Verbal and Social Behaviour

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Topics

- Early social responses: what and how to teach
- Tact and intraverbal question discrimination
- Advanced verbal behaviour: listing, narration and past events
- Advanced social verbal behaviour: conversation

Day one: early social behaviour

- Autism as a social disorder across the life span
- Applied behaviour analytic procedures for social learning
  - Incidental teaching
  - Natural Environment teaching
  - Early Start Denver Model
- What to target and how
  - Establishing others as discriminative stimuli and reinforcers
  - Joint attention: responding and initiating
  - Conditioning eye contact

Day one: intermediate language targets

- Establishing operants
- Convergent control: Tact question discrimination

Day two: advanced language targets

- Convergent and Divergent Control:
  - Difference between answering questions and narrating
  - Past events: sequencing
  - Problem solving: listing

Day two: advanced social verbal behaviour

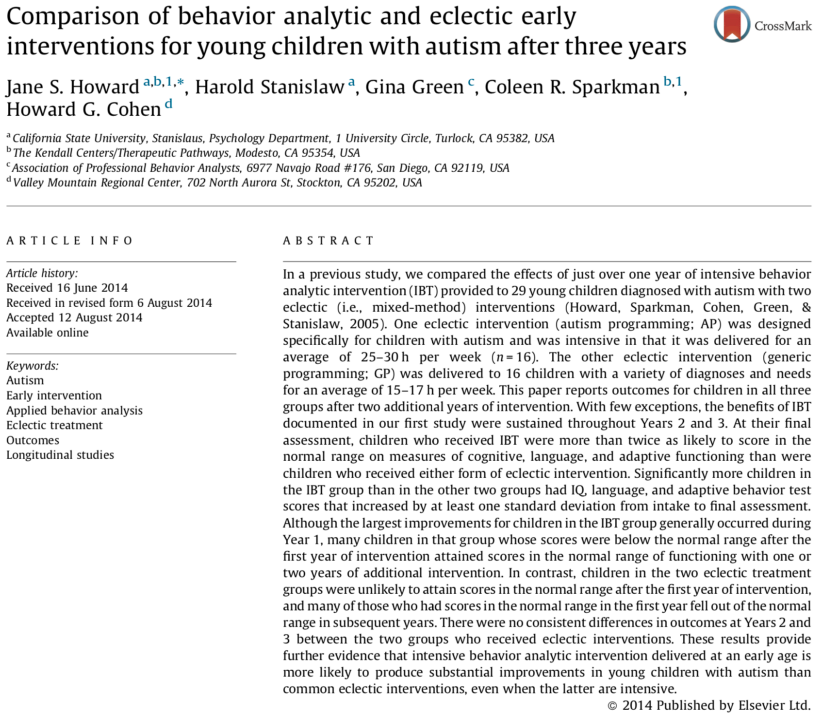
- The function and structure of conversation
- Naturalistic interventions vs rule governed instruction

A disorder of social interaction

- Lack of social initiation and reciprocity
- Sharing of interests, emotions or affect (people as Sds, MOs and Srs)
- Poorly integrated verbal and non verbal communication, poorly modulated eye contact and body language, use and understanding of gestures and facial expressions (behaviour)
- Difficulties in developing, maintaining and understanding relationships: adjusting to social contexts, pretend play and making friends (outcomes)

Gold standard for autism treatment

- Early Intensive Behavioural Intervention:
  - Comprehensive curriculum
  - Evidence-based
  - Family involvement
  - Lead by expert individuals
  - Intensive
  - Early
  - Applied Behaviour Analysis



Comparison of behavior analytic and eclectic early interventions for young children with autism after three years

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ABSTRACT

In a previous study, we compared the effects of just over one year of intensive behavior analytic intervention (IBT) provided to 29 young children diagnosed with autism with two eclectic (i.e., mixed-method) interventions (Howard, Sparkman, Cohen, Green, & Stanislaw, 2005). One eclectic intervention (autism programming; AP) was designed specifically for children with autism and was intensive in that it was delivered for an average of 25–30 h per week ($n = 16$). The other eclectic intervention (generic programming; GP) was delivered to 16 children with a variety of diagnoses and needs for an average of 15–17 h per week. This paper reports outcomes for children in all three groups after two additional years of intervention. With few exceptions, the benefits of IBT documented in our first study were sustained throughout Years 2 and 3. At their final assessment, children who received IBT were more than twice as likely to score in the normal range on measures of cognitive, language, and adaptive functioning than were children who received either form of eclectic intervention. Significantly more children in the IBT group than in the other two groups had IQ, language, and adaptive behavior test scores that increased by at least one standard deviation from intake to final assessment. Although the largest improvements for children in the IBT group generally occurred during Year 1, many children in that group whose scores were below the normal range after the first year of intervention attained scores in the normal range of functioning with one or two years of additional intervention. In contrast, children in the two eclectic treatment groups were unlikely to attain scores in the normal range after the first year of intervention, and many of those who had scores in the normal range in the first year fell out of the normal range in subsequent years. There were no consistent differences in outcomes at Years 2 and 3 between the two groups who received eclectic interventions. These results provide further evidence that intensive behavior analytic intervention delivered at an early age is more likely to produce substantial improvements in young children with autism than common eclectic interventions, even when the latter are intensive.

Can EIBI impact on the core deficits of autism?

Randomized, Controlled Trial of an Intervention for Toddlers With Autism: The Early Start Denver Model

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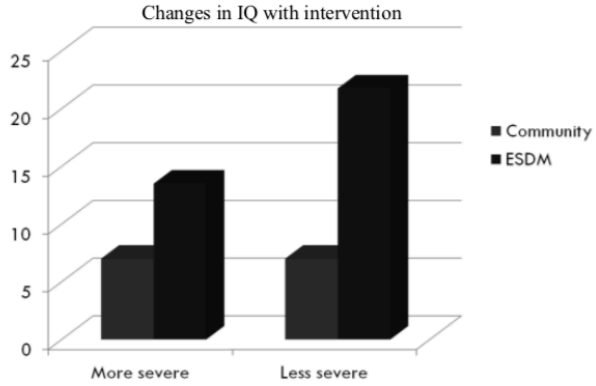
KEY WORDS
autism, behavioral intervention, cognitive function, developmental outcomes, early intervention

WHAT'S KNOWN ON THIS SUBJECT: Previous studies on the efficacy of early behavioral intervention for improving outcomes for preschool-aged children with autism have yielded promising results. However, no randomized clinical trials of early developmental behavioral intervention designed for toddlers with autism have been conducted to date.

WHAT THIS STUDY ADDS: This study assessed the efficacy of the Early Start Denver Model, a comprehensive developmental behavioral intervention, for improving outcomes of toddlers with ASD. The intervention, which was initiated when children were less than 2½ years, resulted in significant improvements in IQ, language, adaptive behavior, and autism diagnosis.

Severity of ASD moderates outcomes, but those with more severe ASD improve in ESDM

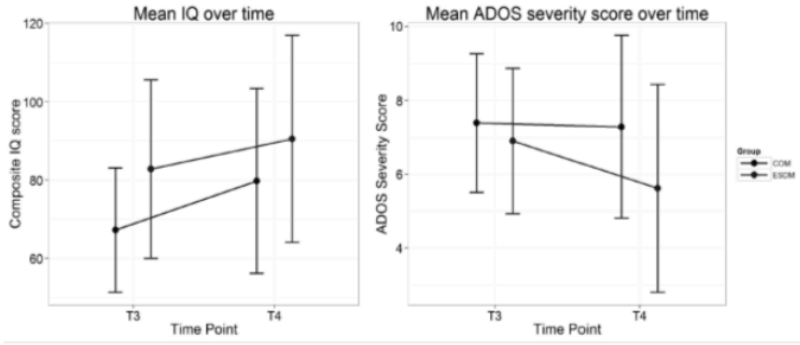
Dawson, et al., Pediatrics, 2010



Long-Term Outcomes of Early Intervention in 6-Year-Old Children With Autism Spectrum Disorder

Annette Estes, PhD, Jeffrey Munson, PhD, Sally J. Rogers, PhD, Jessica Greenson, PhD, Jamie Winter, PhD, Geraldine Dawson, PhD

- Follow-up of the same children, two years after



Naturalistic & structured intervention

- Planned situation in which the adult manipulates the child's motivation for a particular activity or item and creates opportunities to establish social responses, verbal responses, generalise acquired responses or teach new responses related to the activity
- Planned situation in which the adult presents a series of formal teaching trials in which the response is unrelated to the reinforcer

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1975, 8, 411-420 NUMBER 4 (WINTER 1975)

INCIDENTAL TEACHING OF LANGUAGE IN THE PRESCHOOL[1]

BETTY HART AND TODD R. RISLEY

THE UNIVERSITY OF KANSAS

"Incidental teaching" denotes a process whereby language skills of labelling and describing are learned in naturally occurring adult-child interactions. In the present study, 15-min daily samples of the spontaneous speech of 11 children were recorded during free play over eight months of preschool. After incidental teaching of compound sentences, increases in unprompted use of compound sentences were seen for all the children, first directed to teachers, and then to children, in accordance with who attended to the children's requests for play materials. The incidental teaching procedure also stimulated spontaneous variety in speech, and appears to have general applicability to child learning settings.

DESCRIPTORS: disadvantaged children, language, compound sentences, incidental teaching, spontaneous speech, verbal training

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The Analysis of Verbal Behavior 2006, **22,** 49–60

Behavioral Language Interventions for Children with Autism: Comparing Applied Verbal Behavior and Naturalistic Teaching Approaches

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Several important behavioral intervention models have been developed for teaching language to children with autism and two are compared in this paper. Professionals adhering to Skinner's conceptualization of language refer to their curriculum and intervention programming as applied verbal behavior (AVB). Those primarily focused on developing and using strategies embedded in natural settings that promote generalization refer to their interventions as naturalistic teaching approaches (NTAs). The purpose of this paper is to describe each approach and discuss similarities and differences in terms of relevant dimensions of stimulus control. The discussion includes potential barriers to translation of terminology between the two approaches that we feel can be overcome to allow better communication and collaboration between the two communities. Common naturalistic teaching procedures are described and a Skinnerian conceptualization of these learning events is provided.

