The Role of Joint Control Training in the Acquisition of Complex Listener Responses: A Literature Review and Some Applications

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Pennsylvania Training and Technical Assistance Network

PaTTAN's Mission

The mission of the Pennsylvania Training and Technical Assistance Network (PaTTAN) is to support the efforts and initiatives of the Bureau of Special Education, and to build the capacity of local educational agencies to serve students who receive special education services.

PDE's Commitment to Least Restrictive Environment (LRE)

Our goal for each child is to ensure
Individualized Education Program (IEP)
teams begin with the general
education setting with the use of
Supplementary Aids and Services
before considering a
more restrictive environment.

Agenda

- Introduction
- Verbal Operants
- Joint Control
- The listener
- Listener responding
- Literature Review
- Some Applications

Introduction to the Issue

- Skinner (1957) in his behavioral analysis of the nature of verbal behavior suggested that verbal behavior only occurs in the presence of a listener
  – Speaker and listener as critical members of verbal interaction
  – Speaker normally also a listener (Skinner, 1957)
- A hallmark to this analysis: verbal and non-verbal behavior fundamentally no different
  – Comprises forms of operant behavior under various types of stimuli and motivational control

- Elaboration on the difference between traditional or commonsense understanding of language and behavioral analysis
  – Concerned with the verbal behavior of the individual speaker rather than with the verbal practices of a verbal community (e.g., as presented in a dictionary or grammar text; Sundberg & Michael, 2001)

The Verbal Operants

- Skinner (1957) conceptually described the different units or "operants"
  - Individual's sophisticated verbal repertoire is comprised of.
- Verbal operant as unit of analysis
  - Did not account for topography but functional relation between a type of responding and the same independent variables that control verbal and non-verbal responding (e.g., MO/S^D and consequences that follow that type of responding)

A Little Review – MAND

MO → Response → Sr+

(Verbal Behavior)

- Functional control of motivating operations
- Only operant that produces reinforcer related to the motivational state
- Allows the speaker to control the environment
- Common terms: request, command, demand, countermand

The Intraverbal

$$S^D \rightarrow Response \rightarrow Sr+$$

(Verbal)　　(Verbal Behavior)　　(generalized social Sr+

- Functional control of verbal discriminative stimuli
- No point-to-point correspondence
- Common examples: conversational skills, answering questions, filling in responses
- Palmer (2016)
  - Intraverbal and intraverbal control

The Tact

$$S^D \rightarrow Response \rightarrow Sr+$$

(Sensory)　　　(Verbal Behavior)　　(generalized social reinforcement)

- Functionally controlled by sensory, non-verbal discriminative stimuli
- Common term: labeling, naming

The Echoic

$$S^D \rightarrow Response \rightarrow Sr+$$

(Vocal Verbal)   (Verbal Behavior)   (generalized social
reinforcement)

- Functionally controlled by VOCAL verbal discriminative stimuli
- Point-to-point correspondence
- Commonly known as repeating or copying someone else's verbal behavior

The Echoic and the Tact

- Verbal relations that have identified in the literature as of extreme importance for the development of complex verbal repertoires
  - (E.g., Listener responding)

Joint Control

- Lowenkron (1984, 1988, 1989, 1997, 1998, 2006a, 2006b). A model to explain complex behavior in humans.

- Finds the varieties of speaker behavior entirely sufficient to describe the behavior of the listener.

Joint Control – Definition

"Joint control occurs when the currently rehearsed topography of a verbal operant, as evoked by one stimulus is simultaneously evoked by another stimulus. This event, the onset of joint stimulus control by two stimuli over a common response topography, then sets the occasion for a response appropriate to this special relation between the stimuli" (Lowenkron, 1998)

"the effect of two discriminative stimuli acting jointly to exert stimulus control over a common response topography" (Lowenkron, 1998)

- The onset of joint control is a stimulus event that arises with the appearance of a second source of control; a non-verbal stimulus (i.e., tact), over a rehearsed topography (i.e., echoic/self echoic – mimetic/self-mimetic)

- Joint control - nothing special or new beyond operant stimulus control.

- However, unique event of a single verbal response comes under two joint sources of stimulus control

- This event then exerts control over a third response (e.g., listener/selection response)

The Listener

The listener is said to effectively act as a listener or "understand" the verbal behavior of a speaker if he simply behaves in an appropriate fashion (Skinner, 1957)

- The application of Skinner's analysis of verbal behavior (1957) may seem a straightforward early in language training
- More advanced skills – thinking, understanding, completing sequences of tasks- more complex than realized
- Advanced verbal relations involve multiple sources of control
  - Interacting repertoires cannot develop before the relevant or more basic components are established

A little more on the Listener…

- Listener is a fundamental component of any verbal interaction
  - Listener being verbal

- The control exerted by verbal stimuli is at least partially dependent upon the listener having an existing verbal repertoire

- Given the covert nature of listening behaving, a behavioral approach assumes that hearing the directions of speakers evokes a number of discriminated verbal behaviors in both, the speaker and the speaker as a listener (Schlinger, 2008)

- The behavior of the listener and the speaker may be inseparable.

