On the Role of the Speaker and Listener within the Same Skin in the Emergence of Untaught Verbal Operants.

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Objectives

- Explore Skinner’s (1957) conceptualization of covert verbal behavior as a type of private events, particularly as presented in latter portions of *Verbal Behavior*.

- Present the start of a research agenda for studying covert verbal behavior and according to the Skinner (1957) conceptualization.

- “These additional uses of verbal behavior….are most interesting when a group is not involved – when, in short, a (person) talks to (himself or herself). Once a speaker also becomes a listener, the stage is set for a drama in which one (person) plays several roles.” (Skinner, 1957, p. 433).
Some Background Information
Skinner on Private Events

- Private events are behavior occasioned by external environmental stimuli that happens to occur at the covert level – nothing mystical or magical about the fact that they occur covertly (1957; 1953)

- Thinking is behaving (1953)

- “Events at the covert end have no special properties, observe no special laws, and can be credited with no special achievements” (1957; p. 438)

- Conditioned or respondent covert seeing: We see X only when any stimulus that has accompanied X is present (i.e., see “red” covertly when one sees a heart on a card), as determined by one’s history of reinforcement (1953).

- Operant covert seeing: One sees reinforcing stimuli covertly because it is reinforcing to do so (i.e., the person who daydreams about Venice) (1953)
The Debate on Private Events

• Because they are private, they are unobservable, “guessed at, inferred, hypothetical constructs” -- not amenable to measurement (Baum, 2011)

• We should study private events, and establish reliable overt indicators (Palmer, 2011)

• Levels of analysis – both independent and dependent variables (Anderson et al., 2000)
Speaker and Listener within the Same Skin

- *Thinking* (Ch. 19 of 1957) may be LEAST subjected to empirical investigation:
- Thinking conceptualized as covert verbal behavior for which speaker mediates his or her own reinforcement (serves as his or her own listener)
- Many practical benefits for doing so
Speaker and Listener within the Same Skin

- **The speaker’s own verbal behavior automatically supplies stimuli for echoic, textual, or intraverbal behavior, and these in turn generate stimuli (which occasion) further responses” (1957; p. 439)

- Speaker’s covert (and overt) verbal behavior affects his/her behavior as a listener
  - Opening a Lock example
  - Playing the Piano example

- Covert verbal responses may be automatically reinforced by the practical consequences they produce for the speaker – automatic practical consequences may supply the necessary contingencies (1957; p. 442); problem-solving (Palmer, 1991)
Overt Indicators of Covert (Private) Behavior
Stimulus Pairing Observation Procedure (SPOP):

- Rosales, Rehfeldt, & Huffman (2012; *JABA*):
- SPOP: a procedure to produce tacting & listener skills that requires no explicit instruction
- Participants are simply exposed to pairings of stimuli separated by an ITI.
- Vocal names accompanied by visual stimuli mirror naturally occurring opportunities (i.e., observing adults and peers manipulating and tacting items).
- Rosales et al. found that some untaught listener and tact skills emerged after SPOP instruction for preschool children; but tact instruction with other stimuli was necessary for other tact and listener relations to emerge.
- Horne & Lowe (1996): participants’ echoing of names during SPOP may facilitate their performance during listener and tact posttests, as though responding as a speaker and listener within the same skin.

• **Purpose:**
  – Evaluate the efficacy of SPOP and MEI/SPOP in producing untaught listener and tact skills
  – Explore the role of participants’ echoic behavior (echoing of stimulus names) on their performance on listener and tact test trials

  ▪ **Participants:**
    ▪ Three 7-year olds with autism and severe language delays (VB-MAPP Level 1)
Procedure Overview:

• Pretest Probes (in 9-trial blocks):
  – Tact Probes (“what is it?)
  – Listener Probes (“where is the ______”)

• SPOP Instruction:
  – Trial consisted of 2 s presentation of picture and its dictated name (5 9-trial blocks), with 2-3 s ITI

• Posttest Probes 1

• MEI/SPOP:
  – Identical to SPOP instruction but performed with 2 novel sets of 3 stimuli

• Remedial SPOP w/ Original Stimuli

• Posttest Probes 2
Measures:

• Performance on
  – 1. Tact Probes (for emergent tacts)
  – 2. Listener Probes (emergent listener)

as a function of SPOP

Proportion of Echoed Stimulus Names emitted during

  1. Listener pre and posttests trials ("where is the ___")
  2. SPOP Instruction (pairings of dictated names with visual stimuli)
Only Jackson showed untaught listener and tact skills with original instructional stimuli following multiple exemplar instruction with SPOP and novel stimuli.

