, prompted and unprompted, the controlling variables, and variety per day or per session and graph your results.
- Prompt mands initially to teach the child that its easy to get things with verbal behavior so as to not turn the child off to communicating.

Rules for Teaching Manding

- Run multiple trials a day, across all mands.
- Within each trial attempt to use less of a prompt than was needed on the previous trial.
- Get the best quality response with the least amount of prompting.

Rules For Teaching Manding

- Use Differential Reinforcement:
  Differential Reinforcement is defined as - "Within a response class, reinforcing only those responses that meet a specific criterion and placing all other responses on extinction."
- Practice teaching mands so that you are skilled in how and when to reinforce, what approximations to accept, what level of prompt to provide and how to fade prompts quickly.

Rules For Teaching Manding

- Consistency in methods across trainers is essential as is contriving lots of opportunities for generalization.
- Be a "giver" and not a "taker" – do not remove reinforcers just to require the child to mand again.
- Avoid "killing" MOs - to prevent this with early learners, give some items for "free" or require less response effort at times.
- An orderly and progressive curriculum must be in place.

The Analysis of Verbal Behavior 2013, 29, 000–000

The Establishing Operation and Teaching Verbal Behavior

Vincent J. Carbone, Carbone Clinic

Twenty years ago Michael (1993) refined and extended the concept of the conditioned establishing operation (CEO). With this paper he updated his previous treatment of the topic (Michael, 1982) by providing terminological refinements and conceptually clear descriptions of the reflexive and transitive CEOs. In the 20 years since the publication of that paper there has been an increase in the application of CEOs as independent variables in the teaching of verbal behavior in applied setting. The purpose of this paper is to provide a brief overview of clinical applications of the EO to the teaching of verbal behavior during the last 20 years.

Key words: applied, establishing operation, motivation, verbal behavior

EARLY MANDING

Milestones Assessment: Level 1 (0-18 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

Assessment			
1st	2nd	3rd	4th

Mand **TOTAL SCORE:**

Does the child use words, signs, or pictures to ask for desired items or activities?

1st	2nd	3rd	4th	
				1. Emits 2 words, signs, or PECS, but may require echoic, imitative, or other prompts but no physical prompts (e.g., *cracker, book*) **(E)**
				2. Emits 4 different mands without prompts (except *What do you want?*) — the desired item can be present (e.g., *music, slinky, ball*) **(T)**
				3. Generalizes 6 mands across 2 people, 2 settings, and 2 different examples of a reinforcer (e.g., mands *bubbles* from mom and dad, inside and outside, a red bottle and a blue bottle) **(E)**
				4. Spontaneously emits (no verbal prompts) 5 mands — the desired item can be present **(TO: 60 min.)**
				5. Emits 10 different mands without prompts (except, *What do you want?*) — the desired item can be present (e.g., *apple, swing, car, juice*) **(E)**

Comments/notes:

Teaching Procedures for Mand Training

VOCAL MANDING

Echoic to Mand Transfer

Establish MO---------- Vocal Prompt---------- ***Mand-***----Reinforce

Item Prompt

Fade Vocal Prompt

Fade Item

MO----------***MAND***----------Reinforce

MANUAL SIGN MANDING

Mimetic to Mand Transfer

Establish MO----------Vocal Prompt----------***Mand*---------**Reinforce

Item Prompt

Physical Prompt

Model Prompt MANDING VIDEOS

Fade All Prompts

MO----------***MAND***----------Reinforce R

47

Fade the item
(transferring stimulus control to the MO)

Once the child is consistently manding when there is an MO and the item is present without any additional prompt, begin to run procedures to transfer stimlus control of the mand from the presence of the item solely to the MO.

→ Item is present and the child mands, but DO NOT deliver the reinforcer immediately.

→ Instead place the item out of sight (behind back) and wait 2-3 seconds.

→ If the child mands within the 2-3 seconds, deliver the reinforcer.

→ If the child does not mand within the 2-3 seconds bring the item into view and when the child mands deliver the reinforcer immediately.

48

Fade the item diagram (transferring Stimulus Control to the MO)

- MO + ITEM → Vocal mand = Reinforce
- MO + ITEM → Vocal mand
  → 3 second time delay → Vocal mand = Reinforce
  (with item out of sight)
- MO + ITEM → Vocal mand
  → 3 second time delay → NR
  (with item out of sight)
  → bring item in sight → Vocal mand = Reinforce

Joey: transferring stimulus control to MO

Video: Jamie – Tranferring control of the mand to the MO

The Analysis of Verbal Behavior 2007, **23**, 89–102

Transferring Control of the Mand to the Motivating Operation in Children with Autism

Emily J. Sweeney-Kerwin, Vincent J. Carbone, Leigh O'Brien, Gina Zecchin, and Marietta N. Janecky, Carbone Clinic

Few studies have made use of B. F. Skinner's (1957) behavioral analysis of language and precise taxonomy of verbal behavior when describing the controlling variables for the mand relation. Consequently, the motivating operation (MO) has not typically been identified as an independent variable and the nature of a spontaneous mand has been imprecisely described. The purpose of this study was to develop procedures to bring the mand response under the control of the relevant MO and therefore free it from the multiple controls that are more easily identified by practitioner's who rely on Skinner's analysis and taxonomy. Using a rolling time delay and prompt fade procedure both participants' mand repertoires were successfully transferred to the relevant MO and a listener and described within the context of a behavioral analysis of language.

Key words: verbal behavior, motivating operation, mand, autism.

Sweeney-Kerwin, E. J., et al. (2007).

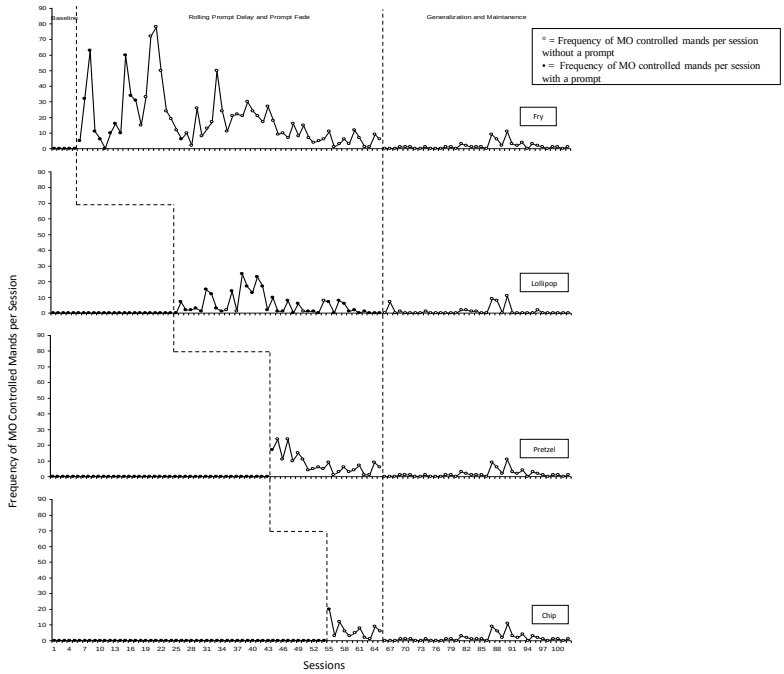


Figure 1. Frequency of MO controlled mands per session during baseline (BL), treatment, and generalization and maintenance conditions for all targeted items for Martin.

Sweeney-Kerwin, E. J., et al. (2007).

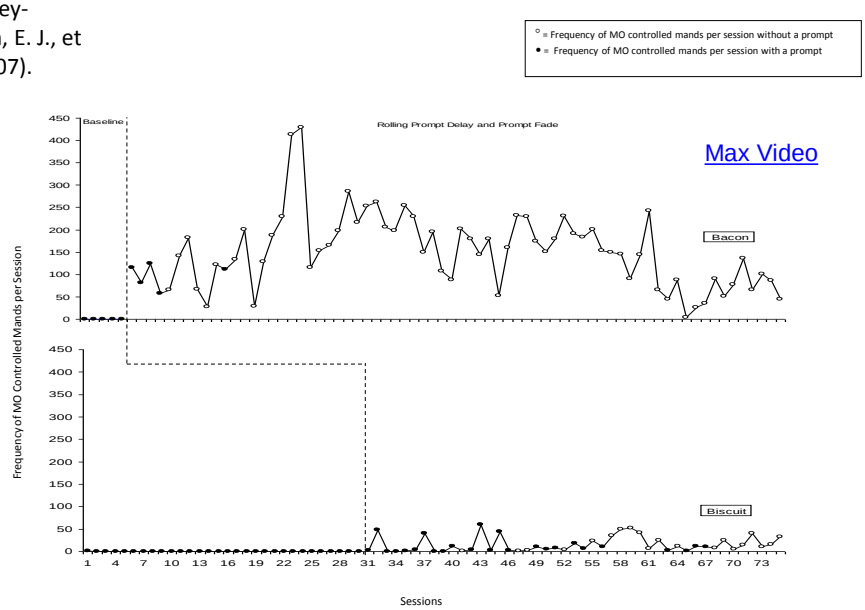


Figure 2. Frequency of MO controlled mands per session during baseline (BL) and treatment conditions for Jeff.

When Manding Goes Wrong: Scrolling and Error Correction

Scrolling: Scrolling is when the learner has an MO for an item or activity but emits the incorrect mand (sign or vocal) or chains more than one mand together

- Never reinforce a scrolled response.

If a vocal learner makes an error…

1. Wait for 3-5 seconds where the learner is not manding.
2. Next, give a vocal prompt for the correct mand.
3. When the child echoes the vocal prompt, immediately deliver the reinforcer.
4. If child has a strong echoic repertoire, do an echoic to mand transfer before giving the child the desired item.
5. If, following your vocal prompt, the child emits the incorrect mand again, wait for 3-5 seconds where the learner is not manding. Once the learner has been quiet for 3-5 seconds provide a vocal prompt, when the learner echoes the mand, immediately deliver the reinforcer.

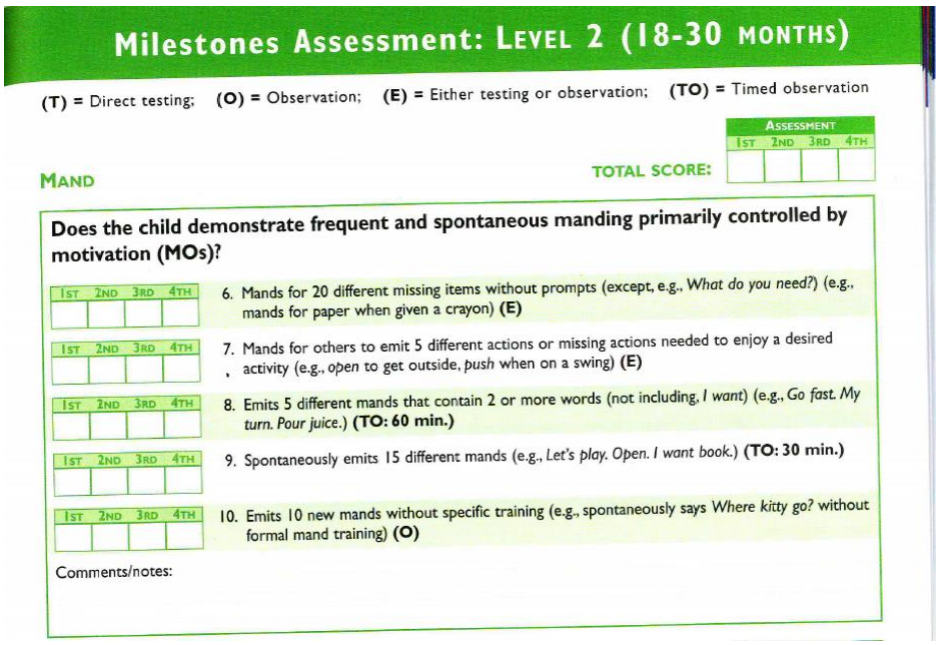
Andre Vocal Scrolling

If a signer makes an error…

1. If you know what the child wants, prompt their hands to a neutral position for 3-5 seconds.
2. Next, prompt the correct sign (i.e., gestural or physical).
3. The child signs with the prompt, immediately deliver the reinforcer.
4. If child has a strong motor imitation repertoire, do a mimetic to mand transfer before giving the child the desired item.
5. If, after you model the sign, the child emits the wrong sign again, prompt the hands to a neutral position. This time go straight to a physical prompt and reinforce immediately so that the child does not have the opportunity to emit the incorrect sign again.

Scrolling Procedure:
Video: *Peter*
Video: *Anthony*

Intermediate Learners



Milestones Assessment: Level 2 (18-30 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

	Assessment			
	1st	2nd	3rd	4th
Mand — **Total Score:**				

Does the child demonstrate frequent and spontaneous manding primarily controlled by motivation (MOs)?

1st	2nd	3rd	4th	
				6. Mands for 20 different missing items without prompts (except, e.g., *What do you need?*) (e.g., mands for paper when given a crayon) **(E)**
				7. Mands for others to emit 5 different actions or missing actions needed to enjoy a desired activity (e.g., *open* to get outside, *push* when on a swing) **(E)**
				8. Emits 5 different mands that contain 2 or more words (not including, *I want*) (e.g., *Go fast. My turn. Pour juice.*) **(TO: 60 min.)**
				9. Spontaneously emits 15 different mands (e.g., *Let's play. Open. I want book.*) **(TO: 30 min.)**
				10. Emits 10 new mands without specific training (e.g., spontaneously says *Where kitty go?* without formal mand training) **(O)**

Comments/notes:

Intermediate Manding Goals

- Requests others to perform an action
- Requests missing items needed for a task

TEACHING INTERMEDIATE MANDING
MANDING FOR ACTIONS AND MISSING ITEMS

The CMO-T plays an important role in teaching children with autism by increasing the number and variety of items that act as reinforcers and therefore increases the variety of mands that can be taught.

Several researchers have demonstrated the benefit of contriving transitive MOs to teach mands to persons with developmental disabilities and autism (Carroll & Hesse, 1987; Hall & Sundberg, 1987; Sigafoos, Doss and Reichle, 1989; Sundberg, Loeb , Hale and Eigenheer, 2002; Sundberg & Partington, 1998)

Teaching these skills to children with autism usually requires a sophisticated teacher repertoire related to the manipulation of the relevant motivating operations.

CMO-T Definition

- **Motivating Operation (MO)** - Any set of events, stimulus or condition that alters (establishes/abolishes) the value of some stimulus as a reinforcer and alters (evokes/abates) the frequency of some response that has produced that consequence (Michael, 1993)
- **Transitive MO (CMO-T)** - a set of stimulus conditions, where there is a motivating operation for a stimulus but access to that stimulus is blocked, interrupted, or denied, that momentarily establishes the value of some other stimulus as a reinforcer and evokes all behaviors that have in the past produced that reinforcer.

CMO-T Diagram

When An Item or Activity or Action Would Act as a Reinforcer
(Motivating Operation)

AND
Some Other Item or Activity or Action
is Required To Obtain the Reinforcer

BUT
Access to the Activity or Action is blocked
or Has Been interrupted

Then
The Activity or the Actions is Conditioned as a Reinforcer

AND
All Behaviors That Have Previously Been Strengthened with
Newly Established Reinforcer Will be Evoked

CMO-T Example

When Painting a Picture Becomes Valuable to Me
(Motivating Operation)

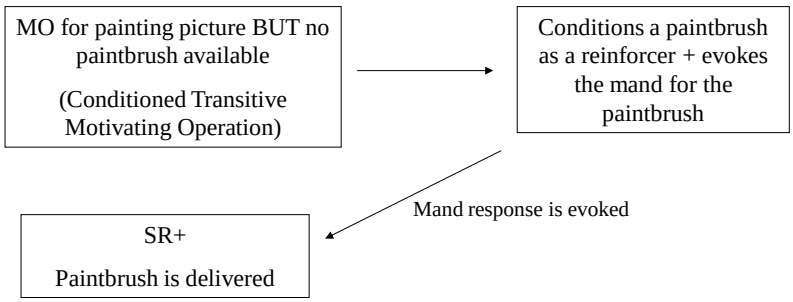
AND
I Need a Paintbrush

BUT
No paintbrush is available

Then
The Paintbrush is Momentarily Conditioned as a Reinforcer

AND
All Behavior That Has Produced the Paintbrush is Evoked-
I ask,
"Can I have a paintbrush?"

Clinical Example of the Application of CMO-T



Teaching mands for missing items under the control of the CMO-T

- Establish a routine by teaching to mastery (80% - 100% independent over 3 or more consecutive days) using a stimulus-response chain.
- Conduct baseline probes for all possible mand targets within the chain by removing items needed to complete the chain.
- Begin to teach the mand for one missing item needed to complete the chain.
- After you have taught one mand, run baseline probes for all the remaining mand targets.
- If teaching needs to continue, select the next target and begin teaching the mand for that missing item.
- Continue to teach and run baseline probes until all the targets have met mastery criteria (i.e., mand emitted under the control of the CMO-T for three out of three baseline probes or across 3 consecutive days of teaching).
- Continue with maintenance once all the targets have met criteria.
- Contrive opportunities for and track novel responses.

CMO-T Lesson Plan for Increasing Mands: Teaching

Learner: Andrew

Date: _____

Activity: Drawing a Picture of a Train

Y = correct mand topography emitted solely under the control of the CMO-T

N = incorrect mand topography emitted or correct mand topography emitted following a prompt provided by the instructor

Description of the Routine/Chain: Andrew has motivation for seeing a completed drawing of a train. He needs certain features of the train to be drawn and certain colors used.

Objective: To increase opportunities to teach wider variety of mands by momentarily conditioning actions (drawing parts of the train) as reinforcers (by withholding drawing features of the train), as they are necessary to access the terminal reinforcer of seeing the completed drawing (i.e., contriving the CMO-T).

Set up to Contrive MO	What is conditionally conditioned as a reinforcer?	What should you teach the learner to say?	Probe Data Recording
Instructor draws the train track in order to contrive motivation. Andrew now has the motivation to complete the train drawing. The trains are missing from the drawing	The teacher drawing a train	Draw blue train	Y N
Draws the outline of the blue train.	Coloring the in blue train	Color blue	Y N
Train colored in blue, but missing features of the train (smokestack)	Drawing the smokestack	Smokestack	Y N
Smokestack not colored in.	Coloring in the smokestack	Color blue	Y N

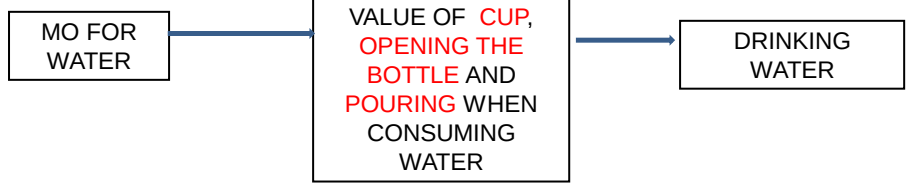
Andrew

Drawing a Picture

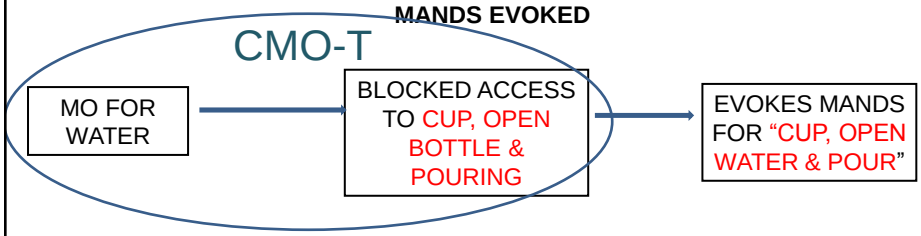
67

APPLICATION OF THE CMO-T

EXPOSURE



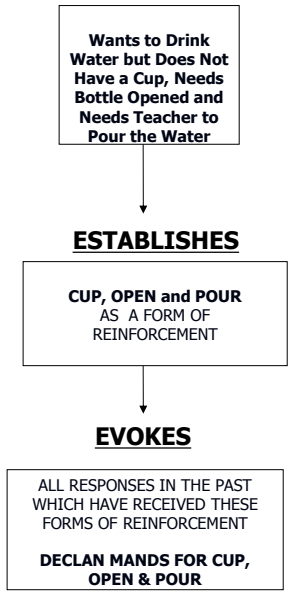
SUBSEQUENTLY, MANDS EVOKED



James- Just Water

68

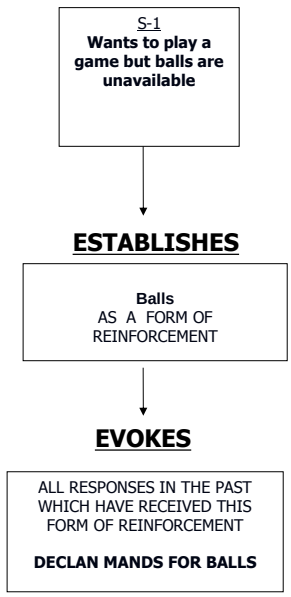
The diagram below illustrates the controlling relations that you will see in the video example of Declan manding for cup, open and pour.



James

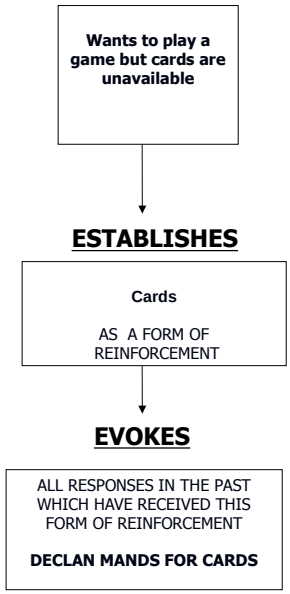
69

The diagram below illustrates the controlling relations that you will see in the video example of Declan playing Cariboo.



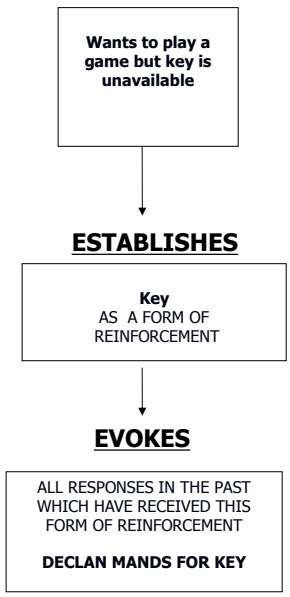
70

The diagram below illustrates the controlling relations that you will see in the first video example of Declan playing Cariboo.



71

The diagram below illustrates the controlling relations that you will see in the first video example of Declan playing Cariboo.



James Just Cariboo

72

How to Increase the Number of Mands Per Day

Develop lesson plans similar to the one on the next slide to capture and contrive many opportunities per day to increase the number of mand opportunities.

CMO-T Lesson Plan for Increasing Mands:
Teaching

Learner: Andre
Date: _____
Activity: Computer

Y = correct mand topography emitted solely under the control of the CMO-T

N = incorrect mand topography emitted or correct mand topography emitted following a prompt provided by the instructor

Description of the Routine/Chain: Andre often accompanies his instructor to the computer to watch/listen to music videos on youtube.com. To watch them, he must use the mouse to click in the search box on the you tube website, type in the song/artist name, click on the appropriate icons on the web page to select a video, and turn up the volume on the speakers so he can hear the music.

Objective: Increase opportunities to teach a wider variety of mands by removing items needed to watch/listen to music videos on youtube.com (i.e., contriving a CMO – T).

Set up to Contrive MO	What is conditionally conditioned as a reinforcer?	What should you teach the learner to say?	Probe Data Recording
Andre has an MO to watch/listen to music videos on youtube.com. He arrives at the computer and youtube.com is open. The instructor asks Andre who he would like to listen to. After selecting a song/artist Andre needs to use the mouse to click in the search box to type in the song/artist name, but the mouse is missing.	Mouse	"Mouse"	Y N
Andre has an MO to watch/listen to music videos on youtube.com. After using the mouse to click in the search box to type in the artist/song name, the instructor will tell Andre to type the artist/song title in. The keyboard is missing.	Keyboard	"Keyboard"	Y N
Andre has an MO to watch/listen to music videos on youtube.com. After the song/artist name has been typed in and Andre has selected a video, he presses play, but hears no sound. He attempts to turn up the volume or mands for "volume," at which point the instructor tells him to go ahead and turn up the volume, but the speakers are missing.	Speakers	"Speakers"	Y N

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Andre Manding

Increasing the Mand Repertoire of Children With Autism Through the Use of an Interrupted Chain Procedure

Kristin M. Albert, Vincent J. Carbone, Danielle D. Murray, Margaret Hagerty, and Emily J. Sweeney-Kerwin
Carbone Clinic

ABSTRACT

Mand training is an essential component of verbal behavior training for any individual who lacks this skill. The current study replicates and extends, with some procedural differences, the work of Hall and Sundberg (1987) by using an interrupted chain procedure to teach mands for missing items to children with autism. The participants were 3 children with autism, ranging between 5 and 8 years of age, who would regularly mand for a wide variety of reinforcers when they were present but would rarely mand for items that were not in sight (i.e., missing items). Participants were first taught to complete 3 behavior chains. Subsequently, the chains were interrupted by removing 1 item needed to complete each chain to contrive motivating operations (MOs) as a means of teaching mands for missing items. Following mand training incorporating vocal prompt and prompt fading procedures, all participants emitted unprompted mands for the missing items within the context of the trained chains and within the context of novel, untrained chains. After teaching mands for missing items, probes were conducted to test for untrained tact acquisition. All participants also demonstrated tact responses relative to the missing items as a result of the mand training.

Keywords: autism, establishing operation, interrupted chain, mand, motivating operation

Table 1. Descriptions of Chains Taught to Participants

Participant and Chain	Materials	Steps
Victor		
Making an art project	Shapes cut from paper, Glue, **Glitter**	Pick up paper shapes, Put glue on each shape, Arrange shapes into a picture, Put glue on top of arranged shapes, Sprinkle glitter on top of glue
Painting a picture	Smock, Paper, Clip, Paintbrush, Water, Paint, **Easel**	Put on smock, Hand clip to instructor (to clip paper onto easel), Pick up paintbrush, Dip paintbrush in water, Dip paintbrush in paint, Apply paintbrush to paper, Repeat painting steps several times
Making a sandwich	Bread, **Toaster**, Plate, Peanut butter, Knife	Open bag of bread, Put bread in toaster, Push down toaster button, Take bread out of toaster (after bread has popped back up), Put bread on plate, Open peanut butter, Put peanut butter on knife, Spread peanut butter on bread, Eat sandwich
Nathaniel		
Listening to music	**Portable CD player**, CD, Headphones	Open CD player, Put CD in CD player, Put headphones on, Press play button, Listen to music
Science project	Plastic container, Bottle of water, **Two bottles of food coloring**, Spoon	Pour water into container, Drop food coloring into container, Pick up spoon, Mix liquid with spoon
Painting a picture	Smock, Paper, Paintbrush, Water, Paint, **Easel**	Put on smock, Put paper on easel, Pick up paintbrush, Dip paintbrush in water, Dip paintbrush in paint, Apply paintbrush to paper, Repeat painting steps several times
Carina		
Painting a picture	Smock, Paper, **Clip**, Paintbrush, Water, Paint, Easel	Put on smock, Hand clip to instructor (to clip paper onto easel), Pick up paintbrush, Dip paintbrush in water, Dip paintbrush in paint, Apply paintbrush to paper, Repeat painting steps several times
Making an art project	Paper, Three crayons, Glue stick, **Glitter**	Color picture, Rub glue on paper, Sprinkle glitter on top of glue
Making juice	Cup, Powder to make juice, Spoon, two ice cubes, **Measuring cups containing water**	Scoop powder into cup, Pour water from measuring cups into cup, Mix solution in cup using spoon, Put ice cubes into cup, Drink juice

Note. Materials removed to teach mands for missing items are shown in **boldface**.

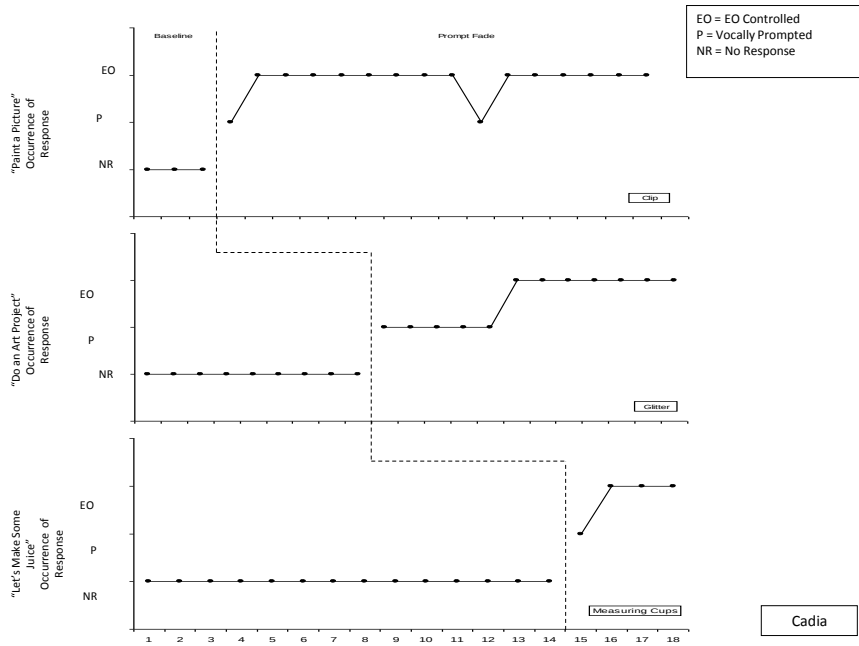

Figure 3. The occurrence of mands for missing items recorded by controlling variable (MO, prompted, no response) across baseline and treatment conditions.

77

Data Recording

NET VIDEOS

78

121

PROBE DATA SHEET

Name: Joseph V. Skill area: Vocal Mand Probes Mastery Criteria: 5 consecutive y's

Antecedent	3/24	3/24	3.29	3.31	4.5	4/7	4/12	4/14	4/19	4/21	4/26	met criteria		
train	Y (N)	Y N	Y (N)	Y (N)	Y N	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
track	3/22 Y (N)	3/24 Y N	3.29 Y N	3.31 Y N	4.5 Y N	4/7 Y (N)	4/12 Y (N)	4/14 Y N	4/19 Y N	4/21 Y N	4/26 Y (N)	4/28 Y N	5/3 Y N	5/5 Y N
jump	3/22 Y (N)	3/24 Y N	3.29 Y N	3.31 Y N	4.5 Y N	4/7 Y N	4/12 Y (N)	4/14 Y N	4/19 Y (N)	4/21 Y N	4/26 Y N	4/28 Y N	5/3 Y N	5/5 Y N
squeeze	3/22 Y (N)	3/24 Y N	3.29 Y N	3.31 Y N	4.5 Y (N)	4/7 Y N	4/12 Y N	4/14 Y N	4/19 Y N	4/21 Y N	4/26 Y N	4/28 Y N	5/3 Y N	5/5 Y N
block	3/22 Y (N)	3/24 Y N	3.29 Y (N)	3.31 Y (N)	4.5 Y N	4/7 Y N	4/12 Y (N)	4/14 Y N	4/19 Y N	4/21 Y N	4/26 Y N	4/28 Y N	met criteria Y N	Y N
bubbles	3/22 Y (N)	3/24 Y (N)	3.29 Y (N)	3.31 Y N	4.5 Y (N)	4/7 Y N	4/12 Y (N)	4/14 Y N	4/19 Y N	4/21 Y (N)	4/26 Y N	4/28 Y (N)	5/3 Y N	5/5 Y N
playdoh	3/22 Y (N)	3/24 Y (N)	3.29 Y (N)	3.31 Y N	4.5 Y N	4/7 Y N	4/12 Y N	4/14 Y N	4/19 Y N	met criteria Y N	Y N	Y N	Y N	Y N
movie	3/22 Y N	3/24 Y (N)	3.29 Y (N)	3.31 Y N	4.5 Y N	4/7 Y N	4/12 Y (N)	4/14 Y N	4/19 Y (N)	4/21 Y N	4/26 Y (N)	4/28 Y N	5/3 Y N	5/5 Y N
dinosaur	3/22 Y N	3/24 Y (N)	3.29 Y N	3.31 Y N	4.5 Y (N)	4/7 Y N	4/12 Y N	4/14 Y N	4/19 Y (N)	4/21 Y N	4/26 Y N	4/28 Y N	5/3 Y N	5/5 Y N

met criteria

met criteria

met criteria

5

79

Domain: Vocal Mand Probes Cumulative Number of Skills Retained per month

Baseline Instr. Δ Schedule Δ to 2-3hr sessions in PM Instr. Δ See next graph

Cumulative Number of Vocal Mand Probes Targets Retained per Month

50 40 30 20 10 0

Date 3/31 4/30 5/31 6/30 7/31 8/31 9/30 10/31 11/30 12/31

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Learners Name: Joey Dates: From 3/31/11 to 12.31.11

p. 1 of ___

80

Skills Tracking Sheet

Learner: Joseph V.
Skill Area: Vocal Mand Probes
Mastery Criteria: 5 consecutive y's

Item Name	Date Introduced	Date Acquired
train	3/22/11	4/26/11
track	3/22/11	8/11/11
jump	3/22/11	5/5/11
Squeeze	3/22/11	5/10/11
block	3/22/11	4/28/11
bubbles	3/22/11	5/17/11
playdoh	3/22/11	4/19/11
movie	3/22/11	5/17/11
dinosaur	3/22/11	5/5/11
rice	3/22/11	6/14/11
beads	9/21/11	5/5/11
shovel	4/28/11	9/23/11
pour	4/28/11	5/12/11
computer	4/28/11	9/28/11
slinky	4/28/11	5/12/11
fly	5/3/11	5/17/11
ball	5/3/11	6/14/11
dance	5/3/11	9/7/11
tickle	5/3/11	6/7/11
rock	5/10/11	6/28/11

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Data Collection and Graphing

Vocal Learners

Controlling Variable/Prompt Level Response Definitions

- **V** – vocal prompt; when the instructor vocally models the spoken name of the reinforcer to evoke the vocal mand relevant to the specific MO
- **ITEM** – presence of the item; when a vocal mand relevant to the specific MO is evoked when the reinforcing item itself is present or has already been presented within the current setting/physical environment (e.g., ITT, NET) **or** when the instructor engages in or demonstrates a reinforcing action
- **MO** – motivating operation; when a vocal mand relevant to the specific MO is evoked when the reinforcing item is not present/visible and has not yet been presented since the last change in environment (i.e., physical location); this includes manding for actions when they are not being demonstrated if the action itself is the reinforcer
- **TMO** – transitive conditioned motivating operation; when an item that would not typically serve as a reinforcer is conditionally conditioned as a reinforcer because it is missing but needed to complete a behavioral chain (so as to contact a terminal reinforcer) and the vocal mand specific to the missing item is emitted
- **IV** – intraverbal; when a vocal mand relevant to a specific MO is evoked by a verbal antecedent stimulus that does not have point to point correspondence with the response

VOCAL MANDING

Learner: Ben Date: 9/14 Session Time: 2:30-4:30 Instructor: KC.

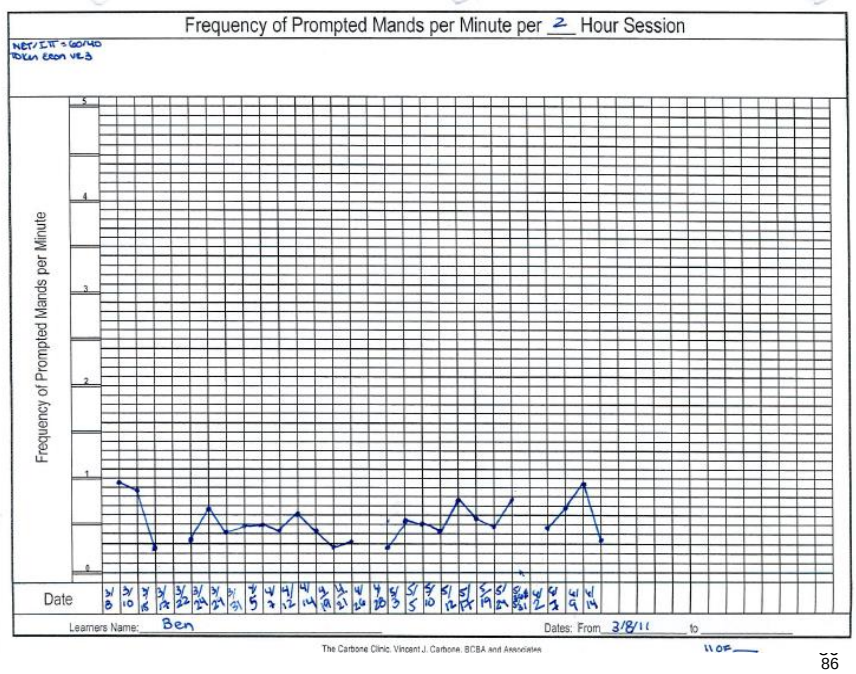
Reinforcer	Prompt Level	Probe	Reinforcer	Prompt Level	Probe
1. Chocolate	V IV (ITEM) MO TMO		26. Chocolate	V IV (ITEM) MO TMO	
2. Pick a movie	(V) IV ITEM MO TMO		27. itsy bitsy Leave verse	V IV (ITEM) MO TMO	
3. Chocolate	V IV (ITEM) MO TMO		28. Wiggles Wiggles	(V) IV ITEM MO TMO	
4. Bang xylophone	V (V) ITEM MO TMO		29. replay	(V) IV ITEM MO TMO	
5. "	V (V) ITEM MO TMO		30. "	(V) IV ITEM MO TMO	
6. Chocolate	V IV (ITEM) MO TMO		31. "	V IV (ITEM) MO TMO	
7. "	V IV (ITEM) MO TMO		32. Play	V IV (ITEM) MO TMO	
8. "	V IV (ITEM) MO TMO		33. replay	(V) IV ITEM MO TMO	
9. Magnet	(V) IV ITEM MO TMO		34. Clap	V IV (ITEM) MO TMO	
10. Air guitar	V IV ITEM (MO) TMO		35. magnet	V IV (ITEM) MO TMO	
11. Pizza Dough	(V) IV ITEM MO TMO		36. "	V IV (ITEM) MO TMO	
12. Play	V IV (ITEM) MO TMO		37. blue one	(V) IV ITEM MO TMO	
13. Chocolate	V IV (ITEM) MO TMO		38. Clap hand	(V) IV ITEM MO TMO	
14. "	V IV (ITEM) MO TMO		39. "	V IV (ITEM) MO TMO	
15. jump	V IV (ITEM) MO TMO		40. Chocolate	V IV (ITEM) MO TMO	
16. throw	(V) IV ITEM MO TMO		41.	V IV ITEM MO TMO	
17. "	(V) IV ITEM MO TMO		42.	V IV ITEM MO TMO	
18. Make the cake	(V) IV ITEM MO TMO		43.	V IV ITEM MO TMO	
19. knife	(V) IV ITEM MO TMO		44.	V IV ITEM MO TMO	
20. Cassie	V (V) ITEM MO TMO		45.	V IV ITEM MO TMO	
21. Cut	V IV (ITEM) MO (TMO)		46.	V IV ITEM MO TMO	
22. Mash	V IV ITEM (MO) TMO		47.	V IV ITEM MO TMO	
23. "	V IV ITEM (MO) TMO		48.	V IV ITEM MO TMO	
24. Make volcano	(V) IV ITEM MO TMO		49.	V IV ITEM MO TMO	
25. Mash	V IV ITEM (MO) TMO		50.	V IV ITEM MO TMO	

MAND DATA SHEET

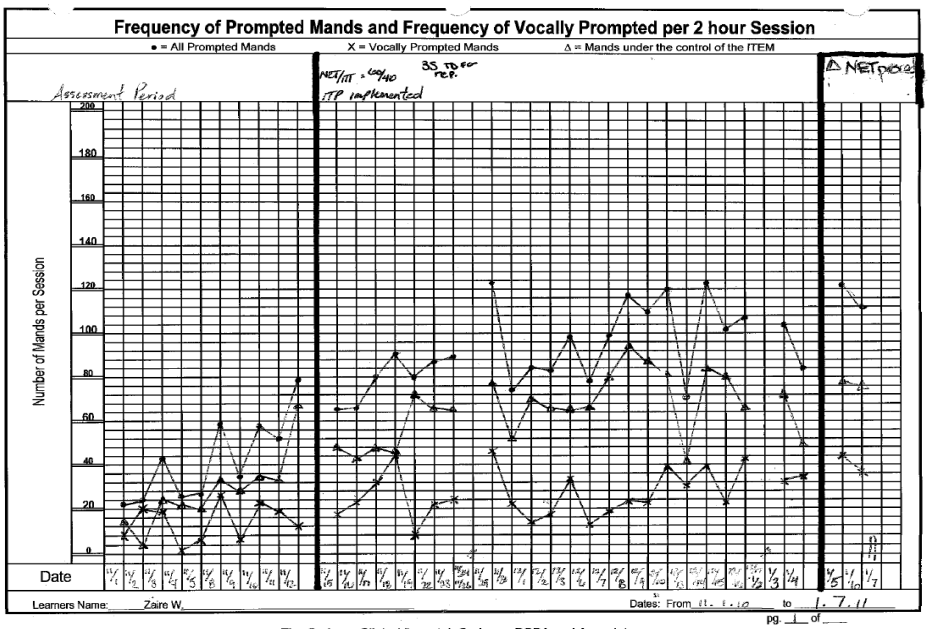
Learner's Name: Ben

Date	Teacher	Time spent manding	Total # of Mands	Total # of prompted mands	# of prompted mands per minute	Total # of MO mands	Total # of TMO mands
5.10.11	KC	100	61	43	.43	3	15
5.12.11	KC	110	88	84	.76	7	2
5.17.11	KC	100	65	56	.56	4	2
5.19.11	SR	105	56	51	.49	3	2
5.24.11	KC	100	89	77	.77	7	5
5.26&5.31	N	0	C	H A	N C	E	
6.2.11	KC	105	89	49	.47	3	5
6.7.11	KC	110	79	75	.68	2	2
6.9.11	KC	85	73	71	.95	2	0
6.14.11	KC	110	40	35	.32	5	0

85



86


Frequency of Prompted Mands and Frequency of Vocally Prompted per 2 hour Session
• = All Prompted Mands
X = Vocally Prompted Mands
Δ = Mands under the control of the ITEM
Assessment Period
NET/IT = 60/40
ITP implemented
35 TO 60 REP.
Δ NET DATA
Number of Mands per Session
200
180
160
140
120
100
80
60
40
20
0
Date
Learners Name: Zaire W.
Dates: From 11-1-10 to 1.7.11
pg. 1 of
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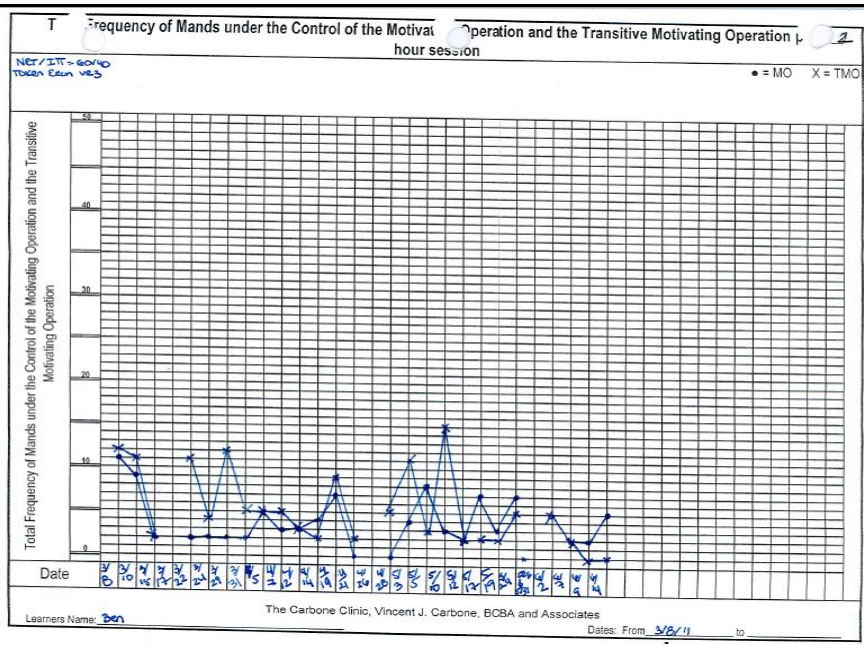
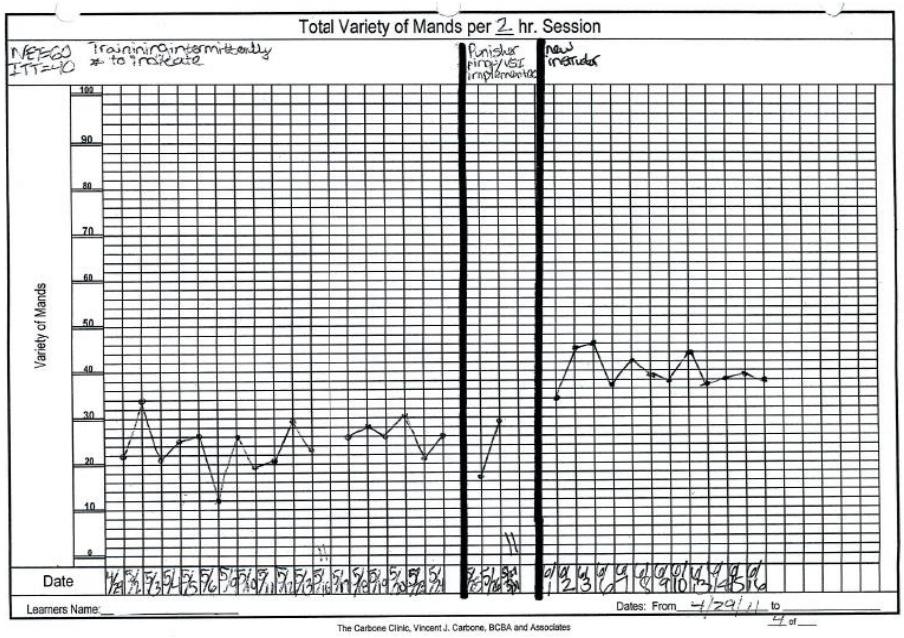

Frequency of Mands under the Control of the Motivat Operation and the Transitive Motivating Operation
hour session
NET/IT = 60/40
TOKEN ECON VBS
• = MO X = TMO
Total Frequency of Mands under the Control of the Motivating Operation and the Transitive Motivating Operation
50
40
30
20
10
0
Date
Learners Name: Ben
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
Dates: From 3/8/11 to



89

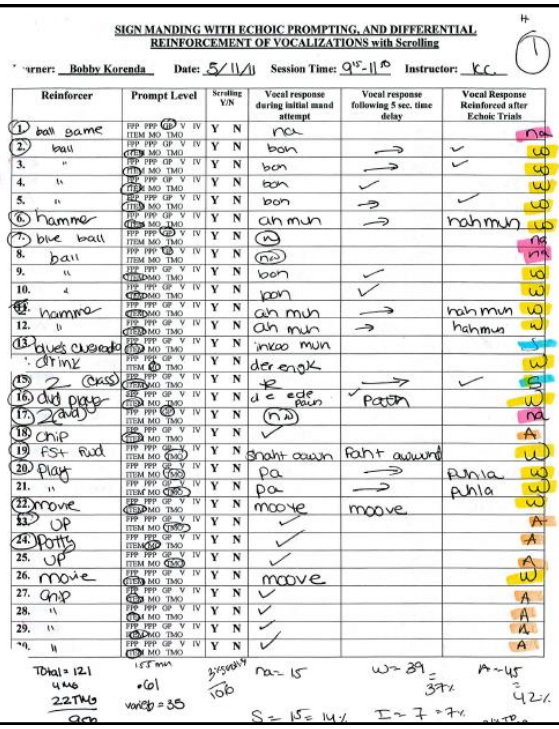
Data Collection and Graphing

Non-Vocal Learners

90

Controlling Variable/Prompt Level Response Definitions

- **FPP** - full physical prompt; when the instructor provides hand over hand guidance to evoke the entire sign mand topography relevant to the specific MO
- **PPP** – partial physical prompt; when the instructor provides a faded physical prompt to evoke a portion of or the entire sign mand topography relevant to the specific MO **or** when the instructor provides a full physical prompt to evoke only a portion of the sign mand topography relevant to the specific MO
- **GP** – gestural prompt; when the instructor physically models the entire sign mand or a portion of the sign mand to evoke the sign mand topography relevant to the specific MO
- **V** – vocal prompt; when the instructor vocally models the spoken name of the reinforcer to evoke the sign mand topography relevant to the specific MO
- **ITEM** – presence of the item; when a sign mand topography relevant to the specific MO is evoked when the reinforcing item itself is present or has already been presented within the current setting/physical environment (e.g., ITT, NET) **or** when the instructor engages in or demonstrates a reinforcing action
- **MO** – motivating operation; when a sign mand topography relevant to the specific MO is evoked when the reinforcing item is not present/visible and has not yet been presented since the last change in environment (i.e., physical location); this includes manding for actions when they are not being demonstrated if the action itself is the reinforcer
- **TMO** – transitive conditioned motivating operation; when an item that would not typically serve as a reinforcer is conditionally conditioned as a reinforcer because it is missing but needed to complete a behavioral chain (so as to contact a terminal reinforcer) and the sign mand topography specific to the missing item is emitted
- **IV** – intraverbal; when a sign mand topography relevant to a specific MO is evoked by a verbal antecedent stimulus that does not have point to point correspondence with the response



SIGN MANDING WITH ECHOIC PROMPTING, AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS with Scrolling

Learner: Bobby Korenda Date: 5/11/11 Session Time: 9:15-11:10 Instructor: K.C.

	Reinforcer	Prompt Level	Scrolling Y/N	Vocal response during initial mand attempt	Vocal response following 5 sec. time delay	Vocal Response Reinforced after Echoic Trials
1	ball game	FPP PPP GP V IV ITEM MO TMO	Y N	na		na
2	ball	FPP PPP GP V IV ITEM MO TMO	Y N	bon	→	✓ W
3	"	FPP PPP GP V IV ITEM MO TMO	Y N	bon	→	✓ W
4	"	FPP PPP GP V IV ITEM MO TMO	Y N	bon	✓	W
5	"	FPP PPP GP V IV ITEM MO TMO	Y N	bon	→	✓ W
6	hammer	FPP PPP GP V IV ITEM MO TMO	Y N	ah mun	→	nah mun W
7	blue ball	FPP PPP GP V IV ITEM MO TMO	Y N	(W)		na
8	ball	FPP PPP GP V IV ITEM MO TMO	Y N	(na)		na
9	"	FPP PPP GP V IV ITEM MO TMO	Y N	bon	✓	W
10	"	FPP PPP GP V IV ITEM MO TMO	Y N	bon	✓	W
11	hammer	FPP PPP GP V IV ITEM MO TMO	Y N	ah mun	→	nah mun W
12	"	FPP PPP GP V IV ITEM MO TMO	Y N	ah mun	→	hah mun W
13	blues clues drink	FPP PPP GP V IV ITEM MO TMO	Y N	inkoo mun		S
		FPP PPP GP V IV ITEM MO TMO	Y N	der engk		W
15	2 (CHIS)	FPP PPP GP V IV ITEM MO TMO	Y N	K	→	✓ S
16	dvd play	FPP PPP GP V IV ITEM MO TMO	Y N	d e ede pain	✓ Pain	W
17	2 (dvd)	FPP PPP GP V IV ITEM MO TMO	Y N	(na)		na
18	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
19	FST Rud	FPP PPP GP V IV ITEM MO TMO	Y N	shaht awun	Paht awuna	W
20	Play	FPP PPP GP V IV ITEM MO TMO	Y N	pa	→	Puna W
21	"	FPP PPP GP V IV ITEM MO TMO	Y N	pa	→	Ahla W
22	move	FPP PPP GP V IV ITEM MO TMO	Y N	moove	moove	W
23	UP	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
24	Potty	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
25	UP	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
26	move	FPP PPP GP V IV ITEM MO TMO	Y N	moove		W
27	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
28	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
29	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
30	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A

TOtal = 121 / 446 / 22TMs / 900 — 185 min — 3 responses/10s — na = 15 — W = 39 = 37% — A = 45 = 42% — V = 35 — S = 15 = 14% — I = 7 = 7%

Tran

Alphabet

SIGN MANDING WITH TIME DELAY, ECHOIC PROMPTING AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS

Learner: Matthe Date: 4.28.08 Session Time: 2:30-2:50 Instructor: HV

	Reinforcer	Prompt Level	Vocal response during initial attempt	Vocal Response after Time Delay	Vocal Response after Echoic Trials	
1.	cracker	FPP PPP GP V ITEM MO TMO	kwahwuh		kahkuhr	SS
2.	"	FPP PPP GP V ITEM MO TMO	"	kahkuhr		SS
3.	movie	FPP PPP GP V ITEM MO TMO	poofe		✓	SS
4.	cracker	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
5.	"	FPP PPP GP V ITEM MO TMO	kwahkuwh	kahkuhr		WA
6.	movie	FPP PPP GP V ITEM MO TMO	poofe	✓		SS
7.	cracker	FPP PPP GP V ITEM MO TMO	kwahguhr		✓	SS
8.	movie	FPP PPP GP V ITEM MO TMO	poofe			SS
9.	"	FPP PPP GP V ITEM MO TMO	poov		✓	WA
10.	marble	FPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
11.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
12.	cracker	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
13.	movie	FPP PPP GP V ITEM MO TMO	poofe			SS
14.	"	FPP PPP GP V ITEM MO TMO	moofe			WA
15.	"	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS
16.	marble	FPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
17.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
18.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
19.	candy	FPP PPP GP V ITEM MO TMO	gohde		kade	WA
20.	"	FPP PPP GP V ITEM MO TMO	gohde		"	WA
21.	"	FPP PPP GP V ITEM MO TMO	kohde			WA
22.	movie	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS
23.	block	FPP PPP GP V ITEM MO TMO	kuhp			SS
24.	"	FPP PPP GP V ITEM MO TMO	"			SS
25.	movie	FPP PPP GP V ITEM MO TMO	poofe	✓		SS
26.	block	FPP PPP GP V ITEM MO TMO	kuhp			SS
27.	"	FPP PPP GP V ITEM MO TMO	"			SS
28.	mall	FPP PPP GP V ITEM MO TMO	moofe	✓		WA
29.	"	FPP PPP GP V ITEM MO TMO	"	✓		WA
30.	"	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS
across	23	8A	79%	11/T	10/.98	"

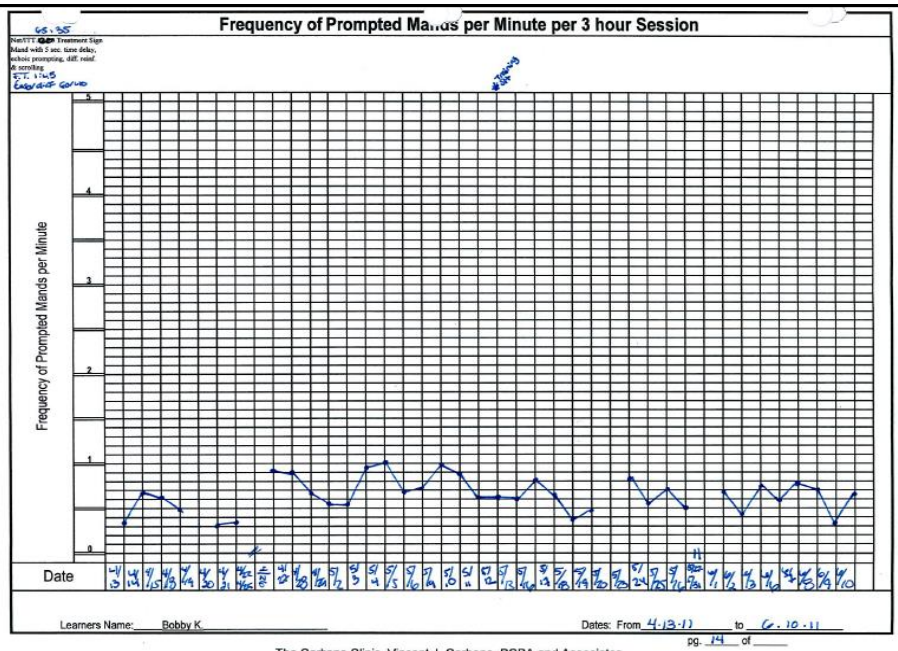
93

MAND DATA SHEET

Learner's Name: Bobby

Date	Teacher	Time spent manding	Total # of Mands	Total # of prompted mands	# of prompted mands per minute	Total # of MO mands	Total # of TMO mands
5.2.11	CL	160	134	120	.64	14	8
5.3.11	KC	150	168	145	.97	5	18
5.4.11	KC	155	188	136	1.0	2	30
5.5.11	KC	150	136	100	.67	7	29
5.6.11	CL	165	123	119	.72	5	4
5.9.11	CL	155	169	156	1	4	9
5.10.11	KC	150	167	133	.89	11	23
5.11.11	KC	155	121	95	.61	4	22
5.12.11	KC	160	105	98	.61	2	5
5.13.11	CL	170	114	102	.60	7	5
5.16.11	CL	150	150	123	.82	11	16
5.17.11	KC	135	98	87	.64	4	7
5.18.11	CW	135	50	49	.36	0	1
5.19.11	CW	160	86	77	.48	7	2
5.20.11				NC			
5.23.11	CL	150	130	124	.83	8	6
5.24.11	KC	150	102	81	.54	12	9
5.25.11	CL	160	147	114	.71	8	25
5.26.11	CL	155	95	78	.50	13	4
5.27.11				NC			
6.1.11	CL	165	121	112	.68	5	4
6.2.11	CW	160	72	66	.41	3	3
6.3.11	CL	165	139	125	.76	6	8
6.6.11	CL	160	102	94	.59	4	4
6.7.11	KC	155	138	119	.77	6	13
6.8.11	CL	155	124	110	.71	7	7
6.9.11	CW	160	63	50	.31	5	8
6.10.11	CL	170	116	108	.64	2	6
6.13.11	CL	165	134	103	.66	7	24

94


Frequency of Prompted Mands per Minute per 3 hour Session
Frequency of Prompted Mands per Minute
Date
Learners Name: Bobby K.
Dates: From 4-13-11 to 6.10.11
pg. 14 of
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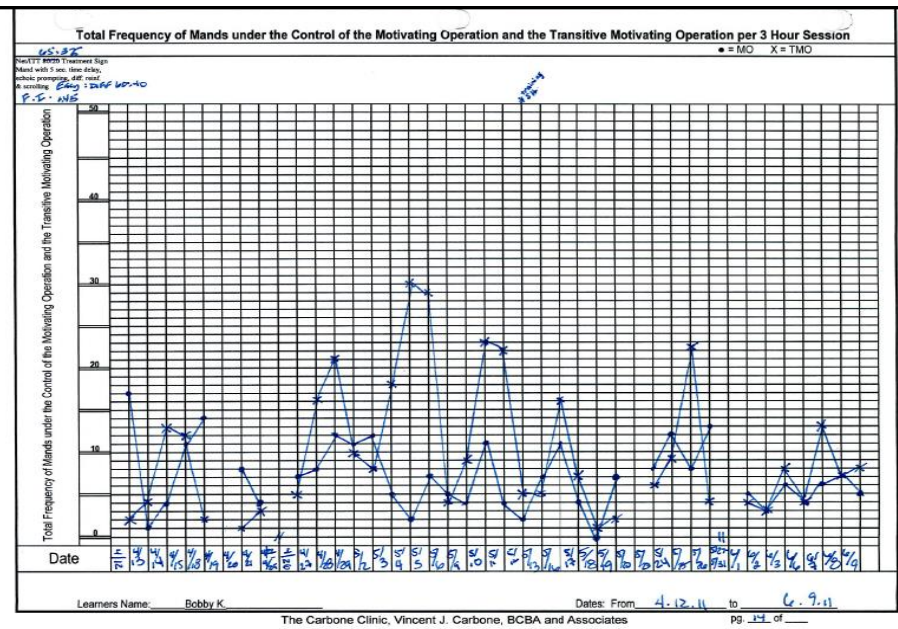
95


Total Frequency of Mands under the Control of the Motivating Operation and the Transitive Motivating Operation per 3 Hour Session
● = MO X = TMO
Total Frequency of Mands under the Control of the Motivating Operation and the Transitive Motivating Operation
Date
Learners Name: Bobby K.
Dates: From 4.12.11 to 6.9.11
pg. 14 of
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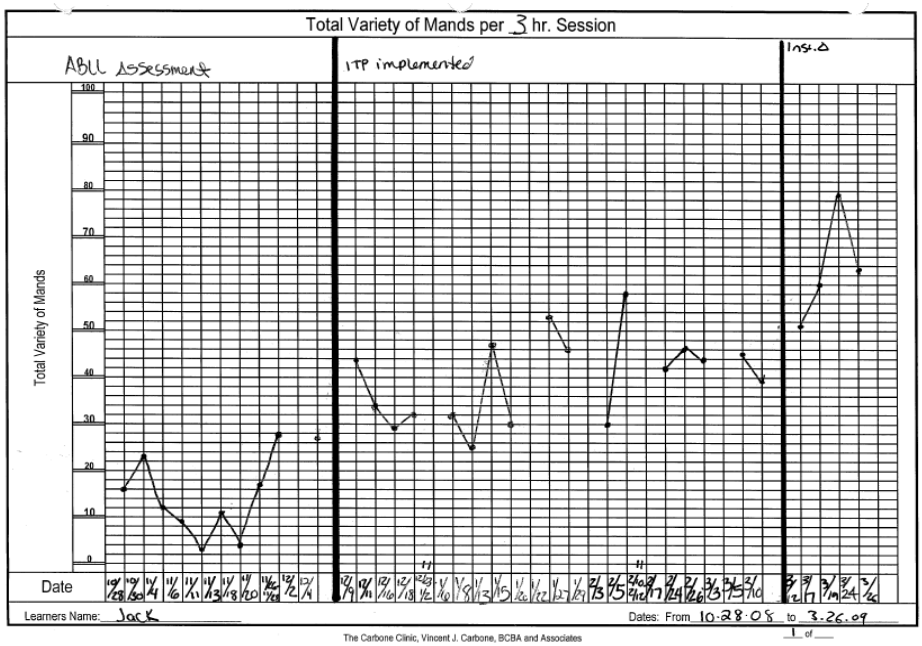
96


Total Variety of Mands per 3 hr. Session
ABLLS assessment
ITP implemented
Inst. Δ
Total Variety of Mands
Date
Learners Name: Jack
Dates: From 10.28.08 to 3.26.09
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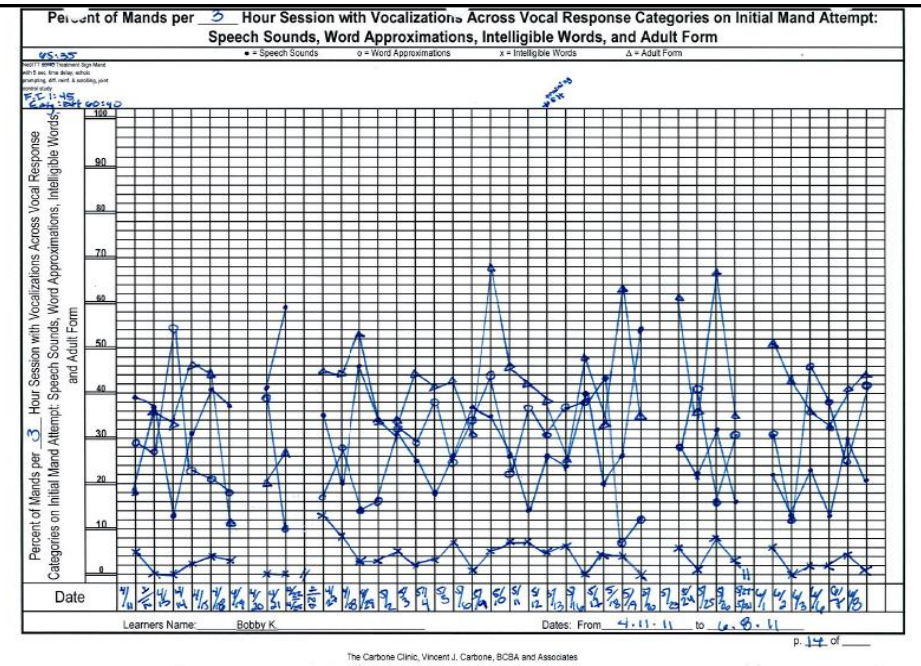
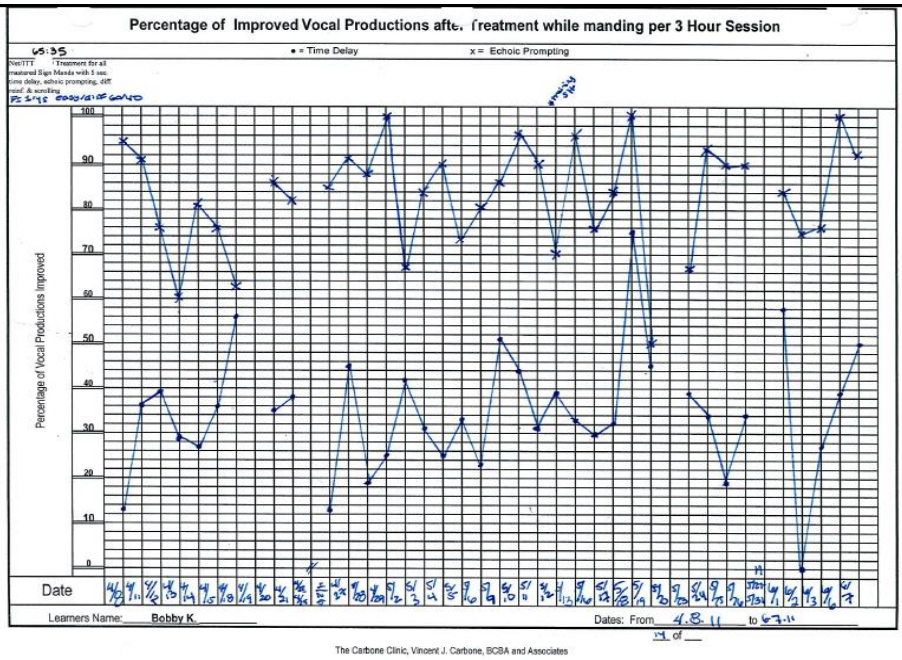
97


Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on Initial Mand Attempt:
Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
• = Speech Sounds
o = Word Approximations
x = Intelligible Words
Δ = Adult Form
Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on Initial Mand Attempt: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
Date
Learners Name: Bobby K
Dates: From 4.11.11 to 6.8.11
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

98


Percentage of Improved Vocal Productions after Treatment while manding per 3 Hour Session
• = Time Delay
x = Echoic Prompting
Percentage of Vocal Productions Improved
Date
Learners Name: Bobby K.
Dates: From 4.8.11 to 6.7.11
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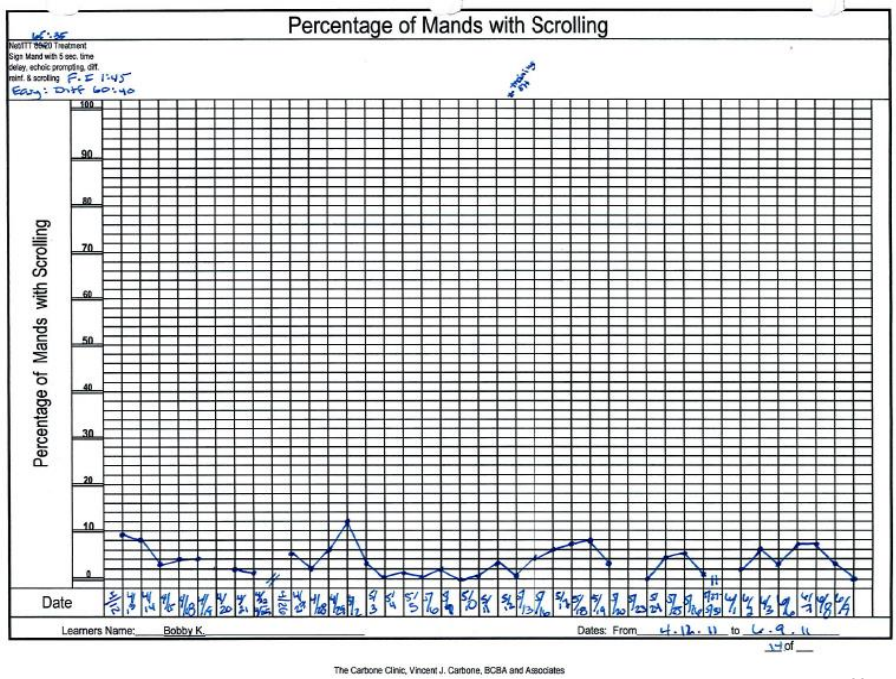
99


Percentage of Mands with Scrolling
Percentage of Mands with Scrolling
Date
Learners Name: Bobby K.
Dates: From 4.12.11 to 6.9.11
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100

CONDITIONING NEUTRAL ITEMS AS REIFNORCERS

Scoring

- Use the following categories to score Nick's responding while playing with the target toys/games. Record these data on your Daily Data sheet, then transfer them to the probe sheet in the "Conditioning New Reinforcers" section of the data book.
- Red (R)
  - Resists accepting toys or appears uninterested in toys
  - Multiple prompts are needed
  - Established reinforcer used as a promise reinforcer and consistently paired with activity
  - Engages in escape-maintained problem behavior

NOTE: At this level mands for the various parts of the toy/game should be being modeled by the instructor

- Yellow (Y)
  - Accepts toys when offered
  - Emits some independent responses
  - Intermittent use of an established reinforcer
  - May infrequently engage in escape-maintained problem behavior

  NOTE: At this level, mands for the various parts of the toy/game should be being modeled by the instructor
- Green (G)
  - Willingly engages in task with minimal prompting
  - Reaches for toys
  - Gestures for continuation of the activity
  - No established reinforcer is needed
  - Does not engage in any escape-maintained problem behavior

  NOTE: At this level, mands for the various parts of the toy/game should be beginning to be taught. Once a toy meets criteria for being conditioned as a reinforcer, mands should be opened within the sign mand probe program.
- Green Plus Selection (G+)
  - Demonstrates all behaviors as described in "Green"
  - In addition, selects the toy off from a shelf when mixed amongst things that have not previously been paired with reinforcement

  NOTE: At this level, mands for the various parts of the toy/game should be beginning to be taught. Once a toy meets criteria for being conditioned as a reinforcer, mands should be opened within the sign mand probe program.

NET Lesson Plan for Conditioning New Reinforcers: Stimulus-stimulus Pairing with Toys/Games

Learner: Nick Date: 12/9/11

Toy/Game to be Conditioned	Established Promise Reinforcer(s) to be Used	Schedule for Delivering Established Reinforcers	Responses to Prompt within Toy/Game	Duration Spent Conditioning Activity	Scoring
Caribou	Edibles/ Tickles	VR3	put balls in game, take balls out, put balls in chest.	5 min.	R (Y) G G+
Moon Sand		VR3	Scoop sand in bowl	5 min	R (Y) G G+
Old McDonald		VR2	pop and place animals on game	5 min.	R (Y) G G+

Nick Video

Conditioning New Reinforcers: Stimulus-stimulus Pairing with Toys/Games

Name: Nick B. Criteria: 3 con. G.

Toy/Game	Date													
	5/16	6/3	6/15	7/6	8/10	9/12	9/23	10/5	10/19	11/4	11/16	11/23-11/25	12/2	12/11
Bug Game	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R
	5/16	6/3	6/20	7/8	8/12	9/14	9/26	10/5	10/24	11/7	11/9	11/16	11/23-X	12/5
Shape Game	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R
	5/16	6/3	6/20	7/8	8/12	9/14	9/28	10/24	11/4	11/21	11/23-11/25	11/28	12/5	12/7
Markers/stickers	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R
	12/9	12/16-1/2	1/9											
Old MacDonald (con't)	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R
	12/9	12/16-1/2	1/9	1/11	1/27									
Caribou (con't)	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R
	12/9	12/16-1/2	1/9	1/27										
Moon Sand (con't)	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R	G+ G Y R

met criteria

5/17/10 KA – adapted from T. Kasper, 2010

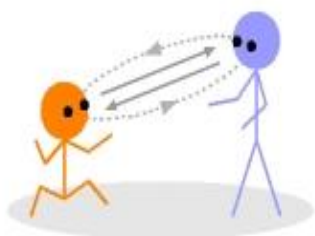
PROTOCOL

Social Skills and Play Skills

The Importance of Social Skills

- Autism is a disorder of impairment of social reciprocity.
- Social deficits have been identified as the core underlying feature of autism spectrum disorder (White, Koenig & Scahill, 2007).
- In fact the deficit does not appear to improve over time and may even worsen as the demands for more complex social interactions increase with age (Carter, Davis, Klin & Volkmar, 2005).
- Of particular concern early in social development is the failure to develop joint attention skills (Isaksen & Holth, 2009).
- "Joint attention has been described as two persons actively sharing attention to an object or an event, while they are monitoring each other's attention to that object or the event." (Isaksen & Holth, 2009, p.216)

- A bid for joint attention is reinforced by the reaction or response of another person suggesting the reinforcing value of the social attention the bid produces. (Dube, MacDonald, Mansfield, Holcomb & Ahearn, 2004; Holth, 2005; Isaksen & Holth, 2009)
- Using Dube et al's analysis here is what may happen to evoke initiations of joint attention.
- First, it is not just eye contact as depicted below.



KELLEN

1 In a Child Who Has Learned the Value of Adult Attention

3 Adult Attention to Cat is a Reinforcer for JA Bid

AND

Also an S^D

FOR

Additional Child Play Responses

That are Reinforced by the Adult's Continued Attention and Interactions

2 Unexpected Appearance of a Cat is Motivating Operation

Conditions the Sight of Adult Attending to the CAT & Their Reaction as a Reinforcer

EVOKES

Gaze Shift and Point and Vocalizations

"Hey, Look at That Cat"

Assessment of Social and Play Skills

- Social Skills Checklist (McKinnon & Krempa, 2002)
- Early Start Denver Model (ESDM) Curriculum Checklist (Rogers & Dawson, 2010)
- Developmental Play Assessment (DPA) Instrument (Lifter, 1996)
- VB-MAPP

Objectives for Social Skills and Play Skills

Social Skills

- Visually tracks and shows interest in people's movements
- Spontaneously looks at other children
- Spontaneously engages in parallel play near other children
- Spontaneously follows a peers or imitates their motor behavior
- * Spontaneously mands to a peer
- Spontaneously responds to the mands from peers
- * Spontaneously mands to peers to participate in games, social play, etc.
- Intraverbally responds to questions and statements from peers
- Engages in pretend social activities with peers

Play Skills

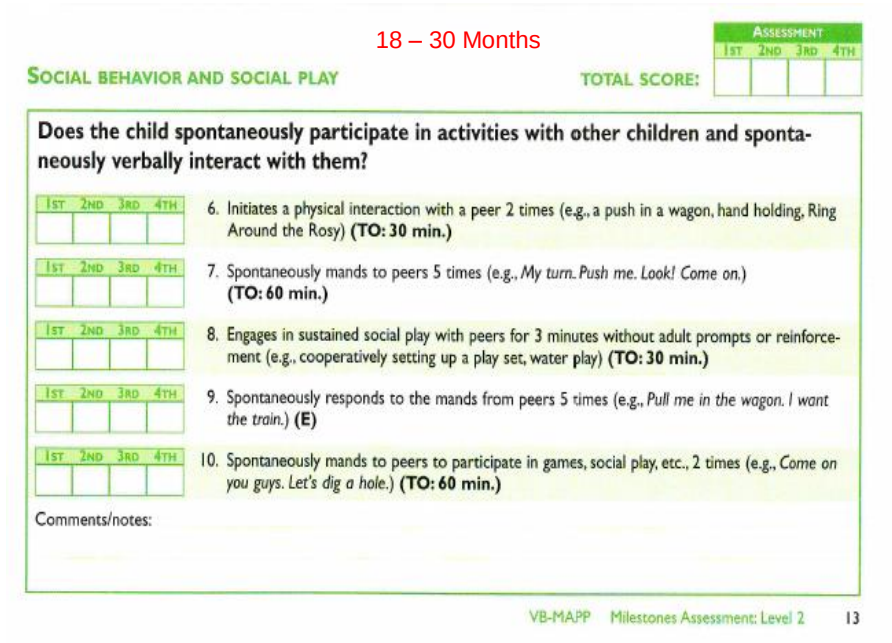
- Manipulates and explores objects
- Independently engages in movement play
- * Independently engages in cause-and-effect play
- Searches for missing or corresponding toy or part of a set
- Plays with toys according to their function
- Plays with everyday items in a creative way
- Assembles toys that have multiple parts
- Spontaneously engages in pretend or imaginary play
- Independently engages in arts and crafts
- Independently engages in sustained play activities (e.g., play dress-up)
- Independently draws or writes (e.g., dot-to-dot, matching games, mazes, tracing letters and numbers)

Teaching Peer Manding

- At about 18 months children begin to mand for items and activities from other children.
- This skill must be taught to many children with autism.
- The benefits of peer manding are:
  - correlate other children with reinforcement
  - increase social initiations

Videos

18 – 30 Months



SOCIAL BEHAVIOR AND SOCIAL PLAY

TOTAL SCORE:

ASSESSMENT			
1ST	2ND	3RD	4TH

Does the child spontaneously participate in activities with other children and spontaneously verbally interact with them?

1ST	2ND	3RD	4TH	
				6. Initiates a physical interaction with a peer 2 times (e.g., a push in a wagon, hand holding, Ring Around the Rosy) **(TO: 30 min.)**
				7. Spontaneously mands to peers 5 times (e.g., *My turn. Push me. Look! Come on.*) **(TO: 60 min.)**
				8. Engages in sustained social play with peers for 3 minutes without adult prompts or reinforcement (e.g., cooperatively setting up a play set, water play) **(TO: 30 min.)**
				9. Spontaneously responds to the mands from peers 5 times (e.g., *Pull me in the wagon. I want the train.*) **(E)**
				10. Spontaneously mands to peers to participate in games, social play, etc., 2 times (e.g., *Come on you guys. Let's dig a hole.*) **(TO: 60 min.)**

Comments/notes:

VB-MAPP Milestones Assessment: Level 2 13

113

Classroom Application – Social Skills

Peer pairing and manding:

- Set up a game or an activity that has already been conditioned as a reinforcer (e.g., puzzles, trains, cars, caribou) for the learner.
- The teacher should sit next to or behind the peer.
- The peer should be in control of the game pieces or activity as well as some edibles.
- When the learner sits down the teacher should instruct the peer to begin delivering preferred items and pieces for the game or activity, while saying "here *learner's name*."
- The teacher should instruct the peer to frequently give reinforcers to the learner (pairing).
- When the learner begins to freely accept the reinforcers and begins to show an interest in the peer (e.g., gives eye contact to the peer, moves in the direction of the peer) the teacher should instruct the peer to withhold an item or an action to allow the learner an opportunity to mand. If the learner does not mand within 3-5 seconds, the teacher should instruct the peer to vocally prompt the mand.
- All prompting for the learner should come from the peer so that the learner begins to mand from the peer and not from an adult.

114

Peer Manding Data Collection

1. Record reinforcer of items he mands for from a peer
2. Record prompt level required to evoke correct mand
3. Score yes or no if he emits eye contact on the initial mand attempt to the peer
4. Record mand from peer
5. Record prompt level to reinforce mand to peer
6. Score yes or no if he emits eye contact when reinforcing the mand of a peer
7. Tally the frequency of eye contact emitted during the session other than eye contact emitted when manding to a peer or reinforcing the mand of a peer

Peer Pairing and Manding Session

Learner: _____ **Date:**_____ **Session Time:**_____ **Instructor:**_____

Reinforcer	Prompt Level	Eye contact to peer on initial mand
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N
	PV TV Item MO TMO	Y N

Mand from peer Peer(s) name(s): _____	Prompt level to deliver item	Eye contact to peer when delivering item
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N
	FPP PPP IND	Y N

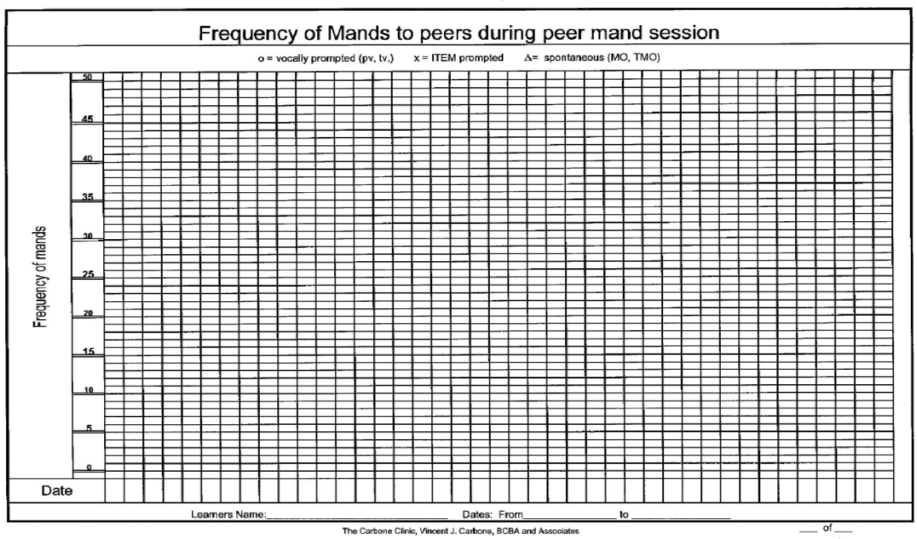
Spontaneous Eye contact emitted towards peer (at any time other than manding to the peer)

Key: PV = peer vocal prompt, TV = teacher vocal prompt, ITEM = item present, MO = spontaneous (mand for item that is not present), TMO = transitive motivating operation (spontaneous mand for an item, activity, action that is only valuable as a reinforcer because it will gain access to a more preferred item (e.g., manding for a remote to watch a movie), FPP = full physical prompt, PPP = partial physical prompt, IND = independent

Peer Manding Graphing:

1. Graph the frequency of mands to peers during peer mand session
2. Graph the frequency of responses to mands from peers during mand sessions
3. Graph the percentage of mands to peers and responses to mands from peers with eye contact
4. Graph the frequency of spontaneous eye contact emitted towards peer

117



82

118

Conditioning Social Attention to Teach Social Skills

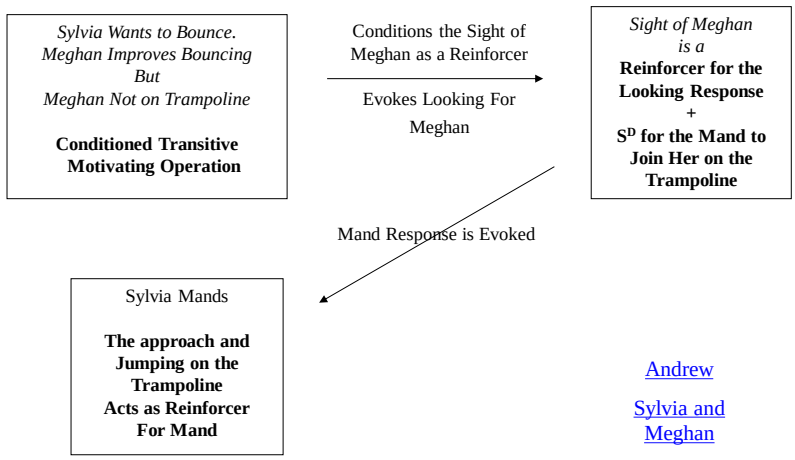
- Sophisticated social skills in children are acquired and maintained when attention and reactions of adults and other children act as reinforcers. (Dube et al. 2004; Isaksen & Holth, 2009)
- This repertoire does not develop easily and without instruction for some children with autism.
- Failure to come easily under the control of social reactions of others may be the greatest barrier to social development in children with autism.
- The behavioral literature suggests that pairing or correlating neutral stimuli (social attention) with established reinforcers may result in the neutral stimuli becoming conditioned or secondary reinforcers. (Copper, Heron & Heward, 2007)
- Isaksen & Holth (2009) suggests that pairing social attention of adults and other children may not be sufficient and he relies on the early work of Lovaas (1966) and early stimulus control research as support for his conclusions.

- They suggests that is necessary to also condition the neutral stimulus as a discriminative stimulus ($S^{D)}$ for a response that ultimately results in acquiring a reinforcer.
- In other words, to condition social attention as a reinforcer it will be necessary to first condition attention as a discriminative stimulus that is positively correlated with the availability of reinforcement for some response ($S^{D).}$
- Early social development usually includes a progression from wanting others to interact, to attending to what other people do, and imitating what they do. (Sundberg, 2008)
- By about 18 months children begin manding from others during play and then at about 24-30 months children mand for others to join them in play.
- This behavior is of course predicated on the notion that the social attention of other children are now conditioned as a reinforcer.
- This generally occurs without explicit programming by parents or teachers.

- If this type of social development does not occur then specific arrangements of contingencies may result in the conditioning of other children's attention as reinforcers and therefore increased age appropriate social responding.
- On the following slide is a behavioral analysis of the social response of manding for others to join in play activities.

Behavioral Analysis of Early Social Skills Training

Following frequent exposure to the variables that control the response the following behavioral chain occurs:



Andrew

Sylvia and Meghan

Italiced Words = Stimuli
Bold Words = Behavioral Variables
Standard Print Words = Effects of Behavioral Variables

Teaching Eye Contact as A Social/Language Pragmatic Skill

- Failure to develop eye contact in the early years may ultimately affect the development of language and social behaviors later in life. (Guralnick, Connor, Hammond, Gottman, & Kinnish,1996).
- Lack of eye contact in children with autism may also affect how others react to the child.
- For example, low rates of eye contact has led to the conclusions that children with autism are aloof, abnormal, impersonal or detached (Hutt & Ounstead, 1966).

- Despite the importance of this issue a limited number of behavior analytic studies have addressed this important issues.
- Until the 1980s, the predominant concern with eye gaze behavior regarded its role as a supposed prerequisite to intensive instruction of other skills (Foxx, 1977; Lovaas, 1977; Lovaas, 1981; Helgeson, Fantuzzo, Smith, & Barr, 1989). The argument was that a child who did not orient toward an instructor would be unable to learn and respond. (Foxx, 1977; Lovaas, 1977; Lovaas, 1981; Helgeson, Fantuzzo, Smith, & Barr, 1989)
- In one variation, Foxx (1977) introduced an experimental condition that combined the use of reinforcement and punishment in the form of an overcorrection procedure; if a child did not perform the target behavior, an unspecified period would follow during which the child was prompted through a random rotation of any of three head positions each of which he maintained for 15 sec.
- In another variation (Helgeson et al., 1989), children were prompted to maintain eye contact as they responded to a series of questions. In some reports the authors also prompted the eye contact responses by holding a reinforcing item at eye level (Greer & Ross, 2007; Hwang & Hughes, 1995). Other prompting procedures included physically guiding the child's head to look at the researcher. (Greer & Ross, 2007; Hegelson, Fantuzzo, Smith & Barr, 1989).

- While each of these interventions reported increases in eye contact, neither generalization to novel therapists nor generalization to novel settings was achieved, though Lovaas (1981) did stress the importance of programming for generalization.
- Despite the capacity of behavioral interventions to increase eye contact, there has been increasing concern regarding the functionality of such interventions. (Seibert, & Oller, 1981; Mirenda et al., 1983; Rollins, 1999; Arnold, Semple, Beale, & Fletcher-Flinn, 2000; Turkstra, 2005)
- Although some studies employed behavior analytic principles to increase the eye contact of autistic children, each neglected to present a behavioral analysis of eye contact to guide their methods to teach this important social and language pragmatic behavior.
- What follows is a behavioral analysis of eye contact as a language pragmatic skill of a speaker followed by procedures to teach children with autism to accompany their verbal behavior with eye contact.

- This analysis differs with others that have used behavior analytic principles to teach topographically correct behavior but without regard to the social function served by the eye contact of a speaker when talking to another person.
- A functional analysis of eye contact within the context of talking to someone suggests it is accompanying nonverbal behaviors that serves to more effectively control the social environment by influencing the behavior of a listener and therefore maximizing reinforcement for the speaker (Seibert, & Oller, 1981; Prutting, 1982; Kleinke, 1986; Rollins, 1999; Arnold et al., 2000). In other words, the verbal behavior of an individual is made more effective when accompanied by language pragmatic skills such as body posture, gestures, physical proximity and of course eye contact. (Bloom & Lahey, 1978).
- A behavior analysis suggests that these responses are all nonverbal operants under the precise stimulus control of a listener and other contextual stimuli. This is especially clear in the case of eye contact as a form of attention to another's face. Hoth (2005) explains "In an operant analysis, 'attention' boils down to stimulus control." (6.163).