"The listener also behaves verbally when he/she is said to be listening" (Schlinger, 2008)

- Listening may be predicated upon the interaction of multiple sources of control
  – Mediate listening responses

Verbal Mediation in Listener Behavior

- By identifying the role of verbal mediation (i.e., speaker behaviors), the analysis of joint control provides a plausible interpretation of the occurrence of generalized responding, which unmediated accounts are insufficient to explain
- When verbally mediated, responses not dependent upon a history of reinforcement related to a particular stimulus or set of stimuli.

Verbal Mediation in Listener Behavior

- When verbally mediated, the listener response is emitted under the control of various stimuli within the task (e.g., selection task)
- In the case of a selection task, for instance, the selection response is determined by the occasion in which one response topography is emitted under two sources of control and is hence a generic event serving as the basis for generalized responding

Listener Responding

- The emission of a response under the control of a verbal stimulus (Cooper et al., 2007)

- Topography of the response does not involve a communicative attempt
  - Response to a mand of a verbal partner

Listener Behavior and Individuals with Autism

- Individuals with ASD may display impaired abilities to engage in complex typical behaviors of speakers and/or listener
  - E.g., requesting, thinking, following directions that contain multiple stimuli
- The absence of core speaker and listener repertoires present multiple barriers that impede individuals diagnosed with ASD to appropriately and effectively interact with the social environment

- Incorporation of specific programming for the acquisition of listener repertoires commonly seen in behavior analytic interventions.

- However, such programs may focus on the shaping of specific response topography or the "unmediated" stimulus selection
  - Rather than addressing verbal repertoires
  - May acquire listener repertoire that may not lead to generative responding

So, where is the literature leading us?

- The analysis of joint control provides a plausible explanation for the development/performance of complex, multiply controlled verbal repertoires in individuals with ASD

- Useful information and guidance regarding conceptually robust language training programs for individuals with ASD and/or other language impairments

Systematic Literature Review

- Review of available literature regarding the use of the analysis of joint control (Lowenkron, 1984, 1988, 1989, 1997, 1998, 2006a, 2006b) as well as procedures that derive from this analysis.

- Emphasis on methodological rigor of studies selected for review

Inclusion Criteria

Article included only if met the following criteria
•Peer Reviewed journal articles
•Used analysis of joint control as conceptual basis
•Used joint control training procedures to teach complex listener or related skills (e.g., generalized delayed matching, generalized sequencing tasks)
   – Scarcity of research related to the training of LR

•Experimental studies

Inclusion Criteria

- Due to limited studies that used joint control training procedures with individuals with ASD and/or other developmental disabilities, studies that included other populations were considered (e.g., . typically developing children, college students, adults)

Results

- Five peer reviewed articles
  - Causin, K. G., Albert, K. M., Carbone, V. J., & Sweeney-Kerwin, E. J. (2013). The role of joint control in teaching listener responding to children with autism and other developmental disabilities. Research in Autism Spectrum Disorders, 7, 997-1011.
  - Clough, C. W., Meyer, C. S., & Miguel, C. F. (2016). The effects of blocking and joint control training on sequencing visual stimuli. The Analysis of Verbal Behavior. DOI 10.1007/s40616-00667-1

- DeGraaf, A., Schlinger, H. D. (2012). The effects of joint control training on the acquisition and durability of a sequencing task. The Analysis of Verbal Behavior, 28, 59-71.
- Gutierrez, R. D. (2006). The role of rehearsal in joint control. The Analysis of Verbal Behavior, 22, 183-190.
- Tu, J. C. (2006). The role of joint control in the manded selection responses of both vocal and non-vocal children with Autism. The Analysis of Verbal Behavior, 22, 191- 207.

Research in Autism Spectrum Disorders

Journal homepage: http://ees.elsevier.com/RASD/default.asp

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

CrossMark

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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.

Causin et al. (2013)

- One of two studies conducted with children with Autism
- 3 students diagnosed with ASD
  - 2 vocal; 1 non-vocal learner (sign)

- All students assessed through use VBMAPP

- Approximate language skills mainly level 2 for all students participating with some skill repertoires in level 3

- Study conducted in private clinic that served students with ASD and/or other developmental disabilities and that used instruction based on principles of behavior analysis and Skinner's analysis of verbal behavior