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ORIGINAL PAPER

Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder

Laura Schreibman · Geraldine Dawson · Aubyn C. Stahmer · Rebecca Landa · Sally J. Rogers · Gail G. McGee · Connie Kasari · Brooke Ingersoll · Ann P. Kaiser · Yvonne Bruinsma · Erin McNerney · Amy Wetherby · Alycia Halladay

Abstract Earlier autism diagnosis, the importance of early intervention, and development of specific interventions for young children have contributed to the emergence of similar, empirically supported, autism interventions that represent the merging of applied behavioral and developmental sciences. "Naturalistic Developmental Behavioral Interventions (NDBI)" are implemented in natural settings, involve shared control between child and therapist, utilize natural contingencies, and use a variety of behavioral strategies to teach developmentally appropriate and prerequisite skills. We describe the development of NDBIs, their theoretical bases, empirical support, requisite characteristics, common features, and suggest future research needs. We wish to bring parsimony to a field that includes interventions with different names but common features thus improving understanding and choice-making among families, service providers and referring agencies.

Keywords Early intervention · Naturalistic · Developmental · Behavioral

"behavior reinforced through the mediation of other persons [who] must be responding in ways which have been conditioned *precisely in order to reinforce the behavior of the speaker*"

1957, p.225

The question

- How can behaviour be established for which typically reinforcing stimuli do not function as reinforcers?
- In other words, how can social behaviour be established through interaction with other people, and to achieve interaction with other people, when such interactions are not naturally reinforcing?
- **Interaction is the means through which language is acquired and the reason why it is acquired**

Incidental teaching refers to the interaction between an adult and a single child, which arises naturally in an unstructured situation such as free play and which is used by the adult to transmitting formation or give the child practice in developing a skill. An incidental teaching situation is child-selected; that is, the child initiates interaction by requesting assistance from the adult.

Hart and Risley (1975, p.411)

Characteristics

- Child-selected. Child initiates interaction by "requesting" assistance. Problem one.
- Focuses principally on "requesting". Problem two.
- The request can be *verbal* or *non-verbal*. Problem three

Basic procedure

- Adulto makes moment to moment decisions to:
  - Decide the language objective
  - Which signal to use (just attention or attention and verbal instruction)
  - Which prompt hierarchy to use (full, partial, minimal)

Table 6.1
Examples of Incidental Teaching

Using Phonemes	
Target response	Requesting preferred materials or activities with an initial sound or syllable.
Prerequisite skills	Initiates for objects or activities by reaching or pointing; imitates some sounds.
Environmental design	Make a list of the sounds the child imitates; then display favorite foods and activities that begin with those sounds (e.g., /m/ for milk, macaroni, movie, music).
Child's initiation	Reaches for, points or gestures to, or pulls an adult toward materials or activities.
Request for elaboration	Respond to his initiation with the question "What do you want?" If he does not respond or responds incorrectly, model the correct sound (e.g., "Say, '/m/.' ").
Provide the object for which the child initiated	When he responds with the correct sound, confirm that he is correct by stating the object label with emphasis on the target sound (e.g., "*m*ilk"), and give him the requested item.
Using Prepositions	
Target response	Using one of the following prepositions or prepositional phrases: *in, on, under, next to, behind,* or *in front of.* (*Note:* You may want to begin with only two prepositions.)
Prerequisite skills	Uses sentences to request objects, imitates verbal models of 8 to 10 words.
Environmental design	Put high-interest toys or snacks in, on, under, or beside containers, and put containers on countertops, shelves, or tables in the kitchen, family room, or playroom. Use a variety of containers (e.g., shoeboxes, plastic food containers, food storage bags) to promote generalization. For example, put the child's favorite videotape in a bag, and put her stuffed bear behind a shoebox.
Child's initiation	The child requests food or play materials with a word, phrase, or sentence (e.g., "I want a cookie").
Request for elaboration	Respond to the child's initiation with a question that requires her to identify the location of the object in relation to a container, using a target preposition or prepositional phrase. For example, ask "Where is the videotape?" If the child makes an incorrect response or does not respond, provide a verbal model (e.g., "Say, 'I want the video that's *in* the bag' ").
Provide the object for which the child initiated	When the child uses a correct preposition or prepositional phrase in a sentence, confirm that her response is correct and immediately provide access to that item (e.g., "Oh, you want the videotape that is *in* the bag. Here it is").

Fenske, Krantz & McClannahan
(1996)

Naturalistic intervention models

- Natural Environment Teaching (VB)
- Mand Model
- Pivotal Response Training
- Natural Language Paradigm
- Joint Activity Routines (ESDM)

Natural Environment Teaching

- Centres around the child's immediate interests and activities as a guide for language instruction (Sundberg & Partington, 1999)
- Consequences for correct verbal responses are specific to the child's interest and activities
- The focus is initially on increasing spontaneous manding (requesting)

Where to start? A chair or a mat? Pairing…

- What does it mean?
- How does one measure it?
- How is it done?
- **Is it a process, a principle or a procedure?**

Motivation

- “Follow and manipulate his motivation”, “capture interest”, “follow the child’s lead”
- These are not operational terms…
- Motivating Operations: definition

Motivating Operations

- A change in the environment (internal or external) that alters the value of a stimulus as a reinforcer and increases the probability of behaviour that has previously contacted that stimulus, in the presence of its discriminative stimuli

An analysis of social behaviour

- MO: conditioned
- SD: person (o persone and toys)
- R: vocal or non vocal
- SR: vocal or non vocal action of the person
- Any response that is evoked by the presence or action (can be verbal or non verbal) of a person and maintained by continued contact with the person (interaction), that conforms to the rules of the verbal community (e.g., eye contact is different fro different cultures). In the case of “social play”, the person increases the value of the objects and their use, or it is necessary for the reinforcing movement (sensory motor social routines).

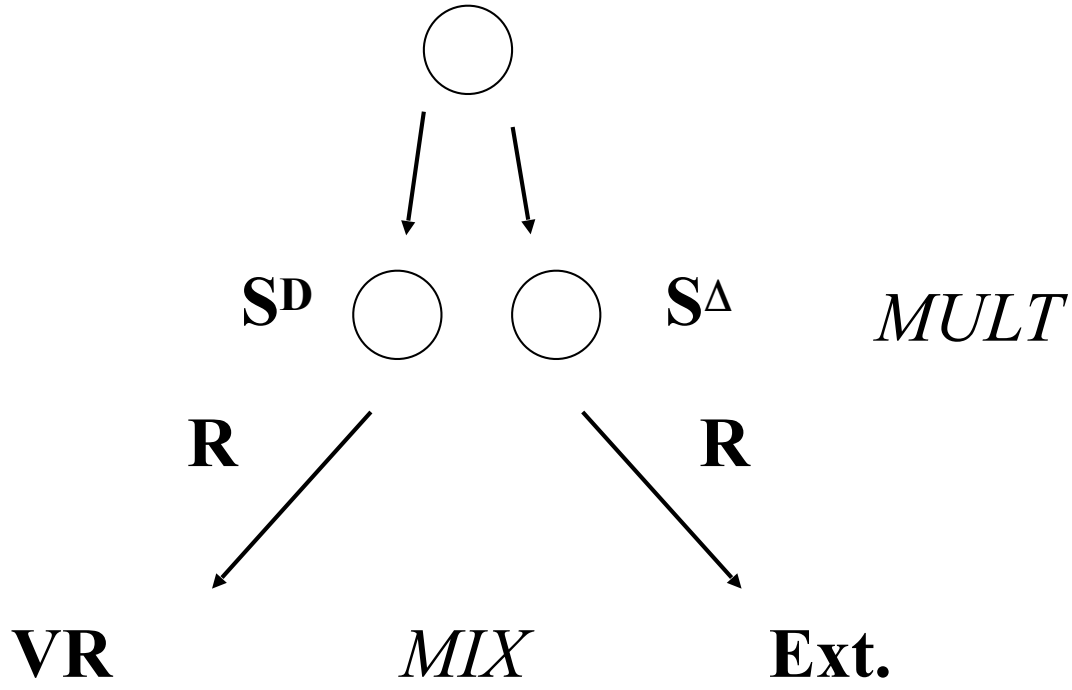
Follow his motivation…

- Adapting one's behaviour based on fluctuations in the child's behaviour (interest) in order to maintain the child in contact with our actions and adult mediated activities.
- Creating opportunities: making changes to the physical or verbal environment to alter the value of certain stimuli (MO manipulation) and establish the adult as a discriminative stimulus for the delivery of the reinforcer
- Non-Specific, generalised mands for attention (showing, giving, proto-declarative pointing)
- Mand training: specific topographies to access items or actions. Attention must already be a conditioned reinforcer, the adult an Sd.

