Innovation and refinement of skill acquisition and behavior reduction procedures at the Lovaas Institute

California ABA
February 23, 2008
• Behavioral Philosophy

• Environmental events are major determinants of learning and behavior.

• “If a child cannot learn the way we teach, then we must teach in a way the child can learn”.

• Ivar Lovaas
A Model for Problem Solving in Discrete Trial Training for Children with Autism

Suzannah Ferraioli
Carrie Hughes
Tristram Smith
## Evaluating Progress

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes Answer</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of correct responding increased?</td>
<td>Yes: Continue program</td>
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<tr>
<td>Prompts Faded?</td>
<td>Yes: Yes</td>
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<td>Yes: Re-evaluate child’s education plan</td>
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<td>No: Yes</td>
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<td>Lack of progress in ALL programs?</td>
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<td>Correct responding near 0% or</td>
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<tr>
<td>No acquisition in the last 8-10</td>
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<tr>
<td>sessions</td>
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<td>Variable responding across sessions?</td>
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<td>Increased problem behaviors or</td>
<td>Yes: Yes</td>
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<tr>
<td>new problem behaviors?</td>
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<tr>
<td>Lack of generalization or maintenance?</td>
<td>Yes: Yes</td>
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<td>No: Yes</td>
</tr>
</tbody>
</table>
Inconsistent Progress

![Graph showing inconsistent progress over sessions]

- X-axis: Session
- Y-axis: Percent Correct

The graph illustrates fluctuations in correct responses across sessions, indicating inconsistent progress.
Inconsistent Progress Flowchart

Does performance vary across time of day, setting, or programs?
  Yes
  Alter the schedule, conduct an environmental assessment
  No

Does performance vary across instructors?
  Yes
  Further objectify the SD, prompting progression, response definition, or consequences. Look for inadvertent prompts
  No

Are reinforcers highly preferred? Is the schedule of reinforcement sufficient?
  Yes
  Conduct preference assessments, increase rate of reinforcement, restrict access to reinforcers outside of session.
  No

Is the instructional format individualized? Is the child motivated?
  Yes
  No
  Change instructional format
  No
Lack of Skill Acquisition

[Graph showing percent correct over sessions]
Skill Acquisition Decision Tree

Does the student have the necessary pre-requisite skills?
   Yes
   No Implement skills assessment, teach pre-requisites.

Are teaching materials clear, engaging?
   Yes
   No Simplify/modify materials

Is the vocal SD clear, concise?
   Yes
   No Simplify SD (e.g., eliminate carrier phrases)

Is the prompt effective? non-aversive?
   Yes
   No Individualize/modify prompt procedure

Is the error correction procedure individualized? effective?
   Yes
   No Individualize/modify error correction procedure

Is the instructional format individualized?
   Yes
   No Consider format changes (video modeling, in-vivo demonstration, innovation)
## Increase in Problem Behavior

<table>
<thead>
<tr>
<th>Increase or new problem behavior</th>
<th>Yes</th>
<th>Collect data to determine function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the task too easy or too difficult?</td>
<td>Yes</td>
<td>Modify the task, reduce the response requirement, conduct a skills assessment</td>
</tr>
<tr>
<td>No</td>
<td></td>
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</tr>
<tr>
<td>Is the reinforcement schedule thin?</td>
<td>Yes</td>
<td>Reinforcer assessment, collect base rate data on the number of consecutive trials prior to problem and consider shorter sittings, more frequent breaks</td>
</tr>
<tr>
<td>Is the repertoire of reinforcers limited?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are prompting procedures aversive?</td>
<td>Yes</td>
<td>Evaluate and individualize prompting methods</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are other aspects of the teaching procedure aversive?</td>
<td>Yes</td>
<td>Individualize teaching materials, error correction procedure</td>
</tr>
</tbody>
</table>
Round Robin Reinforcer Workshop

Round 1 - no talking but can make sounds; can use manipulatives; until he/she laughs, smiles, makes eye contact, or communicates desire for more (motivation for instructors to work hard).

