Overview of Operants and Teaching Procedures

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Behavioral Classification of Language

Primary Verbal Behaviors

- Mand (Requesting)
- Tact (Labeling)
- Echoic (Vocal/Manual Sign Imitation)
- Intraverbal ("Wh" questions)

Non-Verbal Behavior

- Listener Behavior (Receptive)
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.

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

Kellen Typical Development

Listener Responses

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

*Mand* (requesting): Asking for reinforcers that you want. Saying “candy” because you want candy.

- **Antecedent**
  - Motivation (MO)

- **Learner Behavior**
  - Verbal Behavior

- **Reinforcer**
  - Specific to the MO

- **Antecedent**
  - Motivation for candy

- **Learner Behavior**
  - Learner says “Candy”

- **Reinforcer**
  - Delivery of candy
**TACT**

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

![Diagram of Tact]

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

![Diagram of Echoic]
**MIMETIC**

*Mimetic* (imitating manual signs): Copying someone’s motor movements. Signing “candy” after someone else signs “candy.”

**Antecedent**
Verbal Stimulus

**Learner Behavior**
Verbal Behavior that matches the antecedent

**Reinforcer**
Non-Specific Socially Mediated Reinforcement

**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**
Verbal Stimulus

**Learner Behavior**
Verbal Behavior that does **not** match the antecedent

**Reinforcer**
Non-Specific Socially Mediated Reinforcement

**Antecedent**
Teacher says: “What do you eat?”

**Learner Behavior**
Learner says “Candy”

**Reinforcer**
Teacher says “Good job” and delivers a toy

*Video – Intraverbal   Sign Intraverbal Katy Sign 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**
  - Verbal Stimulus

- **Learner Behavior**
  - Non-Verbal Behavior (motor responses to antecedent)

- **Reinforcer**
  - Non-Specific Socially Mediated Reinforcement

**Antecedent**
Teacher says: “Give me the candy?”

**Learner Behavior**
Learner hands candy to teacher

**Reinforcer**
Teacher says “Good job” and delivers a toy

- Video – Listener Responding
- Video – LRFFC

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Teach All The “Meanings”

- **CANDY**
- **Mand**
- **Tact**
- **Echoic**
- **Intraverbal**
- **listener Behavior**
- **Mimetic**
## CHILD LANGUAGE DEVELOPMENT

<table>
<thead>
<tr>
<th>Approximate Age</th>
<th>Expressive Language</th>
<th>Auditory Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 4 months</td>
<td>Verbal play through cooing, gooing, and laughing. Vowel sounds heard such as ooooh, eee, and ahh.</td>
<td>Turns head toward sounds and can begin to discriminate one sound from another.</td>
</tr>
<tr>
<td>4 to 8 months</td>
<td>Babbling begins. Some consonant sounds can be heard.</td>
<td>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).</td>
</tr>
<tr>
<td>8 to 12 months</td>
<td>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.</td>
<td>Relates words with physical objects (e.g. understands that the word “ball” actually means the object ball). Responds to simple phrases such as “no.”</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>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). At 65% intelligible words</td>
<td>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.</td>
</tr>
</tbody>
</table>

| 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. At 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. |
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.
TEACHING PROCEDURES
&
Teaching the Operants

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 $S^D$.

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**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:

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Learner Behavior</th>
<th>Reinforcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocal S: “Do this.”</td>
<td>Imitation of motor movement (Child moves the bear back and forth on the table)</td>
<td>Non-Specific Reinforcement</td>
</tr>
<tr>
<td>Demonstration of motor movement (Teacher models moving the bear back and forth on the table)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Physical Prompt</td>
<td></td>
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</table>

Transfer of stimulus control:

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**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:

- **Antecedent**
  - Vocal $S^D$—“Touch your nose.”
  - Model Prompt (Teacher touches nose)

- **Learner Behavior**
  - Non-Verbal Behavior
  - (Child touches nose)

- **Reinforcer**
  - Non-Specific Reinforcement

Transfer of stimulus control:

- **Antecedent**
  - Vocal $S^D$ (“Touch your nose.”)