Attention as an Sd and a reinforcer

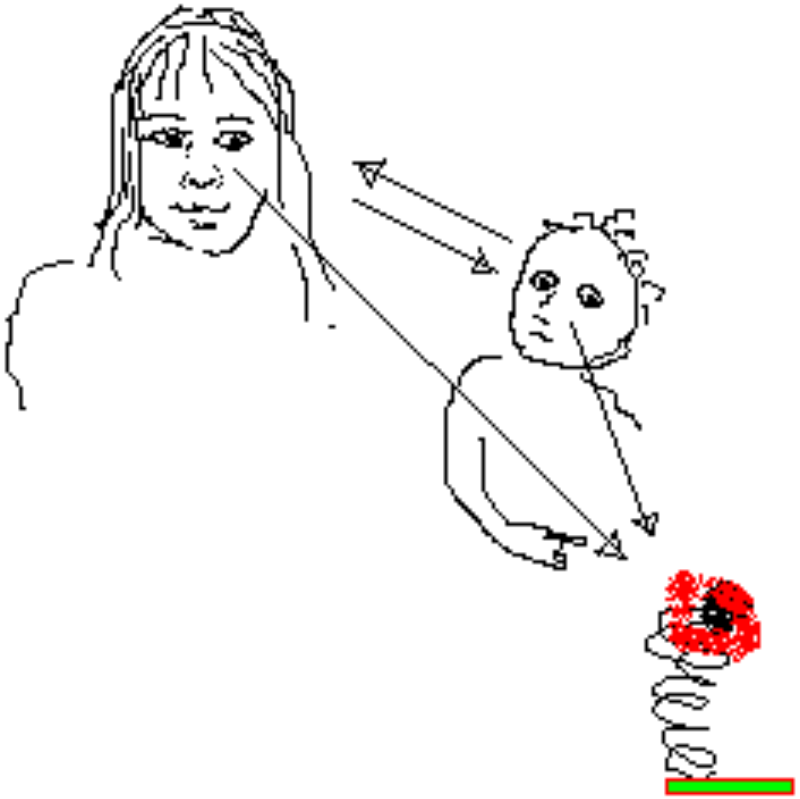
- How does the child "know" if an opportunity for honouring his mand exists?
- What are the signals that the child must learn to discriminate?
- What is "attention"? What are the behaviours that we commonly tact as "attention"?
- Looking - how does the child know if the adult is attending/looking? He must look…

Observing responses
Dinsmoor (1983)



Per Holth 2009

Joint attention: A triade



From Per Holth, with author's permission

Three procedural models

- Eye-contact as behaviour, demonstrations of attending by adult as the reinforcer
- Dube et al., 2004 (shared interest)
- Carbone et al., 2007 (to honour mand)
- Isaksen & Holth., 2009 (signal for access)

Dube et al., 2004: "Toward a Behavioral Analysis of Joint Attention"

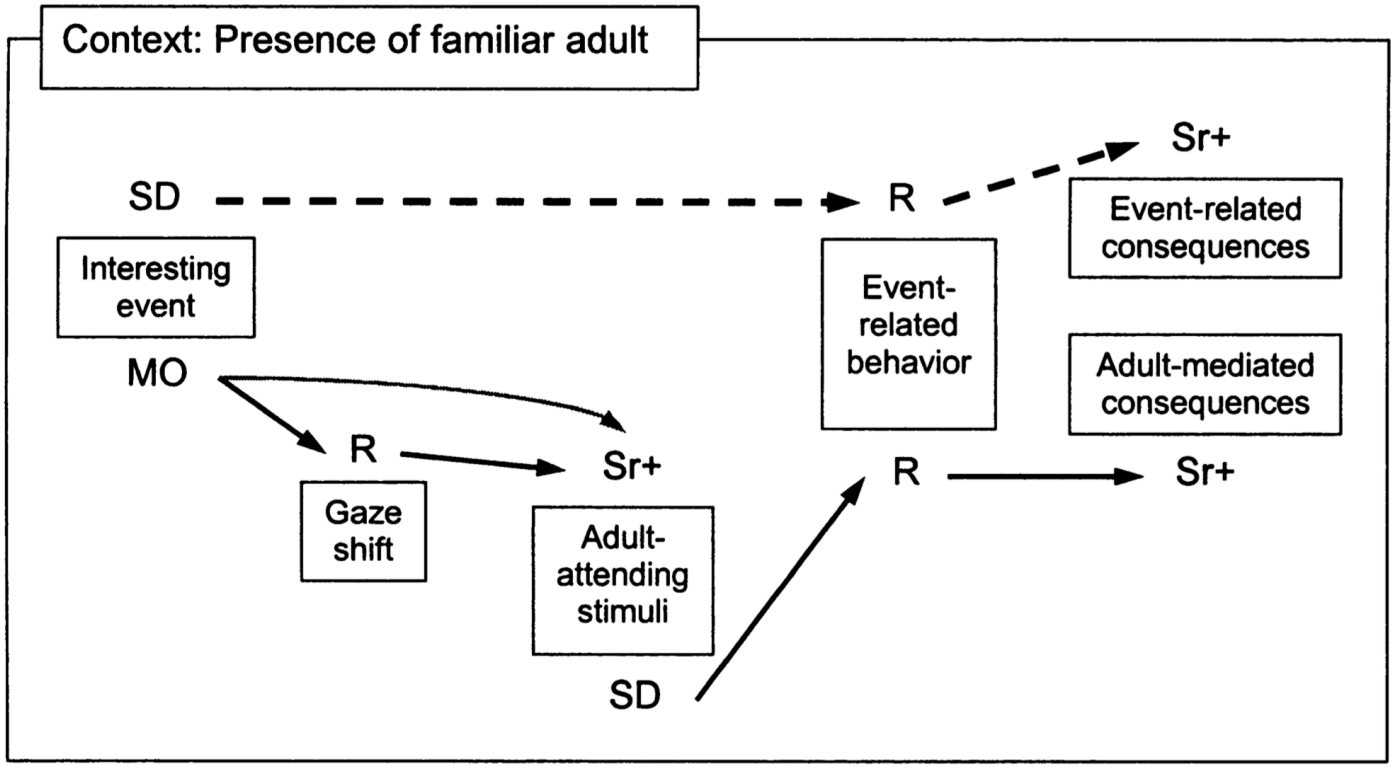


Figure 1. Contingency diagram. Large box indicates a context that includes a familiar adult. Smaller boxes show stimuli and responses. Abbreviations for contingency terms appear above or below boxes: SD = discriminative stimulus; R = response; Sr+ = conditioned reinforcer; MO = motivating operation. Dashed arrows show a three-term contingency that is independent of adult-mediated consequences. Solid arrows show contingencies that may support joint attention initiation. The curved gray arrow from MO to Sr+ represents the reinforcer-establishing effect of the interesting event; the arrow from MO to R represents the evocative effect of the interesting event.

Carbone et al., 2013: "Teaching Eye Contact to Children with Autism: A Conceptual Analysis and Single Case Study"

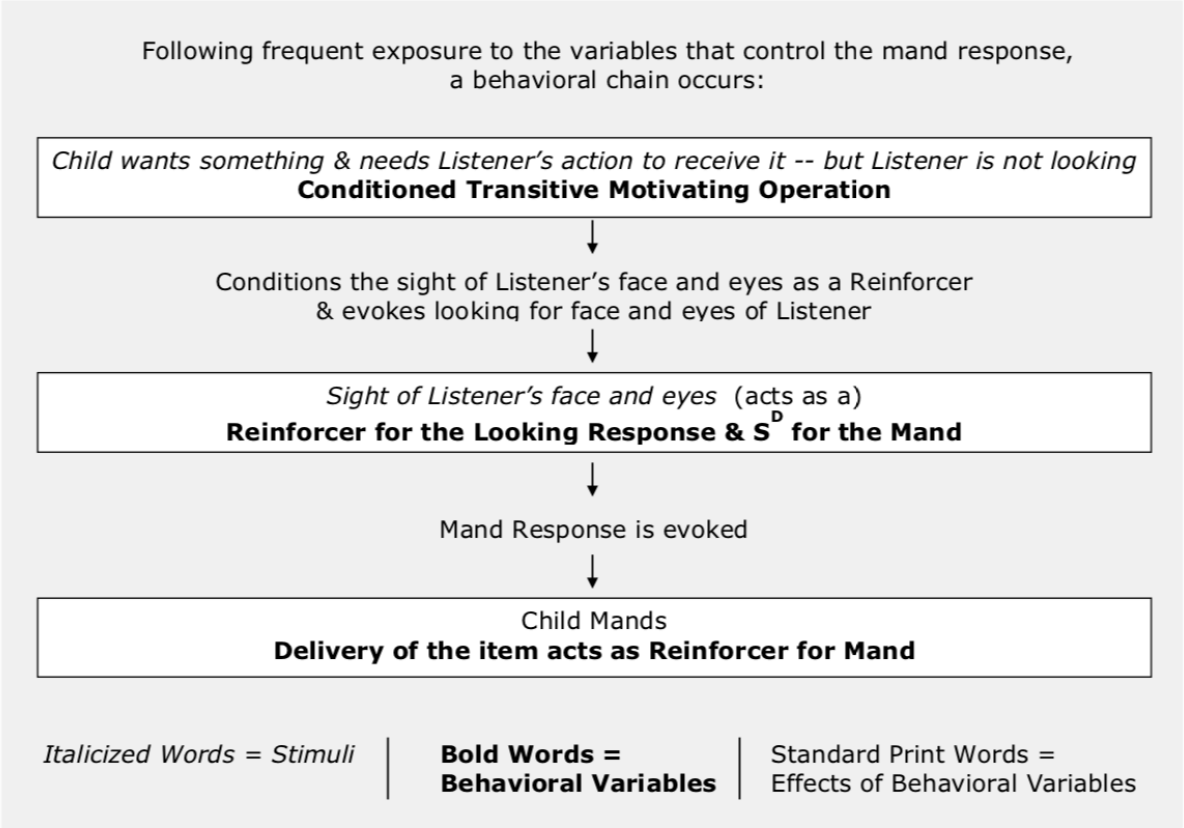


Figure 2. Description of the behavioral variables that evoke the eye contact response and select and maintain it by reinforcement in the form of social attention of a communication partner.

Isaksen & Holth, 2009 "An operant approach to teaching joint attention skills to children with autism"

- Gaze following
- Monitoring
- Social referencing
- Protoimperative
- Protodeclarative

Social sequences across verbal curricular levels

- Language is social in nature: it is acquired and maintained through social interaction
- Limitations of current interventions
- Preverbal and Early learner
- Intermediate learner
- Advanced learner

What to reinforce?