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Teaching Eye Contact to Children with Autism: A Conceptual Analysis and Single Case Study

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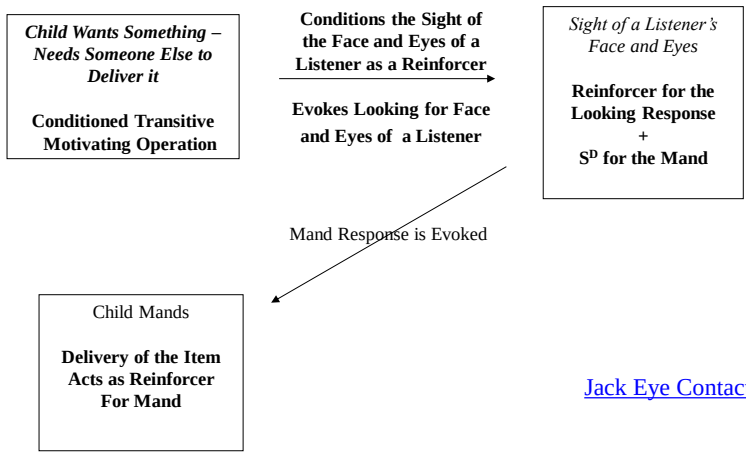
Abstract

Eye contact occurs very early in development and serves many functions for the young child. It has been implicated in the development of social, cognitive, and language skills. A substantial number of children with autism fail to develop this important skill and therefore experimenters with both developmental and behavior analytic perspectives have researched methods to teach eye contact. However, only a few researchers have recently attempted to condition the response of the communication partner as a reinforcer for social behavior and thereby arrange the conditions under which typical children develop social responses. The purpose of this case study was to extend the analysis of typical development of social skills to the teaching of eye contact as a language pragmatic skill to a child with autism. Data from a single case study of a child with autism are provided.

Keywords: Eye Contact, Social Skills, Mands, Extinction, Autism, Motivating Operations

Behavioral Analysis of Eye Contact During Language Training

Following frequent exposure to the variables that control the mand response the following behavioral chain occurs:



Jack Eye Contact Video

Italiced Words = Stimuli
Bold Words = Behavioral Variables
Standard Print Words = Effects of Behavioral Variables

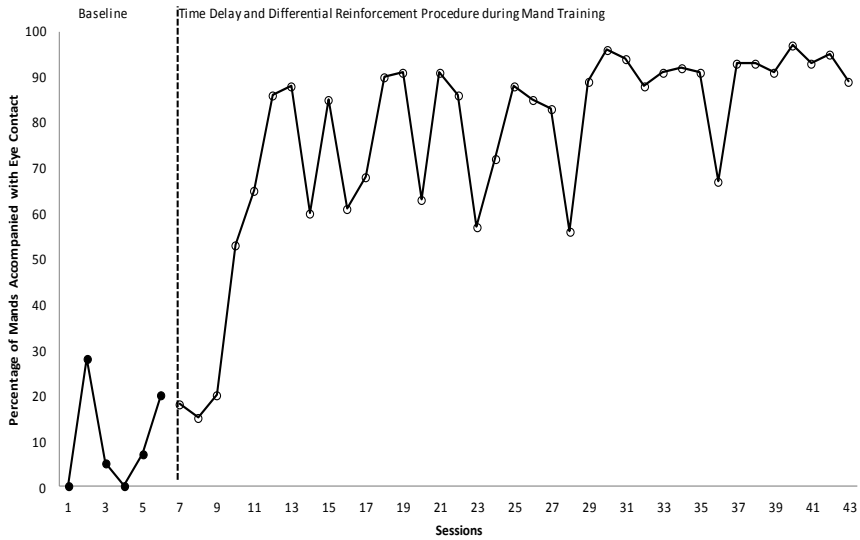


Figure 1. Percentage of Mands Accompanied by Eye Contact per session during baseline and treatment conditions and across four different instructors

129

Skillstreaming (McGinnis & Goldstein, 1990)

- When attention has already been conditioned as a reinforcer Skillstreaming curriculum may be appropriate to use
- There are 3 levels:
  - Early Childhood (preschool through grade 1)
  - Elementary School Child (grades 2 – 5)
  - Adolescent Child (grades 6 – 12)
- The Skillstreaming approach utilizes modeling, role playing, performance feedback, and transfer training (homework).

130

- The Early Childhood curriculum covers 40 skills lessons, such as trying when it's hard, knowing when to tell, dealing with teasing, and waiting your turn. The skills are divided into six areas: Beginning Social Skills, School-Related Skills, Friendship-Making Skills, Dealing with Feelings, Alternatives to Aggression, and Dealing with Stress.

- The Elementary School Child curriculum contains 60 skill lessons, such as contributing to discussions, introducing yourself, staying out of trouble, and dealing with embarrassment. The skills are divided into five skill groups: Classroom Survival Skills, Friendship-Making Skills, Dealing with Feelings, Alternatives to Aggression, and Dealing with Stress.

- The Adolescent curriculum contains 50 skill lessons, such as giving instructions, expressing affection, dealing with accusation, and deciding what caused a problem. There are six skill groups: Beginning Social Skills, Advanced Social Skills, Dealing with Feelings, Alternatives to Aggression, Dealing with Stress, and Planning Skills.

Social Skills Lesson Plans

Name: Naryan H. Date: March 1, 2010

SKILL AREA: Initiating Social Interactions

Objective: Naryan will initiate a social interaction with 100% accuracy (40/40 points) on cold probes across 3 consecutive sessions in novel situations. Accuracy will be determined based on the total possible points on the instructor scored rating scale.

Topographical Definition: Naryan will initiate a social interaction with another person by greeting them using a socially acceptable greeting in an appropriate voice volume/intonation, while standing at a socially acceptable distance, maintaining appropriate body posture and hand gestures, and appropriate eye contact. He will wait for a listener to respond and will respond appropriately to listener.

Functional Definition: When Naryan sees someone he would like to interact with (antecedent), he will greet and interact with this person (behavior), and this person will then reply to Naryan's greeting and interact with him (consequence).

Setting: Any location within the clinic.

Materials: Video camera

Teaching Procedure

Baseline: Baseline data will be collected prior to teaching using 3 clinic sessions of cold probe data. Baseline data should be collected with the individuals with whom the generalization probes will be run.

1. Set the individual up in a visible location where he or she is not engaged in a task, suggesting that he/she is available to talk.
2. Bring the Naryan within close proximity of this individual.
3. Walk by the individual, slowing down/ pausing if necessary to contrive motivation for Naryan to initiate an interaction with this individual.
4. See what Naryan does.
   a. If Naryan initiates/interacts with the individual in an appropriate way, the individual should respond appropriately.
   b. If Naryan initiates/interacts with the individual in an inappropriate or incorrect way, block any inappropriate physical interactions and continue with the interaction.
   c. If Naryan does not declare any motivation to interact with this person, continue the transition and try again at later time.
5. Do not give any feedback to Naryan following the interaction. Continue with the transition.

Training: Training should be conducted in a role-play situation between Naryan and the instructor.

1. **Model the Situation for Naryan**
   - Walk up to someone who is not busy to interact with
   - Greet them by saying "Hello (person's name)." "Hi (person's name)." "How are you?" or "Hi (person's name), what's up?"
   - Give the person a high-five, pound, or a handshake
   - Wait for the listener to respond
   - If asked "How are you?" respond accordingly (i.e. "Fine, thank you." Or "Good, thanks!")
   - Say goodbye before walking away (i.e. "See you later!")

2. **Tell Naryan: What to Do**
   - Talk with someone who is not busy.
   - Stand still when talking to the person
   - Look at the other person's eyes when you greet him/her.
   - Say "Hello (person's name)." "Hi (person's name)." "How are you?" or "Hi (person's name), what's up?"
   - Give the person a high-five, pound, or a handshake
   - Wait quietly for them to answer
   - If the other person asks "How are you?" tell him "I'm fine" or "I'm good, thanks!"
   - Say goodbye before walking away (i.e. "See you later!")

3. **Tell the Naryan: What Not to Do**
   - Don't talk to someone who is busy
   - Don't look away from the person when you say hello
   - Don't look away when the other person is talking
   - Don't walk away before the other person says "Hi" to you
   - Don't start talking about something else if they ask "How are you?"
   - Don't stand too close or start touching the other person, except for a high-five, pound, or handshake
   - Don't ask the other person for a hug

4. **Demonstrate the Correct Responses Again**

5. **Role Play the Situation with Naryan and His Teacher while Videotaping the Situation**

6. **Error Correction Procedure**
   - If Naryan errors at any point during the interaction, tact the mistake in the moment, bring him back to the situation where the interaction began, and have him restart the initiation as defined above
   - Repeat this process until Naryan is able to initiate and complete the social interaction, as defined above, with 100% accuracy (40/40 points)

7. **Instructor Provides Naryan with Feedback Regarding Practice Situations**
   - Provide general feedback (e.g. "You did a nice job _____, but you need to work on _____").
   - If an error correction was needed, discuss the reasons why he had to restart the interaction
   - Play the video for Naryan and ask questions to him while watching the video. Pause the video at different points and ask direct questions related to what is happening:
     e.g. "Did you look at the other person's eyes when you talked to them?" Then provide direct feedback on whether Naryan responded appropriately in the situation. Model the correct response if Naryan did not engage in the correct response.

Criteria for Skill: 3 consecutive cold probes at 100% accuracy (40/40 points) in training sessions, followed by 3 consecutive cold probes with 100% accuracy (40/40 points) in novel generalized situations.

Maintenance:
- Maintenance trials will be run once a week on previously mastered social skills
- Data will be collected and graphed on the total number of points based on the social rating scale for mastered targets
- Following 3 consecutive days below 70% accuracy (28/40 points), the targeted skill will go back into teaching at the training level

Data Collection and Graphing:
- Data Collection
  - Baseline
    - Data will be collected on the first contrived trial of the initiation of a social interaction between a *novel person* and Naryan
      - Data will be collected as a cold probe and graphed using a different symbol for each individual
    - Record data using the Evaluation Criteria rating scales
  - Training Level
    - Data will be collected on the first contrived trial of the initiation of a social interaction between the *teacher* and Naryan
      - Data will be collected as a cold probe prior to teaching the skill
    - Record data using the Evaluation Criteria rating scales
  - Generalization Level
    - Data will be collected on the first contrived trial of the initiation of a social interaction between a *novel person* and Naryan
      - Data will be collected as a cold probe prior to teaching the skill
    - Record data using the Evaluation Criteria rating scales
- Graphing
  - Graph the Total Number of Points Based on the Social Rating Scale
    - Graph should contain a baseline, training level, generalization level, and maintenance with phase changes for each and different symbols for each novel individual (used both in baseline and in the generalization level) and the training level.

Evaluation Criteria during Training and Real Life Situations

Skill: _____ Date: _____

Section 1:

	Poor Excellent	Tally Restarts for Specific Errors
Appropriate Voice Volume	1 2 3 4 5	
Appropriate Voice Tone	1 2 3 4 5	
Proper Body Posture & Position	1 2 3 4 5	
Appropriate Eye Contact	1 2 3 4 5	
Appropriate Hand Gestures	1 2 3 4 5	
Appropriate Distance	1 2 3 4 5	
	None Some Many	
Inappropriate Responses	5 4 3 2 1	
Appropriate Responses	1 2 3 4 5	

Total: _____/40

Section 2:

Appropriate Responses:

Wait until person is not busy: + / -

Say "Hello (person's name)", "Hi (person's name)", "How are you?", or "Hi (person's name), what's up?": + / -

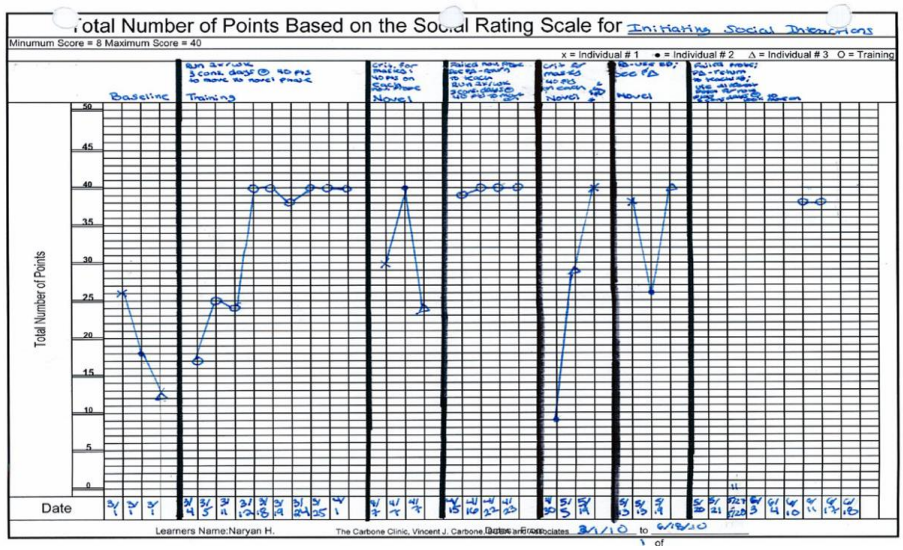
Give the person a high-five, pound, or a handshake: + / - / N/A

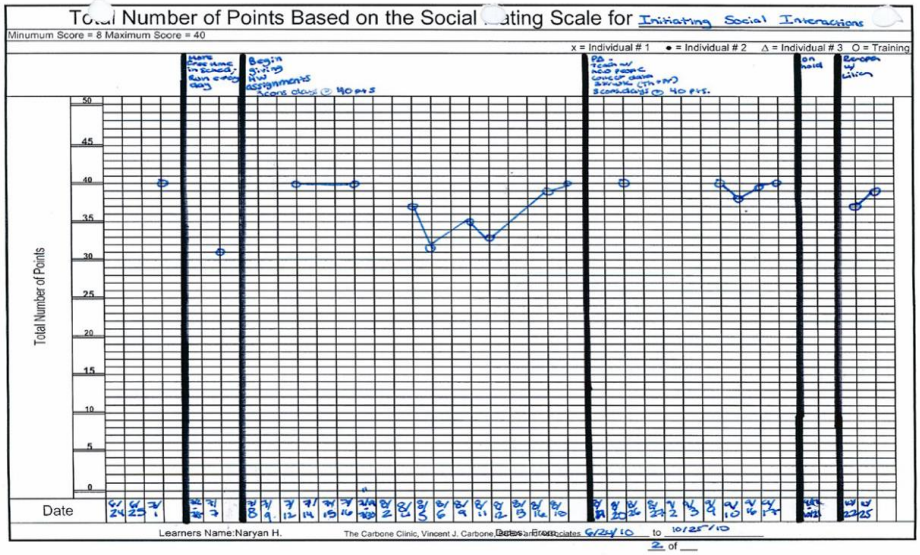
Wait: + / -

Respond if asked "How are you?" accordingly (i.e. "Fine, thank you." Or "Good, thanks!"): + / -

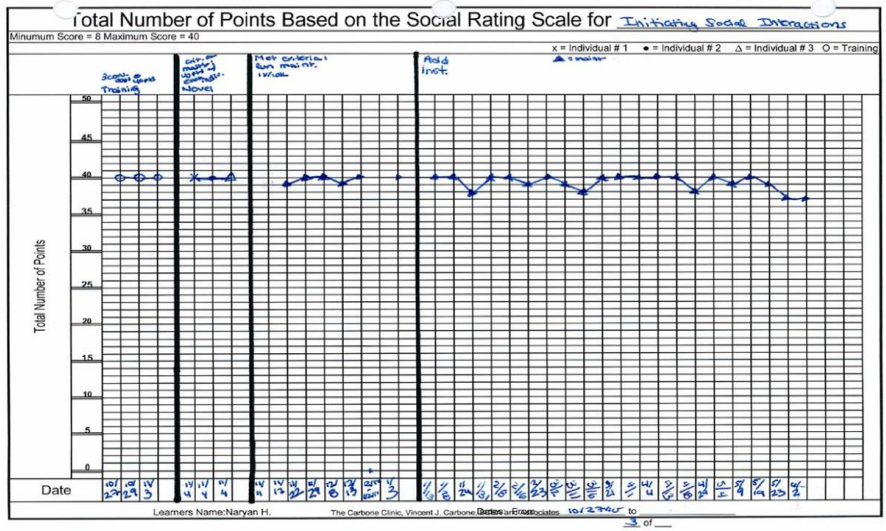
Say "Goodbye" or "I will talk to you later": + / -

Total: _____




Total Number of Points Based on the Social Rating Scale for Initiating Social Interactions
Minumum Score = 8 Maximum Score = 40
x = Individual # 1 ● = Individual # 2 △ = Individual # 3 O = Training
Total Number of Points
Date
Learners Name:Naryan H.
The Carbone Clinic, Vincent J. Carbone, Barbara Brown Associates
6/24/10 to 10/25/10
2 of

137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Total Number of Points
Date
Learners Name:Naryan H.
The Carbone Clinic, Vincent J. Carbone, Barbara Brown Associates
10/27/10 to
3 of

138

Naryan Skillstreaming Video

1

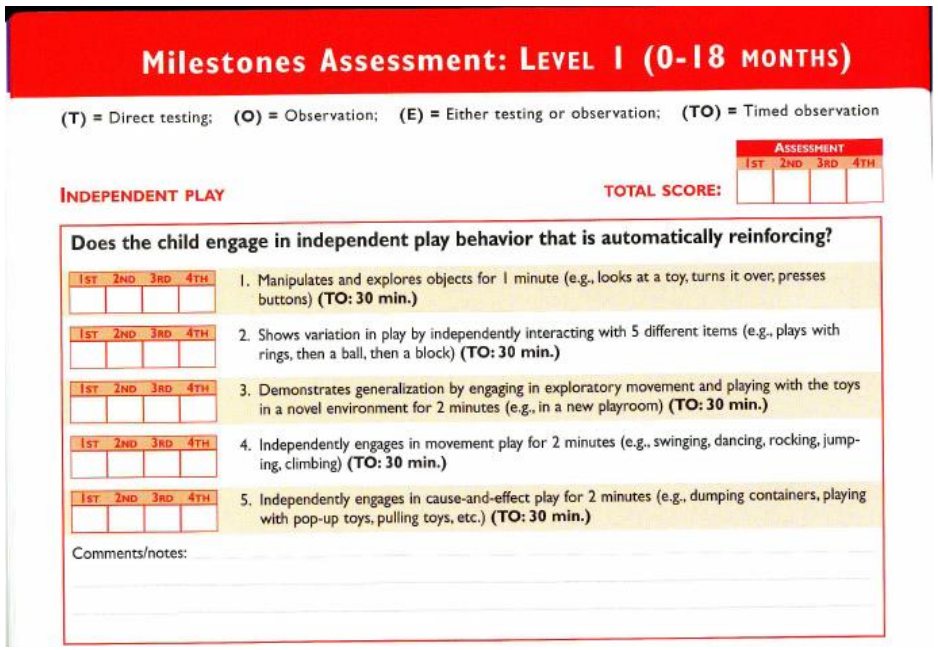
2

Play Skills

- Impaired social and play skills are some of the defining or core characteristics of autism:
  - qualitative impairment in social interaction
  - restricted repetitive and stereotyped patterns of behavior, interests and activities (i.e., play)
  - delays or abnormal functioning with social interaction and symbolic imaginative play (American Psychiatric Association [DSM-IV-TR], 2000)
- Many children with autism and other developmental disabilities engage in high rates of self-stimulatory behaviors and other problem behaviors due to deficits in these skill repertoires.
- We can teach children to engage in more appropriate behaviors by developing their play and social skills. If these children can learn to initiate social interactions, interact with their peers and independently engage in play skills during free time, then the other self-stimulatory and problem behaviors should decrease.

Teaching Early Play Skills

- Early teaching of play skills may involve developing a stimulus-response chain.
- By using a stimulus-response chain you can begin to teach the learner the basic function of the activity.
- Begin by selecting an activity or game that has several components and develop your stimulus response chain to teach the learner every step of putting the activity together, playing with the pieces functionally and then cleaning up the activity.
- For different learners you might modify your teaching to include just the act of doing the activity.



Milestones Assessment: Level 1 (0-18 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

Assessment			
1st	2nd	3rd	4th

Independent Play **Total Score:**

Does the child engage in independent play behavior that is automatically reinforcing?

1st	2nd	3rd	4th	
				1. Manipulates and explores objects for 1 minute (e.g., looks at a toy, turns it over, presses buttons) **(TO: 30 min.)**
				2. Shows variation in play by independently interacting with 5 different items (e.g., plays with rings, then a ball, then a block) **(TO: 30 min.)**
				3. Demonstrates generalization by engaging in exploratory movement and playing with the toys in a novel environment for 2 minutes (e.g., in a new playroom) **(TO: 30 min.)**
				4. Independently engages in movement play for 2 minutes (e.g., swinging, dancing, rocking, jumping, climbing) **(TO: 30 min.)**
				5. Independently engages in cause-and-effect play for 2 minutes (e.g., dumping containers, playing with pop-up toys, pulling toys, etc.) **(TO: 30 min.)**

Comments/notes:

Stimulus Response Data Sheet

Learner: _____Thomas _____ **Skill:** __appropriate toy play – sesame street pop up toy__

Chaining Procedure: _____ **Criteria:** _____

Instructions: Create a stimulus response chain with the SD and consequence listed for each response. Record the prompt level for each response (total task), or current target step (backward chain or forward chain).

Step #	SD / Consequence	Response	Baseline																		
	S^D Toy with all lids close on floor in front of Thomas and instructor says "play with your toys" → C lid opens, music plays ←	Press 1st button (buttons can be pressed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 1 lid open, 3 closed C lid opens, plays music	Press 2nd button (buttons can be pressed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 2 lids open, 2 closed C lid opens, music plays	Press 3rd button (buttons can be pressed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 3 lids open, 1 closed C lid opens, music plays	Press 4th button (buttons can be pressed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 4 lids open C lid closed	Close 1st lid (lids can be closed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 3 lids open, 1 closed C lid closed	Close 2nd lid (lids can be closed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 2 lids open, 2 closed C lid closed	Close 3rd lid (lids can be closed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
	S^D 1 lid open, 3 closed C all lids closed, social Sr+ from instructor	Close 4th lid (lids can be closed in any order)	NR IR IND	NR IR IND	NR IR IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
		Percentage (out of 8 steps)																			

[Thomas – Toy Play]

Increasing Length of Utterance

Length of Utterance

- Before 2 years old most children speak in one word utterance.
- At about 2 years children usually speak in 2 word utterances, mainly nouns and verbs, e.g. “mommy shoe” “daddy car” “mommy come” “daddy go” doggy bark” “baby cry”, etc.
- These are mostly mands and tacts.
- At about 2.5 years grammatical structure appears in the verbal behavior of young children.
- For example, the inflection or tag “… ing” appears, i.e., running, jumping, drinking, etc.
- In addition phrases or frames may occur, “I want_____”, “It is____”, etc.
- These frames “modulate the meaning” of the one and two word utterances.

- These frames act as modifiers, they modify the content words in the sentences.
- Said another way they provide the listener additional information about the content words.
- In Skinner’s analysis the content words are called primary verbal operants and the modifiers are called autoclitic frames.
- These autoclitics include words, inflections, order of the words and even intonation, e.g. raising the voice to suggest a question.
- The modifiers do not appear until the 2.5 year old child has many primary verbal operant words since there isn’t anything to modify until then.
- If you begin to teach the modifiers that increase the length of utterance to match a typical child in a child with very few mands, tacts, and intraverbals, you will cause several problems.

- The problems include the following:
  - increase response effort and child stops talking
  - articulation is reduced
  - unusual grammatical structure interferes with communication

Pre-Requisites for Learning Length of Utterance

LINGUISTIC STRUCTURE

TOTAL SCORE:

ASSESSMENT			
1ST	2ND	3RD	4TH

Is the child's articulation becoming clearer? Is his speaker and listener vocabulary growing, and is he beginning to emit more 2 and 3 word phrases and sentences?

1ST	2ND	3RD	4TH	
				6. The child's articulation of 10 tacts can be understood by familiar adults who cannot see the item tacted **(T)**
				7. Has a total listener vocabulary of 100 words (e.g., *Touch nose. Jump. Find keys.*) **(T)**
				8. Emits 10 different 2-word utterances per day of any type except echoic (e.g., mand, tact) **(E)**
				9. Emits functional prosody (i.e., rhythm, stress, intonation) on 5 occasions in one day (e.g., puts emphasis or stress on certain words such as, *It's MINE!*) **(O)**
				10. Has a total speaker vocabulary size of 300 words (all verbal operants, except echoic) **(E)**

Comments/notes:

TACT

TOTAL SCORE:

ASSESSMENT			
1ST	2ND	3RD	4TH

Does the child tact nouns and verbs?

1ST	2ND	3RD	4TH	
				6. Tacts 25 items when asked, *What's that?* (e.g., *book, shoe, car, dog, hat*) **(T)**
				7. Generalizes tacts across 3 examples of 50 items, tested or from a list of known generalizations (e.g., tacts 3 different cars) **(T)**
				8. Tacts 10 actions when asked, for example, *What am I doing?* (e.g., *jumping, sleeping, eating*) **(T)**
				9. Tacts 50 two-component verb-noun or noun-verb combinations, tested or from a list of known two-component tacts (e.g., *washing face, Joe swinging, baby sleeping*) **(T)**
				10. Tacts a total of 200 nouns and/or verbs (or other parts of speech), tested or from an accumulated list of known tacts **(T)**

Comments/notes:

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Milestones Assessment: Level 2 (18-30 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

Assessment			
1st	2nd	3rd	4th

Listener Responding **TOTAL SCORE:**

Is the child acquiring more advanced listener skills?

1st	2nd	3rd	4th	
				6. Selects the correct item from a messy array of 6, for 40 different objects or pictures (e.g., *Find cat. Touch ball.*) **(T)**
				7. Generalizes listener discriminations (LDs) in a messy array of 8, for 3 different examples of 50 items (e.g., the child can find 3 examples of a train) **(T)**
				8. Performs 10 specific motor actions on command (e.g., *Show me clapping. Can you hop?*) **(T)**
				9. Follows 50 two-component noun-verb and/or verb-noun instructions (e.g., *Show me the baby sleeping. Push the swing.*) **(T)**
				10. Selects the correct item in a book, picture scene, or natural environment when named for 250 items, tested or from an accumulated list of known words **(T)**

Comments/notes:

Assessment			
1st	2nd	3rd	4th

Intraverbal **TOTAL SCORE:**

Does the child verbally respond to the content of the words of others?

1st	2nd	3rd	4th	
				6. Completes 10 different fill-in-the-blank phrases of any type (e.g., song fill-ins, social games and fun fill-ins, animal or object sounds) **(T)**
				7. Provides first name when asked, *What is your name?* **(T)**
				8. Completes 25 different fill-in-the-blank phrases (not including songs) (e.g., *You eat... You sleep in a... Shoes and...*) **(T)**
				9. Answers 25 different *what* questions (e.g., *What do you like to eat?*) **(T)**
				10. Answers 25 different *who* or *where* questions (e.g., *Whose your friend? Where is your pillow?*) **(T)**

Comments/notes:

autoclitics

Advanced Manding

Milestones Assessment: Level 3 (30-48 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

Assessment			
1st	2nd	3rd	4th

Mand **TOTAL SCORE:**

Does the child mand for information, mand with different parts of speech, and give directions to others?

1st	2nd	3rd	4th	
				11. Spontaneously mands for different verbal information using a WH question word 5 times (e.g., *What's your name? Where do I go?*) **(TO: 60 min.)**
				12. Politely mands to stop an undesirable activity, or remove any aversive MO under 5 different circumstances (e.g., *Please stop pushing me. No thank you. Excuse me, can you move?*) **(E)**
				13. Mands with 10 different adjectives, prepositions, or adverbs (e.g., *My crayon is broken. Don't take it out. Go fast.*) **(TO: 60 min.)**
				14. Gives directions, instructions, or explanations as to how to do something or how to participate in an activity 5 times (e.g., *You put the glue on first, then stick it. You sit here while I get a book.*) **(O)**
				15. Mands for others to attend to his own intraverbal behavior 5 times (e.g., *Listen to me... I'll tell you... Here's what happened... I'm telling the story...*) **(O)**

Comments/notes:

Manding for Information

MANDING FOR INFORMATION

Skinner (1957) states "**A question is a mand which specifies verbal action**".

- In other words, there are stimulus conditions under which a verbal response (information) has been **established** as a reinforcer and therefore **evokes** a question (mand), the answer to which in the past has produced some form of reinforcement (e.g., more effective action by the asker).

- Sundberg, Loeb, Hale, and Eigenheer (2002) demonstrated that mands for information regarding location (where) and specific information about a person (who) could be taught to children with autism by manipulating motivating operations.
- Using the analysis of the CMO-T, where access to a reinforcer is blocked or interrupted, you can contrive conditions under which verbal information is conditionally conditioned as a reinforcer and will evoke behavior that has led to information in the past.
- For example, if a child would like to play with a certain toy and a teacher says "**sure, lets play with it" but the location of the toy is unknown to the child then INFORMATION about the location of the toy is now valuable and the teacher can now teach the child to say "where" as a mand for information**.
- The CMO-T has also been used to teach mands for information to kids with autism (Betz, Higbee, & Pollard, 2010; Endicott & Higbee, 2007; Lechago, Carr, Grow, Love, & Almason, 2010; Williams, Donley, & Keller, 2000).

General Teaching Procedures:

- Contrive motivation for information (e.g., hide an item that the learner needs, interrupt a pre-established routine).
- As soon as the learner declares motivation for "who," "what," "which," "where," "why," "how," or "can/does/do/will" information (e.g., looks for the missing item), prompt the mand by saying, "Ask me, '*mand for information*?'" (e.g., "Ask me, 'Where is the pencil?'")
- Immediately following the learner echoing the prompted mand, transfer stimulus control by recontriving motivation and implementing a 3-second time delay to wait for the learner to repeat the mand for information.
- After the learner repeats the mand for information, reinforce the mand by delivering the **INFORMATION** requested.

Teach the following:

What: when the names of people, places, things, and actions would be reinforcing information

Where: when location would be reinforcing information

Who: when the name of a specific person would be reinforcing

Whose: when the name of a person who possesses something would be reinforcing

When: when information regarding time would be reinforcing

Why: when information for the causes of events would be reinforcing

How: when information for instructions and the functions of things would be reinforcing

Adapted from Sundberg (2002)

- Let's now look at a video example of manding for information. Notice how the instructor must prompt some forms of the appropriate mands for information (questions) when the MO is strong but when the learner does not have the form of the response in his repertoire.

4 Diego

DIEGO CHAIN OF MANDS FOR INFORMATION

- MANDING "WHY?"
  - S-1: Watching the video is effective as reinforcement
  - S-2: Kim says to Diego, "Press stop."
- ESTABLISHES
  - An explanation of her request as a reinforcer
- EVOKES
  - Diego's asking, "WHY?"
  - Reinforcer: Kim says, "Because we are going to go play with some toys."

- MANDING "WHERE?"
  - S-3: "Because we are going to play with some toys."
- ESTABLISHES
  - Additional information about the location of the toys as a reinforcer
- EVOKES
  - Diego's asking, "WHERE?"
  - Reinforcer: Kim says, "Over at the other table."

- MANDING "HOW?"
  - S-4: Placing parts on Mr. Potato Head is effective as reinforcement
  - S-5: Diego tries but cannot put the back pack on the to Mr. Potato Head
- ESTABLISHES
  - Instructions about how to do it as a reinforcer
- EVOKES
  - Diego's asking (with an echoic prompt), "HOW DO I DO IT?"
  - Reinforcer: Kim *tells* him how to do it.

- MANDING "WHERE?"
  - S-6: The nose on potato head is effective as reinforcement
  - S-7: Diego cannot find it
- ESTABLISHES
  - Information about its location as a reinforcer
- EVOKES
  - Diego's asking, "WHERE IS IT?"
  - Reinforcer: Kim says, "On the shelf."

- MANDING "WHICH?"
  - S-8: Kim says, "On the shelf."
  - S-9: There are several shelves
- ESTABLISHES
  - Information regarding a specific shelf as a reinforcer
- EVOKES
  - Diego's asking, "WHICH ONE?"
  - Reinforcer: Kim says, "The one over there."

- MANDING "WHERE?"
  - S-10: Mr. Potato Head's eyes are effective as reinforcement
  - S-11: Diego cannot find them
- ESTABLISHES
  - Information about the location of the eyes as a reinforcer
- EVOKES
  - Diego's asking, "WHERE ARE THE EYES?"
  - Reinforcer: Kim says, "I don't know, but I know someone who does."

- MANDING "WHO?"
  - S-12: Kim's information about someone who knows
- ESTABLISHES
  - Information about a specific person as a reinforcer
- EVOKES
  - Diego's asking (with an echoic prompt), "WHO?"
  - Reinforcer: Kim says, "Emily."

TYLER MANDING FOR INFORMATION

- Tyler's repertoire of manding for information is strong and therefore requires no prompting. The contrived MOs evoke all of the appropriate mands.
- Note how Jimmy contrives the motivation to increase the value of information as a reinforcer for Tyler.

Kellen Manding Info

TYLER VIDEO

Sample Lesson Plan
TYLER

Contrived MO (MOTIVATION)	What Now Becomes a Reinforcer?	What should you teach the learner to say?	Teacher's Response (Reinforcer)	Data Recording of Prompted and Unprompted
Guess what?	Info about what they are going to do	What?	I want to play with something…	Prompted Spontaneous Novel
I want to play with something…	Info about what Jimmy wants to play with	What do you want to play with?	I want to play with the trains	Prompted Spontaneous Novel
(Goes to the trains) Not right now though…	Info about when Tyler can play with the trains	When?	After you give me a high five	Prompted Spontaneous Novel
We've got to turn it on…	Info about how to turn it on	How do we turn it on?	We have to press that button	Prompted Spontaneous Novel
(Button doesn't work) I don't know how to turn it on, but I know someone who does	Info about who knows how to turn on the trains	Who? (Knows how to turn on train)	Danielle	Prompted Spontaneous Novel
Danielle knows how to turn it on	Info from Danielle about how to turn on the trains	How do we turn it on?	You press the lever	Prompted Spontaneous Novel

Sample Lesson Plan
TYLER

Contrived MO (MOTIVATION)	What Now Becomes a Reinforcer?	What should you teach the learner to say?	Teacher's Response (Reinforcer)	Data Recording of Prompted and Unprompted
Accidentally turn the train off	Info about why Jimmy turned the train off	Why did you do that?	It was an accident, but I want to play another game	Prompted Spontaneous Novel
I want to play another game…	Info about what game the teacher wants to play	What game?	Perfection	Prompted Spontaneous Novel
Lets go get Perfection	Info about where Perfection is	Where's Perfection?	I don't know where it is, but I know someone who knows	Prompted Spontaneous Novel
I know someone who knows where Perfection is	Info about who knows where Perfection is	Who? (Knows where Perfection is)	Kelly	Prompted Spontaneous Novel
Kelly knows where Perfection is	Info about where Perfection is	Where's Perfection?	In the teacher's room	Prompted Spontaneous Novel

Sample Lesson Plan
TYLER

Contrived MO (MOTIVATION)	What Now Becomes a Reinforcer?	What should you teach the learner to say?	Teacher's Response (Reinforcer)	Data Recording of Prompted and Unprompted
The closet is locked and the key is missing	Info about where the key is	Where's the key?	I don't know where it is, but I know someone who knows	Prompted Spontaneous Novel
I know someone who knows where the key is…	Info about who knows where the key is	Who?	Danielle	Prompted Spontaneous Novel
Danielle knows where the key is	Info about where the key is	Where's the key?	It is on top of the bookshelf	Prompted Spontaneous Novel
You need to open the door with one of the keys	Info about which key he should use	Which key?	This key	Prompted Spontaneous Novel
We're not going to play the game here	Info about where to play the game?	Where are we going to play?	At the table	Prompted Spontaneous Novel

Sample Lesson Plan
CHICKEN TOY

Contrived MO (MOTIVATION)	What Now Becomes a Reinforcer?	What should you teach the learner to say?	Teacher's Response (Reinforcer)	Data Recording: Prompted, Spontaneous, or Novel
Turn on the chicken ….he's not working	Info. about Why the chicken isn't working	Why? (is it not working)	It needs batteries	Prompted Spontaneous Novel
Let's get batteries	Info. about Where is the battery	Where are the batteries?	Someone has it	Prompted Spontaneous Novel
Get the batteries…someone has it	Info. about Who has the battery	Who has the battery?	Aura	Prompted Spontaneous Novel
Take off the top and put the battery in…..	Info. about How to put the battery in	How?	You need to use something	Prompted Spontaneous Novel
You need to use something….	Info. about What you need to use	What?	A screwdriver	Prompted Spontaneous Novel
Get the screwdriver	Info. about Where is the screwdriver	Where is the screwdriver?	In the drawer	Prompted Spontaneous Novel
Get the screwdriver….it's in the drawer	Info. about Which drawer	Which drawer?	The top drawer	Prompted Spontaneous Novel

Response Definitions:

- **Prompted**: Any mand for information evoked by an instructor's vocal prompt
- **Spontaneous**: Any mand for information emitted 1) in the absence of an instructor's vocal prompt and, 2) in the context of a routine during which the same mand has been prompted at least once before
- **Novel**: Any mand for information emitted 1) in the absence of an instructor's vocal prompt and, 2) in the context of a routine or other situation during which the same mand has never been prompted

Criteria for mastery:

- 5 consecutive sessions with at least 5 novel mands for information

Data Collection:

Who?			What?		
Prompted	Spontaneous	Novel	Prompted	Spontaneous	Novel
Novel Situations:			**Novel Situations:**		

Manding for Information

Learner: Naryan Session Time: 9-1PP Date: 5/2/07

Instructions: Record tally marks for all prompted, spontaneous, or novel mands for information. Record each novel situation taught or presented to the learner for each mand for information in the lines provided below.

Who?			What?		
Prompted	Spontaneous	Novel	Prompted	Spontaneous	Novel
		III			I
Novel Situations: Chelsea here come 2 circle home			**Novel Situations:** put in order		

Why?			How?		
Prompted	Spontaneous	Novel	Prompted	Spontaneous	Novel
Novel Situations:			**Novel Situations:**		

Which?			Where?		
Prompted	Spontaneous	Novel	Prompted	Spontaneous	Novel
	I	I		II	
Novel Situations: part of jacket			**Novel Situations:**		

When?			Can/ Do/ Does/ Will?		
Prompted	Spontaneous	Novel	Prompted	Spontaneous	Novel
I					
Novel Situations:			**Novel Situations:**		

175

Frequency of Who Mands per 3 hour session

Criteria for mastery: 5 novel mands across 5 days

●=Prompted Mand X=Spontaneous Mand Δ=Novel

Frequency of Who Mands

50 40 30 20 10 0

Date

Learners Name: Naryan Dates: From 10/1/09 to 12/11/09

The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

176

Assessment

Verbal Behavior Milestones Assessment and Placement Program: The VB-MAPP

- The VB-MAPP is an assessment based on Skinner's (1957) analysis of verbal behavior, a description of a behavioral analysis of language.
- There are 5 components to the VB-MAPP that are used:
  - to asses language and other related skills (Milestones)
  - to assess behaviors that interfere with learning those skills
  - to determine appropriate educational placements(Transition)
  - to assist in developing instructional objectives
  - Skills Tracking
- The VB-MAPP is structured according to typical language development milestones.
- It represents over 30 years of research and field test data from approximately 75 typically developing children and over 200 children with autism.

Conducting the VB-MAPP

- The VB-MAPP can be conducted with any language delayed individual, regardless of age or specific diagnosis.
- The examples and materials used and specific test items should be adjusted to account for age-appropriateness.
- To conduct the VB-MAPP it is essential that the tester have a basic understanding of behavior analysis, Skinner's analysis of verbal behavior, and the components of linguistic structure.
- The accuracy and effectiveness of this assessment tool are related to the skill level of the person conducting the assessment.
- Multiple people can be involved in the assessment of the individual skills (i.e., linguistic structure and the echoic may be best assessed by a SLP).

Comparing ABLLS to VB-MAPP

ABLLS

- 466 individual skills assessed over 25 sections
- Evaluates performance of individual skills
- Assessment is time consuming
- Order of skills (hierarchy) is not matched to typical development
- Does not provide age norms
- Does not assess problem behavior
- Difficult to link to Individualized Education Plans (IEP) or typical special education curricula

VB-MAPP

- 170 milestones measured across 16 skill areas
- Evaluates achievement of developmental milestones
- Assessments can be completed quickly
- Order of milestones (hierarchy) more closely matched to typical development
- Levels linked to specific ages, so easier to compare to age norms
- Includes barrier assessment to identify areas interfering with learning
- Provides guidance for the development of IEP goals and placement

Components of the VB-MAPP

There Are Five Components Within the VB-MAPP

1. Milestones assessment contains 170 verbal behavior milestones across three developmental levels (birth-18 months, 18-30 months, 30-48 months) and 16 different domains (i.e., verbal operants and related areas).

2. Barriers assessment examines 24 common learning and language barriers faced by children with autism.

3. Transition assessment uses 18 different measures to evaluate a child's ability to learn in a less restrictive educational environment.

4. Skills task analysis and tracking provides a further breakdown of the skills within different domains.

5. Placement and IEP goals provides recommendations for program development for children based on their VB-MAPP profiles, and their specific scores for each of the 170 milestones and the 24 Barriers. In addition, over 200 IEP objectives directly linked to the skills, and barriers assessments and a verbal behavior intervention program are provided.

VB-MAPP: Milestones Assessment

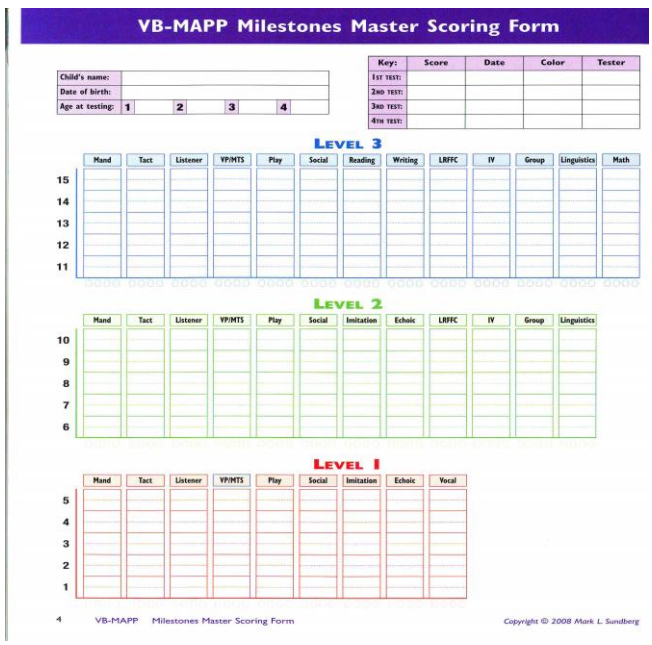
- An assessment designed to provide a representative sample of a child's existing verbal and related skills.
- The goal of assessment is to determine the specific skills that are present or absent in a child's language and related repertoires (e.g., tacting verbs, manding for information, social interaction with peers) by assessing performance on developmental milestones.
- Suggested milestones were selected and sequenced by averaging the milestones from over 50 developmental charts.
- The milestones were then reclassified in terms of Skinner's analysis of verbal behavior.

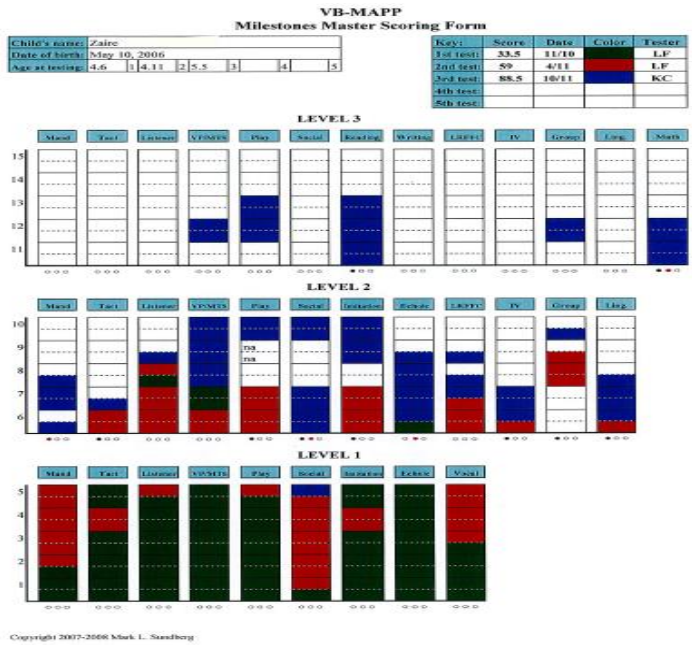
VB-MAPP: Milestones Assessment

Milestones are assessed across 16 domains:

- **Mand**
- **Tact**
- **Echoic (EESA Subtest)**
- **Intraverbal**
- **Listener Responding**
- **Motor Imitation**
- **Math**
- **Independent Play**
- **Social Behavior and Social Play**
- **Visual Perceptual and Matching-to-Sample**
- **Classroom Routines and Group Skills**
- **Linguistic Structure**
- **Reading**
- **Listener Responding by Function, Feature and Class (LRFFC)**
- **Writing**
- **Vocal**

- The 16 skill domains are presented in a developmental sequence that is broken down across three levels. The levels are designed to approximately correspond with the learning and language skills demonstrated by a typically developing child.
  - Level 1 – 9 measures; birth to 18 months of age.
  - Level 2 – 12 measures; 18 to 30 months of age.
  - Level 3 – 13 measures; 30 to 48 months of age.





VB-MAPP - ABLLS

Milestones Assessment: Level 1 (0-18 months)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

Protocol Book - Page 6

Mand

TOTAL SCORE: 5 5

Assessment 1st	2nd	3rd	4th
5	5		

Does the child use words, signs, or pictures to ask for desired items or activities?

1st	2nd	3rd	4th	
1	1			1. Emits 2 words, signs, or PECS, but may require echoic, imitative, or other prompts but no physical prompts (e.g., *cracker, book*) **(E)**
1	1			2. Emits 4 different mands without prompts (except *What do you want?*) — the desired item can be present (e.g., *music, slinky, ball*) **(T)**
1	1			3. Generalizes 6 mands across 2 people, 2 settings, and 2 different examples of a reinforcer (e.g., mands *bubbles* from mom and dad, inside and outside, a red bottle and a blue bottle) **(E)**
1	1			4. Spontaneously emits (no verbal prompts) 5 mands — the desired item can be present **(TO: 60 min.)**
1	1			5. Emits 10 different mands without prompts (except, *What do you want?*) — the desired item can be present (e.g., *apple, swing, car, juice*) **(E)**

Comments/notes:

TACT

TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th
4½	4½		

Does the child tact nouns and verbs?

1st	2nd	3rd	4th		
1	1			6.	Tacts 25 items when asked, *What's that?* (e.g., *book, shoe, car, dog, hat*) **(T)**
1	1			7.	Generalizes tacts across 3 examples of 50 items, tested or from a list of known generalizations (e.g., tacts 3 different cars) **(T)**
1	1			8.	Tacts 10 actions when asked, for example, *What am I doing?* (e.g., *jumping, sleeping, eating*) **(T)**
½	½			9.	Tacts 50 two-component verb-noun or noun-verb combinations, tested or from a list of known two-component tacts (e.g., *washing face, Joe swinging, baby sleeping*) **(T)**
1	1			10.	Tacts a total of 200 nouns and/or verbs (or other parts of speech), tested or from an accumulated list of known tacts **(T)**

Comments/notes:

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INTRAVERBAL

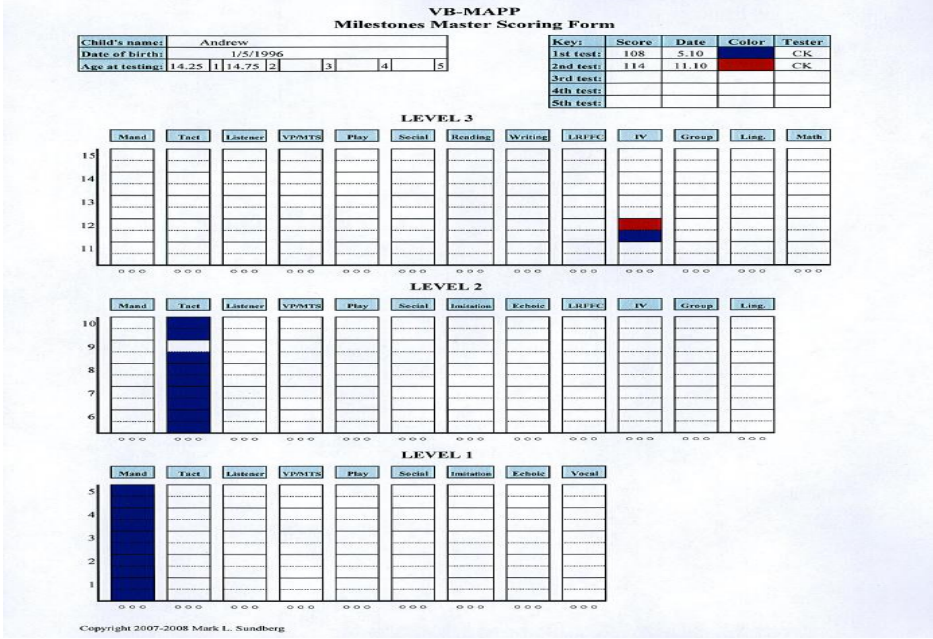
TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th
½	1		

Does the child verbally respond to the content of the words of others?

1st	2nd	3rd	4th		
0	0			11.	Spontaneously emits 20 intraverbal comments (can be part mand) (e.g., Dad says, *I'm going to the car,* and the child spontaneously says, *I want to go for a ride!*) **(O)**
½	1			12.	Demonstrates 300 different intraverbal responses, tested or obtained from an accumulated list of known intraverbals **(T)**
0	0			13.	Answers 2 questions after being read short passages (15+ words) from books, for 25 passages (e.g., *Who blew the house down?*) **(T)**
0	0			14.	Describes 25 different events, videos, stories, etc. with 8+ words (e.g., *Tell me what happened... The big monster scared everybody and they all ran into the house.*) **(E)**
0	0			15.	Answers 4 different rotating WH questions about a single topic for 10 topics (e.g., *Who takes you to school? Where do you go to school? What do you take to school?*) **(T)**

Comments/notes:



Barriers Assessment

- Once a specific barrier is identified a more detailed descriptive and/or functional analysis of that problem is required.

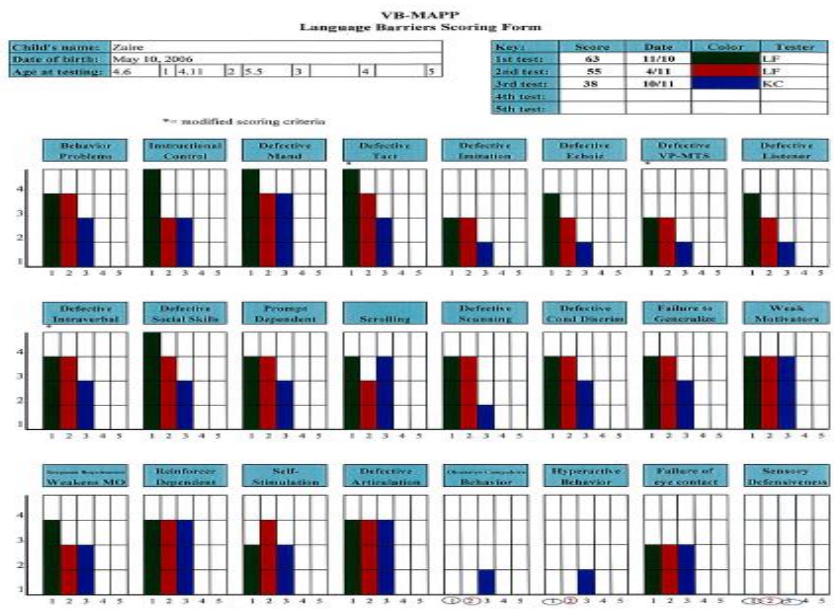
- Following the functional analysis of the barrier, an individualized intervention program needs to be designed and implemented by a qualified professional.

VB-MAPP Barriers Assessment

•Because language and learning barriers can interfere with the effectiveness of instruction, it is important to find out not only what a child can do (The VB-MAPP Milestones Assessment), but also to find out what they cannot do and analyze why they cannot do it.

•The VB-MAPP Barriers Assessment provides a way to identify which barriers or combination of barriers might be interfering with learning across 24 common learning and language acquisition barriers:

- **Behavior problems**
- **Instructional control**
- **Defective mand**
- **Defective tact**
- **Defective echoic**
- **Defective imitation**
- **Defective VP-MTS**
- **Defective listener**
- **Defective intraverbal**
- **Defective social skills**
- **Prompt dependent**
- **Scrolling**
- **Defective scanning**
- **Defective conditional discriminations**
- **Failure to generalize**
- **Weak motivators**
- **Response requirement weakens MO**
- **Reinforcer dependent**
- **Self-stimulation**
- **Defective articulation**
- **Obsessive-compulsive behavior**
- **Hyperactive behavior**
- **Failure to make eye contact**
- **Sensory defensiveness**



VB-MAPP Barriers Assessment

0 = No problem; **1** = Occasional problem; **2** = Moderate problem; **3** = Persisent problem **4** = Severe problem

1. Negative Behaviors

Assessment	1st	2nd	3rd	4th
Score:	4	3	2	

0. Does not demonstrate any significant negative behaviors
1. Engages in some minor negative behaviors weekly, but recovery is quick
2. Emits a variety of minor negative behaviors daily (e.g., crying, verbal refusal, falling to the floor)
3. Emits more severe negative behavior daily (e.g., tantrums, throwing things, property destruction)
4. Often emits severe negative behavior that is a danger to himself or others (e.g., aggression, self-injury)

2. Instructional Control (Escape and Avoidance of Instructional Demands)

Assessment	1st	2nd	3rd	4th
Score:	3	2	2	

0. Typically cooperative with adult instructions and demands
1. Some demands will evoke minor noncompliant behavior, but recovery is quick
2. Emits noncompliant behavior a few times a day, with minor tantrums, or other minor behaviors
3. Emits noncompliant behavior several times a day, with longer tantrums and more severe behaviors
4. Noncompliant behavior dominates the child's day, negative behaviors can be severe and dangerous

3. Absent, Weak, or Defective Mand Repertoire

Assessment	1st	2nd	3rd	4th
Score:	3	2	2	

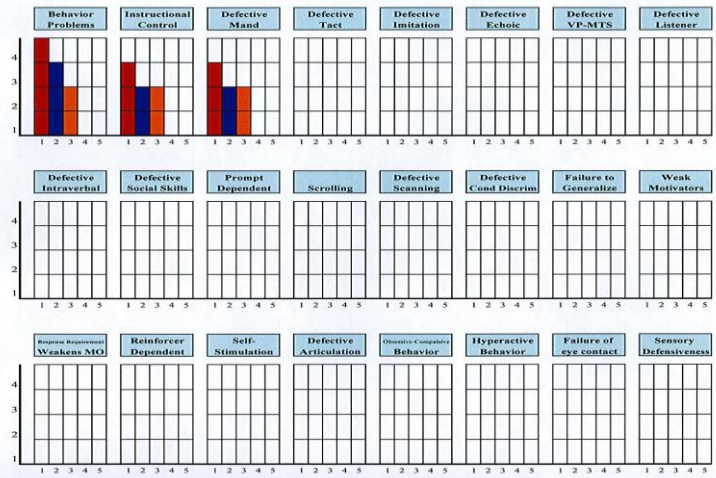
0. The mand repertoire is growing consistently and is in proportion with the other Milestones
1. Mands occur, echoics are strong, but the tact and listener skills (LDs) Milestone scores are higher than the mand
2. Mands are limited to a small set of consumable reinforcers, despite strong tacts, LDs, and echoic skills
3. Mands are very limited, are prompt bound, are rote, scrolling occurs, responses do not match the motivating operations (MOs), negative behaviors function as mands, excessive or inappropriate mands occur
4. No effective mands, associated negative behaviors, same problems in #3 above may occur

193

VB-MAPP Language Barriers Scoring Form

Child's name:	Kaitlin
Date of birth:	7/19/1999
Age at testing:	10.3 | 1 | 10.11 | 2 | 11.6 | 3 | | 4 | | 5

Key:	Score	Date	Color	Tester
1st test:		11/09		CM
2nd test:		7/10		JS
3rd test:		1/11		JS
4th test:				
5th test:				



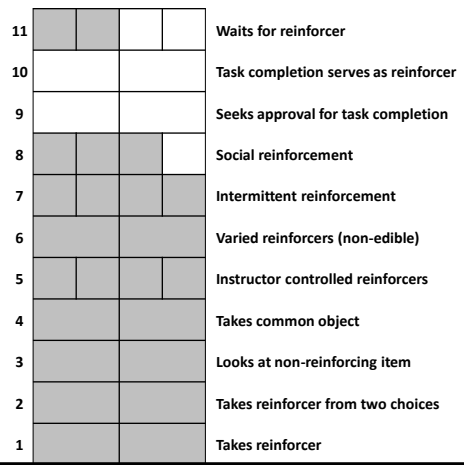
194

ABLLS Information

- On the next few slides is a list of skills similar to those in the VB MAPP.
- This list provides a description on just a few slides of the types of skills assessment by the VB-MAPP.
- One of the advantages of the VB-MAPP is that it provides the breakdown of skills by age ranges.

ABLLS LANGUAGE SKILLS SEQUENCE - COOPERATION

A



ABLLS LANGUAGE SKILLS SEQUENCE – VISUAL PERFORMANCE

B

21	Mazes
20	Picture sequence
19	Seriation
18	Replicate simple 3-D objects
17	Extend a sequence pattern
16	Delayed finding sample
15	Delayed replication of sequence
14	Jigsaw puzzle
13	Juxtaposed puzzle
12	Square-edged border frame
11	Inset frame connect pieces
10	Inset puzzle
9	Form box
8	Sequence pattern to match visual model
7	Block designs from picture card
6	Block designs on picture card
5	Sort non-identical items in categories
4	Match object to picture
3	Match picture to object
2	Match identical pictures
1	Match identical objects

ABLLS LANGUAGE SKILLS SEQUENCE – RECEPTIVE LANGUAGE

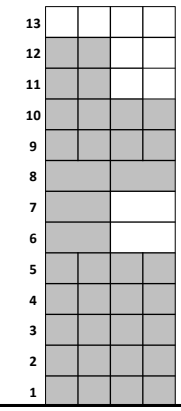
C

28	Give item to person or place
27	Follow instructions to go to a person
26	Select two pictures from a larger set
25	Select two objects from a larger set
24	Select one of three or more pictures
23	Select one of three or more objects
22	Select by class
21	Select by feature
20	Select by function
19	Touch own piece of clothing
18	Point to or touch body parts on others
17	Point to or touch own body parts
16	Varied instructions to select any response
15	Select one of two pictures of common objects
14	Select one of two common objects
13	Select one of two reinforcers
12	Select reinforcing items from two objects
11	Follow instructions to touch items vs. distracters
10	Follow instructions to perform simple motor actions
9	Gives non-reinforcing items
8	Follow instructions in a routine situation
7	Follow instructions to perform an action out of context
6	Follow instructions to touch common item in various places
5	Follow instructions to touch reinforcing items in various places
4	Follow instructions to look at a common item
3	Follow instructions to look at a reinforcing item
2	Follow instructions to perform an enjoyable activity in context
1	Responds to own name

52	Pictures of social interactions
51	Pictures of emotions
50	Selects pictures of locations or activities
49	Selects non-examples
48	Pronouns
47	Prepositions
46	Same/different
45	Selects items in a sequence
44	Association pictures
43	Selects multiple items w/ 2 adjectives
42	Selects multiple items w/ spec adjectives
41	Selects w/ 2 adjectives
40	Selects adjectives
39	Common environmental sounds
38	Locates objects when only parts are shown
37	Locates objects in a larger picture
36	Selects community helpers
35	Acquires new selections with no training
34	Selects one of three pictures-actions
33	Dem. specific pretend action
32	Dem. Specific action w/ obj in discrim
31	Specific motor response
30	Go to person do action
29	Go to person get object

ABLLS LANGUAGE SKILLS SEQUENCE – MOTOR IMITATION

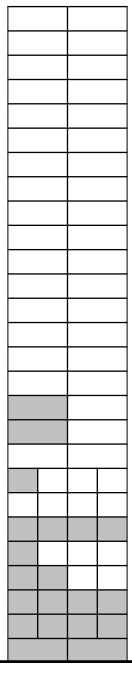
D



13	Delayed imitation
12	Spontaneous imitation of others
11	Imitation with no verbal prompt
10	Imitation of a sequence of actions
9	Imitation of fine motor movements
8	Imitation of a speed of an action
7	Imitation of mouth and tongue movements
6	Imitation of head movements
5	Imitation of arm and hand movements
4	Imitation of leg and foot movements
3	Imitation of gross motor
2	Imitation w/ objects in discrimination
1	Imitation using objects

ABLLS LANGUAGE SKILLS SEQUENCE – MANDING

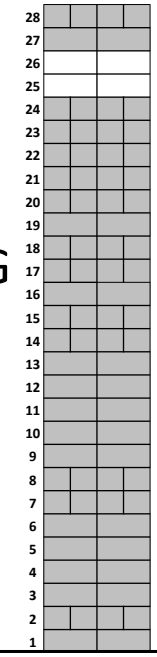
F



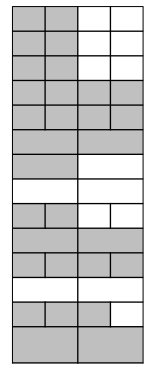
27	Spontaneous requests
26	Acquires novel requests w/o training
25	Requests using pronouns
24	Requests using adverbs
23	Requests using prepositions
22	Requests using adjectives
21	Requests future items/events
20	Requests info using “why”
19	Requests info using “can/does/will”
18	Requests info using “how”
17	Requests info using “when”
16	Requests info using “which”
15	Requests info using “who/whose”
14	Requests info using “where”
13	Requests info using “what”
12	Requests to remove or stop
11	Requests help
10	Requests using sentences
9	Requests using yes and no
8	Requests missing items
7	Requests attention
6	Requests others to perform action
5	Spontaneous requests
4	No reinforcer present + “what do you want”
3	Requests w/ reinforcer present “what do you want”
2	Requests w/ reinforcer present and verbal prompt
1	Requests by indicating

ABLLS LANGUAGE SKILLS SEQUENCE – TACTING

G



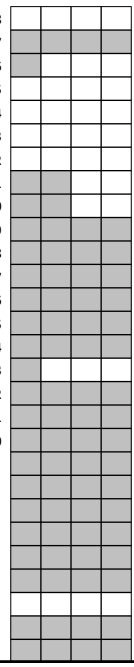
28 Environmental sounds
27 Community helpers
26 Noun + adj
25 Noun + verb
24 Two component w/ carrier phrases
23 Two component labels w/ pic
22 Two component labels w/ object
21 Identifies obvious problems
20 Labels exclusion from category
19 Label features with are missing or wrong
18 Labels using yes / no
17 Labels class of a set of items
16 Labels class of an object
15 Labels function of item
14 Labels item when told its class
13 Labels item when told feature
12 Labels item when told function
11 Labels adjective
10 Labels parts and features of objects
9 Labels body parts
8 Labels using carrier phrases
7 Acquires novel labels
6 Labels actions in picture
5 Labels ongoing actions
4 Labels pictures of common items
3 Labels familiar people
2 Labels common objects
1 Labels reinforcers



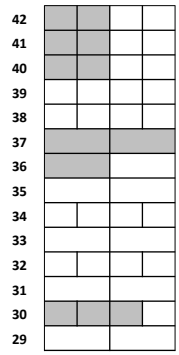
42
41
40 Internal events and emotions
39 Labels emotions of others
38 Labels adverbs
37 Labels parts of scenes
36 Labels and describe scenes
35 Three component label + carrier
34 Three component labeling
33 Pronouns + carrier
32 Labels pronouns
31 Prepositions + carrier
30 Prepositions
29 Carrier phrase w/ noun, w/ verb, w/ adj

ABLLS LANGUAGE SKILLS SEQUENCE – INTRAVERBAL

H



28 Answers "yes/no/can/does/will" ques
27 States item when told feat, func, class
26 States activity when given sequence
25 Describes sequence of steps of activity
24 Makes related statements to vis display
23 Answers "why" questions
22 Answers "how" questions
21 Answers "when" questions
20 Answers "which" questions
19 Answers "who/whose" questions
18 Name items previously observed
17 Answers "where" questions
16 Answers "what" questions
15 Opposites
14 States class given mult examples
13 Mult responses given category
12 Fill in item given class
11 Fill in class given item
10 Fill in item given features
9 Fill in features given item
8 Fill in function given item
7 Fill in item given function
6 Fill-ins about common activities
5 Personal info
4 Animal sounds
3
2 Fill-ins about fun activities
1 Fill-ins from songs



42 Tell stories
41 Spontaneous conversation
40 Answers novel questions
39 Maintains conversation peer/adult
38 Mult response to academic ques
37 Single response to academic ques
36 Mult response current events
35 Single response current events
34 Mult response comm events
33 Single response comm events
32 Past and upcoming events
31 Before and after steps in sequence
30 Mult responses given three stimuli
29 Mult responses given two stimuli

Discrete Trial Instruction

- Discrete trial instruction (DTI) has been demonstrated to be an effective method of treatment and education for persons with autism (Smith, 2001).
- The instructional method includes a teacher presenting instructional material in a precise and sequenced manner so that it evokes frequent responses to the material by the learner.
- Following each learner response the teacher presents a consequence that usually takes the form of some type of feedback that either indicates the responses are correct or incorrect.
- Correct responses usually result in a suspected form of reinforcement to strengthen the responses.

- Following incorrect responses the teacher provides feedback indicating an error and usually conducts an error correction procedure.
- The instructional demands could be in the form of presentation of verbal responses of the teacher (What is it? Touch your nose, etc.), nonverbal stimuli (pictures, objects to match), or some combination of both (Tell me which one you drink from).

WHAT SKILLS ARE TAUGHT USING DTI ?

- DTI instruction can be used to teach almost any skill in any environment.
- In this context we are talking about teaching skills that are representative of the core deficits of persons with autism.

The skills taught during DTI at an instructional table usually include the following:

1. listener behavior (commands and selection)
2. tacting (labeling)
3. motor imitation
4. visual performance (matching, sorting, etc)
5. intraverbal behavior (responding to what is said)
6. echoic responses

- For our purposes today we are specifically discussing DTI in the context of presentation of instructional demands by an instructor at a table during one on one instruction.

Identifying Skills Taught During DTI

- Let's first do a quick quiz on identifying the verbal and non-verbal skills that will be taught mainly during discrete trial instruction.
- Then we will look at some video to identify the skills to be taught during discrete trial instruction.

MVB Folder and open to
1.VB Operants Quiz in Id operants folder
Identify Verbal Operants --- 2. Sylvia & 3. Katy

TEACHING PROCEDURES

OVERVIEW

- Teaching target skills
- Transfer of stimulus control for teaching target skills
- Error correction procedure

Prompting and Prompt Fading Procedures

- Prompts
  - Something done to increase the likelihood that a person will emit the correct behavior at the correct time; can be response or stimulus.
- Response prompts
  - Vocal prompts (least intrusive): Vocal verbal behavior of another person results in the correct response in the presence of the S^D.
  - Gestural prompts (moderately low): Any movement or gesture of another person that leads to the correct response in the presence of the S^D.
  - Modeling prompts (moderately high): Any demonstration of correct behavior by another person that makes it more likely the correct behavior will occur at the right time. A person observes the model and imitates the modeled behavior to make the correct response in the presence of the S^D.
  - Physical prompts (most intrusive): Another person physically assists another person to engage in the correct behavior at the right time.
- Fading Prompts
  - The gradual removal of prompts as the behavior continues to occur in the presence of the S^D with the goal of transferring stimulus control to the naturally occurring S^D.

TEACHING TARGET SKILLS
(ERRORLESS TEACHING PROCEDURES)

Errorless teaching procedures are used to ensure learners emit high rates of correct responding. One example is a time delay procedure.

1. **Prompt:** Present the instructional demand and prompt immediately (0-second time delay).
2. **Transfer:** Re-present the instructional demand and introduce a time delay of 2-3 seconds before prompting and/or fade some dimension of the prompt (e.g., fade from a physical to a gestural prompt, use a phonemic prompt instead of a full word, decrease physical guidance) = "transfer trial."
3. **Distracters:** Require 1-3 easy, mastered responses.
4. **Probe (TEST):** Re-present the instructional demand and further fade the prompt or probe by waiting 3 seconds for the response to occur.
5. **Reinforce:** Differentially reinforce as appropriate.

Video - Teaching

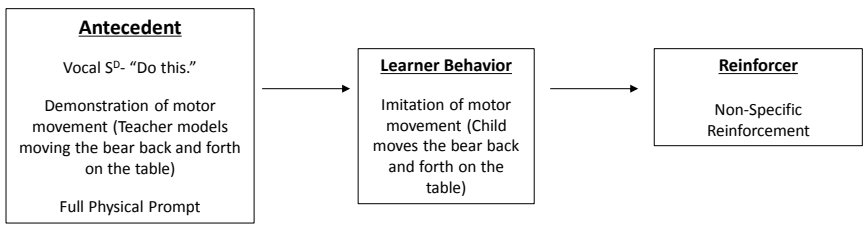
TEACHING VERBAL & NON VERBAL OPERANTS

- The goal is to transfer responding across operants by transferring stimulus control of the responses from one antecedent stimulus to another.
- Use previously established responses from one operant (e.g., echoic) to teach new responses as another operant (e.g., tact).

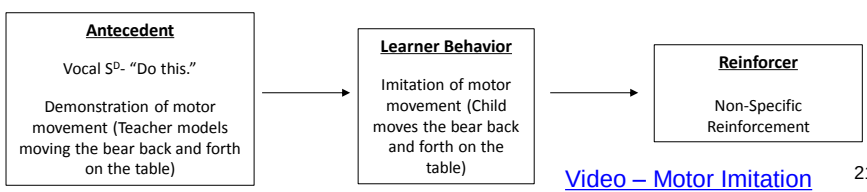
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Mimetic**
  - Transfer of stimulus control from the full physical prompt to the demonstration of the motor movement (modeled stimulus).

Prompt:



Transfer of stimulus control:

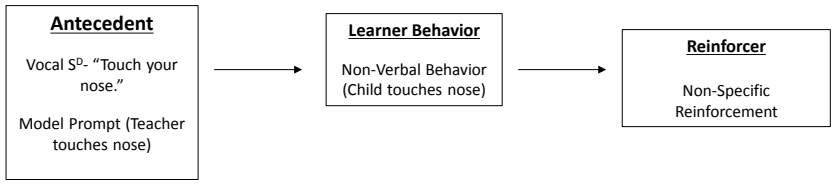


Video – Motor Imitation

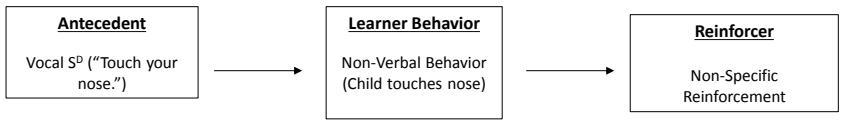
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Listener Responding: Listener Command**
  - Teach using mimetic to listener transfer procedure
  - Transfer of stimulus control from the model prompt to the vocal S^D

Prompt:



Transfer of stimulus control:

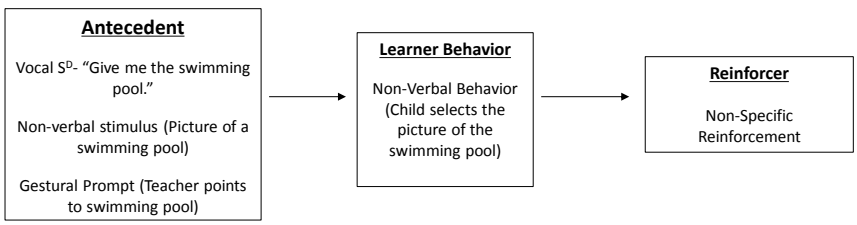


Video – Listener Responding

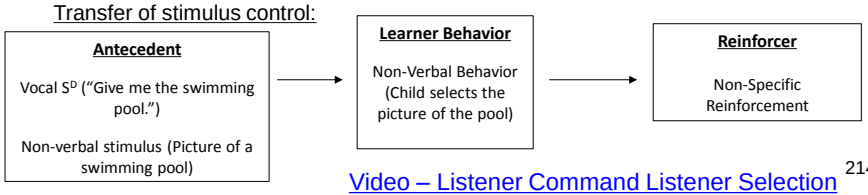
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Listener Responding: Listener Selection**
  - Transfer of stimulus control from the gestural prompt to the vocal S^D and the non-verbal stimulus.

Prompt:



Transfer of stimulus control:



Video – Listener Command Listener Selection

TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Listener Responding by Feature Function Class**
  - Transfer of stimulus control from gestural prompt to the vocal S^D and non-verbal stimulus

Prompt:

Antecedent	→	Learner Behavior	→	Reinforcer
Vocal S^D- "Give me the one you eat." Non-verbal stimulus (Picture of a chip) Gestural Prompt (Teacher points to chip)		Non-Verbal Behavior (Child selects chip)		Non-Specific Reinforcement

Transfer of stimulus control:

Antecedent	→	Learner Behavior	→	Reinforcer
Vocal S^D ("Give me the one you eat.") Non-verbal stimulus (Picture of a chip)		Non-Verbal Behavior (Child selects chip)		Non-Specific Reinforcement

Video - LRFFC

TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Tact (Vocal)**
  - Teach using echoic to tact transfer procedure
  - Transfer stimulus control from the vocal prompt (echoic model) to the non-verbal stimulus

Prompt:

Antecedent	→	Learner Behavior	→	Reinforcer
Vocal S^D- "What is it?" Non-verbal Stimulus (Body Part-Ears) Vocal Prompt (Teacher says "Ears")		Vocal Verbal Behavior (Child says "Ears")		Non-Specific Reinforcement

Transfer of stimulus control:

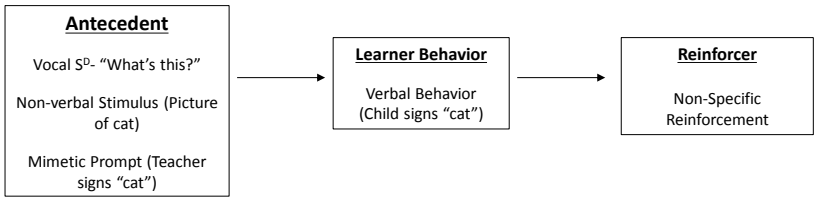
Antecedent	→	Learner Behavior	→	Reinforcer
Vocal S^D- "What is it?" Non-verbal Stimulus (Body Part-Ears)		Vocal Verbal Behavior (Child says "Ears")		Non-Specific Reinforcement

Video - Tact (vocal)

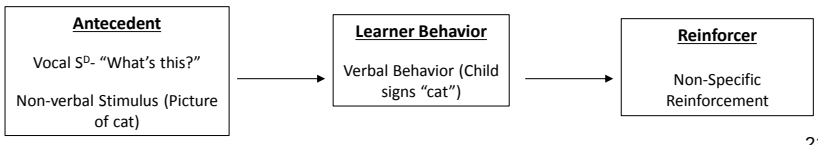
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Tact (Sign)**
  - Teach using mimetic to tact transfer procedure
  - Transfer stimulus control from the mimetic prompt (gesture model) to the non-verbal stimulus

Prompt:



Transfer of stimulus control:

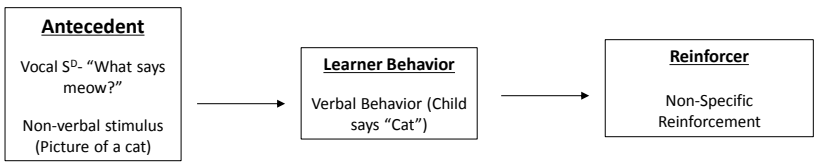


Video - Tact (Sign)

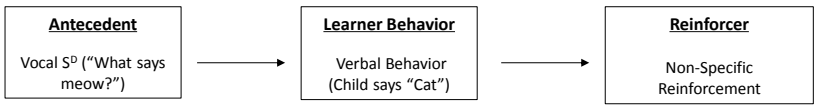
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

- **Intraverbal (Vocal)**
  - Teach using tact to intraverbal transfer procedure
  - Transfer of stimulus control from the non-verbal stimulus to the vocal S^D

Prompt:



Transfer of stimulus control:



Video – Intraverbal 1

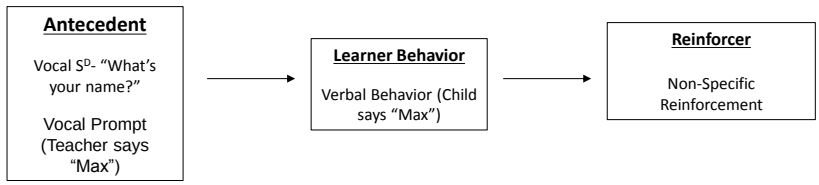
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

Intraverbal (Vocal)

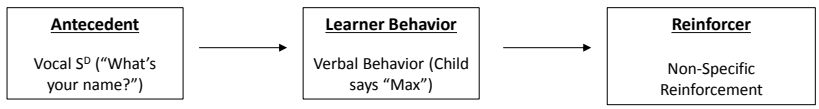
Teach using echoic to intraverbal transfer procedure

Transfer of stimulus control from the vocal prompt (echoic model) to the vocal S^D

Prompt:



Transfer of stimulus control:



Video – Intraverbal 2

Intraverbal 3

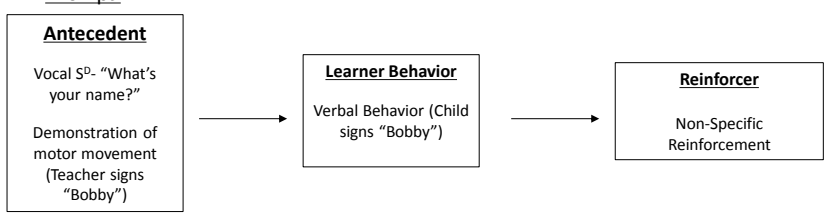
TRANSFER OF STIMULUS CONTROL FOR TEACHING TARGET SKILLS

Intraverbal (Sign)

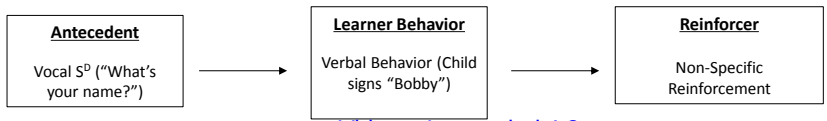
Teach using mimetic to intraverbal transfer procedure

Transfer of stimulus control from the mimetic prompt (motor movement) to the vocal S^D

Prompt:



Transfer of stimulus control:



Video – Intraverbal 4 3

ERROR CORRECTION PROCEDURES

DEFINING INCORRECT RESPONSES

An error (i.e., incorrect response) occurs when the learner:

1. Emits a response not scheduled for reinforcement (i.e., wrong answer)
2. Chains two or more responses together (i.e., self-corrections)
3. Fails to respond within 2-3 seconds following the presentation of the demand (i.e., long latency)

- Errors may be emitted for both current acquisition skills and previously mastered skills targets.
- Errors may also be emitted during teaching sequences (e.g., during prompted trials, during transfer trials, or on probes).
- The same error correction procedure should be implemented regardless of when the error is emitted.

ERROR CORRECTION

If the learner emits an incorrect response at any time use the following error correction procedure.

1. **Prompt:** Immediately following the error, re-present the instructional demand and prompt immediately (0-second time delay).
2. **Transfer:** Re-present the instructional demand and introduce a time delay of 2-3 seconds before prompting and/or fade some dimension of the prompt (e.g., fade from a physical to a gestural prompt, use a phonemic prompt instead of a full word, decrease physical guidance) = "transfer trial."
3. **Distracters:** Require 1-3 easy, mastered responses.
4. **Probe:** the instructional demand and further fade the prompt or probe by waiting 3 seconds for the response to occur.
5. **Reinforce:** Differentially reinforce as appropriate.

procedures may be adjusted according to individual learner responding

Video – Error Correction

DECLAN- 3A- Shows Everything Just Discussed

References

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). Applied behavior analysis (2nd ed.). Upper Saddle River, NJ: Pearson.

Miltenberger, R. (2004). Behavior modification: principles and procedures (3rd ed.). New York, NY: Wadsworth Inc.

TEACHING LEARNER COOPERATION DURING DISCRETE TRIAL INSTRUCTION

- Many learners with autism have learned to escape and avoid during DTI.
- This problem can lead to slow progress and the development of few skills even in learners who would be capable of a good outcome.
- What follows is a discussion of how to reduce learner escape and avoidance behavior during discrete trial instruction.

Jack -CMO-R (Part 1)

PLAY Jack Video – Play until just before Treatment and then go to NEXT SEVERAL SLIDES

TREATMENT CHOICES

- Differential reinforcement + extinction
- Functional communication training (FCT) + extinction
- Abolish the conditioned reflexive motivating operation (CMO-R)

Discriminated Avoidance Experiment

In Chamber for 1 minute → Tone On (10 Seconds) → Shock

Lever Press → Tone Off & Shock Off

One Minute ITI → Tone On (10 Seconds) → Shock

Eventually…

Eventually…

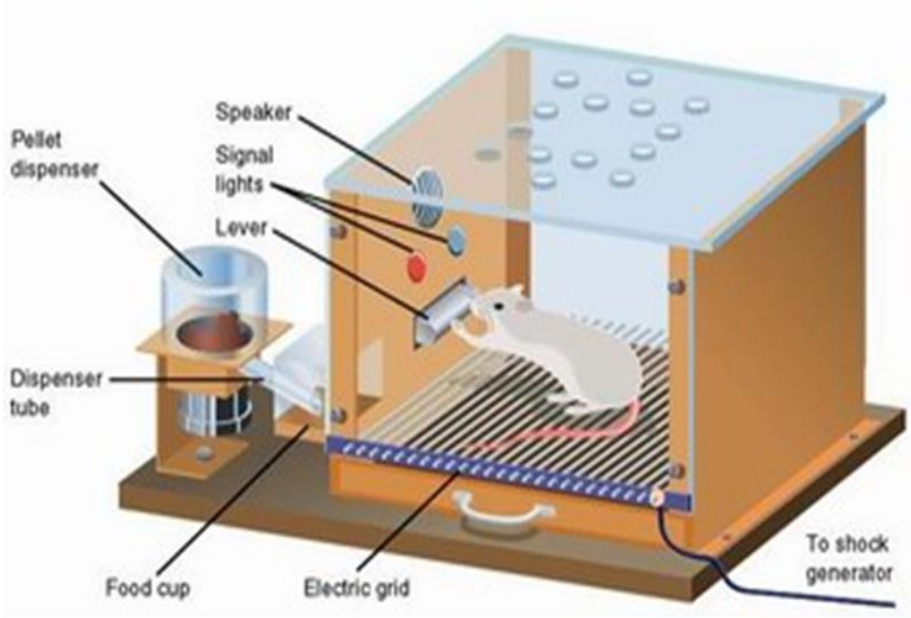
One Minute ITI → Tone On → Lever Press → Tone OFF/No Shock

THEN

One Minute ITI → Tone On → Lever Press → Tone OFF/No Shock

This response pattern continually repeats over time…

EVENTUALLY



229

DEVELOPMENT OF THE CMO-R IN THE LABORATORY

(Conditioned Reflexive Motivating Operation)

Neutral Stimulus		**"Painful Stimulation"**		**Effects**
(Tone) Presentation of Stimulus, Object or Event	Time →	**(Shock)** Worsening Set of Conditions	=	Termination of Worsening Condition is a Reinforcer & Evokes Behavior That Has Been So Reinforced

After repeated correlations of the above sequence…

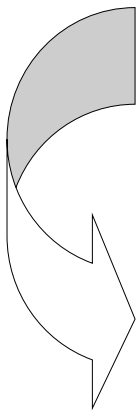
Warning Stimulus (CMO-R)		**Effects**
(Tone) Presentation of Stimulus, Object or Event	=	Establishes Termination of Warning Stimulus (tone) as a Reinforcer and Evokes Behavior That Has Led to its Termination

230

DEVELOPMENT OF THE CMO-R IN THE CLASSROOM

(Conditioned Reflexive Motivating Operation)

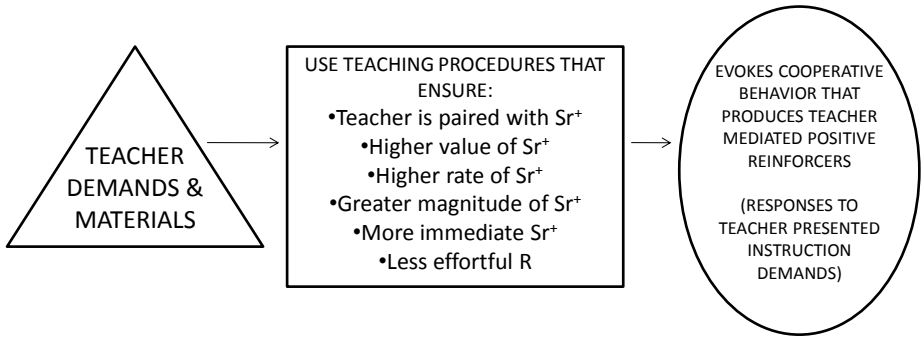
Neutral Stimulus		"Painful Stimulation"		Effects
		Worsening Set of Conditions		
Presentation of Instructional Demands, Instructional Materials and Presence of Teacher	Time →	• Session Begins with Removal of Positive Reinforcement • Low value Positive Reinforcement •Frequent Social Disapproval •Effortful Responses Required •Difficult Responses Required •High Rate of Demands •Frequent Learner Errors •Delayed Positive Reinforcement •Low magnitude Positive Reinforcement	=	Termination of Worsening Condition is a Reinforcer & Evokes Behavior That Has Been so Reinforced



After repeated correlations of the above sequence…

Warning Stimulus (CMO-R)		Effects
Presentation of Instructional Demands, Instructional Materials and Presence of Teacher	=	Establishes Termination of the Warning Stimuli as a Reinforcer and Evokes all Responses That Have Led to Their Removal

ABOLISHING THE CMO-R



Jack CMO-R- Part 2
Jack MVB

Britt
Josh Video
Josh Picture

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Focus on Autism and Other Developmental Disabilities
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The Role of the Reflexive-Conditioned Motivating Operation (CMO-R) During Discrete Trial Instruction of Children With Autism

Vincent J. Carbone,[1] Barry Morgenstern,[2] Gina Zecchin-Tirri,[3] and Laura Kolberg[3]

Abstract

The principle of motivation has resurfaced as an independent variable in the field of behavior analysis over the past 20 years. The increased interest is the result of refinements of the concept of the motivating operation and its application to the learning needs of persons with developmental disabilities. Notwithstanding the increased emphasis upon modification of motivating operations to reduce problem behavior, there is limited recognition of this important behavioral variable in autism treatment literature. An overview of antecedent-based instructional modifications that lead to a reduction of escape and avoidance behavior of children with autism during instruction is provided. An analysis of these instructional methods as motivating operations is proposed. A conceptually systematic analysis of the influence of instructional methods is offered as a tool for improving the selection and implementation of effective teaching procedures.