Round 2 - no talking and no sounds; can use manipulatives; until he/she laughs, smiles, makes eye contact, or communicates desire for more

Round 3 - no talking and no sounds; no manipulatives; until he/she laughs, smiles, makes eye contact, or communicates desire for more

Round 4 - no talking and no sounds; no manipulatives; for 30 seconds.
Generalization/Maintenance Decision Tree

Is there a generalization failure?  
   Yes  No

Are there generalization steps imbedded in program?  
   Yes  No

Has the student maintained pre-requisite skills?  
   Yes  No

Does generalization occur across people, settings, materials, SDs?  
   Yes  No

Can the student respond without vocal cues/SD from an adult?  
   Yes  No

Continue

Include generalization steps (teach multiple exemplars, teach across people and settings, include a maintenance schedule)

Create or modify the maintenance schedule

Teach multiple exemplars until correct responding to novel stimuli occurs, continue program until rate of learning matches a norm rate, consider increasing fluency of skill, consider decreasing rates of reinforcement in individual instruction

Consider incidental teaching, visual schedules, time delay prompting, tactile cues, etc.
Teaching Receptive Language
Case Study: Nick

- Diagnosed with autism in May 2005, at age 2 years, 3 months
- Age at onset of ABA services: 2 years, 4 months
- Age at onset of services with the Lovaas Institute: 3 years, 2 months
Skill level at onset of services with the Lovaas Institute

- No receptive or expressive language
- Several gross motor imitation responses
- No independent toy play skills
- Engaged in protest behaviors (crying, whining, collapsing on floor) and occasional self-injurious behaviors (head-banging) in order to get his needs met
- Some basic knowledge of PECS, but no self-initiated exchanges
Receptive Object Labels: Phase 1

- Introduced on 6/28/06
- Taught across objects (i.e., multiple exemplars) in a field of 1-4 objects
- Prompting strategies: field size of 1 (stimulus fading), point, and hand-over-hand prompts
- First objective: shoe
- Second objective: cup
  - Introduced 7/27/06
Receptive Object Labels: Phase 1

- Initially practiced cup in a field without the presence of shoe
- Discrimination Training with shoe:
  - Massed trials in separate sittings with both objects in the field
  - Initial trial was prompted, then faded
  - Acquired skills (gross motor imitation) were used in expanded trials
Receptive Object Labels: Phase 1

- Other strategies utilized:
  - Negative reinforcement paired with verbal praise following every independent correct response
  - Shortened time between sittings (less than 1 minute)
  - Presented one objective without the second object in the field at the start of a sitting, and introduced the second after several successful trials
Receptive Object Labels: Phase 1

- Other strategies utilized:
  - Required Nick to make eye contact with the instructor prior to the delivery of each $S^D$
  - Incidental labeling of each object incorporated into the reinforcement for each correct response, as well as incidentally throughout the day
Receptive Object Labels: Phase 2

- On 9/6/06 the stimuli used for shoe and cup were reduced to one exemplar for each object.
- The shoe and cup that Nick used at the highest frequencies in his daily life were selected.
Due to Nick’s strong visual-spatial skills, it was hypothesized that a visual prompt would be more successful than previous attempts. On 9/20/06 a picture prompt was introduced. Instructors presented an identical picture of the object concurrent with the S^D.
Receptive Object Labels: Phase 3

- Prompting strategies utilized:
  - Hand-over-hand prompts
  - Pointing to the picture
  - Trials of matching to prime the sitting
  - Holding the picture above the object
Despite these prompting measures, Nick was unable to learn to independently point to the corresponding object. Common incorrect responses consisted of pointing to the picture rather than the object, repeating the verbal $S^D$, or non-responses.
Program discontinued

Due to continued discrimination difficulties and a significant increase in protest and self-injurious behaviors when the ROL stimuli were present in the room, this program was temporarily discontinued on 10/18/06.
Although responding was inconsistent, Nick occasionally attempted to make spontaneous verbal requests for familiar items, such as water, cookie, and Spongebob.