- Natural contingencies of reinforcement
- To evoke behaviours that naturally recruit social interaction through social interaction (all VB is social)
- If we can achieve this early in intervention, we can then create opportunities to teach language in the context of specific play activities, without relying on arbitrary non functional reinforcers
- The actions of the adult (a change in a verbal antecedent or a change in the physical environment) as Sds and Srs

Joint Activity Routines

- Early Start Denver Model (Rogers., 2010)
- Joint: source of reinforcement must come from the adult (together)
- Activity: it must make sense, have a theme, a purpose (functional play skills)
- Routine: repetition is key. Building chains: Sds and Srs

Structure

- Set up: start of the activity, approach
- Theme: elaboration
- Variation: changes
- Closing, transition: ending
- Interaction: listening, narration, imitation, assistance

Skill	Level 1	Observed	Parent Report	Teacher Report	CODE
Receptive Communication					
1	Localizes to sounds by turning toward sound source.				
2	Looks to playful vocal sounds (raspberry, whistle).				
3	Responds to voice by turning toward person.				
4	Looks at indicated pictures as adult points to pictures in book.				
5	Follows a proximal point to place objects in containers, puzzle pieces, etc.				
6	Looks when shown an object and told, "Name, look."				
7	Looks to partner when name is called.				
8	Follows a proximal point to object or location.				
9	Follows distal point to retrieve toy.				
10	Looks, reaches, or smiles in response to adult gestures and voice in social games.				
11	Looks, reaches, smiles, and/or gestures in response to adult language/gesture in songs.				
12	Responds by stopping actions momentarily in response to inhibitory words (e.g., "no," "stop").				
13	Gives object as verbally requested when paired with adult's outstretched hand.				
14	Performs a one-step, routine instruction involving body actions paired with verbal/gesture cue (e.g., "Sit down," "Come here," "Clean up").				
15	Performs a one-step, routine verbal instruction involving body actions without accompanying gesture (e.g., "Sit down," "Come here," "Clean up").				
Expressive Communication					
1	Uses a goal-directed reach to request.				
2	Vocalizes with intent.				
3	"Asks" for help by handing object to adult.				
4	Takes turns vocalizing with communication partner.				
5	Expresses refusal by pushing away object or giving the object back to another person.				
6	Points proximally to request desired object.				
7	Makes eye contact to obtain a desired object when adult blocks access/ withholds desired object.				
8	Points to indicate a choice between two objects.				
9	Combines vocalization and gaze for intentional request.				
10	Points distally to request desired object.				
11	Points distally to indicate a choice between two objects.				
12	Vocalizes with CVCV reduplicative babbling (not necessarily word approximations).				
13	Produces five or more consonants in spontaneous vocalizations.				
14	Produces CVCV with differing CV sequences (variegated babbling).				
Social Skills					
1	Accepts brief sensory social activities and touch.				
2	Uses motor prompt to initiate or continue a sensory social routine.				
3	Attends briefly to another person with eye contact.				
4	Maintains engagement in sensory social routines for 2 minutes.				
5	Responds to preferred objects/activities via gaze, reach, smiles, and movements.				
6	Watches and engages with imitative adult during parallel toy play activities.				

Skill	Level 2	Observed	Parent Report	Other/ Teacher Report	CODE
	Receptive Communication				
1	Follows instructions to "stop" or "wait" without prompts or gestures.				
2	Follows 8–10 one-step verbal instructions involving body actions and actions on objects.				
3	Identifies by pointing or showing several named body parts on self or other person.				
4	Responds to verbal instruction to give/point/show for 8–10 specific objects in natural play, dressing, eating routines (e.g., baby, chair, car, block, cup, bear).				
5	Identifies by pointing and visually attends to three named pictures in a book (including cup, car, dog, cat, baby).				
6	Understands early spatial concepts (e.g., in, on).				
7	Looks to people and photos of people when named—family, pets, teachers.				
8	Retrieves 8–10 verbally requested objects in room but not directly in front of child, requiring some search.				
9	Upon verbal request (with gesture cues), completes two actions with one object.				
10	Points to named body parts in picture.				
	Expressive Communication				
1	Uses target signs or gestures with vocalizations to express (request, all done, share, help, protest).				
2	Produces 6–10 single words or approximations within the context of familiar routines, sensory–social routines, songs.				
3	Spontaneously produces multiple words associated with a play routine (roll, go, stop).				
4	Functional use of 20 or more approximations of nominals (names of objects, animals, people) and nonnominals (words that refer to actions or other relations: all gone, up, etc.).				
5	Spontaneously labels objects and pictures.				
6	Vocalizes with varied intonation during songs, etc.				
7	Requests and refuses using single words with gaze.				
8	Labels actions in context (e.g., during body movements and/or actions on objects).				
9	Approximates names of three important people (includes self).				
10	Shakes head and says "no" to refuse.				
11	Nods head "yes" and says "yes" to affirm.				
12	Asks (approximates) "What's that?" when encountering something unfamiliar.				
	Joint Attention Behaviors				
1	Responds to "Look" and offered object with gaze shift, body turn, and looks at offered object.				
2	Responds to "Look" and point by orienting to the indicated distal object/ person.				
3	Gives or takes object from other person coordinated with eye contact.				
4	Responds to "Show me" by extending object to adult.				
5	Spontaneously "shows" objects.				
6	Spontaneously follows point or gaze (no verbal cue) to look at target.				
7	Spontaneously points to interesting objects.				
8	Shares smile with adult with alternating gaze during pleasurable object activity.				

Skill	Level 3	Observed	Parent Report	Teacher Report	CODE
	Receptive Communication *(cont.)*				
11	Comprehends the function of common objects (ride, cut, eat, sleep, put on feet, drink, etc.).				
12	Understands pronoun referents "mine" and "yours."				
13	Identifies 10 actions via pictures, choices, acting out.				
14	Follows two or more unrelated instructions in novel context.				
	Expressive Communication				
1	Produces two- to three-word combinations for a variety of communicative intentions (e.g., requesting, greeting, gaining attention, protesting).				
2	Produces two or more word utterances to comment to another person.				
3	Labels actions in pictures and books.				
4	Comments and requests on location (up, down, in, on top).				
5	Comments and requests using early possessive forms (mine, yours).				
6	Gestures or vocalizes "I don't know" in context.				
7	Consistently uses other people's names to get their attention.				
8	Delivers a simple message to another person ("Go tell Mommy 'Hi'").				
9	Says "Hi" and "Bye-bye" appropriately, both initiating and in response.				
10	Uses pronouns for self and other (me and you variants).				
11	Uses simple words and gestures to describe personal experiences.				
12	Names one to two colors.				
13	Responds appropriately to "What?" questions.				
14	Responds appropriately to "Where?" questions.				
15	Responds appropriately to "Who?" questions.				
16	Asks simple "yes/no" questions using rising intonation (can be one-word utterance with rising intonation).				
17	Asks "What?" and "Where?" questions.				
18	Answers simple information questions: name, age, color of shirt, etc.				
	Social Skills: Adults and Peers				
1	Plays simple gross motor games (e.g., ball, "Hide and Seek," "Ring-around-the-Rosy").				
2	Shares and shows objects when partner requests.				
3	Imitates and carries out novel songs/finger plays in group situation.				
4	Responds appropriately to simple requests/instructions from peers.				
5	Initiates interactions and imitations of peers.				
6	Plays in familiar dramatic play routine with peer in parallel play.				
7	Takes turns with simple board games.				
8	Uses politeness terms: "Please," "Thank you," "Excuse me."				
9	Imitates a variety of novel gross motor actions in standing and while moving, such as in "Follow the Leader" or animal walks.				
10	Participates in play activities involving verbal scripts.				
11	Frequently draws others' attention to objects verbally and gesturally to comment, show, share, and request.				
12	Responds to others' bids for joint attention by looking and commenting.				
13	Receptively identifies affect (happy, sad, mad, scared) from photos, in others, and/or in line drawings.				
14	Expressively identifies affect from photos, in others, and/or in line drawings.				
15	Makes own face reflect affect (happy, sad, mad, scared).				

Differences

- Analysis:
  - Developmental but uses behavioural procedures
  - Behavioural both in theory and practice, but developmentally sequenced
- Classification of objectives: psycholinguistic, developmental domains, behavioural
- Definition of spontaneity
- Prompting hierarchy (most to least, least to most, time delay)
- Allocation of direct teaching and generalisation (NET) vs prompting social engagement (ESDM)

Naturalistic interventions: early learner

Profile	Objective: establish others as Sds
Absent mands (grabs) or defective (moves adult hands) Limited social engagement, self-directed, sensory stimulation Limited or absent: listener skills, functional object use and play-skills, imitative skills. Defective NV conditional discrimination	Maintains proximity and accepts adult giving items Early social responses (eye contact based: anticipation, following a point, showing) Mand training: direct MO and transitive MO Gradual inclusion of activity based adult directed skills (listener, matching and imitation) Tacting **Teacher objective: To create tens of joint activity routines**

Example: throwing balls

	Examples	Social targets	VB: Mands, tacts, pure IV	NV: Receptive, Imitation, Matching
Opening	Setting up, gathering materials: balls, tunnel, basket	Looks at adult and points to activity. Follow adult pointing to get materials	Asks to be picked UP. Points to balls and mands "ball".	R: "get tunnel"
Theme	Throwing balls through the tunnel, picking them up from floor into the basket, throwing them again	Looks up in anticipation of next action. Following pointing to gather specific balls. Laughs at BIG ball not fitting Shakes head to sign NO. Shows after finding hidden ball	Mands: Ball, In, Down Mand: Throw Tact: counting balls IV: ready steady GO	Imitates throwing High, bouncing Matching: adult shows BIG ball, child finds another BIG ball. Shows blue ball, child finds blue ball
Variations	Balls back and forth through the tunnel. Putting them in basket and throwing them all at once onto the floor. Using basket as a target.			
Ending	Tidying up, balls back in the basket, folding tunnel and putting it in bag	Takes it in turns to throw balls back in the basket, puts lid back on and gives basket to put up.	Points to where it should go on the shelf	Matches coloured balls in belonging boxes (e.g. red with red)