Keywords

motivating operations, establishing operations, autism, escape and avoidance behavior, discrete trial instruction

EFFECTIVE TEACHING PROCEDURES

ABOLISHING THE CMO-R

TEACHING METHODS	YES	NO	COMMENTS
1. Present competing positive reinforcement (Abolishing Operation)			DAVID VIDEO
2. Fade in number of demands			Bobby Ext
3. Fade in effort and difficulty of responses (low effort responses at first and then increase difficulty)			SIMPLE TO COMPLEX VIDEOS
4. Intersperse easy and hard tasks			Giving Up
5. Mix and vary tasks			Reinforcers Naryan
6. Reduce learner errors (use errorless teaching methods)			Josh L.
7. Extinction of off-task responses			
8. Immediately deliver reinforcement			
9. Initially use shortest inter-trial interval (ITI) needed and possible			

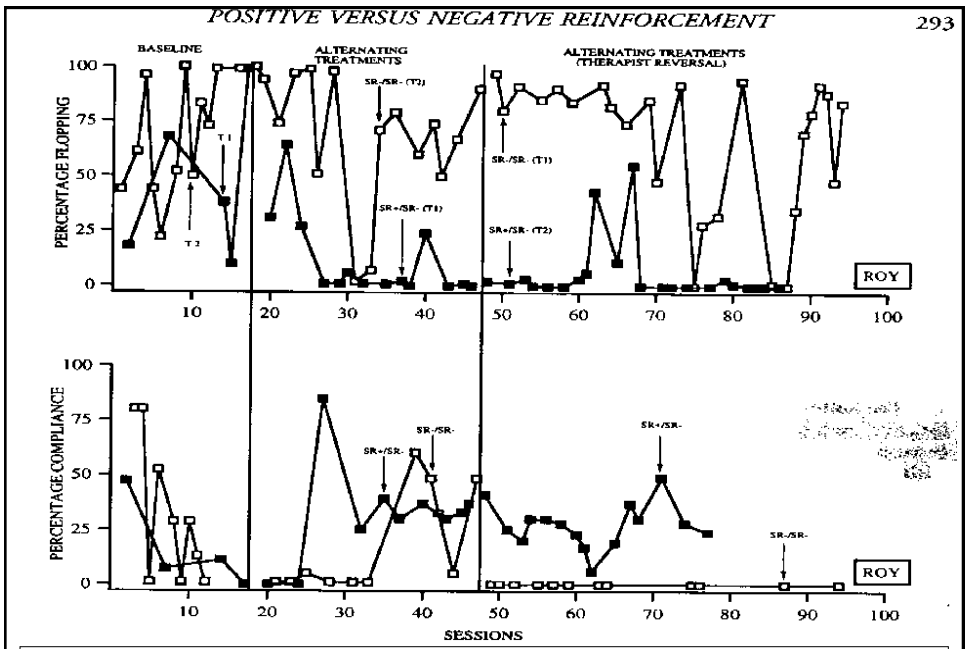
SUPPORTING RESEARCH

Curricular Revisions

1. **Pair teaching environments with reinforcement and use competing reinforcers.**

Initially, correlate the teaching environment with highly valuable and high-density reinforcement relative to the conditions that have typically been interrupted at the start of teaching sessions.

(De Leon, et al., 2001; Fisher & Mazur, 1997; Harding, et al., 1999; Hoch, H., McComas, J. J., Thompson, A. L., & Paone, D., 2002; Lalli, et al., 1999; Lalli & Casey, 1996; Michael, 1993; Piazza, et al., 1997)



Lalli, J. S., Vollmer, T. R., Progar, P. R., Wright, C., Borrero, J., Tocco, K., et al. (1999). Competition between positive and negative reinforcement schedules in the treatment of escape-maintained problem behaviors. *Journal of Applied Behavior Analysis, 32*, 285-296.

237

SUPPORTING RESEARCH

Curricular Revisions

2. <u>Mix and vary instructional demands.</u>

Presenting instructional demands in which the stimuli and response requirements vary from trial to trial appear to reduce the value of escape as a reinforcer compared to massed trialling and constant task presentation.

(Dunlap, 1984; Dunlap and Koegel, 1984; Winterling, Dunlap, &O'Neil, 1987)

238

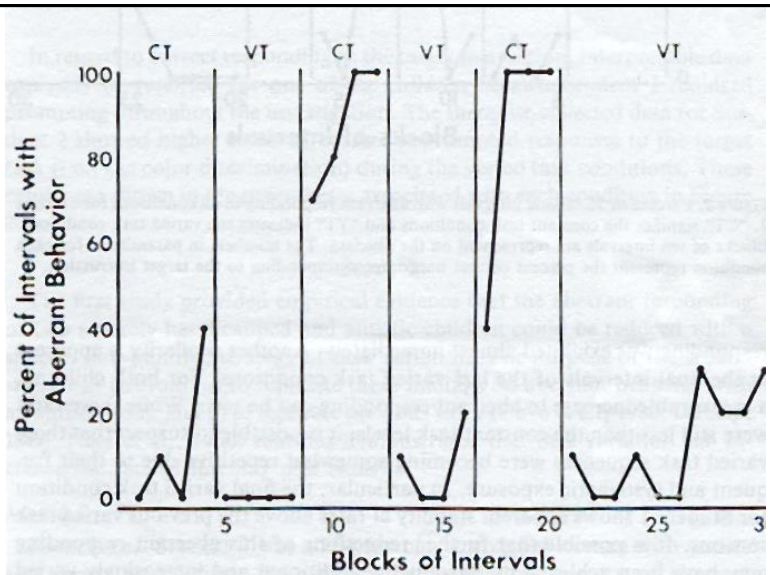


Figure 1. Percent of 15-second intervals with aberrant responding in all conditions for Studen
1. "CT" signifies the constant task conditions and "VT" indicates the varied task conditions

Winterling, V., Dunlap, G., & O'Neill, R. E. (1987). The influence of task variation on the aberrant behaviors of autistic students. *Education and Treatment of Children, 10,* 105-119.

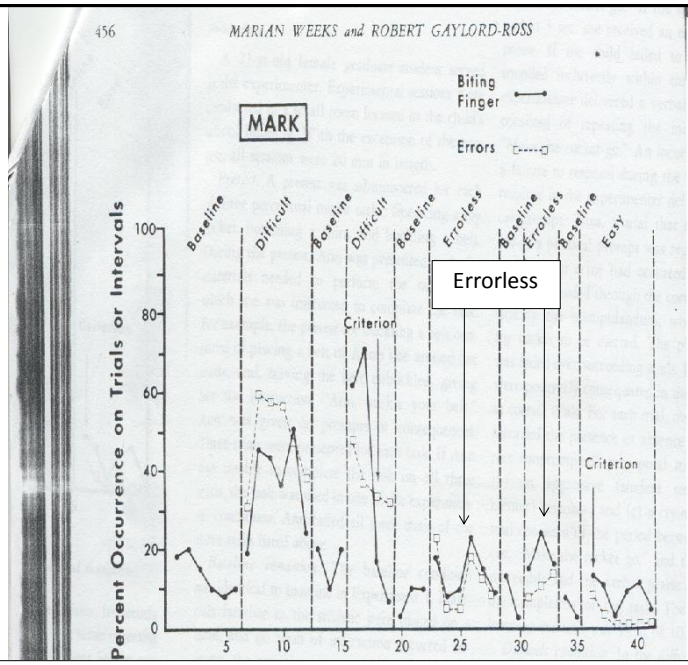
SUPPORTING RESEARCH

Curricular Revisions

3. <u>Reduce learner errors.</u>

Reduce student errors through teaching methods that ensure high levels of correct responding. These procedures will lower the value of escape-established reinforcement and will ensure that instructional demands are correlated with an improving set of conditions relative to a worsening set of conditions that results from frequent errors.

(Terrace, 1963; Sidman & Stoddard, 1966; Sailor, Guess, Rutherford, & Baer, 1968; Reese, Howard, & Rosenberger, 1977; Etzel & LeBlanc, 1979; Alltman, Hobbs, Roberts, & Haavik, 1980; Carr, Newsom, & Binkoff, 1980; Weeks & Gaylord-Ross, 1981; Touchette & Howard, 1984; Carr & Durand, 1985; Lancioni & Smeets, 1986; Woolery, Bailey, & Sugai, 1988; Durand, 1990; Horner & Day, 1991; Woolery, Ault, & Doyle, 1992; Cameron, Luiselli, McGrath, & Carlton, 1992; Cameron, Ainsleigh, & Bird, 1992; Sprague & Horner, 1992; Heckman, Alber, Hooper, & Heward, 1998; Smith & Iwata, 1997; Woolery, Ault, & Doyle, 1992)



Weeks, M. & Gaylord-Ross, R. (1981). Task difficulty and aberant behavior in severely handicapped students. *Journal of Applied Behavior Analysis, 14,* 449-463.

241

SUPPORTING RESEARCH

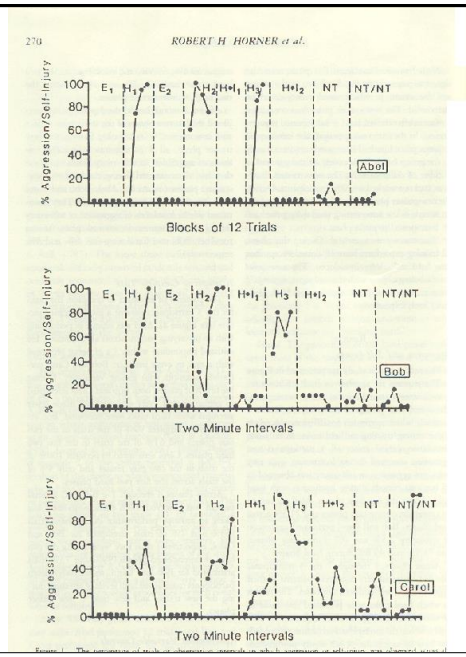
Curricular Revisions

4. <u>Intersperse easy and difficult demands.</u>

Interspersing "easy" tasks which result in correct responding and therefore are correlated with a higher density of reinforcement with relatively more "difficult" tasks will reduce problem behavior by reducing the value of escape as a reinforcer.

(Singer, Singer, & Horner, 1987; Mace, Hock, Lalli, West, Belfiore, Pinter, et al., 1988; Mace & Belfiore, 1990; Harchick & Putzier, 1990; Horner, Day, Sprague, O'Brien, & Healthfield, 1991; Zarcone, Iwata, Hughes, & Vollmer, 1993)

242



Horner, R. H., Day, H. M., Sprague, J. R., O'Brien, M., Tuesday-Heathfield, T. (1991). Interspersed requests: A nonaversive procedure for reducing aggression and self-injury during instruction. *Journal of Applied Behavior Analysis, 24,* 265-278.

243

SUPPORTING RESEARCH

Curricular Revisions

5. Fade in number of demands.

Present a low frequency of demands at first and fade in greater and greater response ratio requirements. Deliver extinction for problem behavior that occurs when the MO was not manipulated precisely so as to "abolish" problem behavior.

(Weld & Evans, 1990; Pace, Iwata, Cowdery, Andree, & McIntyre, 1993; Zaracone, Iwata, Vollmer, Jagtiani, Smith, & Mazaleski, 1993; Zarcone, Iwata, Smith, Mazaleski, &Lerman, 1994; Pace, Ivanic, & Jefferson, 1994; Piazza, Moes, & Fisher, 1996)

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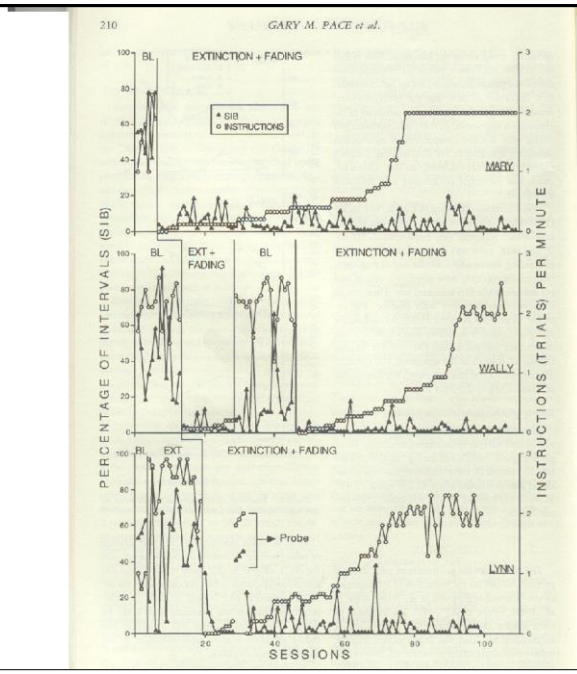


Pace, G. M., Iwata, B. A., Cowdery, G. E., Andree, P. J., & McIntyre, T. (1993). Stimulus (instructional) fading during extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis, 26,* 205-212.

SUPPORTING RESEARCH

Curricular Revisions

6. <u>Fade in effort/difficulty of tasks.</u>

Ensuring that the response being taught is the most efficient will reduce the shift in the value of reinforcement toward escape and evoke problem behavior.

(Wacker, Steege, Northup, Sasso, Berg, Reimers, et al., 1990; Iwata, Smith, & Michael, 2001; Horner & Day, 1991; Weld & Evans, 1990; Richman, Wacker, and Winborn, 2001)

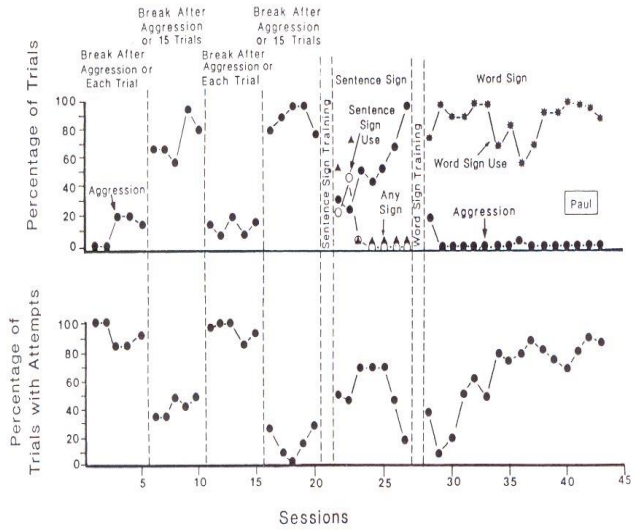
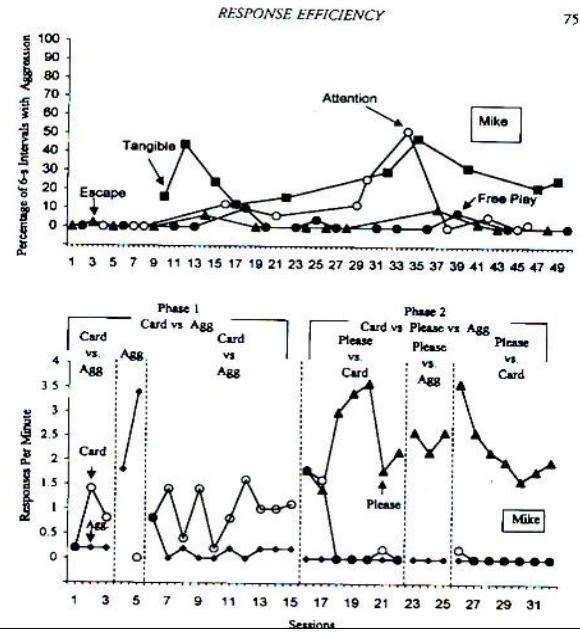


Figure 1. The percentage of trials per session with aggression for Paul across assessment phases. The upper panel indicates the percentage of trials per session in which Paul aggressed or used signing. The lower panel indicates the percentage of trials in which Paul attempted to perform the task.

247

Horner, R. H., Day, H. M., Sprague, J. R., O'Brien, M., Tuesday-Heathfield, T. (1991). Interspersed requests: A nonaversive procedure for reducing aggression and self-injury during instruction. *Journal of Applied Behavior Analysis, 24,* 265-278.



Richman, D. M., Wacker, D. P., & Winborn, L. (2001). Response efficiency during functional communication training: Effects of effort on response allocation. *Journal of Applied Behavior Analysis, 34,* 73-76. 248

SUPPORTING RESEARCH

Curricular Revisions

7. Use extinction for problem behavior when needed.

With some learners it will not be possible to reduce the problem behavior and teach quick and correct responding without removing the reinforcement for the problem behavior that sometimes occurs.

(Fischer, et al., 1993; Goh & Iwata, 1994; Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Pace, Iwata, Cowdery, Andree, & McIntyre, 1993; Mazakeski, et al., 1993; Wacker et al., 1990; Zarcone, et al., 1994; McCord, et al., 2001)

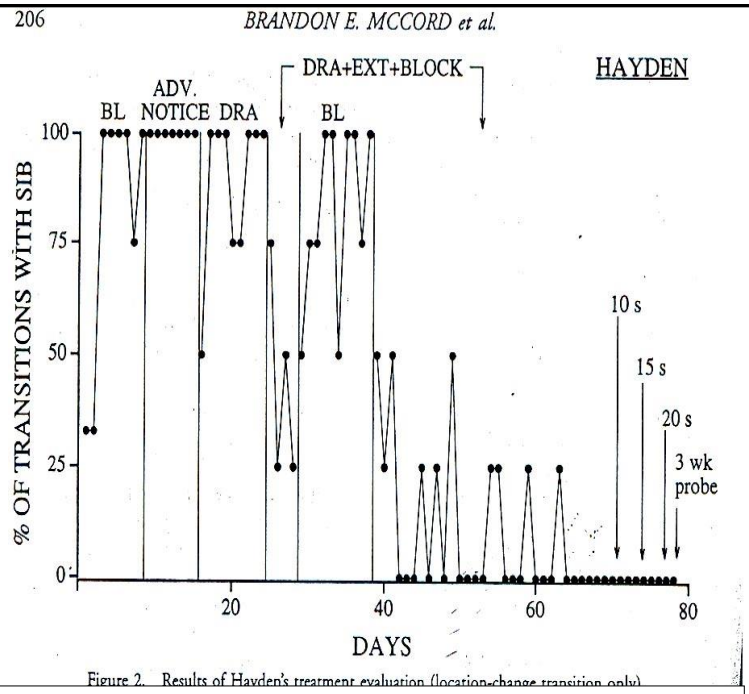


Figure 2. Results of Hayden's treatment evaluation (location-change transition only)

McCord, et al. (2001)

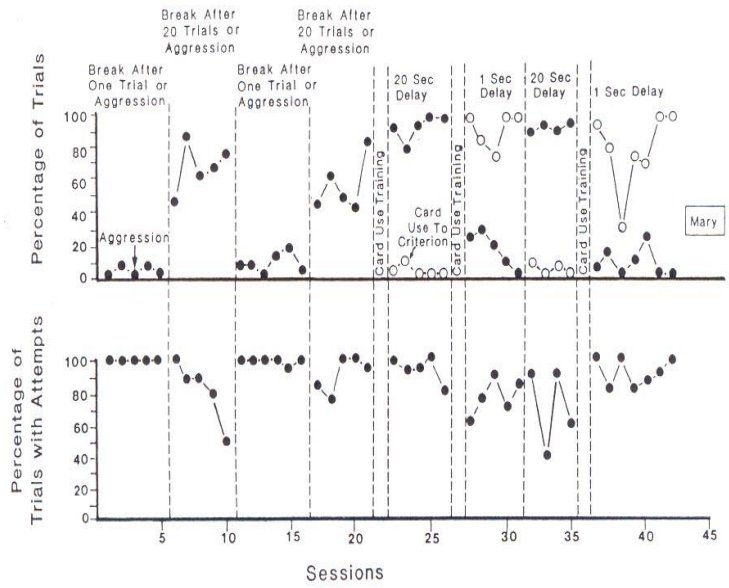
SUPPORTING RESEARCH

Curricular Revisions

8. <u>Immediately deliver reinforcement.</u>

Several studies have demonstrated the need to deliver reinforcement immediately for behaviors that replace problem behaviors. Delays in the receipt of reinforcement has been demonstrated to be related to higher rates of problem behavior when teaching new behaviors.

(Horner and Day, 1991)



Horner, R. H., Day, H. M., Sprague, J. R., O'Brien, M., Tuesday-Heathfield, T. (1991). Interspersed requests: A nonaversive procedure for reducing aggression and self-injury during instruction. *Journal of Applied Behavior Analysis, 24,* 265-278.

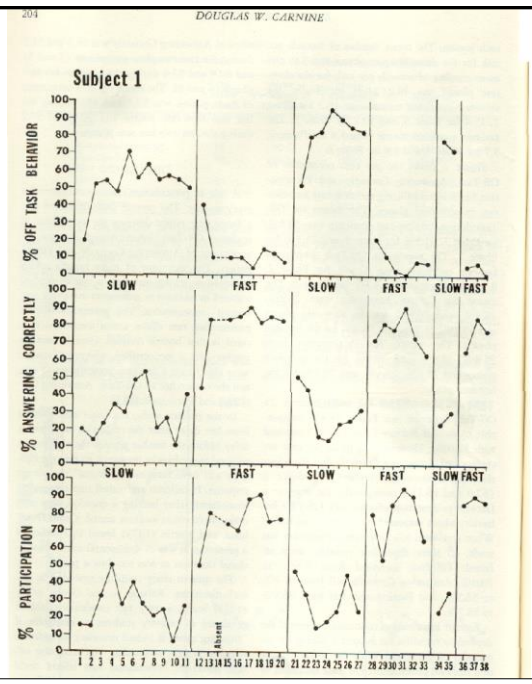
SUPPORTING RESEARCH

Curricular Revisions

9. <u>Pace instruction properly.</u>

Inter-trial intervals of about 2 seconds or less seem to produce maximal benefit with children with autism. Begin teaching with a low frequency of demands so as to not evoke the problem behavior. Present easy demands so that errors are reduced and correct responding frequently contacts reinforcement on a dense variable ratio (VR) schedule. Gradually increase the response-reinforcer ratio.

(Carnine, 1976; Weeks & Gaylord-Ross, 1981; Carnine & Engelmann, 1982; Dunlap, Dyer, &Koegel, 1983; West & Sloane, 1986; Cameron, Luiselli, McGrath, & Carlton, 1992; Zanolli, Daggett, & Pestine, 1995)



Carnine, D. W. (1976). Effects of two teacher presentation rates on off-task behavior, answering correctly, and participation. *Journal of Applied Behavior Analysis, 9,* 199-206.

Supporting Research for Short Inter-trial Intervals

Behavior Modification
XX(X) 1–26
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DOI: 10.1177/0145445512463046
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The Effect of Varying Teacher Presentation Rates on Responding During Discrete Trial Training for Two Children With Autism

Carole A. Roxburgh[1] and Vincent J. Carbone[1]

Abstract

Recent research has emphasized the importance of manipulating antecedent variables to reduce interfering behaviors when teaching persons with autism. Few studies have focused on the effects of the rate of teacher-presented instructional demands as an independent variable. In this study, an alternating treatment design was used to evaluate the effects of varied rates of teacher-presented demands (1 s, 5 s, 10 s) on the occurrence of problem behavior, opportunities to respond, responses emitted, accuracy of responding, and magnitude and rate of reinforcement for two children with autism. Results indicated that fast presentation rate (1 s) resulted in lower rates of problem behavior, higher frequencies of instructional demands, higher frequencies of participant responding, and greater magnitudes and rates of reinforcement. Differential effects on accuracy of responding across conditions were not observed. Implications for manipulating the rate of teacher-presented instructional demands as an antecedent variable to reduce problem behavior are discussed.

Roxburgh, C. A., & Carbone, V. J. (2012).

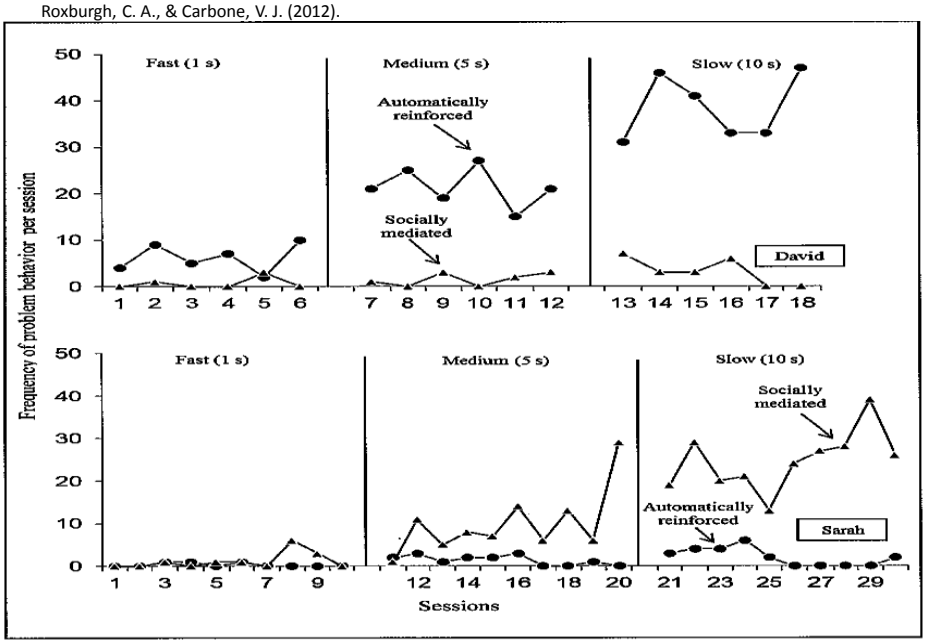

Figure 2. Frequency of problem behavior per session by suspected function during fast, medium, and slow teacher presentation rates for David and Sarah

Roxburgh, C. A., & Carbone, V. J. (2012).

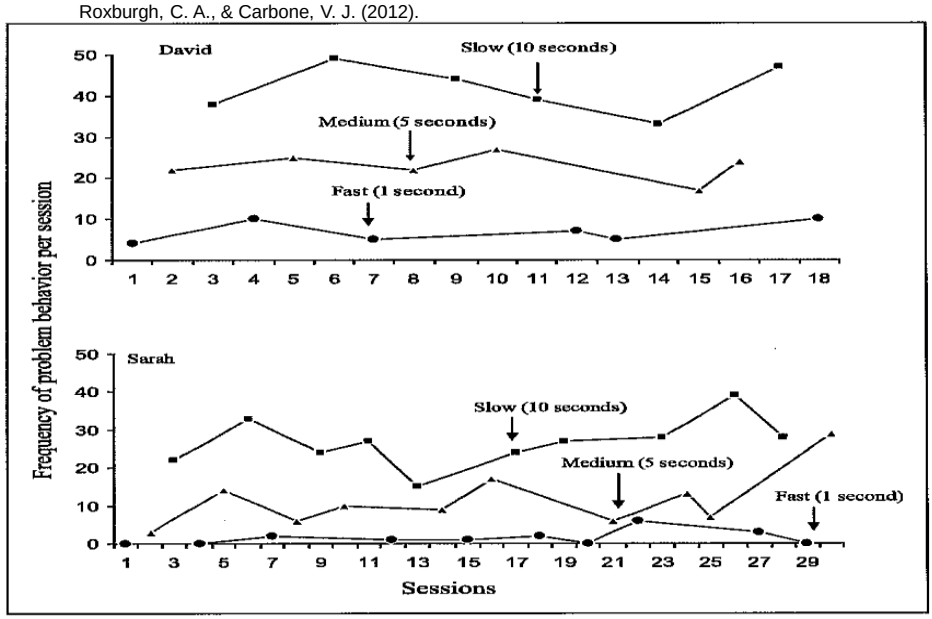

Figure 1. Frequency of problem behavior per session during fast, medium, and slow teacher presentation rates for David and Sarah

257

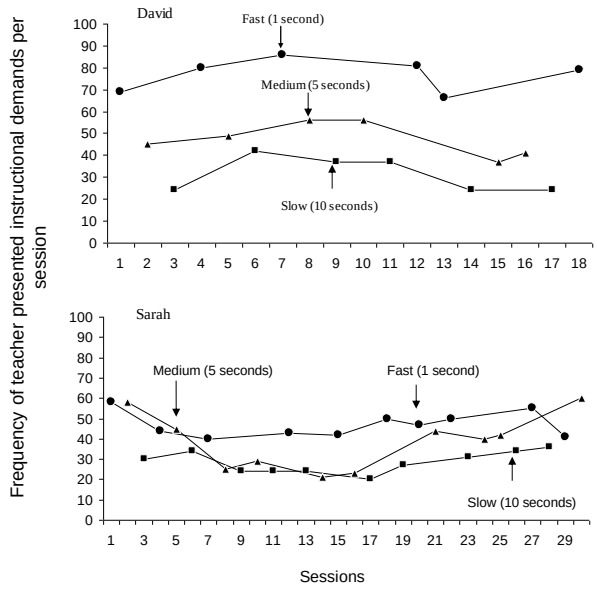

Figure 2: Frequency of teacher presented instructional demands per session during fast, medium and slow teacher presentation rates for David and Sarah.

258

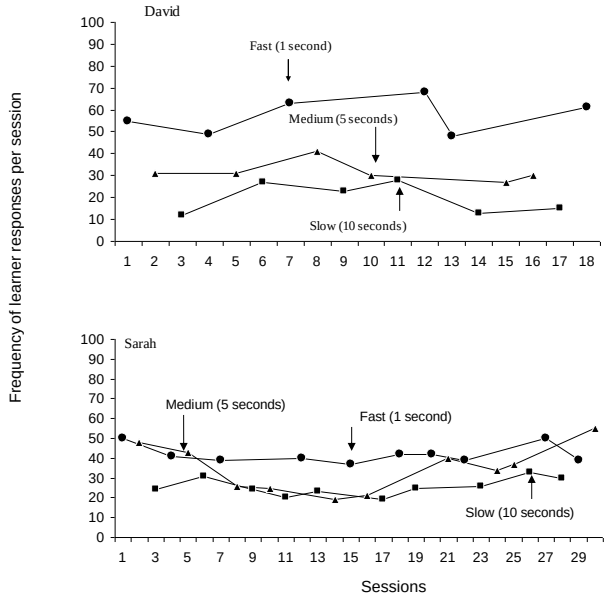

Figure 3: Frequency of learner responses per session during fast, medium and slow teacher presentation rates for David and Sarah.

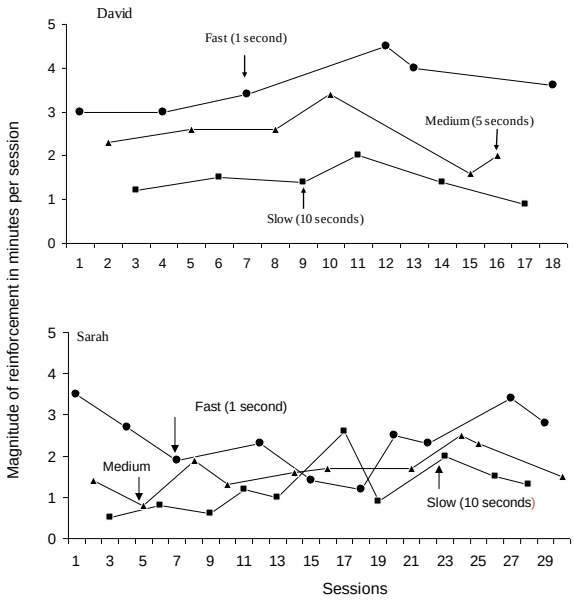

Figure 4: Magnitude of reinforcement in minutes per 10 minute session during fast, medium and slow teacher presentation rates for David and Sarah.

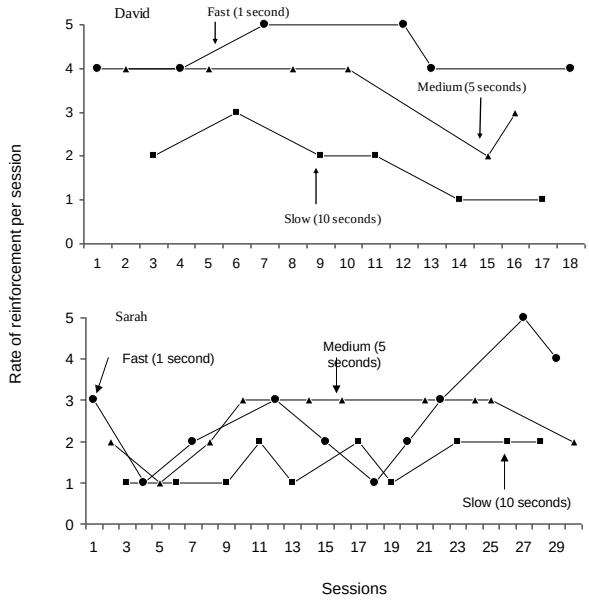

Figure 5: Rate of reinforcement per session during fast, medium and slow teacher presentation rates for David and Sarah.

261

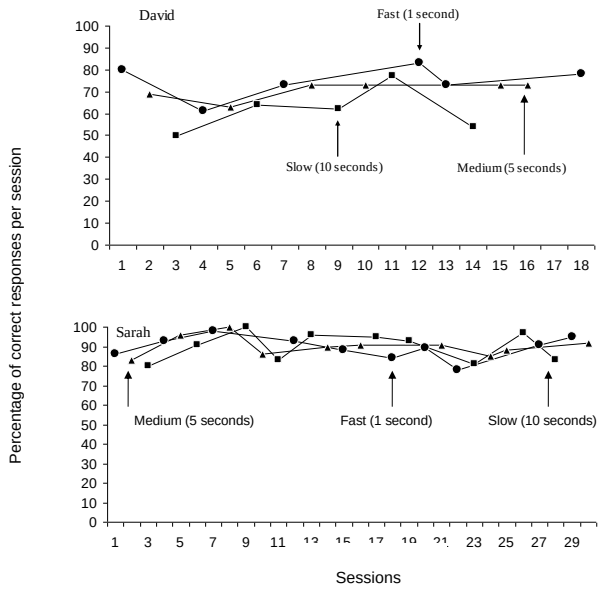

Figure 6: Percentage of correct responses per session during fast, medium and slow teacher presentation rates for David and Sarah.

262

Data Recording During Discrete Trial Instruction

The following describes procedures for data collection and display that are specific to the Carbone Clinic.

- First Trial data collection, as opposed to trial-by-trial data collection, has been selected for the following reasons (Cummings & Carr, 2009; Dollins & Carbone, 2003; Lerman, et al. , 2011; Najdowski et al., 2009):
  - First Trial probe data collection is less time consuming, which results in more time being spent teaching.
  - First Trial data collection is equally as efficient (amount of time to mastery).
  - First Trial data may be equally as effective at leading to maintenance of skills over time, although some results suggest slightly lower maintenance over time for skills mastered using first trial probe data.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2009, 42, 57–71 NUMBER 1 (SPRING 2009)

EVALUATING PROGRESS IN BEHAVIORAL PROGRAMS FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS VIA CONTINUOUS AND DISCONTINUOUS MEASUREMENT

ANNE R. CUMMINGS AND JAMES E. CARR

WESTERN MICHIGAN UNIVERSITY

We evaluated the influence of two different frequencies of data collection on skill acquisition and maintenance within behavioral treatment programs for children with autism spectrum disorders. Six children were taught multiple skills in up to four different behavioral programs. Half of the skills were measured continuously (i.e., trial by trial), and the other half were measured discontinuously (i.e., first trial only). When differences were detected, quicker acquisition was typically associated with discontinuous measurement, and stronger maintenance was typically associated with continuous measurement.

DESCRIPTORS: autism spectrum disorders, continuous measurement, discontinuous measurement, skill acquisition

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265

The current study provides preliminary evidence against which some of the claims made regarding the influence of continuous and discontinuous measurement can be evaluated. Dollins and Carbone (2003) have suggested that teaching and continuously recording data would result in lengthier sessions. The present data support this claim, although the social importance of the difference was not determined. A second claim is that recording data

266

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2009, 42, 827–832 NUMBER 4 (WINTER 2009)

COMPARISON OF DATA-COLLECTION METHODS IN A BEHAVIORAL INTERVENTION PROGRAM FOR CHILDREN WITH PERVASIVE DEVELOPMENTAL DISORDERS: A REPLICATION

ADEL C. NAJDOWSKI, VARDUI CHILINGARYAN, RYAN BERGSTROM, DOREEN GRANPEESHEH, SUSIE BALASANYAN, BARBARA AGUILAR, AND JONATHAN TARBOX

CENTER FOR AUTISM AND RELATED DISORDERS

Cummings and Carr (2009) compared two methods of data collection in a behavioral intervention program for children with pervasive developmental disorders: collecting data on all trials versus only the first trial in a session. Results showed that basing a child's progress on first-trial data resulted in identifying mastery-level responding slightly sooner, whereas determining mastery based on all trials resulted in slightly better skill maintenance. In the current replication, no such differences in indication of mastery or maintenance were observed when data were collected on all trials or the first trial.

DESCRIPTORS: autism, data collection, discrete trials, interspersed trials, massed trials

One of the defining features of applied behavior analysis is the improvement of behavior in meaningful and socially important ways (Baer, Wolf, & Risley, 1968). The primary method for assessing behavior change is through repeated data collection. Thus, behavior analysts who deliver behavioral intervention programs to children with autism have often used continuous data-collection methods in which data are collected on each learning trial. However, in an attempt to decrease time spent collecting data, clinicians have recently begun to collect data on the first trial within a block of trials (cf. Dollins & Carbone, 2003; Sundberg & Hale, 2003).

tal disabilities. Results suggested that basing a child's progress on first-trial data led to determination that the child had met mastery levels sooner than basing progress on data that were collected on all 10 trials. By contrast, using data from all 10 trials better identified skill maintenance (i.e., retention of skill performance following initial mastery).

A potential limitation of the methods used by Cummings and Carr (2009) was that data collection did not continue for the remaining nine trials in the first-trial data-collection procedure. Thus, it was not possible to determine if an all-trials data-collection procedure would have agreed with conclusions

A Comparison of Methods for Collecting Data on Performance During Discrete Trial Teaching

Dorothea C. Lerman [a], Laura Harper Dittlinger [b], Genevieve Fentress [b] & Taira Lanagan [c]

[a] University of Houston, Clear Lake

[b] Texana Behavior Treatment and Training Center

[c] Center for Autism and Related Disorders, Tarzana, CA

ABSTRACT

Therapists of children with autism use a variety of methods for collecting data during discrete-trial teaching. Methods that provide greater precision (e.g., recording the prompt level needed on each instructional trial) are less practical than methods with less precision (e.g., recording the presence or absence of a correct response on the first trial only). However, few studies have compared these methods to determine if less labor-intensive systems would be adequate to make accurate decisions about child progress. In this study, precise data collected by therapists who taught skills to 11 children with autism were reanalyzed several different ways. For most of the children and targeted skills, data collected on just the first trial of each instructional session provided a rough estimate of performance across all instructional trials of the session. However, the first-trial data frequently led to premature indications of skill mastery and were relatively insensitive to initial changes in performance. The sensitivity of these data was improved when the therapist also recorded the prompt level needed to evoke a correct response. Data collected on a larger subset of trials during an instruction session corresponded fairly well with data collected on every trial and revealed similar changes in performance.

Keywords: continuous recording, data collection, discontinuous recording, discrete-trial teaching

Behavior Analysis in Practice, Spring (4), 2011

Conclusions

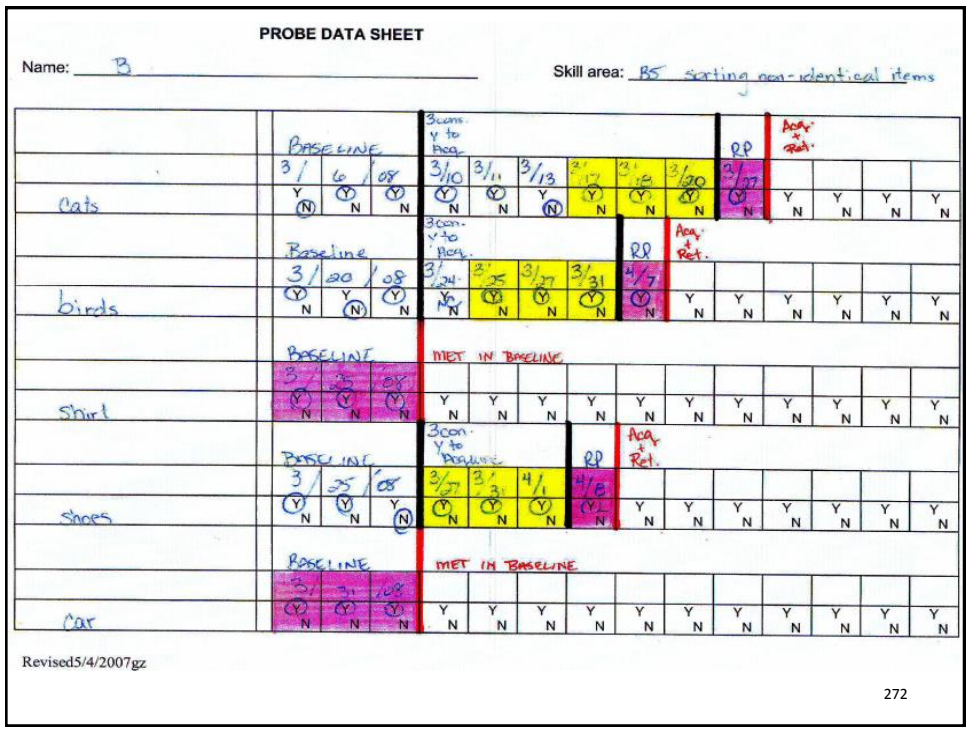
Together, results of the present analyses suggest that first-trial recording could have led to premature determinations about skill mastery, particularly if the criterion was based on performance across two sessions. This finding is consistent with that obtained by Cummings and Carr (2009), who used a two-session mastery criterion. On the other hand, the instructors would have considered the majority of targets mastered in approximately the same amount of time under continuous and discontinuous recording if they had collected data on a larger subset of trials (i.e., three-trial recording) or if they had based the criterion on performance across three consecutive sessions. This latter finding is consistent with that obtained by Najdowski et al. (2009), who used a three-session mastery criterion.

Yes/No Probes

- Baseline: Conduct at least three probes for each target.
  - Write the target name along the far left of the yes/no probe data sheet.
  - Write date across the first three spaces on the probe sheet.
  - In the space above the date line label this section as “Baseline.”
  - Below the date line record Y/N as to whether or not target was answered correctly on each of the three probes.
- Write target name and date introduced on skills tracking sheet.
- Two things can happen after baseline:
  1. Child meets criteria in baseline.
     - Baseline Mastery Criterion → 3 consecutive Y’s
  2. Child does NOT meet criteria.

Yes/No Probe:
1) Child meets criteria in baseline

- On Y/N probe sheet draw a RED phase change line after baseline data and write “mastered in baseline.”
- Highlight baseline data in pink.
- Write date on skills tracking sheet in both the acquired and retained columns.
- Fill in target on the retention side (back) of skills tracking sheet and write “mastered in baseline” (MIB) across boxes.



Yes/No Probe:
2) Child does NOT meet criteria

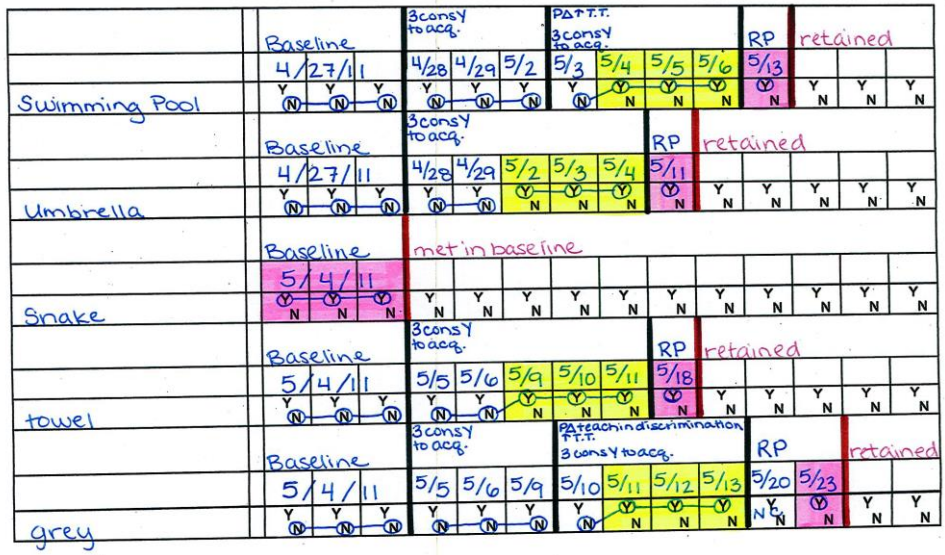
- Target placed into teaching using prompt/transfer/probe procedure; teach 2 times per session.
- Draw a black phase change line on probe sheet after baseline data.
- After the black phase change line label the criterion for acquisition (e.g., 3 consecutive Yes); each day fill in the date and whether the learner scored a Yes or No. Connect data points to show graphic display.
- Once the criterion is met, skill is acquired.
  - Draw black phase change line on probe sheet and highlight (yellow) the days on which the acquisition criterion was met.
  - After the phase change line fill in the date on which the retention probe will be conducted; in the space above the date line label this RP for retention probe.
  - Skill goes into retention.
  - On the skills tracking sheet fill in the date the skill was acquired.
  - Fill out back of the skills tracking sheet with retention information (i.e., target name and date of retention probe).

- 1 week later probe target (i.e., 7-day retention probe).
  - If learner gets "Y" the skill is considered acquired and retained.
    - On the probe sheet draw a RED phase change line and write "acquired and retained," "retained," or "mastered"; highlight (pink) the date on which the target was retained.
    - Fill in the date the target was retained on skills tracking sheet.
    - On the back of the skills tracking sheet record a Y under the column for the date on which the retention probe was conducted.
    - Target is placed into mixed and vary.
  - If learner does NOT get "Y" return to teaching and make a program change according to the frame analysis and data based decision making clinic wide protocol.
    - On the probe sheet draw a black phase change line.
    - After the phase change label with the new acquisition criterion (i.e., 4 consecutive Yes).
    - Repeat the process described above until the target is retained.

PROBE DATA SHEET

Name: B

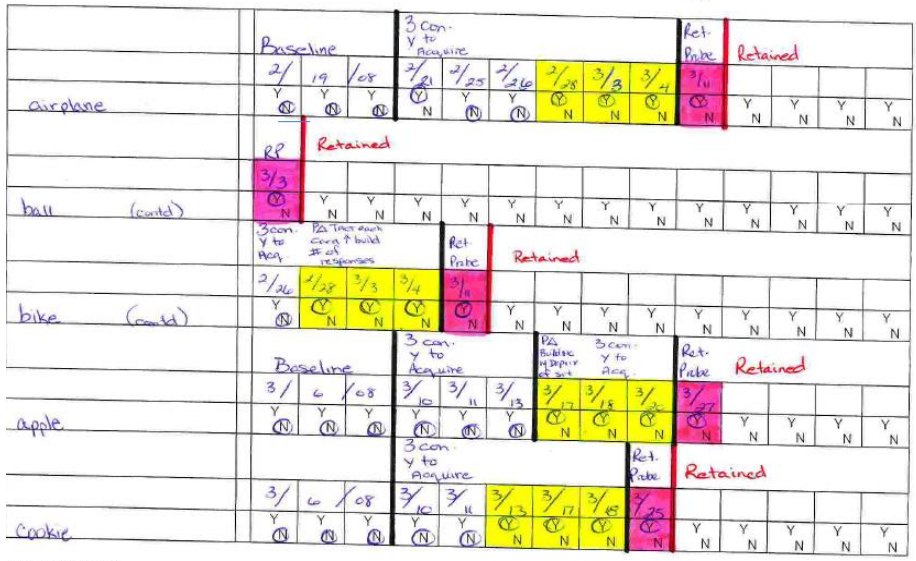
Skill area: G4



PROBE DATA SHEET

Name: B

Skill area: B5 sorting non-identical items

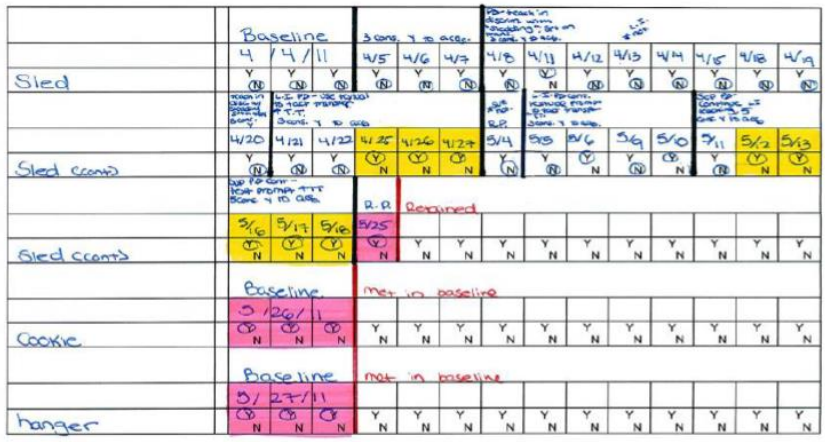


Revised5/4/2007gz

121

PROBE DATA SHEET

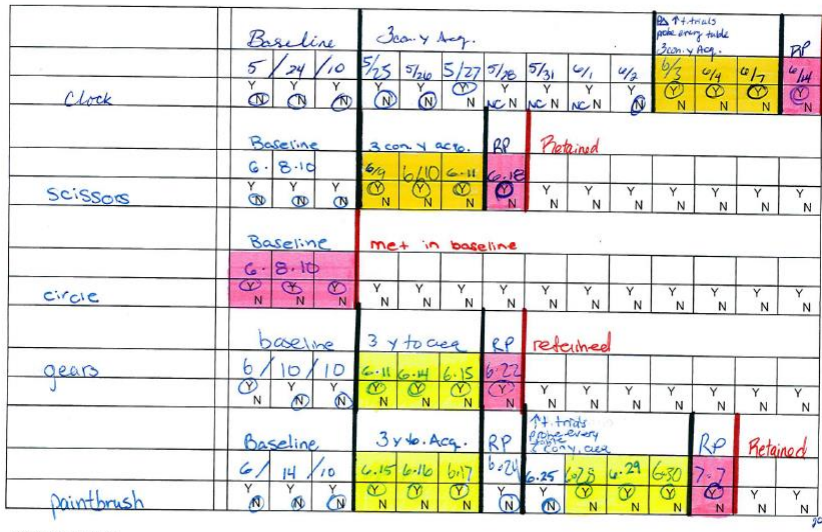
Name: Ben Skill area: G4



Revised5/4/2007gz

277

Name: Bobby Skill area: G4

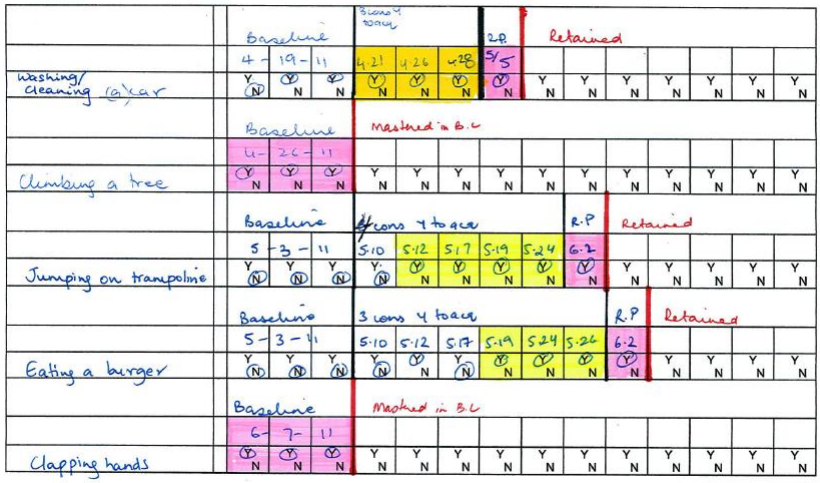


Revised5/4/2007gz

278

PROBE DATA SHEET

Name: Tim H. Skill area: G25



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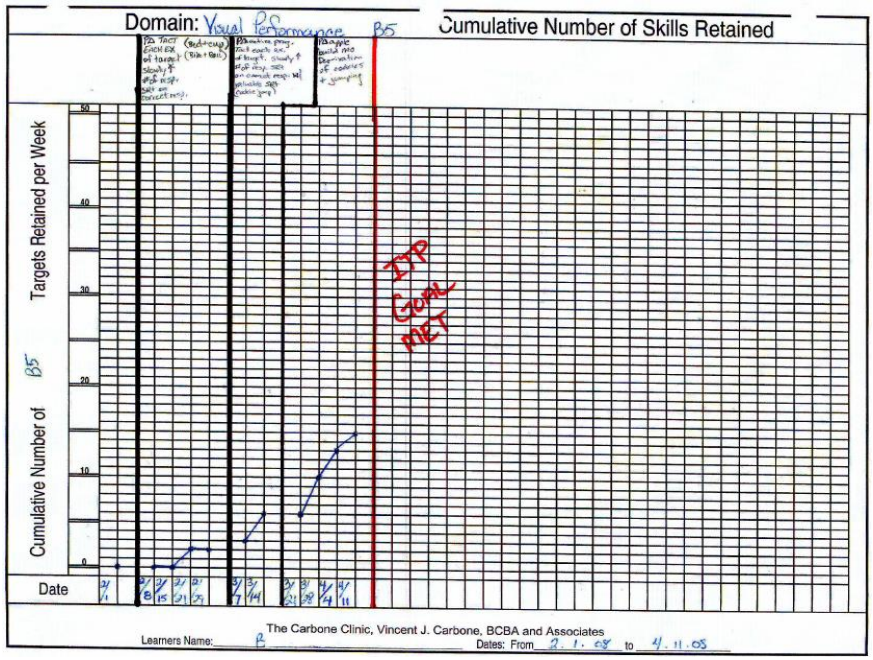
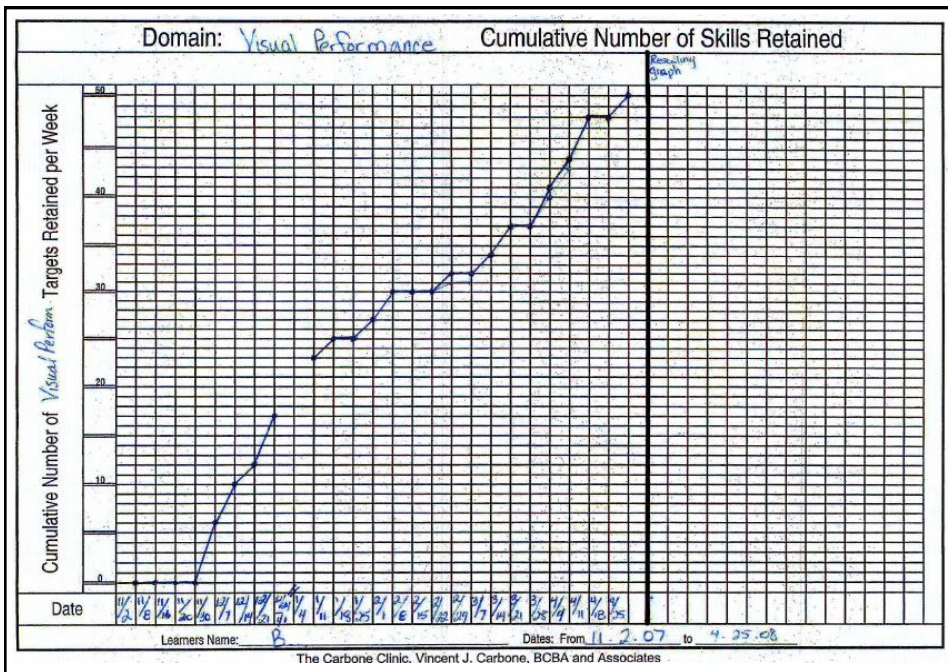
279

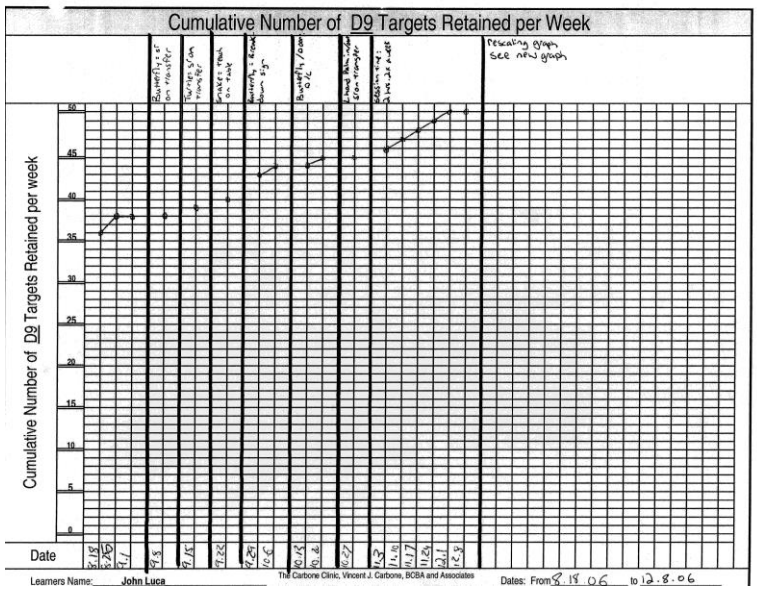
Yes/No Probe: Graphing

- Weekly basis
- Graph total number of skills retained per week within each skill/goal.
- Graph total number of skills retained per week for whole operant.

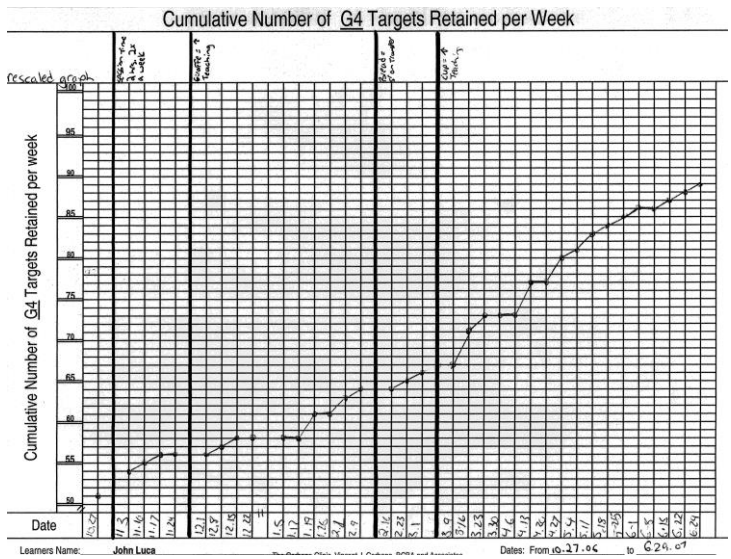
280


Domain: Visual Performance
B5
Cumulative Number of Skills Retained
Cumulative Number of B5 Targets Retained per Week
50
40
30
20
10
0
IEP Goal Met
Date
2/1
2/8
2/15
2/21
2/27
3/7
3/14
3/21
3/28
4/4
4/11
Learners Name: B
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
Dates: From 2.1.08 to 4.11.08

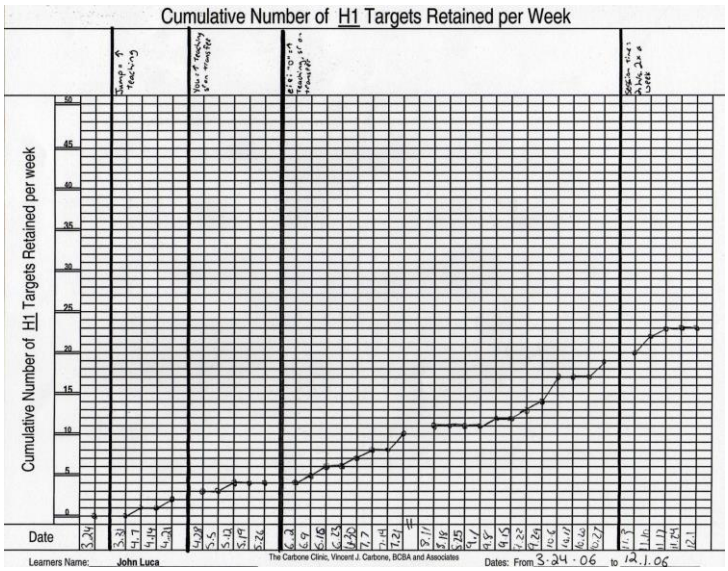

Domain: Visual Performance
Cumulative Number of Skills Retained
Reaching Graph
Cumulative Number of Visual Perform. Targets Retained per Week
50
40
30
20
10
0
Date
11/2
11/8
11/16
11/26
11/30
12/7
12/14
12/21
12/28
1/4
1/11
1/18
1/25
2/1
2/8
2/15
2/22
2/29
3/7
3/14
3/21
3/28
4/4
4/11
4/18
4/25
Learners Name: B
Dates: From 11.2.07 to 4.25.08
The Carbone Clinic. Vincent J. Carbone. BCBA and Associates


Cumulative Number of D9 Targets Retained per Week
Cumulative Number of D9 Targets Retained per week
Date
rescaling graph see new graph
Learners Name: John Luca
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
Dates: From 8.18.06 to 12.8.06

283


Cumulative Number of G4 Targets Retained per Week
rescaled graph
Cumulative Number of G4 Targets Retained per week
Date
Learners Name: John Luca
Dates: From 10.27.06 to 6.29.07

284



References

Cummings, A.R., & Carr, J.E. (2009). Evaluating progress in behavioral programs for children with autism spectrum disorders via continuous and discontinuous measurement. *Journal of Applied Behavior Analysis, 42,* 57 – 71.

Dollins, P., & Carbone, V.J. (2003, May). Using probe data recording methods to assess learner acquisition of skills. In V.J. Carbone (Chair), *Research related to Skinner's analysis of verbal behavior with children with autism.* Symposium conducted at the 29th annual convention of the Association for Behavior Analysis, San Francisco.

Najdowski, A.C., Chilingaryan, V., Bergstrom, R., Granpeesheh, D., Balasanyan, S., Aguilar, B., & Tarbox, J. (2009). Comparison of data collection methods in a behavioral intervention program for children with pervasive developmental disorders: A replication. *Journal of Applied Behavior Analysis, 42,* 827 – 832.

Data Based Decision Making

- A large body of research supports the use of data based instructional practices and data based decision making.
- Within our clinical setting, data are collected daily and visually displayed on a line graph.
- The data are used to identify trends within a student's progress and in turn analyze the relationship between instruction and student performance.
- Rules for when to apply a program change are standardized and in turn supervisors can monitor progress of both the students and instructors so that students improve their performance and instructors improve their instructional decision making.

- A data based decision making system which includes: daily measurements of the targeted response, visual displays of the data on line graphs, evaluation of the targeted response on a daily basis and standardized rules for changing teaching practices are more effective than those programs that do not.

- Educators and practitioners who are guided by decision rules are more likely to enhance the performance of students even those with the most challenging educational needs.

Evaluation of the Data

- Daily cold probes, allow the instructor to evaluate and monitor a learner's progress on a frequent basis.
- All data are displayed on hand written graphs which allow instructors to closely examine the data and identify trends of a student's progress and in turn analyze the functional relationship between instruction and student performance.
- Trends in learner performance may show:
  - Acceleration of skills (increasing)
  - Deceleration of skills (decreasing)
  - Stability (no change)
  - Variability (inconsistent)
- The instructor uses the trend line to make a data based decision.

- However, continuous measurement of the data alone is simply not enough to ensure sound data based decision making. Standardized guidelines must be established to dictate when changes in instructional practices are necessary.
- It is only when guidelines to implement a program change are established, combined with graphic display and data evaluation, are improvements in student performance achieved.

Applying Decision-Making Rules

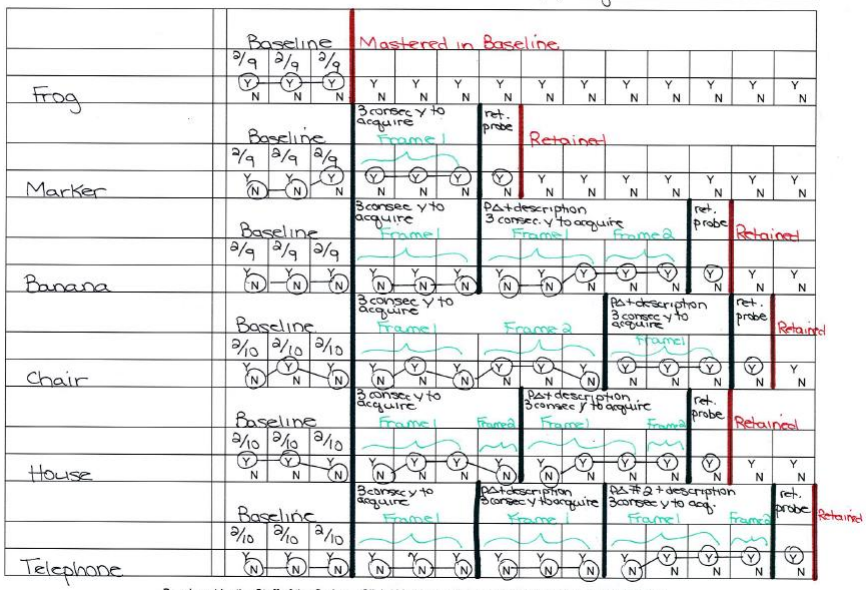
- Decision rules have been established within our clinical setting so that instructors will examine the data to identify when changes in instructional practices are necessary.
- The decision rules apply to both the instructors and the supervisors, but the decision making process first begins with the instructor.

Frame Analysis

- After baseline, the learner has up to 6 consecutive sessions to meet the acquisition criterion (3 consecutive days of "yes" on the cold probe). These 6 sessions, or data points, are broken up into 2 frames, each frame consisting of 3 data points. (***The frame size changes based upon the number of days required for acquisition.)
- Following baseline, an instructor must make a program change according to the following guidelines:
  - Frame 1 – If the learner receives 3 consecutive "no's," immediately make a program change. However, if the learner receives at least 1 yes, then maintain the current procedures.
  - Frame 2 – If a program change was not made in frame 1, the learner must receive 3 consecutive "yes's" across frames 1 and 2 to acquire the target. However, recording of the first "no" in frame 2 prompts an immediate program change.
  - Once an instructor change is made, the frame analysis is re-started (i.e., at frame 1).
- If a second change is needed according to this frame analysis, it is made by a lead instructor.
- If a third change is needed according to this frame analysis, it is made by a supervisor.

PROBE DATA SHEET

Name: Cameron Skill area: Tacting



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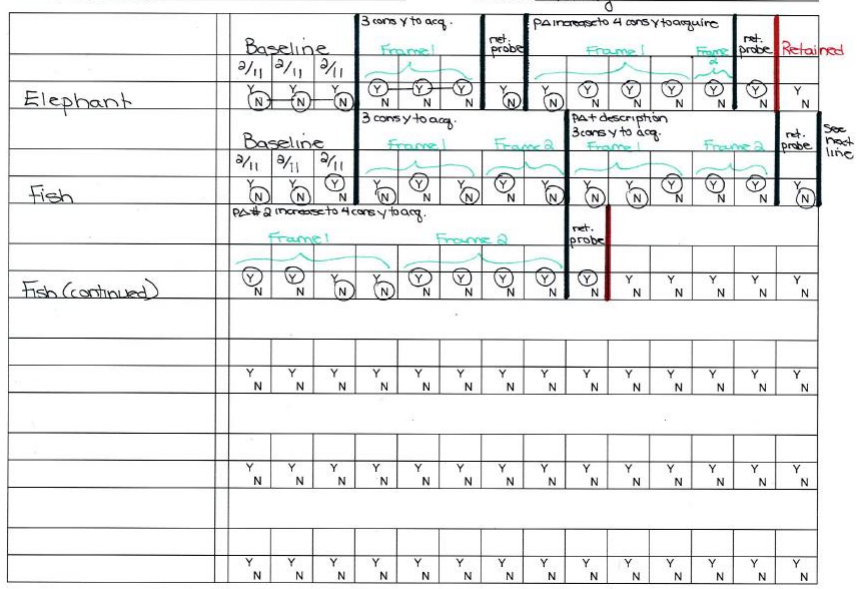
PROBE DATA SHEET

Name: Cameron Skill area: Tacting



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General Guidelines to Implement an Instructor Program Change

- The instructor fills out a program change form and writes a brief description as to why an instructional change is necessary. The best description of the reason for the program change usually includes information such as: the student does not attend to the stimulus, scan the field, or makes frequent discrimination errors.
- The instructor then chooses a change in instruction that is listed on the form or changes some element of the teaching through an analysis of the unique learning needs of the student.
- The change in the teaching (independent variable) is indicated on the graph and the probe data sheet.

Program Change Procedures

Antecedent: Stimulus Control/Motivation

CHECK THOSE APPROPRIATE

- ☐ Increase pairing

Reduce the number of demands (Decrease VR)

- ☐ Provide higher rate of interspersing mastered skills with target skills
- ☐ Decrease the response effort

Further reduce errors: Modify prompt procedure and prompt fade procedure

Change the pace of instruction (ITI)

Decrease/increase session time

- ☐ Conduct a Sr+ assessment
- ☐ Increase the saliency of Sr+
- ☐ Change the field of the stimuli

Increase the number of teaching trials

- ☐ Change the physical environment
- ☐ Change the aim
- ☐ Teach pre-requites skills

Decrease the number of goals/objectives

- ☐ Build MO by deprivation of specific reinforcers

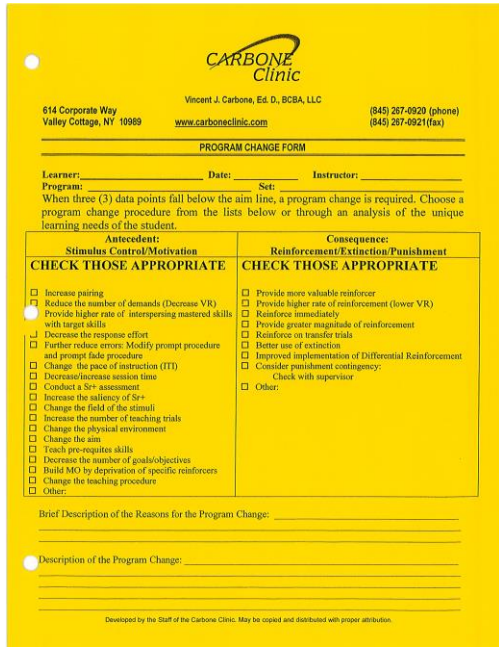
Change the teaching procedure

Other:

Consequence: Reinforcement/Extinction/Punishment

CHECK THOSE APPROPRIATE

- ☐ Provide more valuable reinforcer
- ☐ Provide higher rate of reinforcement (lower VR)
- ☐ Reinforce immediately
- ☐ Provide greater magnitude of reinforcement
- ☐ Reinforce on transfer trials
- ☐ Better use of extinction
- ☐ Improved implementation of Differential Reinforcement
- ☐ Consider punishment contingency: Check with supervisor
- ☐ Other:



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(845) 267-0920 (phone)
(845) 267-0921(fax)

PROGRAM CHANGE FORM

Learner:_____ Date: _____ Instructor: _____
Program: _____ Set: _____

When three (3) data points fall below the aim line, a program change is required. Choose a program change procedure from the lists below or through an analysis of the unique learning needs of the student.

Antecedent: Stimulus Control/Motivation	Consequence: Reinforcement/Extinction/Punishment
CHECK THOSE APPROPRIATE	**CHECK THOSE APPROPRIATE**
☐ Increase pairing ☐ Reduce the number of demands (Decrease VR) ☐ Provide higher rate of interspersing mastered skills with target skills ☐ Decrease the response effort ☐ Further reduce errors: Modify prompt procedure and prompt fade procedure ☐ Change the pace of instruction (ITI) ☐ Decrease/increase session time ☐ Conduct a Sr+ assessment ☐ Increase the saliency of Sr+ ☐ Change the field of the stimuli ☐ Increase the number of teaching trials ☐ Change the physical environment ☐ Change the aim ☐ Teach pre-requites skills ☐ Decrease the number of goals/objectives ☐ Build MO by deprivation of specific reinforcers ☐ Change the teaching procedure ☐ Other:	☐ Provide more valuable reinforcer ☐ Provide higher rate of reinforcement (lower VR) ☐ Reinforce immediately ☐ Provide greater magnitude of reinforcement ☐ Reinforce on transfer trials ☐ Better use of extinction ☐ Improved implementation of Differential Reinforcement ☐ Consider punishment contingency: Check with supervisor ☐ Other:

Brief Description of the Reasons for the Program Change: _____

Description of the Program Change: _____

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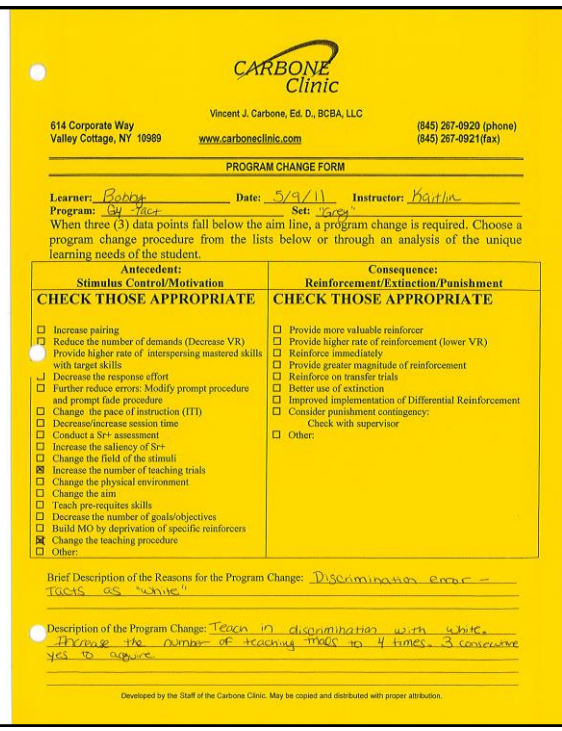
Yes/No Cold Probes

- A phase change line is drawn on the cold probe data sheet to indicate the program change.
- The criteria and the instructor change are written at the top of the probe sheet to indicate a change in the independent variable.
- If the program change is successful in increasing the accuracy of correct responses, no further changes may be needed.

Example of an Instructor Program Change

- The following slides illustrate an instructor program change for yes/no first-trial probes.
- Following baseline, the learner received three consecutive "no" responses on the first-trial probes for the tact "grey."
- The instructor identified that the learner did not discriminate between "white" and "grey."
- The instructor made a program change to teach "grey" in discrimination with "white" and increase the number of teaching trials to four times.
- The instructor program change was successful in increasing the accuracy of the response, which led to acquisition and retention of this skill.



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(845) 267-0921(fax)

PROGRAM CHANGE FORM

Learner: Bobby Date: 5/9/11 Instructor: Kaitlin
Program: G4 -Tact Set: "Grey"

When three (3) data points fall below the aim line, a program change is required. Choose a program change procedure from the lists below or through an analysis of the unique learning needs of the student.

Antecedent: Stimulus Control/Motivation	Consequence: Reinforcement/Extinction/Punishment
CHECK THOSE APPROPRIATE	**CHECK THOSE APPROPRIATE**
☐ Increase pairing ☐ Reduce the number of demands (Decrease VR) ☐ Provide higher rate of interspersing mastered skills with target skills ☐ Decrease the response effort ☐ Further reduce errors: Modify prompt procedure and prompt fade procedure ☐ Change the pace of instruction (ITI) ☐ Decrease/increase session time ☐ Conduct a Sr+ assessment ☐ Increase the saliency of Sr+ ☐ Change the field of the stimuli ☒ Increase the number of teaching trials ☐ Change the physical environment ☐ Change the aim ☐ Teach pre-requites skills ☐ Decrease the number of goals/objectives ☐ Build MO by deprivation of specific reinforcers ☒ Change the teaching procedure ☐ Other:	☐ Provide more valuable reinforcer ☐ Provide higher rate of reinforcement (lower VR) ☐ Reinforce immediately ☐ Provide greater magnitude of reinforcement ☐ Reinforce on transfer trials ☐ Better use of extinction ☐ Improved implementation of Differential Reinforcement ☐ Consider punishment contingency: Check with supervisor ☐ Other:

Brief Description of the Reasons for the Program Change: Discrimination error - tacts as "white."

Description of the Program Change: Teach in discrimination with white. Increase the number of teaching trials to 4 times. 3 consecutive yes to acquire.

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PROBE DATA SHEET

Name: B

Skill area: G4

| | | |

Measurement of Instructor Performance on Data Based Decision Making

- In addition to data collected on learner performance following instructional changes, the supervisor also collects and graphically displays data regarding the effectiveness of individual instructor program changes.
- These data are used to track the performance of the instructor on their ability to make effective data based decisions per individual learner as well as their overall decisions across a variety of learners and instructional programs.

- These data are used by the administration to evaluate how effective the instructors are at making data based decisions.
- This information can suggest something about their ability to change instructional methods based upon the data to improve learner outcomes.
- These data become important for two reasons:
  - First, it allows the supervisor to identify which instructors require training on making effective data based decisions. In other words, instructors who have a solid understanding of evidence based literature in teaching children with autism will make effective instructional decisions.
  - Second, it becomes useful in annual reviews as a way of evaluating teacher performance related to implementation of instructional practices.

Measurement of Instructor Performance

- As an illustration of our data based decision making system, a case study of one instructor's performance on making instructional changes from January, 2010 through April, 2010 will be presented.
- Brian has Masters in Education Degree and has completed all the coursework and supervision requirements necessary for the national board certification in behavior analysis.

- Figure 1 illustrates Brian's data on the number of instructor program changes made and the percent of instructor program changes that led to retention of skills for three learners (i.e., were successful).
- In January, 2010, Brian made 13 instructor program changes where 69% of those changes led to the Learners' retention of skills.
- In February, 2010, Brian made 4 instructor program changes of which 100% led to the Learners' retention of target skills.
- In March, 2010, he made 8 instructor program changes of which 50% led to the Learners' retention of skills.
- In April, 2010, he made 7 instructor program changes of which 43% led to the Learner's retention of skills.

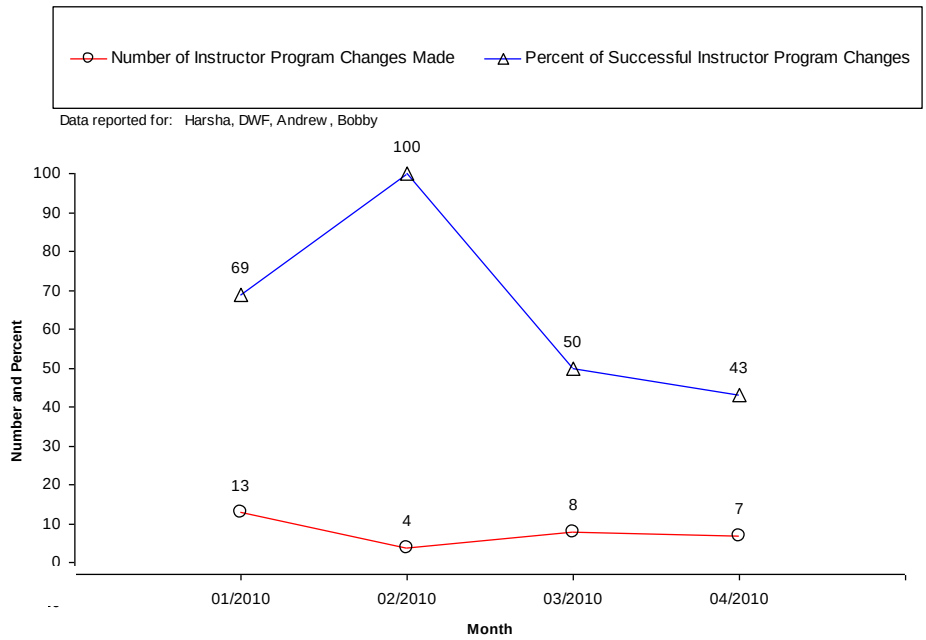


Figure 1. The number of instructor program changes made and the percentage of those program changes that were successful (i.e., led to retention of skill) per month for Brian.

- Figure 2 illustrates the cumulative number of instructor program changes made and the percentage of those program changes that led to retention of target skills per month for all nine instructors within our center based program.
- In January, 2010, a total of 63 instructor program changes were implemented of which 54% led to retention of skills for the individual learners.
- In February, 2010, a total of 50 instructor program changes were implemented of which 50% led to retention of skills for the individual learners.
- In March, 2010, a total of 72 instructor program changes were implemented of which 42% led to retention of skills for individual learners.
- In April, 2010, a total of 85 instructor program changes were implemented of which 46% lead to the retention skills for individual learners.

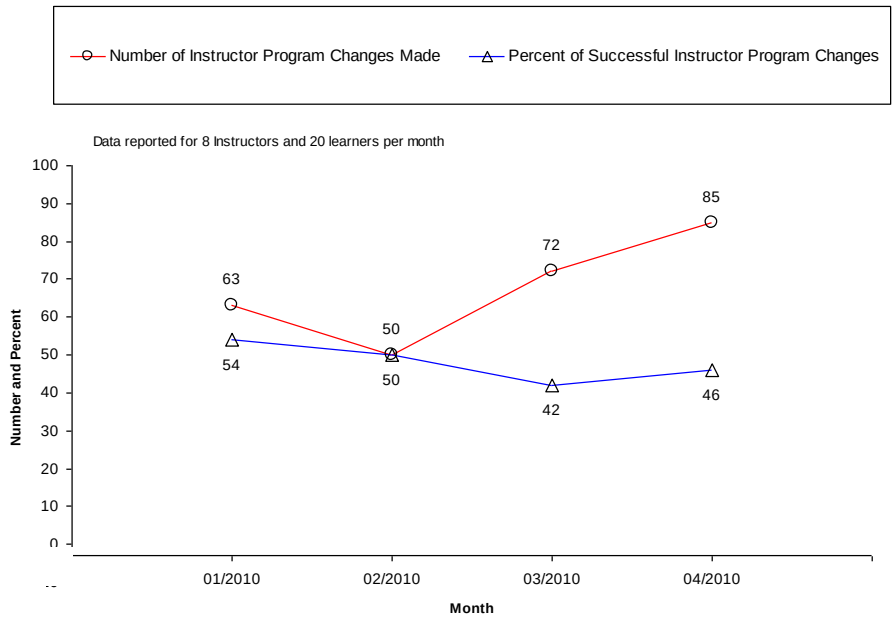


Figure 2. The number of instructor program changes made and the percentage of those program changes that were successful (i.e., led to retention of skill) per month for all instructors.

- As shown in figures 2, the percent of successful program changes for all instructor changes decreased from January to March, and then showed a slight increase in April.
- The reduction in percentages of data based decisions from January to March suggest to the Supervisor that individual instructors may need additional supervision within instructional decisions.
- Novel or unfamiliar teaching situations, individual learner skill level, etc. can all be taken into account by the supervisor.
- Information gathered based upon the data, observation of the learner during instructional sessions and interview with the instructor will help the supervisor identify the areas in need of improvement.
- Analysis of these data help the supervisory staff directly determine the effectiveness of the instructor's data based decisions.
- Although we have collected some data in support of the effectiveness of our data based decision making system, an experimental investigation of its effectiveness on learner outcomes is still needed.

MATERIALS MANAGEMENT AND PROGRAM BOOK

Program Materials

- Material Set-Up
- Color Coding Index Cards
- Rolling Cart
- Daily Data
- Clipboard
- Reinforcers
- Program Book
- Pencil Case

Material Set-Up

- VB-MAPP assessment will be used to determine known skills
  - Place known skills on index cards to intersperse during your mixed and vary teaching
  - This will aid to keeping the pace of instruction fast and ensure mixing across all the verbal operants

Setting Up Teaching Materials

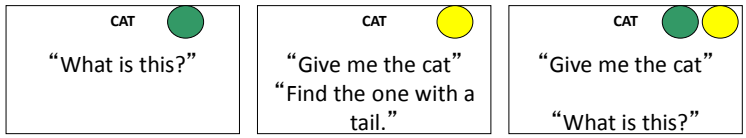
Yellow Receptive	Pink Motor Imitation	Blue Intraverbal or Visual Performance	Green Tact
" Clap your hands"	"DO THIS" - clap hands	"If you're happy and you know it, clap your_____" - Hands	"What is this (point to hand)?" - Hand
		B8 **"Match"** **apple, bear, car, duck**	

Purple/White -> Vocal Imitation
White -> Textual

These colors correspond with the color of the domain tabs in the program book.

Setting Up Teaching Materials

- On the back of pictures of common objects, place a green mark to indicate a mastered tact and/or yellow mark to indicate mastered receptive targets.

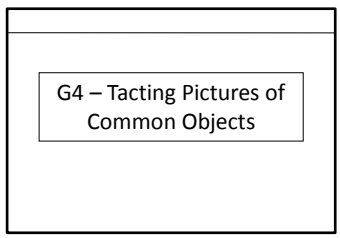


- Once mastered skills are placed on index cards according to each of the operants, place the cards into a box and label the box "Known Skills."

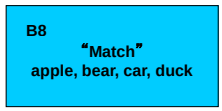
Organization for Current Targets

- All targets that are currently being taught should also be written on index cards according to the color coded system.
- However, these targets should be kept separate from "known skills."
- For all current programs, gather stimuli necessary for teaching (including index cards, objects, pictures, etc.) and place them into Ziploc bags labeled by ABLLS/VB-MAPP goals.

Emily Jane
Video Vincent



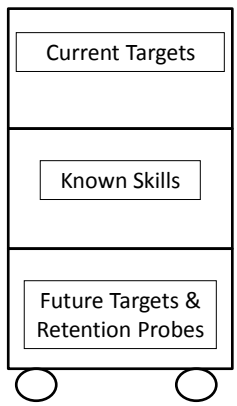
- When choosing target skills to teach, write all skills to be taught for each goal on a Skills Tracking Sheet.
- Gather stimuli needed and place them into ziplock bags
  - Label bags with ABLLS/VB-MAPP goal, brief description of goal
  - Put index card with goal written on it and any other materials needed for target in bag
  - Example:
    - B8: Match a pattern
      - Written on bag: "B8: Match a Pattern"
      - In bag:
        - » Blue index card with target written on it



        - » Materials needed for skill → apple, bear, car, duck
- These cards will be put into known skills pile once they have been mastered.

Rolling Carts

- Each learner should have his/her own three-drawer rolling cart which will be used to store all necessary teaching materials.
- The rolling cart should be organized as follows:
  - Current Targets
    - This will include the learner's targets labeled according to skill area/goal.
  - Known Skills
    - This will include all the learner's known skills.
  - Future Targets/Retention Probes
    - This will include all stimuli that will be used to teach additional targets once the learner masters current targets, as well as upcoming retention probes.



Daily Data

- This is a daily lesson plan and data sheet which contains the following information:
- Program
  - Which environment are you teaching in and what are you teaching (e.g., NET – manding; ITT – G4)
  - Easy/Difficult ratio
  - Schedule of reinforcement
- Time
  - Time spent in each environment (e.g., NET 9:00 – 9:45)
- Probe Data/Data Collection
  - Y/N Probes
  - % correct for ADL chains
  - Any other data that is to be collected specific to the learner
- Program Changes/Notes
  - Any teaching procedure changes
  - Baselines
  - Retention probes

Sample Daily Data

DAILY DATA SHEET

Learner: Morgan Date: 6/6/12 Session Time: 2:30 - 4:20

Instructor: KA NET: 70 vs. ITT: 30 Page 1 of 2

	Program	Time	Probe Data/Data Collection	Program Changes/ Notes
	NET	2:30 - 2:55		
	• manding			
	turn on bubbles		Y N Wii Sports	Y N
	fan bubbles		Y N remote	Y N
	cone jump		Y N Disney puzzle	Y N
	• circle time			
	ITT (VR20; easy: diff 80: diff 20)	2:55 - 3:15		
C20	cut w/ ... knife		Y N	
C22	animal ... horse		Y N	RP
	insect ... bee		Y N Y N Y N	BSL
G10	jacket → sleeve, zipper, pocket, hood ↳ teach all 2x w/ MVB		Y N	@ needs PA if ANO
	NET	3:15 - 3:40		
	• manding			
ADLs	Hand Washing		/21 = % IND	total task
	Shoe Tying		Step 6 FP PP IND	backward chain
Leisure	Independent Work		/43 = % IND	PA → distance 3 ft during; refer w/ stickers on VA's schedule

Page 2 of 2

	Program	Time	Probe Data/Data Collection	Program Changes/ Notes
	ITT (VR20; easy: diff 80: diff 20)	3:40 - 3:55		
H5	When's your birthday? ... Nov 10th		Y N	
	What's your sister's name? ... Jenny		Y N	?, Δ → teach in session w/ "What's your ___?"
Feature	Animal		Y N	
	Banana ↳ teach all 2x ↳ w/ MVB		Y N Y N Y N	BSL
	NET	3:55 - 4:20		
	• manding			
	• DTI → NET Gen			see lesson plan on clipboard
ADLs	teach both 2nd time			

- Total # of Mands: _____
- Problem Behavior:
  - Frequency: _____
  - Duration: _____

Additional Comments:

Clipboard

- A clipboard should be used to store and organize all necessary data sheets for each teaching session.
- The following data sheets should be placed on the clipboard before every session:
  - Daily Data Sheet
  - Learner-specific mand data sheets
  - Learner-specific ABC sequence analysis data sheets
  - Any other learner specific data sheets
- Timer to record duration of problem behavior

Reinforcers

- Put edible reinforcers in a container.
- Keep tangible items such as toys with you.
- Use these preferred items for transitioning your learner to all teaching environments, as well as to pair yourself, the environment, and other items with reinforcement.