Nick used default verbalizations of “water” and “cookie” to request all desired objects or activities.

He acquired the ability to respond to 3 receptive instructions.

Receptive Object Labels program was re-introduced on 1/10/07 using objects that were highly motivating and that instructors hypothesized Nick might know.
Receptive Object Labels: Phase 4

- **Spongebob** was introduced
  - Physical prompts from behind were utilized
- **Balloon** was introduced one week later with neutral distracters.
- Practiced **balloon** and **Spongebob** in separate sittings with both objects presented in the field

![Graph showing correct responding with objectives in acquisition](image)
Receptive Object Labels: Phase 4

- Prompting strategies utilized:
  - Nick was given the object paired with verbal praise after each correct response, both prompted and independent
  - Seated Nick several feet from the table
  - Negative reinforcement following each correct response
  - Acquired receptive instructions were used as distracter trials
Receptive Object Labels: Phase 4

- Prompting strategies utilized:
  - Practiced the two objectives several hours apart
  - Required Nick to imitate the word after each trial
  - Restricted edible reinforcement to this program (within sessions)
  - Systematically faded the number of prompts used for each objective
Again, Nick was unable to discriminate between the first two objectives, and the program was temporarily discontinued on 2/28/07.
Program: Sound Discrimination

Introduced on 4/25/07
Sound Discrimination

- **Program Rationale:** To teach a child with little or no receptive language to discriminate between auditory input and to associate this with a visual stimulus.

- **Prerequisite Skills:** Matching, Non-verbal imitation with objects.

- In this program, sounds associated with objects are used to prompt the child to attend to auditory stimuli.
Selecting Objectives to Teach

- Ten noise-making objects were selected to be introduced simultaneously in Sound Discrimination.
- Objects were selected that had maximally discriminable labels, physical appearance, sounds, and motor movements.
- Upon introducing discrimination training, the first two objects chosen were maximally discriminable in all four of these characteristics.
Stimuli

- Ring
- Hourglass
- Spinner
- Duck
- Egg (filled with rice)
- Lunchbox (filled with blocks)
- Clacker
- Drum
- Bell
- Tambourine
Sound Discrimination: Phase One

- **S^D:** “(Label)” while presenting two fields of identical objects*, and making the corresponding sound
- **R:** Nick makes the sound by manipulating the identical object
- Nick did not demonstrate any difficulty with this phase of the program
- This phase was practiced for 5 days in order to build a reinforcement history for the program as well as to provide exposure to the object labels, their actions, and associated sounds

* One field of objects was presented in front of Nick, and a second field of identical objects was placed in front of the instructor
Sound Discrimination: Phase One

*Insert video: NG*

*17:12:28 - 17:48:00*

*37 min from end*

*(background noise)*
Sound Discrimination: Phase Two

- $S^D$: “(Label)” while presenting one field of objects, and holding up an object while making the sound
- Nick did not demonstrate difficulty transitioning to Phase Two
- This phase was practiced for 3 days
- The duration of visual presentation for each object was faded across sessions
Sound Discrimination: Phase Two

*Insert video: NG*

18:03:07 - 18:39:03

37 min from end
*(background noise)*
Sound Discrimination: Phase Three

- SD: “(Label)” while making a sound with an object out of Nick’s visual field
- Phase 3 was practiced across all 10 objects for 4 days
- Instructors held the objects under the table to make the sound (“hidden” in a bucket)
- Nick did not demonstrate difficulty transitioning to this phase
Sound Discrimination: Phase Three

Insert video: NG
19:22:17 - 20:01:04

35 from end
Sound Discrimination: Phase Four

- **S^D:** “(Label)”
- **R:** Nick touches or makes the sound with the correct object
- In this phase of the program, the sound component was removed, requiring Nick to select the correct object based on the object label only
Sound Discrimination: Phase Four