Naturalistic interventions: Intermediate learner

Profile	Objective: Talking and being with people as the Sr
Combines words as mands Single and multi-step instructions Hundreds of tacts: including adjectives, propositions and actions Question discrimination (tact and intraverbal)	Symbolic play (younger children) Games and experiences (older children) Teaching and generalisation occurs in the context of joint activities All verbal operants (about activity) Monitoring eye-gaze and joint attention with commenting and reciprocation **Transfer objectives from structured teaching into naturalistic contexts**

Making foot prints with paint on long paper

ACTIVITY	Social and Mands	Tact and Intraverbal	Listener
Gathering the materials from various rooms of the house. Each has a long piece of paper. painting on feet and walking on paper. Funny walks. Washing feet. Getting dinosaurs and painting their paws and making them walk to leave foot prints. Painting a scene for the dinosaurs (mountain and lake) Adding glitter and hanging up paper on windows. Giving dinosaurs a bath. Putting every away in the various rooms.	Imitating strokes Showing own prints Following eye-gaze to get a specific coloured paint Asking "where is the X paint?" Asking for assistance for opening paint Reciprocating comments about actions Commenting on an ambiguous event (e.g., using juice instead of paint) Taking it in turns to paint	Discriminating questions about the ongoing activity: who, what, where, how. Functions: what do we paint with? What do we paint? What do we do with the paper? What is the towel for? What do we use for cleaning? Prepositions: where is the X? What is under the X	Following multiple step instructions Acting out a story about the dinosaurs going to the mountains

Naturalistic interventions: Advanced learner

Profile	Objective: Verbal interaction as the Sr
Mands for information Describes ongoing events Intraverbally controlled responding (problem solving and recalls past events)	Verbal interaction (conversation) within the context of activities and experiences. Conversation about the activity Activity is ongoing and conversation is about something else Cooperative play Emotions (private events) Others perspectives **Teacher objective: conversation social rules (posture, changing topic, monitoring listener) and structure (questions, answers, comments) Integrating all advanced objectives**

Not just making a cake…

ACTIVITY	Complex speaker and listener responding
The activity serves as the shared enjoyable event, as a springboard for a conversation	Do you know where mum keeps the chocolate? **No.** Can you ask her? **Mum, where is the chocolate?** What do you need it for? **We are making a cake for John's birthday!** It's in the top shelf of the cupboard above the dishwasher **Ok, thanks!** …. **She said it's in the top shelf od the cupboard above the dishwasher** Ok, let's get it. Do you think John is going to like it? **Yes, he likes chocolate.** Is he having a party? **Yes on Saturday, at Animal Kingdom** Mmmh sounds fun. I was there last week… **Why did you go?** Oh, I went for another one of my kids' birthday **Which one?** William's, there were some new animals **Which animals?** Some new baby monkeys. I love monkeys **I like the elephants, do you like elephants?** I do, very much, I once rode on an elephant. Have you ever been on on one? **No, where did you do that?** Remember last summer I went to India? They have elephants there and they let you ride on them…

Teaching VB: Similarities across curricula

- Focus on speaker behaviour
- Refer to Skinner's taxonomy of verbal behaviour
- Hierarchical sequence of skills
- Generally direct establish individual responses

VB beyond early vocabulary

- As soon as a basic verbal behaviour repertoire has been established, further explanations (and procedures) become necessary to account for (and to teach) the interactions of its parts

- "Little or no previous research has attempted to establish relational instructional control in individuals with developmental disabilities who do not already possess it"

Tarbox, Zuckerman, Bishop, Olive, and O'Hora (2009, p. 123)

Shift in curriculum programming

- Understanding stimulus control is key when teaching beyond the acquisition of early vocabulary (names that refer to objects, animals, actions and people, colours and sounds)
- Rarely a verbal response is emitted in the absence of a verbal antecedent
- Teaching children to be sensitive to changes in verbal antecedents and to select the corresponding response is fundamental to establishing speaker skills at both the tact and intraverbal level
- Once this happens on the established early vocabulary repertoire, new relations (concepts) can be taught
- In the absence of question discrimination, responding will be defective with numerous discrimination errors

"Verbal Behavior"

- Functional analysis (and synthesis) of language
- Behaviour under the functional control of environmental variables
- No new principles are necessary
- "What happens when a man speaks or responds to speech is clearly a question about human behavior and hence a question to be answered with the concepts and techniques of psychology as an experimental science of behavior" (Skinner, 1957, p. 5)

Description first, then explanation

- “Our first responsibility is simple description: what is the topography of this subdivision of human behavior? Once that question has been answered in at least a preliminary fashion we may advance to the stage called explanation: what conditions are relevant to the occurrences of the behavior--what are the variables of which it is a function?” (Skinner, 1957, p. 10).

“Verbal behavior is usually the effect of multiple causes”

- Skinner’s analysis cannot be fully appreciated (or procedures effectively derived from) without consideration of the interaction of how environmental variables exert control over verbal behaviour at anyone time.
- Difference between the lab and the real world
- Variables are made to act one at the time
- The real world puts multiple control back in verbal behaviour
- Multiple causality is the basic concept in Verbal Behavior (1957)
- Discrete trial teaching assumes that behaviour is under single, separate (discrete) antecedents

The whole is greater than the sum of its parts

- "Readers sometimes fail to recognize that pure forms of the respective verbal operants are rare outside the laboratory or instructional contexts, and a common preoccupation of students is to try to classify utterances as one or another verbal operant on the assumption that the example must be exclusively one type"

Michael, Palmer, and Sundberg (2011, p. 4)

Misconceptions about verbal operants

- Elementary operants: functional independence (sources of control differ) vs interdependence
- Pure examples are rare in the natural environment
- Multiple control is ubiquitous
- Therefore, classification into types is of little importance
- Focus must be on identification of controlling variables

Multiple Control

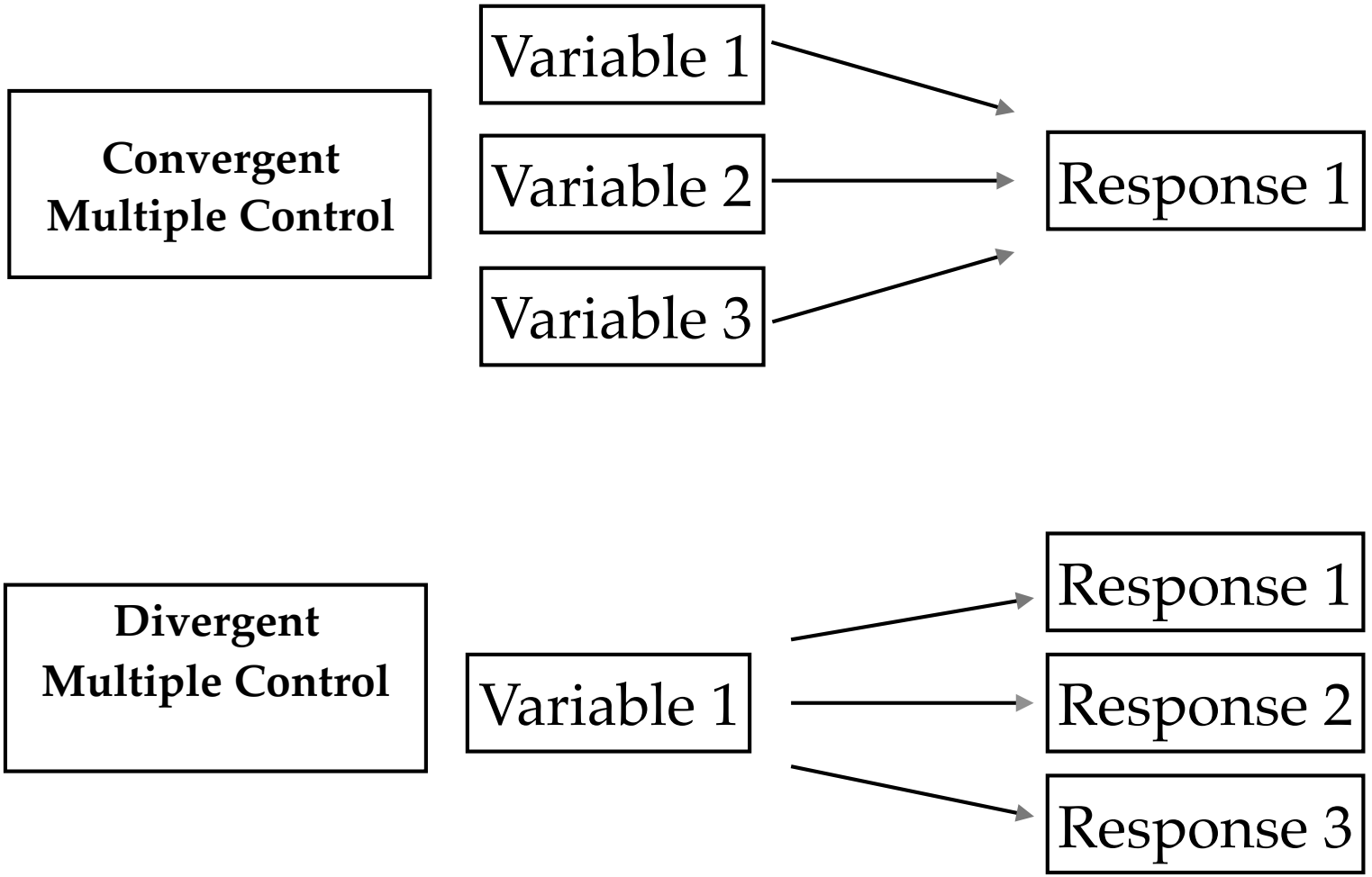
- "Two facts emerge from our survey of the basic functional relations in verbal behavior:

  - The strength of a **single response** may be, and usually is, a function of **more** than one **variable** and
  - A **single variable** usually affects more than **one response**."