Program Book

Order of Book

- Table of Contents
- Program Management at a Glance
- Retention Calendar
- VB-MAPP Grids
- Assessment Report
- ITP Report/Meeting Minutes
- Manding
- ABLLS/VB-MAPP Goals by Domain
- Other Instructional Programs (e.g., Direct Instruction, Activities of Daily Living)
- Problem Behavior
- Daily Report/Data
- Progress Reports/Meeting Minutes

Program Book (continued)

- Table of Contents
  - List of all sections in book
- Program Management
  - List ALL current programs that have skills in acquisition (including manding and problem behavior)
- Retention Calendar (white tab)
  - Retention probes
- VB-MAPP Grids (white tab)
  - Milestones
  - Barriers
- Assessment Report (white tab)
- ITP Report/Meeting Minutes (white tab)

Program Book (continued)

- Manding (white tab)
  - Mand Trial by Trial Data (white tab)
    - Mand Protocol (if applicable)
    - Current Mand List
    - Raw mand data → trial by trial data
    - Mand summary sheet
    - Number of mands per minute graph
    - Frequency of MO and TMO mands
    - Variety of Mands
    - Additional mand graphs (if necessary)
      - % of mands across vocal production categories
      - % of mands adult form on the initial mand attempt and % if mands that improve with time delay and/or echoic trials
      - % of appropriate (e.g., non-repetitive mands)
      - % of mands with scrolling
      - Any other learner specific graphs

Program Book (continued)

  - Sign/Vocal Mand Probes (white tab)
    - Yes/No Probe Sheets
    - Skills Tracking/Retention
    - Cumulative Skills Graph
    - Program Changes
  - Manding for Information (white tab)
    - White tab for each "wh" question type, with frequency of _____ mands for info per session graph

Program Book (continued)

- ABLLS/VB-MAPP Goals by Domain
  - Visual Performance (blue tab)
    - Individual skill area (e.g., B1; blue tab)
      - Yes/No Probe Sheets
      - Skills Tracking/Retention
      - Cumulative Skills Graph
      - Program Changes
    - Label each separate skill area (e.g., B2, B3; blue tabs)
    - Cumulative skills for entire domain (blue tab)
      - Cumulative Skills Graph
  - Listener Responding (yellow tab)
  - Motor Imitation (red tab)
  - Vocal Responding (white tab)
  - Tact (green tab)
  - Intraverbal (blue tab)
- Add tabs for other goals as necessary (e.g., Activities of Daily Living = pink, Direct Instruction = orange or white)

Program Book (continued)

- Behavior Reduction Section (white tab)
  - Behavior Reduction Plan and Addenda (white tab)
  - Raw Data and Problem Behavior Summary Sheets (white tab)
    - Raw Data → A-B-C Data
    - Problem Behavior Summary Sheets follow the raw data
  - Total Frequency and Cumulative Duration and Antecedent Graphs (white tab)
    - Total frequency of episodes and cumulative duration of problem behavior
    - Frequency of episodes of problem behavior by antecedent
  - Specific contrived behavior reduction program (white tab)
    - E.g., Accepting No/Interruption/Count and Mand/Wait
    - Behavior protocol
    - Raw data
    - Graph → % of contrived trials without problem behavior
- Daily Report/Data (white tab)
- Progress Reports/Meeting Minutes (white tab)

Data sheet and Graph Information

- Most current data/graph/report is ALWAYS the last data sheet/graph/report in that section.
- Keep one past month of data and current working month's data in book.
- Archive all previous months.

Pencil Case

- Erasable blue pen
- Orange pen
- Black and red permanent markers
- Yellow and pink highlighter
- Red pen
- Ruler
- Calculator
- White out pen
- Regular pen
- Clicker (optional)
- Tabs (optional)
- Post-it notes (optional)

NATURAL ENVIRONMENT TEACHING

- The most effective teaching of language includes teaching in all settings throughout the day, across persons and circumstances.
- In addition, a full, rich language repertoire of a child includes:
  - nonverbal responses to what someone says (receptive)
  - verbal responses specific to his/her motivation or MO (mands)
  - verbal responses that match exactly what someone else just said (echoic)
  - verbal responses to nonverbal stimuli in the environment (tacts)
  - verbal responses to what someone else just said that do not exactly match what was just said (intraverbal)

- To develop this repertoire, it is essential to teach a child to respond this way in the natural environment as well as during formal intensive teaching.

Naturalistic Teaching Approaches (NTAs)	Discrete Trial Teaching (DTT)
• Loosely structured sessions paced by the student (e.g., typical play setting)	• Highly structured sessions paced by the teacher (e.g., student seated at table across from teacher)
• Free operant responding	• Discrete learning trials
• No pre-specified order for instruction; target stimuli selected based on the student's motivation	• Specific scope and sequence for instruction; target stimuli selected irrespective of the student's motivation
• Target stimuli are varied every few trials	• Target stimuli repeated until criteria are met
• Reinforcers are functionally related to responses	• Responses and reinforcers are not functionally related
• Loose shaping contingencies; any vocalization is reinforced	• Correct or successive responses are often reinforced
• Decreased need for specific procedures to target generalization because target stimuli, reinforcers, and prompts are present in natural environments	• Requires special procedures for generalization because target stimuli, reinforcers, and prompts are not present in natural environments

(adapted from Delprato, 2001; Koegel, O'Dell, & Koegel, 1987; and Sundberg & Partington, 1998)

Examples of Teaching Language in a Natural Environment

- Teaching a child to request various toys during a free play period.
- Teaching a child to request food items and receptively identify utensils during snack time.
- Teaching a child prepositions while playing with a dollhouse.
- Teaching a child to label colors while doing a highly preferred art activity.
- Teaching a child to ask and answer "wh" questions while playing a game, such as *Guess Who.*
- Teaching a child to fill-in missing words while singing songs as a class.
- Teaching a child to count while helping to pick out produce at the grocery store.

Reasons to Teach Language in the Natural Environment

1. Since responses are selected based on the student's motivation they may be learned (acquired) more quickly.
2. Best condition to teach manding (requesting).
3. Uses stimuli, prompt strategies, and reinforcers that are present in the student's natural environment.
4. Teaching can be conducted by everyone the student interacts with (e.g., teachers, parents, peers).
5. Typically associated with less aversive conditions and therefore less problem behavior (Koegel, Koegel, & Surratt, 1992).
6. Interactions can more easily represent typical conversational exchanges (i.e., can more easily mix across different response types on a natural way).
7. Less need for specific strategies for generalization since the settings in which the responses are taught are the settings in which most responses will later be required.

Methods for Naturalistic Teaching

- Several different evidenced-based NTAs have been developed:
  - Incidental Teaching
  - Mand-Model
  - Time Delay
  - Milieu
  - Natural Language Paradigm
  - Pivotal Response Training
  - **Natural Environment Teaching**
- For reviews on the various approaches to teaching language in the naturalistic settings see Charlop-Christy & LeBlanc (1999), Delprato (2001), LeBlanc, Esch, Sidener, & Firth (2006), Peterson (2004), and Sundberg & Partington (1999).

Natural Environment Teaching (NET)

Goals

- Increasing the frequency and variety of verbal behavior across all verbal operants

Procedures (Sundberg & Partington, 1998, 1999)

- Set up the natural environment in a way that is easy to contrive motivation for a variety of reinforcers
- When the student displays motivation, prompt a verbal response
  - Time Delay
  - Model
- Deliver reinforcers specific to the motivation
- Use stimulus control transfer procedures to transfer control of mands from an instructor's prompt to the presence of the item and eventually to the MO
- Use stimulus control transfer procedures to transfer responses from mands (requests) to other operants under different sources of control
- Vary antecedent stimuli and response requirements so as to mix and vary across the verbal operants

These procedures, which are based off of the NLP, have been used to teach "where" and "who" mands for information (Sundberg, Loeb, Hale, Eigenheer, 2002), to teach spontaneous mands that occur solely under the control of the MO (Sweeney-Kerwin, et al., 2007), to teach mands for missing items (Hall & Sundberg, 1987; Sigafoos, Doss, & Reichle, 1989), to improve the acquisition of tacts following mand training (Carroll & Hesse, 1987; Arntzen & Almas, 2002), and to improve the echoic and tact repertoires following mand training (Drash, High, & Tudor, 1999).

Comparing NET and Other NTAs

NET	Other NTAs
• Conceptually based upon the work of Skinner (1938, 1953, 1957) and Michael (1982, 1988, 1993, 2000, 2007) • Uses a behavioral analysis of language to guide development of teaching procedures and selection of targets • Teaching is conducted in the natural environment • Environment is set up so as to contrive motivation and capture teaching opportunities • Focus is on teaching all of the verbal operants (i.e., mand, tact, echoic, mimetic, and listener behavior)	• Conceptually based upon the work of Stokes and Baer (1977) and Hart and Risley (1968, 1974, 1975) • Uses a traditional (linguistic) analysis of language to guide development of teaching procedures and selection of targets • Teaching is conducted in the natural environment • Environment is set up so as to contrive motivation and capture teaching opportunities • Focus is primarily on teaching spontaneously language in the forms of requests

NATURAL ENVIRONMENT TEACHING: EARLY LEARNERS

STUDENT PROFILE:	TEACHING OBJECTIVES:
• Limited basic skills • Weak echoic • Almost no formal mands • Few receptive responses outside of the context • Few tacts • Few intraverbals	• Put very few demands on the child and pair yourself with reinforcers. • Have child take reinforcers from you. • Gradually increase response requirement. • Begin errorless teaching of mands with full complement of prompts and then fade prompts. • Intersperse a few instructional demands for easy tasks. • Move to the formal teaching setting briefly and mand for reinforcers

339

EARLY LEARNER NET LESSON PLAN: ANTHONY

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Pairing	**N/A**
Playing with Blocks	**Mands (requests):** • "Block" (sign) • "Go" (vocal) **Receptive:** • Stack the block • Put the block on top **Motor Imitation:** • Knocking down blocks • Stacking blocks **Intraverbals:** • Ready, set, "go" (part mand)

VIDEO (Anthony with Christy)

340

EARLY LEARNER NET LESSON PLAN: SOFIA

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Spinning	**Mands (requests):** • "Spin" (vocal) • "All done" (vocal) Katy ABCs Katy Old McDonald

VIDEO (Sofia with Emily)

EARLY LEARNER NET LESSON PLAN: MAX

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Sesame Street Musical Toy	**Mands (requests):** • Sesame Street characters ("Ernie," "Grover," "Cookie Monster," "Zoe," "Big Bird," "Elmo") • "Pull" **Receptive:** • Feet • Stomp feet • Clap hands • Big Bird's eyes • Ernie **Motor Imitation:** • Stomping feet • Nodding head • Arms up **Tact (labeling):** • Sesame Street characters ("Big Bird," "Zoe") VIDEO (Max with Emily) Max 2 Bobby/Brian Leanne with Joey Working Hard

NATURAL ENVIRONMENT TEACHING: INTERMEDIATE LEARNERS

STUDENT PROFILE:	TEACHING OBJECTIVES:
• Several mands, some of which are emitted under the control of the motivating operation (MO) and the transitive motivation operation (CMO-T) • Some receptive language, including some RFFCs (receptives by feature, function, and class) • Many tacts • Simple intraverbals	• Teach within the context of the activities which are reinforcing and motivating for the child. • Teach Mands, simple tacts, receptive, RFFC, and simple intraverbals. • Many of these responses will be multiply controlled (e.g., part or mostly mand). • Begin the VB module in this environment. • Move the teaching gradually to more intensive teaching settings.

INTERMEDIATE LEARNER NET LESSON PLAN: JOHNNY

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Art Project: Coloring and gluing a pig picture	**Mands (requests):** • "Paint" (sign) • "Scissors" (sign) • "Glue" (sign) • "Paper" (sign) **Tact (labeling):** • "Pig" **Intraverbal:** • Oink, oink… "pig" • Moo, moo… "cow" • Pig… "oink, oink" • Meow… "cat" Managing Problem Behavior Andy

VIDEO (Johnny with Cindy)

INTERMEDIATE LEARNER NET LESSON PLAN: KAITLIN

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Reading a book: "Brown Bear, Brown Bear"	**Mands (requests):** • "Book" (sign) • "Candy" (sign) **Tact (labeling):** • "Bird" • "Duck" • "Horse" • "Frog" • "Cat" • "Dog" • "Sheep" • "Fish" **Intraverbal:** • Brown "bear," brown "bear" (part tact) Katie ABCs

VIDEO (Kaitlin with Laura)

345

INTERMEDIATE LEARNER NET LESSON PLAN: DECLAN

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Reading a picture book	**Mands (requests):** • "Turn the page" • "Read" **Receptive:** • Cake • High 5 • Bee • Cat **Motor Imitation:** • Itsy bitsy spider song movements **Tact (labeling):** • "Train," "hat," "cupcakes," "bathroom," "duck," "shower," "clock," "butterfly," "bug," "ladybug," "bunny," "car," "spider," "fire truck," "bus" **Intraverbal:** • Duck… "quack, quack" • Clock… "tick tock, tick tock" • Train… "choo choo" • Bee… "buzz" • "Itsy Bitsy Spider" song fill-ins (e.g., "spider"… "spout"... "rain"… "out"…"sun") • "Wheels on the Bus" song fill-ins (e.g., "bus"… "round and round"… "town"… "waa")

VIDEO (Declan with Danielle)

346

NATURAL ENVIRONMENT TEACHING: ADVANCED LEARNERS

STUDENT PROFILE:	TEACHING OBJECTIVES:
• Many spontaneous mands, including mands for information • Complex tacts • RFFCs • Intraverbals • Some math skills • Some reading skills	• Teach within the context of the reinforcing or motivational activities of the child. • Complex VB modules that are conversations within non-verbal contexts. • These modules include answers to "wh" questions as well as manding for information (i.e., asking "wh" questions). • Have similar but less complex conversations in the intensive teaching settings.

ADVANCED LEARNER NET LESSON PLAN: CODY

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Art Project: Making a butterfly	**Mands (requests):** • "How do we do it?" • "Can I do it?" • "Next color" **Tact (labeling):** • Parts a features of a butterfly (e.g., "wings," "antenna," "body," "legs")
Reading a book: "Caterpillar Spring"	**Mands (requests):** • "Turn the page" **Receptive:** • Sleeping • Woodpecker **Tact (labeling):** • "Sun," "caterpillar," "another bird," "ladybug," "ant," "bee," "dragonfly," "leaf," "flower," "butterfly" • Parts and features of a butterfly (e.g., "wings," "antenna," "body," "legs") • "Yes"/"No" • Pronouns (e.g., "his") **Intraverbal:** • What says tweet, tweet? – "bird" • What does a bee say? – "buzz" • Tell me something that swims in the water – "fish"

VIDEO (Cody with Cindy)

ADVANCED LEARNER NET LESSON PLAN: CODY

ACTIVITY	WHAT THE LEARNER WILL TALK ABOUT
Reading a book: "The Big Truck Book"	**Mands (requests):** • "Wait" **Tact (labeling):** • "Farm truck" **Intraverbal:** • Tell me some other vehicles – "Garbage truck"… "passenger train"… "car"… "bike" **End of last video for this video** NET Videos

DTI to NET Generalization

TRANSFERING DTI SKILLS TO NET

- DTI has been demonstrated to be an effective method of treatment and education for persons with autism (Smith, 2001).
- However many children with autism fail to generalize the skills they were taught from one setting to another or from one set of stimuli to others.
- If the skills taught during DTI were only taught in the context of DTI it is unlikely they would transfer (generalize) to the every day natural environment of the learner.
- In other words, the children would only be able to emit those responses when sitting at a table and being presented with specific teaching materials.
- If the skills that were taught in the context of DTI do not generalize to more natural environments, it is unlikely that these skills would be used in any functional way.

- Consequently, effective ABA programs plan to target generalization by transfering the skills taught during DTI to the naturally occurring environments appropriate to the age of the individual.
- Begin by assessing and targeting generalization of skills from DTI to NET in the context of functional, motivating activities that are conducted in different settings and using different stimuli from the original teaching situation.

Target Selection and Data Collection for DTI to NET Generalization

- Identify a NET activity that includes many opportunities to emit functional responses across various verbal and non-verbal operants.
- Select a range of verbal and non-verbal targets to be taught that are relevant to the activity.
- Teach all of those targets to the learner's specified mastery criteria during DTI.
- After all targets have been mastered at DTI, run the NET activity and probe all targets in the context of this activity. Record yes/no first trial probe data.

- If the learner responds correctly, reinforce and move on with the activity.
- If the learner responds incorrectly, run an error correction within the context of the activity to teach the response. Strengthen that response throughout the remainder of the activity.
- If the learner emits any incorrect responses on first trial probes, you will repeat the above mentioned steps for all targets on each subsequent day until the learner meets the mastery criteria of scoring a "yes" on first trial probes of all targets during one single session.
- Graph yes/no probe data daily. Graph cumulative number of DTI to NET Generalization targets mastered per week.

DTI to NET Generalization Lesson Plan

Bobby DTI- NET

Learner: Bobby

Date: _____

Activity: Old McDonald Game

Module #: 1

Objective:

To assess and transfer stimulus control of tact, listener, motor imitation, and intraverbal responses from stimuli taught during DTI to exemplars in the natural environment

Materials:

Old McDonald game w/ cards, animal pieces (pig, horse, cow, chicken, sheep), Poppers; variety of reinforcers

Targets	Y / N
Pig- tact	Y N
horse-tact	Y N
Cow-tact	Y N
pig- receptive	Y N
horse - receptive	Y N
Cow- receptive	Y N
pig-motor im.	Y N
horse - motor im.	Y N
cow- motor im.	Y N
pig- intraverbal	Y N
horse- intraverbal	Y N
Cow- intraverbal	Y N

DTI to NET Generalization Lesson Plan

Learner: ___Morgan_____

Date: _____

Activity: _Goodnight Gorilla Book_

Emily with Morgan

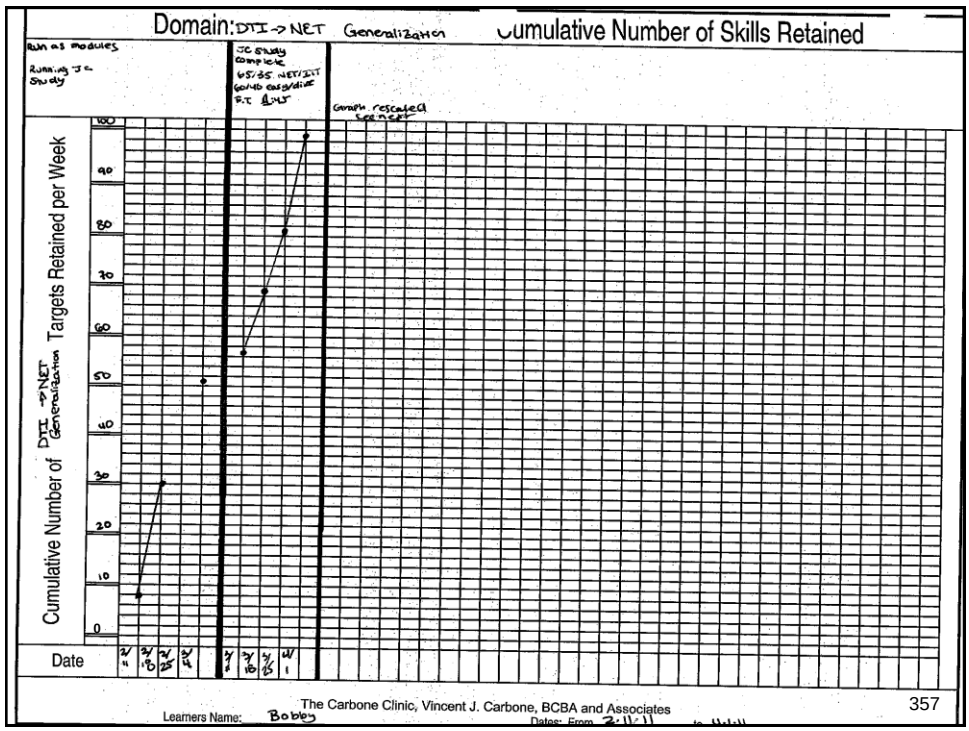
Module #: __1_____

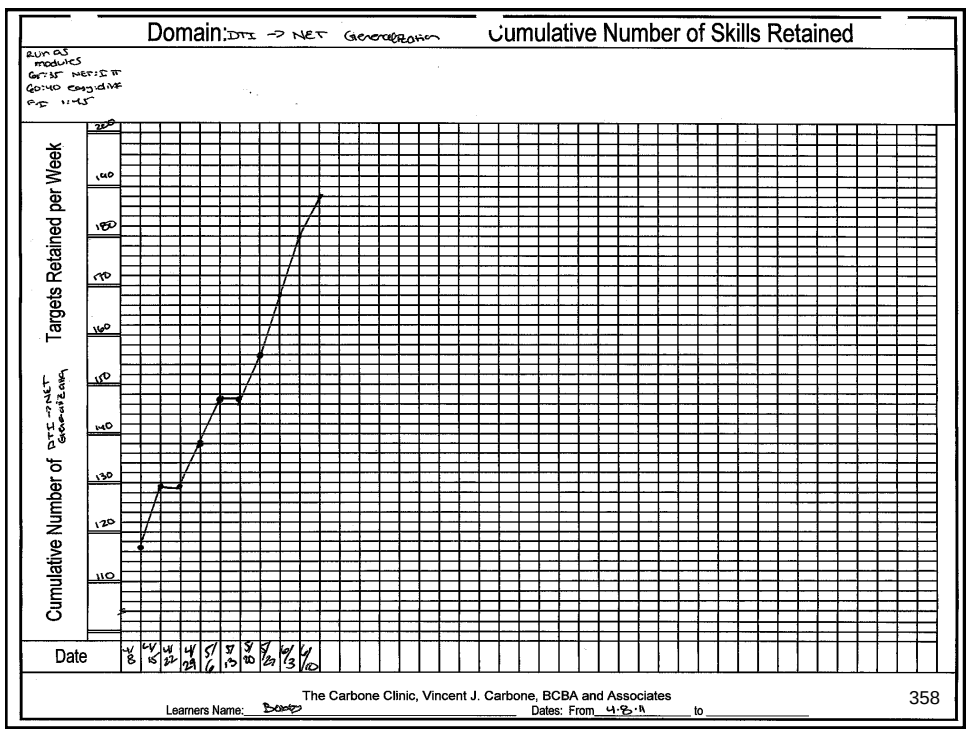
Objective:

__to assess and transfer stimulus control of listener, tact, and intraverbal responses from stimuli at DTI to different exemplars in the natural environment_____

Materials: ___Goodnight Gorilla book, velcro stimuli, felt board_____

Targets	Y / N
G4 – keys	Y N
– flashlight	Y N
G10 – elephant: ears	Y N
tusks	Y N
trunk	Y N
H2/5/6 – What does a lion say? (roar)	Y N
C41 – Find the animal with the long neck. (giraffe)	Y N
G5 – What is the gorilla doing? (yawning)	Y N


Domain: DTI -> NET Generalization
Cumulative Number of Skills Retained
Run as modules
Running JC Study
JC study complete 65/65 NET/DTT GO:40 easy/diff P.T 1:45
Graph rescaled forward
Cumulative Number of DTI -> NET Generalization Targets Retained per Week
100
90
80
70
60
50
40
30
20
10
0
Date
2/11
3/10
3/25
4/8
4/8
4/22
5/6
5/20
6/3
6/17
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
Learners Name: Bobby
Dates: From 2/11/11 to
357


Domain: DTI -> NET Generalization
Cumulative Number of Skills Retained
Run as modules
GO:35 NET:5 PT GO:40 easy/diff P.T 1:45
Cumulative Number of DTI->NET Generalization Targets Retained per Week
200
190
180
170
160
150
140
130
120
110
Date
4/8
4/15
4/22
4/29
5/6
5/13
5/20
5/27
6/3
6/10
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
Learners Name: Bobby
Dates: From 4-8-11 to
358

PERFORMANCE MANAGEMENT

Teaching Sign Manding Evaluation Form

Teacher: Kaitlin w/ Bobby Competency Conducted by: (Kat)

Instructions: Use a rating scale of "+" to indicate that the skill did occur and "-" to indicate that the skill did not occur. At the end of the evaluation period, tally the total number of "+" and "-" and calculate the percentage of correct responses. The shaded areas indicate critical skills; if these skills are not observed it will result in failing the competency.

	Date	Remediation Date	Re-Assessment Date
	2/10/11		
Area one: Organization			
Instructional area is neat and clean	+		
All materials needed are organized and ready	+		
Variety of potential reinforcers are available	+		
[redacted]	+		
Area two: Teaching Procedure			
Teacher actively builds/contrives MO	+		
[redacted]	+		
Teacher uses the least intrusive but most effective prompt	+		
Teacher fades prompts appropriately	+		
Stimulus control transfer is done appropriately	+		
Item name is said many times during and after delivery of Sr+	+		
Teacher provides adequate number of teaching trials per day	(-) 1		
Variety of stimuli (multiple exemplars) used to teach the same mand whenever possible/appropriate	+		
Teacher conducts discrimination training across as many Sr+ as possible	+		
Varies elements of teaching procedures based on unique teaching situation	+		
Area three: Teaching Vocal Approximations			
Teacher holds up item and learner mands with no prompts	+		
Teacher implements a 5 second time delay	+		
If the learner emits the target vocal production within the time delay period, the teacher immediately delivers the reinforcer	+		
If the learner doesn't emit the target vocal production, the teacher withholds reinforcement and states the item name	+		
If the learner emits the target vocal production the teacher reinforces immediately	+		
If the target approximation is not reached the teacher presents the word up to 3 -5 times before differentially reinforcing	+		
Area four: Reinforcement			
Teacher differentially reinforces approximations with a greater or lesser magnitude of reinforcement when appropriate/applicable	+		

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	Date	Remediation Date	Re-Assessment Date
	2/14/11		
Area five: Error Correction			
Controlling procedures are implemented correctly	N/A		
Other learner-specific error correction procedures (e.g., repetitive mand procedure) are implemented correctly	↓		
Area six: Data Collection			
Data collection sheet is available	+		
All mands are recorded (80% IOA)	+ (IOA = 82%)		
Target approximation or sound is recorded accurately on data sheet (80% IOA)	+ (IOA = 89%)		
Data for controlling variables for each mand are accurately recorded (80% IOA)	+ (IOA = 100%)		
Rate of mands are calculated and graphed daily	+		
Data for vocal categories of productions are calculated and graphed daily	+		
Other learner-specific mand graphs are graphed daily	+		
Area seven: Avoids Common Mistakes			
Initial mands are dissimilar topographies	N/A		
Teaches mands that are specific (e.g., puzzle, ball, cookie), NOT general (e.g., more, eat, toy, all done)	↓		
Initial mands are from several motivational categories			
Appropriate number of teaching targets (sign mand probes) are identified	+ (#)		

	Date	Correct (+)	Errors (-)	% Correct	Pass/Fail
Initial Assessment	2/14/11	28	1	97%	Pass
Remediation					
Re-Assessment					

Impressions: Good implementation of vocal shaping procedures. His consistency + quality of saying "more" has improved nicely!

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Targets:

(#) For majority of mand probe targets there were only 1 or 2 teaching trials. Sometimes this was an NO issue (e.g., gumball game). But, more needs to be done to plan multiple opportunities in context of several different activities throughout session to 7 teaching trials for all mand probe targets.

(#) I know time is strapped now w/ study stuff + IFT to NET generalization. But, as his schedule gets back to normal a big emphasis per mandings needs to be conditioning new activities as reinforcers and teaching mands for several things w/in context of these activities simultaneously. This will allow up to ↑ # of mand probe targets while still T # of teaching trials per target.

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Natural Environment Teaching Evaluation Form

Teacher: Kaitlin + Bobby Competency Conducted by: KA

Instructions: Use a rating scale of "+" to indicate that the skill did occur and "-" to indicate that the skill did not occur. At the end of the evaluation period, tally the total number of "+" and "-" and calculate the percentage of correct responses. The shaded areas indicate critical skills; if these skills are not observed it will result in failing the competency.

	Date	Remediation Date	Re-Assessment Date
	2/16/11		
Area one: Organization			
Instructional area is neat and clean	+		
All materials needed are organized and ready	+		
Begins promptly/avoids wasting time	+		
Recommendation based on previous competency: N/A	+		
Area two: Instructional Delivery (General)			
Establishes instructional control	+		
Follows MO of learner	+		
Appropriate level of enthusiasm	+		
Mixes verbal operants	+		
Teaches appropriate targets	+		
Uses errorless teaching	+		
Exposes learner to new activities	+		
Actively builds MO for activities	+		
Uses appropriate variety of activities	+		
Stays with activities for an appropriate amount of time	+		
Has student help clean up	+		
Varies elements of teaching procedures based on unique teaching situation	+		
Area three: Instructional Delivery (Adjusted by Learner)			
Begins NET session with manding	+		
Averages correct number of responses per min	+		
Targets ITT to NET generalization (VB Modules)	+		
Conditions new reinforcers	+ (*)		
Teaches appropriate play skills	+		
Teaches appropriate social skills	N/A		
Area four: Reinforcement			
Sr+ reinforcer competes with Sr-/SrA+	+		
Pairs social reinforcement with tangible items	+		

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	Date	Remediation Date	Re-Assessment Date
	2/16/11		
Area five: Behavior Management			
Correctly implements behavior reduction procedures	+		
Maintains composure during behavior reduction procedures	+		
Area six: Data Collection			
Accurately records behavior (ABC) data (80% IOA)	(-) *		
Accurately records learner-specific data across NET instructional objectives (e.g., play or social skills data, conditioning new reinforcers, etc.)	+		
Graphs for learner-specific NET instructional objectives are up to date	+		

Responses across verbal operants: 1 minute sample

Mands	Tacts	Receptive	Intraverbal	Motor Im.	Echoics	Textual

Responses per minute (1 minute timing): _____

	Date	Correct (+)	Errors (-)	% Correct	Pass/Fail
Initial Assessment	2/16/11	27	1	96%	Pass
Remediation					
Re-Assessment					

Impressions: The farm animal activity looked really good - nice balance of manding + other operant responses all related to a motivating activity.

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Targets:

(1) 10A for PB data was 3/10 = 30%. All episodes were recorded but 4/10 were recorded w/ diff antecedents, 9/10 w/ diff behaviors, + 9/10 w/ diff consequences.

(2) There was some attention to conditioning new SR+, but as his schedule opens up after VB-MAPP update + study are done this will need to be a much larger focus.

Effective Teaching Procedures Evaluation Form

Teacher: Kaitlin + Bobby Competency Conducted by: KG

Instructions: Use a rating scale of "+" to indicate that the skill did occur and "-" to indicate that the skill did not occur. At the end of the evaluation period, tally the total number of "+" and "-" and calculate the percentage of correct responses. The shaded areas indicate critical skills; if these skills are not observed it will result in failing the competency.

	Date	Remediation Date	Re-Assessment Date
	2/14/11		
Area one: Organization			
Instructional area is neat and clean	+		
All materials needed are organized and ready	+		
Begins promptly/avoids wasted time	+		
Materials needed are ready, labeled and organized based upon daily data for an unfamiliar teacher	+		
Recommendation based on previous competency [illegible]	+		
Area two: Instructional Delivery			
Establishes instructional control	+		
Confirms MO of learner	+		
Begins session with pairing/manding	+		
Stimulus demand fading procedures are used	+		
Gives clear/discrete directions and prompts	+		
Tone of voice is natural	+		
Appropriate level of enthusiasm	+		
Mixes verbal operants	+		
Appropriate ratio of easy (80%) to difficult (20%) tasks	+ (E)		
Ratio of Corrects to Errors (above 80%): E D 61% 39% 58% 42% Corrects: 9 Errors: 1 %: 90% Corrects: 11 Errors: 1 %: 92% Corrects: 10 Errors: 0 %: 100%	+		
Conducts cold probes prior to teaching	+		
Errorless Teaching:			
Presents SD and prompts response using 0 second time delay	+		
Uses transfer trial after prompted response	+		
Presents distracters	+		
Probes target response	+		
Maintains pace of instruction 16-25 per min	+		
Teacher uses prompts that reliably evoke the response	+		
Teacher fades prompts appropriately	+		
Varies SDs	+		
Varies elements of teaching procedures based on unique teaching situation	(-) 1		

	Date	Remediation Date	Re-Assessment Date
	2/14/11		
Area three: Error Correction			
Re-states SD and prompts response with 0 second time delay after error/no response	+		
Uses transfer trial after prompted response	+		
Presents distracters	+		
Probes target response	+		
Re-presents target stimuli many times during teaching	+		
	+		
Area four: Reinforcement			
Delivers reinforcers immediately	+		
Teacher controls reinforcers	+		
Follows appropriate VR schedule	(-) 2		
Differentially reinforces responses	+		
Sr+ reinforcer competes with Sr-/SrA+	+		
Uses a variety of reinforcers	+		
Pairs social reinforcement w/tangible items	+		
Area five: Behavior Management			
Correctly implements extinction procedures	N/A		
Maintains composure during behavior reduction procedures	↓		
Accurately records behavior data	↓		
Area six: Data Collection			
Measurement of student responses is reliable (80% or above)	+		

	Date	Correct (+)	Errors (-)	% Correct	Pass/Fail
Initial Assessment	2/16/11	37	2	95%	Pass
Remediation					
Re-Assessment					

Impressions: Good job mixing assessment skills in with MVR + current targets. Prompting of signs listed very precise – nice remediation of previous target. Good attention to differentially reinforcing improved vocal productions (HI + S + S) as a part of the shaping process.

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Targets:

① Don't hold your hand up next to Bobby's face/eyes to block his vision of a competing reinforcer. Prompt him to turn around by telling him to, physical prompt on cheek, etc. Then ↓ something about your teaching to ↓ the value of that competing Sr+ + ↑ looking away.

② Avg. VR + range were too high. Many times I had recorded 5 - 10 more demands per run through than you had while clicking. If tracking your own VR in-the-moment, be sure your clicks are accurate. (May need to video to double V.)

③ This 60:40 ratio seemed ok, esp. given focus on HI + S+S. When revamping program look to specify this ratio @ s/t diffy from the typical 80:20.

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Running General Behavior Reduction Procedures Evaluation Form

Teacher: Kaitlin M Bobby Competency Conducted by: KR

Instructions: Use a rating scale of "+" to indicate that the skill did occur and "-" to indicate that the skill did not occur. At the end of the evaluation period, tally the total number of "+" and "-" and calculate the percentage of correct responses. The shaded areas indicate critical skills; if these skills are not observed it will result in failing the competency.

	Date	Remediation Date	Re-assessment Date
	2/10/11		
Area one: Organization			
All materials needed are organized and ready	+		
Variety of potential reinforcers available	+		
Recommendation based no previous competency: None	+		
Area two: Told "no"			
When the learner mands for an item or activity the instructor tells him "no" and offers an alternative item/activity	+		
Instructor delivers the alternative item/activity *if no problem behavior occurs*	+		
Instructor removes the item offered if problem behavior occurs	+		
Instructor ignores the problem behavior (e.g., turns back, leaves area if safe) except to block SIB	(-)		
Instructor waits until problem behavior has stopped for a period of time before reengaging with the learner	N/A		
If problem behavior continues for a long period of time, instructor continues to move forward with session as time dictates	N/A		
If a demand is to be placed the instructor continues to place the demand until learner complies with demand without engaging in P.B. *(uses physical guidance if necessary)*	+		
Instructor begins to deliver reinforcers in the activity transitioned to only when problem behavior has stopped for a period of time	+		
Instructor thins schedule of reinforcement (for delivering alternative reinforcer) as appropriate	+		
Procedure consistently implemented based on antecedent	+		
Area three: Wants Something			
If able/willing to reinforce, the instructor:			
Tells the child "No (behavior)"	N/A		
Begins to count to designated time			
Holds fingers up to show passage of time			
Pace of count is good			
Starts count over if behavior continues			
Blocks and protects during SIB			

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369

	Date	Remediation Date	Re-assessment Date
Does not follow the learner if they run away (exception: SIB)	N/A		
Prompts mand after count is completed			
Delivers reinforcer for mand			
Discontinues procedure if time dictates a transition			
Length of count is appropriate and increased as appropriate based on strength of learner's mand repertoire			
If not able/willing to reinforce, the instructor:			
Blocks access to the reinforcer	N/A		
Ignores the problem behavior (e.g., turns back, leaves area if safe) except to block SIB			
If problem behavior continues for a long period of time, continues to move forward with session as time dictates			
If a demand is to be placed continues to place the demand until learner complies with demand without engaging in P.B. *(uses physical guidance if necessary)*			
Begins to deliver reinforcers in the activity transitioned to only when problem behavior has stopped for a period of time			
Procedures consistently implemented based on antecedent and willingness to reinforce			
Area four: Interruption/Transition			
Instructor prepares for transition (i.e., gathers materials)	+		
Instructor approaches the learner and offers a promise reinforcer (if necessary)	+		
Instructor delivers the instruction to transition to a less preferred activity	+		
Instructor delivers promise reinforcer *if no problem behavior occurs*	+		
Instructor withdraws the promise reinforcer if problem behavior occurs	+		
Instructor keeps the demand on the learner by repeating the demand in a neutral voice every 2 – 3 seconds and uses physical guidance to obtain compliance with the demand *(if necessary)*	+		
Instructor begins to deliver reinforcers in the activity transitioned to only when problem behavior has stopped for a period of time	+		
Instructor thins schedule of reinforcement as appropriate	+		
Procedure consistently implemented based on antecedent	+		
Area five: Demand (NET/ITT)			
Instructor keeps the demand on the learner by repeating the demand in a neutral voice every 2 – 3 seconds and uses physical guidance to obtain compliance with the demand *(if necessary)*	+		

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370

	Date	Remediation Date	Re-assessment Date
Instructor begins to deliver reinforcers only when problem behavior has stopped for a period of time	+		
Procedure consistently implemented based on antecedent	+		
Area six: MO Unclear			
Instructor does not change anything about the environment	+		
Instructor blocks SIB (if necessary)	N/A		
Procedure consistently implemented based on antecedent	+		
Area seven: Data Collection			
ABC data are accurately recorded for problem behavior during daily routines (IOA 80%)	⊖[2]		
Data are graphed daily	+		

	Date	Correct (+)	Errors (-)	% Correct	Pass/Fail
Initial Assessment	2/10/11	25	2	93%	Pass
Remediation					
Re-Assessment					

Impressions: Good job maintaining composure throughout. Nice implementation of ESC EXT in NET.

Targets:

① If you were "in transition" + determining your plan of what to do next when PB is evoked by told no, don't jump into demands. Still do what you were doing – sitting + thinking of your plan; then after plan is decided present relevant demands. Today in both areas you immediately did several MI's then pulled out the ball toy + required several balls to be put in. All of this looked like contingent demands, not natural demands of moving forward w/ session.

② See target re: IOA on NET comp.

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Training

Effective Teaching Procedures Evaluation Form

Teacher: Sarah at Andre Competency Conducted by: CW

Instructions: Use a rating scale of "+" to indicate that the skill did occur and "-" to indicate that the skill did not occur. At the end of the evaluation period, tally the total number of "+" and "-" and calculate the percentage of correct responses. The shaded areas indicate critical skills; if these skills are not observed it will result in failing the competency.

	Date	Remediation Date	Re-Assessment Date
	11.8.11		
Area one: Organization			
Instructional area is neat and clean	+		
All materials needed are organized and ready	+		
Begins promptly/avoids wasted time	— 1	+	
Materials needed are ready, labeled and organized based upon daily data for an unfamiliar teacher	+		
Appropriate number of teaching targets are identified	+		
Teaching targets are appropriate and functional	+		
Recommend next based on previous competency	N/A		
Area two: Instructional Delivery			
Establishes instructional control	+		
Confirms MO of learner	+		
Begins session with pairing/manding	+		
Stimulus demand fading procedures are used	— 2	+	
Gives clear/discrete directions and prompts	+		
Tone of voice is natural	+		
Appropriate level of enthusiasm	+		
Mixes verbal operants 25	+		
Appropriate ratio of easy (80%) to difficult (20%) tasks	+		
Ratio of Corrects to Errors (above 80%): Corrects: 11 Errors: 1 %: 94 Corrects: 13 Errors: 2 %: 87 Corrects: 10 Errors: 1 %: 91	+		
Maintains pace of instruction 16-25 per min	— 3	+	
Varies SDs	— 4	—	
Conducts cold probes prior to teaching	+		
Errorless Teaching:			
Presents SD and prompts response using 0 second time delay	— 5	+	
Uses transfer trial after prompted response	+		
Presents distracters	+		
Probes target response	+		
Teaches each target two times (unless otherwise specified)	+		
Teacher uses prompts that reliably evoke the response	+		
Teacher fades prompts appropriately	+		

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	Date	Remediation Date	Re-Assessment Date
Implements learner specific teaching procedures and/or program changes accurately	– 6	+	
Varies elements of teaching procedures based on unique teaching situation	+		
Area three: Error Correction			
Corrects errors immediately	+		
Re-states SD and prompts response with 0 second time delay after error/no response	+		
Uses transfer trial after prompted response	– 7	+	
Presents distracters	+		
Probes target response	+		
Re-presents target stimuli many times during teaching	– 8	+	
Area four: Reinforcement			
Delivers reinforcers immediately	+		
Teacher controls reinforcers	+		
Follows appropriate VR schedule VR 3	+		
Differentially reinforces responses	+		
Sr+ reinforcer competes with Sr-/SrA+	+		
Uses a variety of reinforcers	+		
Pairs social reinforcement w/tangible items	+		
Area five: Behavior Management			
Correctly implements extinction procedures	NA		
Maintains composure during behavior reduction procedures	↓		
Accurately records behavior data	↓		
Area six: Data Collection			
Measurement of student responses is reliable (80% or above)	+		

	Date	Correct (+)	Errors (-)	% Correct	Pass/Fail
Initial Assessment	11.8.11	34	8	81 %	FAIL
Remediation	11.9.11	41	1	98 %	PASS
Re-Assessment					

Impressions: You take corrective feedback and immediately implement the changes. it has been a pleasure training you. Great job improving your skills throughout the session.

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373

Targets:

① Before you start a run through determine what you'll be teaching and if you can set up any materials prior to beginning the run through to avoid a period of time w/ Andre just sitting and waiting for the next SD.

② Stimulus demand fade in should be a few things
- Fade in # of responses 1, 2, 3
- Fade in requirement for Andre to deliver tokens
- Fade in difficulty of demands

③ Pace of instruction – low only when you are setting up materials

④ Vary SD "Tell me what you see" "What is it" "What #" "what # do you see" "Who is this" "Whats her name" etc.

⑤ When teaching new targets make sure you are immediately prompting the response.

⑥ Make sure you understand + implement each Prg. & indicated for each target

⑦ Consistently run a transfer trial when running error correction procedure

⑧ After an error correction procedure Put the stimuli back into the pile towards top to represent again + be sure he is properly maintaining that skill

M.
Vary your SD

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374

INTRODUCTION TO SELECTON-BASED AND TOPOGRAPHY-BASED VERBAL BEHAVIOR

The behavioral and conceptual analysis of the differences between selection-based (SB) and topography-based (TB) verbal behavior was offered by Jack Michael (1985).

This analysis is not widely recognized outside of the behavior analytic community. It serves as the foundation for my discussion on this topic.

This difference is more commonly referred to as the difference between aided (symbol-based) and unaided (sign language and gesture) methods of augmentative communication.

When analyzed behaviorally and conceptually, **it becomes clear that the two systems are actually quite different from the perspective of the speaker and therefore need a more thorough comparison beyond variables related to concreteness of the stimuli, visual nature of the learner, strength of the learner's motor skills, and number of competent listeners.**

In the field of autism, practitioners must often choose between a SB symbol system, a TB method such as sign language, or some combination for their non-vocal learners.

Let's look at the differences between the two forms of communication to help guide our choices in this very important area.

See Slide Below

SELECTION-BASED AND TOPOGRAPHY-BASED VERBAL BEHAVIOR (cont.)

Topography-Based (sign)	Selection-Based (pointing, exchanging)
▪ Different motor movement for each controlling relation ▪ Example: the mand (sign) for candy requires a different topography (motor movement) than the mand (sign) for shoes	▪ The "speaker" makes virtually the same motor movement for each controlling relation (pointing, exchanging) ▪ Example: the mand (point, exchange) for candy requires the same topography (motor movement) as the mand (point, exchange) for shoes

This analysis leads to the conclusion that signing and talking are quite similar, while selection-based systems share very few characteristics with talking.

EFFICIENCY OF THE RESPONSES

- An important consideration in choosing an augmentative form of communication is how easily it can be acquired and how efficient it is in replacing problem behavior.
- Several studies have examined the ease of acquisition and efficiency issues.
- On the issue of efficiency and response effort there is empirical support for the superiority of sign compared to visual symbol **systems in reducing problem behavior (Richman, et al. 2001). In addition, the learner almost always chose the sign over the symbol to replace problem behavior in this study.**
- A task analysis of the motor movements necessary to communicate with a symbol (i.e. scanning, selecting, placement on a Velcro strip) shows the difference in efficiency between SB and TB.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2001, 34, 73–76 NUMBER 1 (SPRING 2001)

RESPONSE EFFICIENCY DURING FUNCTIONAL COMMUNICATION TRAINING: EFFECTS OF EFFORT ON RESPONSE ALLOCATION

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An analogue functional analysis revealed that the problem behavior of a young child with developmental delays was maintained by positive reinforcement. A concurrent-schedule procedure was then used to vary the amount of effort required to emit mands. Results suggested that response effort can be an important variable when developing effective functional communication training programs.

DESCRIPTORS: functional analysis, functional communication training, aggression, concurrent schedules, mands, developmental disabilities

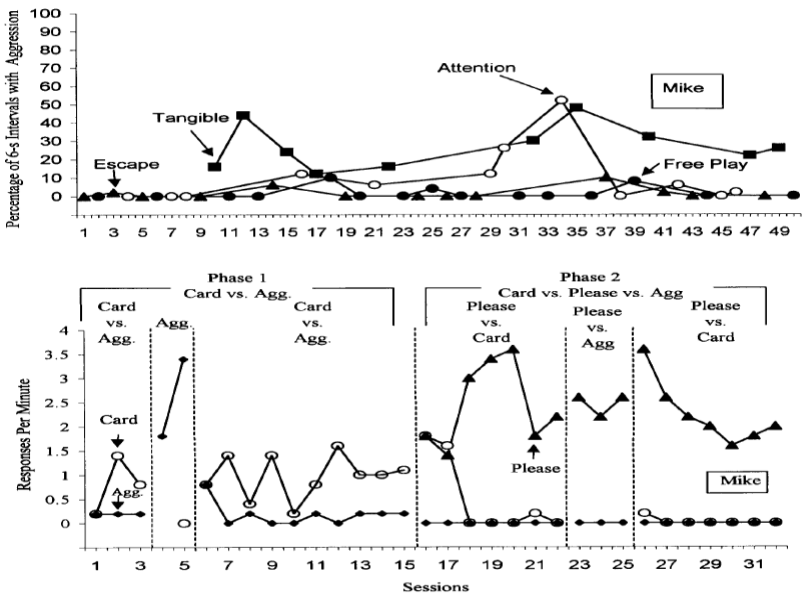

Figure 1. Top panel depicts the percentage of 6-s intervals with aggression during Mike's functional analysis. Bottom panel depicts responses per minute of aggression and manding (card or "please") during the mand analysis.

NUMBER OF RESPONSES FOR TB & SB RESPONSES

Sign Mand for Water

MO ⟶ sign water **(1)** ⟶ receives water

PECS Mand for Water

MO ⟶ scans for book **(1)** ⟶ moves to book **(2)** ⟶ opens book **(3)** and scans to picture **(4)** ⟶ picks up picture **(5)** ⟶ scans for strip **(6)** ⟶ places picture **(7)** ⟶ scans for "I want" **(8)** ⟶ selects "I want" **(9)** ⟶ places "I want" **(10)** ⟶ gives strip to listener **(11)** ⟶ receives water

- **It can be difficult to ensure that the "speaker" always has the relevant symbols available.** And, when an item suddenly becomes effective as a reinforcer and the symbol is not available due to space limitations or other reasons an episode of problem behavior could occur.
- **In addition, the speed of the SB communication is generally slower compared to signing or talking. This may effect the stimulus control of the speaker (i.e. I forgot what I had to say while searching the symbol) or the stimulus control of the listener (i.e. no longer interested in what you have to say).**
- This may partially account for why persons with both SB and TB verbal repertoires will generally prefer to engage in TB responding given a capable audience.
- The SB response in general may be shorter due to time and effort limitations.

EASE OF ACQUISITION

- The data in this area are mixed within studies that have compared SB and TB related to ease of acquisition. For an early review of research on this topic see Potter and Brown (1997).
- The studies reviewed by Potter & Brown all showed that persons with developmental disabilities acquired TB skills more quickly, with less errors, and developed receptive responses to the same stimuli while heir SB repertoires developed more slowly with more errors and less development of receptive responses.
- Conflicting data on efficiency has been presented by Adkins and Axelrod (2000) but there were some methodological flaws.
- Michael's conceptual behavioral analysis of the differences between SB and TB would suggest quicker acquisition rates with TB vs SB.
- This difference is partially related to the extra level of conditionality in the discrimination between SB and TB.

DIAGRAMS OF THE METHODS OF COMMUNICATION

Topography-Based VB Diagram

1.MO/S^D ⟶ 2. R ⟶ 3. Sr^+

Selection-Based (PECS) VB Diagram

1. MO/S^D ⟶ 2. scan response ⟶ 3. Sr^+ (finding the picture)

4. MO/S^D (seeing the picture) ⟶ 5. response (selection) ⟶ 6. . Sr^+

An additional level of discrimination is required in SB verbal behavior.

- In the case of SB there must always be two stimuli present, two responses, and a mediating scanning response between them. In the case of TB (sign) there need only be one stimulus present to produce a response while eliminating the need for a scanning response.
- Not only must two stimuli be present but a conditional relationship must be strengthened between the specific stimuli and some type of selection response. You only point to a picture of a cup when the presence of the picture makes it an S^D for selecting it while all other stimuli are S^Δ for the selection response. This is a very difficult discrimination to learn and is not required when teaching signing.
- A study by Grow, et al. (2011) documented this finding.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 475–498 NUMBER 3 (FALL 2011)

A COMPARISON OF METHODS FOR TEACHING RECEPTIVE LABELING TO CHILDREN WITH AUTISM SPECTRUM DISORDERS

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Many early intervention curricular manuals recommend teaching auditory-visual conditional discriminations (i.e., receptive labeling) using the simple-conditional method in which component simple discriminations are taught in isolation and in the presence of a distracter stimulus before the learner is required to respond conditionally. Some have argued that this procedure might be susceptible to faulty stimulus control such as stimulus overselectivity (Green, 2001). Consequently, there has been a call for the use of alternative teaching procedures such as the conditional-only method, which involves conditional discrimination training from the onset of intervention. The purpose of the present study was to compare the simple-conditional and conditional-only methods for teaching receptive labeling to 3 young children diagnosed with autism spectrum disorders. The data indicated that the conditional-only method was a more reliable and efficient teaching procedure. In addition, several error patterns emerged during training using the simple-conditional method. The implications of the results with respect to current teaching practices in early intervention programs are discussed.

Key words: autism, conditional discrimination training, early intervention, receptive labeling, stimulus control

- A more recent review of the research literature suggests that the earlier work seemed to demonstrate that tacts and intraverbals were more easily acquired with TB methods and that the more recent research suggests mands are more easily acquired using SB methods such as PECS (Barlow, Tiger, Slocum, & Miller, 2013).
- \
- The later studies (Chambers & Rehfeldt, 2003; Gregory, DeLeon, & Richman, 2009; Tincani,2004; Ziomek & Rehfeldt, 2008) that concluded PECS was acquired more easily were all plagued with the same methodological flaw related to presenting one single picture stimulus therefore precluding responding within a conditional discrimination arrangement. This will favor quicker acquisition of PECs over sign.

- A more rigorous study by Barlow, et al. (2013), found evidence to suggest that PECs may be more easily acquired by some children with autism. All three participants showed acquisition patterns to those presented on the following slide.

- It is unclear why this may be the case however none of the participants in that study had imitative responding in their repertoires and the sign response necessary for a correct score may have been too difficult. For example the required sign for chip for a 2 year old with autism, Joey, was the " …presentation of one hand, palm facing up and the other in a "c" formation with at least 2.5 cm between the thumb and the other four fingers, the hand in the "c" formation had to move across the palm of the bottom hand at least one time". (p.62)

387

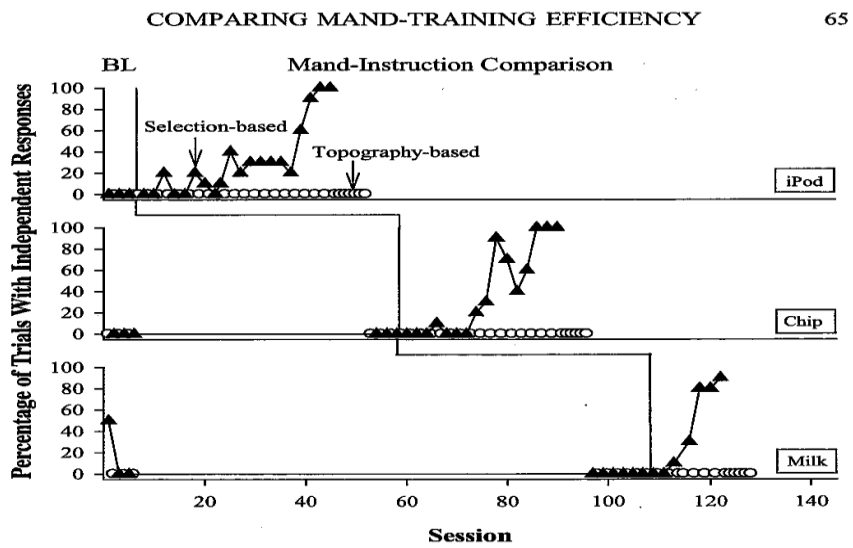


Figure 1. The percentage of trials Joey engaged in independent selection-based (SB) and topography-based (TB) mands across the iPod, Chip, and Milk.

388

- Moreover, while Barlow, et al. (2013) attempted to control for the level of conditionality they actually failed to do so.
- In presenting an array of 3 stimuli to select in the PECS treatment sessions they always presented distractors that were never taught as mands.
- Therefore the children did not need to scan the array except to find the one that matched the item they wanted without any consideration of the distractors.
- In others words, the rule became when you want the candy that you see in front of you just look for the candy picture.
- This is not a true discrimination since the targeted items were only available when the participant wanted them and never available when the participant wanted something else (didn't want them).
- Consequently, the skewed findings in favor of PECS may have resulted from the ease of acquisition associated with a simpler discrimination established by the researchers and not a true difference between sign and PECs.

- Other issues comparing manual sign language and PECS are listed below.
- It is not possible to teach truly spontaneous manding solely under the control of just the motivation using SB methods. Because the picture or symbol must always be present to produce the mand response, it is always multiply controlled and therefore spontaneous manding is never achieved.
-
- Within SB verbal behavior systems it becomes difficult to develop symbols that effectively control the behavior of the "speaker" and listener as the concepts become more complex. This may reduce speed of acquisition and limit number of responses that can be acquired (i.e. symbol for beautiful, help).
- TB verbal behavior may allow for a greater number of opportunities to communicate since additional environmental supports are not necessary. This may mean that you can acquire communication responses in more environments and more often (e.g. swimming pool, bed, bathroom, picnic, on a swing, on play equipment).
- Contriving incidental teaching opportunities and capturing communication opportunities during active play is an important program component for children with autism. The effort and equipment needed to communicate with symbol systems (SB) during these activities limit the number and quality of communication responses that can be taught when motivation for verbal behavior may be the strongest.

- Since there is no actual verbal community of SB responders and teachers generally do not use pictures and the spoken word while teaching, there are no models for the learner to benefit from through simultaneous observation of picture communication paired with reinforcement.
- Some verbal responses are learned by hearing the words or seeing the signs of others when paired with reinforcement during enjoyable activities. If a teacher signs while singing a reinforcing song, the signs may begin to acquire some control over the signs of the child when fill-in opportunities are provided.

DEVELOPMENT OF VOCALIZATIONS

- Vocal verbal behavior is the most desirable form of communication and therefore should be at least one of the goals to be achieved by augmentative communication.
- **The research literature suggests that some children with autism may develop vocal verbal behavior with both SB and TB methods. However, manual sign language has shown some superiority over selection based methods.**
- There appear to be both learner characteristics and instructional variables that account for the development of vocal responding in some children with autism.
- The learner characteristics necessary for the development of vocal responding **appear to be related to the development of at least a minimal echoic repertoire. Children who do not develop this repertoire are less likely to become vocal regardless of the method of instruction.**
- **The limited TB-based literature (sign language) shows greater support for the development of vocalizations although SB verbal behavior methods (PECS and SAL) have successfully engendered vocal verbal behavior.**

- It appears that regardless of the method, learners with some echoic skill may develop vocalizations if the instruction focuses initially upon intensive mand training, which takes advantage of the effects of strong reinforcement, along with stimulus-stimulus pairing of spoken words with delivery of the reinforcer. When vocal responses are also shaped as they develop, vocalizing is enhanced. These may be the contributing independent variables separate from the SB or TB method.
- TB sign language may have some advantage over SB in developing vocalizations with some children with autism.
- **It appears that the different motor movements associated with each sign and the point to point correspondence between the motor movements and the response product (what is seen) for each sign may facilitate both the development of the sign repertoire and the development of vocalizations. The unique motor movement associated with each sign may act as a built in prompt for the vocalization.**
- Through sign training, a more sophisticated motor imitative repertoire may be developed and in turn this newly acquired repertoire may facilitate the development of improved vocal imitation.
  - VIDEOS IN NEXT SECTION Sign Vocalization Videos

GENERALIZED SELECTION-BASED BEHAVIOR

- It appears that topography based verbal behavior has primacy over selection-based verbal behavior.
- In another section we discussed the role of joint control in the development of generalized selection based responding.
- It is clear however, that TB plays a role in mediating many selection based responses.
- In the Potter et al. (1997) article, the researchers found selection based responses were mediated by TB verbal behavior.
- In fact, persons with limited TB verbal behavior performed less adequately on tests for selection based responding.

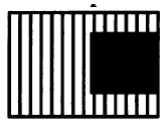
- A few studies have demonstrated that after acquiring TB tacts and intraverbals compared to SB responses that persons with developmental disabilities were more likely to correctly select the items when there name was given. (Sundberg, et al. 1996)

John Luca Video

Joint Control Activity

- In addition, Potter et al (1997) demonstrated that college students reported using their TB repertoire to more accurately perform a delayed matching response.
- When they were shown arbitrary configurations of dots matched to flag-like figures and then asked later to choose the correct dot array when re-shown the flag-like figures the subjects indicated that they would tact both figures and intraverbally link them.

Potter et al., 1997



Goes With

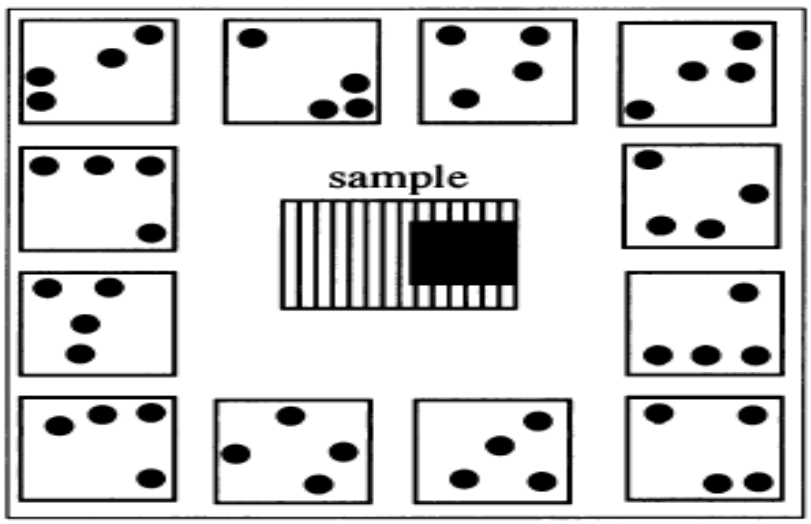


Fig. 1. Illustration of the patterns and screen arrangement used.

- They then reported when shown the flag- like figure they would tact it as they had before and then tact each of the dot arrays until the intraverbal connection between the two responses evoked the correct selection of the appropriate dot array.

- You can imagine someone saying " That's the backward flag that goes with "Y", no wait, it goes with the backward L, that's it ".

- Other responses are possible such as self-echoing the invented name of the item that goes with the invented name of the flag-like figure until the echo and the tact can occur while looking at the same array which would be the moment of "recognition" and then choosing it.

399

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The role of joint control in teaching listener responding to children with autism and other developmental disabilities☆

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ABSTRACT

This study evaluated the effectiveness of a teaching procedure derived from the analysis of joint control in increasing listener responses for three children with autism using a multiple probe design across participants. One nonvocal and two vocal children with autism were taught to select multiple pictures of items from a large array in the order in which they were requested (e.g., "Give me the ball, cup, and spoon") using the joint control teaching procedure. The effect of these procedures on the emission of accurate selection responses to both trained and novel stimulus sets was measured. The results indicated that listener responses to trained stimuli increased following the implementation of the independent variable and untrained responses across novel stimulus sets also emerged. Implications for designing language training programs for children with autism based on an analysis of joint control are discussed.

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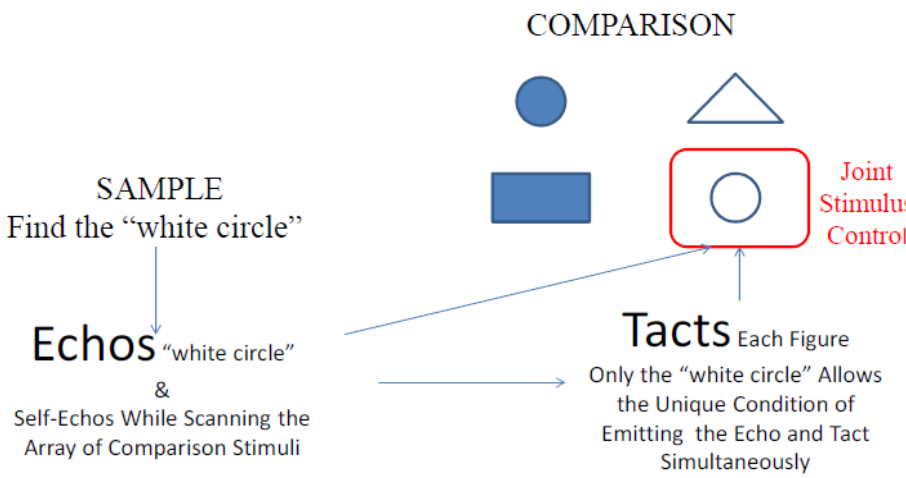
400



Teaching Functional Manual Sign Language

Research Support for Teaching Manual Sign Language

- There is sufficient empirical support to conclude that sign language can be an effective form of alternative communication.
- There are several reports that conclude that the use of manual sign manding will produce a functional communication repertoire. (see Millar, Light, & Schlosser, 2006, Schlosser & Wendt, 2008a).
- Schlosser and Wendt (2008a) in their review chapter write:

  The available body of research on manual sign and gestures for children with autism reveals strong intervention effectiveness scores for symbol acquisition and production, as well as related outcomes such as speech comprehension and speech production. These results suggest that the use of manual signing gestures is a very effective communication option for children with autism. (p.370).

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ELSEVIER

A further comparison of manual signing, picture exchange, and speech-generating devices as communication modes for children with autism spectrum disorders

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These findings are consistent with previous studies reporting that children with ASD can learn to use SGDs, PE, and MS to make requests for preferred items (Flippin et al., 2010; van der Meer & Rispoli, 2010; Wendt, 2009). Furthermore, van der Meer, Didden, et al. (2012) and van der Meer, Kagohara et al. (2012) showed that eight children with developmental disabilities learned to use SGD, PE, and MS to make general requests for snacks or toys. The present results extend the previous research by van der Meer and colleagues by demonstrating that four new children with ASD could concurrently learn to use SGD, PE, and MS to make specific requests.

p. 1255

Why Teach Sign Manding First

- Sundberg (2004) refers to the mand as a "dominating type of verbal behavior" (p. 211). Examination of one's own daily verbal behavior seems to suggest that a large percentage is mands.
- The mand is under the control of a relevant and immediate motivating operation (Michael, 2007) and therefore specifies its reinforcer.
- Stafford, Sundberg & Braam (1988) discovered that the specific reinforcement associated with the mand produced stronger effects on dimensions of response production than the non-specific reinforcement associated with all the other verbal operants.
- Since the mand response produces strong reinforcement any sounds that are produced when emitting a mand with sign or picture symbol will receive strong, immediate and specific reinforcement.
- Koegel, O'Delll and Dunlap (1988) were the first to demonstrate the increase in speech production related to reinforcing all vocal mand attempts.
- .Drash, High and Tudor (1999) demonstrated that teaching the mand repertoire by providing vocal prompts in the presence of a strong motivating operation and the delivery of specific reinforcement improved the vocal production of all participants with autism.

405

- By definition, children with autism:
  1. engage in aberrant behaviors which interfere with their learning,
  2. they fail to develop functional communication, and
  3. they fail to develop appropriate social responses.
- These core deficits can often be addressed through mand training. Various reports (Mirenda, 2003; Charlop-Christy, Carpenter, Le Blanc, & Kellet, 2002; Durand & Carr, 1991; Shafer, 1994; Drash, High, & Tudor, 1999; Koegel, et al., 1998) have indicated that mand training immediately benefits persons with developmental disabilities in the following ways:
  1. Manding reduces problem behavior.
  2. Manding increases social initiations.
  3. Manding increases overall communication attempts.
  4. Since the mand is the only verbal response that directly benefits the speaker it may be the most easily acquired initially and with the greatest functional value to the language disordered child.
  5. Sign mand training using total communication training may produce an increase in vocal productions .

406

How To Teach The Sign Mand

- Get the best quality response with the least amount of prompting.
- Practice teaching mands so that your are skilled in how and when to reinforce, what approximations to accept, what level of prompt to provide, and how to fade the prompts as quickly as possible.
- Consistency in methods across trainers is essential, and numerous trials are necessary to promote generalization.
- An orderly and progressive curriculum must be in place.
- The practical steps to teaching mands, once the MO has been established, include stimulus control transfer procedures. The quick transfer procedure for teaching the mand, as recommended by Sundberg and Partington (1998), includes the following steps:

Stimulus Control Transfer Procedures

Sign Manding

- Physical Prompt
- Gestural Prompt
- Echoic Prompt
- Item

Fade All

- FADE ALL TO MO + Audience

Teaching a Functional Verbal Repertoire with Sign Manding

Sign Videos---Kyle Case Study Olumide
Case Study JL Case study

SIGN LANGUAGE vs. PECS: ADVANTAGES

SIGN

- Requires one less level of discrimination
- May Reduce Problem Behavior More Effectively Than PECS
- No need to carry any devices with you
- Generalized Responding
- No pictures needed when you want to talk, so the opportunity to talk is always present
- Iconic nature may facilitate learning
- May lead to talking when mands are taught first
- Each motor movement produces different visual and proprioceptive sensations to the speaker
- Can develop a full verbal behavior repertoire
- Speed of signing is comparable to that of speaking

PECS

- Listeners do not need any special training
- First responses may simply be match to sample
- May lead to talking when mands are taught first
- Motor response required of learners is easy

SIGN LANGUAGE vs. PECS: DISADVANTAGES

SIGN

- Teachers need to be trained in special teaching procedures to shape the signs
- Listeners need special training
- Some fine motor requirements

PECS

- Teachers need to be trained in special teaching procedures to facilitate picture exchanges
- Pictures become increasingly complex and abstract
- Listeners may need special training as pictures become more abstract
- When language becomes complex, speed is slow when using pictures
- Pictures needed in order to communicate
- Added level of discrimination
- Difficult to teach all the functions of verbal behavior

WHY SIGN LANGUAGE TRAINING MAY FAIL

- First signs taught are not mands
- First signs taught are too complex/generic (e.g., please, yes/no, help, toilet, more, thank you)
- First signs may resemble each other too closely (e.g., eat and drink)
- First signs may involve a complex response form
- Not enough training trials are provided
- Training is conducted under multiple sources of control (e.g., motivation, picture/object prompts, vocal prompts, imitative prompts), and prompts are not faded so "spontaneous'' responses can occur
- Individual verbal operants are never established (i.e., mands, tacts, intraverbals); responses remain multiply controlled
- Stuck at one level too long, not a progressive curriculum in place
- Single verbal operant focused on almost extensively (e.g., tacts, but limited intraverbal or mand training)
- Failure to establish a signing verbal community
- Failure to require signs outside of the training sessions
- Failure to generalize to novel stimuli, staff, settings, times, etc.

Conclusions

<u>Selecting a Response Form</u>

- Even when echoic responding is weak vocal behavior should be the response form of choice.
- If skilled attempts to develop the echoic repertoire and mands and tacts are unsuccessful then an alternative response should be considered.
- If a person has physical or neurological disabilities which makes the differential muscle control necessary for signing impossible a pointing or selection based system should be immediately considered.

- If a student is young without physical conditions which preclude sign then begin an intensive signing program that includes speaking while signing. The teacher, however, should be skilled in prompting and differentially reinforcing vocalizations that may occur. Beginning with sign language may more effectively reduce problem behavior and may increase vocal productions.

- With older students who may be involved in frequent community activities and who do not have a strong echoic repertoire or frequent verbalizations, a combination of signing and a selection-based methods may be best.

- This older person may have a need to immediately verbally interact with persons in the community who do not have specialized sign training and therefore would benefit from the use of a picture selection repertoire. Picture selection will be easier to acquire once sign language has been taught.

413

CONSIDERATIONS IN CHOOSING ALTERNATIVE METHOD

- Learner profile
- Efficiency of the response
- Ease of acquisition
- Facilitation of speech production

- Other considerations: "The Big 5" (Esch, 2010)
  - Fast
  - Easy
  - Cheap
  - Effective
  - Always accessible

414

Functional Communication and Preference for Method

1. Manual sign language, PECS and use of the iPad as a SGD all produce functional communication with children with autism. (Van De Meer, et al. 2012).
2. In addition it appears that preference assessments demonstrated that most children prefer to use SGD or picture exchange over manual sign language.
3. Preference assessments have also demonstrated a strong preference for SGD over manual sign.
4. The learner preferences may be an artifact of the preference assessment procedure and not the actual preference of the individual.

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Research in Developmental Disabilities

Speech-generating devices versus manual signing for children with developmental disabilities

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ABSTRACT

We compared speed of acquisition and preference for using a speech-generating device (SGD) versus manual signing (MS) as augmentative and alternative communication (AAC) options. Four children with developmental disabilities (DD), aged 5–10 years, were taught to request preferred objects using an iPod®-based SGD and MS. Intervention was introduced in a multiple-probe across participants design and SGD and MS conditions were compared in an alternating treatments design. A systematic choice-making paradigm was implemented to determine if the children showed a preference for using SGD or MS. All participants showed increased use of SGD when intervention was introduced, but only three learned under the MS condition. Three participants exhibited a preference for the SGD while the remaining participant demonstrated a preference for using MS. Results support previous studies showing that individuals with DD often show a preference for different AAC options and extend previous data by suggesting that acquisition and maintenance was better for the preferred option.

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Research in Developmental Disabilities

Review article

Assessing preferences for AAC options in communication interventions for individuals with developmental disabilities: A review of the literature

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Self-determination

ABSTRACT

We synthesized studies that assessed preference for using different augmentative and alternative communication (AAC) options. Studies were identified via systematic searches of electronic databases, journals, and reference lists. Studies were evaluated in terms of: (a) participants, (b) setting, (c) communication options assessed, (d) design, (e) communication skill(s) taught to the participant, (f) intervention procedures, (g) outcomes of the intervention and outcome of the preference assessment, (h) follow-up and generalization, and (i) reliability of data collection and treatment integrity. Seven studies, involving 12 participants, met the inclusion criteria. In these studies, individuals were taught to use either speech-generating devices (SGD), (b) picture exchange (PE) systems, and/or (c) manual signs. Assessments to identify preferences for using each AAC option were conducted in each study. Sixty-seven percent ($n = 8$) of participants demonstrated some degree (≥55%) of preference for using SGD compared to 33% ($n = 4$) of participants who demonstrated some degree (≥55%) of preference for PE. The results indicate that individuals with developmental disabilities often show a preference for different AAC options. Incorporating an assessment of such preferences might therefore enable individuals to exert some degree of self-determination with respect to AAC intervention.

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A further comparison of manual signing, picture exchange, and speech-generating devices as communication modes for children with autism spectrum disorders

Larah van der Meer [a,*], Dean Sutherland [b], Mark F. O'Reilly [c], Giulio E. Lancioni [d], Jeff Sigafoos [a]

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Picture exchange communication
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Specific requesting
Speech-generating devices

ABSTRACT

We compared acquisition of, and preference for, manual signing (MS), picture exchange (PE), and speech-generating devices (SGDs) in four children with autism spectrum disorders (ASD). Intervention was introduced across participants in a non-concurrent multiple-baseline design and acquisition of the three communication modes was compared in an alternating treatments design. Children's preference for using MS, PE or the SGD was also assessed. With intervention, all four participants learned to make specific requests using at least one of the three communication modes. The children also showed a preference for one mode. These results extend previous studies by demonstrating (in four new children with ASD) differential acquisition of, and idiosyncratic preferences for, three commonly used alternative communication modes. The present results further suggest faster acquisition and better maintenance with the preferred mode. We conclude that children's preferences for MS, PE, and SGDs should be considered when designing and implementing augmentative and alternative communication interventions.

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2.9.4. AAC preference assessments

These assessments were undertaken to determine if participants would show a preference for using one of the two AAC options. These assessments occurred after every eighth session (i.e., after four MS and four SGD sessions) on average. This number varied slightly because these assessments had to occur before the first session for the day to prevent sequence effects (selecting the AAC option that was taught last; Sigafoos et al., 2005), as well as to ensure that at least two such preference assessments were undertaken during intervention for each participant.

During a preference assessment, the trainer presented the MS option on one side of the table and the SGD option on the other side of the table (alternated across sessions to control for choice being made dependent on location of the AAC option). The trainer asked the participant: *Which communication option would you like to use? Sign language on this side* (while pointing), *or the SGD on this side* (while pointing)? The trainer initiated one requesting opportunity with the chosen AAC option before reverting back to initiating requesting opportunities with the AAC device that was being used for that session. Choice for an AAC option was defined as physically pointing to, touching, or picking up the selected communication option. If the child did not choose an option within 10 s, the device preference assessment was terminated and training continued with the AAC option that was scheduled for use in that session.

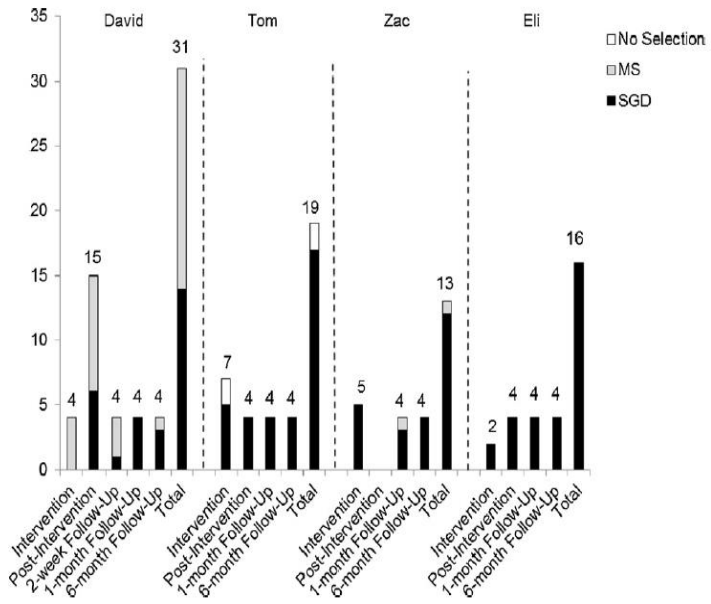


Fig. 2. Results from the device preference assessment probes depicting the number of times each communication option (SGD and MS) was chosen and number of times a device was not chosen (no selection) across each phase of the study for each participant.

- Preference assessments of the type described in the previous slide clearly favors the use of the SGD over manual sign.
- A more effective method for assessing preference would include building a strong MO for an item, then insure the MO is present and then reinforce any correct response with either manual sign or a SGD.
- Under these conditions the preference for differing methods of communication might be more accurately assessed.

SGD Videos

Increasing Speech Sound Production of Children with Autism

Introduction

- A large number of children with autism fail to develop echoic responses (vocal imitation) to adult sounds and words (Esch, Carr & Michael, 2008).
- The low frequency and variety of sound production by these children provides few responses to be selected and shaped by a verbal community.
- As a result many children with autism do not acquire vocal verbal behavior as their primary form of communication.
- To overcome this deficit the implementation of some behavior analytic procedures have shown promise in supporting the development of vocal verbal behavior.

- The term vocal behavior is used specifically to refer to the production of auditory stimuli resulting from the movements of the muscles of the vocal apparatus, e.g., the sounds one makes.
- In treatment programs for children with autism we are interested in developing not just vocal responses because not all vocal responses constitute verbal behavior. Coughing and yawning produce vocalizations but in most cases they are not considered verbal.
- Vocal verbal behavior is the production of auditory stimuli that effectively control the behavior of a community of listeners resulting in reinforcement for the speaker (Skinner, 1957). Vocal verbal behavior is the production of the sounds and words of a verbal community.
- Non-vocal persons are individuals who fail to emit high rates of vocal verbal behavior

.

- In the case of children with autism this issue is represented by individuals who produce very few speech sounds or words that correspond to those produced by other members of their verbal community.

- In more common terms, these are children with articulation problems or speech sound disorders.

- More precisely, for some children with autism the naturally occurring contingencies of reinforcement have failed to effectively control the movements of their vocal musculature.

- This does not mean that non-vocal persons do not emit verbal behavior (VB); they may exhibit other forms of VB (e.g., sign language, exchanging pictures, speech output devices, hitting, screaming, self-injury, etc.

- The purpose of this talk is to outline the evidence-based methods to increase the speech production of children with autism who emit few vocal verbal responses and who have generally failed to develop functional vocal verbal behavior.

- Be reminded, that many of the children we will be discussing have weak alternative verbal behavior repertoires (language) as well. In other words, their alternative forms of verbal behavior are not extensive across verbal operant categories.

- Teaching vocal verbal behavior to nonvocal learners can be very difficult task. It requires a diverse teacher repertoire and a substantial understanding of the applications of Skinner's analysis of VB. Procedures that have been shown to have at least some support include:

1. Reinforcing all Vocalizations
2. Stimulus-Stimulus Pairing (Automatic Reinforcement)
3. Echoic Training
4. Alternative Communication Methods- Manual Sign Language and PECS
5. PECS and Manual Sign Mand Training with Time Delay and Differential Reinforcement Procedures.
6. Shaping Vocal Productions. (Phonetic Transcription)

Non-Behavior Analytic Approaches to Speech Production

- The field of speech language pathology contains several methods that clinicians use to increase speech production of children with autism.
- Two of the most frequently reported are:

1. Non-Speech Oral Motor Exercises (NSOME)
2. PROMPT Therapy

- I will only briefly mention these methods because they are frequently recommended as alternatives to behavior analytic approaches.
- Notwithstanding the popularity of these methods there are no adequately controlled studies that suggest their benefit for children with autism.

NSOME

- NSOME are based upon the assumption that the limited speech production of some children with autism is the result of weak articulatory muscles and therefore oral motor exercises will overcome the problem.

- Carole Bowen describes these exercises this way:

  "Exercises for the mouth, or what some Speech Language Pathologists (Speech and Language Therapists) call "oral motor exercises", "oral motor therapy", "oral placement therapy" or "oro-motor work", are, in some clinical settings, a prominent component of intervention for children with speech sound disorders. The activities may include sucking thickened drinks through straws; blowing cotton balls, horns, whistles and windmills; chewing and mouthing plastic and rubber objects; licking peanut butter and other foods from around the mouth; and playing with "oral motor tools and toys!" (Carole Bowen, 2005) http://speech-language-therapy.com/oralmotortherapy.htm

- In a special issue of the journal *Speech and Language Seminars* Gregory Lof (2008) reported:

  "Many SLPs believe that children with speech sound disorders need to strengthen their articulatory muscles, which research has refuted. In fact, Sudbury et al. found that children with speech sound disorders actually had stronger tongues than did children without speech problems. In Clark's article, she elaborates on the role of strengthening exercises, also pointing out how targeting increased strength in therapy probably is not beneficial for improving speech accuracy."(p. 254)

Lof went on to say:

"Research studies have been conducted on the efficacy of nonspeech tasks, and these studies do not support the use of NSOMEs to change speech sound productions. Forrest and Iuzinni report on findings from their study, one that compares a traditional production treatment approach to NSOMEs for nine children with speech disorders. Their findings are consistent with prior research that shows the benefits of production training and the lack of benefits of NSOMEs." (p.254)

NSOME

PROMPT Therapy

- PROMPT therapy has become a popular method designed to increase the vocal production of children with autism.

- One proponent of this method describes it this way:

  "PROMPT stands for "Prompts for Restructuring Oral and Muscular Phonetic Targets." It is used to restructure the speech production capabilities of children with a variety of speech disorders, including apraxia.

  PROMPT utilizes specific techniques based on touch pressure, proprioceptive (the body's sense of itself) and kinesthetic (tactile) cues to help reshape the way the brain and mouth work together to articulate words. This is a very hands-on approach which will require the involvement of a speech language pathologist to administer treatments.

  For example, one PROMPT technique involves manipulating the external muscles of the face to help the child understand the movement required to produce a specific sound. Because each individual's needs are different, the types of techniques will vary. The PROMPT technique often is not used by itself to treat apraxia, but is used in conjunction with other tools." (Karen George http://www.chicagospeechtherapy.com/how-can-the-prompt-speech-therapy-technique-help-children-with-apraxia/

Below are illustrations of therapists conducting PROMPT therapy sessions.

- Despite the popularity of this method there are no controlled studies to support the effectiveness of this method with children with autism.
- To learn more about this method visit the prompt institute website of and read comments by the developer of the method Deborah Hayden. http://www.promptinstitute.com/

REINFORCING ALL VOCALIZATIONS IN FREE AND RESTRICTED OPERANT CONDITIONS

- Reinforcement was delivered for any and all vocalizations that were produced during 3 hour sessions.
- Activities are scheduled that lead to increased vocalizations (e.g. jumping, singing, tickling).
- On the next slides is a data recording sheet for recording any and all sounds and graphs documenting the increase in vocalizations that correlated with the implementation of this procedure.

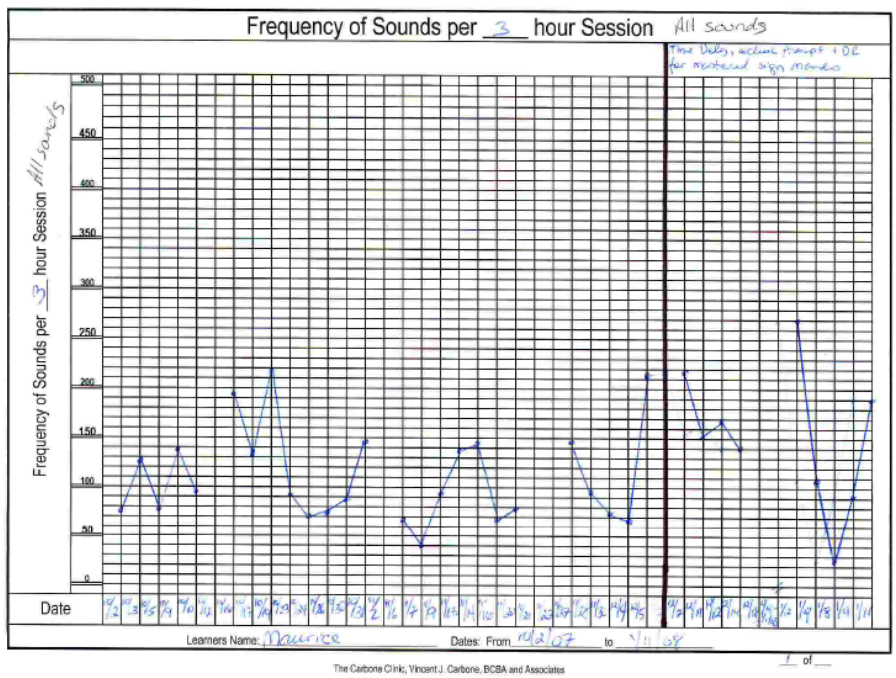
Pre-Pairing/ Sound Inventory Data Sheet

Child: Pablo **Date:** 6/26/12 **Time:** 9-1150

Activity	Sound Heard
tickles	uh,uh
trans.	n ah
car	eh e woo ah oo e oo
metal	eh oo oo h oo oh w oo oh ah
scratcher	aw ow oo whoo oh oo oo ah woah oo woo
bubbles	uh,ih, ih oo eh oh oo uh eh ih ihih
	oh ah oh ih eh uh wow woo uu
	oh eh woh ah uu
movie	eh uu eh uh
music	uu,uu,eh,oo
jump	ah ih ih,uu oo eh ah ih ih ih oo
water	guh guh uh oh oo oh ah eh oh oo uu ah
slinky	ih oo oo oo eh huh hoo h oo wow
	oo
ball	uh uh eh oh
mit	eh,uu,uu,ih,ih eh oh
drink	uh ih
sandwich	eh uh eh ah uh uh uh aw buh
fear	
spin	uu,ih ih
book	eh eh
go	w o

freq = 143
var = 14

435



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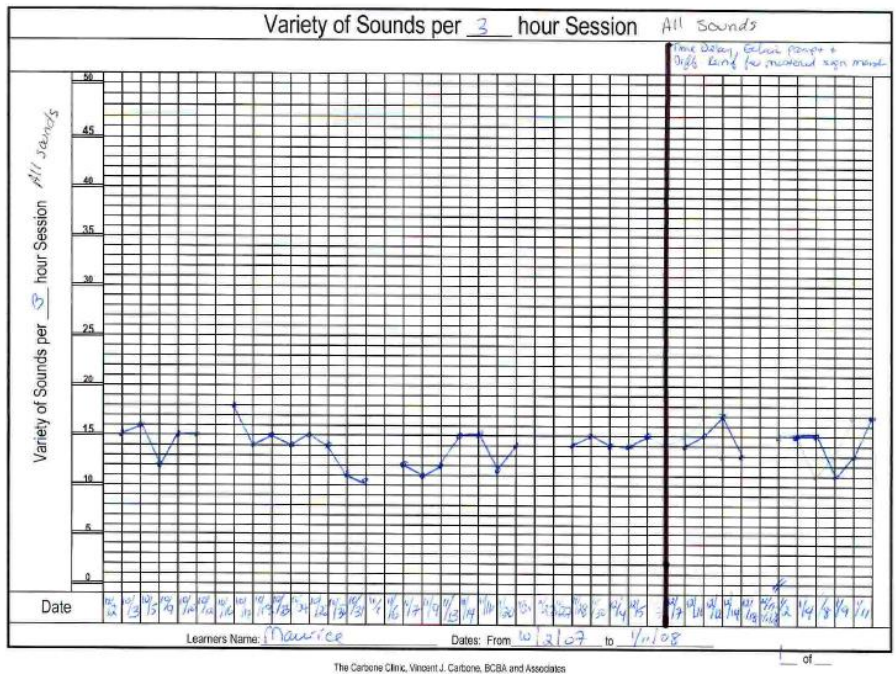
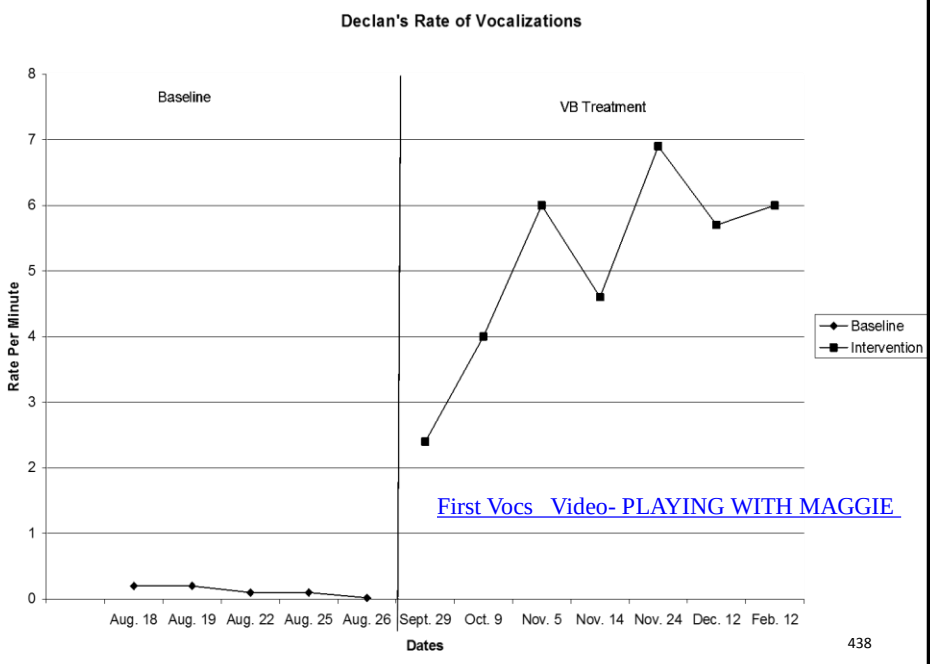

Variety of Sounds per 3 hour Session All Sounds
Prime Delay, Gestural Prompt + Diff. Kind for mastered sign mand
Variety of Sounds per 3 hour Session All Sounds
50
45
40
35
30
25
20
15
10
5
0
Date
Learners Name: Maurice
Dates: From 10/2/07 to 4/11/08
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

437


Declan's Rate of Vocalizations
Baseline
VB Treatment
Rate Per Minute
8
7
6
5
4
3
2
1
0
Aug. 18
Aug. 19
Aug. 22
Aug. 25
Aug. 26
Sept. 29
Oct. 9
Nov. 5
Nov. 14
Nov. 24
Dec. 12
Feb. 12
Dates
Baseline
Intervention
First Vocs Video- PLAYING WITH MAGGIE

438

The Role of Automatic Reinforcement in Speech Sound Production

- Automatic reinforcement describes circumstances in which reinforcement of behavior occurs when it is not directly socially mediated but is, instead, the product of a response. (Michael & Vaughan, 1980)
- Skinner referred to this type of overlooked source of reinforcement many times in his writings.
- He claimed that a substantial portion of behavior that appears to produce limited social reinforcement might well be controlled by automatic reinforcement.
- In fact, he claims that much of the behavior of infants might well be under the control of automatic reinforcement.
- For example, he suggests that an infant's movements that effectively change the environment, such as swatting a mobile hung above the crib or the first steps might be automatically reinforced by the control over the non-verbal environment.
- Indeed, problem solving behavior might well be strengthened by those, "I did it," moments.