- Cumulative number of untrained and trained sets acquired during probes
  - Precise definition of dependent variables
- Data collected on accuracy of participant responding (cold probe procedure)
  - Y/N
- IOA data collected on dependent measures
  - 29-50% of sessions
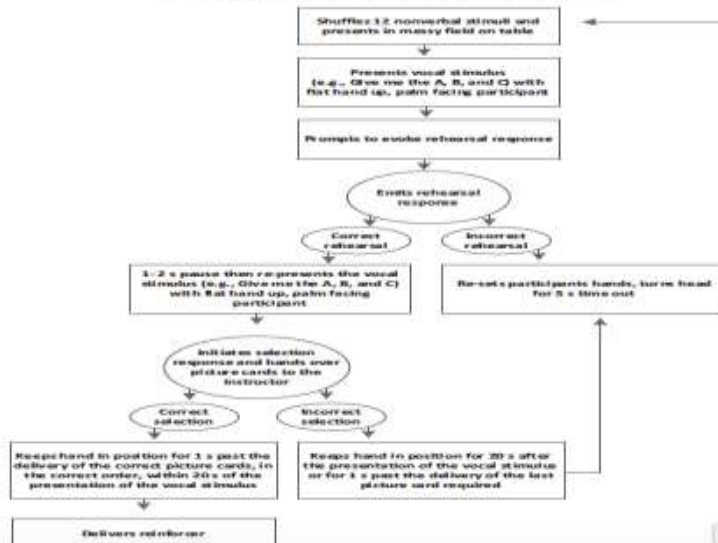- Multiple probe /participants (Horner & Baer, 1978)

- Teacher training conducted prior to baseline
  - Treatment fidelity of teacher training
    - 90% or above criteria
  - Booster sessions

Overview of Probe procedure

Joint Control Training

- Shuffles non verbal stimuli
- Present vocal stimuli (e.g., give me A – B – C)
  - Flat hand up/palm facing participant
  - Physically blocking participant from responding
- Prompt to evoke rehearsal through
  - Echoic to self-echoic
  - Intraverbal (sign)
- **SELF-REHEARSAL**
- Re state SD
- Correct response - reinforce
- Incorrect response – error correction

Error Correction Procedure

- Stopped trial
- Re-set
- Joint control training procedure re-started
  - Prompts depending upon nature of error
- Participants were never directly prompted to select the correct item

Results
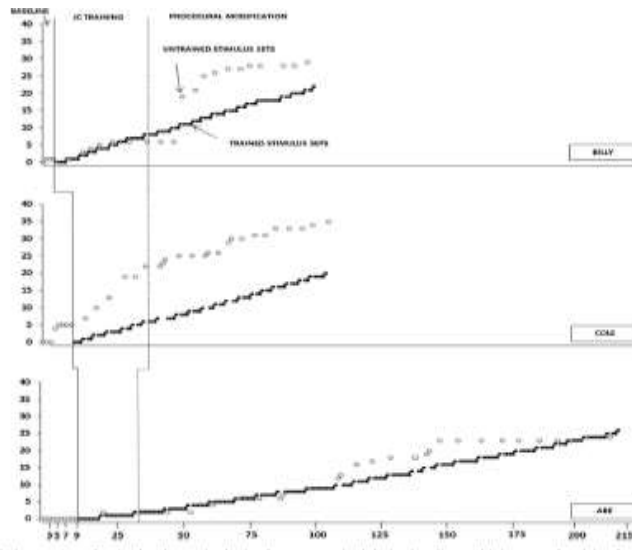
The Role of Joint Control in the Manded Selection Responses of Both Vocal and Non-vocal Children with Autism

Joyce C. Tu, Center for Behavioral Sciences, Inc.

In the present study, joint-control training was applied when teaching manded selection responses to children with autism. Four vocal children with autism participated in the first experiment, two males (ages seven and eight) and two females (ages seven and nine). The results showed that it was only after object-word naming was trained under joint control that the symmetrical performance of manded selection responses appeared with no additional training. Four non-vocal children with autism participated in the second experiment, two males (ages six and seven), and two females (ages twelve and thirteen). These results also showed that it was only after the joint tact/self-mimetic/sequelic control training that the symmetrical performance of manded selection responses appeared with no additional training.

Key words: joint control, listener's behavior, manded selection responses, match-to-sample, autism.

Tu (2006)

- 8 Participants – all diagnosed with ASD
  - 4 vocal and 4 non-vocal
- Joint control used to teach "manded selection responses"
  - Bi-directional relations or name object symmetry (Horne & Lowe, 1996)

- 2 experiments

Experiment 1

- DV = Emergence of untrained/unreinforced manded stimulus selection responding

- IV = Acquisition of joint tact/self-echoic responses

Joint Control Training – Tu (2006)

1. 4 pictures of set one were presented at one time
2. The experimenter said the name of the picture while using the echoic gesture prompt
3. While the participant was repeating the name of the picture, the experimenter said the name of picture again and again displayed the prompt
4. When the participant picked up the named picture, the experimenter immediately said "What is it?"
5. A correct response (tacting the picture) was reinforced – if incorrect, correct tact behavior prompted
6. Training continued until the participant selected each picture correctly on each of 10 trials when presented two at a time, and again three at a time, and finally four at a time.
7. Echoic prompt was faded – participants responded by self rehearsing
8. Reinforcement provided for each correct response