- Two maximally discriminable objects were chosen for discrimination training in Format 4
  - Hourglass and Ring
- The two objectives were introduced into this format simultaneously to attenuate sequence effects
- Prompts (sound component) were faded across sittings
- The two objectives were first practiced in separate sittings; blocked trials were eventually utilized
Sound Discrimination: Phase Four

Insert video: NG

00:47:07 - 01:59:26

30 min from end
Sound Discrimination: Phase Four

- Strategies utilized during blocked trials:
  - $S^D$s were delivered only after Nick was making eye contact with the instructor
  - Elongation of the label “hourglass,” and short, quick, high-pitched delivery of the label “ring”
  - Exaggerated mouth structure
  - Non-verbal (edible) reinforcement
  - Silent field rotation
  - Short inter-trial intervals
  - Sittings were ended in the event of environmental distractions (e.g., sirens, family members walking through, etc.)
Sound Discrimination: Phase Four

- After 3 weeks of discrimination training, the first two objectives were acquired
  - 11 months after ROL was initially introduced
- Three more objectives were acquired over the next month
- Functional items were introduced at this point (e.g., cup), using sounds as a prompt
- Nick’s responses were shaped to pointing to the objects, as opposed to shaking them
- The eighth objective introduced (shoe) was taught using point prompts, without an auditory component
Where is Nick today?

- Nick has acquired 26 receptive object labels across picture and object stimuli, as well as the names of 12 people in his life.
Receptive Labeling

*Insert video: NG*

02:22:05 - 02:54:16

28 min from end

AND

04:32:14 - 05:27:10

26 min from end
Where is Nick today?

- Nick demonstrated the ability to expressively label 6 objects during a probe phase on 1/16/08.
- He has acquired the ability to expressively label 18 objects across several exemplars.
- He has begun to use these labels to request desired toys/food.
Expressive Labeling

*Insert video: NG*

07:50:28 - 08:32:08

23 min from end
Singing

*Insert video: NG*


32 min from end
Future plans for Nick’s language development

- Increasing his use of acquired object labels to mand for desired items
- Continued generalization of acquired expressive and receptive object labels to a variety of stimuli across environments
- Continued introduction of functional objects, people, and places in Nick’s daily life
- Introduction of more complex language skills, such as action labels, colors, etc.
Improvements for the Future

- Introduce the program sooner
- Move more rapidly through the first phases if possible
- Instructor consistency with nuances of teaching
Case Study: Lisa

- Diagnosed with autism at age 3 years
- Age at onset of ABA services: 3 years, 4 months
- Age at onset of services with Lovaas Institute: 4 years, 2 months
Standard Receptive Object Label Programming

- Introduced on 10/23/07
- Demonstrated discrimination errors when first two objectives (sock and napkin) were in random rotation
- Implemented 1:1 reinforcement with an edible for both objectives and utilized negative reinforcement
- Demonstrated incorrect responses on prompted trials
- Discontinued on 12/4/07
Sound Discrimination programming was introduced (12/4/07):

1) Imitate instructor when presented with a field of objects identical to the instructor’s (no labels), no verbal reinforcement

2) Respond to the label + sound when action demonstrated by instructor (1 field of stimuli)

3) Respond to label + sound when instructor model is not visible

4) Reduce the length of sound

5) Blocked trials using sound as the prompt
Sound Discrimination

*Insert video: LM*

01:22:21 - 02:39:04

02:57:01 - 03:34:26

18 min from end (may need to edit out her name)
Re-introduce Receptive Object Labels

- Standard Receptive Object Labels programming was re-introduced on 1/29/08 (3 months after initial introduction) using 3D stimuli only and Lisa was permitted to engage in action with the object
  - Shaped responding so Lisa handed the object to the instructor using differential reinforcement
  - Currently both picture and object stimuli are used
Total Acquired Receptive Labels

ROL Program discontinued and Sound Discrimination Program introduced

ROL Re-introduced
Expressive Object Labels

- Program was introduced at the same time as the Receptive Object Labels program was re-introduced.

- Used only 3D stimuli initially; currently, pictures and objects are used.