Jenna showed untaught listener skills.

Sophia showed improvement in tact and listener skills following SPOP and MEI/SPOP but none were at criterion performance.
# Echoic Results

*Mean percentage of echoed trials for the original stimulus sets and MEI stimuli sets for Jackson.*

<table>
<thead>
<tr>
<th></th>
<th>Original Set</th>
<th>MEI Set 1</th>
<th>MEI Set 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>25.93%</td>
<td>18.52%</td>
<td>66.66%</td>
</tr>
<tr>
<td>Intervention</td>
<td>96.67%</td>
<td>94.07%</td>
<td>92.78%</td>
</tr>
<tr>
<td>Posttest</td>
<td>34.72%</td>
<td>66.67%</td>
<td>44.44%</td>
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</tbody>
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Jackson, who showed untaught tacting and listener skills, echoed names on high proportion of trials during all SPOP phases, but on few trials during listener pre and posttests.
Echoic Results

Mean percentage of echoed trials for the original stimulus sets and MEI stimuli sets for Jenna.

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<thead>
<tr>
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<th>MEI Set 2</th>
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</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>63.49%</td>
<td>33.33%</td>
<td>22.22%</td>
</tr>
<tr>
<td>Intervention</td>
<td>96.3%</td>
<td>91.11%</td>
<td>98.3%</td>
</tr>
<tr>
<td>Posttest</td>
<td>81.81%</td>
<td>73.61%</td>
<td>92.98%</td>
</tr>
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Jenna, who showed untaught listener skills following SPOP & MEI, echoed names on high proportion of trials during all SPOP phases, and on a high proportion of posttest trials relative to pretests.
## Echoic Results

*Mean percentage of echoed trials for the original stimulus sets and MEI stimuli sets for Sophia.*

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<thead>
<tr>
<th></th>
<th>Original Set</th>
<th>MEI Set 1</th>
<th>MEI Set 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>83.33%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Intervention</td>
<td>97.04%</td>
<td>94.07%</td>
<td>92.54%</td>
</tr>
<tr>
<td>Posttest</td>
<td>97.78%</td>
<td>93.65%</td>
<td>79.09%</td>
</tr>
</tbody>
</table>

Sophia, who made minor improvements in tact and listener skills, named stimuli on a high proportion of SPOP trials and pre and posttest trials.
Implications

- SPOP effective in promoting development of listener skills
- Tact skills at criterion levels following SPOP for one participant only
- All participants echoed frequently during SPOP instruction, Jackson less so during listener tests when skills were at criterion, Sophia moreso when skills were not at criterion
- Naming occurring covertly during Jackson’s listener tests?
- Echoic behavior only corollary
Would teaching written spelling (i.e., taking dictation) facilitate the induction of vocal spelling (intraverbal)?

- **Skinner (1957):** Writing and speaking are separately acquired and conditioned; what “bridges the gap” between spoken and written behavior?