Experiment 2

- DV= occurrence of untrained/unreinforced name-object symmetry responding (manded stimulus selection)

- IV= occurrence of joint tact/self-mimetic (Intraverbal) responding

Joint Control Training

1. 4 shapes placed on the table one at a time
2. The experimenter said to the participant "give me (_____)" – name of the shape
3. The participant was prompted mimetically to make the hand sign of the shape, then hand the picture of the shape to the experimenter
4. The experimenter immediately said "What is it?"
5. Correct tact responses were reinforced – Incorrect tact responses were followed by a verbal "try again"
6. Training continued until the participant selected each shape correctly on each of the five trials when shapes were presented individually and as a group (2, 4, and 4)

Results

- It was only after object-word naming was trained under joint control that the symmetrical performance of the manded selection response appeared with no additional training - Vocal learners
- Similar result for non-vocal learners with mimetics

The Role of Rehearsal in Joint Control

Rick D. Gutierrez, California State University, Los Angeles

Behavior analysts have offered accounts of the behavior involved in matching to sample and delayed matching to sample. But until recently have not offered a behavioral analysis of generalized matching-to-sample. The concept of joint control, however, seems especially suited to such an analysis The present study used a joint-control procedure to train five adult women to acquire a generalized sequencing behavior using an unfamiliar language. After joint-control training the participants were able to produce untrained picture sequences, and blocking the mediating response during the sequencing task resulted in a reduction in the number of accurate sequences. These results clearly support response mediation as a precurrent to various kinds of complex human behavior.

Key words: rehearsal, joint control, mediating responses, blocking, generalized matching, naming

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Gutierrez (2006)

- 5 adult women
  - Age range 20-45 yoa.
- This study used a joint control procedure to teach participants to acquire a generalized sequencing behavior using an unfamiliar language (Mandarin Chinese)
  - Response mediation in complex human behavior
- The role of rehearsal blocking
- 1 Experiment
  - ABC design – A = echoic/tact training; B= Joint control training; C= Blocked/non-blocked test

Table 1
Sequences spoken by the experimenter in each set.

Set 1	Pen, Cup, Fork, Water	Fork, Pen, Cup, Water	Cup, Water, Fork, Pen	Water, Pen, Fork, Cup
Set 2	Pen, Water, Cup, Fork	Fork, Pen, Water, Cup	Cup, Pen, Water, Fork	Water, Fork, Cup, Pen
Set 3	Pen, Fork, Water, Cup	Fork, Water, Pen, Cup	Cup, Fork, Pen, Water	Water, Cup, Fork, Pen

Joint Control Training (Gutierrez, 2006)

1. The experimenter named the four sequence one picture at a time
2. Then repeated the sequence of names while using the echoic gesture, prompting the participant to repeat the four Chinese Mandarin terms (e.g., book, pen, cup, and water)
3. While participants were repeating the sequence of Mandarin terms, they were also required to arrange the four pictures on the table in the order named
4. And then to immediately say the sequence of four terms
5. The correct response (tacting the sequence by saying the four Mandarin terms in ithe order they were displayed on the table) was reinforced by candy. After a statement of the sequence of terms, the experimenter prompted the correct statement and repeated steps 2-4.
6. Training continued until participants made 3 consecutive correct arrangements of the four pictures and the corresponding sequence of terms for each of the 4 sequences
7. Echoic-gesture prompts faded as self-rehearsal improved.

Rehearsal Blocking

- Participants asked to sequence/arrange a number of pictures

- Participants were told to sing overtly "the wheels on the bus" (if do not know the words to the song – continue saying it!!! until participants had sequenced the pictures)

Results

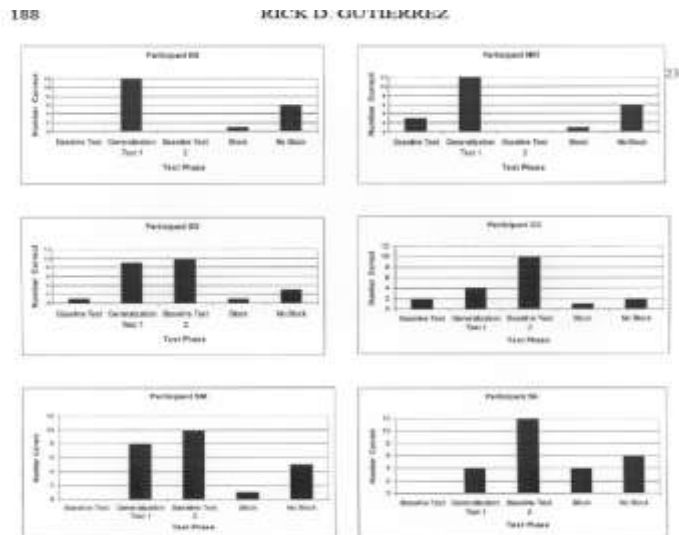188   RICK D. GUTIERREZ

Fig. 1. Performances of six participants across each phase of this study. The block and non-block test phases have a maximum of six correct trials possible.