- Lisa acquired 6 objectives on probe and as of 2/12/08 acquired a total of 10 expressive object labels.
Case Study: Katie

- Diagnosed with autism in July 2006 at age 2 years, 4 months
- Previously received ABA services in Canada in French language
- Age at onset of services with Lovaas Institute: 3 years, 6 months
Receptive Object Label Programming

- Previous ABA provider addressed receptive language skills in French
- At onset of services with Lovaas Institute introduced Receptive Object Labels Program in English
  - Hand-over-hand prompts (full and partial)
  - Reduced field
  - Picture prompt
  - Position prompts
- Demonstrated discrimination of first two objectives, however unable to discriminate with further objectives
Sound Discrimination

- ROL discontinued on 1/15/08
- Sound Discrimination introduced on 1/22/08
  - $S^D$: “(Label)” presented with a model/sound and two identical fields of stimuli
  - Faded second field and visual model on 2/5/08 (i.e., instructor’s objects are under the table) within sittings
Sound Discrimination

Insert video: LKC

05:39:10 - 06:33:20
08:37:23 - 08:43:13
10:16:01 - 10:48:00
11:34:27 - 12:31:29

14 min from end to 7 min from end
Behavior Reduction Procedures

- Social Positive
- Social Negative
- Automatic Positive
- Automatic Negative
Social Positive

- Motivation
  - NCR, schedule based reinforcement
- Alternate
  - Effective requesting repertoire
- Consequence
  - Attention extinction (ignoring)
  - Tangible extinction (blocking)
Social Negative

- Motivation
  - Make instruction effective and reinforcing
- Alternate
  - Effective requesting repertoire (Break, choice, etc)
- Consequence
  - Escape extinction
Automatic Positive

- Motivation
  - Enriched environment, matched stimuli
- Alternate
  - Effective requesting repertoire
- Consequence
  - By definition, extinction not an option
  - However, you may dampen or block sensory stimulation
Reduction in Climbing Behavior
Case Study: Jimmy

- Jimmy was diagnosed with autism in June 2003
- He began ABA services in August 2003
- Jimmy began services with the Lovaas Institute in August 2005
Skill Level:

- Jimmy initiated PECS exchanges for food.
- He had approximately 20 spontaneous words.
- **Programming**: Reviewing acquired skills to build compliance.
- **Repetitive/Ritualistic behaviors**: visual, verbal, and physical (body scripting).
- **Challenging behaviors**: Frequent and high intensity protest behaviors.
Reason for Intervention

- Dangerous
- Interfered with teaching new skills
Definition of Climbing Behavior

- This behavior is defined as climbing doorframes, shelves, stairway railings, window ceils, intercom, people and portable heating unit.
- Primarily occurred on the doorframe of the walk-in closet of the treatment room.
Inappropriate Climbing

Insert Video: JL
00:00:00-
02:07:09

28 min from end of tape
Function of Behavior

- Based on direct observation, review of antecedent/behavior/consequence and frequency data collected by the ABA team, and parent/staff interview, this behavior appears to function as automatic and attention-seeking.
Unsuccessful Interventions

- Response block and removal from the door frame
- Reinforcement of the absence of behavior on a fixed-interval schedule (every minute)
- Attention-extinction
Intervention

- The purpose of the intervention was to teach Jimmy an alternate, appropriate, and safe location to engage in the climbing behavior
A pull up bar, purchased at a local sporting goods store, was placed in the doorway of the walk-in closet located in the treatment room.
“Bar”

Insert video: JL on bar
02:07:25-02:25:28

26 min from end of tape
Intervention Continued

- A lock was purchased for the door to restrict access to the bar and doorframe when adults were not present.
- A picture of the bar was incorporated into the PECS book.
- Jimmy was required to request for “bar” rather than “climbing”.
- Initially, instructors would response block Jimmy when he attempted to climb and prompted him to request the bar.
- Jimmy quickly learned to vocally request for the bar.
Intervention Continued

- All requests for the bar were granted at this time
- He was allowed to play on the bar for 10-15 seconds at a time
- Jimmy’s parents implemented this intervention during parent-directed time
Once Jimmy was consistently requesting the bar, access was contingent upon appropriate behavior and correct responding within structured teaching.