- **Learner Behavior**
  - Non-Verbal Behavior
  - (Child touches nose)

- **Reinforcer**
  - Non-Specific Reinforcement

**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:

- **Antecedent**
  - Vocal $S^D$—“Give me the swimming pool.”
  - Non-verbal stimulus (Picture of a swimming pool)
  - Gestural Prompt (Teacher points to swimming pool)

- **Learner Behavior**
  - Non-Verbal Behavior
  - (Child selects the picture of the swimming pool)

- **Reinforcer**
  - Non-Specific Reinforcement

Transfer of stimulus control:

- **Antecedent**
  - Vocal $S^D$ (“Give me the swimming pool.”)
  - Non-verbal stimulus (Picture of a swimming pool)

- **Learner Behavior**
  - Non-Verbal Behavior
  - (Child selects the picture of the pool)

- **Reinforcer**
  - Non-Specific Reinforcement

**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 $S^O$ and non-verbal stimulus

**Prompt:**

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<tbody>
<tr>
<td>Vocal $S^O$: “Give me the one you eat.”</td>
<td>Non-Verbal Behavior (Child selects chip)</td>
<td>Non-Specific Reinforcement</td>
</tr>
<tr>
<td>Non-verbal stimulus (Picture of a chip)</td>
<td></td>
<td></td>
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<td>Gestural Prompt (Teacher points to chip)</td>
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<td>Non-verbal stimulus (Picture of a chip)</td>
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<td>Vocal $S^O$: “What is it?”</td>
<td>Vocal Verbal Behavior (Child says “Ears”)</td>
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<td>Non-verbal Stimulus (Body Part-Ears)</td>
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<td>Vocal Prompt (Teacher says “Ears”)</td>
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**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

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**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:

```
Antecedent
Vocal S:< “What’s this?”
Non-verbal Stimulus (Picture of cat)
Mimetic Prompt (Teacher signs “cat”)

Learner Behavior
Verbal Behavior (Child signs “cat”)

Reinforcer
Non-Specific Reinforcement
```

Transfer of stimulus control:

```
Antecedent
Vocal S:< “What’s this?”
Non-verbal Stimulus (Picture of cat)

Learner Behavior
Verbal Behavior (Child signs “cat”)

Reinforcer
Non-Specific Reinforcement
```

Video - Tact (Sign)

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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

Prompt:

```
Antecedent
Vocal S:< “What says meow?”
Non-verbal stimulus (Picture of a cat)

Learner Behavior
Verbal Behavior (Child says “Cat”)

Reinforcer
Non-Specific Reinforcement
```

Transfer of stimulus control:

```
Antecedent
Vocal S< (“What says meow?”)

Learner Behavior
Verbal Behavior (Child says “Cat”)

Reinforcer
Non-Specific Reinforcement
```

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:

**Antecedent**
- Vocal $S^D$: “What’s your name?”
- Vocal Prompt (Teacher says “Max”)

**Learner Behavior**
- Verbal Behavior (Child says “Max”)

**Reinforcer**
- Non-Specific Reinforcement

Video – Intraverbal 2

Intraverbal 3

Transfer of stimulus control:

**Antecedent**
- Vocal $S^D$ (“What’s your name?”)

**Learner Behavior**
- Verbal Behavior (Child says “Max”)

**Reinforcer**
- Non-Specific Reinforcement

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:

**Antecedent**
- Vocal $S^D$: “What’s your name?”
- Demonstration of motor movement (Teacher signs “Bobby”)

**Learner Behavior**
- Verbal Behavior (Child signs “Bobby”)

**Reinforcer**
- Non-Specific Reinforcement

Video – Intraverbal 4

Intraverbal 3

Transfer of stimulus control:

**Antecedent**
- Vocal $S^D$ (“What’s your name?”)

**Learner Behavior**
- Verbal Behavior (Child signs “Bobby”)

**Reinforcer**
- Non-Specific Reinforcement

Video – Intraverbal 4

Intraverbal 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*

References