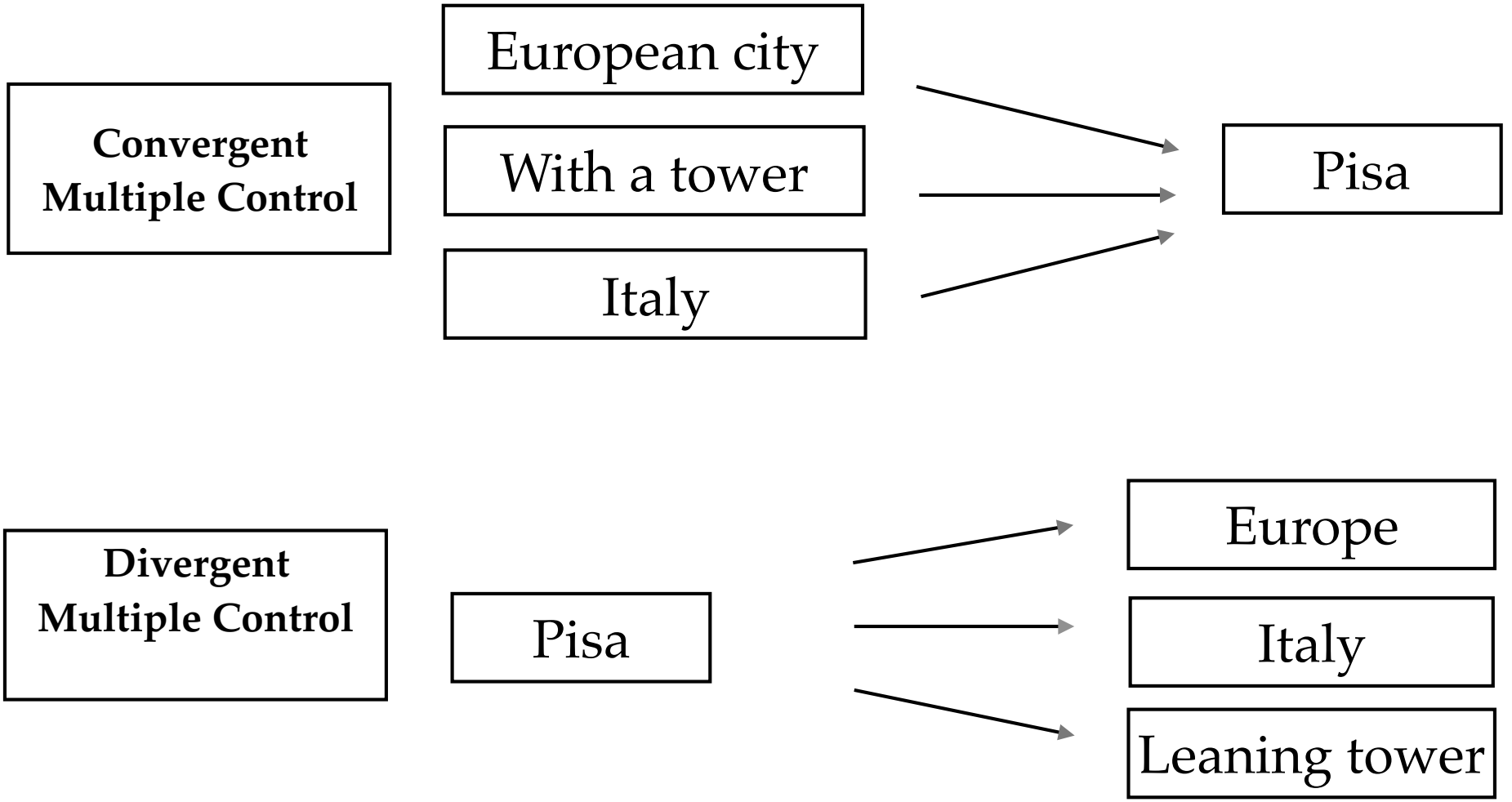
    (Skinner, 1957, p. 227)

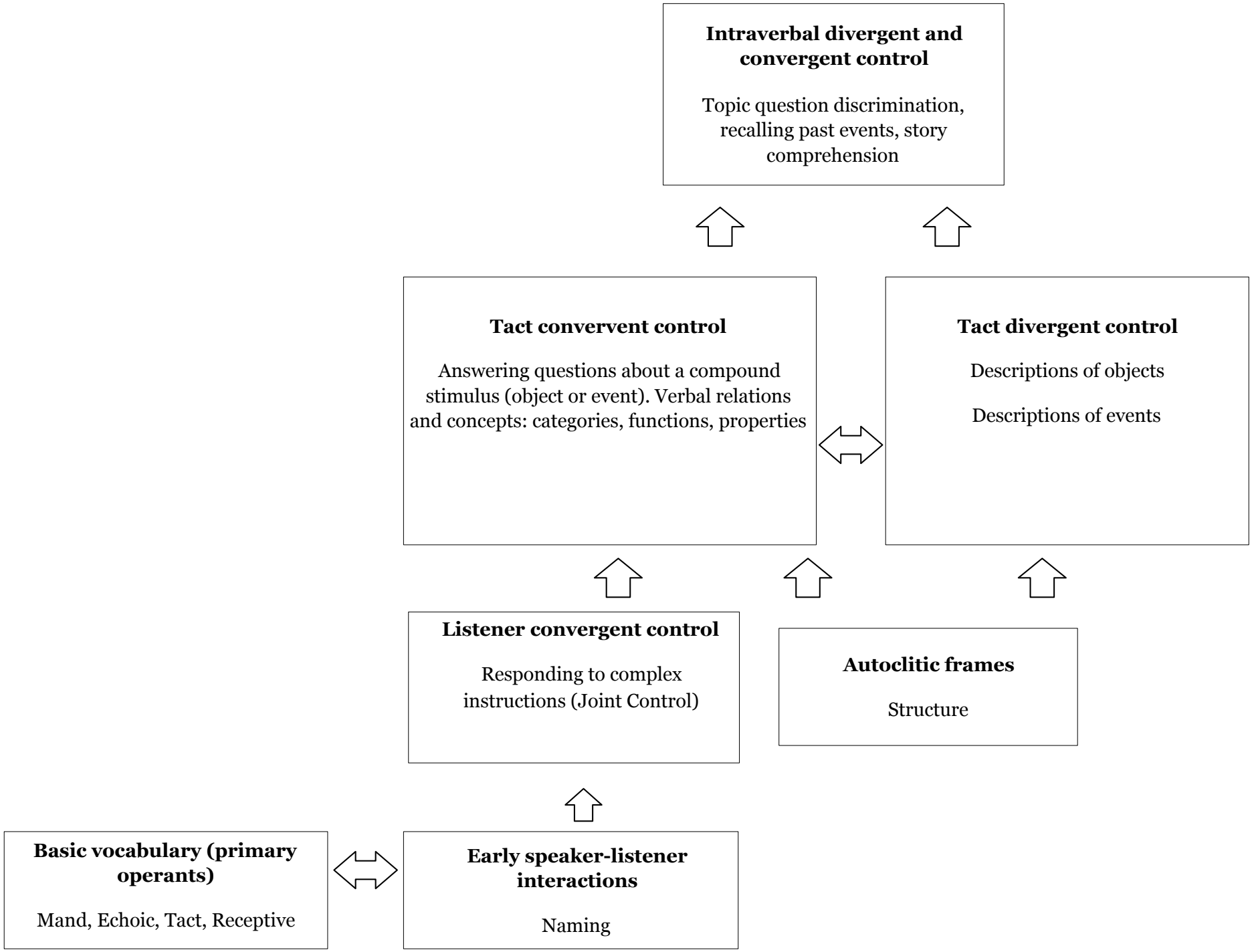
- Stimulus control is continuous
- Stimulus control is additive
- Many competing responses typically vie for dominance