Gradually increased number of trials conducted in structured teaching sessions prior to granting access to bar.
A response cost intervention was introduced on October 3, 2006. This component was introduced because the frequency of climbing behavior reduced in the treatment room, but continued throughout the house. Goal was to extinguish the climbing behaviors to zero or near-zero levels.
If Jimmy engaged in inappropriate climbing behavior, instructors restricted access to the bar for the remainder of session.

Bar icon was placed on a restricted activities page in his PECS binder.

Increase in protest behaviors was observed.
Results

- Inappropriate climbing behavior reduced to near-zero levels
- These results generalized across settings (parent-directed times)
Future Goal

- Fade out the climbing bar while maintaining the absence of climbing behavior
Attention Maintained Non-Responses
Case Study: Michael

- Diagnosed with PDD-NOS at age 2 years, 9 months
  - Diagnosed with Autism at age 3 years, 9 months
- Began ABA services at age 3 years
- Began services with Lovaas Institute in October 2006 at age 4 years, 3 months
Baseline

- Did not demonstrate independent greetings
- High levels of prompting were given to respond, which also evoked elopement behavior which was determined to be attention maintained
  - Michael would look back to the adult as he eloped
Intervention

- Instructors initiated greetings then reinforced with an edible reinforcer and social praise for independent responses
- Faded greeting from verbal to wave to expectant look to no adult initiation
  - Continued to receive edible reinforcement at 1:1 ratio throughout prompt fading
Intervention Continued

- When all prompts were faded, edible reinforcement was systematically faded
  - 1:2 independent initiations
  - 1:2 independent initiations per person (in order to create more variability)
  - 1:3 independent initiations per person
  - Social praise only
Difficulties with Intervention

- Generalization was difficult in the community and with family members due to Michael’s parents not fully participating in the intervention.
- When a new team member was added, Michael exhibited high levels of non-responses with greeting that instructor.
Unpredictable Consequences to Reduce Noncompliance
Case Study: Jack

- Diagnosed with Autism at age 2 years, 2 months
- Began services with Lovaas Institute at age 2 years, 4 months
Noncompliant Behavior

- Definition: Jack does not respond, responds incorrectly, or does not respond with his best response to an instruction being presented.
- Based on direct observation, review of antecedent/behavior/consequence data collected by the family and ABA team, and parent/staff interview this serves to function as attention and automatic.
- Behavior occurred during both receptive and expressive programs.
- One instance of non-compliance lasted up to 240 minutes.
Interventions

- Follow through with all instructions, prompting when required
- Structure sessions so that reinforcers were only available during structured sittings; between sittings Jack was directed to acquired task completion activities
- When Jack requested edibles, preferred activities, etc., he was required to respond to the SD to which he was engaging in noncompliance
- When engaged in noncompliance, the reinforcer was removed and Jack was directed to a task completion activity
- Reinforce all instances of cooperation
Unpredictable Consequences

Immediately following noncompliant behavior, Jack is presented with one of six consequences:

1. Reinforce the behavior
2. Dismissing Jack without receiving edible reinforcement
3. Answering for Jack
4. Laughing and telling Jack that he is silly
5. Moving on to the next objective without receiving reinforcement
6. Follow through with instruction
Reinforce the Behavior

“That’s right, way to go!”

Insert video: JT
03:57:01- 04:09:12
56 min from end
Dismiss without Receiving Edible Reinforcement

- “Go play”

Insert video: JT
04:45:09 - 05:04:23
55 min from end
Answer for Jack

“You don’t know how to do it, this is how.”

Insert video: JT
01:11:26-01:39:14

61 min from end of tape
Laughing and Telling Jack he is Silly

- “You’re so silly!”

*Insert video: JT*

03:03:12 - 03:42:27

*57 from end of tape*
Change Objective without Receiving Reinforcement


Insert video: JT
03:44:02-03:57:00

56 min from end
Following Through

- Informational “no” delivered, prompt as needed, continue with objective until achieving independent response.