The Effect of Joint Control Training on the Acquisition and Durability of a Sequencing Task

Allison DeGraaf, California State University, Los Angeles and California Unified Service Providers, L.L.C
Henry D. Schlinger, Jr., California State University, Los Angeles

Gutierrez (2006) experimentally demonstrated the effects of joint control and particularly the role of response mediation in the sequencing behavior of adults using an unfamiliar language. The purpose of the current study was to replicate and extend the procedures used by Gutierrez by comparing the effects of joint control training with the effects of a prompt-and-fade procedure on the acquisition of a sequencing task. The effects of each procedure on delayed sequencing behavior were also tested. Ten undergraduate students participated in 2 experiments. The results indicated that all participants acquired the sequencing response in fewer trials and maintained accurate delayed responding when the component responses necessary for joint control were directly taught. Finally, when the self-echoic mediation component was blocked, accurate responding deteriorated in 8 of 10 participants.
Key words: joint control, echoic, tact, verbal behavior

DeGraaf et al. (2012)

- Replication of Gutierrez (2006).

- Compared the effect of joint control training with the effects of a prompt-fade procedure on the acquisition of a sequencing task.
  – Particularly the role of response mediation
- Several procedural modifications from Gutierrez (2006).

- 2 Experiments

Experiment 1

- 5 individuals (4 male/1 female)

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Set 1   "gan"   "bay"   "cha"   "schway"

Set 2   "sho"   "beung"   "shaw"   "duh"

Figure 1. Sets of stimuli. Pictures of objects with their Chinese Mandarin names (spelled phonetically). Partially adapted from Gutierrez (2006).
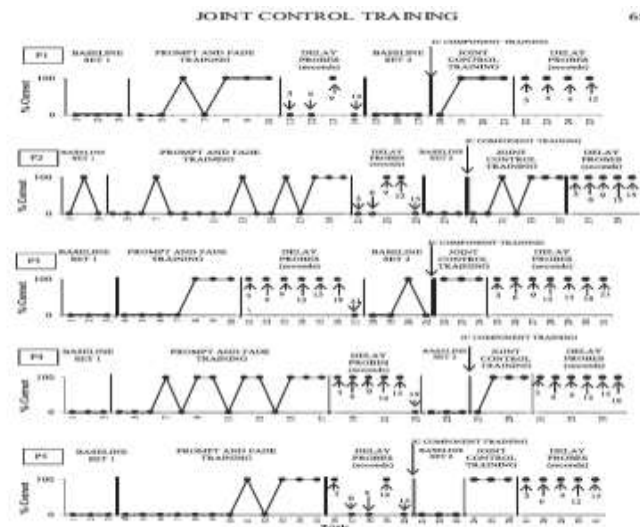
- Prompt- Fade procedure training

Joint Control Training (DeGraaf, 2012)

1. The experimenter instructed the participant to repeat the sequence upon hearing the experimenter say it.
2. If the participant made an error, the experimenter repeated it until an accurate echoic response occurred.
3. The participant was further instructed to continue to repeat the sequence
4. While the participant was repeating the sequence, he or she was required to arrange the pictures on the table in the order named.
5. If the participant made an error, the experimenter repeated the steps of the procedure
6. This process continued until the participant made an independent correct response.
7. Correct responding resulted in the delivery of a token

Rehearsal Blocking

- Attempted to replicate findings of Gutierrez (2006) by blocking verbal response mediation that is thought to account for the occurrence of joint control

- Participants were asked to say the American English alphabet or count backwards from 100 while arranging the target task.

Results (Experiment 1)

Figure 2. Effects of sequencing training using a prompt-and-fade and joint control procedure on the immediate and delayed sequencing behavior of Participants 1, 2, 3, and 4.

Some Additional results

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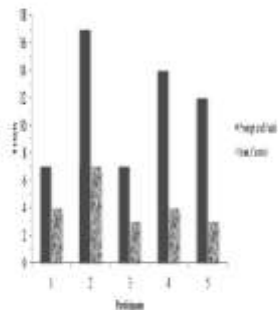Figure 3. Trials to criterion for the sequencing response during the prompt-and-fade and the joint control training.
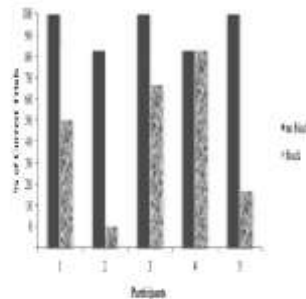

Figure 4. Percentage of correct blocked and non-blocked trials from Experiment 1. The blocked and non-blocked phases have a maximum of 6 correct trials possible.