Convergent and Divergent

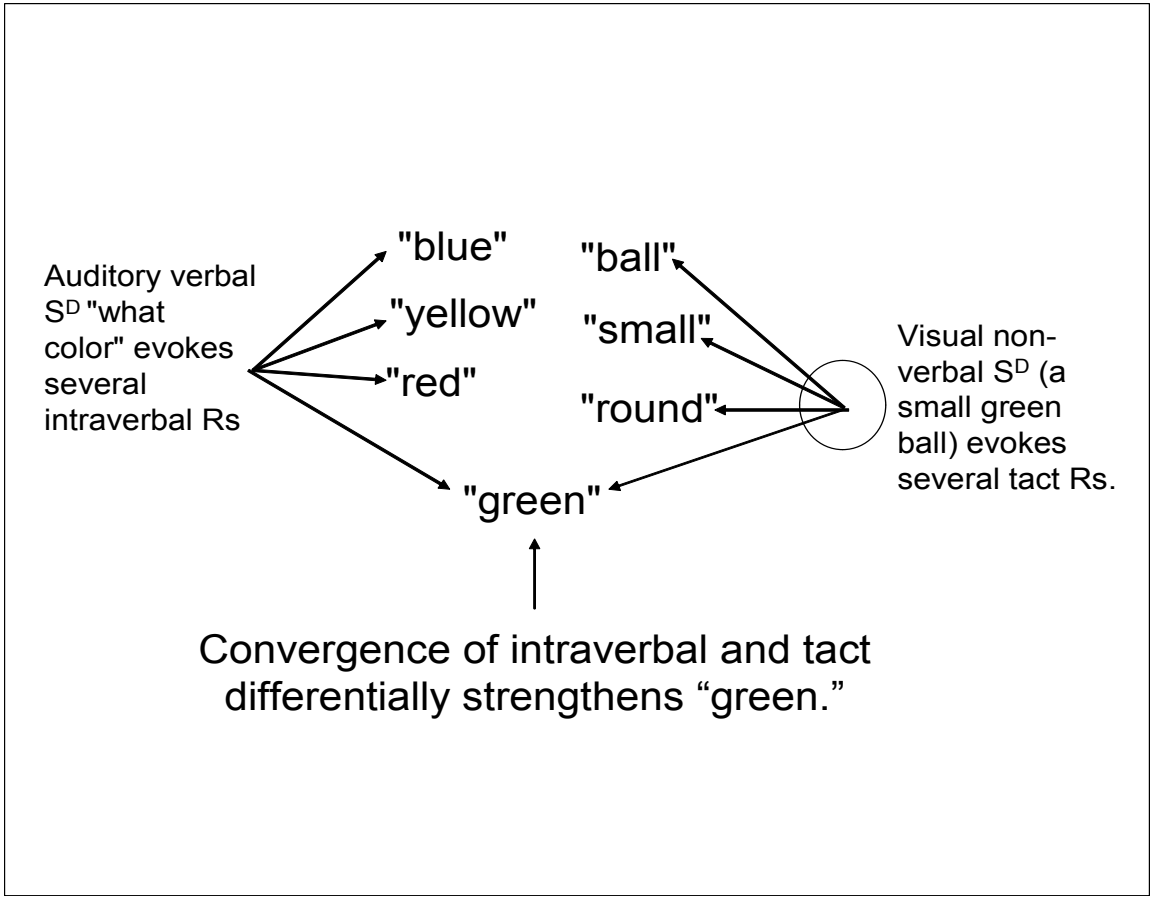


Convergent and Divergent




Intraverbal divergent and convergent control
Topic question discrimination, recalling past events, story comprehension
Tact convervent control
Answering questions about a compound stimulus (object or event). Verbal relations and concepts: categories, functions, properties
Tact divergent control
Descriptions of objects
Descriptions of events
Listener convergent control
Responding to complex instructions (Joint Control)
Autoclitic frames
Structure
Basic vocabulary (primary operants)
Mand, Echoic, Tact, Receptive
Early speaker-listener interactions
Naming

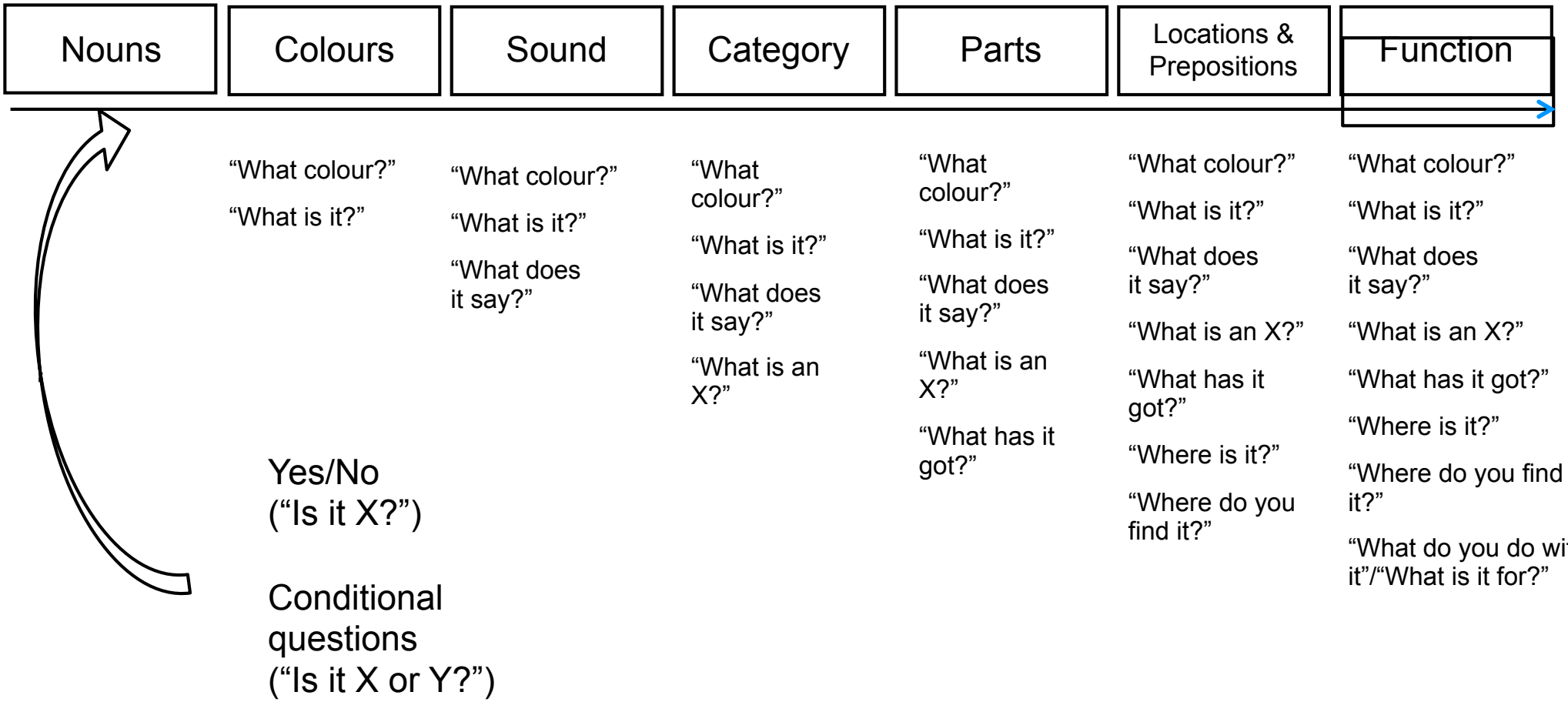
Response strength changes



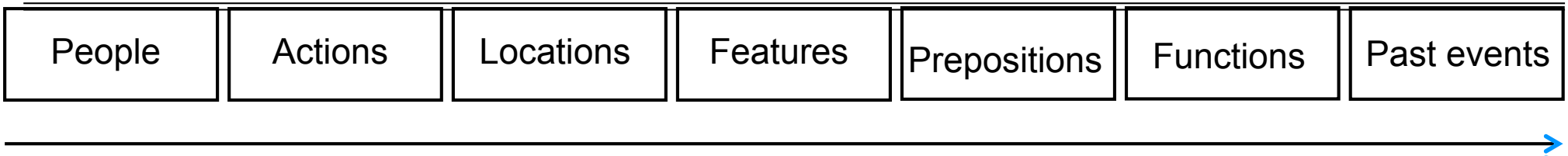
At any moment, several and incompatible responses may increase in strength. Only the stronger ones will be emitted.

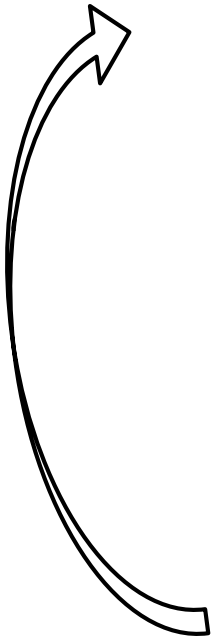
Michael, Palmer & Sundberg, 2011

Continuum: tact and intraverbally controlled conditional discrimination - object



Continuum: tact and intraverbally controlled conditional discrimination - event





Yes/No
("Is it X?")

Conditional questions
("Is it X or Y?")

People	Actions	Locations	Features	Prepositions	Functions	Past events
"Who is it?"	"Who is it?"	"Who is it?"	"Who is it?"	"Who is it?"	"Who was it?"	
"What is he doing?"	"What is he doing?"	"What is he doing?"	"What is he doing?"	"What is he doing?"	"What was he doing?"	
	"Where is he?"	"Where is he?"	"Where is he?"	"Where is he?"	"Where was he?"	
		"What colour is his top?"	"What colour is his top?"	"What colour is his top?"	"What colour was his top?"	
		"What colour is his hair?"	"What colour is his hair?"	"What colour is his hair?"	"What colour was his hair?"	
		"Where is the juice"	"Where is the juice?"	"Where is the juice?"	"Where was the juice?"	
			"What is he drinking?"	"Who is drinking?"	"Who was drinking?"	
			"What is he drinking with?"	"What is he drinking?"	"What was he drinking?"	
				"What is he drinking with?"	"What was he drinking with?"	

“An Intraverbal” vs. “Intraverbal Control”

- Intraverbals, narrowly defined, are relatively trivial:
  - Poems, songs, catch phrases, memorized facts, lists
  - They represent a small proportion of verbal behavior and are easily understood.
- Intraverbal control, as an example of multiple control, is pervasive and important.
  - Verbal behavior almost always has verbal antecedents.
  - So some intraverbal control is almost always present, even if it arises from one’s own speech.
  - It is usually just one of many concurrent controlling variables that combine to evoke a verbal response.

Intraverbal Control - advanced

- **Knowledge based:**
- Complex discriminations: topics and associative questions
- Listing

- **Event based:**
- Past event recall: questions and narration
- Stimuli to be recalled: Static (picture), moving (video), experience (own salient event), oral (story)

Complex discriminations

- Tact conditional discrimination (simple prepositions and Wh): objects and events
- Multi-component conditional discrimination on complex stimuli (tact)
- Topic based intraverbal conditional discrimination
- Personal information intraverbal conditional discrimination (complex social questions)
- Two + information arbitrary intraverbal relations
- Two + information arbitrary intraverbal relations with negation
- Associative questions
- Same topic intraverbal webbing

Listing

- Listing by class (macro-categories, sub-categories, problem solving)
- Lists by place
- Lists actions by context
- Lists by function
- Lists by part
- Lists by attribute/adjective

“Tell me all the European cities you remember”

Problem solving

- Generating adjunctive stimuli, supplementary stimulation: stimuli that in conjunction with the original Sd related to the "problem" increase the likelihood of the target response:
  - Places I have visited
  - Where was she from?
  - Visualising a map and the borders
  - Asking the person next to me
  - Looking at Internet

Listing as problem solving

- Listing as an example of divergent control and problem solving
- Procedures less concerned with specific numbers of members to be evoked by the verbal stimulus
- But with facilitating the emission of covert verbal behaviour: problem solving
- Extinction induced variability and lag schedules

VB beyond beyond present stimuli

- If a response is under the control of a stimulus, or a constellation of stimuli, and if those stimuli are absent, we must engage in some kind of mediating behavior to reinstate some or all of those stimuli

- What about “memory”?