*Insert video: JT*
02:11:22 - 02:47:18

53 min from end

AND/OR

05:10:10-07:50:20

49 min from end
# Data Sheet

<table>
<thead>
<tr>
<th>Date Instructor</th>
<th>SD/Program</th>
<th>Unpredictable Consequence</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Reinforce IR</td>
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<td></td>
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<td>Laugh “you’re silly”</td>
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<td></td>
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<td>Follow Through</td>
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<td></td>
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<td>No SR+ Move On</td>
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<tr>
<td></td>
<td></td>
<td>Answer for J</td>
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<tr>
<td></td>
<td></td>
<td>Say “go play”</td>
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</tbody>
</table>
Important Components

- Included “reinforcing consequences”
- Parent participation with intervention was high and consistent
- Team members implemented all consequences evenly
Reduction of High Frequency Stereotopy
Case Study: Luca

- Diagnosed with autism at age 2 years
- Began services with Lovaas Institute at age of 2 years, 8 months
- Began ABA services with no previous receptive or expressive language, play skills, and delayed gross motor skills
Hand Stereotypy

- Definition: Behaviors serving the function of sensory involving the use of Luca’s hands. These behaviors include hand clapping, hand sucking or biting at a low intensity while no demands are placed, toy and/or body slapping, finger twisting, hand flapping, object/body part knocking with hand, object rubbing/streaking, toe twisting with fingers, visual hand behavior, and finger rubbing or scratching.

- Occurred at constant rate, therefore frequency data were not initially recorded; later, data were recorded during programs only.
Intervention

- Redirect and reinforce incompatible behavior
- First four months of treatment, negative feedback was not delivered for hand stereotypy
- Four months after onset of services, introduced consequence of informational “no” and redirected with gross motor imitation within programs
Intervention

Informational
“no” 6 months

introduce “MotivAider” and reinforce every 30 sec for absence of hand stereotypy 1 month

reinforce every 60 seconds 7 months

parent began using “MotivAider” outside of structured sessions 2 months

intermittently reinforced with edible 3 months

reinforce every 4 minutes

reinforce every 6 minutes 1 month

reinforce every 8 minutes 1 month
Intervention

- When behavior was no longer occurring during programs, began intermittently reinforcing with edible; also introduced use of a “rug”
  - If Luca engaged in hand stereotypy, he was redirected to a rug and was allowed to engage in stereotypy for up to 30 seconds
Hand Stereotypy

- Data recorded during programs only
- Data recorded across all environments at all times

Frequency per hour

Dates:
- Enrolled in school
- 2/1/04, 4/1/04, 6/1/04, 8/1/04, 10/1/04, 12/1/04, 2/1/05, 4/1/05, 6/1/05, 8/1/05, 10/1/05, 12/1/05, 2/1/06, 4/1/06, 6/1/06, 8/1/06, 10/1/06
Serial and Concurrent Intra-Program Objective Sequences for Children with Autism

Scott Cross
Florida State University
http://etd.lib.fsu.edu/theses/available/
Purpose

Compare two instructional procedures (serial and concurrent)

1. Reduce the professional divide within the field of behavior analysis
   - Smith (2002) “division among camps”
   - Green (2005) “call for data”

2. Improved services to consumers

3. Contribute a refined methodology for instructional comparisons with children with autism
<table>
<thead>
<tr>
<th></th>
<th>Noah</th>
<th>James</th>
<th>Rebecca</th>
<th>Mark</th>
<th>Michael</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>5-9</td>
<td>3-7</td>
<td>5-6</td>
<td>2-6</td>
<td>3-8</td>
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<tr>
<td><strong>Diagnosis</strong></td>
<td>autism</td>
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<tr>
<td><strong>IQ</strong></td>
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<td>88</td>
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<td><strong>Merrill-Palmer</strong></td>
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<td><strong>Behavior Composite</strong></td>
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<td><strong>Childhood Autism</strong></td>
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<td>31</td>
<td>37.5</td>
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<tr>
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<td>severe</td>
<td>severe</td>
<td>mild</td>
<td>severe</td>
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</tbody>
</table>
Experimental Tasks