439

- As Palmer (1996) points out, children become effective listeners before they become effective speakers.
- Parents frequently talk in positive terms to their children as they are providing early survival tasks, e.g. feeding, bathing, removing unpleasant stimuli, etc.
- As such, the parent's sounds and words that have been paired with the reinforcing activities noted above might well become conditioned reinforcers.
- The same sounds when produced by the child during babbling might well strengthen the muscle movements necessary to produce them.
- Consequently infants may babble more frequently the sounds that have been paired with socially mediated reinforcement.
- The data on children's development of sounds shows the pattern of producing the sounds that have been heard during parent care-giving activities. (Schlinger, 1995)
- This process of automatic reinforcement seems to strengthen the vocal repertoire and increase the variety of sounds produced overall and prepare the young child to speak in words and sentences.

440

- All of this is to say that the foundation for speaking intelligibly in young children might well be the outcome of automatic reinforcement upon the vocal attempts.
- Several researchers have extended this analysis to the application of a procedure called stimulus-stimulus pairing (SSP) and the concept of automatic reinforcement to the development of vocalizations in children who fail to develop them typically.
- Petursdottir, Carp, Mathhies, & Esch (2011) describe this procedure " This procedure involves an adult's repeated presentations of a specific phoneme or syllable, each immediately followed by the presentation of a preferred item or activity, without any response requirement by the child" (p.45)
- Since phonemes and syllable units are the building blocks of vocal verbal behavior, any attempts to increase their frequency and variety in young children who do not develop them typically might lead to a greater likelihood of developing vocal behavior.
- Sundberg et al. (1996) were the first to make use of the concept of automatic reinforcement to develop vocal responding in language delayed children.

- All children developed novel vocalizations without direct reinforcement after stimulus-stimulus pairing procedures were implemented.
- A series of studies have been conducted since 1996 with children with developmental disabilities and with low rate speech sound production and virtually absent vocal verbal behavior.
- Overall the results of these studies indicate that for some children this method is effective in increasing vocal productions but not for all children.
- The most recent study published related to the topic of SSP by Pettursdottir, et al. (2011), investigated the variables that might account for the successes and failures of the procedure in clinical applications.
- As an alternative to SSP Esch, Esch & Love (2009) demonstrated some preliminary benefit to a direct reinforcement procedure using lag schedules of reinforcement that support speech variability.
- Despite the mixed results to date, a recent replication and extension of the methods currently "in press" with the *Journal of Applied Behavior Analysis* by Miliotis, Sidener, Reeve, Carbone, Radar, Sidener & Delmolino, demonstrated a treatment effect with children with autism.
- For a current review of the literature on the SSP method see the Pettursdottir, et al. (2011) in The Analysis of Verbal Behavior.
- On the next slide is a description of the stimulus-stimulus pairing account of increased vocal production..

Stimulus-Stimulus Pairing

The two-step process is as follows:

- STEP 1. The speech sounds and words heard by young children are frequently conditioned as reinforcers by correlation with parents' positive reinforcers (e.g., food, caresses, smiles).

STIMULUS (speech sound) — Paired → STIMULUS (reinforcer)

- STEP 2. Subsequent production of these sounds by the child is strengthened by the product of his or her verbal behavior in the form of auditory stimuli. The closer the sound production is to matching the sounds that have been conditioned as reinforcers the greater the reinforcement (Schlinger, 1995; Sundberg, Michael, Partington, & Sundberg, 1996).

SPEECH SOUND PRODUCED → WHAT IS HEARD ACTS AS A REINFORCER

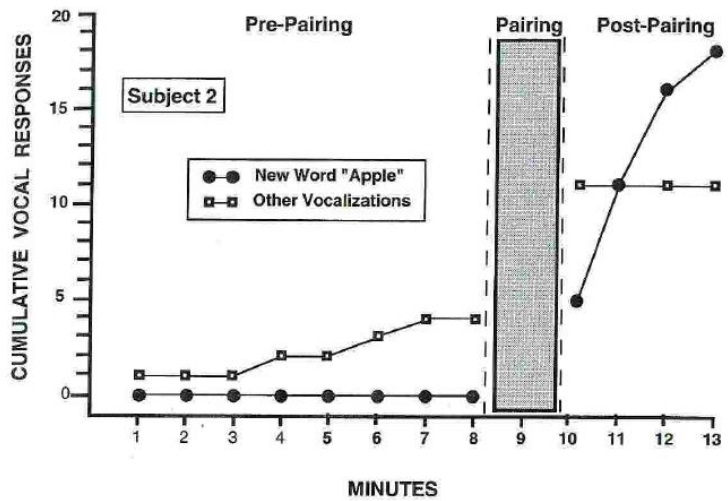


Fig. 2. Cumulative number of all vocal responses for Subject 2 on pre- and post-pairing measures. The shaded area represents the time during which one new target word was paired with tickles.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2012, 45, 809–813 NUMBER 4 (WINTER 2012)

AN EVALUATION OF THE NUMBER OF PRESENTATIONS OF TARGET SOUNDS DURING STIMULUS–STIMULUS PAIRING TRIALS

ADRIANE MILIOTIS, TINA M. SIDENER, AND KENNETH F. REEVE
CALDWELL COLLEGE

VINCENT CARBONE
THE CARBONE CLINIC

DAVID W. SIDENER
GARDEN ACADEMY

LISA RADER
CALDWELL COLLEGE

AND

LARA DELMOLINO
RUTGERS UNIVERSITY

We evaluated the differential effects of 2 variations of a stimulus–stimulus pairing procedure on the vocalizations of 2 children with autism. For both participants, presenting 1 sound per pairing trial resulted in a higher rate of vocalizations than 3 sounds per pairing trial.
Key words: autism, stimulus–stimulus pairing, vocalizations

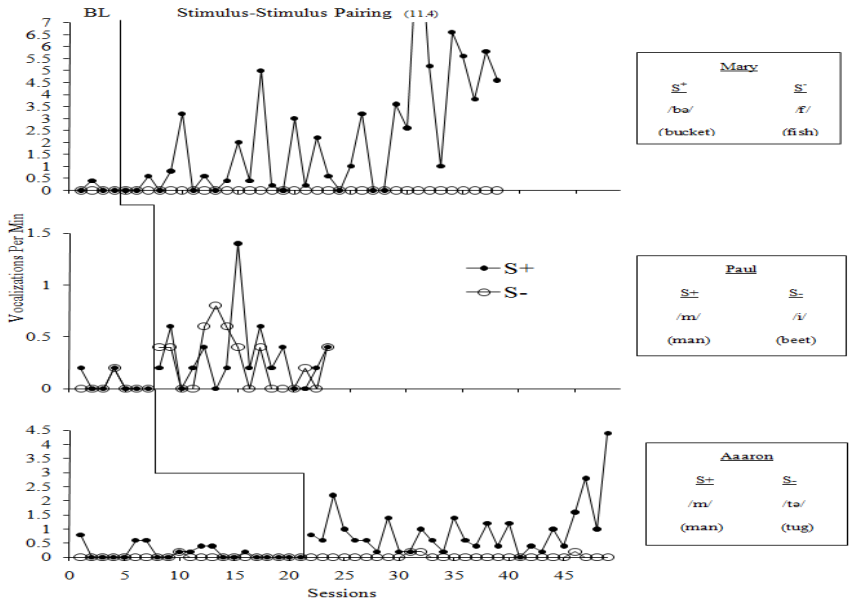


Figure 1.Within-session data on rate of target and non-target vocalizations for Mary (top panel), Paul (middle panel), and Aaron (bottom panel).

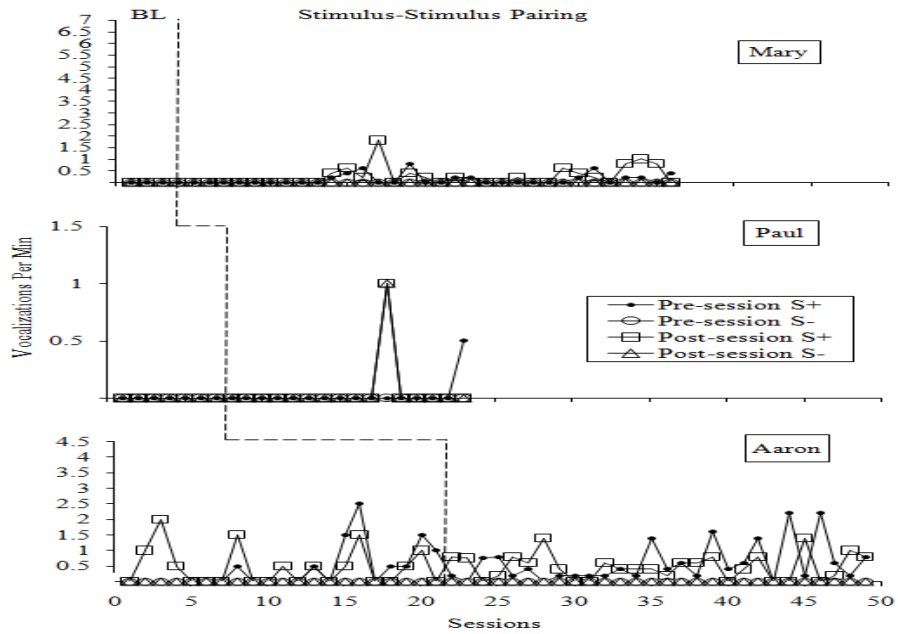


Figure 2. Target and non-target vocalizations during pre- and post-sessions for Mary (top panel), Paul (middle panel), and Aaron (bottom panel).

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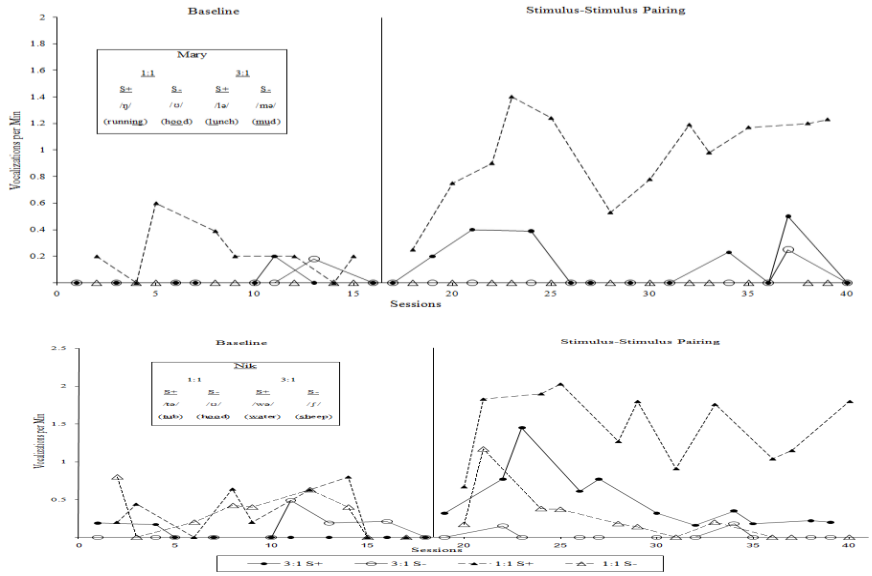


Figure 1.. Within-session data on rate of target and non-target vocalizations for Mary (top panel) and Nik (bottom panel) during the experiment

Teaching Procedures

The following are procedures to follow when attempting to take advantage of automatic reinforcement generated by stimulus-stimulus pairing:

1. Choose sounds that have the highest frequency in the repertoire of the child or words that may be particularly easy for the learner. Initial position consonant-vowel combinations that are associated with the names of items that act as reinforcers may be useful. For example "buh" for a child who is reinforced by bubbles. Transfer to the mand may be facilitated when targets are chosen this way.

2. Present a sound three times with about a 1-second delay between presentations. If you hear any approximation or any sound after any of the presentations, deliver the reinforcer immediately. If there is no sound or approximation, then deliver the reinforcer after the third presentation anyway.

"buh" – 1 sec – "buh" – 1 sec – "buh" – 1 sec REINFORCER

*****If "buh" is emitted at any point, deliver the reinforcer immediately*****

NOTE: According to recent research results (Miliotis et al., 2012), it would be recommended to reinforce after every single presentation.

"buh" – 1 sec ⟶ REINFORCER

3. Graph results.
   - Percentage of ARP trials where target echoic was emitted
   - Another type of data is sound inventory
     - To track total frequency and variety of speech sounds made pre- and post-pairing
     - To track frequency of target ARP sound emitted during free operant conditions (i.e., at all times outside of the ARP sessions) pre- and post-pairing

James Video

Emily with Vince

Houston

Automatic Reinforcement Procedure

Child: Nick B Target: "ik" Date: 6/29/11 Time: 2:30-4:20

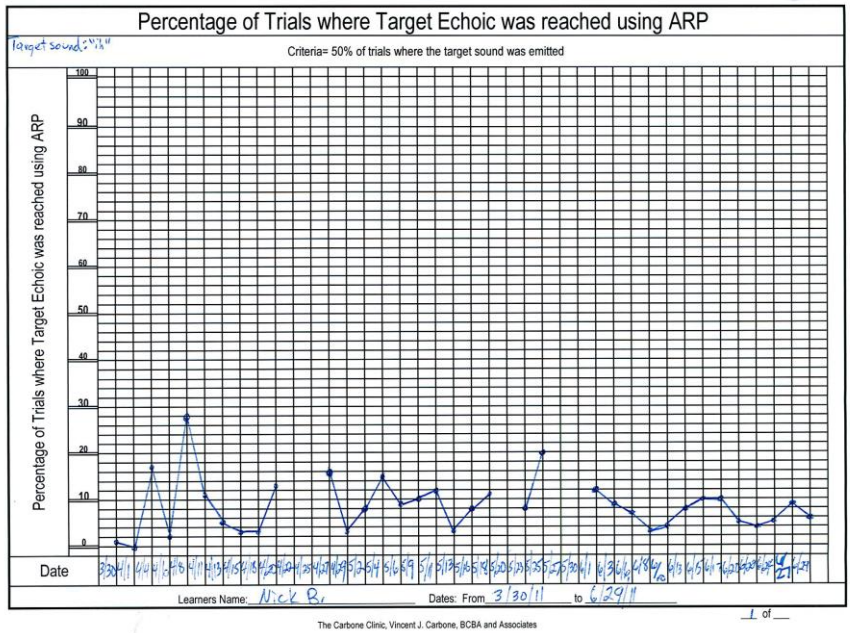
Procedure:

1. Present target sound 3 times or greater with a 1 sec. delay between each presentation.
2. If the child echoes the sound during any one of the presentations reinforce and do so abundantly.
3. If after the final presentation of the trial the child doesn't echo the sound, reinforce anyway but not as much as you might it they echoed back the target sound.
4. If the child emits any other sound during your presentation of the target sound continue with presenting the target until you get to the final presentation, again reinforce anyway but not as much as you would if it were the target sound.
5. Take trial by data on what the child said if anything in the space below the trial number (see below).

1	2	3	4	5	6	7	8	9	10
+	o	–	o	o	–	o	o	o	–
11	12	13	14	15	16	17	18	19	20
o	–	o	o	o	–	o	o	o	o
21	22	23	24	25	26	27	28	29	30
–	o	o	o	–	–	o	o	–	o
31	32	33	34	35	36	37	38	39	40
–	–	o	o	o	o	o	–	o	–
41	42	43	44	45	46	47	48	49	50
o	o	+	–	o	o	–	o	–	–
51	52	53	54	55	56	57	58	59	60
–	–	–	–	–	o	o	o	o	–
61	62	63	64	65	66	67	68	69	70
o	–	–	o	o	o	o	o	o	+
71	72	73	74	75	76	77	78	79	80
+	o	o	o	o	+	o	o	+	–
81	82	83	84	85	86	87	88	89	90
–	o	o	–	–	–	–	–	o	o
91	92	93	94	95	96	97	98	99	100
–	o	o	o	o	–	o	o	–	o

Key: "+" target sound "–" no sound "o" other sound"

6/29



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Echoic Training

- Vocal imitation is an important skill in the development of vocal verbal behavior. Consequently, procedures have been developed to teach this skill. Using the parlance of Skinner's analysis this method is called echoic training.

- Echoic training methods are designed to increase the number and intelligibility of vocal responses.

- Echoic targets can be selected from the high frequency sounds the learner produces during free operant procedures.

Selecting targets for echoic training:

1. Developmentally easy sounds
2. High frequency sounds the learner produces during free operant procedures
3. Sounds and words associated with reinforcers and for reinforcers for which the child mands

Echoic Teaching Procedure

1. Once echoic targets are selected, list on the probe data sheet echoic responses that will be taught first.

2. Begin the teaching procedure by having strong reinforcement available and visible to the learner to establish motivation for correct responding.

3. Present the echoic.

4. If the learner reaches parity, reinforce immediately.

5. If the learner does not reach parity, re-present the word 2-3 more times (based upon the learner).

6. At any point the learner reaches parity or a better response occurs, reinforce.

7. If the learner does not reach parity or give a better response following 2-3 echoic trials, drop to an easier echoic or motor imitation response and differentially reinforce.

Mattie Echoics
Rurai

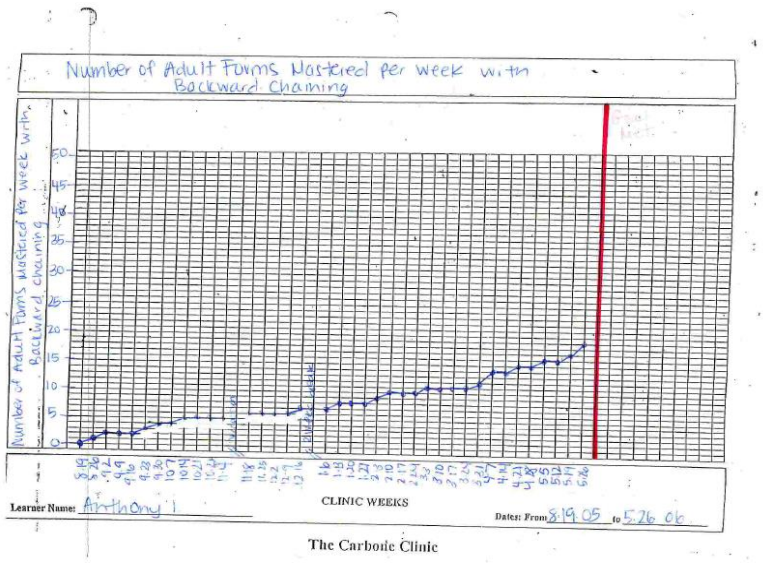
ECHOIC DATA SHEET

ECHOIC DATA SHEET

Learner: Declan **Date:** 10/3/03

Trial	Target Sound/Word	1st	2nd	3rd	Easier Sound/Word
1	Goo	✓			
2	Buh		✓		
3	Duh	✓			
4	Duh	✓			
5	Goo	✓			
6	Buh	✓			
7	Buh	✓			
8	Goo	✓			
9	Duh		✓		
10	Goo	✓			
11	Goo	✓			
12	Buh	✓			
13	Duh		✓		
14	Buh	✓			
15	Goo	✓			
16	Duh	✓			
17	Goo	✓			
18	Buh	✓			
19	Buh	✓			
20	Duh		✓		

459



460

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Kaufman Assessment And Teaching The Echoic Response

Assumptions:

1. Children who speak with limited consonant production and with motor coordination difficulties will have intelligibility problems.

2. Even though some of these sounds may appear in isolation they are not produced in combination with other sounds.

3. Many of these children simplify their production of words to compensate for these coordination difficulties (e.g. final consonant deletion, vowel neutralization).

4. As teachers we may be able to provide simplified forms of the word or word shells that are close to what the learner can produce.

5. By presenting these forms of the word during vocal imitation as successive approximations to the "adult form" of the word we may be able to shape the word production with limited learner frustration.

6. By requiring movement up the hierarchy of word shells to receive reinforcement, the learner may produce intelligible words within and across many syllable forms (e.g. CV, CVC, CVCV, VC).

Learners who are good candidates for the vocal teaching procedures have these behavioral characteristics (Kasper, Godwin, & Hulshof, 2002):

1. They have a limited ability to echo words and sounds and therefore much of their talking is unintelligible.

2. They do produce simple vowel and consonant sounds in isolation. If they can not perform even these most basic skills, then investigation of medical issues and structural or muscle weakness problems should be investigated by appropriate professionals. However, this problem would not preclude the use of other behavioral procedures.

3. Limited phoneme repertoire.

4. Difficulty producing and sequencing sounds.

5. Limited response to echoic training as evidenced by limited vocalizations even after acquiring 15-25 signed mands.

6. Poor approximations that are resistant to change.

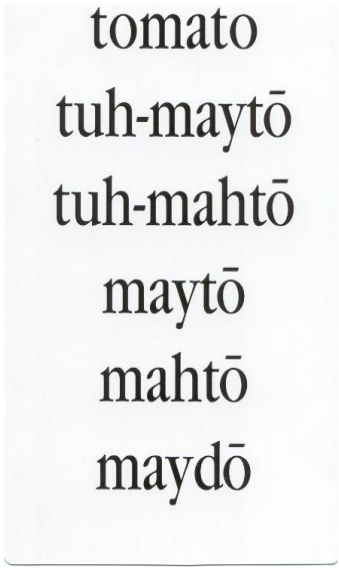
KAUFMAN WORDS-BASIC KIT
Examples

CVCV	mama, papa, neigh neigh, moo moo
VC	on, up, out, in, eat, oat, arm, ant, eye
CV	day, two, me, tea, pea, dough, bay, bow
VCV	apple, obo, oh no, oh boy, okay
CV1CV2	mommy, puppy, daddy, baby, bubble, potato, people, banana, turtle

KAUFMAN CARD EXAMPLE (CVCV)

mama
mah-mah
mom-ah
mah-ah
mah
mm-ah

KAUFMAN CARD EXAMPLE (CV1CV2)



Kaufman Teaching Procedures

1. Based upon the assessment, list on the probe data sheet the words or echoic responses from the category that will be taught first.

2. Begin the teaching procedure by having strong reinforcement available and visible to the learner to establish motivation for correct responding.

3. Present the word approximation at the level of the word that has achieved parity to insure success immediately.

4. Present the next higher word form immediately. If the learner quickly achieves parity (within one trial) then present the next form of the word without reinforcement to promote momentum.

4. If the learner does not meet parity continue to present this word approximation for 3-5 trials. The purpose of re-presenting the word is to give the learner several attempts to slip into parity and thereby receive reinforcement for doing so. If the learner does not meet parity during this process, present a sound, word, or motor movement that the learner will be successful at. If however, the learner reaches parity after several presentations, then reinforce the imitative response. Provide greater magnitudes of the reinforcer for parity responses that occur with fewer trials.

5. Consider using other antecedent variables to increase accuracy of the echoic response (e.g. a couple of easy motor movements, a couple of easy words with same syllable shape, backward chaining of parts of the word).

VIDEOS

Vincent Set Up
Vincent
Declan

Kaufman Probe Data Sheet

Kaufman

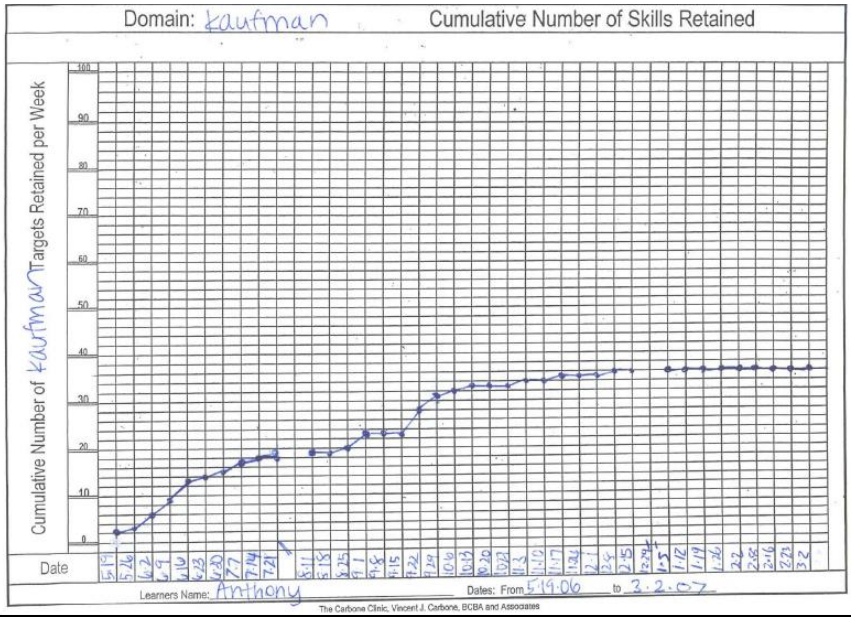
PROBE DATA SHEET

Name: Vincent Saturn Skill area: CVCVCV words

Circle One: (Acquisition) Maintenance

Antecedent	Date and Therapist Name														
	2/2	2/3	2/4	2/6	2/9	2/10	2/11	2/13	2/16	2/17	2/18	2/20			
tomato	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
piano	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
bandana	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Indian	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
Ohio	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y

Graph the weekly cumulative number of Kaufman words mastered as shown below:



Supporting Research

Sweeney-Kerwin, E. J., Zecchin, G., Carbone, V. J., Janecky, M. N., Murray, D. D., & McCarthy, K. (2005, December). *Improving the speech production of children with autism.* Paper presented at the New York State Association for Behavior Analysis, Verona, NY.

The Kaufman Speech Praxis Treatment Kit is widely disseminated as a treatment for the development of vocal imitation skills in children with autism and AOS, however, no empirical evidence currently exists to support its inclusion in a language training program for children with autism. Notwithstanding the lack of empirical support, the Kaufman method of teaching vocal imitation skills has shown promising results and therefore deserves experimental investigation. For example, it provides a method for evaluating a learners vocal imitation skills across a wide range of target sounds and words, a method for selecting targets based upon the assessment, and treatment methods that include the employment of phonological processes to simplify words so the child can learn successive approximations toward target words to achieve a "functional" vocabulary (Kaufman 1997). The purpose of this study was to compare an adaptation of the procedures recommended within the Kaufman method that include assessment, selection of targets and shaping through reinforcement of successive approximations toward the target word as compared to an echoic procedure that included reinforcement for correctly echoing the target response and extinction for echoing incorrect responses. The results indicate the superiority of the adapted Kaufman procedures.

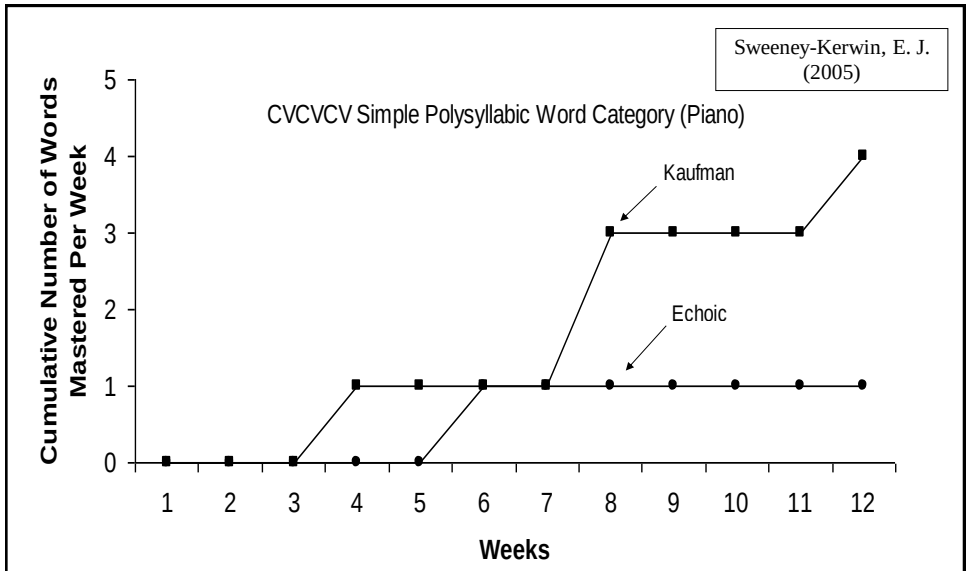


Figure 1. Cumulative number of Kaufman and Echoic words mastered per week for Vincent

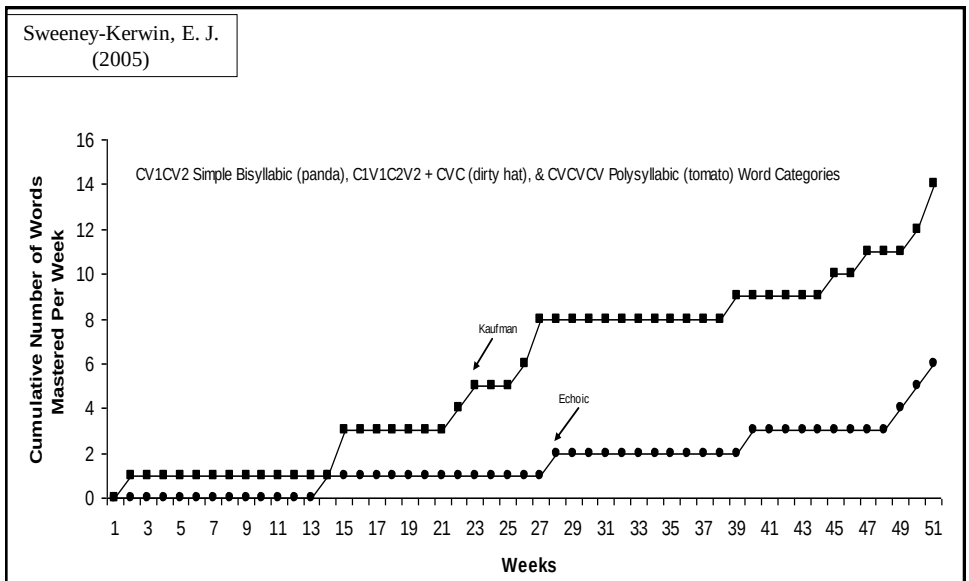


Figure 2. Cumulative number of Kaufman and Echoic words mastered per week for Max

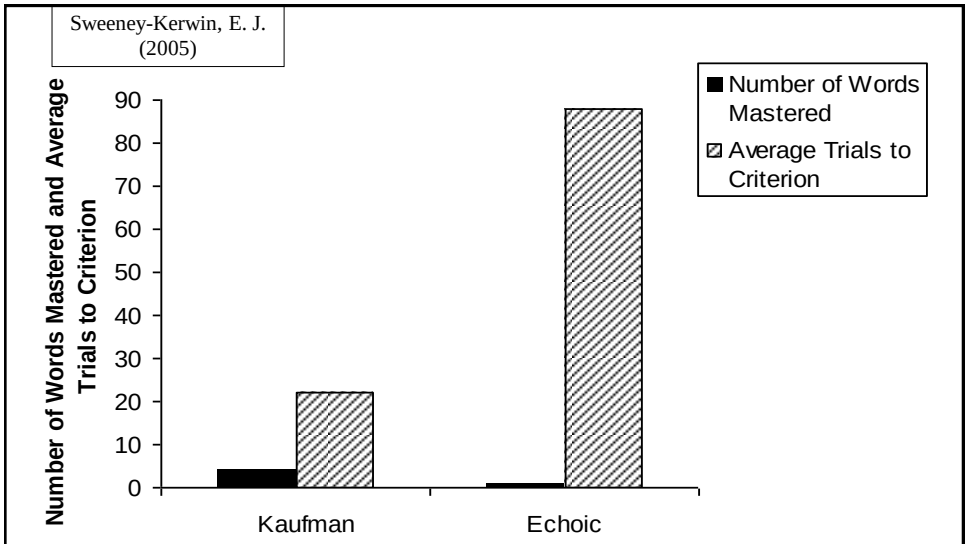


Figure 3. Cumulative number of words mastered in Kaufman and Echoic conditions and average trials to criterion per condition for Vincent.

475

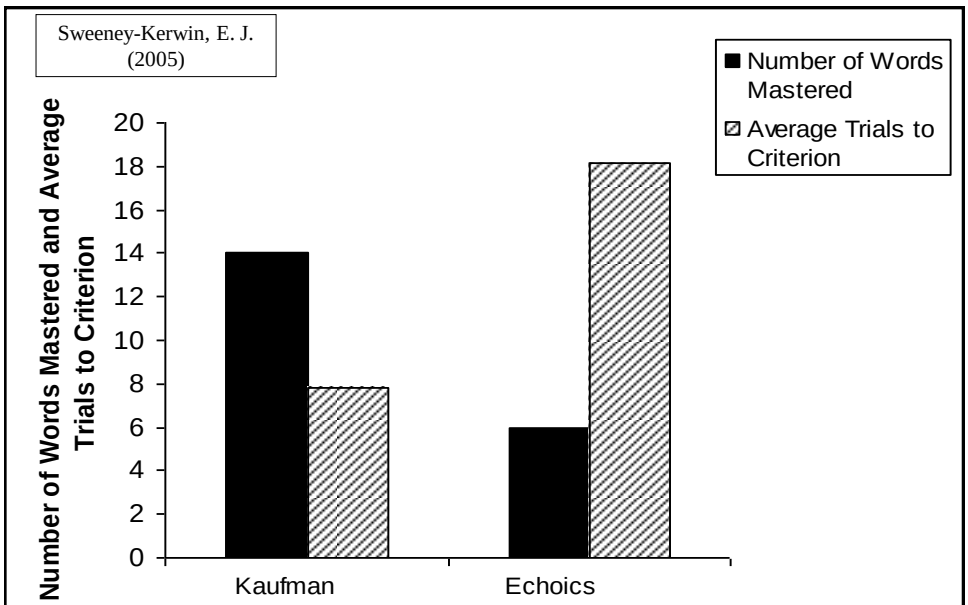


Figure 4. Cumulative number of words mastered in Kaufman and Echoic conditions and average trials to criterion per condition for Max.

476

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Very Limited Research that Supports the Use of The Kaufman Praxis Treatment for Children to Improve Vocal Responding

Sweeney-Kerwin, E. J., Zecchin, G., Carbone, V. J., Janecky, M. N., Murray, D. D., & McCarthy, K. (2005, December). *Improving the speech production of children with autism.* Paper presented at the New York State Association for Behavior Analysis, Verona, NY.

Speech Sound Production

- While there is not an extensive body of literature on the benefits of using sign language to increase vocal productions, the controlled research that is available suggests that the use of manual sign language may best support an increase in vocal productions for learners with autism, especially when a total communication training approach is utilized.

- Millar et al., 2006, reviewed controlled studies between 1975 and 2003 with persons with developmental disabilities and autism that purported to demonstrate that alternative forms of communication produced improved vocal production.

- Only studies that met rigorous experimental standards were included as effective treatment methods.
- They found only 6 studies that were sufficiently rigorous to include in their report.
- Of these 6 studies only 1 study found PECS to be effective in increasing vocal production. Charlop-Christy, et al, 2002.
- All the other 5 studies were manual sign language research papers.

Schlosser & Wendt (2008b) conducted a review of the literature searching for well controlled studies with persons with autism that demonstrated improvements in speech production with alternative communication methods

Research

Effects of Augmentative and Alternative Communication Intervention on Speech Production in Children With Autism: A Systematic Review

Ralf W. Schlosser
Northeastern University, Boston
Oliver Wendt
Purdue University, West Lafayette, IN

Purpose: This systematic review aimed to determine the effects of augmentative and alternative communication (AAC) intervention on speech production in children with autism or pervasive developmental disorder-not otherwise specified.
Method: A systematic review methodology was utilized to limit bias in searching, selecting, coding, and synthesizing relevant treatment studies. This involved a multifaceted search for studies written between 1975 and May 2007 using various bibliographic databases, dissertation databases, hand searches of selected journals and published compilations of AAC theses and dissertations, and ancestry searches. To be included, studies had to meet stringent criteria. A coding manual and form facilitated data extraction in terms of participant characteristics, treatment characteristics, design and measurement, and outcomes.
Results: Nine single-subject experimental design (27 participants) and 2 group studies (98 participants) were included. Results indicated that AAC interventions do not impede speech production. In fact, most studies reported an increase in speech production. However, in-depth analyses revealed that the gains were rather modest.
Conclusions: Although AAC interventions do not appear to impede speech production and may result in increased speech production, the modest gains observed require realistic expectations among clinicians and other stakeholders. Future research should be more hypothesis driven and aim to identify predictive child characteristics, such as prior speech imitation and object exploration skills.

Key Words: augmentative and alternative communication, autism spectrum disorders, speech improvement, systematic review

American Journal of Speech Language Pathology (August 2008), Vol 17, 212-230

Schlosser and Wendt (2008b) found the following:

1. There are nine (9) methodologically rigorous single subject design studies that evaluated vocal production with alternative communication methods.

2. The 9 studies include 5 PECS studies, 1 manual sign study and 3 SGD studies.

3. Of the 5 PECS studies 3 did not demonstrate improved vocalizations.

4. Only two (2) of the studies included showed treatment effects related to vocal production, 2 PECS and 1 manual sign.

5. In Tincani's (2004) comparative study both PECS and manual sign produced increased levels of vocal productions in children with autism and in Tincani et al. (2006) PECS only was evaluated for increased speech production.

6. In Tincani (2004) when sign was compared to PECS manual sign language demonstrated superiority over PECS in both subject's vocal productions.

7. This review also identified 3 SGD studies with 1 showing some benefit and the others showing limited or no benefit related to vocal production in children with autism.

481

They also reported on two group design studies, Yoder & Layton, 1988; Yoder and Stone, 2006) that were appropriately rigorous in their designs.

In the Yoder and Layton (1988) the authors concluded that sign language training along with teacher presented auditory stimuli (words) and alternating between sign training and speech alone training were all superior to sign alone training.

This result was re-analyzed by Schlosser and Wendt and they found no difference among the conditions. They recognized the differences in statistical methods may have led to this result.

In the Yoder and Stone (2006) PECS was more effective than Responsive Education and Pre-Linguistic Mileu Teaching in supporting speech production.

A dissertation (Anderson, 2002) comparing manual sign language to PECS found that in all participants who showed improvements in speech production manual sign language was robustly more effective.

A recent meta-analysis of all PECS research reported "small to negative" findings related to speech production. (Flippin, Reszka, & Watson, 2010)

482

Comparing the Picture Exchange Communication System and Sign Language Training for Children with Autism

Matt Tincani

This study compared the effects of Picture Exchange Communication System (PECS) and sign language training on the acquisition of mands (requests for preferred items) of students with autism. The study also examined the differential effects of each modality on students' acquisition of vocal behavior. Participants were two elementary school students with autism enrolled in a suburban public school. Training sessions involved presentations of preferred items, prompting and prompt fading procedures. Probes were conducted to evaluate the generalization of learned mands to classroom teachers. For one participant, sign language training produced a higher percentage of independent mands. PECS training produced a higher percentage of independent mands for the other participant. For both participants, sign language training produced a higher percentage of vocalizations during training. Mands learned with the experimenter generalized to classroom teachers. The results of the study suggest that acquisition of picture exchange and sign language may vary as a function of individual student characteristics, specifically, motor imitation skills prior to intervention. However, further research is needed to determine the optimal procedures for teaching both modalities to students with communication difficulties.

Speech deficits are common to children with autism (American Psychiatric Association, 2000). Approximately 50% of children diagnosed with autism will remain functionally mute in adulthood (Peeters & Gillberg, 1999). Even with early intensive intervention including speech instruction, some children may fail to acquire useful speech (e.g., Lovaas, 1987). Training in augmentative and alternative communication (AAC) is an option for children with autism who do not readily learn speech. Two AAC modalities, sign language and picture exchange, show promise for teaching communication to nonvocal learners.

In sign language training, children may be taught to mand or request preferred items, engage in conversation, and emit verbal behavior under the control of various stimulus conditions (cf. Sundberg & Partington, 1998). Although there has been little recent research on sign language intervention for children with autism, there is evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with autism and other developmental disabilities (e.g., Brady & Smouse, 1978; Konstantareas, 1984; Layton & Baker, 1981). The Picture Exchange Communication System (PECS; Bondy & Frost, 2002), a popular picture exchange system used primarily for children with autism (National Research Council, 2001), teaches children to exchange picture symbols to mand and tact items, among other functions. Initial studies suggest that most children taught PECS acquire independent use of the system, and many even acquire functional speech (Bondy & Frost, 1994; Charlop-Christy et al., 2003; Schwartz, Garfinkle, & Bauer, 1998).

Given the positive reported outcomes for each modality, choosing between sign language and PECS may be difficult. Although some have argued for the benefits of teaching one AAC system over others (e.g., Sundberg & Partington, 1998), it is unlikely that any single system best meets the diverse needs of all children with autism and multiple disabilities. A number of factors, including cognitive and motor abilities, may influence a child's acquisition of an AAC system (Bonvillian & Blackburn, 1991). Four comparison studies of sign language and picture-based systems, described below, have yielded mixed and unclear evidence about the advantages and disadvantages of each system.

Hodges and Schwethelm (1984) taught 52 nonvocal children with mental retardation sign language and two types of picture-based systems. In the sign lan-

FOCUS ON AUTISM AND OTHER DEVELOPMENTAL DISABILITIES
VOLUME 19, NUMBER 3, FALL 2004
PAGES 152–163

Tinacani, 2004

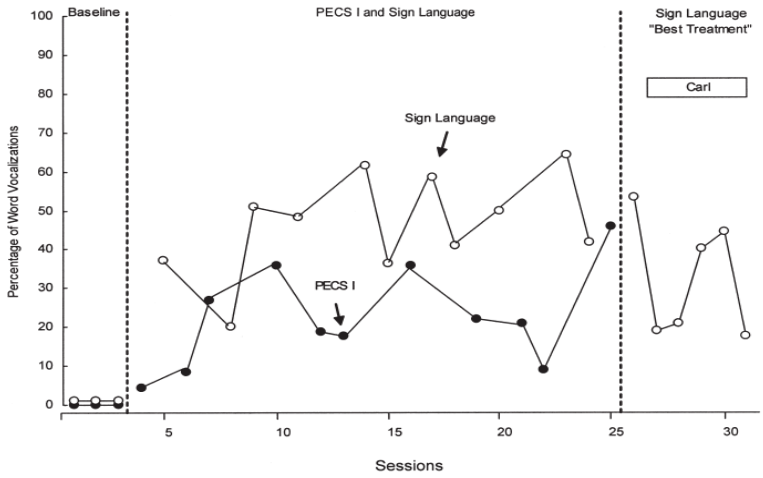

FIGURE 5. Percentage of word vocalizations in baseline and training conditions for Carl.

Tincani, 2004

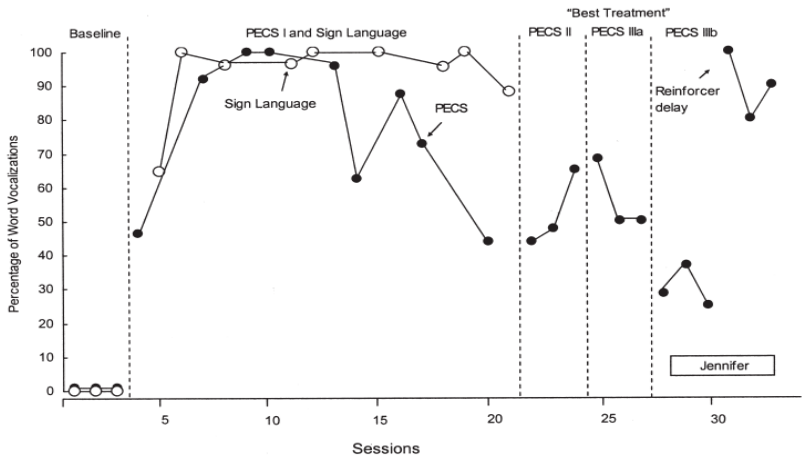

FIGURE 6. Percentage of word vocalizations in baseline and training conditions for Jennifer.

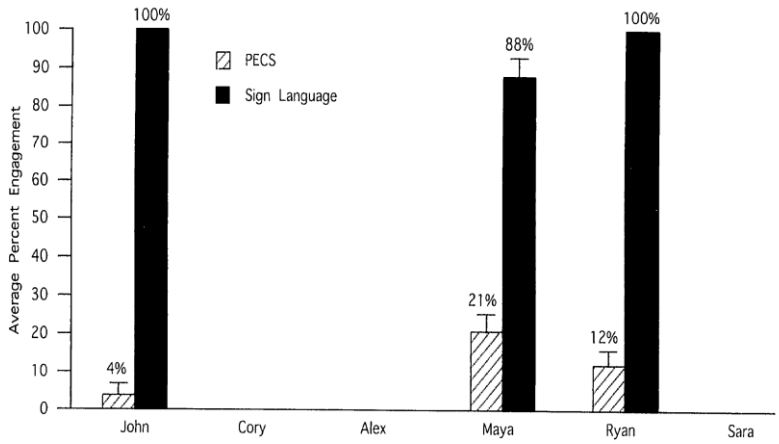

Figure 50: Average percent engagement in vocalization during correct responding at post-treatment across participants in the PECS and sign language conditions.

Anderson, A. (2001) Augmentative Communication and Autism: A Comparison of Sign Language and Picture Exchange Communication System, Dissertation Abstracts.

Effectiveness of the Picture Exchange Communication System (PECS) on Communication and Speech for Children With Autism Spectrum Disorders: A Meta-Analysis

Michelle Flippin
Stephanie Reszka
Linda R. Watson
University of North Carolina at Chapel Hill

Purpose: The Picture Exchange Communication System (PECS) is a popular communication-training program for young children with autism spectrum disorders (ASD). This meta-analysis reviews the current empirical evidence for PECS in affecting communication and speech outcomes for children with ASD.
Method: A systematic review of the literature on PECS written between 1994 and June 2009 was conducted. Quality of scientific rigor was assessed and used as an inclusion criterion in computation of effect sizes. Effect sizes were aggregated separately for single-subject and group studies for communication and speech outcomes.
Results: Eight single-subject experiments (18 participants) and 3 group studies (95 PECS participants, 65 in other intervention/control) were included. Results indicated that PECS is a promising but not yet established evidence-based intervention for facilitating communication in children with ASD ages 1–11 years. Small to moderate gains in communication were demonstrated following training. Gains in speech were small to negative.
Conclusions: This meta-analysis synthesizes gains in communication and relative lack of gains made in speech across the PECS literature for children with ASD. Concerns about maintenance and generalization are identified. Emerging evidence of potential preintervention child characteristics is discussed. Phase IV was identified as a possibly influential program characteristic for speech outcomes.

Key Words: autism, Picture Exchange Communication System, communication intervention, speech

FOCUS ON AUTISM AND OTHER DEVELOPMENTAL DISABILITIES
VOLUME 22, NUMBER 1, SPRING 2007
PAGES 23–32

The Application of PECS in a Deaf Child With Autism:
A Case Study

Georgia A. Malandraki and Areti Okalidou

A 10-year-old nonverbal Greek boy, C.Z., who had been diagnosed with both bilateral sensorineural profound hearing loss and autism, was taught to use the Picture Exchange Communication System (PECS), with some modifications and extensions, over a 4-month intensive intervention period. C.Z.'s original communication and behavioral status as well as the PECS application process are presented, along with the communicative, language, and psychosocial outcomes following the intervention program. Follow-up data were collected 6 months post.

ing impairments. In another Swedish study, Rosenhall, Nordin, Sandstrom, Ahlsen, and Gillberg (1999) reported on audiological examinations of 199 children with autism; 7.9% of them were found to exhibit mild to moderate hearing loss, and 3.5% had severe or profound hearing losses.

Despite the high comorbidity of autism and hearing loss, few studies have used complete audiometrical battery tests (i.e., combined measures of pure tone audiometry and tympanometry) to assess the hearing status of children with autism (Smith, Miller, Stewart, Walter, & McConnell, 1988). The small number of studies may be explained by the observation

- On the next few slides is a study our clinic published related to speech production and application of manual sign.
- In this study the learner was vocal in that she had a strong echoic repertoire but failed to acquire and maintain vocalizations in mainly the tact repertoire.
- When sign was added to the her repertoire a substantial improvement in the frequency of vocal productions occurred as displayed on the data sets on the next few slides.

SLP- ABA Volume 1, No. 3, 2006

A Comparison of Two Approaches for Teaching VB Functions: Total Communication vs. Vocal-Alone

Vincent J. Carbone, Lisa Lewis, Emily J. Sweeney-Kerwin, Julie Dixon, Rose Louden and Susan Quinn

Abstract

Total communication (TC) involves the use of manual signs with their corresponding spoken words simultaneously; and research indicates that TC facilitates vocal responding by children with autism. However, most of this previous research was conducted 20 years ago and did not consider vocal responding in relation to verbal behavior functions (Skinner, 1957). The present study used an alternating treatment design to compare the effects of TC vs. vocal-alone (VA) training on the vocal tact responses of a child with autism. Results indicated that the child produced nearly four times as many vocal tact responses during TC training than during VA training in less than half the number of teaching trials. The use of manual sign training is considered in relation to its advantages for supporting the production of vocal responses.

Keywords: verbal behavior, sign language, tact, autism, total communication.

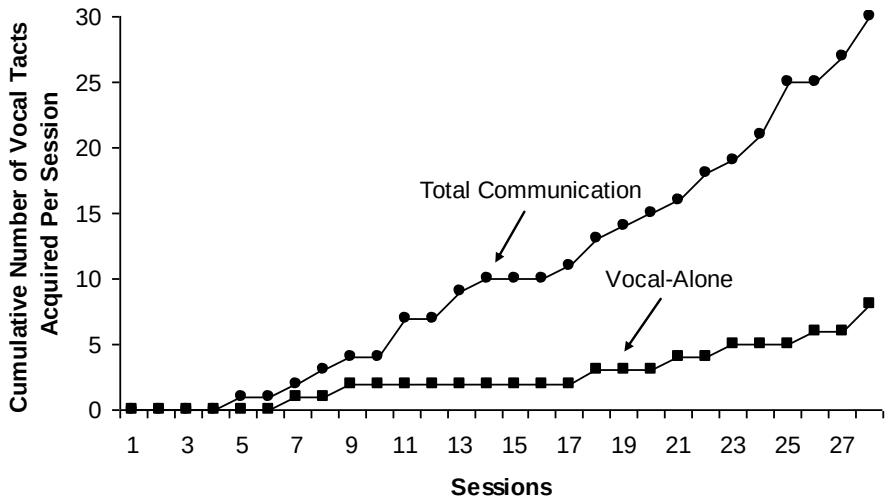

Figure 1. Cumulative number of vocal tacts acquired in the total communication condition and vocal-alone condition per session.

Carbone, V. J., et al. (2006)

491

SARAH VIDEO

Carbone, V. J. et al. (2006)

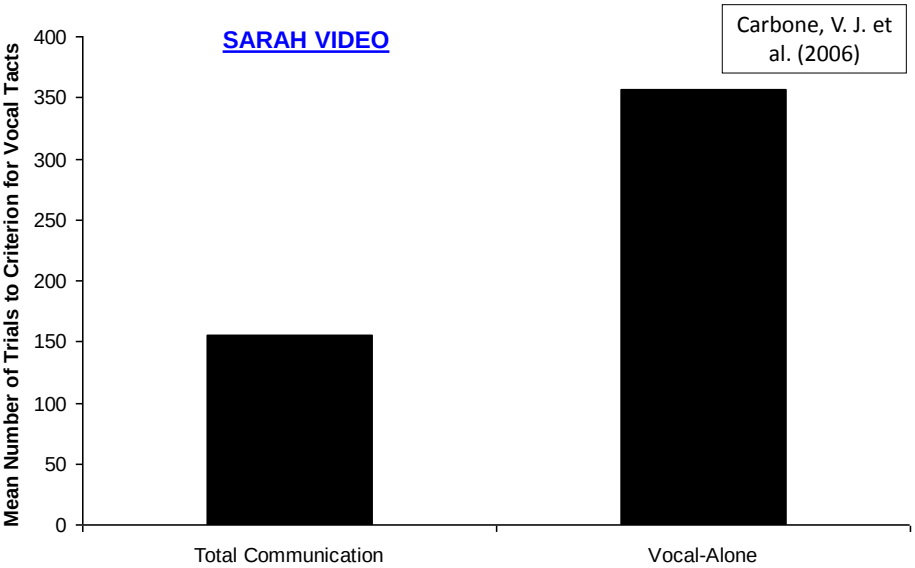

Figure 2. The mean number of trials to criterion for vocal tacts in the total communication condition and vocal-alone condition.

Speech Generating Devices
Sign Vocalization Videos

492

EUROPEAN JOURNAL OF BEHAVIOR ANALYSIS 2009, 10, 275 - 282 NUMBER 2 (WINTER 2009)

Brief report: an evaluation of total communication vs vocal alone for teaching tacts

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Wales Centre for Behaviour Analysis, School of Psychology, Bangor University, Wales[1]
and Betsi Cadwaladr University Health Board[2]

Total Communication (TC) and Vocal Alone (VA) are two teaching approaches used to facilitate vocal responding with children with language delays and autism. TC involves the simultaneous use of the manual sign and the spoken word. VA involves the use of the spoken word only. This single subject study aimed to compare the two approaches using an alternating treatment design to find which condition produced the most effective acquisition rate of vocal tacts for an echolalic child with autism. We also examined the effect of condition on speech articulation on targeted items and the child's listener behaviour (selection) following tact only (speaker) training. An in depth phonological assessment was carried out pre test and the subject's vocal utterances phonetically transcribed over the course of the study by a speech and language therapist (SALT). Results indicated that the TC condition produced six times more vocal tacts than the VA condition; results from the listener behaviour tests showed the subject was able to respond appropriately when given both the vocal and sign, but not with the vocal stimulus alone. The phonetic transcription yielded inconclusive results but indicated ways that such information could be used more effectively in future research.

Keywords: Total Communication, Vocal Alone, tact, autism, articulation, listener behaviour.

Discussion

In the present study, Jim acquired six times more vocal tacts in the TC condition compared to the VA condition. These results support the findings of Carbone et al. (2006) in that TC is a more effective training condition to teach vocal tacts. Although the overall number of acquired targets was relatively low in both conditions, this emphasises the difficulty that some children lacking these repertoires have in acquiring verbal behaviour.

Research in Autism Spectrum Disorders 5 (2011) 977–983

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Research in Autism Spectrum Disorders

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Review

Spontaneous communication in autism spectrum disorder: A review of topographies and interventions

Cormac Duffy, Olive Healy *

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. In spite of some of the criticisms of signing and "total communication", studies comparing the effects of teaching expressive language using speech, signing, or "total communication" report that signing or "total communication" training often results in quicker and more complete learning than speech training alone for many participants (Carbone et al., 2006; Yoder & Layton, 1988). Carbone et al. (2006) compared the effects of "total communication" and speech alone training on labelling responses of a child with autism. Significant differences in terms of the effectiveness of the two training conditions were reported, whereby the child produced over three times as many comments during "total communication" training relative to speech alone training.

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Additional Procedures to Increase Vocal Productions

- Some learners do not produce vocalizations during sign mand training as has been reported in the previous review of the literature.
- Additional procedures may need to be added when teaching manual sign language manding.

EARLY SIGNS- NO VOCALIZATIONS

PROCEDURES TO ADD TO SIGN LANGAUGE TRAINING
TO INCREASE VOCAL VERBAL BEHAVIOR

- The literature indicates that there are other procedures that may be used alone or along with alternative communication to increase vocal production:
  - Time Delay and Differential Reinforcement (Carbone Sweeney-Kerwin, Attanasio & Kasper, 2010; Charlop, Schreibman, & Thibodeau, 1985; Charlop & Trasowech, 1991; Halle, Baer, & Spradlin, 1981; Halle, Marshall, & Spradlin, 1979; Ingenmey & Houten, 1991; Matson, Sevin, Box, Francis, & Sevin, 1993; Matson, Sevin, Fridley, & Love, 1990); Sweeney-Kerwin, Carbone, O'Brien, Zecchin, & Janecky, 2007; Tincani, 2004; Tincani, Crozier, & Alazetta, 2006)
  - Carbone, et al.,(2010) specifically demonstrated that sign mand training along with time delay and echoic prompting procedures increased vocal production and led to some adult form mand responses.
  - The echoic prompting procedure used by Carbone, et al., was similar to the method implemented by Drash, High & Tudor (1999) to increase echoic responses within the context of vocal mand training.

Prompt Delay and Echoic Prompting Procedures

MO----------Sign Response---------Reinforce

ONCE RESPONSE IS STRONG
DO THE FOLLOWING

MO---------Sign Response ---(5 sec Delay)--- **Vocalization**---Reinforce

OR

MO--------Sign Response ---(5 Sec Delay)---**NR**--(Echoic Prompt)--- **Vocalization**--Reinforce

OR

MO--Sign Response ---(5 Sec Delay)--- **NR**-- (Echoic Prompt)---**NR**-----Small Reinforcer

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2010, 43, 705–709 NUMBER 4 (WINTER 2010)

INCREASING THE VOCAL RESPONSES OF CHILDREN WITH AUTISM AND DEVELOPMENTAL DISABILITIES USING MANUAL SIGN MAND TRAINING AND PROMPT DELAY

VINCENT J. CARBONE AND EMILY J. SWEENEY-KERWIN

CARBONE CLINIC

VIVIAN ATTANASIO

VERBAL BEHAVIOR INSTITUTE

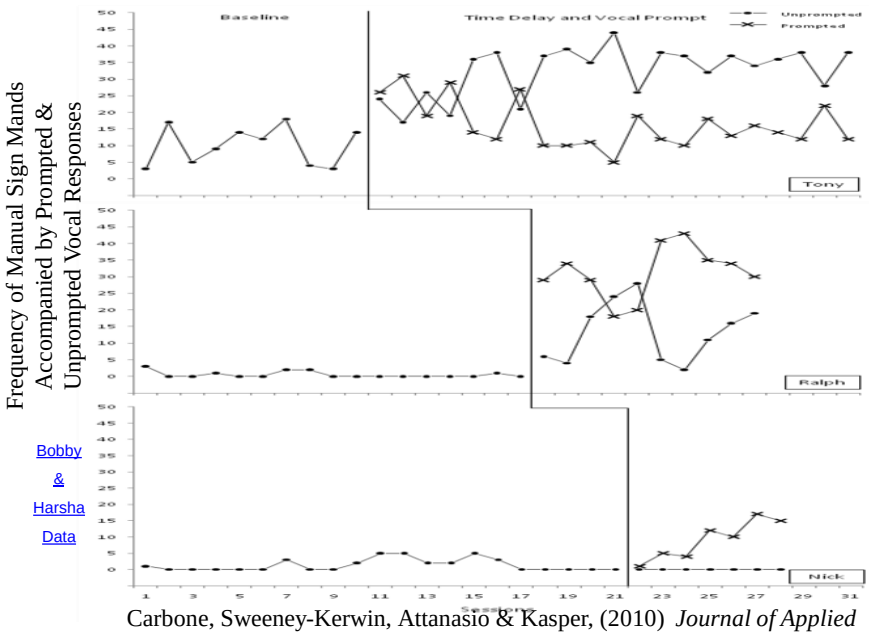
AND

TAMARA KASPER

CENTER FOR AUTISM TREATMENT

The purpose of this study was to determine the effect of manual sign mand training combined with prompt delay and vocal prompting on the production of vocal responses in nonvocal children with developmental disabilities. A multiple baseline design across participants verified the effectiveness of this intervention. All participants showed increases in vocal responses following the implementation of the independent variables.

Key words: autism, mand, manual sign language, prompt delay, vocal responding



Bobby & Harsha Data

Carbone, Sweeney-Kerwin, Attanasio & Kasper, (2010) *Journal of Applied Behavior Analysis.*

Prompt Delay and Echoic Prompting to Improve Vocal Production

NICK

Reinforcer

Nick, Mattie & Peter

1. Ball _____NR → **Prompt Delay** → ih
2. Puzzle _____NR → **Prompt Delay** → e
3. Puzzle Yuu
4. Ball _____NR→ **Prompt delay** → ___NR → **Echoic Prompt** → uh

MATTIE

5. Marble mmm → **Prompt Delay** → arpwuh

PETER

6. Cracker ___NR → **Prompt Delay** → guh → **PROMPT** → guhkuh

Time Delay, Echoic Prompting and Differential Reinforcement of Vocalizations

Bobby and Christy

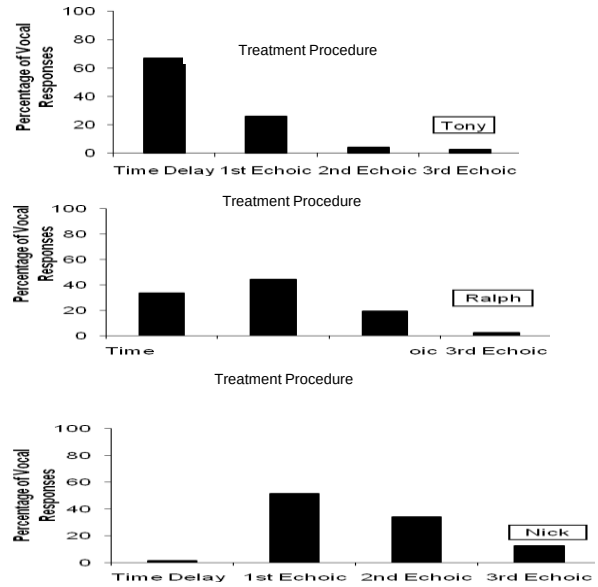
REINFORCER

Bobby w/ Christy

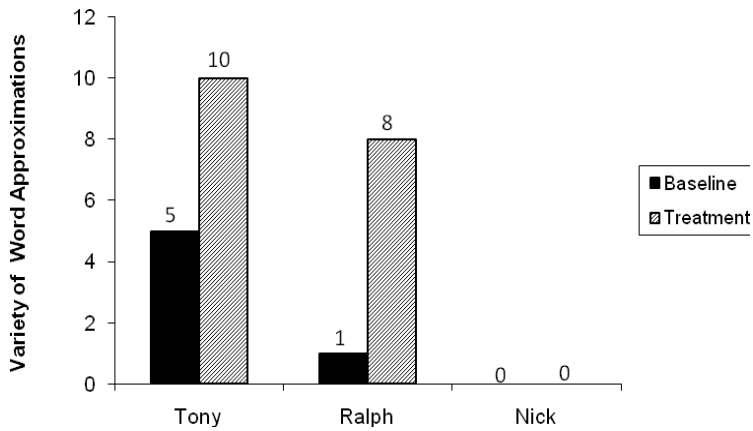
Bobby & Brian

1. Music mooihk
2. Key ke
3. Ball buh → **TIME DELAY** → buu → **PROMPT** → baw
4. Ball bo → **TIME DELAY** → ___ → **PROMPT** → bo → **PROMPT** → baw
5. Potty che → **TIME DELAY** → pohdeh
6. Cereal shoh → **TIME DELAY** → ___ → **PROMPT** → shoh → **PROMPT** → shoh → **PROMPT** → shoh
7. Key che → **TIME DELAY** → ke
8. Jump bohguhmp → **TIME DELAY** → ___ → **PROMPT** → duhmp → **PROMPT** → duhmp → **PROMPT** → juhm
9. Jump juhmp
10. Cereal che → **TIME DELAY** → kyuu → **TIME DELAY** → ke → **PROMPT** → shoh → **PROMPT** → shieyoh

EFFECTS OF TIME DELAY AND ECHOIC



VARIETY OF WORD APPROXIMATIONS



Tony Word Approximations

“wahwah” for water,

“buu” for book,

“reahl” and “eahl” for cereal,

“ve” and “oove” for movie,

“puh” & “buhbul” for puzzle,

“cahn” & “ahnd” for candy

Ralph Word Approximations

puh” for puzzle

“boh” and “bloh” for block

“ta” and “ain” for train

“pa” for turn page

“eht” for pretzel”

References

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Charlop, M. H., Schreibman, L., & Thibodeau, M. G. (1985). Increasing spontaneous verbal responding in autistic children using a time delay procedure. *Journal of Applied Behavioral Analysis, 18,* 155-166.

Charlop, M. H., & Trasowech, J. E. (1991). Increasing autistic children's daily spontaneous speech. *Journal of Applied Behavioral Analysis, 24,* 747-761.

Shaping Vocal Productions

- When manual sign language and or time delay, differential reinforcement and echoic method produce increased vocal production it may still be necessary to shape the response to more closely approximate the adult form of the word.
- Cooper, Heron, & Heward (2007) describe a teaching procedure called shaping, which can be used to teach novel behaviors. Shaping involves differentially reinforcing successive approximations to a terminal behavior. This means that the practitioner must deliver reinforcement for all responses that share predetermined dimensions of the terminal behavior (i.e., are closer approximations to the terminal behavior) while withholding reinforcement for all responses that do not contain those dimensions.
- A study by Bourett, Vollmer and Rapp, (2004) demonstrated the use of a shaping procedure to increase vocal production.
- A more recent report by Newman,Reinecke & Ramos, (2009) demonstrated that a shaping procedure can be an effective method to improve vocal productions of children with autism.

Phonetic Transcription

- Transcription of the vocal productions during the shaping process can provide a standard on which to determine the sequence of successive approximations toward the adult form.
- Much of the theory about, rationale for, and procedures for transcription can be found in the linguistic literature related to the teaching of individuals with language disorders (e.g., apraxia) or individuals learning a second language.
- A transcript is defined as "an intentional representation of data translated from one medium to another as a necessary and convenient analytic strategy" (Müller & Damico, 2002, p. 301).
- The process of transcription involves 2 main components:
    - A listener who can accurately hear what is spoken
    - A notation system by which to record that which is heard (e.g., The International Phonetic Alphabet (IPA)

- There are also various reasons within the behavior analytic literature to consider using transcription when teaching language.
    - Direct and repeated measures of behavior or the product of behavior serve as the data for analyzing the relationship between independent and dependent variables (Skinner, 1938, 1953). In this case, the vocal productions and their transcriptions provide a way to objectively measure the vocal product of the learner's verbal behavior.
    - Second, a precise record of speech productions can serve as a method for determining incremental response requirements toward the adult form of the word during the shaping process.

- By identifying the adult form of the word as the terminal behavior and various combinations of speech sounds as successive approximations to that terminal behavior, the process of shaping can be applied to the development of vocal productions.

- Transcription of vocal productions allows the clinician to assess successive approximations to the adult form of the word. This permits the clinician to determine the next step, or the next successive approximation, that will be reinforced as a part of the shaping process.

- Visual display and analysis of data related to improvements of vocal productions based on transcriptive measurements provide a guide for making data-based decisions throughout the shaping process (Fuchs, Deno, & Mirkin, 1982).

Methods for Transcription

- Based on the reasons identified in both the linguistic and behavior analytic research, we have selected transcription of vocal productions as the dependent measure for vocal shaping procedures.

- What follows are examples of the phonetic transcriptive alphabet we have designed, as well as a system for classifying vocal productions along a continuum from speech sounds to the adult form of the word.

Modified Phonetic Transcription

Transcribe		Example
Vowels:		
e	key	
eh	red	
i	pie	Teach as oh-ih
ih	pin	
a	bait	Teach as a-ih
ah	had	
o	okay	Teach as oh-uu
oh	cod	
oo	moon	
uu	wood	
uh	bud	
Vowel Diphthongs:		
ow	how, about	Teach as ah-oo
aw	law	Teach as oh-oo
oy	boy	Teach as o-e
Vowels Influenced by R:		
er	butter, bird	
or	for, oar	
ar	car, large	
ear	tear	Teach as ih-uh
air	fair	Teach as a-uh

Transcribe		Example
Consonants:		
p	pork	
b	bug	
t	to	
d	dog	
k	king	
g	go	
m	mad	
n	name	
v	vote	
ng	ring	
f	for	
th-	thing	
th+	them	
s	say	
z	zoo	**Data Sheets**
sh	ship	
zh	beige	
h	hen	
ch	chew	
j	join	
w	win	Teach as oo-ihn
y	yet	Teach as e-eht
r	row	
l	let	

Developed by T. Kasper & V.Carbone

Transcribing Vocalizations During Sign Manding

DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS DURING SIGN-MANDING

Learner: Johnny Date: 7/31/07 Session Time: 1145-400 Instructor: Cindy Acevedo

	Reinforcer	Prompt Level	What was said during signing	Echoic 1	Echoic 2	Echoic 3
1.	up	FPP PBL GP V ITEM MO PMO	ah bah			
2.	"	FPP PBL GP V ITEM MO PMO	"			
3.	"	FPP PBL GP V ITEM MO PMO	"			
4.	popcorn	FPP PBL GP V ITEM MO PMO	bah go	bah gohn		
5.	Marker	FPP PBL GP V ITEM MO PMO	?	mah		
6.	"	FPP PBL GP V ITEM MO PMO		muh		
7.	Crayon	FPP PBL GP V ITEM MO PMO	wuh			
8.	Marker	FPP PBL GP V ITEM MO PMO		ye		
9.	Marker	FPP PBL GP V ITEM MO PMO	muh			
10.	"	FPP PBL GP V ITEM MO PMO	"			
11.	pizza	FPP PBL GP V ITEM MO PMO	bah			
12.	banana	FPP PBL GP V ITEM MO PMO		nah nah	nah go	
13.	apple	FPP PBL GP V ITEM MO PMO	ah pah			
14.	train	FPP PBL GP V ITEM MO PMO	wuh			
15.	Bear	FPP PBL GP V ITEM MO PMO	Beh			
16.	clock	FPP PBL GP V ITEM MO PMO				
17.	ball	FPP PBL GP V ITEM MO PMO	bah			
18.	butterfly	FPP PBL GP V ITEM MO PMO	buh	bah yah yah		
19.	bike	FPP PBL GP V ITEM MO PMO	bah			
20.	ride	FPP PBL GP V ITEM MO PMO	wuh			
21.	Sun	FPP PBL GP V ITEM MO PMO	nuh			
22.	dazzle	FPP PBL GP V ITEM MO PMO	ah	sah	dah	
23.	more	FPP PBL GP V ITEM MO PMO	muh	muhnee		Moobe
24.	popcorn	FPP PBL GP V ITEM MO PMO	bah gah			bluto
25.	bottle	FPP PBL GP V ITEM MO PMO	bah go			bahwod
26.	water	FPP PBL GP V ITEM MO PMO	wuh			wahdo
27.	dazzle	FPP PBL GP V ITEM MO PMO		sah sah		bah boo
28.	Work	FPP PBL GP V ITEM MO PMO		wuh		wahwuh
29.	Hot Pot	FPP PBL GP V ITEM MO PMO	Bah go			
30.	"	FPP PBL GP V ITEM MO PMO	"			

Developed by the Staff of the Carbone Clinic. May be copied and distributed with proper attribution.

SIGN MANDING WITH TIME DELAY, ECHOIC PROMPTING AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS

Learner: _____ Date: _____ Session Time: _____ Instructor: _____

	Reinforcer	Prompt Level	Vocal response during initial attempt	Vocal Response after Time Delay	Vocal Response after Echoic Trials	
1.	cookie	FPP PPP GP V ITEM MO TMO				A
2.	geun	FPP PPP GP V ITEM MO TMO	geuh			WA
3.	baun	FPP PPP GP V ITEM MO TMO	"			WA
4.	"	FPP PPP GP V ITEM MO TMO	"			WA
5.	cookie	FPP PPP GP V ITEM MO TMO	kuuka		✓	WA
6.	"	FPP PPP GP V ITEM MO TMO	"	✓		WA
7.	geun	FPP PPP GP V ITEM MO TMO	geuh			WA
8.	cookie	FPP PPP GP V ITEM MO TMO	✓			A
9.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
10.	piggy	FPP PPP GP V ITEM MO TMO	bihde		✓	WA
11.	hurry	FPP PPP GP V ITEM MO TMO	juhpoo		✓	WA
12.	piggy	FPP PPP GP V ITEM MO TMO				A
13.	"	FPP PPP GP V ITEM MO TMO	bihgeh		✓	WA
14.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
15.	"	FPP PPP GP V ITEM MO TMO	"		kahde	WA
16.	puzzle	FPP PPP GP V ITEM MO TMO	muhzuhl		puhzuh	WA
17.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
18.	"	FPP PPP GP V ITEM MO TMO	puhzuh			WA
19.	"	FPP PPP GP V ITEM MO TMO	muhzuh		puhzuh	WA
20.	candy	FPP PPP GP V ITEM MO TMO	gohde		kahde	WA
21.	bubble	FPP PPP GP V ITEM MO TMO	buhbco		buhbuh	WA
22.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
23.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
24.	"	FPP PPP GP V ITEM MO TMO	"			WA
25.	"	FPP PPP GP V ITEM MO TMO	"			WA
26.	"	FPP PPP GP V ITEM MO TMO	"			WA
27.	"	FPP PPP GP V ITEM MO TMO	"			WA
28.	bubble	FPP PPP GP V ITEM MO TMO	buhbuh			WA
29.	cracker	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
30.	"	FPP PPP GP V ITEM MO TMO	✓			A

16

519

SIGN MANDING WITH TIME DELAY, ECHOIC PROMPTING AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS

Learner: matthe Date: 4.28.08 Session Time: 2:30-4:20 Instructor: HV

	Reinforcer	Prompt Level	Vocal response during initial attempt	Vocal Response after Time Delay	Vocal Response after Echoic Trials	
1.	cracker	FPP PPP GP V ITEM MO TMO	kwahwuh		kahkuhr	SS
2.	"	FPP PPP GP V ITEM MO TMO	"	kahkuhr		SS
3.	movie	FPP PPP GP V ITEM MO TMO	poofe		✓	SS
4.	cracker	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
5.	"	FPP PPP GP V ITEM MO TMO	kwahkuhr	kahkuhr		WA
6.	movie	FPP PPP GP V ITEM MO TMO	poofe	✓		SS
7.	cracker	FPP PPP GP V ITEM MO TMO	kwahguhr		✓	SS
8.	movie	FPP PPP GP V ITEM MO TMO	poofe			SS
9.	"	FPP PPP GP V ITEM MO TMO	boov		✓	WA
10.	marble	FPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
11.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
12.	cracker	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
13.	movie	FPP PPP GP V ITEM MO TMO	poofe			SS
14.	"	FPP PPP GP V ITEM MO TMO	moofe			WA
15.	"	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS
16.	marble	FPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
17.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
18.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
19.	candy	FPP PPP GP V ITEM MO TMO	gohde		kade	WA
20.	"	FPP PPP GP V ITEM MO TMO	gohde		"	WA
21.	"	FPP PPP GP V ITEM MO TMO	kohde			WA
22.	movie	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS
23.	black	FPP PPP GP V ITEM MO TMO	kuhp			SS
24.	"	FPP PPP GP V ITEM MO TMO	"			SS
25.	movie	FPP PPP GP V ITEM MO TMO	poofe	✓		SS
26.	block	FPP PPP GP V ITEM MO TMO	kuhp			SS
27.	"	FPP PPP GP V ITEM MO TMO	"			SS
28.	movie	FPP PPP GP V ITEM MO TMO	moofe	✓		WA
29.	"	FPP PPP GP V ITEM MO TMO	"	✓		WA
30.	"	FPP PPP GP V ITEM MO TMO	poofe		moofe	SS

across/23 8A/ 790 1117/ 108/.98 111

520

Vocal Production Classification System

To determine progress toward production of the adult form of the word we have developed a classification procedure based upon the transcriptive record from each mand session.