The Effects of Blocking and Joint Control Training on Sequencing Visual Stimuli

Curtis W. Clough[1] · Careen S. Meyer[1] · Caio F. Miguel[1]

Abstract We assessed the effects of blocking on the accuracy of arranging visual stimuli in sequences as an attempt to assess whether verbal behavior mediates nonverbal performance. Across three experiments, college students were trained to echo and tact the names of abstract images vocally (Experiments 1 and 3) and with hand signs (Experiment 2), and then, they were tested to see whether they could sequence these pictures accurately in the presence of their dictated names or signs. When participants were required to engage in a vocal blocking task, sequencing performances learned via either vocal or hand signs deteriorated (Experiments 1 and 2). In Experiment 3, vocal blocking deteriorated sequencing learned vocally, but not when participants were responding to visual samples (i.e., visual matching). Overall, only 2 out of 12 participants required joint control training to accurately sequence stimuli. Combined results suggest that vocal blocking may serve to prevent verbal behavior that could be mediating sequencing, and that joint control training is not necessary for adults to perform the sequencing task.

Keywords Blocking · Echoic · Joint control · Tact · Verbal behavior

Clough et al. (2016)

- Assessed the effects of blocking on the accuracy of arranging visual stimuli to assess whether verbal behavior mediates non-verbal performance
- 3 Experiments
  - Participants trained to echo and tact names of abstract images vocally (experiments 1 and 3) and with hand signs (experiment 2)

Clough et al. (2016)

- Participants – college students
- DV = % of accurate sequences
  - Additional DV = % of independent echoic/tact

- Design
  - Non concurrent MBD /participants – to show effect of echoic/tact training – control for potential confound of repeated exposure to sequences
  - Reversal ABAB – assess the effects of blocking
- IV= tact/echoic training / Joint control training

Joint Control Training

1. Please repeat back what I say 3 times, then touch the picture on the table and say its name
2. Placed picture on table and prompted participant to say its name 3x
3. Next experimenter modeled touching and tacting the picture at 0 sec delay.
4. After 8 trial block with no error - 0 sec increased to 5 sec delay
5. Errors resulted in experimenter saying "NO", rehearsing the instruction, and provided immediate prompts as described 1-4.
6. Criteria for termination of joint control training was one 8 trial block with independent and accurate rehearsal, touching, and vocal tact responses

Vocal Block

- Prevent verbal behavior in the form of self-echoics
    - Sequencing test repeated with exception:
        - When I point to you, immediately begin singing "Happy Birthday"
        - Then experimenter handed a pile of cards to arrange in order stated
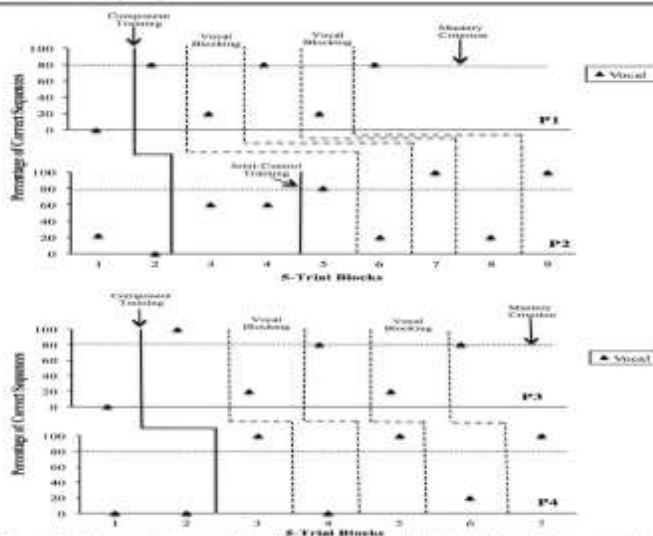   - Please sing continuously while you are arranging the pictures

Results (Exp. 1)

Fig. 2 Percentage of correct sequences (closed triangles) for participants 1, 2, 3, and 4 across each sequencing and blocking conditions during Experiment 1

Experiment 2

- To determine if topography specific blocking procedures would differentially influence sequencing of stimuli trained using vocal and hand signs
- Design – Non concurrent MBD
  - Additional ATD – to teach specific topographies
  - ABAB – to assess effects of blocking
- IV= Component training (echoic/tact)/ Joint Control training

Joint Control Training (hand sign)

1. Please repeat back what I sign 3x, then touch picture and sign its name
2. Then, the experimenter placed the stimulus on the table, modeled the corresponding sign once and then the participant imitated the sign 3x
3. The experimenter pointed to the picture, and modeled the sign at 0 sec. delay
4. After 8 trial blocks with no errors criteria increased to 5 sec delay
5. Errors resulted in experimenter providing immediate prompts (as described above).
6. Criteria for termination of one block of 8 out 8 trials with independent and accurate rehearsal, touching, and hand sign tact responses.