- Greer et al. (2005)

- *Would we observe corollary indicators of covert spelling?*
Participants

- 3 young adults with intellectual disability
- Followed instructions without difficulties, participated in conversations with others, and could identify and name letters
- Had participated in special education in high school and had graduated within the last 1-2 years
- Used multiple baseline design across participants
Instructional Stimuli
(from SAT prep book)

Textual Stimuli:

- Verify
- Confirm
- Demonstrate
- Expand
- Distend
- Increase
- Negate
- Disprove
- Invalidate
Procedure, cont.:

- **Pretests/Posttests**
  - Evaluated nontargeted vocal spelling responses → 3 x each word
  - “Spell ___”
  - No reinforcement and no error correction

- **Dictation Instruction**
  - “Write ___”
  - Correct response → verbal praise
  - Incorrect response → error correction

Plus feedback
Implications:

- All participants vocally spelled the words they had been directly taught to write following dictation instruction.
- Participants may have emitted covert textual spelling in the presence of the tested auditory stimuli, which then controlled their subsequent behavior.
- **Corollary Behaviors:** One participant traced letters during posttests; all repeated experimenter’s dictation of word on vocal spelling test trials.
Including More Measures of Private Events (Palmer, 2011)
Mazo et al. (project completed) Effects of Dictation Taking and Spelling Responses in Children While Using Overt Indicators to Measure Covert Processes

- Replication of De Souza & Rehfeldt (2013) with typically-developing 1st graders
- Included additional measures of covert processes (overt indicators)
Method

- **Dependent Variable**
  - Percent of correct vocal spelling (words unique to each participant)
  - Overt Indicators

- **Independent Variable**
  - Taking Dictation
  - (Written spelling with error correction & feedback)

- **Experimental Design**
  - Multiple Probe Embedded in a Multiple Baseline Design Across Participants
Overt Indicators

• Katherine
  – Mouthing words
  – Looking up
  – Staring into space

• Amelia
  – Mouthing words
  – Looking up
  – Staring into space
  – Finger counting

• Oscar
  – Mouthing words
  – Looking up
  – Staring into space
  – Closing eyes
Private Events as an Independent Variable (Anderson et al. 2000)
Sears & Johnson (2001): Visual imagery was more effective than control condition on written spelling performance and retention.

- **Their Procedure:**
  - *Students looked at word; teacher covered word*
  - *Instructed to see image of item in mind*
  - *Imagine word displayed on large outdoor screen*
  - *Imagine each letter of word pasted onto the screen with fantasy paste*
  - *“Help yourself remember this word by imagining yourself nailing each letter with fantasy nails”*
Method & Procedure:

Participants:

- Mary: 17; ADHD & Variety of language & academic disorders
- Steven: 18; ADHD, Asperger Syndrome
- Stacy: 17; ADHD

Stimuli: 10 ACT words

Mary
Agrarian
Connoisseur
Incorrigible
Inevitable
Irrefragable
Languid
Pendulous
Propensity
Regalia
Zealot

Steven & Stacy
Cavalier
Complaisant
Deliquesce
Exegesis
Forebode
Ingratiate
Malign
Proselyte
Repose
Respite
Procedure

- **Pre and Posttests:** Instructed to write ____
- **Control Condition (exposure):** Shown stimulus for 5 s, “The word is ______;” instructed to write word.
- **Visual Imagining Condition:** Shown stimulus for 3 s; “The word is ______”; stimulus removed.
- “See if you can see the written word in your mind (3 second pause). Imagine the word on a piece of white paper (3 second pause). Help yourself remember the word by imagining yourself writing over each letter of the word (3 second pause).” Instructed to write word.
- **Visual Imagining + Error Correction & Reinforcement Condition:** Same as Visual Imagining, but feedback & error correction provided for correct and incorrect responses

**Corollary Measures**
- Any finger spelling, vocal spelling, echoing or sounding out the dictated word, or looking away from their paper before writing their response on a trial by trial basis
Results

Error correction & reinforcement necessary; 27-42 instances of overt indicators during ALL instructional phases.

Error correction & reinforcement necessary; 1-7 instances of overt indicators during control and VI only.

Mastered words during VI alone; but improvements also noted following control/exposure condition; 4-5 instances of overt indicators during pretests and VI only.
Concluding Comments

• Behavior analysts can’t ignore covert VB or “thinking”
• In verbal organisms, we know that overt VB may recede to the covert level (Skinner, 1957)
• Make it part of the analysis!
• OK with Skinner
• Technology may develop for targeting cognitive skills
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