1. Transcribe vocal responding using the phonetic transcriptive alphabet during mand training.

2. Classify transcriptions of vocal responses according to the following categories:

   – **Speech Sounds** → Any vocal production that contains at least one phoneme or any combination of phonemes (not found in the adult form of the word) independent of the relevant controlling variables. (may include one sound contained in the adult form of the word)

   EXAMPLE- **saying "buh" when manding for music or saying "moo" when manding for music.**

- Word Approximations → Any vocal production with at least 2 phonemes included in an adult form of an American English word and emitted more than once throughout the session under the control of relevant variables

  EXAMPLE- **saying "muhehk" when manding for music**

- Intelligible Word → Any word that effectively controls the behavior of an unfamiliar listener without contextual cues but does not include all phonemes of adult form under the controls of relevant variables
- EXAMPLE- **saying "muusehk" when manding for music.**

- Adult Form → Any word that contains all the phonemes of the adult form under the control of relevant variable

  EXAMPLE- **saying "muusihk" when manding for music.**

(developed by V. Carbone, T. Kasper, L. O'Brien, M. Janecky, & G. Zecchin)

SIGN MANDING WITH ECHOIC PROMPTING, AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS with Scrolling

Learner: Bobby Korenda **Date:** _____ **Session Time:** _____ **Instructor:** _____

	Reinforcer	Prompt Level	Scrolling Y/N	Vocal response during initial mand attempt	Vocal response following 5 sec. time delay	Vocal Response Reinforced after Echoic Trials
1.	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
2.	yellow ball	FPP PPP GP V IV ITEM MO TMO	Y N	yeh ban		WA
3.	"	FPP PPP GP V IV ITEM MO TMO	Y N	yeh ban		WA
4.	green ball	FPP PPP GP V IV ITEM MO TMO	Y N	ge ban		WA
5.	door ball	FPP PPP GP V IV ITEM MO TMO	Y N	dhih		WA
6.	red ball	FPP PPP GP V IV ITEM MO TMO	Y N	ehd		WA
7.	green ball	FPP PPP GP V IV ITEM MO TMO	Y N	se ban		WA
8.	pink ball	FPP PPP GP V IV ITEM MO TMO	Y N	pih ban		WA
9.	music	FPP PPP GP V IV ITEM MO TMO	Y N	moo ihk		WA
10.	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
11.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
12.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
13.	drink	FPP PPP GP V IV ITEM MO TMO	Y N	der engk		WA
14.	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
15.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
16.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
17.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
18.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
19.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
20.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
21.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
22.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
23.	no	FPP PPP GP V IV ITEM MO TMO	Y N	muh	→	mo
24.	"	FPP PPP GP V IV ITEM MO TMO	Y N	mo		M
25.	music	FPP PPP GP V IV ITEM MO TMO	Y N	moo ihk		WA
26.	up	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
27.	chip	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
28.	"	FPP PPP GP V IV ITEM MO TMO	Y N	✓		A
29.	move	FPP PPP GP V IV ITEM MO TMO	Y N	m uhe	move	W
30.	potty	FPP PPP GP V IV ITEM MO TMO	Y N	pohde		B

SIGN MANDING WITH TIME DELAY, ECHOIC PROMPTING AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS

Learner: _____ **Date:** _____ **Session Time:** _____ **Instructor:** _____

	Reinforcer	Prompt Level	Vocal response during initial attempt	Vocal Response after Time Delay	Vocal Response after Echoic Trials	
1.	cookie	FPP PPP GP V ITEM MO TMO	✓			A
2.	green	FPP PPP GP V ITEM MO TMO	geuh			WA
3.	ball	FPP PPP GP V ITEM MO TMO	ra			WA
4.	"	FPP PPP GP V ITEM MO TMO	"			WA
5.	cookie	FPP PPP GP V ITEM MO TMO	kuka		✓	WA
6.	"	FPP PPP GP V ITEM MO TMO	"	✓		WA
7.	green	FPP PPP GP V ITEM MO TMO	geuh			WA
8.	cookie	FPP PPP GP V ITEM MO TMO	✓			A
9.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
10.	piggy	FPP PPP GP V ITEM MO TMO	pihe		✓	WA
11.	jumps	FPP PPP GP V ITEM MO TMO	juhpoo		✓	WA
12.	piggy	FPP PPP GP V ITEM MO TMO	✓			A
13.	"	FPP PPP GP V ITEM MO TMO	bingeh		✓	WA
14.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
15.	"	FPP PPP GP V ITEM MO TMO	"		kahde	WA
16.	puzzle	FPP PPP GP V ITEM MO TMO	muhzuht		puhzuh	WA
17.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
18.	"	FPP PPP GP V ITEM MO TMO	puhzuh			WA
19.	"	FPP PPP GP V ITEM MO TMO	muhzuh		puhzuh	WA
20.	candy	FPP PPP GP V ITEM MO TMO	gohde		kahde	WA
21.	bubble	FPP PPP GP V ITEM MO TMO	buhboo		buhbuh	WA
22.	"	FPP PPP GP V ITEM MO TMO	"		"	WA
23.	candy	FPP PPP GP V ITEM MO TMO	kohde			WA
24.	"	FPP PPP GP V ITEM MO TMO	"			WA
25.	"	FPP PPP GP V ITEM MO TMO	"			WA
26.	"	FPP PPP GP V ITEM MO TMO	"			WA
27.	"	FPP PPP GP V ITEM MO TMO	"			WA
28.	bubble	FPP PPP GP V ITEM MO TMO	buhbuh			WA
29.	candy	FPP PPP GP V ITEM MO TMO	kahkuhr			WA
30.	"	FPP PPP GP V ITEM MO TMO	✓			A

16

SIGN MANDING WITH TIME DELAY, ECHOIC PROMPTING AND DIFFERENTIAL REINFORCEMENT OF VOCALIZATIONS

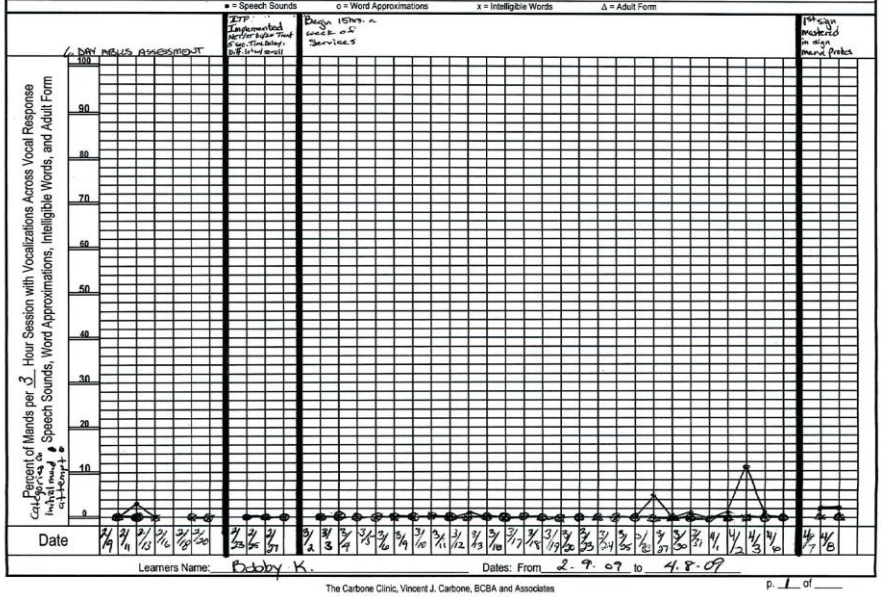
Learner: Matthe Date: 4.28.08 Session Time: 2:30-4:30 Instructor: HV

	Reinforcer	Prompt Level	Vocal response during initial attempt	Vocal Response after Time Delay	Vocal Response after Echoic Trials	
1.	cracker	FPP PPP GP V ITEM MO TMO	kwahkuh		kahkuhr	SS
2.	"	PPP PPP GP V ITEM MO TMO	"	kahkuhr		SS
3.	movie	PPP PPP GP V ITEM MO TMO	poofe		✓	SS
4.	cracker	PPP PPP GP V ITEM MO TMO	kahkuhr			WA
5.	"	PPP PPP GP V ITEM MO TMO	kwahkuh	kahkuhr		WA
6.	movie	PPP PPP GP V ITEM MO TMO	poofe	✓		SS
7.	cracker	PPP PPP GP V ITEM MO TMO	kwahkuhr		✓	SS
8.	movie	PPP PPP GP V ITEM MO TMO	poofe			SS
9.	"	PPP PPP GP V ITEM MO TMO	poov		✓	WA
10.	marble	PPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
11.	"	PPP PPP GP V ITEM MO TMO	"		"	WA
12.	cracker	PPP PPP GP V ITEM MO TMO	kahkuhr			WA
13.	movie	PPP PPP GP V ITEM MO TMO	poofe			SS
14.	"	PPP PPP GP V ITEM MO TMO	moofe			WA
15.	"	PPP PPP GP V ITEM MO TMO	poofe		moofe	SS
16.	marble	PPP PPP GP V ITEM MO TMO	bahbuhl		mahbuh	WA
17.	"	PPP PPP GP V ITEM MO TMO	"		"	WA
18.	"	PPP PPP GP V ITEM MO TMO	"		"	WA
19.	candy	PPP PPP GP V ITEM MO TMO	gohde		kade	WA
20.	"	PPP PPP GP V ITEM MO TMO	gohde		"	WA
21.	"	FPP PPP GP V ITEM MO TMO	kohde			WA
22.	movie	PPP PPP GP V ITEM MO TMO	poofe		moofe	SS
23.	block	PPP PPP GP V ITEM MO TMO	kuhp			SS
24.	"	FPP PPP GP V ITEM MO TMO	"			SS
25.	movie	PPP PPP GP V ITEM MO TMO	poofe	✓		SS
26.	block	FPP PPP GP V ITEM MO TMO	kuhp			SS
27.	"	FPP PPP GP V ITEM MO TMO	"			SS
28.	movie	PPP PPP GP V ITEM MO TMO	moofe	✓		WA
29.	"	FPP PPP GP V ITEM MO TMO	"	✓		WA
30.	"	PPP PPP GP V ITEM MO TMO	poofe		moofe	SS
across	23	8A	7%	1117	108/.98	

525

Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on initial mand attempt: speech sounds, word approximations, Intelligible words and adult form

• = Speech Sounds o = Word Approximations x = Intelligible Words Δ = Adult Form

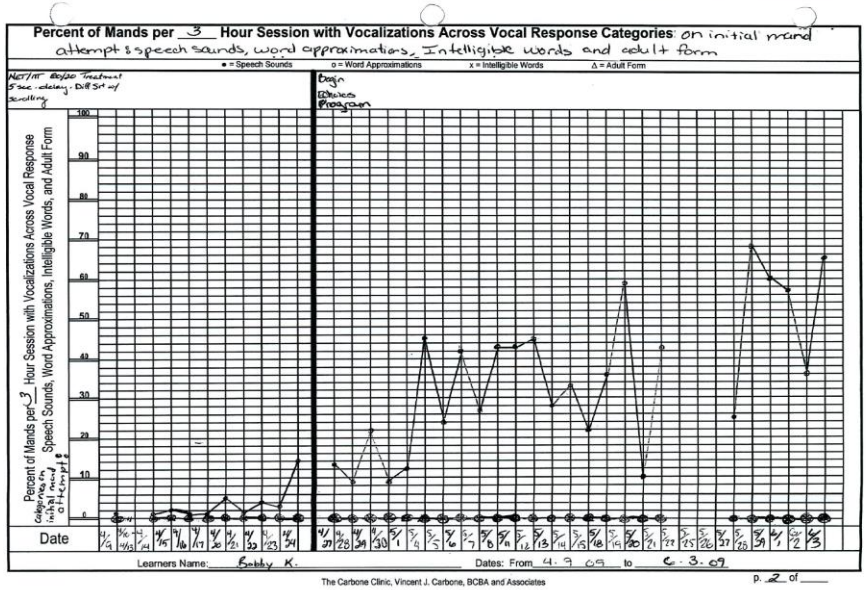


Learners Name: Bobby K. Dates: From 2.9.07 to 4.8.09

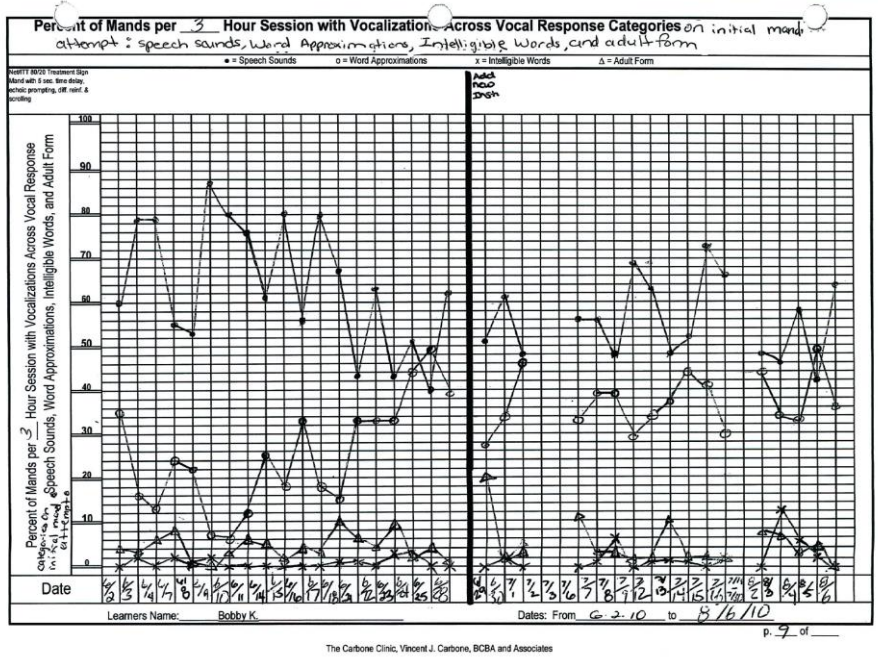
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

p. 1 of ____

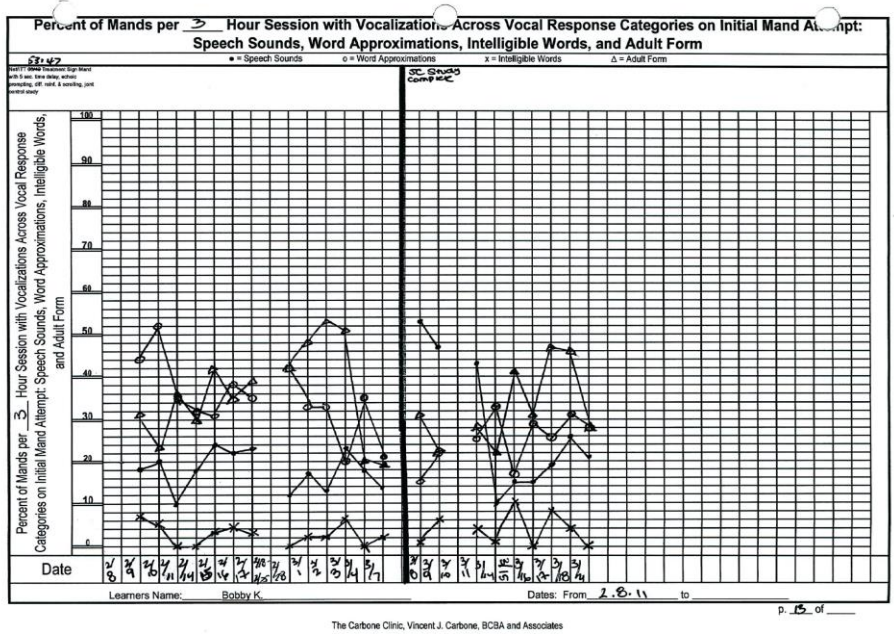
526


Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on initial mand attempt: speech sounds, word approximations, intelligible words and adult form
• = Speech Sounds
o = Word Approximations
x = Intelligible Words
Δ = Adult Form
Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
Date
Learners Name: Bobby K.
Dates: From 4.9.09 to 6.3.09
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
p. 2 of

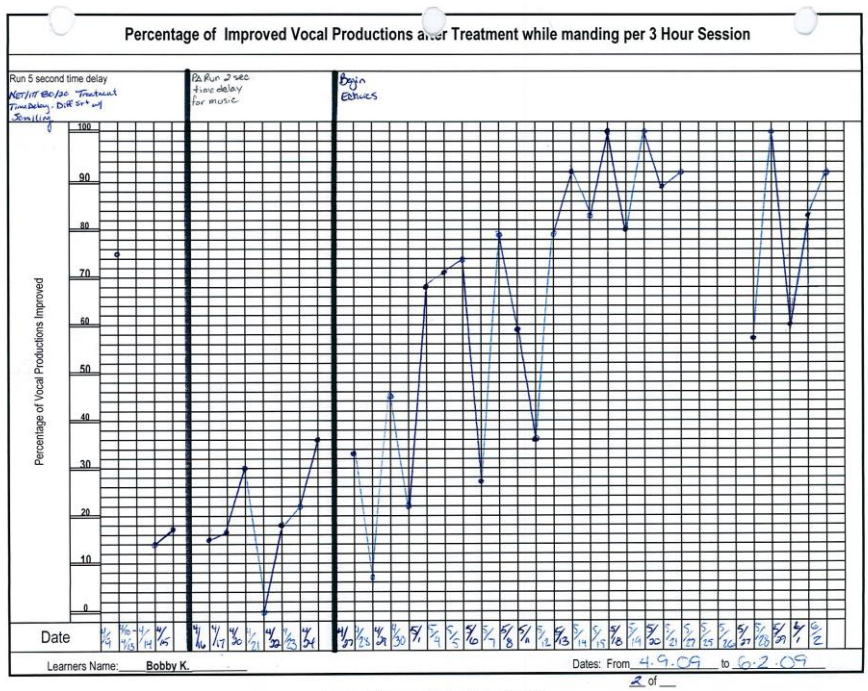
527


Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on initial mand attempt: speech sounds, Word Approximations, Intelligible Words, and adult form
• = Speech Sounds
o = Word Approximations
x = Intelligible Words
Δ = Adult Form
Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
Date
Learners Name: Bobby K.
Dates: From 6.2.10 to 8/6/10
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
p. 7 of

528

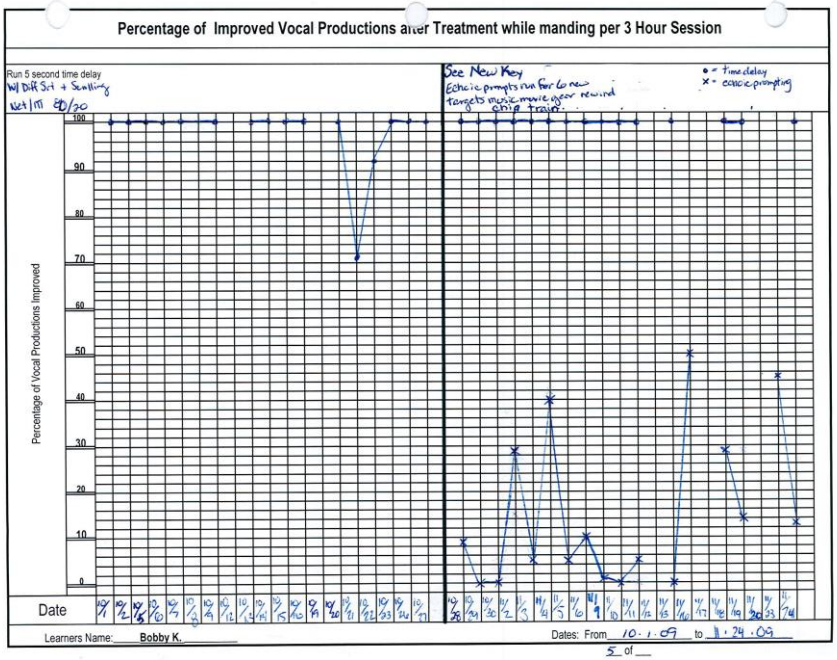

Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on Initial Mand Attempt: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
● = Speech Sounds
○ = Word Approximations
x = Intelligible Words
Δ = Adult Form
Percent of Mands per 3 Hour Session with Vocalizations Across Vocal Response Categories on Initial Mand Attempt: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form
Date
Learners Name: Bobby K.
Dates: From 2.8.11 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

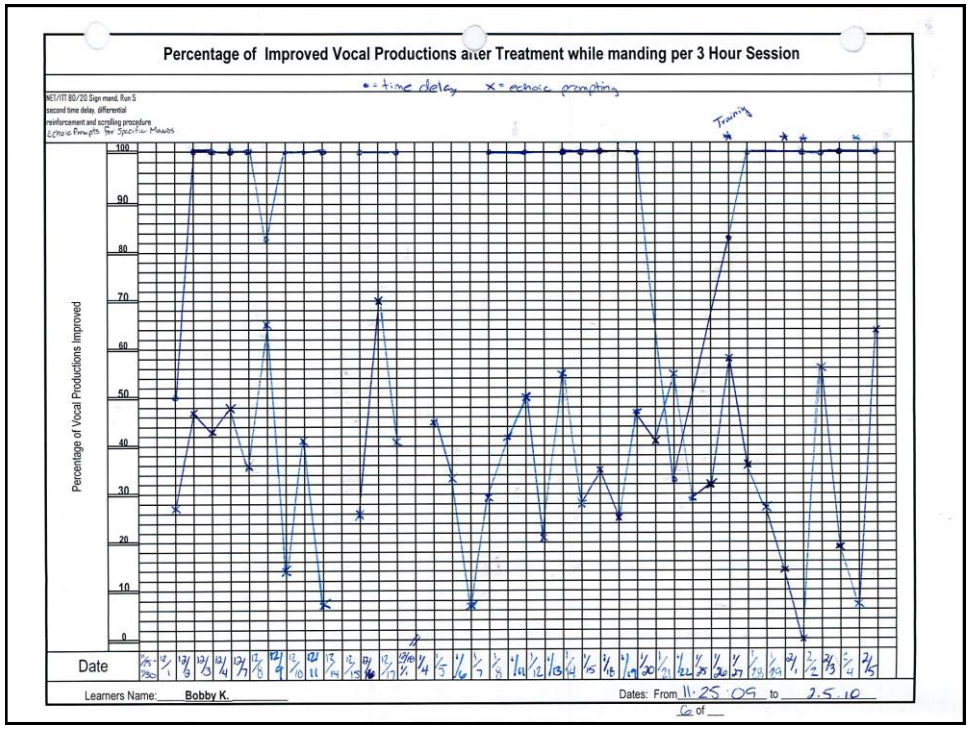
529

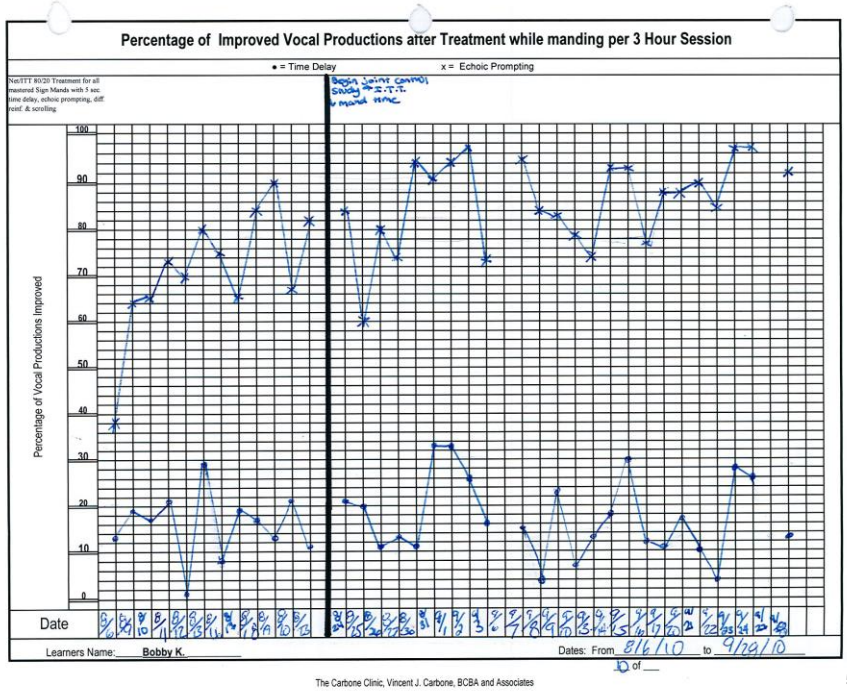

Percentage of Improved Vocal Productions after Treatment while manding per 3 Hour Session
Run 5 second time delay
Percentage of Vocal Productions Improved
Date
Learners Name: Bobby K.
Dates: From 4.9.09 to 6.2.09

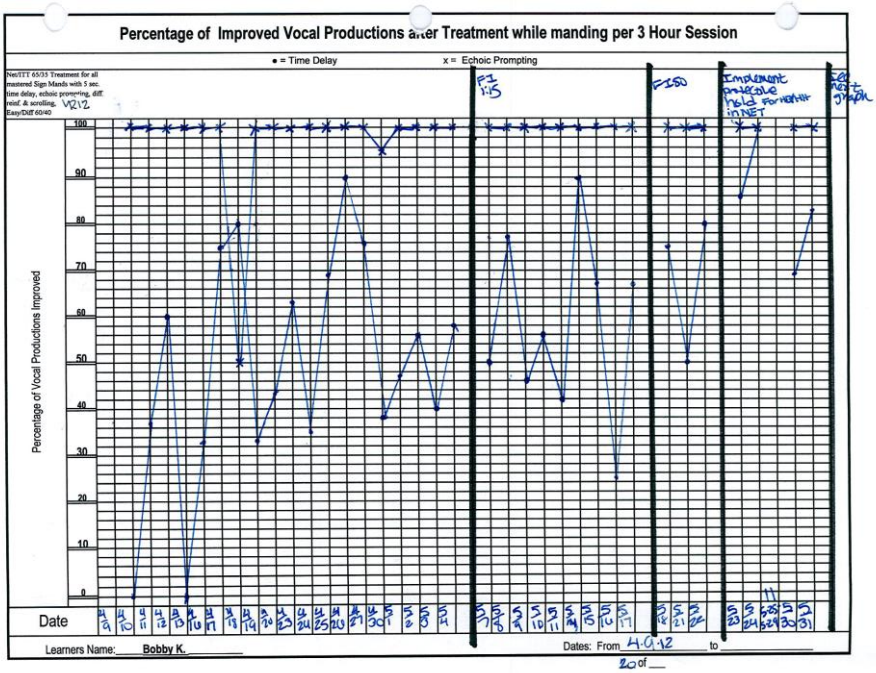
530

531


Percentage of Improved Vocal Productions after Treatment while manding per 3 Hour Session
Run 5 second time delay
W/ Diff Sit + Scrolling
Ket/111 80/30
See New Key
Echoic prompts run for 6 new targets music movie open rewind
• = Time delay
× = echoic prompting
Percentage of Vocal Productions Improved
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Bobby K.
Dates: From 10.1.09 to 11.24.09
5 of
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
532


Percentage of Improved Vocal Productions after Treatment while manding per 3 Hour Session
• = time delay x = echoic prompting
NET/ITT 80/20 Sign mand, Run S second time delay, differential reinforcement and scrolling procedure
Echoic Prompts for Specific Mands
Training
Percentage of Vocal Productions Improved
Date
Learners Name: Bobby K.
Dates: From 11.25.09 to 2.5.10


Percentage of Improved Vocal Productions after Treatment while manding per 3 Hour Session
• = Time Delay x = Echoic Prompting
Net/ITT 80/20 Treatment for all mastered Sign Mands with 5 sec time delay, echoic prompting, diff. reinf. & scrolling.
Begin Joint control Shady & I.T.T. & mand mac
Percentage of Vocal Productions Improved
Date
Learners Name: Bobby K.
Dates: From 8/6/10 to 9/29/10



535

CASE STUDY – Shaping Vocalizations

- What follows is a case study in shaping vocal productions using manual sign training, time delay, differential reinforcement, echoic prompting, transcription during mand training and shaping procedures. The procedures were as follows:
  - Conduct mand training using manual sign language
  - Conduct mand training using time delay, echoic prompts, and differential reinforcement to improve vocal productions
  - Transcribe vocal productions to determine successive approximations for shaping procedure.
  - Graph data based on the transcribed vocal productions
  - Use data to determine daily targets

536

Participant

- The participant for this study was Matthew (Matty), a 7-1 year-old male who had been diagnosed with autism in December, 2003.
- Matty began receiving intensive one-on-one services at the Carbone Clinic in June of 2004.
- When services began, Matty had no vocal or alternative manding repertoire, very limited vocal imitation, tact, or intraverbal repertoires; he had weak motor imitation, receptive, and visual performance repertoires.
- Across his first 4 clinic sessions, when an assessment was conducted, Matty emitted an average of approximately 505 speech sounds per 3 hour session, with an average variety of 20 different speech sounds per session; most of these occurred during highly reinforcing activities (e.g., while dancing, while watching movies, etc.).
- All sounds produced were reinforced leading to an increase is speech sounds. Methods similar to those recommended by Koegel, O'Dell & Dunlap (1988) were implemented.

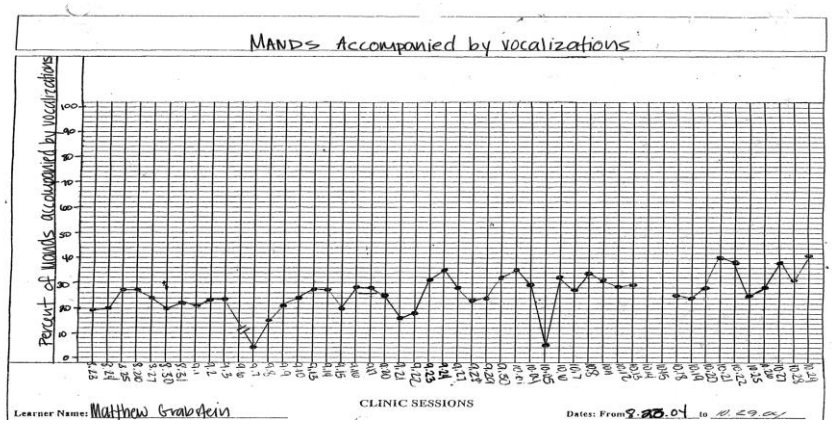
First Vocs Video- PLAYING WITH MAGGIE

- When instruction began, Matty was taught to mand using manual sign language. Note that initially sign training produced no increase in vocal production.

EARLY SIGNS- NO VOCALIZATIONS

- Even after several months of sign mand training there was almost no increase in vocal production.

LOTS OF SIGNS, STILL LIMITED VOCALIZATIONS

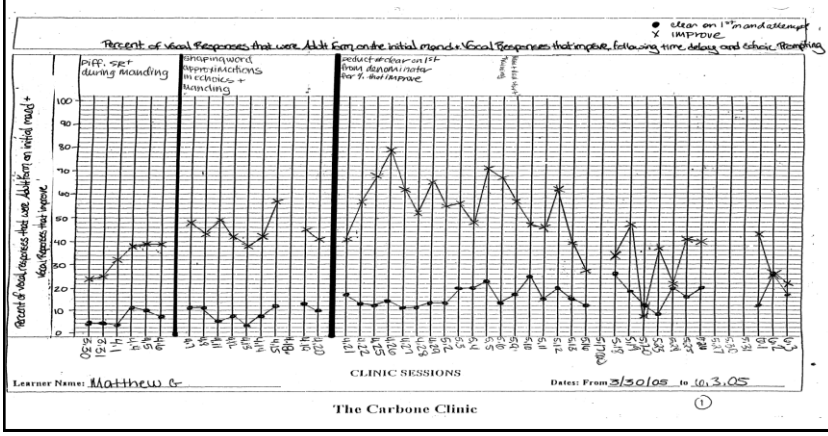


- After he developed a strong manual sign mand repertoire, instructional procedures that included time delay and echoic prompting were implemented to increase the frequency of vocalizations that were produced while manding.

- Use of a time delay, echoic prompting and differential reinforcement did lead to an increase in the production of vocalizations while manding.

TIME DELAY IN FIRST

COUPLE OF TRIALS- MARBLE TRIAL



- This procedure did not have a substantial effect on improving the quality of vocalizations.

- Therefore, a vocal mand **shaping** procedure was developed and implemented to target the improvement of Matty's vocalizations emitted while manding.

Procedures – Vocal Mand Shaping Protocol

- While previous procedures supported the development of some vocalizations, limited progress and improvement was noted.
- *Therefore* vocal shaping procedures were used to target the improvement of vocal productions emitted while manding for all sign mands for which Matty previously met criteria for mastery**.**
- In other words, these procedures were used to target improved vocal productions for all mands that were strong, meaning that they were consistently emitted under the control of the presence of the item or the MO.

Establishing the First Baseline

1. For each sign mand, Matty's baseline vocal production was established by transcribing the vocal productions that accompanied the first 5 sign mand attempts for a given item.
2. From those transcriptions, it was determined which vocal production was emitted most consistently. This was the baseline measure against which future comparisons were made. During the session if Matty emitted a different vocal production during each of the 5 trials, then the one that most closely approximated the adult form of the vocal mand was selected. This was the initial baseline measure against which future comparisons were made.

Baseline Transcriptions for Mand Training to Improve Vocalizations

Directions: Choose mands that have been mastered through the Sign Discrimination Program. Transcribe the vocal response that accompanies the initial sign mand attempt for each reinforcer. Record the date for each trial and the date the baseline was completed for each reinforcer. Highlight the most consistent vocal response. If different vocal responses are emitted on each trial, highlight the response that most closely approximates the adult form. The highlighted vocal response will be the initial baseline measure against which future comparisons of improvement will be made.

Learner: Matthew G.

Reinforcer	Trial #1		Trial #2		Trial #3		Trial #4		Trial #5		**Baseline**	
	Date	Vocal Response	Date	Vocal Response	Date	Vocal Response	Date	Vocal Response	Date	Vocal Response	Date	Vocal Response
Airplane												
Ball	4.4.08	/buh/	4.4.08	/boh/	4.4.08	/boh/	4.4.08	/buh/	4.4.08	/buh/	4.4.08	**/buh/**
Balloon	4.4.08	/poo/	4.4.08	/tuhboo/	4.4.08	/buhboo/	4.4.08	/boo/	4.4.08	/boo/	4.4.08	**/boo/**
Bear	4.4.08	/beh/										
Bell												
Block	4.4.08	/kuhpoo/	4.4.08	/kuhp/	4.4.08	/kuhpoo/	4.4.08	/kuhp/	4.4.08	/kuhp/	4.4.08	**/kuhp/**
Boat												
Book	4.4.08	/buh/	4.4.08	/bohuu/	4.4.08	/buu/	4.4.08	/buh/	4.4.08	/buu/	4.4.08	**/buu/**
Bubbles	4.4.08	/buhboo/	4.4.08	/buhbooye/	4.4.08	/buhboo/	4.4.08	/buhboo/	4.4.08	/buhboo/	4.4.08	**/buhboo/**
Cake	5.9.08	/ka/	5.9.08	/ka/	5.9.08	/ka/	5.9.08	/ka/	5.9.08	/ka/	5.9.08	**/ka/**
Candy	4.4.08	/gohdoo/	4.4.08	/gohdoo/	4.4.08	/gohdoo/	4.4.08	/gohte/	4.4.08	/kohte/	4.4.08	**/gohdoo/**
Car	4.4.08	/kaw/	4.4.08	/kohuh/	4.4.08	/kaw/	4.4.08	/kaw/	4.4.08	/kaw/	4.4.08	**/kaw/**
Cereal												
Chip	4.4.08	/chehpoo/	4.4.08	/chuhpuh/	4.4.08	/chuhpuh/	4.4.08	/chuhpoo/	4.4.08	/chuhpoo/	4.4.08	**/chuhpoo/**
Cookie	4.4.08	/guuke/	4.4.08	/guuke/	4.4.08	/guuke/	4.4.08	/kuuka/	4.4.08	/kuuke/	4.4.08	**/guuke/**
Crayon	4.4.08	/kwahnuh/	4.4.08	/kuhwahnuh/	4.4.08	/kwahnuh/	4.4.08	/kwahnuh/				
Cracker	4.4.08	/krahkwuh/	4.4.08	/krahkwoo/	4.4.08	/kwahkwoo/	4.4.08	/kwahkwuh/	4.4.08	/kwahkwuh/	4.4.08	**/kwahkwuh/**
Cymbal	4.16.08	N/A										

Key: **N/A** = no vocalization emitted with the sign during baseline
Blank = baseline in progress (no data currently)
Highlighted Response = the initial baseline measure (future comparisons of improvement will be compared to the initial baseline)

Table 1. Baseline transcriptions for mand training to improve vocal productions (A-C).

Teaching Procedures

1. The teacher has identified the baseline vocal production of all mands that may be emitted during that session.
2. A variety of reinforcers were made available but out of sight; approximately 5 reinforcers were presented at a time, clearly spread out around the instructor where Matthew could see them.
3. The instructor waited for Matthew to declare motivation for an item (e.g., looking at or reaching for an item).
4. Diagram on the following slide describes the steps of the shaping procedure.
5. On Slide # 111 is a narrative description on the procedure.

Shaping Procedure

MO---------Sign Response ----- **Better Vocalization**----Reinforce

OR

MO---------Sign Response --- **BL Voc**---(5 sec Delay)--- **Better Voc**-----Reinforce

OR

MO--------Sign Response ---(5 Sec Delay)---**BL Voc.** --(Echoic Prompt)--- **Better Voc**-- -- Reinforce

OR

MO--Sign Response ---(5 Sec Delay)---**BL Voc**-- (Echoic Prompt)---**BL Voc**----Small Reinforcer

When Matthew emitted a sign mand,

If he simultaneously emitted a vocal production that was an improvement over the baseline measure, the instructor immediately delivered the reinforcer.

If he simultaneously emitted a vocal production that was **NOT** an improvement over the baseline measure, or if there was no vocal response emitted, the instructor implemented a 5-second time delay.

During this 5-second time delay

If a sign mand was emitted with a simultaneous vocal production that was an improvement over baseline, the instructor immediately delivered the reinforcer.

If no additional vocal response was emitted during the 5-second time delay or a sign mand was emitted with a simultaneous vocal production that was NOT an improvement over baseline, the instructor began running up to five echoic trials (i.e., modeling the sign while providing an echoic prompt of the adult form of the vocal mand).

If, during any one of these echoic trials, Matthew emitted a sign mand with a simultaneous vocal production that was an improvement over baseline, the instructor immediately delivered the reinforcer.

If, after 5 echoic trials, Matthew had **NOT** emitted a sign mand with a simultaneous vocal production that was an improvement over the baseline measure, *the instructor delivered a smaller amount of the reinforcer (differential reinforcement).*

Data Collection

- Trial by trial data of prompt levels necessary to evoke the mand were recorded along with transcriptions for all mands.
- All vocal productions emitted on initial sign mand attempts (i.e., unprompted vocal productions) were scored across the 4 vocal response categories:
  - Speech Sounds
  - Word Approximations
  - Intelligible Words
  - Adult Form

Data sheets displaying recordings of prompt levels and simultaneous transcriptions are presented on the next couple of slides.

Learner: Matthew Date: 8.29.08 Session Time: 3:45 - 4:30 Instructor: Claire

	Reinforcer	Prompt Level	Vocal Response During Initial Mand Attempt	Vocal Response Following 5 Second Time Delay	Vocal Response Reinforced Following Echoic Prompting	
1.	music	FPP PPP GP V ITEM MO TMO	myoozih	→	→	WA
2.	piggy	FPP PPP GP V ITEM MO TMO	pihgeh	→	✓	WA
3.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	✓	SS
4.	"	FPP PPP GP V ITEM MO TMO	"	→	✓	SS
5.	"	FPP PPP GP V ITEM MO TMO	chuh	→	✓	SS
6.	piggy	FPP PPP GP V ITEM MO TMO	pihgeh	→	✓	WA
7.	block	FPP PPP GP V ITEM MO TMO	kuhp			SS
8.	"	FPP PPP GP V ITEM MO TMO	"			SS
9.	"	FPP PPP GP V ITEM MO TMO	"			SS
10.	puzzle	FPP PPP GP V ITEM MO TMO	puhzoo	→	→	WA
11.	"	FPP PPP GP V ITEM MO TMO	✓			A
12.	"	FPP PPP GP V ITEM MO TMO	puhtoo	puhzuu →	→	WA
13.	"	FPP PPP GP V ITEM MO TMO	✓			A
14.	"	FPP PPP GP V ITEM MO TMO	✓			A
15.	juice	FPP PPP GP V ITEM MO TMO	chuhs	✓		SS
16.	"	FPP PPP GP V ITEM MO TMO	"	→	✓	SS
17.	"	FPP PPP GP V ITEM MO TMO	"	→	juhs	SS
18.	"	FPP PPP GP V ITEM MO TMO	✓			A
19.	"	FPP PPP GP V ITEM MO TMO	chuh	→	✓	SS
20.	puzzle	FPP PPP GP V ITEM MO TMO	puhtoo	✓		WA
21.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	✓	SS
22.	music	FPP PPP GP V ITEM MO TMO	myoosih	→	myoozih	WA
23.	"	FPP PPP GP V ITEM MO TMO	"	→	"	WA
24.	movie	FPP PPP GP V ITEM MO TMO	mooveh	→	✓	WA
25.	ball	FPP PPP GP V ITEM MO TMO	boh	→	baw	WA
26.	slinky	FPP PPP GP V ITEM MO TMO	ihngke	→	→	WA
27.	music	FPP PPP GP V ITEM MO TMO	myoosih	→	myoozih	WA
28.	piggy	FPP PPP GP V ITEM MO TMO	pihgeh	→	✓	WA
29.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	✓	SS
30.	slinky	FPP PPP GP V ITEM MO TMO	ihngke	→	→	WA

Learner: Matthew Date: 8.29.08 (cont.) Session Time: 345-420 Instructor: Claire

	Reinforcer	Prompt Level	Vocal Response During Initial Mand Attempt	Vocal Response Following __ Second Time Delay	Vocal Response Reinforced Following Echoic Prompting	
1.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	✓	SS
2.	music	FPP PPP GP V ITEM MO TMO	myoosih	→	myoozih	WA
3.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	→	SS
4.	piggy	FPP PPP GP V ITEM MO TMO	pihgeh	→	✓	WA
5.	"	FPP PPP GP V ITEM MO TMO	"	→	✓	WA
6.	"	FPP PPP GP V ITEM MO TMO	"	→	✓	WA
7.	"	FPP PPP GP V ITEM MO TMO	"	→	✓	WA
8.	music	FPP PPP GP V ITEM MO TMO	myoosih	→	myoozih	WA
9.	"	FPP PPP GP V ITEM MO TMO	"	→	"	WA
10.	ball	FPP PPP GP V ITEM MO TMO	boh	→	→	WA
11.	key	FPP PPP GP V ITEM MO TMO	keh	kih →	→	SS
12.	"	FPP PPP GP V ITEM MO TMO	✓			A
13.	music	FPP PPP GP V ITEM MO TMO	myoosih	→	myoozih	WA
14.	key	FPP PPP GP V ITEM MO TMO	✓			A
15.	juice	FPP PPP GP V ITEM MO TMO	chuhs	→	→	SS
16.	piggy	FPP PPP GP V ITEM MO TMO	pihgeh	→	→	WA
17.	tickle	FPP PPP GP V ITEM MO TMO	kihkuh	→	→	WA
18.		FPP PPP GP V ITEM MO TMO				
19.		FPP PPP GP V ITEM MO TMO	SS = 16/47 = 34%	IW = 0/47 = 0%		
20.		FPP PPP GP V ITEM MO TMO	WA = 25/47 = 53%	A = 6/47 = 13%		
21.		FPP PPP GP V ITEM MO TMO	none = 0			
22.		FPP PPP GP V ITEM MO TMO				
23.		FPP PPP GP V ITEM MO TMO				
24.		FPP PPP GP V ITEM MO TMO				
25.		FPP PPP GP V ITEM MO TMO				
26.		FPP PPP GP V ITEM MO TMO				
27.		FPP PPP GP V ITEM MO TMO				
28.		FPP PPP GP V ITEM MO TMO				
29.		FPP PPP GP V ITEM MO TMO				
30.		FPP PPP GP V ITEM MO TMO				

Resetting the Daily Baseline Measure

1. At the end of each session, the instructor reviewed the transcriptions of Matty's vocal productions that accompanied initial sign mand attempts (i.e., unprompted vocal productions, not those following echoic prompts). If any unprompted vocal production was better than the previous baseline measure, this improved response was set as the new baseline measure against which future comparisons of improvement were made.

2. The list of Matty's best vocal productions (i.e., baseline measures) was updated daily.

Vocal Mand Daily Baseline Measure

Learner: Matthew

Before Session

Session Date: 4.14.08

Transcriptions below are based upon 4/11/08 mand data

1. Ball - /buh/
2. Balloon - /boo/
3. Book - /buh/
4. Bubbles - /buhboo/
5. Candy - /gohdoo/
6. Car - /kaw/
7. Chip - /chihpuh/
8. Cookie - /kuuke/
9. Cracker - /kwahkwuh/
10. Doodle - /doodoo/
11. Fish - /pihsh/
12. Gear - /geuh/
13. Juice - /joosh/
14. Jump - /juhmpoo/
15. Marble - /buhboo/
16. Movie - /poofe/
17. Music - /muuzih/
18. Piggy - /bihge/
19. Popcorn - /pohkoo/
20. Pretzel - /pwehshoo/
21. Puzzle - /puhzoo/
22. Rice - /wish/
23. Slinky - /ihke/
24. Soda - /doduh/
25. Tickle - /tihkohl/

After Session

Improvements based on 4/14/08 session:

- book - /buu/
- candy - /gahde/
- movie- /moofe/
- popcorn - /pohkø/
- pretzel - /bwehzuh/
- puzzle - /puhzuh/

On the next slide are the transcriptions of the sounds produced during the shaping process in the video you will be watching.

Sound Transcription During Manding

REINFORCER

[Video of Vocal Shaping Procedures]

1. Cookie- Kuukeh → TIME DELAY → kuhkeh → PROMPT → Kuhkeh → PROMPT → kuhkeh → PROMPT → kuuke

2. Cookie- Kuukeh → TIME DELAY → kuukeh → PROMPT → kooke

3. Jump- Juhp →TIME DELAY → juhp → PROMPT → juhmp

4. Jump- Juhp → TIME DELAY → juhp → PROMPT → juhp → PROMPT → juhp → PROMPT → juhp

5. Jump- Juhmp

6. Puzzle- Puhzuh → TIME DELAY → puhzuh → PROMPT → puhzoo → PROMPT → puhzl

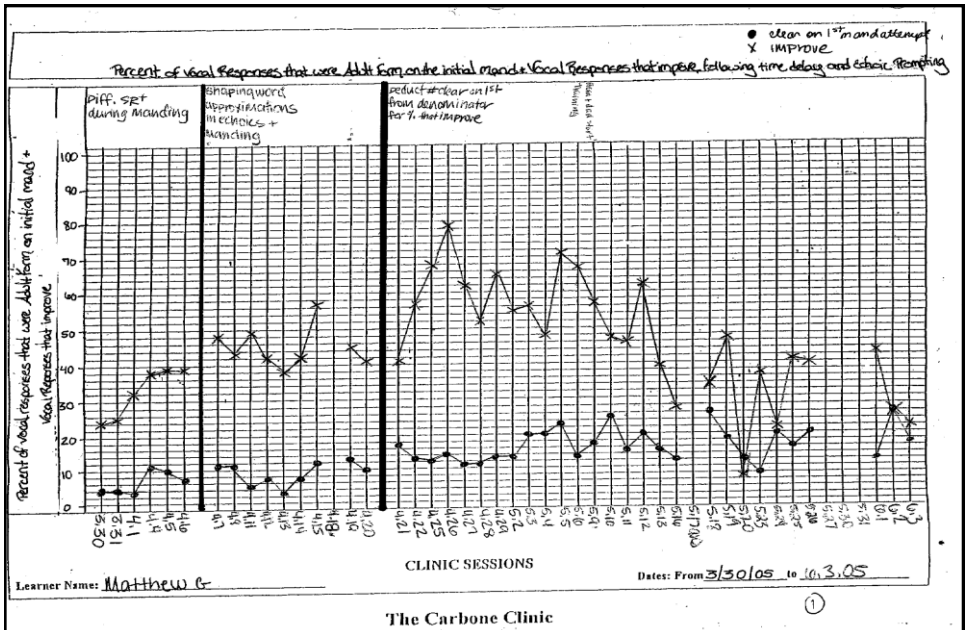
7. Pretzel Prehtzoo → TIME DELAY → prehtzoo → PROMPT → prehtzoo → PROMPT → prehtzl

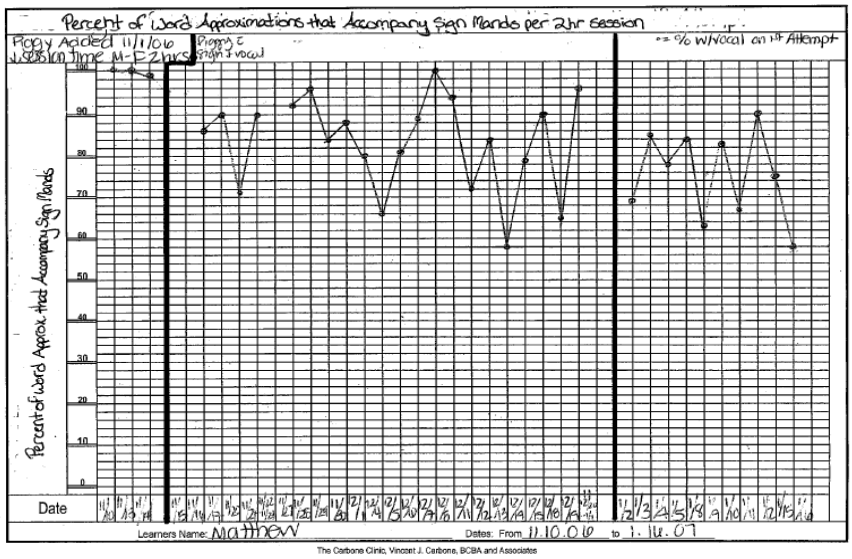
8. Movie- Mooee → TIME DELAY → mooee → PROMPT → mooee → PROMPT → moee → PROMPT → moee

9. Book- Buu → TIME DELAY → buuk

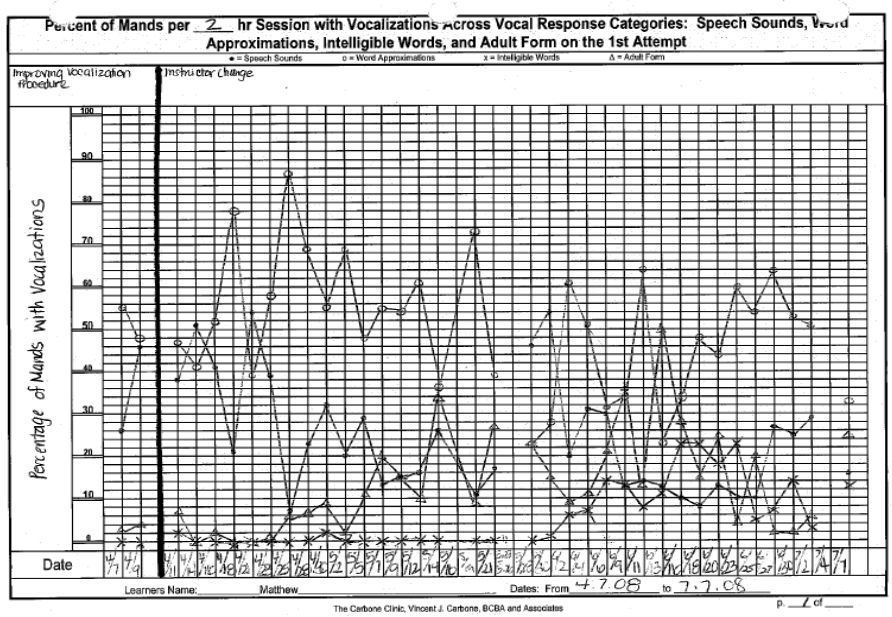
10. Chip- Chihph →TIME DELAY → chihp

11. Chip- Chihp

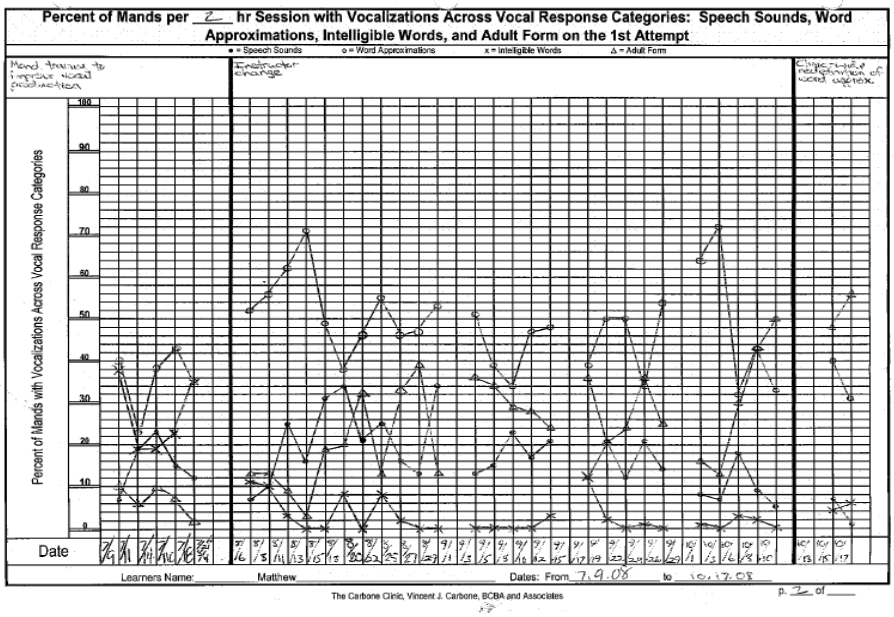



Percent of Word Approximations that Accompany Sign Mands per 2hr Session
Piggy Added 11/1/06
Session Time M-F 2hrs
Piggy E sign + vocal
= % w/vocal on 1st Attempt
Percent of Word Approx that Accompany Sign Mands
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Matthew
Dates: From 11.10.06 to 1.18.07
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

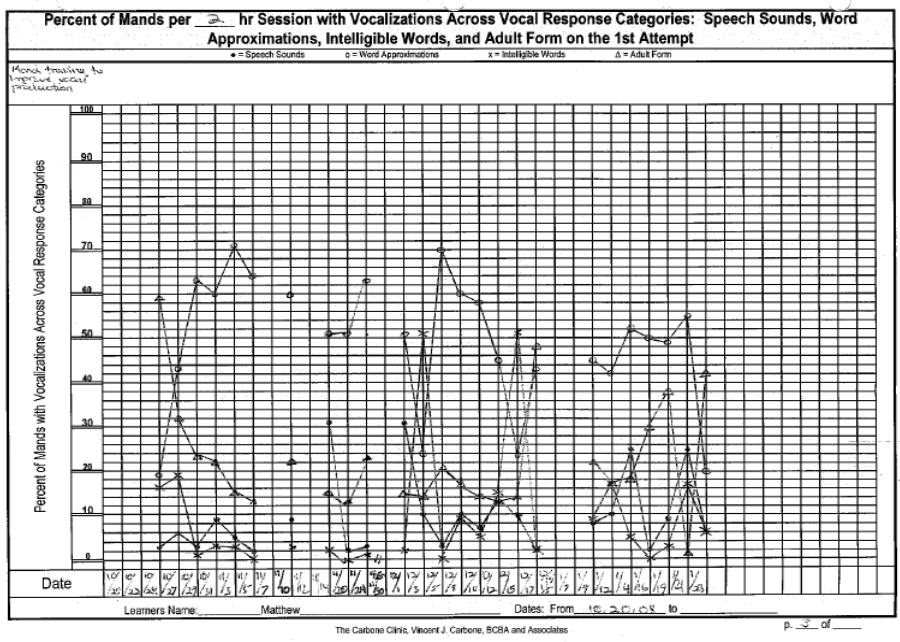
555


Percent of Mands per 2 hr Session with Vocalizations Across Vocal Response Categories: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form on the 1st Attempt
• = Speech Sounds
o = Word Approximations
x = Intelligible Words
Δ = Adult Form
Improving Vocalization Procedure
Instructor Change
Percentage of Mands with Vocalizations
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Matthew
Dates: From 4.7.08 to 7.7.08
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
p. 1 of

556


Percent of Mands per 2 hr Session with Vocalizations Across Vocal Response Categories: Speech Sounds, Word Approximations, Intelligible Words, and Adult Form on the 1st Attempt
• = Speech Sounds
o = Word Approximations
x = Intelligible Words
Δ = Adult Form
Mand training to improve vocal production
Instructor change
Percent of Mands with Vocalizations Across Vocal Response Categories
Date
Learners Name: Matthew
Dates: From 7.9.08 to 10.17.08
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
p. 2 of

557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• = Speech Sounds
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x = Intelligible Words
Δ = Adult Form
Mand training to improve vocal production
Percent of Mands with Vocalizations Across Vocal Response Categories
Date
Learners Name: Matthew
Dates: From 10.20.08 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
p. 3 of

558

Steps in Shaping Vocal Productions

- On the next slide is a demonstration of the incremental changes of four (4) words that progressed from speech sounds or word approximation to adult form or intelligible word.

Successive Approximations

WORD	TIME →					
	April 4	April 11	April 23	April 30	June 30	August 22
						ADULT FORM
Pretzel	Pwehshoo-	Pwehtsuh	Pwehtzuu-	Prehtzuh-	Prehzuhl-	**Prehtzuul**

				WORD APPROX.
	April 16	April 17	April 18	May 19
Wagon	twe –	twen-	ahgwih-	**wahgwih**

			INTELLIGIBLE WORD
	April 4	May 2	Nov 5
Ball	buh-	baw	**bohluh**

			ADULT FORM
	April 4	April 18	June 2
Bubble	buhboo-	bubuh	**buhbuul**

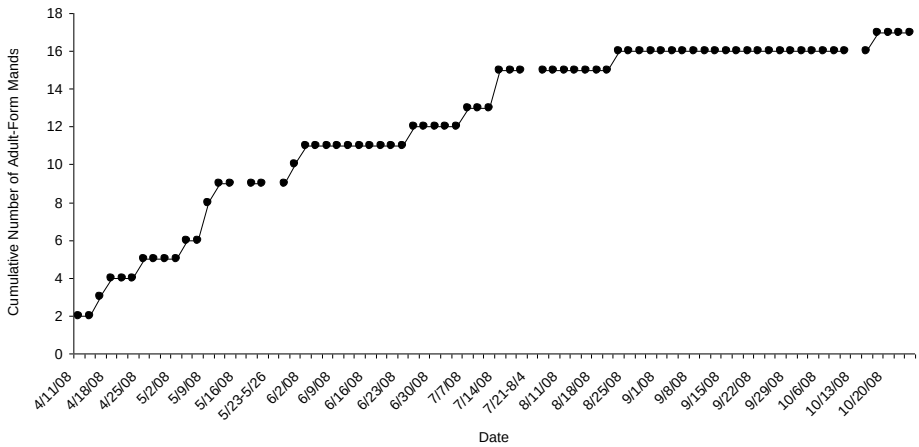

Figure 3. Cumulative Number of Adult-Form Mands by Session.

REVIEW OF TEACHING PROCEDURES TO IMPROVE SPEECH INTELLIGIBILTY

PROCEDURE	TACTICS	DATA RECORDING	GRAPHING
1. Manding Manual Sign Language (When Appropriate)	**CANDIDATE: ALL LEARNERS** 1. Run many trials per day across many reinforcers and MO's with sign language and vocals	• What the learner says • Prompt level needed to evoke each mand • Transcription of sounds	• Rate of spontaneous vs. prompted • Prompt level needed per reinforcer • Classification of sounds
2. Time Delay & Echoic Prompting and Differential Reinforcement During Manding	**CANDIDATE: POOR INTELLIGIBILITY** 1. Reinforce clear articulation of first mand attempt 2. Delay reinforcement and provide up 3-5 echoic prompts for better articulation	• Vocal approximations when manding on first attempt • Vocal approximations that improve when running echoic procedureTranscription of sounds	• % of clear vocal approximations on 1st mand attempt • % of vocal approximations that improve during time delay & echoic trials • Classification of sounds
3. Automatic Reinforcement Procedure	**CANDIDATE: FEW SPEECH SOUNDS PRODUCED** 1. Conduct sound inventory 2. Select a target sound from: • Most often sound heard during sound inventory • Developmentally appropriate sound 3. Pair the sound with reinforcement: Present target 3 times then provide reinforcement 4. Differentially reinforce if the sound is produced	• All sounds or words said during each trial	• % of trials in which the target sound occurs
4. Reinforcing all Vocalizations	**CANDIDATE: FEW SPEECH SOUNDS PRODUCED**	• Transcription of speech sounds	• Frequency of vocalizations • Variety of vocalizations • Classification of sounds

TEACHING PROCEDURES TO IMPROVE SPEECH INTELLIGIBILTY

PROCEDURE	TACTICS	DATA RECORDING	GRAPHING
5. Echoic Procedure	**CANDIDATE: MANY SPEECH SOUNDS; POOR ARTICULATION** 1. Select targets from mands, sound inventory, and ARP produced sounds 2. Show "promise" reinforcer 3. Possible alternative procedures a. Present the word 3-5 times b. Present easy motor movements prior to target c. Present easy words within the same syllable form prior to target d. Breakdown words using a backward chain	• "Yes/No" cold probe on the adult form • Mark on the card the highest level of the shell	• Weekly cumulative number of adult forms that have met criteria
6. Kaufman Procedure	**CANDIDATE: MANY SPEECH SOUNDS; POOR ARTICULATION** 1. Conduct Kaufman assessment and select appropriate targets 2. Begin teaching session: a. Show a "promise" reinforcer b. Present the word approximation at the level where parity was last achieved c. Run up and the down the shells d. Differentially reinforce e. Other procedures: • Present easy motor movements prior to target • Present easy words within the same syllable form prior to target	• "Yes/No" cold probe on the adult form • Mark on the card the highest level of the shell	• Weekly cumulative number of adult forms that have met criteria

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Teaching Advanced Verbal Behavior Leading to Conversation

Teaching Conversational Skills

- What follows is a behavioral analysis of social conversational skills.
- Generally, conversations include reciprocal responding between two people who have well developed manding and intraverbal skills.
- The responding is maintained by the information (specific reinforcement) obtained and the general social attention of the conversational partner.
- Each partner has strong listener skills, strong manding skills, strong intraverbal skills and these repertoires are maintained by specific and generalized conditioned reinforcement in the form of information and attention provided by conversational partner. In other words, the attention of other persons acts as a form of reinforcement. Joint attention and social referencing skills are established before conversational skills occur.
- To maintain the conversation each partner alternately mands and responds intraverbally.

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- To maintain the conversation each partner alternately mands and responds intraverbally.

Conversational Interaction

Mand/Intraverbal	**Intraverbal/Mand**
How are you? (M)	Doing Fine. (I)
What have you been up to? (M)	Been traveling quite a bit. (I)
Any place interesting? (M)	Was in London last week. (I) Have you been there? (M)
Not in a long time. (I) Why London? (M)	We have some customers in Europe. (I)
Did you make it a vacation? (M)	Not this time. But I will be going back in the summer so I will take a few extra days. (I) Why don't you think about coming along? (M)
I just might do that. (I)	Great. (I)

Red = Intraverbal

- What follows is a summary of the pre-requisite skills necessary for conversational skills.

MAND

Birth to 18 Months

MAND **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child use words, signs, or pictures to ask for desired items or activities?

1st	2nd	3rd	4th	
				1. Emits 2 words, signs, or PECS, but may require echoic, imitative, or other prompts but no physical prompts (e.g., *cracker, book*) **(E)**
				2. Emits 4 different mands without prompts (except *What do you want?*) — the desired item can be present (e.g., *music, slinky, ball*) **(T)**
				3. Generalizes 6 mands across 2 people, 2 settings, and 2 different examples of a reinforcer (e.g., mands *bubbles* from mom and dad, inside and outside, a red bottle and a blue bottle) **(E)**
				4. Spontaneously emits (no verbal prompts) 5 mands — the desired item can be present **(TO: 60 min.)**
				5. Emits 10 different mands without prompts (except, *What do you want?*) — the desired item can be present (e.g., *apple, swing, car, juice*) **(E)**

Comments/notes:

Joint Attention- Kellen

MAND

18 to 30 Months

MAND

TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th

Does the child demonstrate frequent and spontaneous manding primarily controlled by motivation (MOs)?

1st	2nd	3rd	4th	
				6. Mands for 20 different missing items without prompts (except, e.g., *What do you need?*) (e.g., mands for paper when given a crayon) **(E)**
				7. Mands for others to emit 5 different actions or missing actions needed to enjoy a desired activity (e.g., *open* to get outside, *push* when on a swing) **(E)**
				8. Emits 5 different mands that contain 2 or more words (not including, *I want*) (e.g., *Go fast. My turn. Pour juice.*) **(TO: 60 min.)**
				9. Spontaneously emits 15 different mands (e.g., *Let's play. Open. I want book.*) **(TO: 30 min.)**
				10. Emits 10 new mands without specific training (e.g., spontaneously says *Where kitty go?* without formal mand training) **(O)**

Comments/notes:

MAND

30 to 48 Months

MAND

TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th

Does the child mand for information, mand with different parts of speech, and give directions to others?

1st	2nd	3rd	4th	
				11. Spontaneously mands for different verbal information using a WH question word 5 times (e.g., *What's your name? Where do I go?*) **(TO: 60 min.)**
				12. Politely mands to stop an undesirable activity, or remove any aversive MO under 5 different circumstances (e.g., *Please stop pushing me. No thank you. Excuse me, can you move?*) **(E)**
				13. Mands with 10 different adjectives, prepositions, or adverbs (e.g., *My crayon is broken. Don't take it out. Go fast.*) **(TO: 60 min.)**
				14. Gives directions, instructions, or explanations as to how to do something or how to participate in an activity 5 times (e.g., *You put the glue on first, then stick it. You sit here while I get a book.*) **(O)**
				15. Mands for others to attend to his own intraverbal behavior 5 times (e.g., *Listen to me... I'll tell you... Here's what happened... I'm telling the story...*) **(O)**

Comments/notes:

SOCIAL & PLAY

Birth to 18 Months

SOCIAL BEHAVIOR AND SOCIAL PLAY **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child attend to others and attempt to socially engage others?

1st	2nd	3rd	4th	
				1. Visually tracks and shows interest in people's movement at least 5 times **(TO: 30 min.)**
				2. Indicates that he wants to be held or physically played with 2 times (e.g., climbs up on his mom's lap) **(TO: 60 min.)**
				3. Spontaneously looks (glances) at other children 5 times **(TO: 30 min.)**
				4. Spontaneously engages in parallel play near other children for a total of 2 minutes (e.g., sits in the sandbox near other children) **(TO: 30 min.)**
				5. Spontaneously follows peers or imitates their motor behavior 2 times (e.g., follows a peer into a playhouse) **(TO: 30 min.)**

Comments/notes:

Joint attention usually occurs before milestone # 1 above at about 9-12 months of age.

8 VB-MAPP Milestones Assessment: Level 1

575

SOCIAL & PLAY

18 to 30 Months

SOCIAL BEHAVIOR AND SOCIAL PLAY **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child spontaneously participate in activities with other children and spontaneously verbally interact with them?

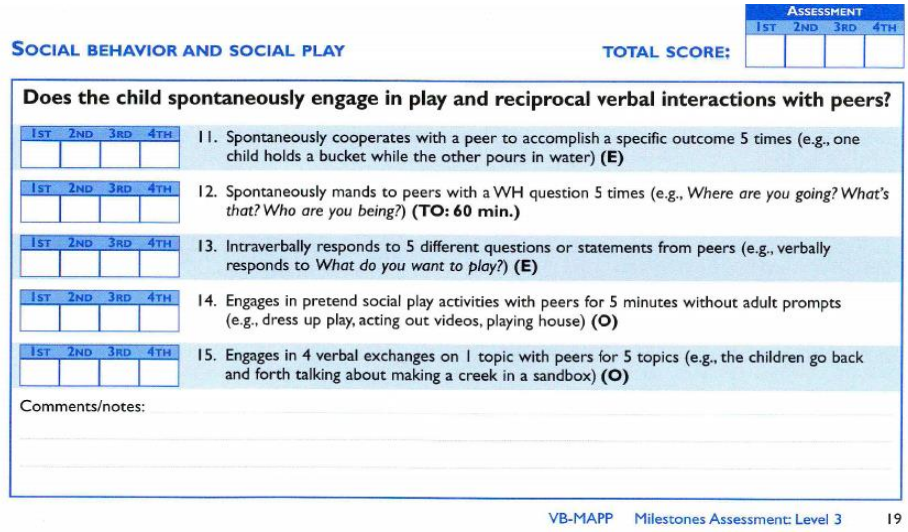
1st	2nd	3rd	4th	
				6. Initiates a physical interaction with a peer 2 times (e.g., a push in a wagon, hand holding, Ring Around the Rosy) **(TO: 30 min.)**
				7. Spontaneously mands to peers 5 times (e.g., *My turn. Push me. Look! Come on.*) **(TO: 60 min.)**
				8. Engages in sustained social play with peers for 3 minutes without adult prompts or reinforcement (e.g., cooperatively setting up a play set, water play) **(TO: 30 min.)**
				9. Spontaneously responds to the mands from peers 5 times (e.g., *Pull me in the wagon. I want the train.*) **(E)**
				10. Spontaneously mands to peers to participate in games, social play, etc., 2 times (e.g., *Come on you guys. Let's dig a hole.*) **(TO: 60 min.)**

Comments/notes:

VB-MAPP Milestones Assessment: Level 2 13

576

SOCIAL & PLAY
30 to 48 Months



SOCIAL BEHAVIOR AND SOCIAL PLAY — **TOTAL SCORE:** — ASSESSMENT 1ST 2ND 3RD 4TH

Does the child spontaneously engage in play and reciprocal verbal interactions with peers?

1ST 2ND 3RD 4TH	
	11. Spontaneously cooperates with a peer to accomplish a specific outcome 5 times (e.g., one child holds a bucket while the other pours in water) **(E)**
	12. Spontaneously mands to peers with a WH question 5 times (e.g., *Where are you going? What's that? Who are you being?*) **(TO: 60 min.)**
	13. Intraverbally responds to 5 different questions or statements from peers (e.g., verbally responds to *What do you want to play?*) **(E)**
	14. Engages in pretend social play activities with peers for 5 minutes without adult prompts (e.g., dress up play, acting out videos, playing house) **(O)**
	15. Engages in 4 verbal exchanges on 1 topic with peers for 5 topics (e.g., the children go back and forth talking about making a creek in a sandbox) **(O)**

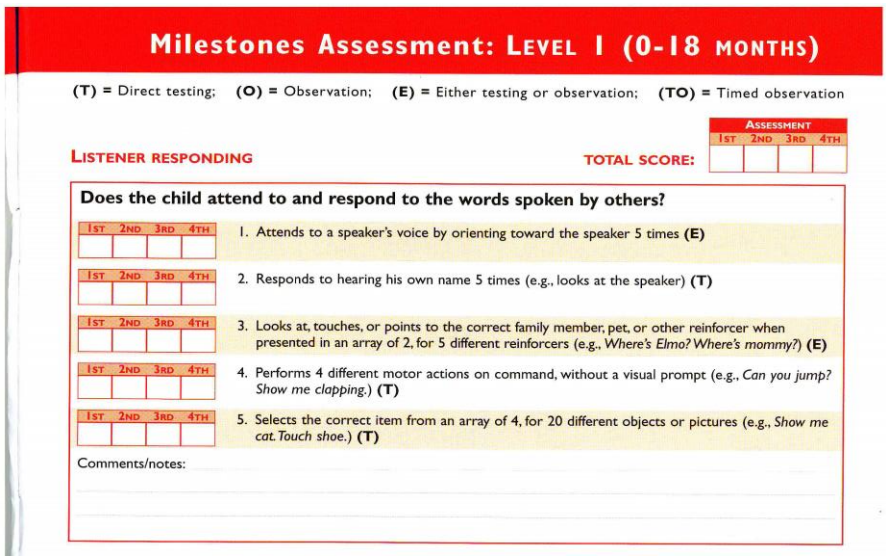
Comments/notes:

VB-MAPP Milestones Assessment: Level 3 19

577

LISTENER BEHAVIOR

Birth to 18 months



Milestones Assessment: LEVEL 1 (0-18 MONTHS)

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

LISTENER RESPONDING — **TOTAL SCORE:** — ASSESSMENT 1ST 2ND 3RD 4TH

Does the child attend to and respond to the words spoken by others?

1ST 2ND 3RD 4TH	
	1. Attends to a speaker's voice by orienting toward the speaker 5 times **(E)**
	2. Responds to hearing his own name 5 times (e.g., looks at the speaker) **(T)**
	3. Looks at, touches, or points to the correct family member, pet, or other reinforcer when presented in an array of 2, for 5 different reinforcers (e.g., *Where's Elmo? Where's mommy?*) **(E)**
	4. Performs 4 different motor actions on command, without a visual prompt (e.g., *Can you jump? Show me clapping.*) **(T)**
	5. Selects the correct item from an array of 4, for 20 different objects or pictures (e.g., *Show me cat. Touch shoe.*) **(T)**

Comments/notes:

578

LISTENER BEHAVIOR
18 to 30 months

(T) = Direct testing; **(O)** = Observation; **(E)** = Either testing or observation; **(TO)** = Timed observation

LISTENER RESPONDING	TOTAL SCORE:	ASSESSMENT 1ST	2ND	3RD	4TH

Is the child acquiring more advanced listener skills?

1ST	2ND	3RD	4TH	
				6. Selects the correct item from a messy array of 6, for 40 different objects or pictures (e.g., *Find cat. Touch ball.*) **(T)**
				7. Generalizes listener discriminations (LDs) in a messy array of 8, for 3 different examples of 50 items (e.g., the child can find 3 examples of a train) **(T)**
				8. Performs 10 specific motor actions on command (e.g., *Show me clapping. Can you hop?*) **(T)**
				9. Follows 50 two-component noun-verb and/or verb-noun instructions (e.g., *Show me the baby sleeping. Push the swing.*) **(T)**
				10. Selects the correct item in a book, picture scene, or natural environment when named for 250 items, tested or from an accumulated list of known words **(T)**

Comments/notes:

LISTENER BEHAVIOR

30 to 48 Months

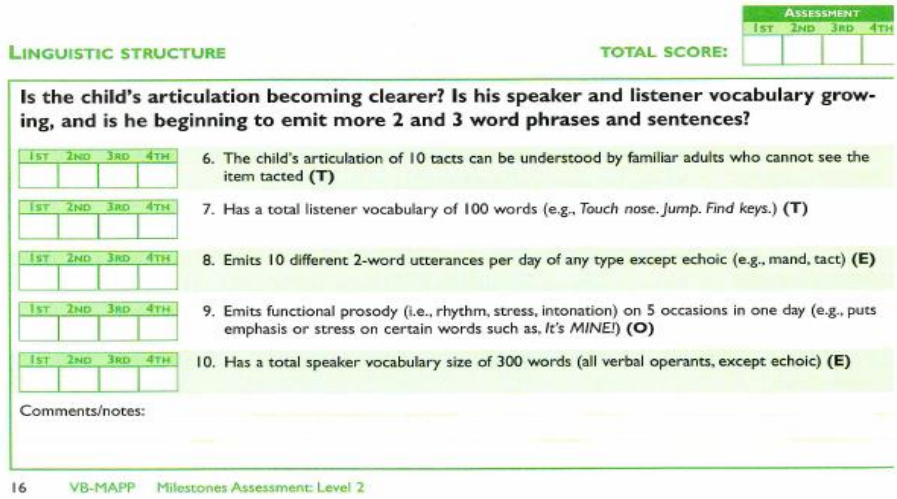
LISTENER RESPONDING	TOTAL SCORE:	ASSESSMENT 1ST	2ND	3RD	4TH

Does the child understand complex words and sentences involving the different parts of speech?

1ST	2ND	3RD	4TH	
				11. Selects items by color and shape from an array of 6 similar stimuli, for 4 colors and 4 shapes (e.g., *Find the red car. Find the square cracker.*) **(T)**
				12. Follows 2 instructions involving 6 different prepositions (e.g., *Stand behind the chair.*) and 4 different pronouns (e.g., *Touch my ear.*) **(T)**
				13. Selects items from an array of similar stimuli based on 4 pairs of relative adjectives (e.g., *big-little, long-short*) and demonstrates actions based on 4 pairs of relative adverbs (e.g., *quiet-loud, fast-slow*) **(T)**
				14. Follows 3-step directions for 10 different directions (e.g., *Get your coat, hang it up, and sit down.*) **(T)**
				15. Has a total listener repertoire of 1200 words (nouns, verbs, adjectives, etc.), tested or from an accumulated list of known words **(T)**

Comments/notes:

LINGUISTIC STRUCTURE
18 to 30 months



LINGUISTIC STRUCTURE TOTAL SCORE: ASSESSMENT 1ST 2ND 3RD 4TH

Is the child's articulation becoming clearer? Is his speaker and listener vocabulary growing, and is he beginning to emit more 2 and 3 word phrases and sentences?

1ST 2ND 3RD 4TH
6. The child's articulation of 10 tacts can be understood by familiar adults who cannot see the item tacted **(T)**

1ST 2ND 3RD 4TH
7. Has a total listener vocabulary of 100 words (e.g., *Touch nose. Jump. Find keys.*) **(T)**

1ST 2ND 3RD 4TH
8. Emits 10 different 2-word utterances per day of any type except echoic (e.g., mand, tact) **(E)**

1ST 2ND 3RD 4TH
9. Emits functional prosody (i.e., rhythm, stress, intonation) on 5 occasions in one day (e.g., puts emphasis or stress on certain words such as, *It's MINE!*) **(O)**

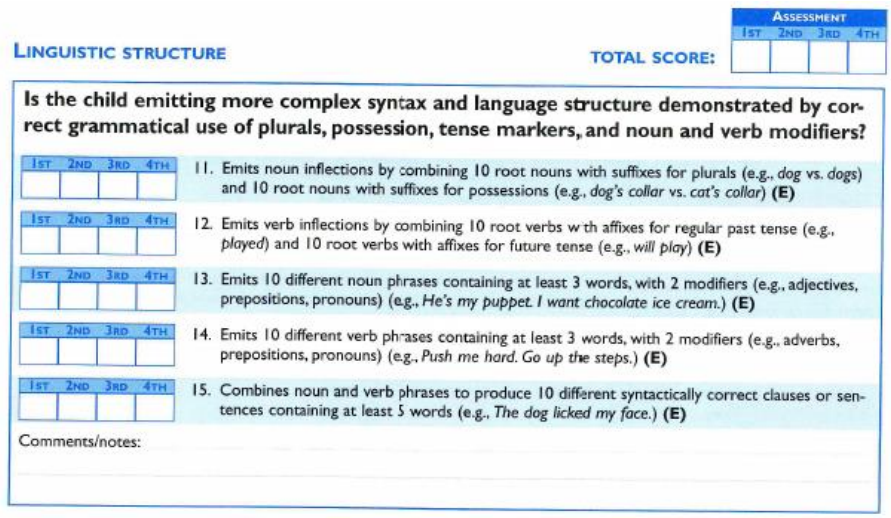
1ST 2ND 3RD 4TH
10. Has a total speaker vocabulary size of 300 words (all verbal operants, except echoic) **(E)**

Comments/notes:

16 VB-MAPP Milestones Assessment: Level 2

581

LINGUISTIC STRUCTURE
30 to 48 months



LINGUISTIC STRUCTURE TOTAL SCORE: ASSESSMENT 1ST 2ND 3RD 4TH

Is the child emitting more complex syntax and language structure demonstrated by correct grammatical use of plurals, possession, tense markers, and noun and verb modifiers?

1ST 2ND 3RD 4TH
11. Emits noun inflections by combining 10 root nouns with suffixes for plurals (e.g., *dog* vs. *dogs*) and 10 root nouns with suffixes for possessions (e.g., *dog's collar* vs. *cat's collar*) **(E)**

1ST 2ND 3RD 4TH
12. Emits verb inflections by combining 10 root verbs w th affixes for regular past tense (e.g., *played*) and 10 root verbs with affixes for future tense (e.g., *will play*) **(E)**

1ST 2ND 3RD 4TH
13. Emits 10 different noun phrases containing at least 3 words, with 2 modifiers (e.g., adjectives, prepositions, pronouns) (e.g., *He's my puppet. I want chocolate ice cream.*) **(E)**

1ST 2ND 3RD 4TH
14. Emits 10 different verb phrases containing at least 3 words, with 2 modifiers (e.g., adverbs, prepositions, pronouns) (e.g., *Push me hard. Go up the steps.*) **(E)**

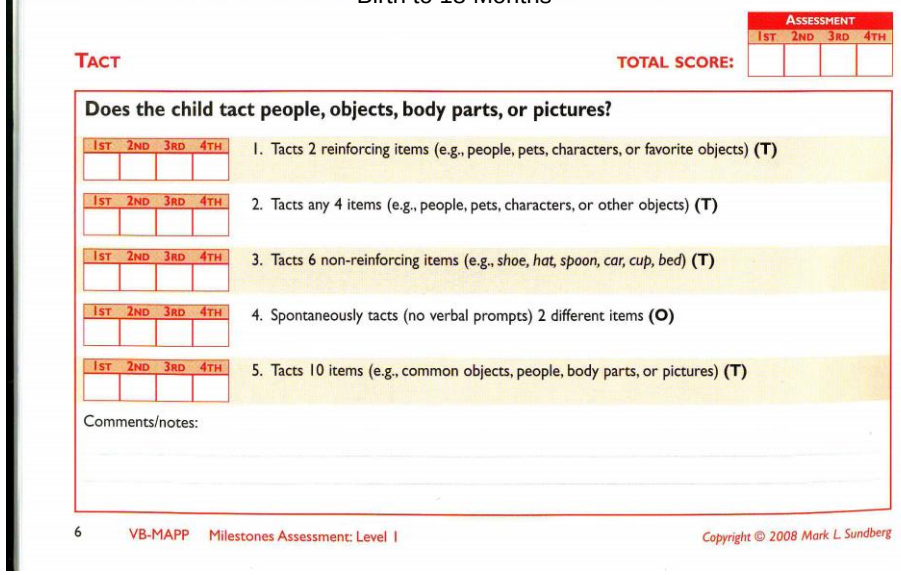
1ST 2ND 3RD 4TH
15. Combines noun and verb phrases to produce 10 different syntactically correct clauses or sentences containing at least 5 words (e.g., *The dog licked my face.*) **(E)**

Comments/notes:

582

TACT

Birth to 18 Months



TACT

TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th

Does the child tact people, objects, body parts, or pictures?

1st	2nd	3rd	4th	
				1. Tacts 2 reinforcing items (e.g., people, pets, characters, or favorite objects) **(T)**
				2. Tacts any 4 items (e.g., people, pets, characters, or other objects) **(T)**
				3. Tacts 6 non-reinforcing items (e.g., *shoe, hat, spoon, car, cup, bed*) **(T)**
				4. Spontaneously tacts (no verbal prompts) 2 different items **(O)**
				5. Tacts 10 items (e.g., common objects, people, body parts, or pictures) **(T)**

Comments/notes:

6 VB-MAPP Milestones Assessment: Level 1

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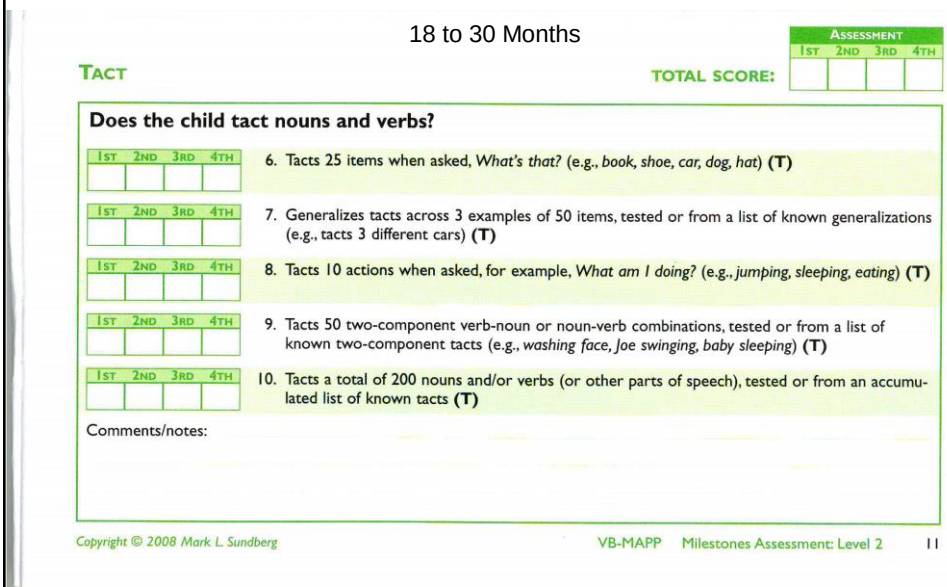
583

TACT

18 to 30 Months



TACT

TOTAL SCORE:

Assessment			
1st	2nd	3rd	4th

Does the child tact nouns and verbs?

1st	2nd	3rd	4th	
				6. Tacts 25 items when asked, *What's that?* (e.g., *book, shoe, car, dog, hat*) **(T)**
				7. Generalizes tacts across 3 examples of 50 items, tested or from a list of known generalizations (e.g., tacts 3 different cars) **(T)**
				8. Tacts 10 actions when asked, for example, *What am I doing?* (e.g., *jumping, sleeping, eating*) **(T)**
				9. Tacts 50 two-component verb-noun or noun-verb combinations, tested or from a list of known two-component tacts (e.g., *washing face, Joe swinging, baby sleeping*) **(T)**
				10. Tacts a total of 200 nouns and/or verbs (or other parts of speech), tested or from an accumulated list of known tacts **(T)**

Comments/notes:

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VB-MAPP Milestones Assessment: Level 2 11

584

TACT

30 to 48 Months

TACT **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child emit a wide variety of tacts, and do they contain several different parts of speech?

1st	2nd	3rd	4th	
				11. Tacts the color, shape, and function of 5 objects (15 trials) when each object and question is presented in a mixed order (e.g., *What color is the refrigerator? What shape is the valentine? What do you do with the ball?*) (This is part tact and part intraverbal.) **(T)**
				12. Tacts 4 different prepositions (e.g., *in, out, on, under*) and 4 pronouns (e.g., *I, you, me, mine*) **(E)**
				13. Tacts 4 different adjectives, excluding colors and shapes (e.g., big, little, long, short) and 4 adverbs (e.g., fast, slow, quietly, gently) **(E)**
				14. Tacts with complete sentences containing 4 or more words, 20 times **(E)**
				15. Has a tact vocabulary of 1000 words (nouns, verbs, adjectives, etc.), tested or from an accumulated list of known tacts **(T)**

Comments/notes:

585

INTRAVERBAL

30 to 48 Months

INTRAVERBAL **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child verbally respond to the content of the words of others?

1st	2nd	3rd	4th	
				11. Spontaneously emits 20 intraverbal comments (can be part mand) (e.g., Dad says, *I'm going to the car,* and the child spontaneously says, *I want to go for a ride!*) **(O)**
				12. Demonstrates 300 different intraverbal responses, tested or obtained from an accumulated list of known intraverbals **(T)**
				13. Answers 2 questions after being read short passages (15+ words) from books, for 25 passages (e.g., *Who blew the house down?*) **(T)**
				14. Describes 25 different events, videos, stories, etc. with 8+ words (e.g., *Tell me what happened... The big monster scared everybody and they all ran into the house.*) **(E)**
				15. Answers 4 different rotating WH questions about a single topic for 10 topics (e.g., *Who takes you to school? Where do you go to school? What do you take to school?*) **(T)**

Comments/notes:

586

Teaching Intraverbal Skills

Intraverbal Behavior

Definition: Skinner (1957) defined the intraverbal as a verbal response controlled by a verbal stimulus and the response product does not have point to point correspondence with the verbal stimulus.

Skinner (1957) went on to discuss the function and form of the advanced intraverbal repertoire as follows: "The intraverbal relations in any adult repertoire are the result of hundreds of thousands of reinforcements under a great variety of inconsistent and often conflicting contingencies. Many different responses are brought under the control of a given stimulus word, and many different stimulus words are placed in control of a single response" (p.74).

Examples of Intraverbal Responses

Verbal Stimulus	Verbal Response (Intraverbal)
What's your name?	Vince
What's your favorite food?	Pizza
Where do you live?	New York
Something you cut with is a	Knife
What did you eat for Breakfast?	Pancakes
I sure am hungry.	I guess it's time to eat.
The party was great.	It was really nice to see everyone.
Most people like the food here.	I don't understand why.

- An intraverbal repertoire is your intellectual repertoire. Your knowledge and skill are frequently judged by the sophistication of your intraverbal repertoire.
- It is also your social repertoire. Conversations consist of mainly intraverbals and mands.
- Failure to develop an intraverbal repertoire reduces advanced social interactions and isolates the individual from the social environment.
- Not all persons with autism develop a strong intraverbal repertoire and those who do sometimes develop a restricted or rote repertoire.
- These individuals can respond to only a few things that others say and usually with the same response on each occurrence.
- Moreover, the verbal stimulus must be presented in exactly the same way for the child to respond correctly.

Conversational Interaction

Mand/Intraverbal	Intraverbal/Mand
How are you? (M)	Great .(INTRAVERBAL)
What have you been up to? (M)	Been traveling quite a bit.(INTRAVERBAL)
Any place interesting? (M)	Was in London last week. (INTRAVERBAL) Have you been there? (M)
Not in a long time. (I) Why London?(M)	We have some customers in Europe. (INTRAVERBAL)
Did you make it a vacation? (M)	Not this time. But I will be going back in the summer so I will take a few extra days. (INTRAVERBAL)
	Why don't you think about coming along? (M)
I just might do that. (INTRAVERBAL)	Great (INTRAVERBAL)

Published Papers on Teaching Intraverbal Behavior

- On the following slides are three recent papers that describe the increasing complexity of intraverbal responding as children develop.
- The role of conditional discriminations in the development of the intraverbal is highlighted.

The Analysis of Verbal Behavior 2011, **27**, 23–43

Intraverbal Behavior and Verbal Conditional Discriminations in Typically Developing Children and Children With Autism

Mark L. Sundberg, Sundberg & Associates
Cindy A. Sundberg, Parenting Partnerships

Individuals with autism often experience difficulty acquiring a functional intraverbal repertoire, despite demonstrating strong mand, tact, and listener skills. This learning problem may be related to the fact that the primary antecedent variable for most intraverbal behavior involves a type of multiple control identified as a verbal conditional discrimination (VC^D). The current study is a descriptive analysis that sought to determine if there is a general sequence of intraverbal acquisition by typically developing children and for children with autism, and if this sequence could be used as a framework for intraverbal assessment and intervention. Thirty-nine typically developing children and 71 children with autism were administered an 80-item intraverbal subtest that contained increasingly difficult intraverbal questions and VC^Ds. For the typically developing children the results showed that there was a correlation between age and correct intraverbal responses. However, there was variability in the scores of children who were the same age. An error analysis revealed that compound VC^Ds were the primary cause of errors. Children with autism made the same types of errors as typically developing children who scored at their level on the subtest. These data suggest a potential framework and sequence for intraverbal assessment and intervention.

Key words: autism, intraverbal, language assessment, language intervention, typically developing children, verbal conditional discrimination

The Analysis of Verbal Behavior 2008, **24**, 159–174

Conditional Discrimination in the Intraverbal Relation: A Review and Recommendations for Future Research

Judah B. Axe, The Ohio State University

Conditional discrimination is inherent in the intraverbal relation when one verbal stimulus alters the evocative effect of another verbal stimulus and they collectively evoke an intraverbal response. Rarely in research on conditional discriminations have both conditional and discriminative stimuli been vocal verbal and rarely have the responses been topography-based. Making conditional discriminations in intraverbal behavior is a repertoire that is often delayed in children with autism and other developmental disabilities. Reviewed in this paper is research on teaching intraverbal behavior, auditory conditional discriminations, and restricted stimulus control. The purpose of these reviews is to identify the extent to which previous researchers examined conditional discriminations in the intraverbal relation and to recommend directions for research in this area.

Key words: intraverbal, conditional discrimination, verbal behavior, autism, developmental disabilities

The Analysis of Verbal Behavior 2013, **29,** 125–135

An Analysis of Verbal Stimulus Control in Intraverbal Behavior: Implications for Practice and Applied Research

Svein Eikeseth, Oslo and Akershus University College
Dean P. Smith, UK Young Autism Project and Oslo and Akershus University College

A common characteristic of the language deficits experienced by children with autism (and other developmental disorders) is their failure to acquire a complex intraverbal repertoire. The difficulties with learning intraverbal behaviors may, in part, be related to the fact that the stimulus control for such behaviors usually involves highly complex verbal stimuli. The antecedent verbal control of intraverbal behavior may involve discriminative stimuli (i.e., discriminated operants), conditional stimulus control, and/or control by compound stimuli. Distinctions among these different types of antecedent control are presented, along with recommendations for intervention procedures that may facilitate the acquisition of intraverbal behavior.

Key words: intraverbal behavior, stimulus control, verbal behavior, conditional discriminations, compound stimuli

TYPICAL DEVELOPMENT OF INTRAVERBALRESPONDING

N=	Age and range	IV scores	Error Analysis and Comments
3	2-year-olds Range = 23-27 months old	Mean= 26 Range= 24-28	• Some simple intraverbal behavior, but no VC^{D}s • Can do song fill-ins, reinforcing intraverbals (part mand), some associations, animal and object sounds, common fill-ins • Limited answers to WH questions (e.g., provides first name, or one word intraverbal answers) • Frequent echoic responding, pointing, or not responding
4	2½-year-olds Range = 29-31 months old	Mean= 26.5 Range= 9-42	• Some simple intraverbal behavior, getting some easy WH questions • Frequent echoic responding, or "What?" "Yeah" "Things" "Huh?" • When some intraverbal control was demonstrated it was often a simple intraverbal relation, minimal VC^{D}s; the last, or prominent word was usually the source of stimulus control, for example… • "What do you smell with?" … "Poopies" • "What grows on your head?" … "Shoulders" • "What helps a flower grow?" … "Up"
9	3-year-olds Range = 34-38 months old	Mean= 58 Range= 50-69	• Well established basic intraverbal repertoire, 1000s of intraverbal relations • But VC^{D} errors were prevalent, for example… • "What grows on your head? … "Plants" • Many "WH" questions caused problems, for example… • "Where do you eat?" … "Food" • Rote responses were evident, for example… • "What day is today?" … "Rainy" (it was sunny) • Problems with prepositions and adjectives in VC^{D}s, for example… • "What's under a house?" … "roof" • Trouble with negation and personal information • "What's something you can't wear?" … "Shirt" • "What is your last name? … "Noah," "Gabriella," "Sofia," "Neil"
7	3½-year-olds Range = 39-44 months old	Mean= 62.9 Range= 57-71	• Strong intraverbal repertoire, but VC^{D} errors were still common, for example… • "What grows on your head?" … "Hat" • "Name some clothing" … "For the body" "When do we set the table?" … "After dinner" • Negation still a major problem • Still having problems with, prepositions, adjectives, adverbs in VC^{D}s • Still having problems with time concepts • Still emitting echoic responses when no intraverbal occurred

N=	Age and range	IV scores	Comments and Error Analysis
10	4-year-olds Range = 45-49 months old	Mean= 69.7 Range= 50-75	• Very strong intraverbal behavior VC^D errors were still common, for example… • "What do you smell with?"... "A skunk" • But VC^Ds are clearly getting stronger, for example… • "What's above a house?"..."An airplane, and stuff that's on the roof" • Negation, time concepts, prepositions, and adjectives in a VC^Ds continued to be a problem for many children • Specific words and concepts like "different," "between," "take," "how," & "why" caused problems
6	5-year-olds Range = 55-60 months old	Mean= 65.7 Range= 38-76	• Children at this age are generally more successful with VC^Ds, for example… • "What's in a balloon?" ... "Helium," "Air" • However, they still have problems with negation, time concepts, and prepositions • Many 5-year-old children missed "What day is today?" "What day is before Tuesday?" "What's your last name?" "How is a car different from a bike?" "What number is between 6 and 8?"

Sundberg Tables

EARLY INTRAVERBAL VIDEOS

14. Britt and Jean Marie

Britt Early Intraverbals

15. Ian with Jean Marie

16. Max early intraverbals

17. Vincent Intraverbals

Complex Intraverbals

Intraverbal Error

Complex Intraverbal Behavior

Adding to Skinner's Analysis

Step # 3

- To this point all of the responses taught conform to Skinner's definition of verbal behavior.
- However, intraverbal responses to novel and untaught verbal stimuli require some additional explanation and analysis.
- Palmer (1991) suggests that advanced intraverbal behavior (talking about past events) seems to require a problem solving repertoire.
- This problem solving repertoire is usually a covert private activity or overt activity that mediates or supplements the sources of control for the response.
- Problem solving (Skinner, 1953) involves acting in ways that make a response scheduled for reinforcement more likely.
- For example a verbal stimulus "What did you eat for breakfast this morning?" might evoke a cascade of private events that could include organizing stimuli, private intraverbals or visual imagery.

- In addition, the speaker might observe the surrounding environment for additional sources of the control for the response that is scheduled for reinforcement.
- These responses will supplement the control for the response and evoke it.
- There have been two recent studies in JABA with typically developing children that demonstrated the benefits of this analysis of the intraverbal as a response that is mediated by a problem solving repertoire. (Suatter, LeBlanc, Jay, Goldsmith & Carr, 2011; Kisamore, Carr, & LeBlanc, 2011)
- Over the last several years our clinic has developed a procedure based upon this analysis to teach advanced intraverbal behavior to children with autism.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 227–244 NUMBER 2 (SUMMER 2011)

THE ROLE OF PROBLEM SOLVING IN COMPLEX INTRAVERBAL REPERTOIRES

RACHAEL A. SAUTTER, LINDA A. LEBLANC, ALLISON A. JAY, TINA R. GOLDSMITH, AND JAMES E. CARR
WESTERN MICHIGAN UNIVERSITY

We examined whether typically developing preschoolers could learn to use a problem-solving strategy that involved self-prompting with intraverbal chains to provide multiple responses to intraverbal categorization questions. Teaching the children to use the problem-solving strategy did not produce significant increases in target responses until problem solving was modeled and prompted. Following the model and prompts, all participants showed immediate significant increases in intraverbal categorization, and all prompts were quickly eliminated. Use of audible self-prompts was evident initially for all participants, but declined over time for 3 of the 4 children. Within-session response patterns remained consistent with use of the problem-solving strategy even when self-prompts were not audible. These findings suggest that teaching and prompting a problem-solving strategy can be an effective way to produce intraverbal categorization responses.