• Noah: Sight word reading
• James: Expressive Functions
• Rebecca: Reading Object Labels
Reading Object Labels

- bus
- sofa
- train
- tree
- snowman
- books
- frog
Experimental Tasks

- Noah: Sight word reading
- James: Expressive Functions
- Rebecca: Reading Object Labels
- Mark: Pretend Play Actions (receptive and expressive)
- Michael: Receptive Actions
Baseline Probe Procedure:

1. Acquired/Mastered Objective
2. Baseline Probe
3. Acquired/Mastered Objective
- From baseline probes, 16 unknown objectives were identified and assigned to either serial or concurrent teaching conditions.

<table>
<thead>
<tr>
<th>Serial</th>
<th>Concurrent</th>
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</thead>
<tbody>
<tr>
<td>1st</td>
<td>5th</td>
</tr>
<tr>
<td>2nd</td>
<td>6th</td>
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<tr>
<td>3rd</td>
<td>7th</td>
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<tr>
<td>4th</td>
<td>8th</td>
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<table>
<thead>
<tr>
<th>Serial</th>
<th>Concurrent</th>
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</thead>
<tbody>
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<td>11th</td>
<td>12th</td>
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<td>13th</td>
<td>14th</td>
</tr>
<tr>
<td>15th</td>
<td>16th</td>
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</tbody>
</table>
Procedure

Reinforcer Assessment

Cumulative responding across four exemplars

Sessions

Baseline
Serial Instruction

- Massed trial 1
- Massed trial 2
- Random rotation 1 & 2
- Massed trial 3
- Expansion of 3
- Massed trial 4
- Expansion 4
- Mastery = 90% across 2 sessions
Concurrent Instruction

• All four objectives were presented in a single session

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>(Transfer) S^D: “What color”?</td>
<td>Prompt (if needed)…“yellow”</td>
<td>Response: “Yellow”</td>
<td></td>
</tr>
<tr>
<td>(Transfer) S^D: “What color”?</td>
<td>Prompt (if needed)…“red”</td>
<td>Response: “Red”</td>
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<tr>
<td>(Transfer) S^D: “What color”?</td>
<td>Prompt (if needed)…“blue”</td>
<td>Response: “Blue”</td>
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<tr>
<td>(Transfer) S^D: “What color”?</td>
<td>Prompt (if needed)…“green”</td>
<td>Response: “Green”</td>
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Parent Generalization

- After each set of four objectives was acquired, they were probed by the parent (not involved in teaching) in a generalization setting.
Michael: Receptive Actions

Cumulative responses for four objectives to meet acquisition criteria

- **Baseline**
  - Correct: 160
- **Serial**
  - Correct: 329
  - Prompted: 224
- **Concurrent**
  - Correct: 322
  - Incorrect: 322

Sessions: 1 to 183
Total number of trials to criterion

- Sight
  - Reading

- Expressive Functions

- Reading Object Labels

- Pretend (Motor/vocal chains)

- Receptive Actions

Trials to Acquisition Criteria Met

<table>
<thead>
<tr>
<th></th>
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<th>1st Serial</th>
<th>2nd Serial</th>
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<td>Noah</td>
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<td>Rebecca</td>
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<tr>
<td>Mark</td>
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<td>Michael</td>
<td>322</td>
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### Table 5.
*Treatment integrity data across participants*

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<td>Mean</td>
<td>Range</td>
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<td>Error correction</td>
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<td>76-91%</td>
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Included Methodology Components

1. IV integrity data
2. Unbiased generalization
3. Demonstration of experimental control
4. Counter balancing treatment conditions
5. Density and effectiveness of reinforcers must be equated (Dunlap, 1984)
6. Selection of exemplars without a biased learning history
7. Baseline probe procedure