Results (Exp. 2)

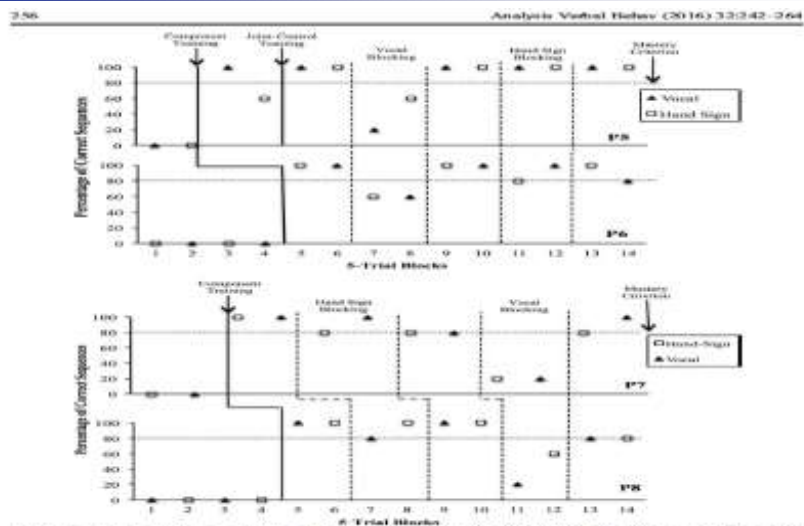Fig. 3 Percentage of correct sequences for sets using vocal (closed triangles) and signing procedures (open squares) for participants 5, 6, 7, and 8 across each sequencing test and blocking (hand-sign blocking and vocal blocking) conditions during Experiment 2

Results (Exp. 3)
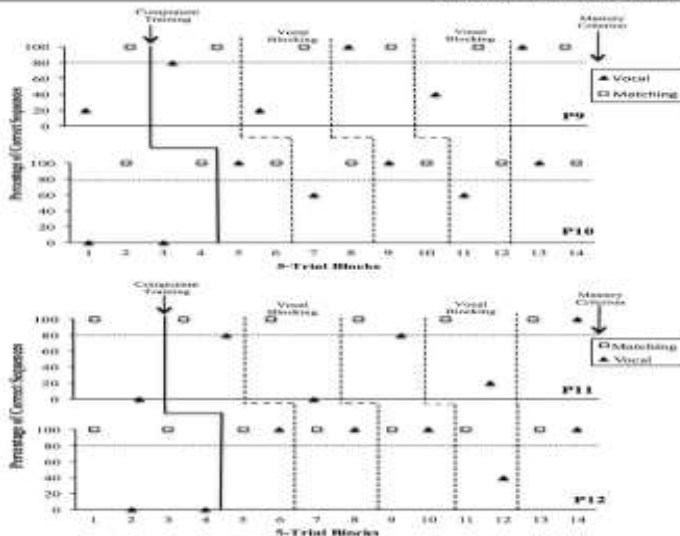
Fig. 4 Percentage of correct responses for sets using vocal procedures (closed triangles) and visual matching (green squares) for participants 9, 10, 11, and 12 across each sequencing and vocal blocking conditions during Experiment 3

Main Points from the Literature

- Joint control serves a critical role in the performance of complex listener behaviors and/or similar tasks
- Training using procedures derived from the analysis of joint control can serve as an effective and efficient avenue for the acquisition of complex verbal and non-verbal repertoires in individuals with autism.
- The generic nature of joint control events allow for novel responses or generalized responses to occur

- For children with autism responding under joint sources of control may be prevented by insufficient echoic/self-echoic and tact repertoires (Michael, Sundberg, & Palmer, 2011) or failure of natural contingencies of reinforcement supplied by the environment to select such responses (Causin et al., 2013)
- Major advantage of a the verbal mediation account is related to the issue of efficiency and generativity

- Not only an explanation for complex human behavior but for the design and development of language training programs for individuals with language deficits and delays (Causin et al., 2013;Degli Espinosa, 2011; Michael et al., 2011; Sidener, 2006; Tu, 2006)
- Of extreme importance to design protocols or strategies that focus on training of the rehearsal since covert rehearsal seemed crucial to maintain accurate sequencing responding

- Joint control/training can serve as a method for identification of deficit areas (tact/echoic)
  - Component skills

- Pre-requisites required for joint control might be necessary for complex behavior requiring conditional discriminations and problem solving.

- **More research is needed**

Limitations

- Type of stimuli

- Complexity of tasks

- Variety of task

- Length of task

- Few studies with population with autism and/or DD

Considerations for Future Research

- Consider participants with other topographical response modalities (writing, typing) if deemed conceptually sound and procedurally feasible.

- Predominant use of visual stimuli - participants without visual impairments
  – Consider populations with impaired language and also visually impaired
    • How could this training be done?