Key words: categorization, intraverbal, meditating response, multiple tact training, problem solving

constant across phases. Finally, behavior analysts should begin to investigate the utility of other problem-solving strategies to establish various types of complex responding. Strategies such as visual imagining or observing the nearby environment for potential response options have been touted as potentially beneficial strategies (V. Carbone, personal communication, August 29, 2004; Palmer, 1991).

559

601

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 255–278 NUMBER 2 (SUMMER 2011)

TRAINING PRESCHOOL CHILDREN TO USE VISUAL IMAGINING AS A PROBLEM-SOLVING STRATEGY FOR COMPLEX CATEGORIZATION TASKS

APRIL N. KISAMORE
WESTERN MICHIGAN UNIVERSITY

AND

JAMES E. CARR AND LINDA A. LEBLANC
AUBURN UNIVERSITY

It has been suggested that verbally sophisticated individuals engage in a series of precurrent behaviors (e.g., covert intraverbal behavior, grouping stimuli, visual imagining) to solve problems such as answering questions (Palmer, 1991; Skinner, 1953). We examined the effects of one problem solving strategy—visual imagining—on increasing responses to intraverbal categorization questions. Participants were 4 typically developing preschoolers between the ages of 4 and 5 years. Visual imagining training was insufficient to produce a substantial increase in target responses. It was not until the children were prompted to use the visual imagining strategy that a large and immediate increase in the number of target responses was observed. The number of prompts did not decrease until the children were given a rule describing the use of the visual imagining strategy. Within-session response patterns indicated that none of the children used visual imagining prior to being prompted to do so and that use of the strategy continued after introduction of the rule. These results were consistent for 3 of 4 children. Within-session response patterns suggested that the 4th child occasionally imagined when prompted to do so, but the gains were not maintained. The results are discussed in terms of Skinner's analysis of problem solving and the development of visual imagining.

Key words: intraverbals, mediating response, tact training, problem solving, visual imagining

602

Advanced Intraverbal Responding

- Typically, children with autism are taught to respond to a series of "wh" questions.
- The children may even develop a repertoire that includes hundreds of responses to specific questions.
- However, developing a repertoire that allows the child to respond to the statements of others that were never taught is the ultimate goal.
- This will require a method that leads to a problem-solving repertoire and not just a set of memorized answers. (Sautter, et al , 2011; Kisamore, et al, 2011)

Advanced Intraverbals

ANSWERING "WH" QUESTIONS

•Our objective is to teach responses to who, what, where, when, why, which, how, and can/do/does/will questions.

•The way we go about teaching these skills is by using reinforcing videos or books.

•By using highly preferred videos or books, we relate the questions to typical life conversations, instead of teaching rote answers to questions.

•When using the video, we develop several questions across all the "wh" question forms.

•The questions are specific and related to the theme of the movie.

•Some tacting questions that will specifically relate to novel questions are also included.

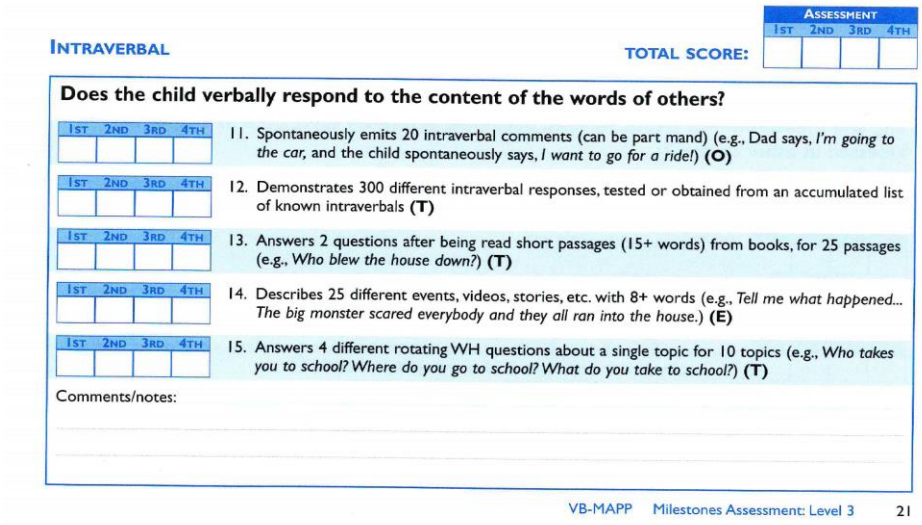
•In addition, the nonverbal stimulus of the video is used to prompt the responses to the questions. The nonverbal stimulus serves as a prompt because the child has already mastered these responses (e.g., colors, locations, prepositions) as tacts. This way, the learner produces his or her own responses without an instructor's echoic prompt.

•A very large tacting repertoire equivalent to a 2.5 to 3 year is necessary for the problem-solving method to be effective.

- Sometimes, just using the non-verbal stimulus (tact) may not be enough to evoke the response.
- In this case, we use thematic prompts.
- Skinner defined a thematic prompt as “a supplemental source of strength in the form of a tact or intraverbal response. It is better known as a ‘hint.’”
- Thematic prompts are best described as prompting around the answer but not actually giving the learner the answer, sometimes referred to as a “hint.” Example:
  - The question may be, “Why can’t the man open the locked door?”
  - The thematic prompt may involve asking, “What do you need to use when a door is locked?”
  - The response would be, “A key.”
  - The next thematic prompt might be, “And does the man have a key?”
  - The response would be, “No.”
  - You can then say, “Right,” and re-present the question, “So, why can’t the man open the locked door?”
  - The response would be, “Because he doesn’t have a key.”

- This is the beginning of using problem solving skills.
- This program requires preparation. The instructor needs to watch the video and develop questions based upon a segment of the video.
- In addition, it is important to be familiar with the points in the video at which you will rely on the non-verbal stimulus to evoke the response and to prepare potential thematic prompts to be used in the event that the learner errors.

INTRAVERBAL
30 to 48 Months



INTRAVERBAL **TOTAL SCORE:**

Assessment			
1st	2nd	3rd	4th

Does the child verbally respond to the content of the words of others?

1st	2nd	3rd	4th	
				11. Spontaneously emits 20 intraverbal comments (can be part mand) (e.g., Dad says, *I'm going to the car,* and the child spontaneously says, *I want to go for a ride!*) **(O)**
				12. Demonstrates 300 different intraverbal responses, tested or obtained from an accumulated list of known intraverbals **(T)**
				13. Answers 2 questions after being read short passages (15+ words) from books, for 25 passages (e.g., *Who blew the house down?*) **(T)**
				14. Describes 25 different events, videos, stories, etc. with 8+ words (e.g., *Tell me what happened... The big monster scared everybody and they all ran into the house.*) **(E)**
				15. Answers 4 different rotating WH questions about a single topic for 10 topics (e.g., *Who takes you to school? Where do you go to school? What do you take to school?*) **(T)**

Comments/notes:

VB-MAPP Milestones Assessment: Level 3 21

607

ADVANCED INTRAVERBAL PROTOCOL

Preparing the Lesson

1. Select a preferred video segment to watch with the student. The video acts as a "conversation piece."
2. Prepare a list of questions to ask the student, ensuring that the student is fluent in the components of the responses as tacts.
3. Be sure to include a variety of "wh" questions (i.e., "who," "what," "when," "where," "why," "which," "how," and "can/do/does/will").
4. Questions should be asked approximately every 15 seconds.

608

Learner Cady Date 8.6.07

Mixed "WH" Questions Video/Book Alice in Wonderland Segment 9	Questions With Video or Book	Questions Without Video or Book
1. What shape is the sun? (circle)	+	+
2. Where are the walrus & carpenter walking? (sand/beach)	+	+
3. Which one has a mustache, walrus or carpenter? (walrus)	+	⊖
4. Does the walrus take off his shoe? (No)	+	+
5. Why does the carpenter remove his shoes? (sand in it)	+	+
6. How does he get the sand out? (w/ hammer)	+	+
7. Where does the cage fall? (ground/sand)	⊖	+
8. Who has a cane? (walrus)	⊖	+
9. What does the carpenter scoop up in his hand? (sand)	+	+
10. When does the carpenter smile (sand in hand)	+	+
11. Who makes the smoke? (walrus)	+	+
12. Which one wears a bowtie? (walrus)	+	+
13. Who gets covered by sand? (carpenter)	+	+
14. What does the carpenter hold in his hand? (hammer)	+	+
15. Why does the carpenter nose shake? (walrus mustache)	+	+
16. How does the carpenter get out of the sand? (walrus/hammer)	+	+
17. Does the walrus get covered w/ sand? (No)	+	+
18. Where does the carpenter's head land when he's upside down? (Hat)	+	+
19. Does the carpenter see baby oysters under water? (Yes)	+	+
20. When do the oysters close? (see carpenter)	+	+
21. How does the carpenter whistle? (fingers)	+	+
22. Why does the walrus walk into the water? (talk to oysters)	+	+
23. When do the oysters open? (walrus talks/stops)	⊖	⊖
24. Which one gets hit w/ the cane? (carpenter)	+	+

Novel Questions Date: 8/7/07	
1 What do the walrus & carpenter walk on? (sand)	+
2 Who has a mustache? (walrus)	⊖
3 Where does the carpenter hold the sand? (in his hand)	+
4 Which one gets covered by sand, carpenter or walrus? (carpenter)	+
5 Does the carpenter get out of the sand? (Yes)	+
6 How does the walrus pull the carpenter out of the sand? (w/ hammer)	⊖
7 When does the carpenter get excited? (sees oysters)	+
8 Why do the oysters close? (see walrus)	+

With Video

1. Who: 3/3 2. What: 3/3 3. Where: 3/3 4. When: 3/3 5. Why: 3/3 6. Which: 3/3
7. How: 3/3 8. Can/Does/Do/Will: 3/3

Without Video

1. Who: 3/3 2. What: 3/3 3. Where: 3/3 4. When: 3/3 5. Why: 3/3 6. Which: 3/3
7. How: 3/3 8. Can/Does/Do/Will: 3/3 9. Novel: 6/8

Video segment **Unpreffered** Annie scene 8-9
Date 6-23-04

Mixed "WH-" Questions	w/ video w/ caps on Type Resp	No video Oral ? Oral Resp
1. what are all the girls doing? cleaning	+	—
2. who is Grace talking to? Mrs. Hannigan	+	+
3. who is in the closet? Annie	+	+
4. why does Mrs H slam the door? Annie leaves	—	+
5. What happened when Mrs. H. went to sit down? Fell	+	+
6. How old should the orphan be? 10	+	+
7. How does Annie feel? happy	+	+
8. does Mrs H. want Annie to go? NO	+	+
9. Who does Annie want to bring? Sandy	+	+
10. What did sandy do? jumped up	—	—
11. Where is Mrs H. going to send Sandy? Trash	+	—
12. Where is Annie going? time Machine	—	+
13. Why is sandy barking? scared	—	+
14. When did Annie wipe her face?	—	—
15. Why did the people come to the front door? Annie	—	—
16. Why do you think the butler sneezed? sandy	—	+
17. Where is the swimming pool? Down the stairs	+	+
18. Can dogs eat at the table? NO	+	+
19. Why does Annie go back down stairs? To help	+	+
20. How did sandy get the water wet? from the dutch	+	+
21. What instrument is Annie playing? Piano	+	+
22.		
23.		
24.		
25.		

Next Session Novel Questions

1 How old is Annie 10	—
2 What color is the car they drive in? black	+
3 What did Grace do when she got to the entrance? ring bell	—
4 who gives Sandy a bath? The Butler	—
5 Where is Annie when the moms are making the bed? in the bed	—
6	
7	
8	
9	

Mixed Intraverbals Procedure

ADVANCED INTRAVERBAL PROTOCOL

Questions With Video

1. Pause the video to ask the student a question.
2. If the student answers correctly, continue with the video. Use additional reinforcers as necessary based on the individual student.
3. If the student answers incorrectly, provide thematic prompts until the original question is answered correctly.
4. Record correct (+) and incorrect answers (-).

- Questions Without Video
  1. Re-present the same questions after a time delay (duration of which depends on the learner) without the video.
  2. If the student answers correctly, reinforce according to his or her established reinforcement schedule.
  3. If the student answers incorrectly, provide thematic prompts until the original question is answered correctly.
  4. If repeated attempts at thematic prompting are unsuccessful, return to the nonverbal stimulus (i.e., the appropriate segment of the movie).
  5. Record correct (+) and incorrect answers (-).

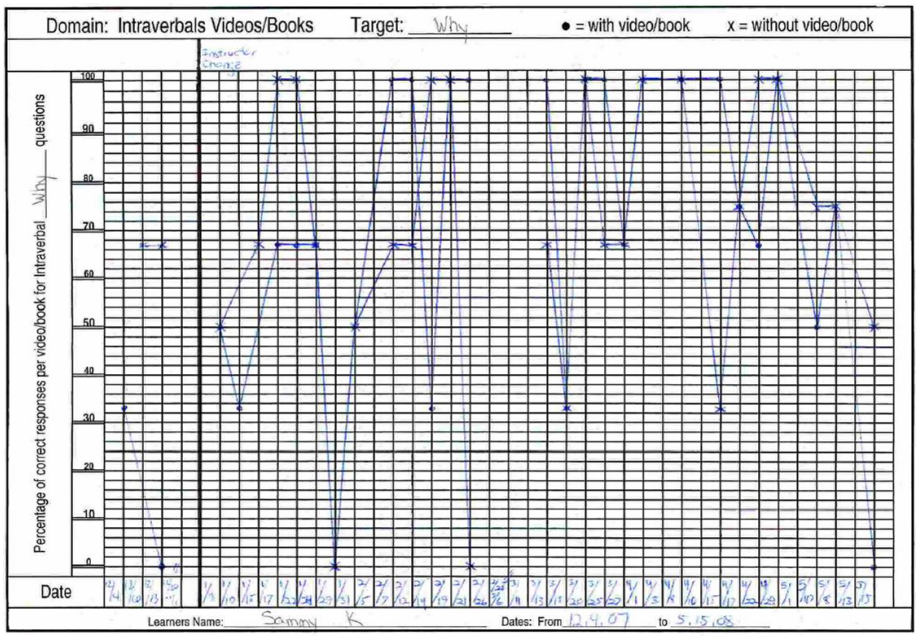
Novel Questions

1. Ask the student 7-8 novel questions about the same video segment later in the session or the next day.
2. If the student answers correctly, reinforce according to established reinforcement schedule.
3. If the student answers incorrectly, provide thematic prompts until the original question is answered correctly.
4. If repeated attempts at thematic prompting are unsuccessful, return to the nonverbal stimulus (i.e., the appropriate segment of the movie).
5. Record correct (+) and incorrect answers (-).

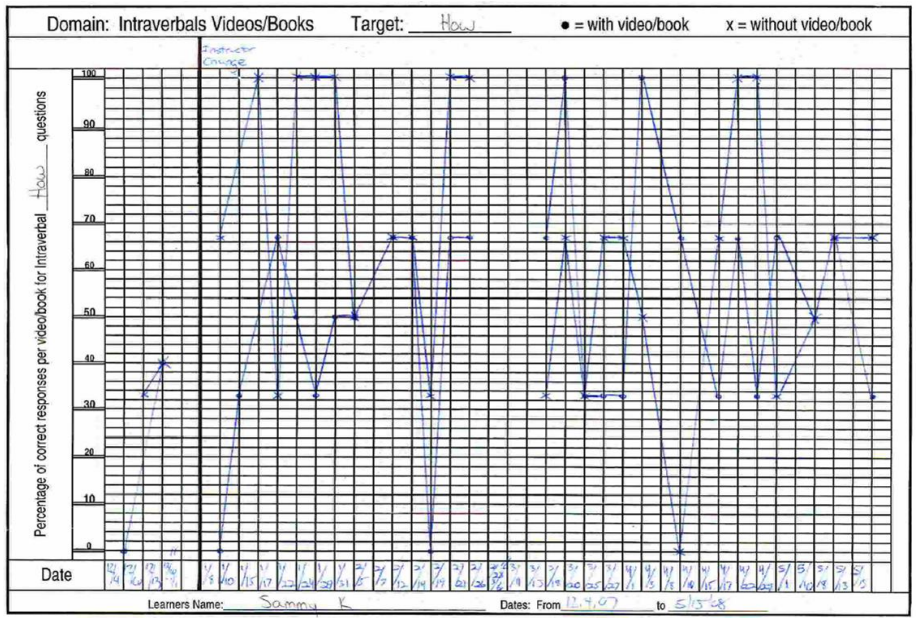
Kellen Intraverbals

29. Adv. IV VIDEO

- Graphing
  1. Graph percentage of correct versus incorrect responses for each “wh” question for with and without the video questions.
  2. Graph percentage of novel questions answered correctly.


Domain: Intraverbals Videos/Books
Target: Why
● = with video/book
x = without video/book
Instructor Choice
Percentage of correct responses per video/book for Intraverbal Why questions
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Sammy K
Dates: From 12.4.07 to 5.15.08

613


Domain: Intraverbals Videos/Books
Target: How
● = with video/book
x = without video/book
Instructor Choice
Percentage of correct responses per video/book for Intraverbal How questions
100
90
80
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50
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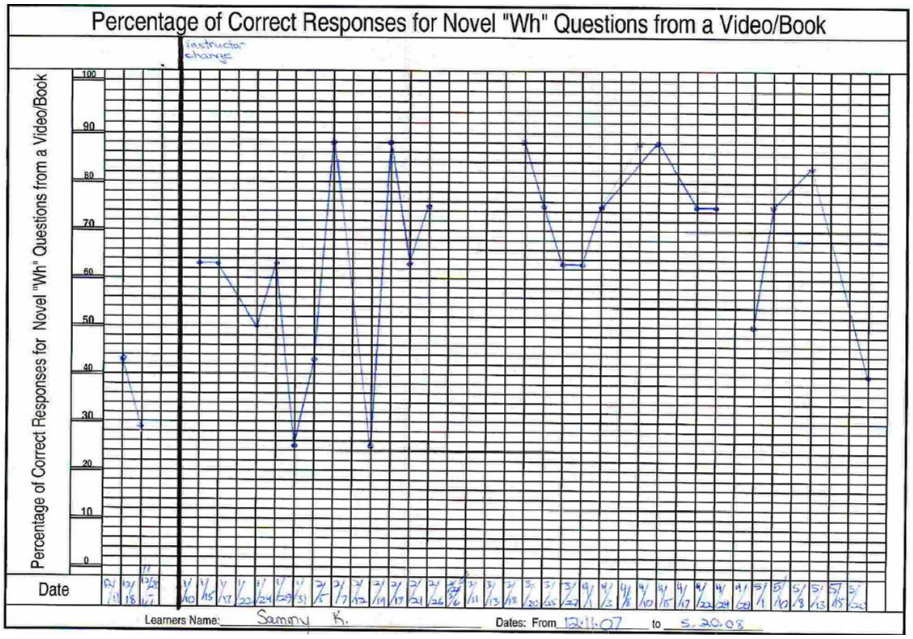
10
0
Date
Learners Name: Sammy K
Dates: From 12.4.07 to 5/15/08

614



VIDEOS

30. Sophia Manding Chicken
31. Sophia- Advanced Intraverbal Responding

Aaron Just Intraverbals
Aaron Conversation Case Study

Final Notes

- A recent paper by Sundberg & Sundberg (2011) in the *The Analysis of Verbal Behavio*r discussed the development of the intraverbal repertoire in children with autism and typically developing children.
- The authors showed that as the verbal stimulus became more complex, e.g." Name some animals" vs "Name some farm animals," that all children made errors in their responses.
- The authors suggest that this is a problem related to the compound effect (additive) of verbal conditional discriminations with more complex verbal stimuli.
- They conclude that at least part of the solution to this problem is related to insuring that pre-requisite skills related to tacting and listener behavior are well established before teaching an intraverbal repertoire.
- This study suggests some of the difficulties in teaching this repertoire.

Summary for Practitioners

1.Don't teach the intraverbal repertoire too early or you may develop rote and restricted responding.

2.Begin teaching this repertoire after responding across listener, tact, linguistic structure and social responding conforms to at least a 2.5 year typical child's repertoire.

3.After developing the initial intraverbal repertoire consider the role of problem-solving (Sautter, 2012) and visual imagery (Kisamore, et. al., 2011) in the development of more complex intraverbal responding.

4.Consider the role of the development of the conditional discrimination and the additive effects of the components of the verbal stimulus on the intraverbal response.

5. Consider lag schedules to produce divergent stimulus control, e.g. Tell me another African animal, and only reinforce novel responses.

6.Teach differential observing responses, i.e., teach to repeat part of the question in the answer, e.g., A hot food you eat at breakfast is oat meal. (Kisamore, 2013)

7. Teach in discrimination verbal stimuli with similar elements, e.g., what do you sweep and what do you sweep with? Einarsson, et al. (in preparation)

8. Extensive tact training may lead to some intraverbal responding .

9. Listenter by feature, function and class may only produce intraverbal when the tact is emitted simultaneously with the selection responses.

10. MET of intraverbals may produce some intraverbals but teaching either divergent or convergent stimulus control does not seem to produce the other. (Pettursdottir, 2008)

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Group Responding

Teaching Group Responding Skills

- Children with autism need to learn outside a one-on-one teaching environment, so it will be important to teach learners to respond to instructions presented by a teacher in a group setting
- Goal: to simulate classroom-like situations to increase group responding, generalize skills taught during 1:1 instruction, and to teach new skills.
- Examples:
  - Circle Time
  - Older Learner Class

Circle Time

- Teacher: Presents all instructions, error corrects, delivers reinforcers (when feasible)
- Prompter: Prompts all responses that are not done independently or done incorrectly and reinforces independent responses.
- Circle time video

Timmy Circle Time Response Definitions:

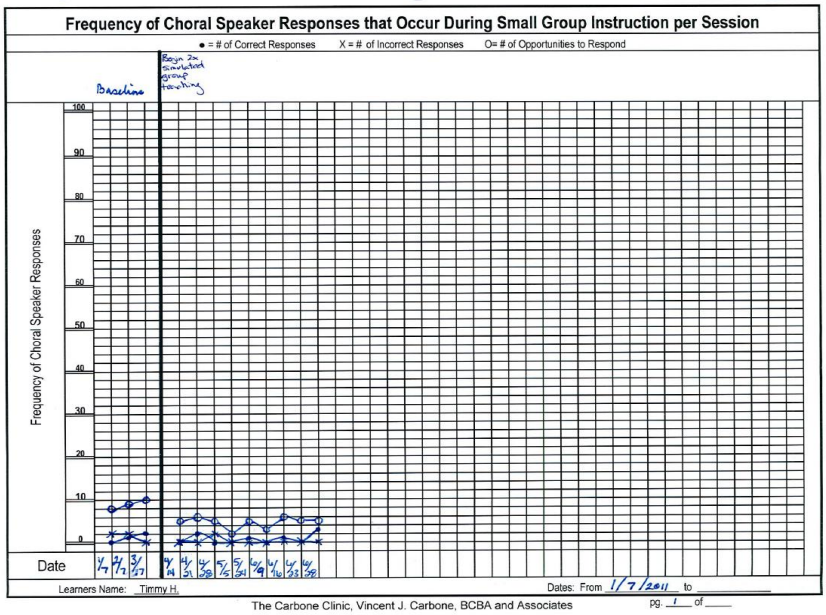
Choral Speaker Responses: When the instructor presents an SD to the entire group participating during circle time Timmy will emit a textual, tact, intraverbal or intraverbal/mand vocal response within 3 seconds.

Individual Speaker Responses: When the instructor presents an SD similar to "What is it?" Timmy will emit a textual, tact, intraverbal or intraverbal/mand vocal response within 3 seconds.

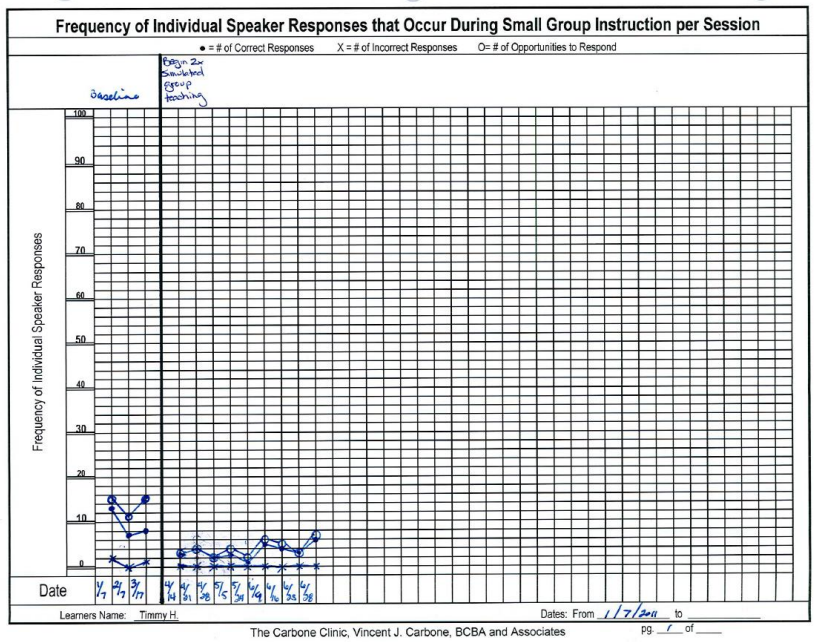
Group Listener Responses: When the instructor presents an SD to the entire group participating during circle Timmy will respond within 3 seconds.

Individual Listener Responses: When the instructor presents Timmy with an SD similar to "Timmy, go put Monday up on the board", Timmy will respond within 3 seconds.

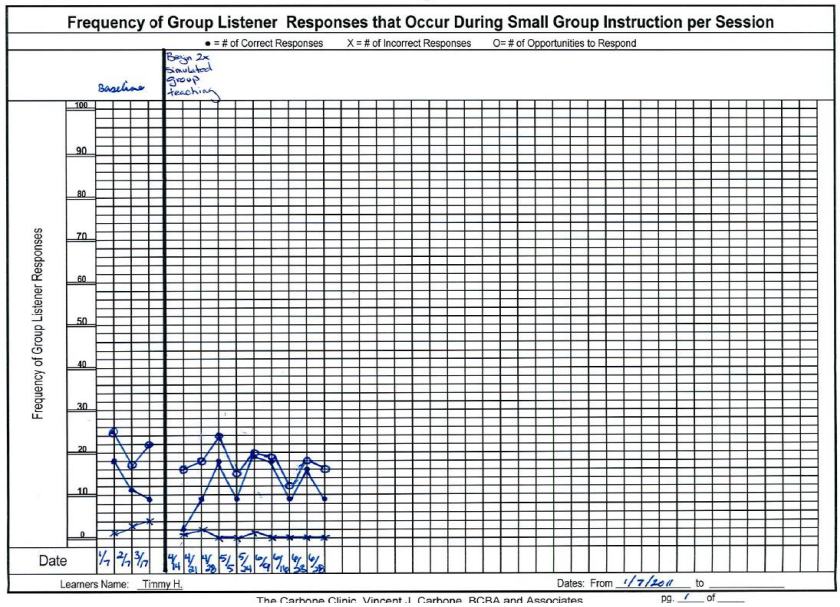
Timmy circle time video


Frequency of Choral Speaker Responses that Occur During Small Group Instruction per Session
● = # of Correct Responses X = # of Incorrect Responses O= # of Opportunities to Respond
Baseline
Begin 2x Simulated group teaching
Frequency of Choral Speaker Responses
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Timmy H.
Dates: From 1/7/2011 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
pg: 1 of

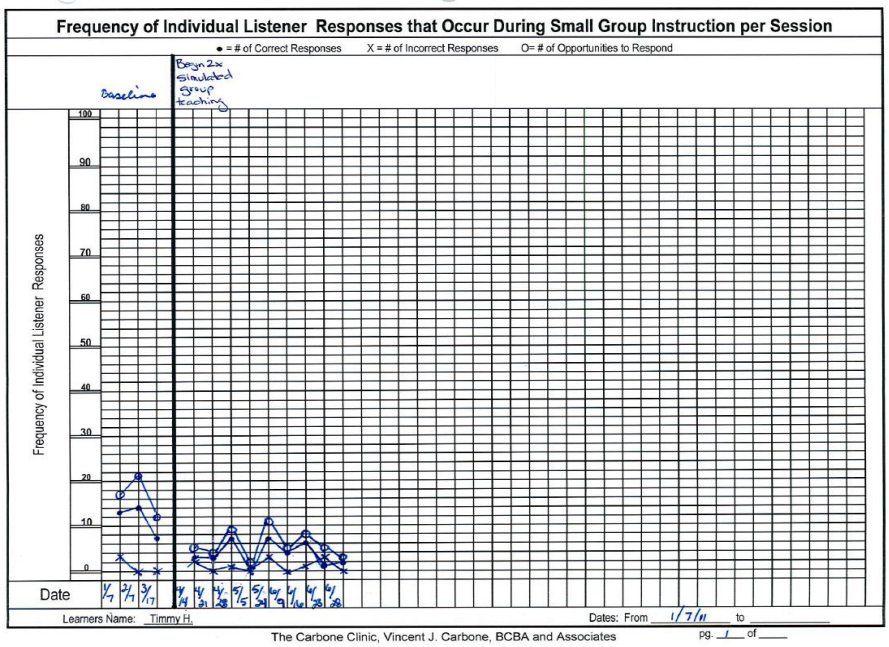
625


Frequency of Individual Speaker Responses that Occur During Small Group Instruction per Session
● = # of Correct Responses X = # of Incorrect Responses O= # of Opportunities to Respond
Baseline
Begin 2x Simulated group teaching
Frequency of Individual Speaker Responses
100
90
80
70
60
50
40
30
20
10
0
Date
Learners Name: Timmy H.
Dates: From 1/7/2011 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
pg: 1 of

626


Frequency of Group Listener Responses that Occur During Small Group Instruction per Session
● = # of Correct Responses X = # of Incorrect Responses O= # of Opportunities to Respond
Baseline
Begin 2x Simulated Group Teaching
Frequency of Group Listener Responses
100
90
80
70
60
50
40
30
20
10
0
Date
1/7 2/1 3/1
4/4 4/21 4/28 5/5 5/24 6/9 6/16 6/23 6/30
Learners Name: Timmy H.
Dates: From 1/7/2011 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
pg. 1 of

627

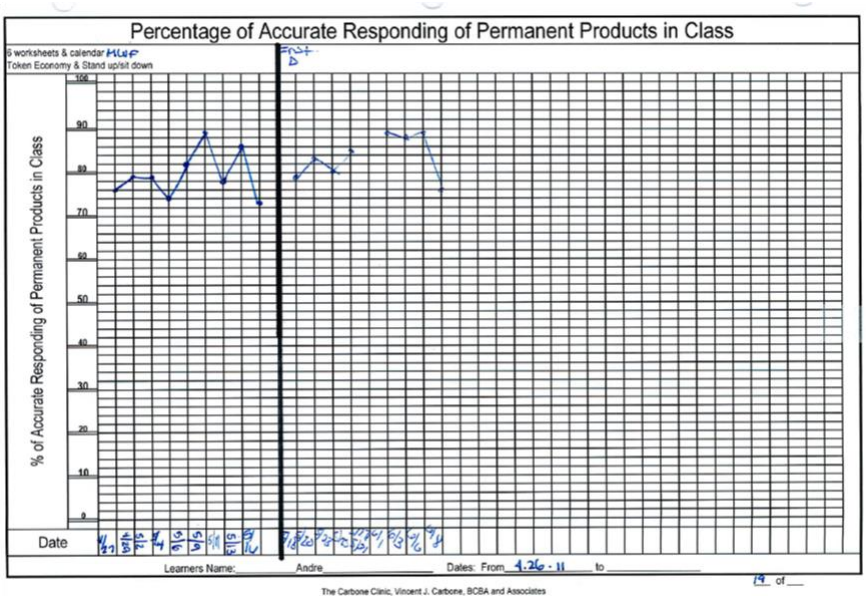

Frequency of Individual Listener Responses that Occur During Small Group Instruction per Session
● = # of Correct Responses X = # of Incorrect Responses O= # of Opportunities to Respond
Baseline
Begin 2x simulated group teaching
Frequency of Individual Listener Responses
100
90
80
70
60
50
40
30
20
10
0
Date
1/7 2/1 3/1
4/4 4/21 4/28 5/5 5/24 6/9 6/16 6/23 6/30
Learners Name: Timmy H.
Dates: From 1/7/11 to
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates
pg. 1 of

628

Class for Older Learners

- Teacher: Presents all instructions, error corrects, and delivers reinforcers
- Prompter: Prompts all responses that are not done independently or done incorrectly
- Data Collected: Frequency of demands, frequency of responses prompted, permanent products, and frequency of correct responses on permanent products
- Graph: Percentage of Teacher Directions Followed Independently in Class and Percentage of Accurate Responding of Permanent Products in Class
- Older Learner Class Video

629



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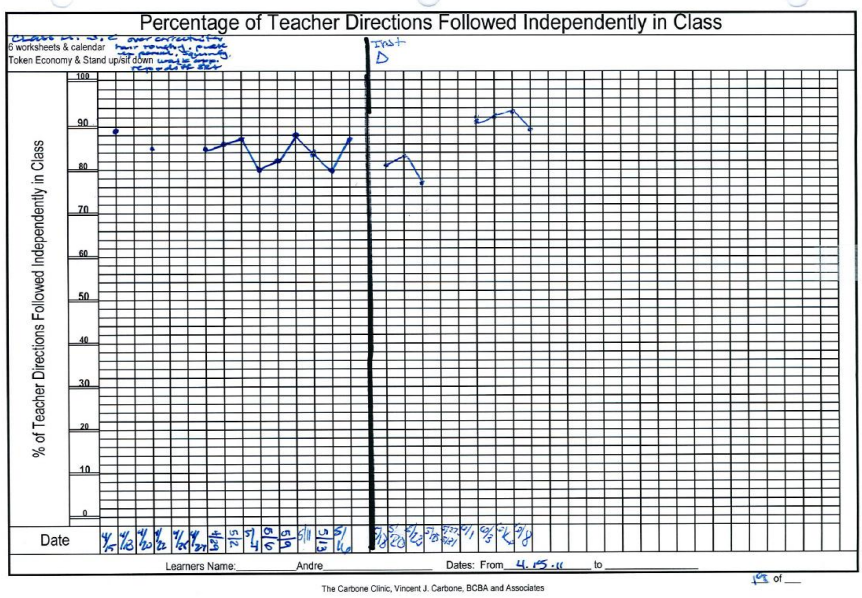


631

Teaching Independence & Life Skills

- Effective educational programs prepare young adults for life after school by teaching independence and life skills.
- Applied Behavior Analysis research literature is replete with demonstrations of effective methods to teach life skills.
- A repertoire of life skills prepares an individual for a life of independence and a happy and productive life.

Life Skills include:

1. Working independently on a task for a substantial period of time
2. Washing hands, brushing teeth, eating independently. toileting, dressing, etc.
3. Following schedules of work, leisure or self-care activities without prompting

- On the following page is a description of how these important skills are taught.

632

Learner: Andy V.

Skill: Hand washing

Chaining Procedure: Backward Chain

Criteria: Mastery for individual step: 3 cons. Days

Instructions: Create a stimulus response chain with the SD and consequence listed for each response. On the first teaching trial of the day record the prompt level for each response. Teach three times per session.

Step #	SD / Consequence	Response	Baseline 3/24	Baseline 3/27	Baseline 3/25	Date 3/25	3/26	3/30	3/31	4/1	4/4	4/5	4/6	4/7	4/8	4/11	4/12	4/13	4/14
21	S^D Vocal SD "Go wash your hands" → ← Walk to sink in bathroom C Standing in front of sink		NR IR (IND)	NR IR (IND)	NR IR (IND)	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
20	S^D Standing in front of sink, sleeves pulled down C Sleeves at elbows	Push up sleeves	(NR) IR IND	NR IR IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
19	S^D Sleeves at elbows, sight of sink with no water running C Water running	Turn on water	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
18	S^D Sees/hears water running C Hands wet	Put hands under water	NR IR (IND)	NR IR (IND)	NR IR (IND)	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
17	S^D Hands wet C Soap in hands	Dispense soap (1 push)	(NR) IR IND	(NR) IR IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
16	S^D Soap in hands C Soapy palms, hears auditory stimulus "5"	Rub palms together while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
15	S^D Hears auditory stimulus "5," sees back of left hand not lathered C Soapy back L hand, hears auditory stimulus "5"	Use right hand to rub back of left hand to while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
14	S^D Hears auditory stimulus "5," sees back of right hand not lathered C Soapy back R hand, hears auditory stimulus "5"	Use left hand to rub back of right hand while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
13	S^D Hears auditory stimulus "5," sees palms and backs of both hands covered with soap C Soap rinsed off palms, hears auditory stimulus "5"	Rub palms together under water while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
12	S^D Hears auditory stimulus "5," sees soap on back of left hand C Soap rinsed off back of left hand, hears auditory stimulus "5"	Use right hand to rub back of left hand under water while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND
11	S^D Hears auditory stimulus "5," sees soap on back of right hand C Soap rinsed off back of right hand, hears auditory stimulus "5"	Use left hand to rub back of right hand under water while counting to 5	NR (IR) IND	NR (IR) IND	NR (IR) IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND	FP PP IND

Key: **NR** – No Response, **IR** – Incorrect Response **FP** – Full Prompt, **PP** – Partial Prompt, **IND** - Independent

Andy Hand washing Andy HW2 Andre Hand washing Tooth brushing Naryan-Set Up Naryan-Ind & Leisure

Naryan-Shaving, etc. Jordo Shoe Tying 1 Jordo – Shoe Tying

633

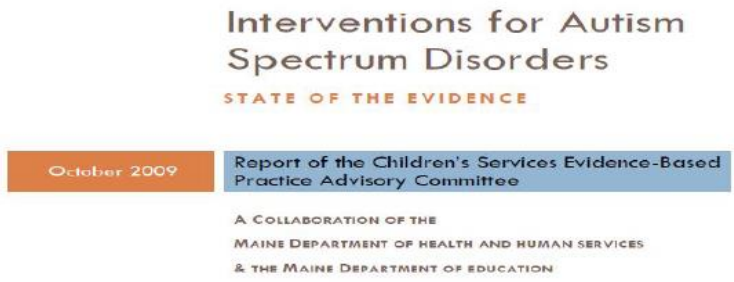
REDUCING PROBLEM BEHAVIOR

- Many procedures are recommended to reduce problem behavior in persons with autism.
- In many cases these procedures have limited or no research support.
- The following slides contain some of the more popular procedure for reducing problem behavior that have limited or no empirical support and therefore should be avoided.

634

What Does Not Work?

- Before presenting methods to reduce problem behavior in children with autism and related disabilities it is worthwhile to discuss commonly recommended methods that have little evidence or negative evidence.
- The State of Maine recent published the report below which comments on effective treatments for persons with autism



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635

Gluten-Casein Free Diet | *INSUFFICIENT EVIDENCE*

Elimination of gluten and casein from diets are believed by some to prevent symptoms of ASD linked to opiod activity that is triggered by the peptides in these substances (Millward, Ferriter, Calver, & Connell-Jones, 2008). A recent high-quality clinical trial of a gluten/caseine free diet did not detect any significant differences in behavior or other symptoms of ASD (Harrison, et al., 2006), while another study showed positive results but had some concerning methodological flaws (Knivsberg, Reichelt, Hoien, & Nodland, 2003). A recent Cochrane review concluded that the evidence for these diets is poor and more research is needed and the Committee echoes this finding (Millward, et al., 2008). A large clinical trial of gluten- and casein-free diets is currently underway.

Harrison, E. J., Shankar, M., Shuster, J., Theriaque, D., Burns, S., & Sherrill, L. (2006). The gluten-free, caseine-free diet in autism: Results of a preliminary double-blind clinical trial. *Journal of Autism and Developmental Disorders, 36*(3), 413-420.

590

636

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The Gluten-Free, Casein-Free Diet and Autism

Limited Return on Family Investment

Sarah Hurwitz
The Hebrew University of Jerusalem, Israel

The gluten-free, casein-free (GFCF) diet is widely used by families of children with autism spectrum disorders (ASD). Despite its popularity, there is limited evidence in support of the diet. The purpose of this article was to identify and evaluate well-controlled studies of the GFCF diet that have been implemented with children with ASD. A review of the literature from 1999 to 2012 identified five studies meeting inclusion criteria. Research rigor was examined using an evaluative rubric and ranged from *Adequate* to *Strong*. In three of the studies, no positive effects of the diet were reported on behavior or development, even after double-blind gluten and casein trials. Two studies found positive effects after 1 year but had research quality concerns. Reasons why families continue to expend effort on GFCF diets despite limited empirical evidence are discussed. Recommendations are that families should invest time and resources in more robustly supported interventions and limit GFCF diets to children diagnosed with celiac disease or food allergies.

Keywords: *gluten-free, casein-free, elimination diet, autism spectrum disorders*

Sensory Integration Therapy | *INSUFFICIENT EVIDENCE*

Sensory Integration Therapy (SIT) aims to improve the functional behavior of children with ASD by addressing sensory integration dysfunction, which is believed to be prevalent in people with ASD (Leong & Carter, 2008). It is thought that people with ASD have underlying impairments in sensory processing i.e., they have difficultly integrating the sensory input continuously received from the environment in the form of touch, movement, sounds, and sensation. The discomfort that results from the inability to manage an over- or under-stimulating environment is believed to inhibit the child's ability to regulate his or her level of arousal (Baranek, 2002) thereby contributing to behavioral issues such as agitation and aggression. SIT is delivered with the goal of improving the sensory processing pathways so that learning and functional ability can grow.

Based on the studies it reviewed, the Committee concludes there is no scientific evidence at this time that SIT has long-term impact on the core symptoms of ASD. These conclusions are consistent with recently published reviews (Baranek, 2002; Dawson & Watling, 2000; Leong & Carter, 2008). However, many parents and people with ASD report that sensory interventions have an immediate effect and enable their child to achieve better self-regulation. The results of this review should not negate the use of sensory interventions as immediate coping strategies by individuals who find them helpful since there is no apparent risk of harm.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1990, 23, 361–370 NUMBER 3 (FALL 1990)

ARTIFACTUAL EFFECTS OF SENSORY-INTEGRATIVE THERAPY ON SELF-INJURIOUS BEHAVIOR

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UNIVERSITY OF MARYLAND

AND

BRIAN A. IWATA
UNIVERSITY OF FLORIDA

Three individuals who exhibited self-injurious behavior (SIB) were exposed to sensory-integrative therapy. Prior to treatment, a functional analysis baseline was conducted to identify the motivational features of their SIB. One subject's SIB appeared to be an attention-getting response (maintained by positive reinforcement), which varied subsequently as a function of attention being either withheld or provided noncontingently during sensory-integration sessions. The 2nd subject displayed a pattern of responding suggestive of stereotypic SIB (maintained by automatic reinforcement), which paradoxically increased during sensory-integration sessions. The 3rd subject's SIB appeared to function as an escape response (maintained by negative reinforcement), and his behavior during sensory-integration sessions was similar to that observed during baseline sessions in which demands were not present. The SIB of all 3 subjects later was reduced when behavioral interventions were applied. The data presented raise questions about the active components of sensory-integrative therapy and the functional types of SIB for which it might be appropriate.

DESCRIPTORS: functional analysis, self-injurious behavior, sensory-integrative therapy, stereotypic behavior

Research in Autism Spectrum Disorders 6 (2012) 1004–1018

Contents lists available at SciVerse ScienceDirect

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Journal homepage: http://ees.elsevier.com/RASD/default.asp

ELSEVIER

Review

Sensory integration therapy for autism spectrum disorders: A systematic review

Russell Lang [a,b,*], Mark O'Reilly [b], Olive Healy [c], Mandy Rispoli [d], Helena Lydon [c], William Streusand [e], Tonya Davis [f], Soyeon Kang [b], Jeff Sigafoos [g], Giulio Lancioni [h], Robert Didden [i], Sanne Giesbers [i]

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ARTICLE INFO

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Weighted vests
Proprioceptive
Vestibular
Sensory diet

ABSTRACT

Intervention studies involving the use of sensory integration therapy (SIT) were systematically identified and analyzed. Twenty-five studies were described in terms of: (a) participant characteristics, (b) assessments used to identify sensory deficits or behavioral functions, (c) dependent variables, (d) intervention procedures, (e) intervention outcomes, and (f) certainty of evidence. Overall, 3 of the reviewed studies suggested that SIT was effective, 8 studies found mixed results, and 14 studies reported no benefits related to SIT. Many of the reviewed studies, including the 3 studies reporting positive results, had serious methodological flaws. Therefore, the current evidence-base does not support the use of SIT in the education and treatment of children with autism spectrum disorders (ASD). Practitioners and agencies serving children with ASD that endeavor, or are mandated, to use research-based, or scientifically-based, interventions should not use SIT outside of carefully controlled research.

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Effects of Weighted Vests on the Engagement of Children With Developmental Delays and Autism

Brian Reichow,[1] Erin E. Barton,[2] Joanna Neely Sewell,[3] Leslie Good,[4] and Mark Wolery[5]

Abstract

The use of weighted vests for children with autism spectrum disorders and developmental disabilities is a common practice as part of sensory integration therapy programs. The purpose of the current investigation was to extend the research on the use of weighted vests for children with autism and developmental delays in a methodologically rigorous study. The study was conducted using an alternating treatment design. This allowed the comparison of three different conditions: weighted vest, vest with no weight (which served as a placebo), and no vest (which served as a baseline). The results showed no differentiation in engagement between conditions for any of the participants. Implications for practice and future research are provided.

Keywords

autism spectrum disorders, sensory integration, weighted vests, engagement

592

641

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The Effects of Weighted Vests on Appropriate In-Seat Behaviors of Elementary-Age Students With Autism and Severe to Profound Intellectual Disabilities

Amy L. Cox
Henry County Schools, Georgia
David L. Gast
Deanna Luscre
Kevin M. Ayres
University of Georgia, Athens

The purpose of this study was to evaluate the impact of weighted vests on the amount of time 3 elementary-age students with autism, intellectual disabilities, and sensory processing abnormalities engaged in appropriate in-seat behavior. An alternating treatments design was used to examine the duration of appropriate in-seat behavior under three conditions: baseline or no vests (A), vests with no weights (B), and weighted vests (BC). Because weighted vests did not have an effect on appropriate in-seat behavior for any participant, a second experiment was conducted. Noncontingent reinforcement (NCR) was assessed within the context of a withdrawal design. NCR had an optimal effect on the participants' in-seat behavior.

Keywords: *weighted vests; sensory integration; noncontingent reinforcement*

593

642

J Autism Dev Disord (2009) 39:105–114
DOI 10.1007/s10803-008-0605-3

ORIGINAL PAPER

The Use of Weighted Vests with Children with Autism Spectrum Disorders and Other Disabilities

Jennifer Stephenson · Mark Carter

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Abstract Therapists who use sensory integration therapy may recommend that children wear weighted vests as an intervention strategy that they claim may assist in remediating problems such as inattentiveness, hyperactivity, stereotypic behaviors and clumsiness. Seven studies examining weighted vests are reviewed. While there is only a limited body of research and a number of methodological weaknesses, on balance, indications are that weighted vests are ineffective. There may be an arguable case for continued research on this intervention but weighted vests cannot be recommended for clinical application at this point. Suggestions are offered for future research with regard to addressing methodological problems.

Keywords Sensory integration · Weighted vests · Autism · ADHD

Therapy is directed at altering underlying neurological processing (Ottenbacher 1982; Schaaf and Miller 2005; Vargas and Camilli 1999) rather than developing skills directly. Traditionally, intervention has involved treatment sessions delivered by an occupational therapist in which controlled sensory stimulation is provided. Such intervention typically involves such activities as brushing and rubbing of the body, deep pressure and compression of joints, as well as use of hammocks and scooter boards to provide stimulation (see Ayres 1972; Hoehn and Baumeister 1994; Smith et al. 2005). A more recent innovation has been the use of "sensory diets" that involve activities and environmental adjustments, purported to complement the individual's individual sensory needs (Smith et al. 2005).

A recent treatment generally included under the umbrella of SI is the wearing of weighted vests. A

643

Auditory Integration Training | *INSUFFICIENT EVIDENCE*

In addition to general sensory processing difficulties, children with ASD are hypothesized to have abnormal responses to auditory stimuli due to sensitivity or insensitivity to certain frequencies of sound (Berard, 1993). Auditory Integration Training (AIT) was developed as a method of retraining a child's auditory pathways to tolerate these frequencies. However, the exact theory of why and how AIT works is yet to be confirmed. Despite this lack of clarity, AIT is frequently marketed to families with anecdotal reports of significant improvements in behavior (Mudford, et al., 2000). Children receiving AIT typically listen to 10 hours of digitally modified music over special headphones over twice per day half-hour sessions. A device filters out the high and low peak frequencies to which the child may be oversensitive (Dawson & Watling, 2000).

Five studies of AIT qualified for review. All were group studies, most with small samples of 9-10 children, but one study had a much larger sample of 80 children (Bettison, 1996). Most of the studies had significant methodological flaws, although two were rated with adequate research report strength. However, all of the studies but one found that AIT had no impact on autistic behavior. Bettison (1996) measured long-term outcomes following AIT for 12 months and found significant improvement in verbal and performance IQ scores; however, the methodology of the study makes its results highly questionable (Sinha, Silove, Wheeler, & Williams, 2004). High-quality controlled studies are needed to determine if there is indeed any merit to AIT's claims.

595

644

American Journal on Mental Retardation, 2000, Vol. 105, No. 2, 118–129

Auditory Integration Training for Children With Autism: No Behavioral Benefits Detected

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David Reeves
University of Manchester (Manchester, England)

Judith Gould and Jo Douglas
Centre for Social and Communication Disorders (Bromley, England)

Auditory integration training and a control treatment were provided for 16 children with autism in a crossover experimental design. Measures, blind to treatment order, included parent and teacher ratings of behavior, direct observational recordings, IQ, language, and social/adaptive tests. Significant differences tended to show that the control condition was superior on parent-rated measures of hyperactivity and on direct observational measures of ear-occlusion. No differences were detected on teacher-rated measures. Children's IQs and language comprehension did not increase, but adaptive/social behavior scores and expressive language quotients decreased. The majority of parents (56%) were unable to report in retrospect when their child had received auditory integration training. No individual child was identified as benefiting clinically or educationally from the treatment.

596

Authors suggest it could also be harmful.

645

Hyperbaric Oxygen Therapy (HBOT)
For Children with Autism

- HBOT has been claimed to be an effective form of treatment for children with autism.
- A well controlled study by Lerman et al. suggests the treatment has no benefit for children with autism (see next slide for abstract)

646

Using Behavior Analysis to Examine the Outcomes of Unproven Therapies: An Evaluation of Hyperbaric Oxygen Therapy for Children with Autism

Dorothea C. Lerman, Ph.D., BCBA, Tesa Sansbury, B.S., Alyson Hovanetz, M.A., BCBA, Erin Wolever, B.A., Amber Garcia, B.S., Erin O'Brien, B.S., and Hellen Adedipe, M.A., BCBA
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ABSTRACT

It has become increasingly common for parents of children with autism to supplement behavior analytic interventions with therapies that have not yet been subjected to adequate scientific scrutiny. When caregivers elect to use unproven therapies despite advice to the contrary, practitioners should employ the methods of applied behavior analysis to experimentally evaluate the outcomes. Controlled evaluations of unproven therapies can be challenging, however, particularly when ongoing behavioral services are supplemented with biomedical interventions. This paper describes the methods and results of a behavior analytic evaluation of hyperbaric oxygen therapy, an unproven intervention that has been growing in popularity over the past several years. Three young children with autism participated. No benefits of the therapy were evident beyond those obtained through the behavioral intervention alone. Considerations for conducting this type of research are highlighted, along with suggestions for practitioners.
Descriptors: Autism, biomedical interventions, hyperbaric oxygen therapy, unproven therapies

Behav Anal Pract. 2008 Winter; 1(2): 50–58.

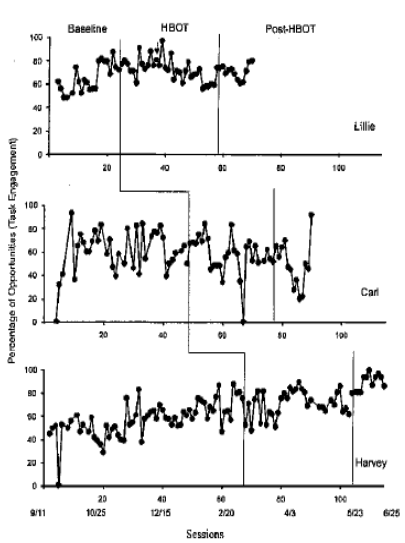

Figure 1. Percentage of task engagement across baseline, HBOT, and post-HBOT conditions for Lillie, Carl, and Harvey. Calendar dates appear below the session numbers.

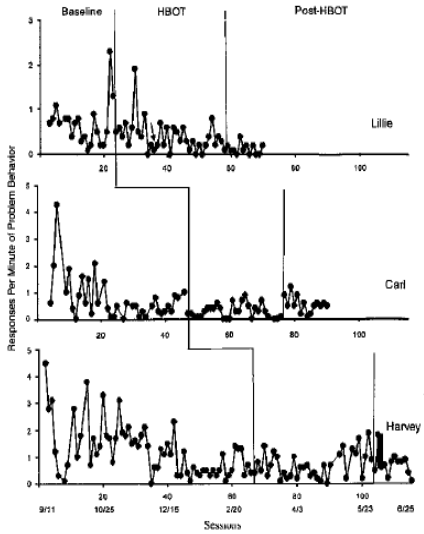

Figure 2. Responses per minute of problem behavior across baseline, HBOT, and post-HBOT conditions for Lillie, Carl, and Harvey. Calendar dates appear below the session numbers.

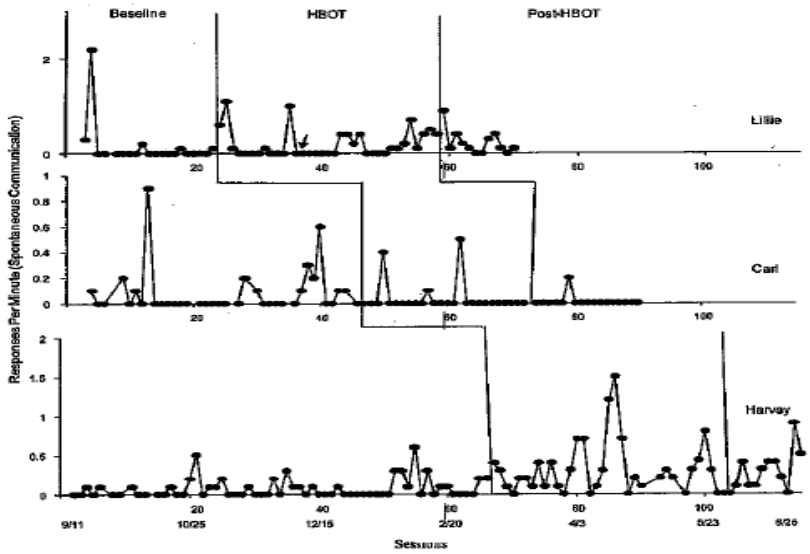

Figure 3. Responses per minute of spontaneous communication across baseline, HBOT, and post-HBOT conditions for Lillie, Carl, and Harvey. Calendar dates appear below the session numbers.

Research in Autism Spectrum Disorders 4 (2010) 268–275

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Randomized trial of hyperbaric oxygen therapy for children with autism

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ARTICLE INFO

Keywords:
Autism Spectrum Disorders
Autism Treatment
Hyperbaric oxygen therapy
Applied behavior analysis

ABSTRACT

Autism Spectrum Disorders (ASDs) are characterized by the presence of impaired development in social interaction and communication and the presence of a restricted repertoire of activity and interests. While numerous treatments for ASDs have been proposed, very few have been subjected to rigorous scientific investigation. Hyperbaric oxygen therapy (HBOT) has been recently popularized as a treatment for the symptoms of ASDs. The purpose of this study was to test the hypothesis that HBOT would have a beneficial effect on ASD symptoms in the context of a double-blind placebo-controlled trial. This randomized double-blind placebo-controlled trial compared HBOT used to deliver 24% oxygen at 1.3 atmospheric pressure ($n = 18$) to placebo ($n = 16$) in children with Autistic Disorder. Both direct observational measures of behaviors symptomatic of autism and standardized psychological assessments were used to evaluate the effects of the treatment. No differences were detected between HBOT and placebo groups across any of the outcome measures. The present study demonstrates that HBOT delivered at 24% oxygen at 1.3 atmospheric pressure does not result in a clinically significant improvement of the symptoms of Autistic Disorder.

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The effects of hyperbaric oxygen therapy on oxidative stress, inflammation, and symptoms in children with autism: an open-label pilot study

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Abstract

Background: Recently, hyperbaric oxygen therapy (HBOT) has increased in popularity as a treatment for autism. Numerous studies document oxidative stress and inflammation in individuals with autism; both of these conditions have demonstrated improvement with HBOT, along with enhancement of neurological function and cognitive performance. In this study, children with autism were treated with HBOT at atmospheric pressures and oxygen concentrations in current use for this condition. Changes in markers of oxidative stress and inflammation were measured. The children were evaluated to determine clinical effects and safety.

Methods: Eighteen children with autism, ages 3–16 years, underwent 40 hyperbaric sessions of 45 minutes duration each at either 1.5 atmospheres (atm) and 100% oxygen, or at 1.3 atm and 24% oxygen. Measurements of C-reactive protein (CRP) and markers of oxidative stress, including plasma oxidized glutathione (GSSG), were assessed by fasting blood draws collected before and after the 40 treatments. Changes in clinical symptoms, as rated by parents, were also assessed. The children were closely monitored for potential adverse effects.

Results: At the endpoint of 40 hyperbaric sessions, neither group demonstrated statistically significant changes in mean plasma GSSG levels, indicating intracellular oxidative stress appears unaffected by either regimen. A trend towards improvement in mean CRP was present in both groups; the largest improvements were observed in children with initially higher elevations in CRP. When all 18 children were pooled, a significant improvement in CRP was found ($p = 0.021$). Pre- and post-parental observations indicated statistically significant improvements in both groups, including motivation, speech, and cognitive awareness ($p < 0.05$). No major adverse events were observed.

Conclusion: In this prospective pilot study of children with autism, HBOT at a maximum pressure of 1.5 atm with up to 100% oxygen was safe and well tolerated. HBOT did not appreciably worsen oxidative stress and significantly decreased inflammation as measured by CRP levels. Parental observations support anecdotal accounts of improvement in several domains of autism. However, since this was an open-label study, definitive statements regarding the efficacy of HBOT for the treatment of individuals with autism must await results from double-blind, controlled trials.

Trial Registration: clinicaltrials.gov NCT00324909

Vision Therapy

- Vision Therapy, usually practiced by optometrists, sometimes includes the recommendation for children with autism to wear prism glasses.
- This is a website of a optometrist who recommends their use.

http://devdelay.org/newsletter/articles/html/337-behavior-through-a-lens.html

- On the next slide is an abstract of controlled study of prism glasses with a child with autism.

A Single-Case Experimental Analysis of the Effects of Ambient Prism Lenses for an Adolescent With Developmental Disabilities

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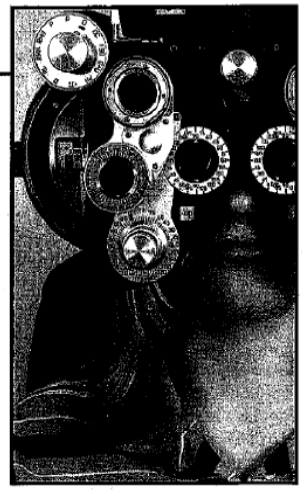
ABSTRACT

We evaluated ambient prism lenses as an intervention to improve the cognitive and motor skills of an adolescent diagnosed with autism and mild mental retardation. Cognitive tasks were presented in both ambient prism lenses and no lenses conditions across four assessments in a multielement design. We then evaluated the effects of ambient prism lenses, placebo lenses, and no lenses on motor skills assessed in previous studies (i.e., balance beam walk and ball-catch) as well as leisure and vocational tasks relevant to the student's academic programming (i.e., money sorting and basketball shooting). Results across assessments indicated relative increases in scores across all experimental conditions, indicating practice effects. No differences across the use of ambient prism, placebo, or no lenses conditions were observed. We conclude with a discussion on how to objectively evaluate controversial and/or alternative therapies for children with developmental disabilities.
Keywords: alternative therapies, ambient prism lenses, autism, single-case experimental design, vision therapy



600

653

Advance Warnings and Activity Schedules

- Some have suggested that advance warnings for transitions that include the use of picture activity schedules and other forms of warnings will reduce the problem behavior associated with transitions. A couple of early studies by Tustin (1995) and Flannery & Horner (1995) suggested the benefits.
- However, the preponderance of recent evidence does not support this finding as demonstrated below.

VISUAL ACTIVITY SCHEDULES

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1994, 27, 705–714 NUMBER 4 (WINTER 1994)

TREATMENT OF ESCAPE-MAINTAINED ABERRANT BEHAVIOR WITH ESCAPE EXTINCTION AND PREDICTABLE ROUTINES

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CHILDREN'S SEASHORE HOUSE

We evaluated the effects of two daily activity schedules on 2 participants' rates of aberrant behavior and their compliance. Functional analysis identified the operant function of the participants' aberrant behaviors to be escape from tasks. Participants were taught to use stimuli contained in daily schedules, and were tested based on a modified stimulus–equivalence model that consisted of flash cards and activity schedules comprised of words or photographs that corresponded to the participants' daily activities. On pretests, the participants demonstrated simple and conditional discriminations with the photographs but not with the printed stimuli. A time-delay procedure was used to teach the participants to name the flash cards. Following training, the printed activity schedules corresponded to lower rates of problem behavior and higher rates of compliance than the photographic activity schedules. Performance on posttests indicated the establishment of functional classes of stimuli involving the flash cards and activity schedules even though this type of correspondence was not directly trained.

601

654

However it does not appear that the schedules had the treatment effect but instead the benefits were derived from the application of extinction. Below is a quote from the discussion section of the paper.

The treatment consisted of a structured routine (activity schedule) plus escape extinction (i.e., aberrant behavior did not result in the termination of an activity). Given that previous treatments with token economies and picture activity schedules had been ineffective, the results of the current study suggest that the escape extinction component (Iwata, 1987) may have functioned as the mechanism responsible for the treatment's effectiveness. A focus

Lalli, et al. , 1994, p. 713

602

655

Research in Autism Spectrum Disorders 6 (2012) 480–492

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Review

Effects of activity schedules on challenging behavior exhibited in children with autism spectrum disorders: A systematic review

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Autism
Challenging behavior
Literature review
Picture schedule

ABSTRACT

We reviewed studies implementing activity schedules to decrease challenging behavior of children with autism spectrum disorders (ASD). Systematic searches of electronic databases, journals, and reference lists identified 18 studies meeting the inclusion criteria. These studies were evaluated in terms of the effectiveness of activity schedules to decrease challenging behavior on the basis of forms and purposes of activity schedules, various settings in which the activity schedule was applied, severity of ASD diagnosis, and communication abilities of the participants. Activity schedules were implemented to decrease challenging behavior in 43 participants aged three to 18 years. Activity schedules included photographs, line drawings, and videos intending to promote self-regulation, independence, transitions, or play skills. Regardless of the form and intended purpose of the activity schedule, they proved effective in reducing challenging behavior in each of the reviewed studies. There was some variation in effectiveness of the activity schedules across settings, severity of ASD diagnosis, and communication abilities. Included studies are summarized and evaluated in terms of effectiveness across the aforementioned variables. Implications and suggestions for future research on the use of activity schedules to decrease challenging behavior are discussed.

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656

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2009, 42, 309–313 NUMBER 2 (SUMMER 2009)

SEPARATE AND COMBINED EFFECTS OF VISUAL SCHEDULES AND EXTINCTION PLUS DIFFERENTIAL REINFORCEMENT ON PROBLEM BEHAVIOR OCCASIONED BY TRANSITIONS

MELISSA B. WATERS, DOROTHEA C. LERMAN, AND ALYSON N. HOVANETZ

UNIVERSITY OF HOUSTON, CLEAR LAKE

The separate and combined effects of visual schedules and extinction plus differential reinforcement of other behavior (DRO) were evaluated to decrease transition-related problem behavior of 2 children diagnosed with autism. Visual schedules alone were ineffective in reducing problem behavior when transitioning from preferred to nonpreferred activities. Problem behavior decreased for both participants when extinction and DRO were introduced, regardless of whether visual schedules were also used.

DESCRIPTORS: autism, differential reinforcement, extinction, problem behavior, transitions, visual schedules

603

657

ADVANCE WARNING RESEARCH

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2005, 38, 235–238 NUMBER 2 (SUMMER 2005)

THE EFFECTS OF ANTECEDENT INTERVENTIONS AND EXTINCTION ON TODDLERS' COMPLIANCE DURING TRANSITIONS

CATHERINE A. COTE, RACHEL H. THOMPSON, AND PAIGE M. MCKERCHAR

UNIVERSITY OF KANSAS

We compared the effects of two antecedent strategies commonly used in early childhood settings to increase compliance during activity transitions: a warning condition, in which children were informed of the transition 2 min before it began, and a condition in which children were allowed access to a toy during the transition. Both antecedent interventions were ineffective when implemented alone; however, when these strategies were combined with extinction, improvements in compliance were observed for all children.

DESCRIPTORS: compliance, extinction, transitions, warnings

604

658

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2006, 39, 103–107 NUMBER 1 (SPRING 2006)

BRIEF FUNCTIONAL ANALYSIS AND TREATMENT OF TANTRUMS ASSOCIATED WITH TRANSITIONS IN PRESCHOOL CHILDREN

DAVID A. WILDER, LIYU CHEN, JULIE ATWELL, JOSH PRITCHARD, AND PHILLIP WEINSTEIN

FLORIDA INSTITUTE OF TECHNOLOGY

A brief functional analysis was used to examine the influence of termination of prechange activities and initiation of postchange activities on tantrums exhibited by 2 preschool children. For 1 participant, tantrums were maintained by access to certain (pretransition) activities. For a 2nd participant, tantrums were maintained by avoidance of certain task initiations. Although advance notice of an upcoming transition was ineffective, differential reinforcement of other behavior plus extinction reduced tantrums for both participants.

DESCRIPTORS: brief functional analysis, preschool children, transitions

605

659

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2010, 43, 751–755 NUMBER 4 (WINTER 2010)

AN EVALUATION OF ADVANCE NOTICE TO INCREASE COMPLIANCE AMONG PRESCHOOLERS

DAVID A. WILDER, KATIE NICHOLSON, AND JANELLE ALLISON

FLORIDA INSTITUTE OF TECHNOLOGY

Advance notice of an upcoming instruction was evaluated to increase compliance among 3 children (4 to 5 years old) who exhibited noncompliance. Results show that the procedure was ineffective for all 3 participants. Advance notice plus physical guidance or physical guidance alone was necessary to increase compliance.

Key words: advance notice, noncompliance, physical guidance, preschoolers, warning

606

660

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2010, 43, 601–613 NUMBER 4 (WINTER 2010)

FURTHER EVALUATION OF ANTECEDENT INTERVENTIONS ON COMPLIANCE: THE EFFECTS OF RATIONALES TO INCREASE COMPLIANCE AMONG PRESCHOOLERS

DAVID A. WILDER, JANELLE ALLISON, KATIE NICHOLSON, O. ELIZABETH ABELLON, AND RENEE SAULNIER

FLORIDA INSTITUTE OF TECHNOLOGY

Functional analyses were conducted to identify reinforcers for noncompliance exhibited by 6 young children. Next, the effects of rationales (statements that describe why a child should comply with a caregiver-delivered instruction) were evaluated. In Experiment 1, 3 participants received the rationales immediately after the therapist's instruction. In Experiment 2, 3 additional participants received more practical rationales immediately before the therapist's instruction. The results indicate that rationales were ineffective for all 6 children. A guided compliance procedure increased compliance for 1 child; contingent access to preferred items with or without response cost increased compliance for the other participants. Although levels of problem behavior varied within and across participants, they were often higher in the rationale and guided compliance conditions.

Key words: extinction, functional analysis, guided compliance, noncompliance, preschool children, rationales

607

661

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1998, 31, 679–682 NUMBER 4 (WINTER 1998)

EFFECTS OF WARNING STIMULI FOR REINFORCER WITHDRAWAL AND TASK ONSET ON SELF-INJURY

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LEHIGH UNIVERSITY

AND

F. CHARLES MACE

UNIVERSITY OF PENNSYLVANIA

Results of a functional analysis of self-injurious behavior (SIB) in a child with autism showed that her SIB was maintained by access to preferred objects and escape or avoidance of task demands. Extinction and noncontingent reinforcement treatments were supplemented by presenting a statement combined with a picture cue at 30-s intervals indicating that a preferred object would be removed or a task would be presented. Warning stimuli in combination with extinction and noncontingent reinforcement reduced SIB to acceptable levels. SIB rates remained comparatively high in a control condition consisting of a 2-min delay to onset of reinforcer removal or task demands.

DESCRIPTORS: self-injury, functional analysis in schools, warning stimuli, treatment supplement

This paper suggests that warning signals, visual and auditory alone may not be effective but when extinction and reinforcement is added the schedules may increase the effectiveness of those procedures. Only 1 subject in this study.

608

662

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2001, 34, 195–210 NUMBER 2 (SUMMER 2001)

FUNCTIONAL ANALYSIS AND TREATMENT OF SELF-INJURY ASSOCIATED WITH TRANSITIONS

BRANDON E. MCCORD AND RICHARD J. THOMSON
ARLINGTON DEVELOPMENTAL CENTER
AND
BRIAN A. IWATA
THE UNIVERSITY OF FLORIDA

We applied functional analysis methodology to the assessment and treatment of 2 individuals' self-injurious behavior (SIB), which was reported to be occasioned by transitions from one activity or location to another. A structural (task) analysis of activity transitions identified at least three separate components that might influence behavior either alone or in combination: (a) termination of a prechange activity, (b) initiation of a postchange activity, and (c) movement from one location to another. Results of preference and avoidance assessments were used to identify activities to which participants were exposed in varying arrangements during transitions in a functional analysis. Results of 1 participant's functional analysis indicated that his SIB was maintained by avoidance of having to change locations, regardless of the activity terminated prior to the change or the activity initiated following it. The 2nd participant's analysis revealed the same function but also an additional one: avoidance of certain task initiations. This information was used to identify transition contexts during intervention and to design treatment procedures appropriate for a given context and behavioral function. A procedure involving advance notice of an upcoming transition had no effect on SIB, and differential reinforcement of alternative behavior (DRA) had limited effects in the absence of extinction. Sustained decreases in SIB were observed when DRA was combined with extinction and response blocking. Further extensions of functional analysis methodology to the assessment of problem behavior in situations characterized by multiple or protracted stimulus changes are discussed.

DESCRIPTORS: activity transitions, advance notification, avoidance assessment, differential reinforcement, extinction, functional analysis, preference assessment, response blocking, self-injurious behavior

Social Stories

- Social Stories are frequently suggested as treatments for problem behavior of children with autism.
- Although there have been some studies to suggest that this treatment might be successful with some children with autism with advanced skills (Scattone et al., 2006)
- A recent review of this treatment led the authors of the Maine document discussed previously to conclude that this treatment has weak support.

Psychotropic Medications

- Finally, there is evidence that some medications to treat some of the problem behaviors associated with autism may be helpful (See next slide)
- However, almost every prescriber of these medications knows that effects of these medications alone are not sufficient to produce a clinically significant treatment effect. Therefore when these medications are administered within a program that includes the behavior analytic interventions we will be discussing today a substantial treatment effect can be achieved

This recent paper in *JABA* supports the notion that medications alone may not be sufficient to reduce problem behavior. This study is not with children with autism.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2009, 42, 177–183 NUMBER 1 (SPRING 2009)

EFFECTS OF STIMULANT MEDICATION UNDER VARIED MOTIVATIONAL OPERATIONS

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ARAN HALL SCHOOL

LORA PERRY
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AND

DUNCAN PRITCHARD
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We evaluated the evocative effects of four conditions (high- and low-preference activities, low and divided attention) and stimulant medication on the behavior of a 16-year-old boy with attention deficit hyperactivity disorder and moderate mental retardation. All behavior (activity engagement, activity changes, inappropriate touching, rude behaviors, and physical aggression) improved with stimulant medication in most conditions, but undesirable behaviors were not reduced to acceptable levels in all conditions. This finding suggests that stimulant medication may be a valuable adjunct to function-based interventions.
DESCRIPTORS: motivating operations, stimulant medication, attention deficit hyperactivity disorder

611

665

Psychotropic Medications

Table 2: Psychotropic Medications Studied in Children and Youth with ASD

Class	Medication (Brand name)	Level of Evidence	Target Symptoms	Significant Potential Side Effects	Studies
Antipsychotics	Risperidone (Risperidal)	Established Evidence	Irritability, hyperactivity, and stereotypy	Weight gain, drooling, dizziness, fatigue, involuntary muscle movement	(Jesner, Aref-Adib, & Coren, 2007; McDougle, et al., 2005; Miral, et al., 2008; RUPP, 2002)
	Haloperidol (Haldol)	Established Evidence	Aggression	Tardive dyskinesia, sedation, irritability	(Anderson, et al., 1989; Anderson, et al., 1984)
Stimulants	Methylphenidate (Ritalin)	Established Evidence	Hyperactivity	Social withdrawal, irritability, agitation, stereotypy	(Handen, Johnson, & Lubetsky, 2000; Quitana, et al., 1995)

Copied from p. 34 of the "Report of the Children's Services Evidence-Based Practice Advisory Committee" (2009).

612

666

Problem Behavior Reduction

- The protocol for reducing the problem behavior of persons with developmental disabilities is well established in the behavior analytic research. For a review of the literature see Hanley, Iwata, and McCord (2003).
- By conducting a functional assessment, the determiners of problem behavior can be identified and treatments to reduce the problem behavior can be tailored to the evoking and maintaining conditions.

667

DATA COLLECTION

Record all instances of problem behavior using sequence analysis cards.

1. Sort cards by antecedent category and count frequency by antecedents.
2. Use the Problem Behavior Summary Sheet to record by antecedents.
3. Graph these baseline data by frequency and by antecedents.
   - "Total Frequency and Cumulative Duration of Problem Behavior"
   - "Total Frequency of Problem Behavior by Antecedent"
4. Choose treatment based upon tentative analysis of the function determined by the antecedent triggers or suspected evoking motivational conditions. Use the data gathered during the treatment phase to verify the function and to make adjustments in the treatments.

668

ABC Data Sheet

Name: Joey Date: 12.4.06

Antecedent	Behavior	Consequence
X Interruption/Transition	❑ Crying	X Deny access from reinforcer and physically guide to comply
☐ Told NO	☒ Whining	☐ Do not attend to problem behavior
☐ Wants something can have	☒ Screaming	☐ Count & Mand
☐ Out of the Blue	❑ Flopping	☐ Do not attend to problem behavior and block access
☐ Other (describe) _____	❑ Bolting	☐ Other
		Duration: 32sec

Antecedent	Behavior	Consequence
☐ Interruption/Transition	☒ Crying	☐ Deny access from reinforcer and physically guide to comply
X Told NO	❑ Whining	X Do not attend to problem behavior
☐ Wants something can have	❑ Screaming	☐ Count & Mand
☐ Out of the Blue	☒ Flopping	☐ Do not attend to problem behavior and block access
☐ Other (describe) _____	❑ Bolting	☐ Other
		Duration: 1min

669

ABC Data Sheet

Name: Joey Date: 3.6.06

Antecedent	Behavior	Consequence
☐ Interruption/Transition	☒ Crying	☐ Deny access from reinforcer and physically guide to comply
☐ Told NO	☒ Whining	☐ Do not attend to problem behavior
X Wants something can have	❑ Screaming	X Count & Mand
☐ Out of the Blue	❑ Flopping	☐ Do not attend to problem behavior and block access
☐ Other (describe) _____	❑ Bolting	☐ Other
		Duration: 2min, 20sec

Antecedent	Behavior	Consequence
☐ Interruption/Transition	☒ Crying	☐ Deny access from reinforcer and physically guide to comply
☐ Told NO	❑ Whining	☐ Do not attend to problem behavior
☐ Wants something can have	❑ Screaming	☐ Count & Mand
X Out of the Blue	☒ Flopping	X Do not attend to problem behavior and block access
☐ Other (describe) _____	❑ Bolting	☐ Other
		Duration: 5 min

670

Record all instances and duration of episodes of problem behavior using sequence analysis cards.

This may include recording **duration** of the problem behavior if that more accurately represents the important dimension of the behavior. For example some tantrums may only occur a few times a day but last for long periods of time.

Examples of sequence analysis cards for recording occurrences and duration are on the following slides.

Baseline
Sequence Analysis Card

Name		**Date:** _____ **Time:**_____
Antecedent	**Behavior**	**Consequence**
❑ Interruption/Transition	❑ Crying	❑ Physically guide to comply
❑ Access Denied/ Told "no"	❑ Whining	❑ Ignored problem behavior
❑ Wants something	❑ Screaming	❑ Count and mand procedure
❑ Sensory Reinforcement is valuable	❑ Flopping	❑ Block access to reinforcement
	❑ Grabbing	❑ Deny access to reinforcer and physically guide to comply with demand
❑ Demand @ Table	❑ Bolting	
❑ Demand in NET	❑ Biting	❑ Escape Extinction
❑ MO is Unclear/Out of the Blue ❑ Other	❑ Hitting	❑ Other Duration:_____
	❑ Kicking	
	❑ Other	

Name		Date: _____ Time:_____
Antecedent	**Behavior**	**Consequence**
❑ Interruption/Transition ❑ Demand (Teach Functional Equivalent)	❑ Crying	❑ Interruption /Transition Protocol ❑ Teach Functional Equivalent Protocol ❑ Physically guide to comply
❑ Told "NO"/Denied Access	❑ Whining	❑ "Told No" Protocol
❑ Motivation Strong but Mands Inappropriately	❑ Screaming	❑ Count and Mand Protocol
❑ Demand During Activities	❑ Flopping ❑ Grabbing	❑ Demand During Activity Protocol
❑ Demand During DTI ❑ Automatic Reinforcement is High in Value	❑ Bolting	CMO-R Protocol ❑ "Stim as Reinforcer " Protocol ❑ RIRD Protocol ❑ Ignored problem behavior
❑ Out of the Blue- Usually Mand for attention, items or enriched environment	❑ Biting ❑ Non-Functional Vocalizations ❑ Head Hitting ❑ Face Slaps	❑ Out of the Blue" Protocol ❑ Extinction ❑ Remind of Reinforcer ❑ Remove Demand ❑ Block access to reinforcement
	❑ Hitting	❑ Other
❑ Other: _____	❑ Kicking ❑ Other	Duration:_____

Developed by Vincent J. Carbone, Ed.D., BCBA-D, & Staff

STEP # 2 ---Analyze the Data

1. Sort cards by antecedent category and identify frequency and duration by antecedents.

2. Record the frequency and duration on the Summary Sheet.

Name_____

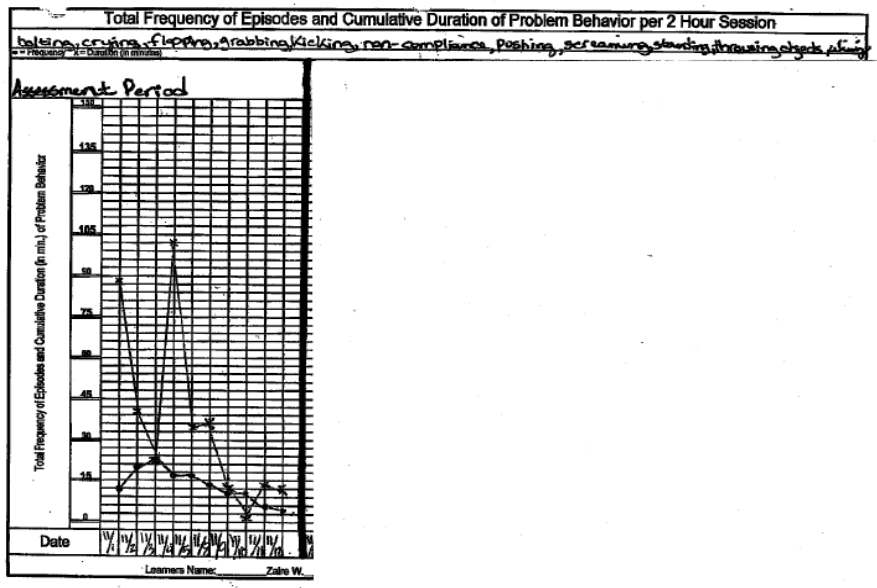
PROBLEM BEHAVIOR SUMMARY DATA SHEET
ACROSS ANTECEDENTS

Date	11/1	11/2	11/3	11/4	11/5	11/8	11/9	11/10	11/11	11/12	Totals per Antecedent/ Duration
Interruption	1	0	4	0	2	0	0	3	1	1	12
Denied access (Told No")	0	1	2	1	0	0	0	2	0	0	6
Wants something (Mands Inappropriately)	4	14	7	8	7	5	4	3	3	2	57
Demand at table	5	0	8	4	3	3	4	1	2	0	30
Demand in NET	0	4	1	3	1	0	1	0	0	0	10
Sensory Reinforcement is Valuable	0	0	0	0	0	0	0	0	0	0	0
MO is unclear	2	1	1	1	4	5	1	2	0	1	18
Total frequency	12	20	23	17	17	13	10	11	6	4	133
Cumulative Duration of Behavior	88:36	40:26	22:13	102:18	35:52	36:26	12:58	2:01	13:41	12:20	6:06:51

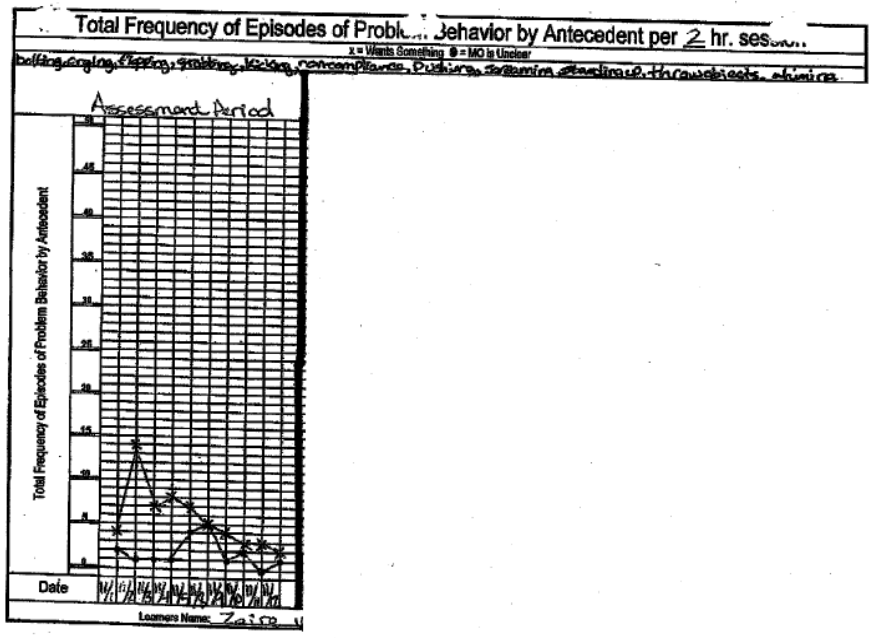
675

3. Graph these baseline data on a line graph by frequency, duration and by antecedents.

676


Total Frequency of Episodes and Cumulative Duration of Problem Behavior per 2 Hour Session
Assessment Period
Total Frequency of Episodes and Cumulative Duration (in min.) of Problem Behavior
Date
Learners Name: Zaire W.

677


Total Frequency of Episodes of Problem Behavior by Antecedent per 2 hr. session
x = Wants Something ⊕ = MO is Unclear
Assessment Period
Total Frequency of Episodes of Problem Behavior by Antecedent
Date
Learners Name: Zaire

678

Major Functions of Behavior

Each of the antecedent conditions listed on the sequence analysis cards suggest a possible function. They match up in the following manner:

1. **Socially Mediated Positive Reinforcement (SMPR)**

"Told No/Denied Access"
"MO Unclear- Out of Blue"
"Motivation is Strong, But Mands Inappropriately"
"Interruption" Part of "Interruption/Transition"

2. **Socially Mediated Negative Reinforcement (SMNR)**

"Demand During Discrete Trial Instruction"
"Demand During Activities"
"Transition" Part of "Interruption/Transition"
"Demand" (Teaching a Functional Equivalent)

3. **Automatic Positive Reinforcement**

"Automatic Reinforcement has High Value" (2 Procedures)

679

SELECTING INTERVENTIONS AND COMPONENTS OF A SUCCESSFUL BEHAVIOR PLAN

The research literature suggests that every successful behavior plan will include the following strategies:

- Eliminate the behaviors motivating operation (MO Modifications)
- Terminate the behaviors contingency of reinforcement (Extinction)
- Replace the behavior with an alternative response (Differential Reinforcement)

680

PROTOCOLS TO REDUCE PROBLEM BEHAVIOR

Demand During Daily Activities

OBJECTIVE OF THE
Demand During Daily Activities :

This is a program to reduce escape motivated behavior during daily activities.

Empirical support:

Carbone, Mogenstern, Zecchin-Tiri & Kolberg, 2010.
DeLeon, I. G., Neidert, P. L., Anders, B. M., &
Rodriguez-Catter, V. (2001).
Kodak, T., Lerman, D. C., Volkert, V. M., & Trosclair, N. (2007).
Lalli, J. S., Vollmer, T. R., Progar, P. R., Wright, C.,
Borrero, J., Daniel, D., et al. (1999)
Lerman & Iwata (1996)

Demand During Daily Activities

CANDIDATES FOR THE Protocol:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by a history of removal of demands acting as a form of reinforcement.

"Automatic Reinforcement is Valued- "Stim as a Reinforcer" --Protocol

OBJECTIVE OF THE "Stim as Reinforcer" Protocol During Discrete Trial Instrucion :

This is a program to reduce self-stimulatory behavior during discrete trial instruction.

Empirical support:
Charlop-Christy et al. 1990
Wolery, Kirk & Gast (1985)
Hung (1978)
Sugai & White (1986)
Charlot-Christy & Haymes (1986)
Hanley, Iwata, Thompson & Lindberg (2000)
Potter, Hanley, et al. (2013)

"Stim as Reinforcer" Protocol

CANDIDATES FOR THE Protocol:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by automatic reinforcement during discrete trial instruction.

685

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1990, 23, 163–181 NUMBER 2 (SUMMER 1990

USING ABERRANT BEHAVIORS AS REINFORCERS FOR AUTISTIC CHILDREN

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CLAREMONT MCKENNA COLLEGE
PATRICIA F. KURTZ
CLAREMONT GRADUATE SCHOOL
AND
FRAN GREENBERG CASEY
THE GEORGE WASHINGTON UNIVERSITY

In a series of experiments, we assessed the efficacy of using autistic children's aberrant behaviors as reinforcers to increase their correct task responding. In Experiment 1, reinforcer conditions of stereotypy, food, and varied (food or stereotypy) were compared. In Experiment 2, the conditions were delayed echolalia, food, and varied (food or delayed echolalia), and in Experiment 3, perseverative behavior was compared with stereotypy and food as potential reinforcers. A multielement design was used for all comparisons, and side-effect measures were recorded during and after teaching sessions as well as at home. Results indicated that, in general, task performance was highest when brief opportunities to engage in aberrant behaviors were provided as reinforcers. Edibles were associated with the lowest performance. Furthermore, no negative side effects (e.g., an increase in aberrant behaviors) occurred. The results are discussed in terms of suggesting a more pragmatic treatment approach by addressing the contingent use of autistic children's aberrant behaviors as reinforcers.

DESCRIPTORS: autism, aberrant behaviors, stereotypy, delayed echolalia, perseverative behavior

665

686

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2000, **33,** 285–297 NUMBER 3 (FALL 2000)

A COMPONENT ANALYSIS OF "STEREOTYPY AS REINFORCEMENT" FOR ALTERNATIVE BEHAVIOR

GREGORY P. HANLEY, BRIAN A. IWATA,
RACHEL H. THOMPSON, AND JANA S. LINDBERG
THE UNIVERSITY OF FLORIDA

Results from several studies have suggested that the opportunity to engage in stereotypic behavior may function as reinforcement for alternative, more socially desirable behaviors. However, the procedural components of this intervention include several distinct operations whose effects have not been analyzed separately. While measuring the occurrence of stereotypy and an alternative behavior (manipulation of leisure materials), we exposed 3 participants to three or four components of a ''stereotypy as reinforcement'' contingency: (a) continuous access to materials, (b) prompts to manipulate materials, (c) restricted access to stereotypy (i.e., response blocking), and (d) access to stereotypy contingent on manipulating the materials. Continuous access to materials and prompting (a and b) produced negligible results. Restriction of stereotypy (c) produced a large increase in the alternative behavior of 2 participants, suggesting that response restriction per se may occasion alternative behavior. However, contingent access to stereotypy (d) was necessary to increase the 3rd participant's object manipulation; this finding provided some support for the use of stereotypy as reinforcement for alternative behavior. Finally, when transfer of the effects of intervention was assessed during periods in which active intervention components were withdrawn, the alternative behavior was maintained for 1 participant.
DESCRIPTORS: stereotypy, alternative behavior, play, preference, reinforcer assessment, maintenance, functional analysis, restriction, contingency, Premack principle

✓ Enriched environment and Prompting alt behavior NOT Effective
✓ Blocking (EXT) plus Stim as Reinforcer was effective.

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2013, **46,** 407–423 NUMBER 2 (SUMMER 2013)

TREATING STEREOTYPY IN ADOLESCENTS DIAGNOSED WITH AUTISM BY REFINING THE TACTIC OF "USING STEREOTYPY AS REINFORCEMENT"

JACQUELINE N. POTTER
NEW ENGLAND CENTER FOR CHILDREN AND WESTERN NEW ENGLAND UNIVERSITY

GREGORY P. HANLEY
WESTERN NEW ENGLAND UNIVERSITY

MATOTOPA AUGUSTINE
NEW ENGLAND CENTER FOR CHILDREN AND WESTERN NEW ENGLAND UNIVERSITY

AND

CASEY J. CLAY AND MEREDITH C. PHELPS
NEW ENGLAND CENTER FOR CHILDREN

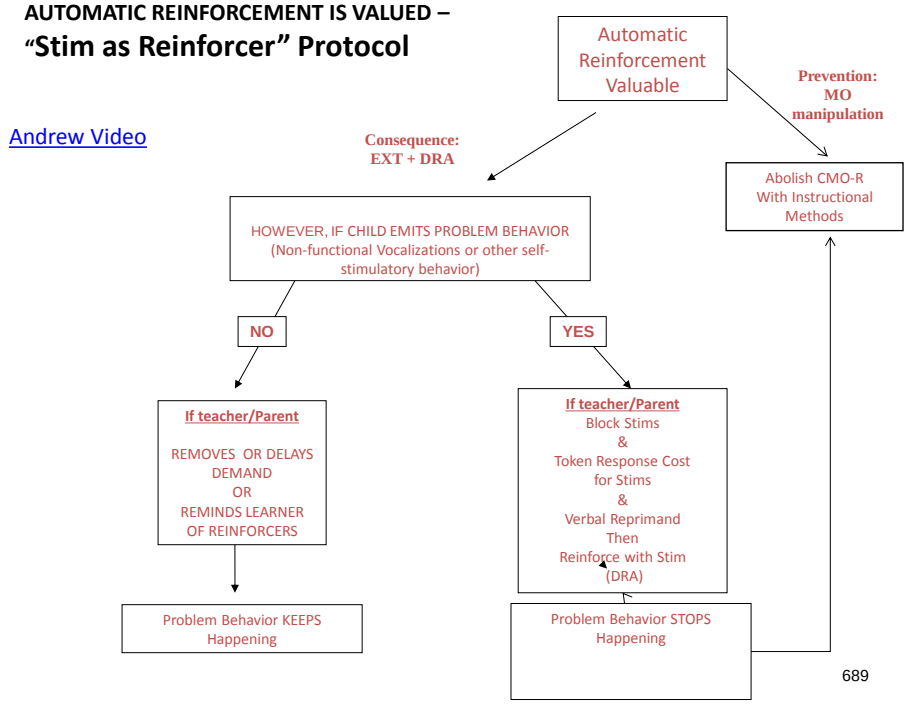
Use of automatically reinforced stereotypy as reinforcement has been shown to be successful for increasing socially desirable behaviors in persons with intellectual disabilities (Charlop, Kurtz, & Casey, 1990; Hanley, Iwata, Thompson, & Lindberg, 2000; Hung, 1978). A component analysis of this treatment was conducted with 3 adolescents who had been diagnosed with autism, and then extended by (a) progressively increasing the quantitative and qualitative aspects of the response requirement to earn access to stereotypy, (b) arranging objective measures of client preference for contingent access to stereotypy compared to other relevant treatments for their automatically reinforced stereotypy, and (c) assessing the social validity of this treatment with other relevant stakeholders. Implications for addressing stereotypy and increasing the leisure skills of adolescents with autism are discussed.
Key words: autism, automatic reinforcement, differential reinforcement, engagement, leisure skills, play, social validity, stereotypy

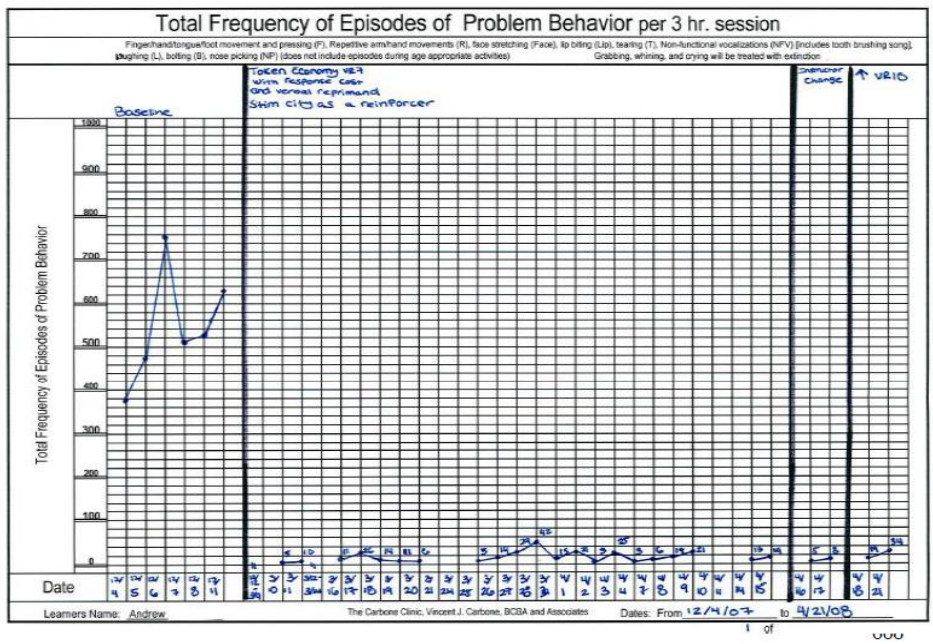
✓ Replicates Previous ~~Results and Exends~~ to Preference
✓ No One Preferred Blocking-Only Condition
✓ Two of Three Preferred Contingent Access to Non-Contingent Access (More SR+)

AUTOMATIC REINFORCEMENT IS VALUED –

"Stim as Reinforcer" Protocol

Andrew Video





Automatic Reinforcement is Valued- Rituals, Compulsions and Obsessions

Objective the Protocol

These are procedures to reduce ritualistic behaviors, compulsions and obsessions maintained by automatic reinforcement.

Empirical Support

Yanerys, L. et al. (2013)

Rodriquez N.M. et al. (2013)

Automatic Reinforcement is Valued- Rituals, Compulsions and Obsessions

Candidates for These Procedures:

Following a descriptive analysis a learner whose ritualistic and obsessional behaviors are maintained by

automatic reinforcement

Journal of Applied Behavior Analysis

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2013, **46,** 507–511 NUMBER 2 (SUMMER 2013)

ASSESSMENT OF PROBLEM BEHAVIOR EVOKED BY DISRUPTION OF RITUALISTIC TOY ARRANGEMENTS IN A CHILD WITH AUTISM

YANERYS LEON, WILLIAM N. LAZARCHICK, AND GRIFFIN W. ROOKER

KENNEDY KRIEGER INSTITUTE

AND

ISER G. DELEON

KENNEDY KRIEGER INSTITUTE AND JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE

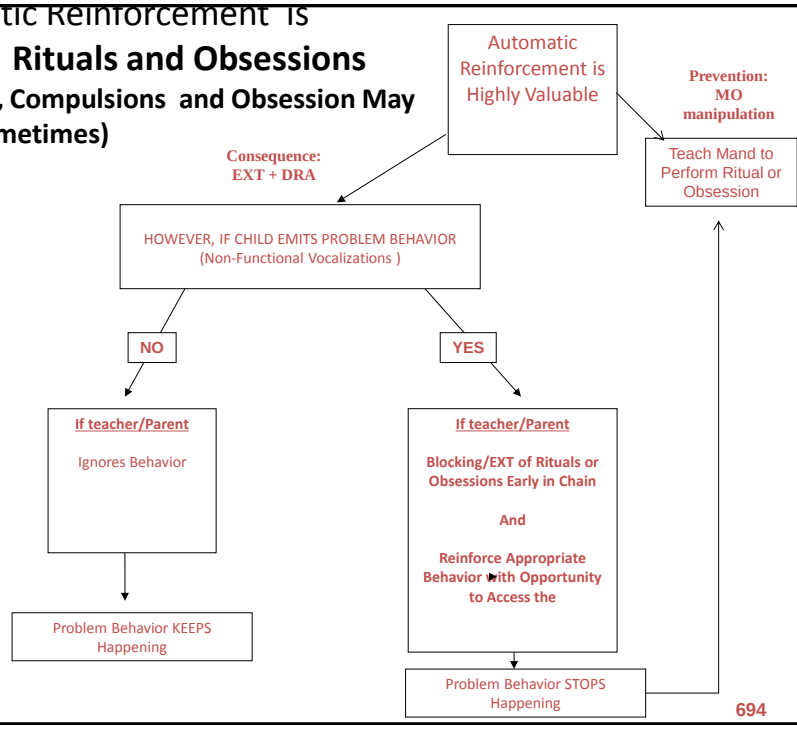
A functional analysis suggested that the problem behavior of a 9-year-old girl with autism was maintained by gaining the opportunity to restore ritualistic toy arrangements that had been disrupted. Functional communication training and extinction produced clear decreases in problem behavior in 2 contexts: 1 in which we removed a play item, and 1 in which we merely relocated the item and blocked its rearrangement.

Key words: behavior disorders, functional analysis, idiosyncratic variables, ritualistic behavior

Rituals May Occur

Automatic Reinforcement Is Valued- **Rituals and Obsessions**

(If Rituals, Compulsions and Obsession May Occur Sometimes)



JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2012, 45, 1–22 NUMBER 1 (SPRING 2012)

FUNCTIONAL ANALYSIS AND TREATMENT OF ARRANGING AND ORDERING BY INDIVIDUALS WITH AN AUTISM SPECTRUM DISORDER

NICOLE M. RODRIGUEZ AND RACHEL H. THOMPSON
WESTERN NEW ENGLAND COLLEGE

KEVIN SCHLICHENMEYER
NEW ENGLAND CENTER FOR CHILDREN

AND

COREY S. STOCCO
WESTERN NEW ENGLAND COLLEGE

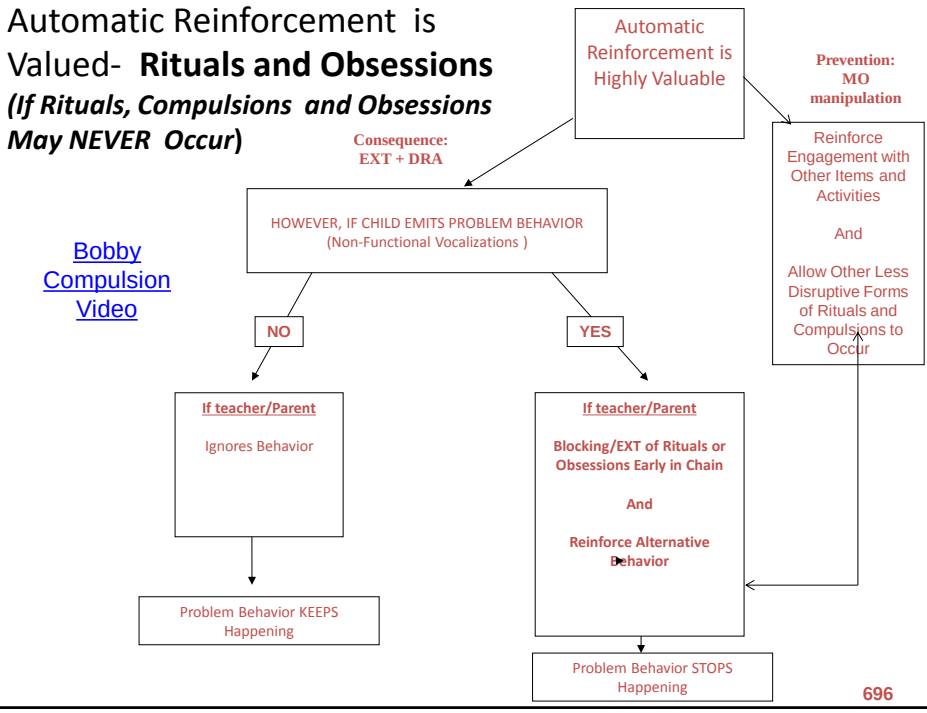
Of the diagnostic features of autism, relatively little research has been devoted to restricted and repetitive behavior, particularly topographically complex forms of restricted and repetitive behavior such as rigidity in routines or compulsive-like behavior (e.g., arranging objects in patterns or rows). Like vocal or motor stereotypy, topographically complex forms of restricted and repetitive behavior may be associated with negative outcomes such as interference with skill acquisition, negative social consequences, and severe problem behavior associated with interruption of restricted and repetitive behavior. In the present study, we extended functional analysis methodology to the assessment and treatment of arranging and ordering for 3 individuals with an autism spectrum disorder. For all 3 participants, arranging and ordering was found to be maintained by automatic reinforcement, and treatments based on function reduced arranging and ordering.

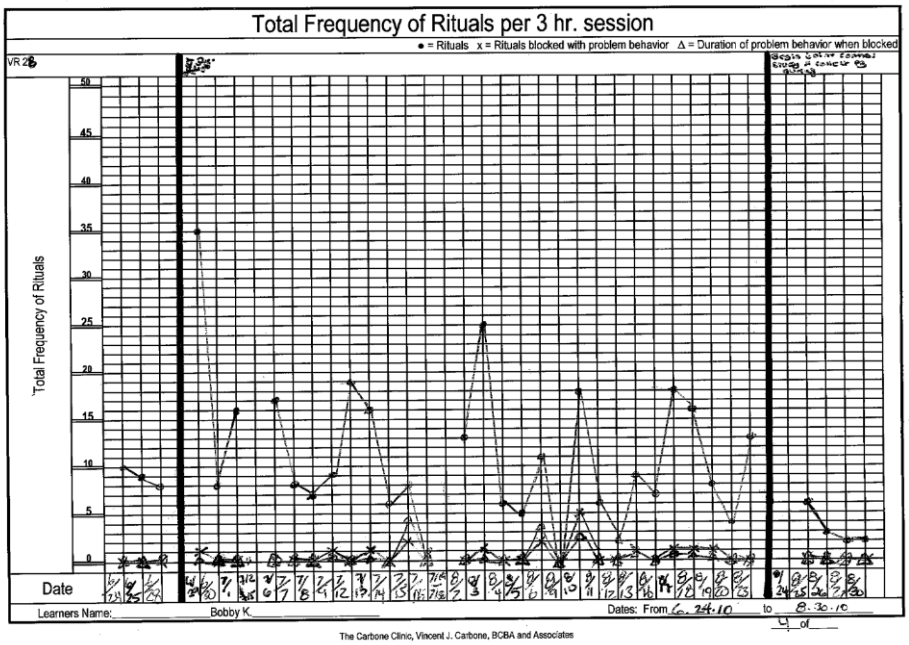
Key words: arranging and ordering, autism, cleaning, completeness, compulsive behavior, washing, functional analysis, higher level restricted and repetitive behavior

Rituals May NOT Occur

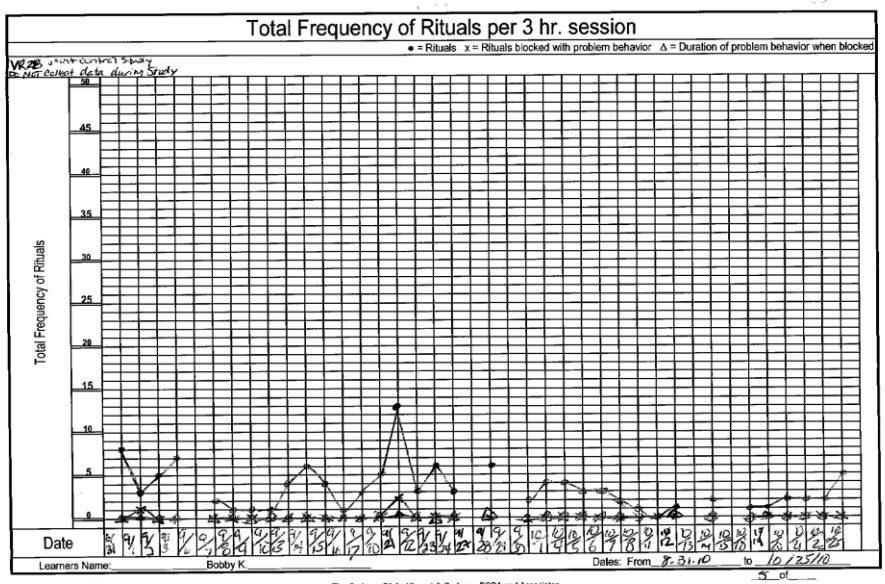
Automatic Reinforcement is Valued- **Rituals and Obsessions** ***(If Rituals, Compulsions and Obsessions May NEVER Occur)***

Bobby Compulsion Video

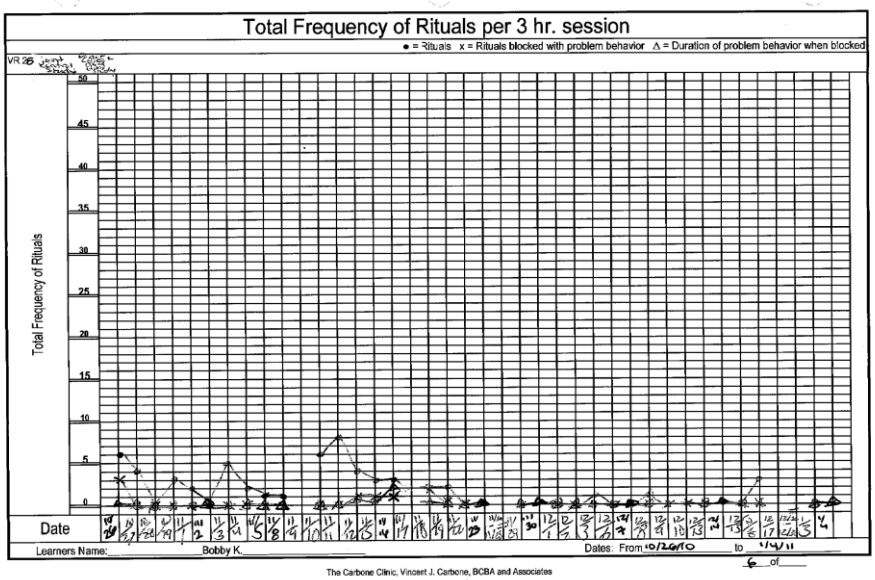



Total Frequency of Rituals per 3 hr. session
● = Rituals x = Rituals blocked with problem behavior Δ = Duration of problem behavior when blocked
VR 2
Total Frequency of Rituals
Date
Learners Name: Bobby K
Dates: From 6.24.10 to 8.30.10
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

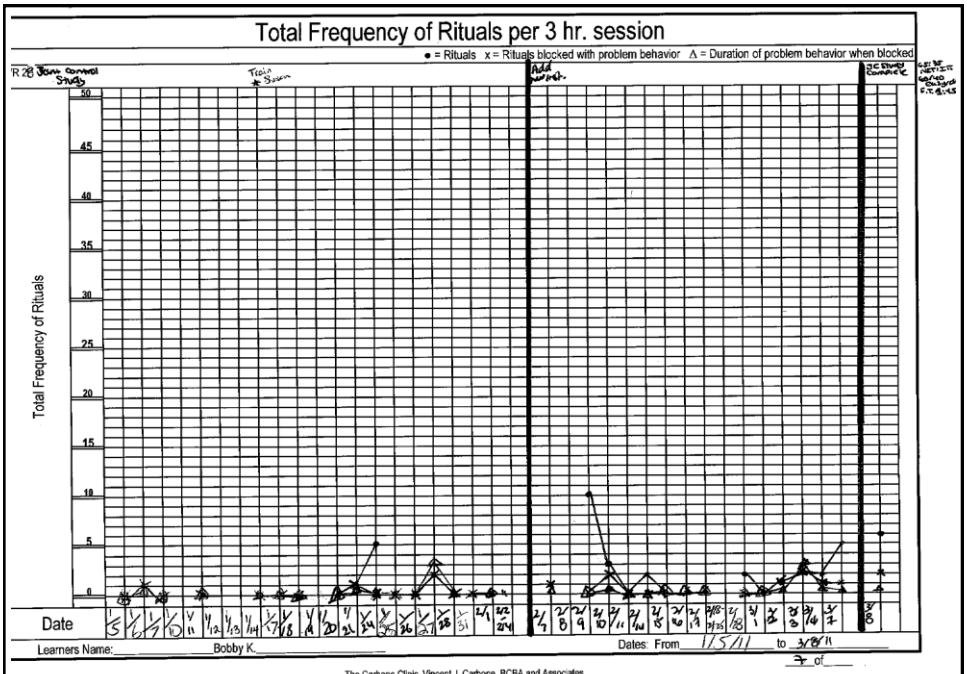
697


Total Frequency of Rituals per 3 hr. session
● = Rituals x = Rituals blocked with problem behavior Δ = Duration of problem behavior when blocked
VR2B
Total Frequency of Rituals
Date
Learners Name: Bobby K
Dates: From 8.31.10 to 10/25/10
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

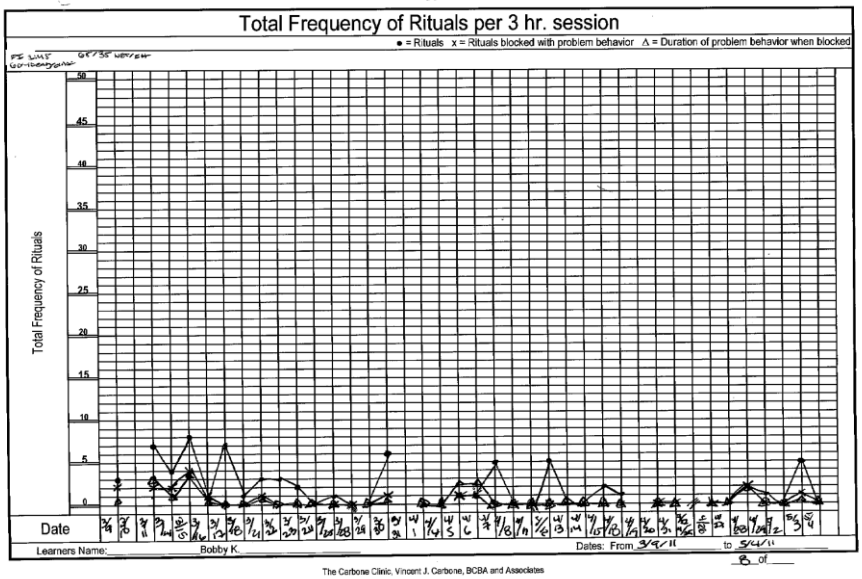
698


Total Frequency of Rituals per 3 hr. session
● = Rituals x = Rituals blocked with problem behavior Δ = Duration of problem behavior when blocked
Total Frequency of Rituals
Date
Learners Name: Bobby K.
Dates: From 10/20/10 to 1/4/11
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

699


Total Frequency of Rituals per 3 hr. session
● = Rituals x = Rituals blocked with problem behavior Δ = Duration of problem behavior when blocked
Total Frequency of Rituals
Date
Learners Name: Bobby K.
Dates: From 1/5/11 to 3/8/11
The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

700



Automatic Reinforcement is Valued--Response Interruption/Response Redirection (RIRD)-Protocol

OBJECTIVE OF THE RIRD PROTOCOL:

This is a program to reduce non-functional vocalizations and other self-stimulatory behaviors maintained by automatic reinforcement.

Empirical support:

Casella et al., 2011
Ahrens et al., 2011
Miguel et al., 2009
Schumacher & Rapp, 2011
Ahearns et al., 2007

Automatic Reinforcement is Valued—

Response Interruption/Response Redirection (RIRD)-Protocol

CANDIDATES FOR THE RIRD Protocol:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by automatic positive reinforcement.

703

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2007, 40, 263–275 NUMBER 2 (SUMMER 2007)

ASSESSING AND TREATING VOCAL STEREOTYPY IN CHILDREN WITH AUTISM

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NEW ENGLAND CENTER FOR CHILDREN AND NORTHEASTERN UNIVERSITY

AND

BO IN CHUNG

YONSEI UNIVERSITY

Previous research implies that stereotypic behavior tends to be maintained by the sensory consequences produced by engaging in the response. Few investigations, however, have focused on vocal stereotypy. The current study examined the noncommunicative vocalizations of 4 children with an autism spectrum disorder. First, functional analyses were conducted in an attempt to identify the function of each child's behavior. For each of the participants, it was found that vocal stereotypy was likely not maintained by the social consequences. Following assessment, response interruption and redirection (RIRD) was implemented in an ABAB design to determine whether vocal stereotypy could be successfully redirected. RIRD involved a teacher issuing a series of vocal demands the child readily complied with during regular academic programming. Vocal demands were presented contingent on the occurrence of vocal stereotypy and were continuously presented until the child complied with three consecutively issued demands without emitting vocal stereotypy. For each child, RIRD produced levels of vocal stereotypy substantially lower than those observed in baseline. For 3 of the children, an increase in appropriate communication was also observed. The children's teachers were trained to implement RIRD. Brief follow-up probes and anecdotal information implied that the treatment had a positive impact in the natural environment.

DESCRIPTORS: vocal stereotypy, automatic reinforcement, response interruption, autism

671

704

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 169–173 NUMBER 1 (SPRING 2011)

RESPONSE INTERRUPTION AND REDIRECTION FOR VOCAL STEREOTYPY IN CHILDREN WITH AUTISM: A SYSTEMATIC REPLICATION

MEGAN DUFFY CASSELLA AND TINA M. SIDENER
CALDWELL COLLEGE

DAVID W. SIDENER
GARDEN ACADEMY

AND

PATRICK R. PROGAR
CALDWELL COLLEGE

This study systematically replicated and extended previous research on response interruption and redirection (RIRD) by assessing instructed responses of a different topography than the target behavior, percentage of session spent in treatment, generalization of behavior reduction, and social validity of the intervention. Results showed that RIRD produced substantial decreases in vocal stereotypy. Limitations of this study were that behavior reduction did not generalize to novel settings or with novel instructors and that appropriate vocalizations did not improve.

Key words: stereotypy, response interruption and redirection, autism

672

705

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 95–108 NUMBER 1 (SPRING 2011)

FURTHER EVALUATION OF RESPONSE INTERRUPTION AND REDIRECTION AS TREATMENT FOR STEREOTYPY

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UNIVERSITY OF HOUSTON–CLEAR LAKE

TIFFANY KODAK
MUNROE-MEYER INSTITUTE
UNIVERSITY OF NEBRASKA MEDICAL CENTER

AND

APRIL S. WORSDELL AND COURTNEY KEEGAN
MAY INSTITUTE

The effects of 2 forms of response interruption and redirection (RIRD)—motor RIRD and vocal RIRD—were examined with 4 boys with autism to evaluate further the effects of this intervention and its potential underlying mechanisms. In Experiment 1, the effects of motor RIRD and vocal RIRD on vocal stereotypy and appropriate vocalizations were compared for 2 participants. In Experiment 2, the effects of both RIRD procedures on both vocal and motor stereotypy and appropriate vocalizations were compared with 2 additional participants. Results suggested that RIRD was effective regardless of the procedural variation or topography of stereotypy and that vocal RIRD functioned as a punisher. This mechanism was further explored with 1 participant by manipulating the schedule of RIRD in Experiment 3. Results were consistent with the punishment interpretation.

Key words: automatic reinforcement, punishment, response interruption and redirection, stereotypy

673

706

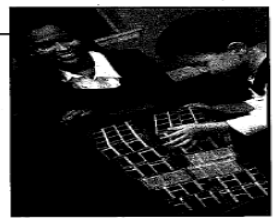
An Approach to Identifying the Conditions Under Which Response Interruption Will Reduce Automatically Reinforced Problem Behavior

Megan L. Kliebert, Jeffrey H. Tiger, and Karen A. Toussaint
Louisiana State University

ABSTRACT

Response interruption is a common intervention for problem behavior maintained by automatic reinforcement, but this intervention is challenging for caregivers to implement with consistent fidelity. In the current study, we challenged the integrity of response interruption across two participants by examining carry over into conditions in which the procedure was not implemented, by removing the presence of an interventionist, and by introducing delays to implementation. The results indicated that these challenges severely compromised treatment efficacy. Conditions under which response interruption procedures are likely to be effective and possible strategies to increase the effectiveness of response interruption are discussed.

Keywords: automatic reinforcement, carry-over effects, children, developmental disabilities, problem behavior, response interruption, stimulus control, treatment integrity



Automatic reinforcement describes an operant behavior–environment relation in which the maintaining reinforcers are a direct consequence of the behavior rather than the reinforcers being mediated by another person (Vaughan & Michael, 1982). The concept of automatic reinforcement has been particularly useful in the assessment of problem behavior because some problem behavior has been shown to be insensitive to the reactions of other members of the social environment and appear to be reinforced by the products of the behaviors themselves (Vollmer, 1994). For example, repetitive hand-flapping often occurs among individuals with autism and will persist even in the absence of social interaction. The concept of automatic reinforcement implies that the problem behavior *is* indeed operant (i.e., maintained by a source of reinforcement), but that the source of reinforcement may be the visual or tactile stimulation hand-flapping produces (Rincover, Cook, Peoples, & Packard, 1979).

Problem behaviors maintained by automatic reinforcement pose several challenges for practitioners. First, the general term automatic reinforcement does not specify the reinforcer type. Second, once identified, these sources of reinforcement are difficult to directly manipulate and control given automatic sources of reinforcement are rarely accessible to the practitioner. For instance, it is relatively easy for a practitioner to withhold their attention following the occurrence of problem behavior and to deliver attention contingent upon a more desirable behavior, as in a typical treatment for problem behavior maintained by attention (Iwata, Pace, Cowdery, & Miltenberger, 1994), but it is more challenging to withhold the sensory stimulation experienced by a client striking his head. If the reinforcers for problem behavior have not been identified or cannot be manipulated, satisfactory treatment effects may be difficult to produce.

A few interventions for this class of behavior have been shown to be effective. One such treatment, known as response interruption, involves a practitioner or caregiver remaining in close proximity to the client and manually interrupting the completion of the response (Ahearn, Clark, MacDonald, & Chung, 2007; Fisher, Lindauer, Alterson, & Thompson, 1998; Hanley, Iwata, Thompson, & Lindberg, 2000; Lalli, Livezey, & Kates, 1996; Lerman & Iwata 1996; McCord, Grosser, Iwata, & Powers, 2005; Reid, Parsen, Phillips, & Green, 1993; Slifer, Iwata, & Dorsey, 1984; Smith, Russo, & Le, 1999; Tiger, Hanley, & Bessette, 2006). For example, Reid et al. successfully reduced the stereotypic hand mouthing of two individuals with developmental disabilities by having a therapist place his or her hand in front of the participant's mouth, blocking the participant's hand from entering the mouth.

Although response interruption procedures have been successful treatment approaches for problem behavior maintained by automatic reinforcement, most studies have involved near perfect implementation of these procedures (i.e., immediate and constant implementation by a highly trained therapist who remains in close proximity to the participant). This sort of vigilance may be a challenge for implementation in classrooms and

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2013, **46**, 549–554 NUMBER 2 (SUMMER 2013)

RESPONSE INTERRUPTION AND REDIRECTION: CURRENT RESEARCH TRENDS AND CLINICAL APPLICATION

CATHERINE K. MARTINEZ AND ALISON M. BETZ

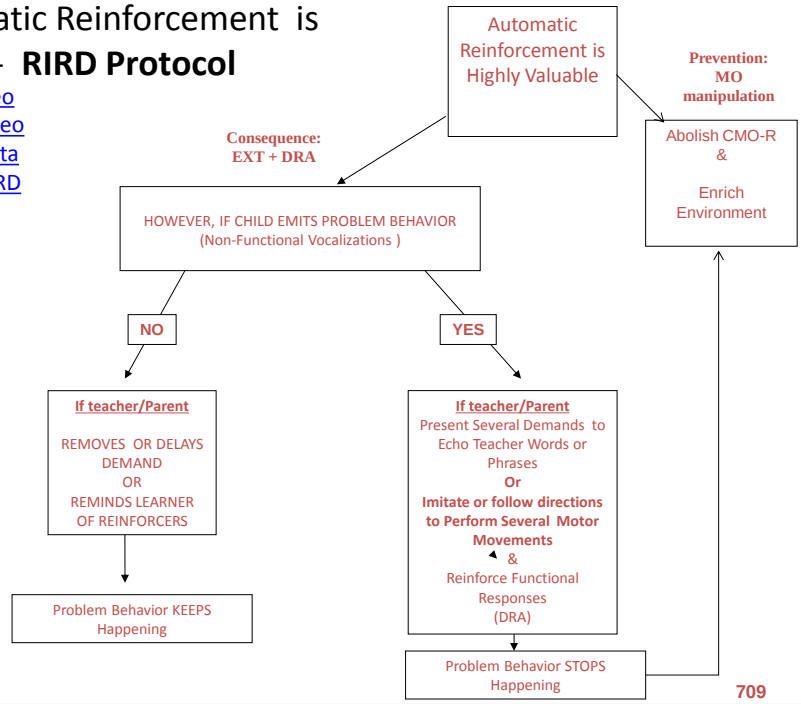
FLORIDA INSTITUTE OF TECHNOLOGY AND THE SCOTT CENTER FOR AUTISM TREATMENT

The objective of this paper is to provide a review of recent literature on response interruption and redirection (RIRD), a treatment for stereotypy. We discuss procedural variations and the potential mechanisms that are responsible for the effectiveness of RIRD. Clinical considerations and suggestions for future research are also discussed.

Key words: autism, redirection, response interruption, stereotypy

Automatic Reinforcement is Valued- **RIRD Protocol**

[Dan Video]
[Andre Video]
[Andre Data]
[Bobby RIRD]



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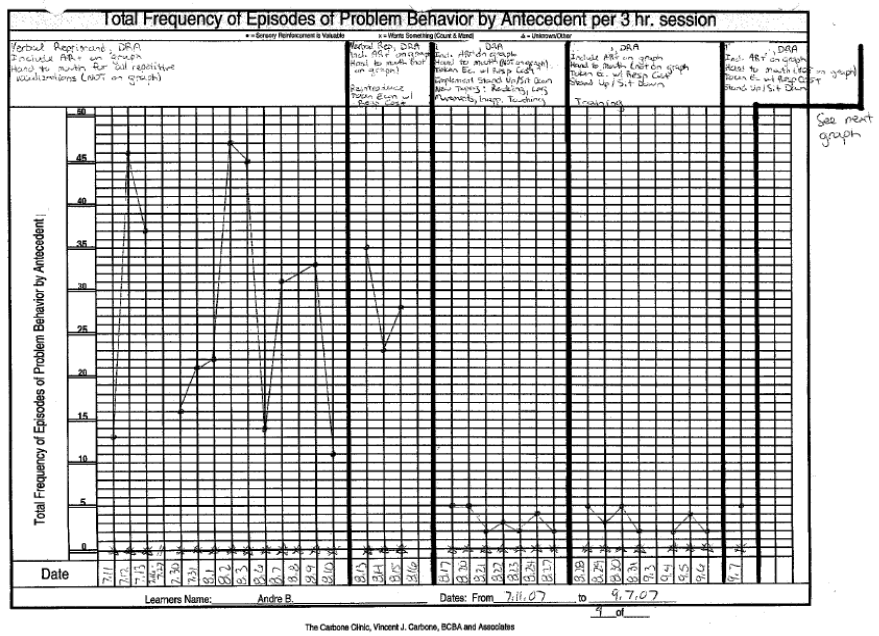

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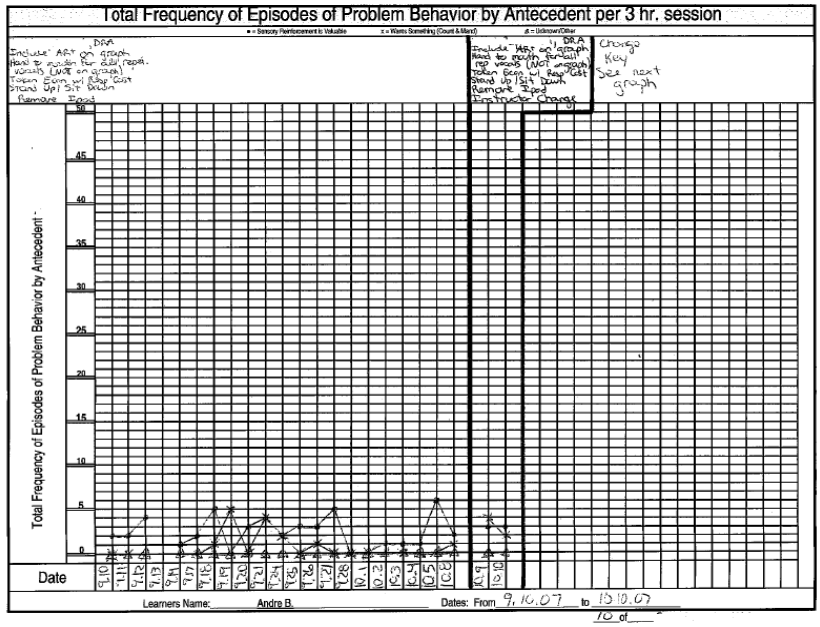
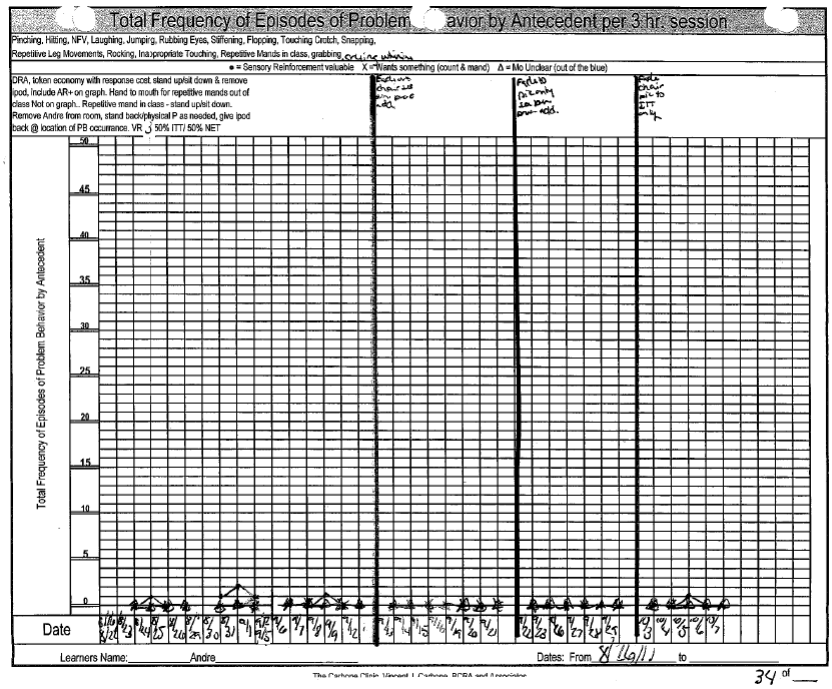


The Carbone Clinic, Vincent J. Carbone, BCBA and Associates

711



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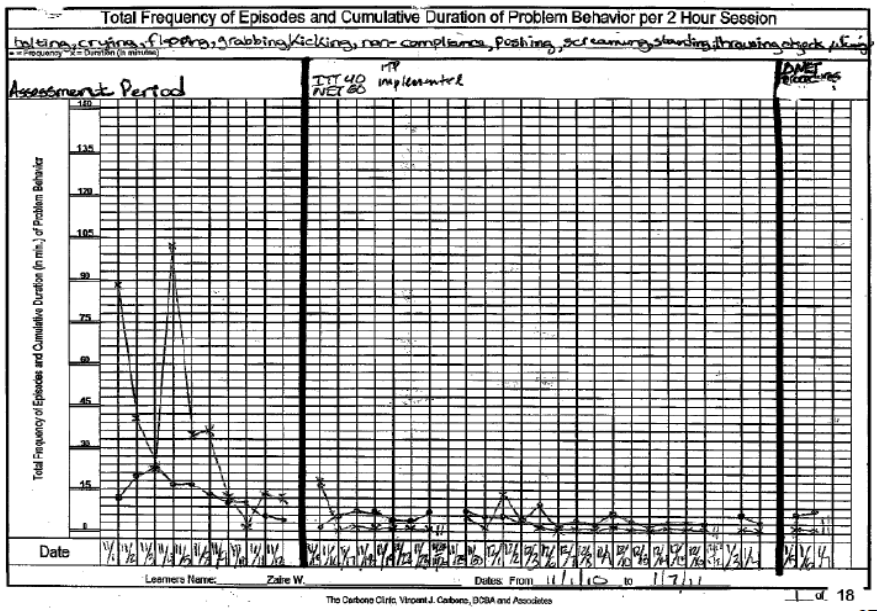

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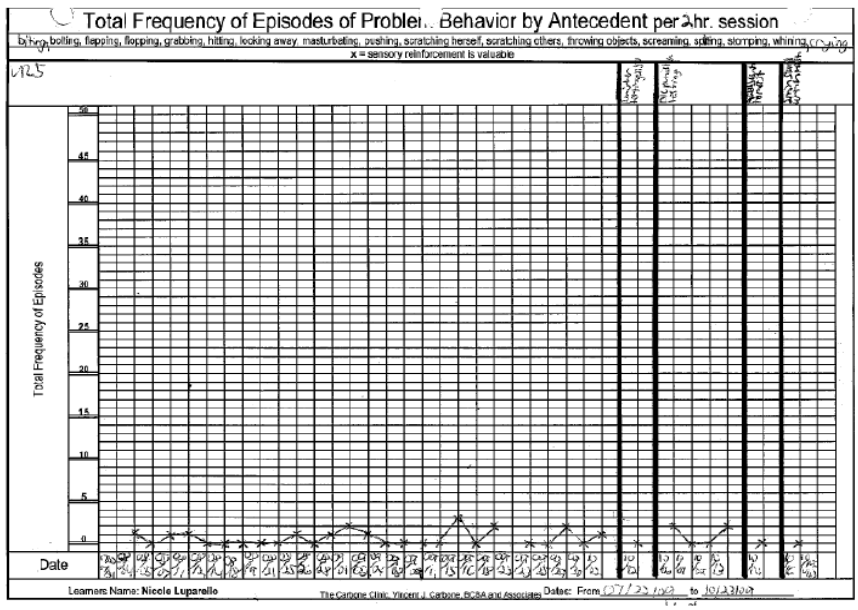

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714

Stimulus Control

- A few studies have also demonstrated the benefit of stimulus control procedures to reduce automatically reinforced stereotypies.
- On the next couple of slides are the abstracts of a couple of those research papers.

715

Behavioral Interventions
Behav. Intervent. **24**: 85–105 (2009)
Published online 19 February 2009 in Wiley InterScience
(www.interscience.wiley.com) **DOI**: 10.1002/bin.276

ESTABLISHING STIMULUS CONTROL OF VOCAL STEREOTYPY DISPLAYED BY YOUNG CHILDREN WITH AUTISM

John T. Rapp[1]*, Meeta R. Patel[2], Patrick M. Ghezzi[3], Christine H. O'Flaherty[3] and Craig J. Titterington[3]

[1]St. Cloud State University, St. Cloud, MN, USA
[2]Clinic 4 Kidz, Novato, CA, USA
[3]University of Nevada-Reno, Reno, NV, USA

We examined the vocal stereotypy of three boys who were diagnosed with an Autism Spectrum Disorder (ASD). Results of functional analyses indicated that each participant's vocal stereotypy was maintained by non-social consequences. For two participants, verbal reprimands were provided contingent on vocal stereotypy in the presence of a red card (RC). For the third participant, after verbal reprimands alone did not decrease vocal stereotypy, toys were withdrawn contingent on vocal stereotypy in the presence of the RC. For all three participants, vocal stereotypy was permitted without programmed consequences the presence of a green card (GC). The results showed that vocal stereotypy decreased in the presence of the RC for all three participants; however, vocal stereotypy came under inhibitory control of the RC for only one of the three participants. The potential utility of using punishment to develop stimulus control of automatically reinforced problem behavior in academic settings is briefly discussed. Copyright © 2009 John Wiley & Sons, Ltd.

716

Behavioral Interventions
Behav. Intervent. **26**: 231–242 (2011)
Published online in Wiley Online Library
(wileyonlinelibrary.com) **DOI**: 10.1002/bin.335

A STIMULUS CONTROL PROCEDURE TO DECREASE MOTOR AND VOCAL STEREOTYPY

Alison S. O'Connor, Jessica Prieto, Barbara Hoffmann, Jaime A. DeQuinzio* and Bridget A. Taylor
Alpine Learning Group, Paramus, NJ, USA

A changing criterion design was used to examine the effects of two stimuli (a green card and a red card), conditioned via discrimination training, on reducing motor and vocal stereotypy in a youngster with autism while he looked at books. During discrimination training, motor and vocal stereotypy was not interrupted in the presence of a green stimulus, but was interrupted in the presence of a red stimulus using manual guidance and appropriate behavior was reinforced. After the participant demonstrated successful discrimination of the stimuli (i.e., the absence of stereotypy in the presence of a red stimulus and the engagement in stereotypy in the presence of a green stimulus), intervention began. During intervention, upon meeting criterion for latency to engage in motor and vocal stereotypy in the presence of the red stimulus for a target duration, the participant was provided access to the green stimulus, which signaled that motor and vocal stereotypy would not be interrupted. The criterion latency to engage in stereotypy in the presence of the red stimulus was systematically increased. Simultaneously, the duration of access to the green stimulus was systematically decreased. The red and green stimuli were faded from poster boards to colored 10 × 10 cm cards, and stimulus control was generalized to the participant's classroom and to a community setting (i.e., public library). Results are discussed in terms of discrimination training as a useful intervention for reducing motor and vocal stereotypy. Copyright © 2011 John Wiley & Sons, Ltd.

Interruption/Transition Protocol

OBJECTIVE OF THE INTERRUPTION/TRANSITION PROTOCOL:

This is a program to teach replacement behaviors for problem behavior that was previously maintained by socially mediated positive and negative reinforcement

Empirical support:
Day, Rea, Schussler, Larsen, Johnson, 1988
McCord, Thomson, & Iwata, 2001
Mace & West, 1986
Wilder, Chen, Atwell, Pritchard, Weinstein 2006
Cote, Thompson, McKerchar 2005

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Cote, Thompson, McKerchar 2005

Interruption/Transition Protocol

CANDIDATES FOR THE INTERRUPTION/TRANSITION PROGRAM:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by a history of having demands removed and reinforcing items maintained following problem behavior. (SMNR and SMPR)

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2001, 34, 195–210 NUMBER 2 (SUMMER 2001)

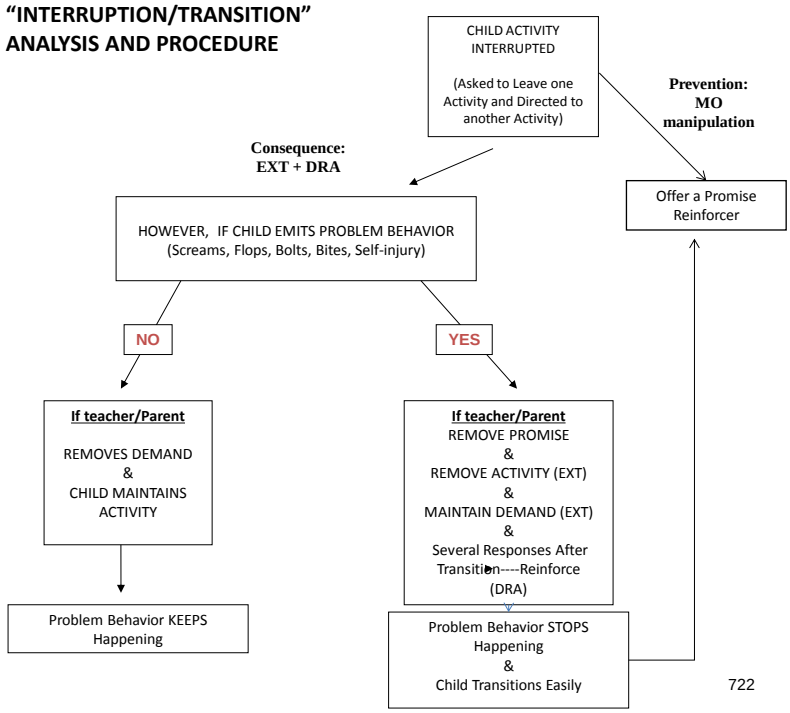
FUNCTIONAL ANALYSIS AND TREATMENT OF SELF-INJURY ASSOCIATED WITH TRANSITIONS

BRANDON E. MCCORD AND RICHARD J. THOMSON
ARLINGTON DEVELOPMENTAL CENTER
AND
BRIAN A. IWATA
THE UNIVERSITY OF FLORIDA

We applied functional analysis methodology to the assessment and treatment of 2 individuals' self-injurious behavior (SIB), which was reported to be occasioned by transitions from one activity or location to another. A structural (task) analysis of activity transitions identified at least three separate components that might influence behavior either alone or in combination: (a) termination of a prechange activity, (b) initiation of a postchange activity, and (c) movement from one location to another. Results of preference and avoidance assessments were used to identify activities to which participants were exposed in varying arrangements during transitions in a functional analysis. Results of 1 participant's functional analysis indicated that his SIB was maintained by avoidance of having to change locations, regardless of the activity terminated prior to the change or the activity initiated following it. The 2nd participant's analysis revealed the same function but also an additional one: avoidance of certain task initiations. This information was used to identify transition contexts during intervention and to design treatment procedures appropriate for a given context and behavioral function. A procedure involving advance notice of an upcoming transition had no effect on SIB, and differential reinforcement of alternative behavior (DRA) had limited effects in the absence of extinction. Sustained decreases in SIB were observed when DRA was combined with extinction and response blocking. Further extensions of functional analysis methodology to the assessment of problem behavior in situations characterized by multiple or protracted stimulus changes are discussed.

DESCRIPTORS: activity transitions, advance notification, avoidance assessment, differential reinforcement, extinction, functional analysis, preference assessment, response blocking, self-injurious behavior

"INTERRUPTION/TRANSITION" ANALYSIS AND PROCEDURE



Interruption /Transition videos

[Nicole]

[Nicole Promise]

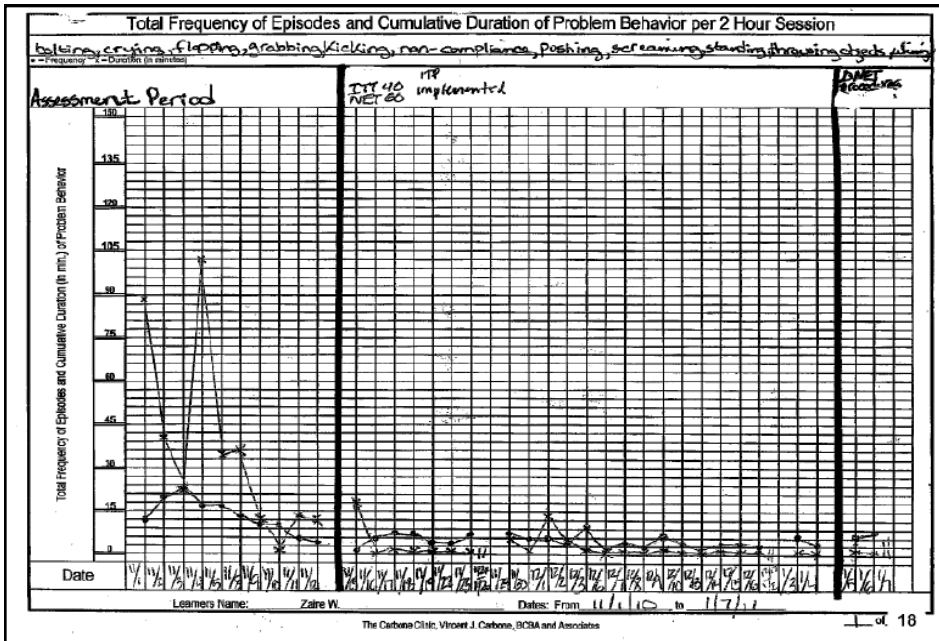
[Andy]

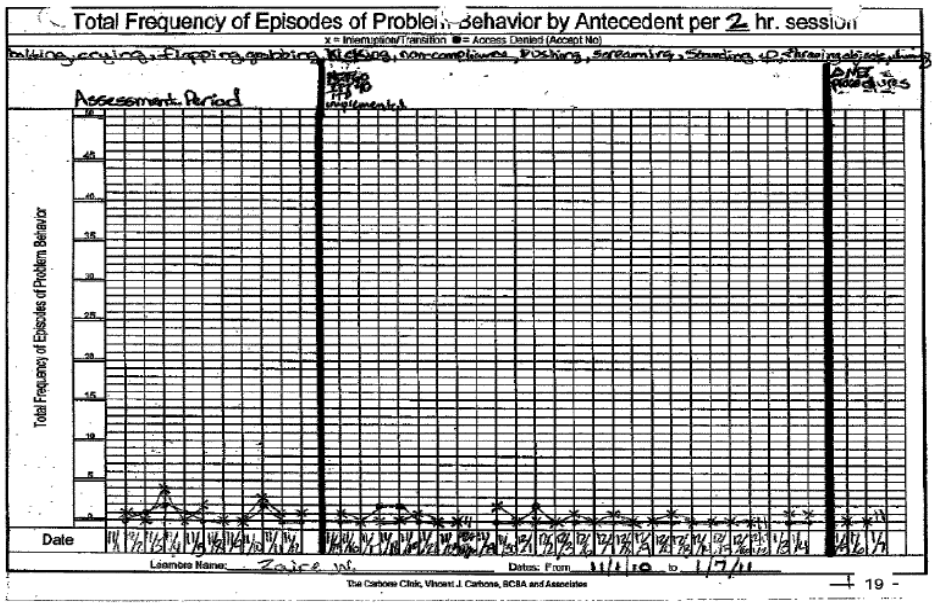
[Jerry Lee- Promise Reinforcer]

[Grace interruption from Mom]

[Brent with Allison]

[Jordo with Emily]





687

725

Contrived Trials

726

INTERRUPTION/TRANSITION DATA SHEET

Name: Max Date: 6·30 Time: 1:30 --- 4:00

BEHAVIOR KEY: Designate an abbreviation for the problem behavior in this box (e.g. Kicking = K, Hitting = H)

h = hitting
CR = Crying
C = compliance f = flopping

Trial	Location	Demand	Problem Behavior	Time to Compliance	Initial
1	trampoline	sit in chair (10 seconds)	h, f	30 sec	
2	spin toy		C	10 sec	
3	books		CR	2 min	
4	puzzles		CR, F	40 sec	
5	music		H	1 min	
6	music		C	10 sec	
7	ball pit		CR	30 sec	
8	trains		f, H	1 min	
9	MOM		H, CR	45 sec	
10	wagon		C	10 sec	

3/10 = 2A·1

689

727

INTERRUPTION/TRANSITION DATA SHEET

Name: Max Date: 6·30 Time: 1:30 --- 4:00

BEHAVIOR KEY: Designate an abbreviation for the problem behavior in this box (e.g. Kicking = K, Hitting = H)

h = hitting
CR = Crying
C = compliance f = flopping

Trial	Location	Demand	Problem Behavior	Time to Compliance	Initial
1	trampoline	sit in chair (10 seconds)	h, f	30 sec	
2	spin toy		C	10 sec	
3	books		CR	2 min	
4	puzzles		CR, F	40 sec	
5	music		H	1 min	
6	music		C	10 sec	
7	ball pit		CR	30 sec	
8	trains		f, H	1 min	
9	MOM		H, CR	45 sec	
10	wagon		C	10 sec	

Max w Emily
Max w Zach

728

Demand Protocol
(Functional Equivalent Protocol)

OBJECTIVE OF THE
Demand Protocol:

This is a program to teach replacement behaviors for problem behavior that was previously maintained by socially mediated negative reinforcement (removal of demands).

Empirical support:
Bird et al, 1989
Carr & Durand, 1985
Durand & Carr, 1991
Fisher et al., 1993
Wacker et al., 1990

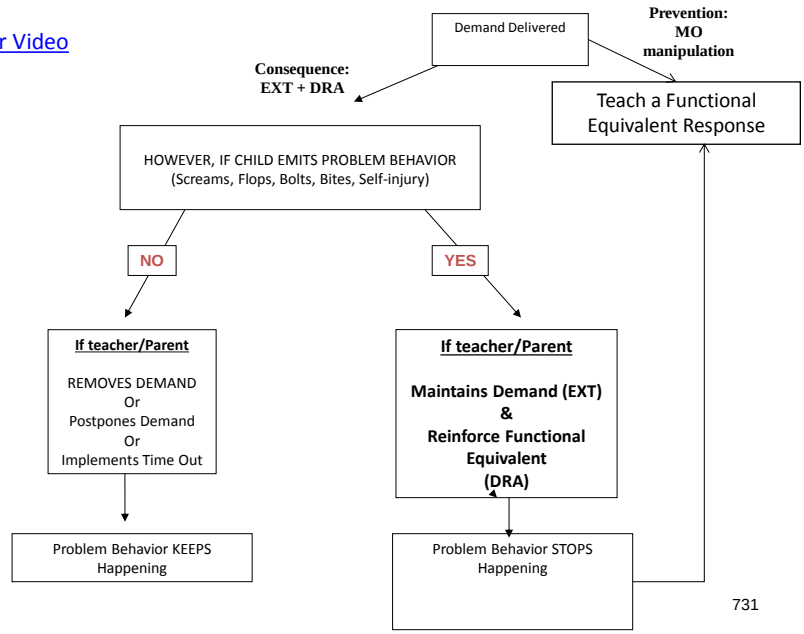
Demand Protocol
Teaching a Functional Equivalent

CANDIDATES FOR THE DEMAND PROTOCOL:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by a history of demands removed following problem behavior. (SMNR)

"DEMAND – TEACHING A FUNCTIONAL EQUIVALENT"
ANALYSIS AND PROCEDURE

Peter Video



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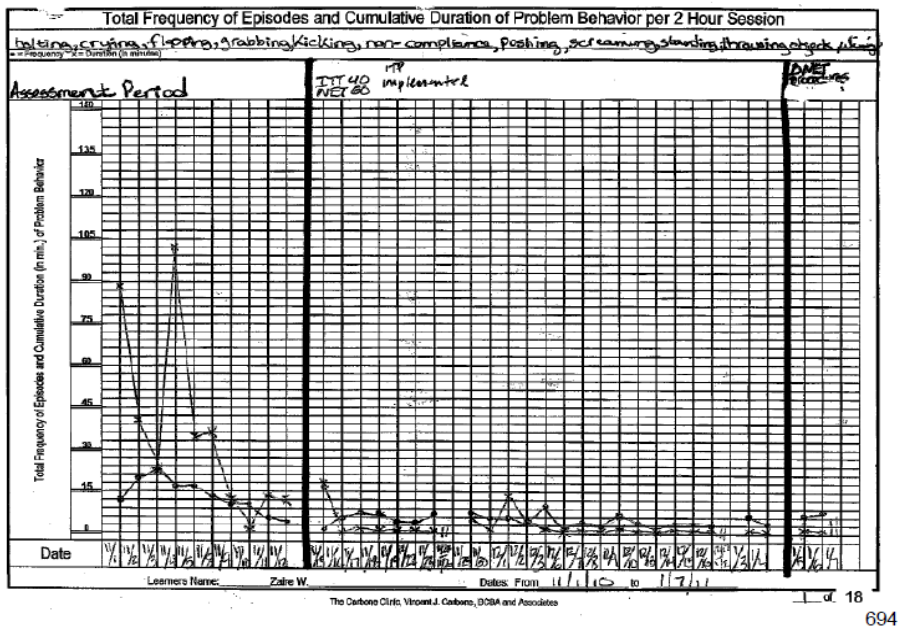

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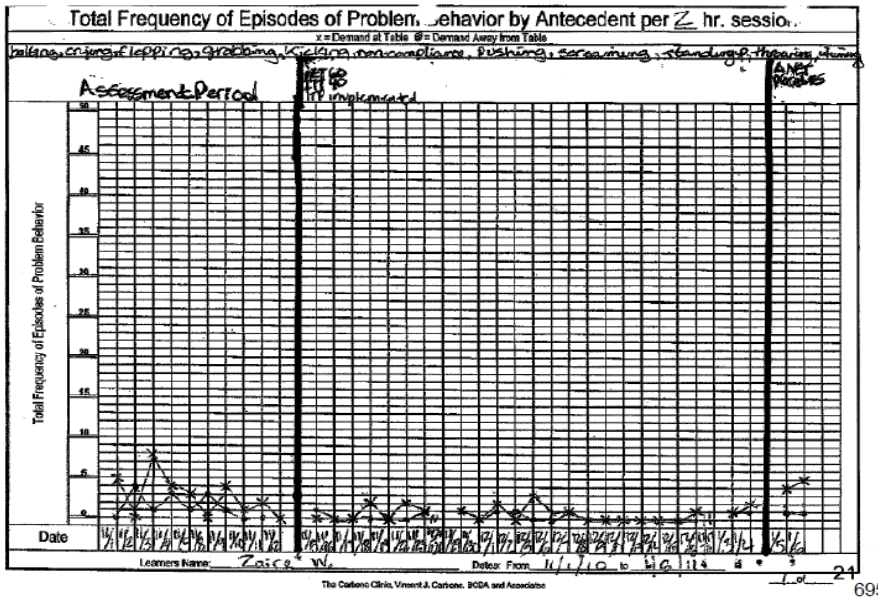

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"Told No" (Denied Access) Protocol

OBJECTIVE OF THE "TOLD NO" (Denied Access) PROTOCOL:

This is a program to teach a child to engage in appropriate responses when denied access to a reinforcer as a replacement for problem behavior previously maintained by SMPR.

Empirical support:

Hagopian, Wilson, Wilder, 2001
Bowman, Fisher, Thompson, Piazza, 1997
Iwata, Pace, Dorsey, Zarcone, Vollmer, Smith, Rodgers, Lerman, Shore, Mazaleski, Goh, Cowdery, Kalsher, McCosh, Willis, 1994
Shirley, Iwata, Kahng, 1999
Mueller, Wilczynski, Moore, Fusilier, Trahant, 2001
McCord, Thompson, Iwata 2001
McCord, Thomson, & Iwata, 2001
Wilder, Chen, Atwell, Pritchard, Weinstein 2006
Cote, Thompson, McKerchar 2005
Hanley, Iwata, McCord 2003
Mace et al., 2011

734

"Told No" (Denied Access) Protocol

CANDIDATES FOR THE
"TOLD NO" (Denied Access) PROTOCOL:

Following a descriptive analysis, a learner whose problem behavior is suspected to be maintained by a history of obtaining preferred items or activities following problem behavior (SMPR).

735

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, 44, 83–94 NUMBER 1 (SPRING 2011)

AN EVALUATION OF THREE METHODS OF SAYING "NO" TO AVOID AN ESCALATING RESPONSE CLASS HIERARCHY

F. CHARLES MACE
NOVA SOUTHEASTERN UNIVERSITY

JAMIE L. PRATT AND KEVIN L. PRAGER
PROVIDENCE OF MAINE

AND

DUNCAN PRITCHARD
ARAN HALL SCHOOL

We evaluated the effects of three different methods of denying access to requested high-preference activities on escalating problem behavior. Functional analysis and response class hierarchy (RCH) assessment results indicated that 4 topographies of problem behaviors displayed by a 13-year-old boy with high-functioning autism constituted an RCH maintained by positive (tangible) reinforcement. Identification of the RCH comprised the baseline phase, during which computer access was denied by saying "no" and providing an explanation for the restriction. Two alternative methods of saying "no" were then evaluated. These methods included (a) denying computer access while providing an opportunity to engage in an alternative preferred activity and (b) denying immediate computer access by arranging a contingency between completion of a low-preference task and subsequent computer access. Results indicated that a hierarchy of problem behavior may be identified in the context of denying access to a preferred activity and that it may be possible to prevent occurrences of escalating problem behavior by either presenting alternative options or arranging contingencies when saying "no" to a child's requests.

Key words: response class hierarchy, saying "no," autism

698

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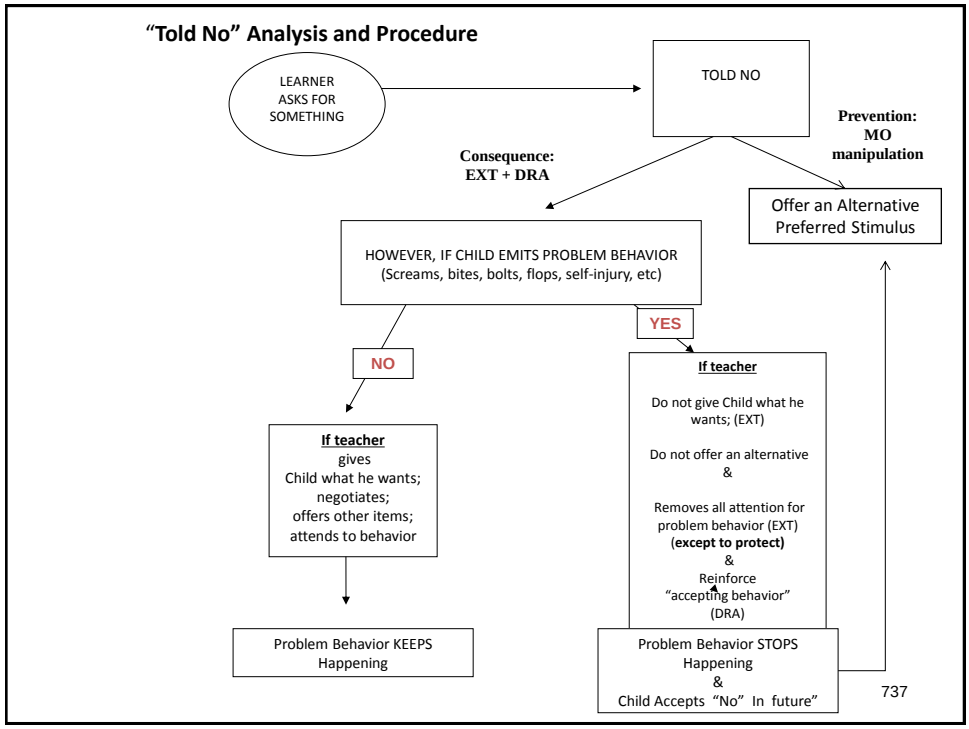


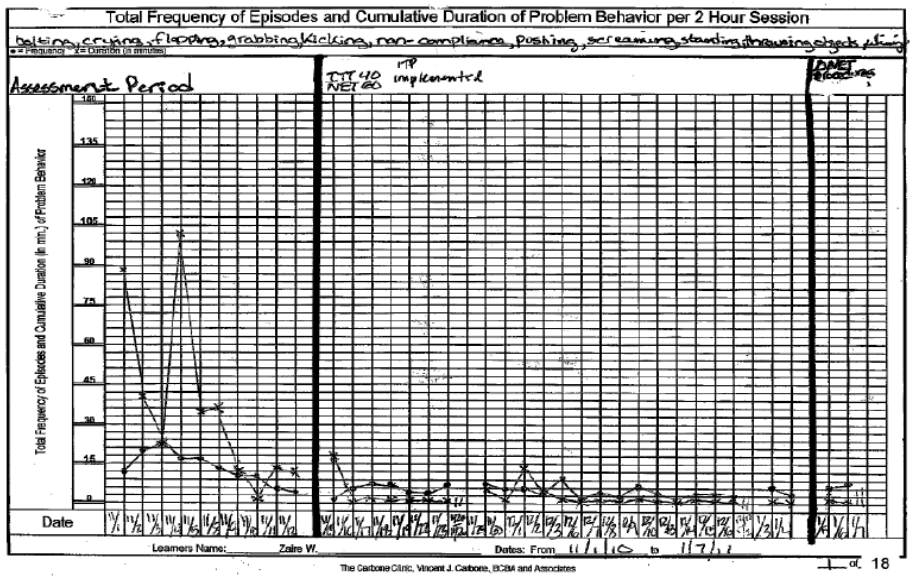
"Told No" Videos

[Bobby accepting no with problem behavior]

[Anthony Accepting NO]

[Bobby accepting no, eliminating alternative SR+]

[Sean R accepting no]



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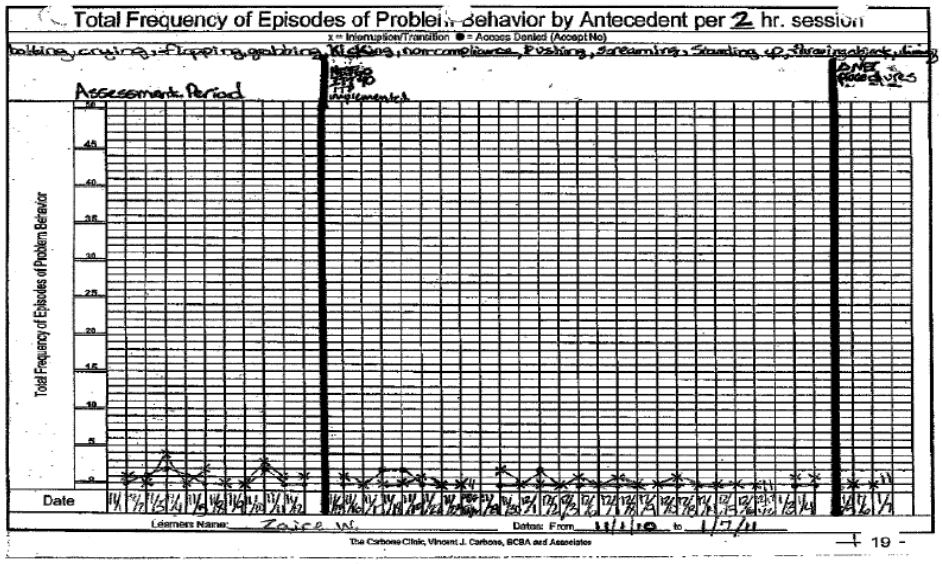

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740

Contrived Trials

741

"Accepting NO" Data Sheet

Name: Max Date: 10/21 Times: 900 – 1150

BEHAVIOR KEY: *Designate an abbreviation for the problem behavior in this box (e.g. Kicking = K, Hitting = H)*

a = accept

Trial	Reinforcing Situation	Alternative Reinforcer Offered	Problem Behavior	Initials
1	block	pretzel	cry/whine	Dad
2	block	edible	cry	Dad
3	cow	sheep	a	Dad
4	music	pig	a	Dad
5	horse	cow	a	Dad
6	chicken	snack	a	Dad
7	farmer	chicken	a	Dad
8	hay	pig	a	Dad
9	cow	sheep	a	Dad
10	hay	chicken	whine	Dad
11				
12				
13				
14				
15				

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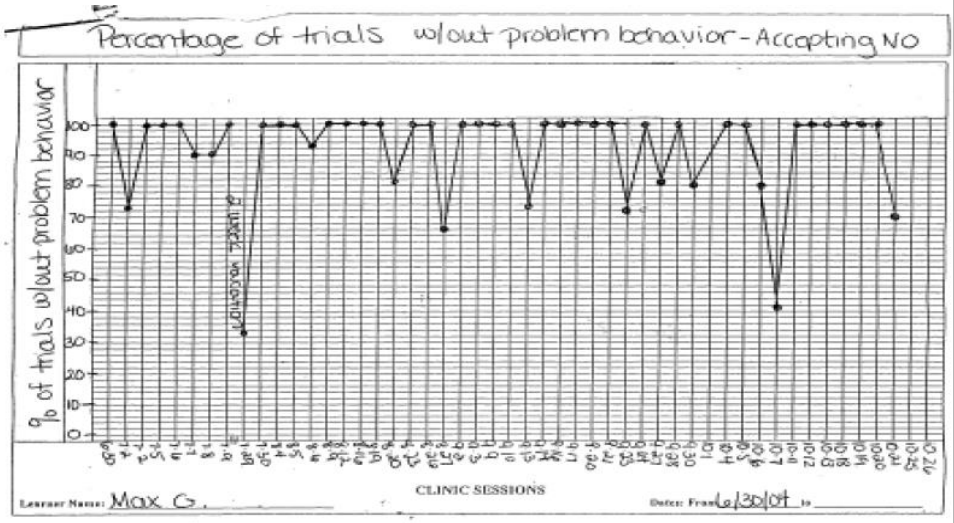
Anthony- Contrived Trials



The Carbone Clinic

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Motivation Strong- (Can Have) But Asks Inappropriately Protocol

OBJECTIVE OF THE " Motivation Strong- …."
PROTOCOL:

This is a program to teach a child to teach a mand response as a replacement for problem behavior previously maintained by SMPR.

Empirical support:
Carr & Durand, 1985

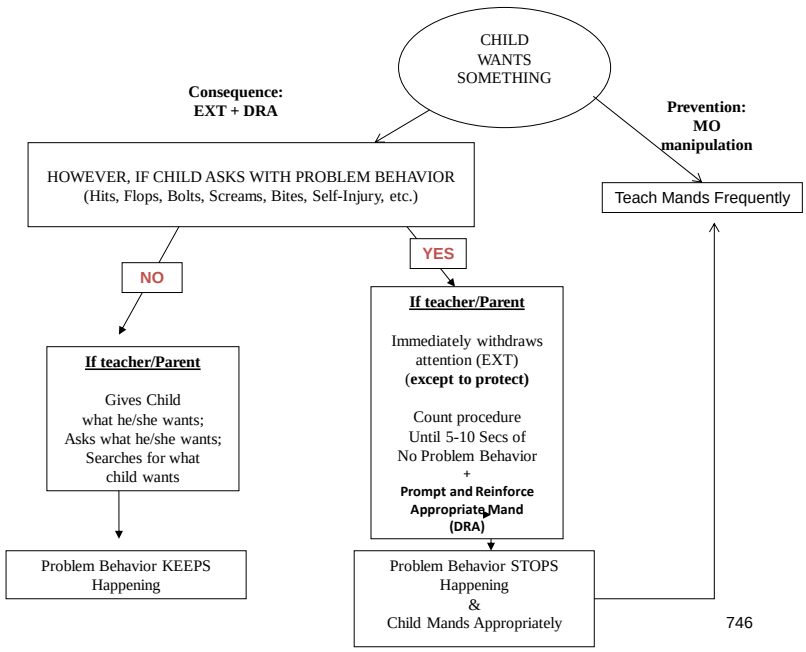
744

MOTIVATION STRONG- (Can Have) But Asks Inappropriately Protocol

CANDIDATES FOR THE MOTIVATION- (CAN HAVE) BUT MANDS INAPPROPRIATELY PROTOCOL:

Following a descriptive analysis, learners whose problem behavior is suspected to be a function of obtaining items and activities and attention contingent upon problem behavior. This program is usually necessary to reduce problem behavior with learners who emit few mands and for whom a mand training program may have been just recently implemented.

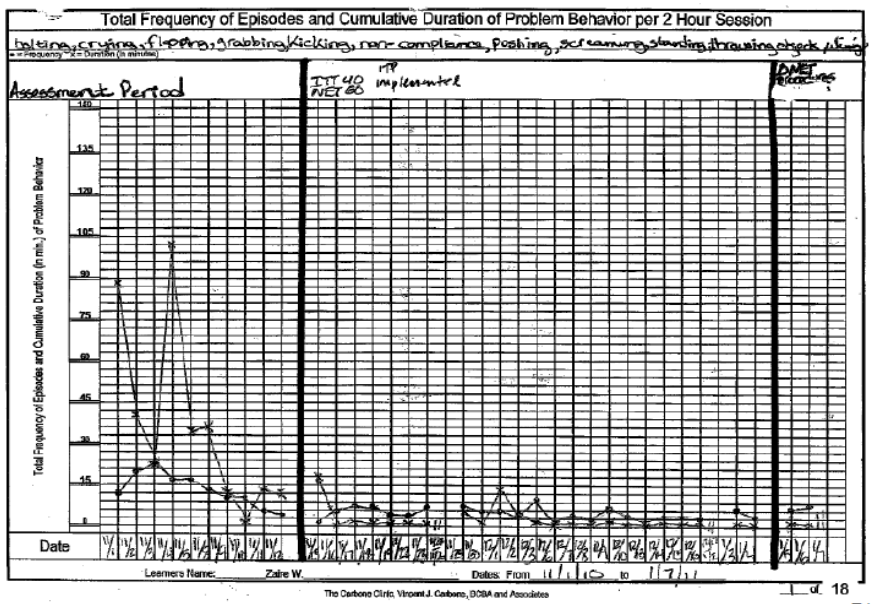
Problem Behavior as Mands Analysis and Procedure



Count and Mand

[Jack G. count and mand]

747



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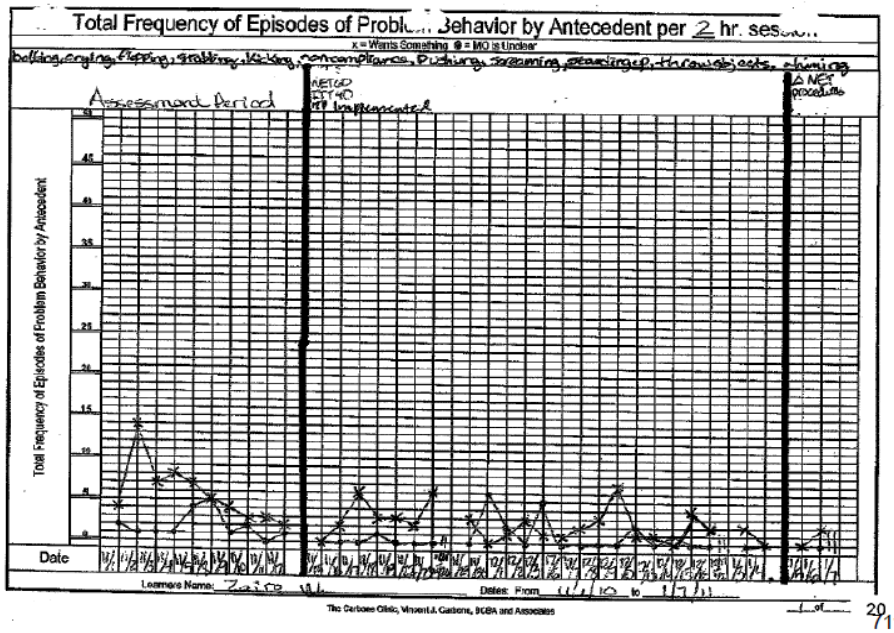


"Out of the Blue" Protocol

OBJECTIVE OF THE "OUT OF THE BLUE" PROTOCOL:

This is a program to teach a child to mand for a generalized rich environment as a replacement for problem behavior that has previously been maintained by access to a variety of reinforcing stimuli.

Empirical support:

Hagopian, Wilson, Wilder, 2001

Bowman, Fisher, Thompson, Piazza, 1997

Iwata, Pace, Dorsey, Zarcone, Vollmer, Smith, Rodgers, Lerman, Shore, Mazaleski, Goh, Cowdery, Kalsher, McCosh, Willis, 1994

Shirley, Iwata, Kahng, 1999

Mueller, Wilczynski, Moore, Fusilier, Trahant, 2001

McCord, Thompson, Iwata 2001

Wilder, Chen, Atwell, Pritchard, Weinstein 2006

Cote, Thompson, McKerchar 2005

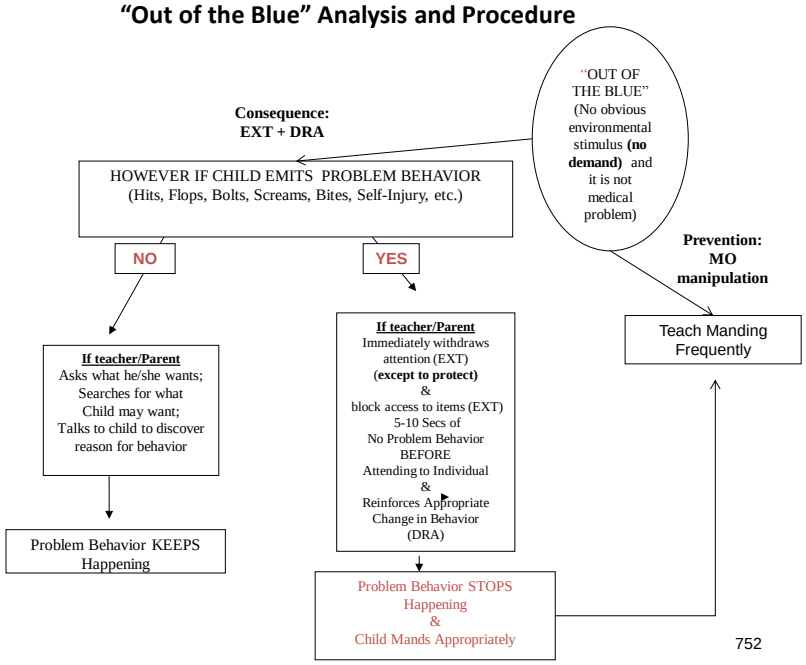
Dorsey, Iwata 1982

“Out of the Blue” Protocol

CANDIDATES FOR THE
“OUT OF THE BLUE” PROTOCOL:

Following a descriptive analysis, learners whose problem behavior is suspected to be maintained by SMPR. Candidates for this program typically have a weak manding repertoire and infrequently emit problem behavior during preferred activities that include high levels of social attention. The function is frequently and incorrectly suspected to be a medical condition, “sensory issues” or not easily identified painful stimulation.

“Out of the Blue” Analysis and Procedure



“Out of Blue” Videos

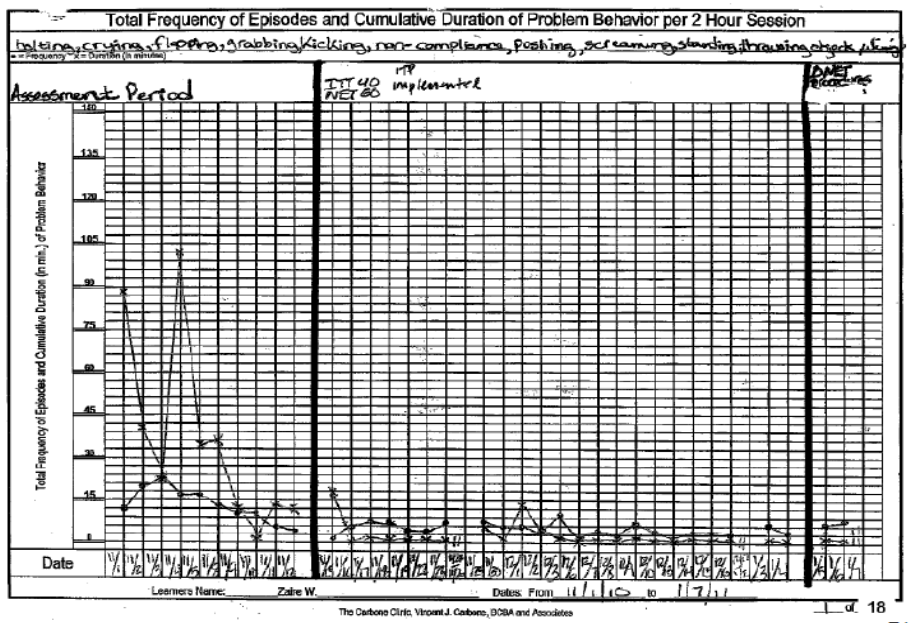
Kaitlin’s first session

Katy Manding

Katy During MVB

Katy Now

Sabrina – needs to be edited



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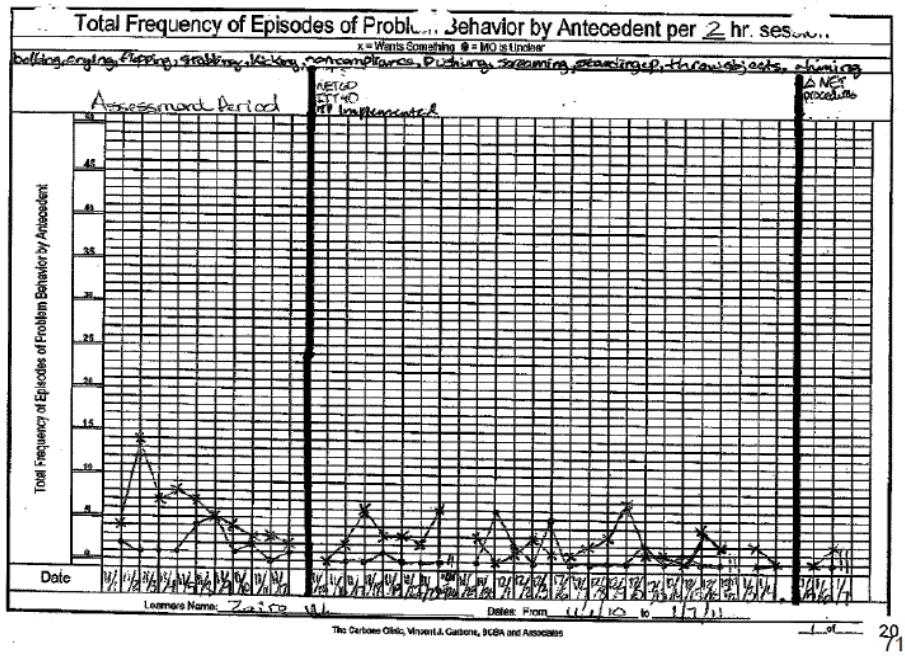

Restricted Procedures

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1988, 21, 381–384 NUMBER 4 (WINTER 1988)

THE RIGHT TO EFFECTIVE BEHAVIORAL TREATMENT

RON VAN HOUTEN
MOUNT SAINT VINCENT UNIVERSITY

SAUL AXELROD
TEMPLE UNIVERSITY

JON S. BAILEY
FLORIDA STATE UNIVERSITY

JUDITH E. FAVELL
AU CLAIR PROGRAM, MOUNT DORA, FLORIDA

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We propose that individuals who are recipients or potential recipients of treatment designed to change their behavior have the right to a therapeutic environment, services whose overriding goal is personal welfare, treatment by a competent behavior analyst, programs that teach functional skills, behavioral assessment and ongoing evaluation, and the most effective treatment procedures available.
DESCRIPTORS: behavioral treatment, clients, ethics, treatment

Consistent with the philosophy of least restrictive yet effective treatment, exposure of an individual to restrictive procedures is unacceptable unless it can be shown that such procedures are necessary to produce safe and clinically significant behavior change. It is equally unacceptable to expose an individual to a nonrestrictive intervention (or a series of such interventions) if assessment results or available research indicate that other procedures would be more effective. Indeed, a slow-acting but nonrestrictive procedure could be considered highly restrictive if prolonged treatment increases risk, significantly inhibits or prevents participation in needed training programs, delays entry into a more optimal social or living environment, or leads to adaptation and the eventual use of a more restrictive procedure. Thus, in some cases, a client's right to effective treatment may dictate the immediate use of quicker acting, but temporarily more restrictive, procedures.

Nicole Data Walker Pictures & Data

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