- More rigorous experimental designs
  – At minimum 3 replications of effect

- Practitioners adherence to the analysis of joint control to develop appropriate programming for individuals with impaired language skills

- Effective, efficient, conceptually sound, aligned with available literature procedures
  – Foster acquisition of skills that would lead to generative responding

APPLICATION

https://www.facebook.com/DowerAndAssociatesInc/videos/10154871061377058/

How Typical Children Use Joint Control Skills in the Context of NET

Learner Profile for Joint Control Training – Mand

- Mand repertoire consisting of many mands for items and actions
  - Under stimulus control of item and/or MO
- Mands under control of CMO-T
- Multiple component mands
- Acquisition of mands without intensive training (preferred)

- VBMAPP level 2 (18-36 months old)

Tact

- Extensive tact repertoire for items/pictures of items;
  - Multiple exemplar training
- Ongoing actions/parts and features (preferred)
  - Noun/verb combinations
- FFC tact (preferred)
- Preposition/adjective (preferred)

- VBMAPP level 2/ level 3 (18-48 months old)

Listener Responding

- Attention to speaker's voice
- Instructional control
- Actions on command (preferred)
- Picture discrimination /picture/natural environment/ scene
  - Multiple exemplar (preferred)
- Selection by FFC (preferred)

- VBMAPP level 2-3 (18-48 months old)

Echoic/Imitation

- Ability to echo words/phrases (vocal students)
  - Most sounds

- Ability to imitate novel movements (non-vocal learner
  - Signs
  - Sequenced movements (preferred)

- VBMAPP level 2 (18-36 months old)

Intraverbal (vocal/sign)

- Signer – Intraverbal sign (preferred)

- Fill in responses (common items; preferred)

- Answering questions (WH; preferred)

- Intraverbal by FFC (preferred)
- Most intraverbal skills are only preferred but not required (based on learner's profile in the literature)

How to Program for Joint Control Training – Training Sequence

Skill Tracking Sheet

Student Name: _____   Skill: _____

	Target	Date introduced	Date Mastered
1	Selection of 3 with a 0 second delay		
2	Selection of 3 with a 0 second delay NET		
3	Selection of 3 with a 3 second delay		
4	Selection of 3 second delay NET		
5	Selection of 3 with a 5 second delay		
6	Selection of 3 with a 5 second delay NET		
7	Selection of 3 with 8 second delay		
8	Selection of 3 with 8 second delay NET		
9			
10			
11			
12			
13			
14			
15			
16			

Joint Control Training – Skill Sequence

- Program based on sequencing task (e.g., multiple selection)
  - Add generalization training
  - Increase latency (0, 3, 5, 8, 10… seconds)
  - Add distractors (partial rehearsal blocking)
  - Increase difficulty of skill to be performed (more steps)
    - Varying stimuli
- Sequence should be based on needs and/or training priorities for the student

Teaching procedure

Teaching Procedures

- Run approximately 10-20 opportunities for LR directions at the targeted level throughout the day.
- Mix and vary into session on unpredictable schedule to the greatest extent possible.
- Present targeted LR skill (3 LR IT- 0 sec wait)
- Cover the cards. Sd: Give the car pig and the dog. (The specific cards change with each presentation)
- Uncover cards
- **Correct Response**: If student gives the cards in the correct order stating the name of the item while selecting directly reinforce with highly preferred reinforcer.
- Record correct response in first column as correct and continue with instruction.
- **Incorrect Response**:
  - (Wrong order, doesn't tact the picture aloud when selecting, doesn't select one or all of the items named)
  - As soon as student makes and error, end the trial
  - Run Joint control procedure
    - Cover cards use repeated echoic procedure to have student list the items to be selected. Continue with repeated echoic covering the cards until the student is fluidly listing the skills to be selected without instructor modeling. Say it with me pig, dog, pig, dog, pig, dog, pig, dog.... (The number of repetitions is dependent on the needs of the learner).
    - Following repeated echoic, instructor presents ready signal and verbal Sd: give the ___ and the ___ (remove item covering cards)(only for select 3 with zero second delay and select 3 with zero second delay NET)
    - Student response correct: student selects correct cards in correct order, tacting the card as it is being selected.
    - Reinforce if correct record as correct in 2nd column.
    - If error occurs repeat procedure, consider conducting repeated echoics for additional repetitions.
- If embedding wait element, instructor will run the repeated echoic ask the student the Sd: give the ___, the ___, and the ___ BUT will not remove item covering cards for until the number of seconds in the delay is completed.
- Data/ Graphing
  - Instructors will take trial by trial data on the multiple step LR directions
  - Instructors will graph the % correct on 1st trial presentations.
  - Students will need to get 100 % correct on 3 consecutive days before moving up to the next skill on the skills tracking sheet.

Data Systems

JOINT CONTROL TRAINING DATA SHEET

Trial	Target	1st	2nd	3rd
	0 seconds 3 responses			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Teaching 2 step Sequence/0sec delay Signer/vocal

3 step sequence – 0 sec delay (signer)

Teaching 3 step sequence – 3s. Delay

Teaching 3step Sequence 5 sec Delay

Teaching 4 step Sequence 3s. Delay

Additional Steps to Consider

- Sequences of actions
- Combination of actions/stimuli discrimination
- Complex verbal conditional discriminations
  - LRFFC

- Embedding the mand into this type of procedure
  - Interrupted chain

QUESTIONS ?

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