Remembering and recall

- Engaging in verbal behavior about a past event as a result of reinforcement contingencies arranged by the verbal community (Skinner, 1957)

A behavioural interpretation of memory

- Palmer, 1991
- The term “memory” embraces two distinct behaviours:
  - The endurance of stimulus control
  - Problem solving

Endurance of stimulus control

- **A response is reinforced in the presence of a stimulus, and that stimulus is presented again at a later time.** The response is said to be "remembered."E.g., "What is the capital of Spain?" "Madrid."
- Inherent in the principle of reinforcement: non further explanation necessary (pure intraverbal)
- In this sense, memory is implicit in all learning(e.g., "remembering" where the toys are the second time child comes to the clinic…)
- Memory in this sense is just learning. All variables relevant to the acquisition of stimulus control will be relevant to the retention of stimulus control.

An incidental stimulus may "remind" us of a person, place, or event if it has some resemblance to that person, place, or event. Being reminded means being made likely to respond, possibly perceptually. A name may remind us of a person in the sense that we now see him. This does not mean conjuring up a copy of the person which we then look at; it simply means behaving as we behaved in his presence upon some earlier occasion

Skinner (about behaviourism)

Controlling variables at acquisition and retention

- Reinforcement
- Discrimination training
- Frequency and fluency
- Stimulus salience
- Blocking
- Response competition (Retroactive or proactive interference)
- “Decay”

Recalling events

- A response is reinforced in the presence of a stimulus. That response is scheduled for reinforcement at a later time, but the stimulus is not present.
- E.g., “What did you have for dinner last Tuesday?” “Spaghetti with clams.”
- Where are the clams?

Two repertoires we must look at

1. Problem-solving behaviours we engage in at the time of remembering (current behaviour, not past behaviour)

2. The behaviour at the time of the event

Spaghetti alle vongole!

- Dinner last Tuesday… Let's see… whered was I? On Friday and Thursday I was in Portland, Wednesday I was on a plane, Tuesday I was in Milan and Monday… Milan, I went out with friends and we went to the river, that's right there's a great seafood restaurant there and I was really looking forward to risotto with cream of scampi, but they had run out, so I ordered my second favourite, Spaghetti with clams…
- Part echoic, part intraverbal, part tact of a past event - mediating verbal behaviour
- Recall response is "spaghetti with clams"
- Rarely a verbal response is solely evoked by a single verbal antecedent

Recall as an acquired skill

- **Acquisition strategies**

- When we know that something about the current setting will be important later on ("Will this be on the quiz?") we engage in rehearsal, elaboration, imagery, word associations, and other mnemonic strategies to create a web of verbal or visual relationships that provide a "behavioral pathway" to the target response. E.g., when introduced to someone, think of someone familiar with the same name.

- **Recall strategies**

- At the time of recall, we go through the alphabet, think of related facts, repeat the question in other words, engage in systematic mnemonics, make up a web of verbal or visual relationships that evoke relevant intermediate responses that in turn expand the web.

Strategies need not be explicit

- A salient event is likely to evoke a lot of relevant behaviour that may have the same effect as an explicit acquisition strategy.
- Your wedding cake

"We must accept that learning occurs constantly. If we can recall an event, it must be the case that learning occurred at the time of the original event"

Palmer (2017)

Being verbally present

- Verbal behaviour at the time of the event
- What does it mean to listen or to pay attention?

Listening is behaving verbally

- Listening is action (Palmer, 1998): active student responding in class
- The extent to which you listen or engage verbally during an event may impact subsequent recall of that event (Schlinger, 2008)

Applied considerations

1. Being verbally present: engaging in matching verbal behaviour to the ongoing event as it happens: the importance of tacting one's environment, public and private

2. Understanding the question: no errors in discrimination "What did you do at school today?" – "Tuesday 17th of April"

3. Problem solving, the behaviour of remembering

Curriculum considerations to remember

1. **Types of stimuli at the time of acquisition (verbal, nonverbal). Contact for future recall requires verbal behaviour**
    - Static (picture)
    - Moving (video)
    - Auditory / verbal (story)
    - Verbal, visual, motivation: salient experience, personal event, didactic lesson
2. **The verbal topography required for demonstration of recall: answering questions vs narrating**
3. **The time between the event and the expected recall**

Two very distinct repertoires

- Question discrimination: who was in the picture? What were they doing? Where were they?
- Description/narration: Tell me what you saw

Verbal stimuli: listening

- We sometimes say a student did not “pay attention” or “didn’t listen” - but what does it operationally mean?
- To listen is to emit sub-vocal verbal behaviour (Schlinger, 2008)
- Not a passive receiver, a listener is constantly active, emits verbal behaviour **corresponding** to the speaker’s behaviour as well as to himself as a speaker.
- Thus, the speaker and listener reside within the same skin and a distinction between speaking and listening becomes redundant (Skinner, 1957)

Not mere repetition

- Although **echoing** plays a fundamental role in listening, "we do not merely repeat what we have heard; we use the terms productively, in novel combinations" (Palmer, 1998, p. 7).

- Listening includes **intraverbal** behaviour: "when listening to someone, some of our echoic responses may function as SDs for intraverbal responses that can both condition new verbal behaviour and evoke other intraverbal responses either about what the speaker is saying or that have nothing to do with what the speaker is saying. When the latter occurs, listening to the speaker ceases (we are said not to be paying attention anymore), leaving us to be our own speaker" (Schlinger, 2008, p.155).

Listening behaviour

- Listening and paying attention: covert verbal behaviour

  - Echoing
  - Self-echoing (rehearsal/repetition)
  - Imagery
  - Elaboration: Cascade of salient discriminative responses (Intraverbal control)

Story Comprehension

- Ensuring verbal presence: echoing (overt then covert)
- Type and length of verbal stimuli. Complexity must match verbal skills:
  - Factual information
  - Abstract verbal stimuli: inferences, predictions, identifying the character's problem, offering a solution, feelings
- Questions: errors must not be due to faulty conditional discrimination
- Narration: sequencing of events, grammatically correct sentences

Definition

- “In general, social skills may be defined as socially acceptable learned behaviours that enable a person to interact with others in ways that elicit positive responses and assist in avoiding negative responses” (Elliott & Busse, 1991, p.62 citing Gresham and Elliott, 1984).

From verbally to socially present

- "In general, social skills may be defined as socially acceptable learned behaviours that enable a person to interact with others in ways that elicit positive responses and assist in avoiding negative responses (Gresham and Elliott, 1984)" (Elliott & Busse, 1991, p. 62).

- **Moment to moment changes in the social arena alter the salience and discriminative properties of certain stimuli, and the value of others, requiring moment to moment behavioural changes to maintain contact with reinforcement and avoid punishment**

- Take the changes in an lift

Advanced social skills

- Definition
- What to teach
- How to teach
- How to maintain

Social skills vs social competence

- **Social skills:** discrete, goal-directed behaviours that allow an individual to interact effectively with others in his or her environment (Sheridan & Walker, 1999),

- S**ocial competence:** the quality of an individual's social interactions as perceived by those around him or her (Gresham, 1986; McFall, 1982).

- Must not only acquire important social behaviours for interacting with others, but also use these skills in ways that are acceptable to others in their environment (Sheridan & Walker, 1999).

Vast literature

- Focused studies on specific social behaviours: initiating conversation, responding to questions, detecting signs of interest and disinterest
- Curriculum-based assessments with hierarchical skill sequences
- Several published reviews on evidence-based practices

Specific behaviours: what

- Social skills categorised around the following five domains (Caldarella & Merrell, 1997) and many curricula centre around these classes
  - Peer relationships (e.g., offering help; inviting play)
  - Self-management (e.g. controlling temper; compromising)
  - Academic (e.g., completing work independently; listening to teacher)
  - Compliance (e.g., following directions; following rules)
  - Assertion (e.g. initiating conversation; acknowledge compliments)

Conversation: Advanced social verbal behaviour

- **Complex speaker behavior and complex listener behavior**
- In many conversations, the verbal behavior is relatively —context-free. The verbal behavior itself is the dominant variable.
- Each verbal response evokes a lot of behavior in the listener, and that behavior serves as one of the controlling variables for subsequent verbal behavior in the listener.
  – E.g., —"I was knocked unconscious at 10,000 feet" evokes emotional, imaginal, echoic, and other behavior in the listener. Many questions follow.
- But conditioning the behavior of the listener is a complex topic in its own right
- (Palmer, 2016 - National Autism Conference at Penn State)

Many approaches

- Video-based instruction
- Priming
- Social scripts and Script fading
- Behavioural skill training
- Teaching Interaction
- Peer mediation
- **Many behavioural techniques utilised: modeling, prompting (e.g., visual cueing, scripts), redirection, shaping, differential reinforcement, self-management**

Function and topography

- **Contingency shaped**
- Social-verbal interaction is a reinforcer
- Opportunities are engineered and non-functional reinforcers are not necessary

- **Rule governed**
- Social-verbal interaction is not currently a potent reinforcer
- Teaching focuses on establishing "social" topographies with non-functional reinforcers

Children with autism

- Insufficient variability: scripted language, ritualistic
- Too few requests for information from others
  – Their opinion
  – Their experience
  – Feedback on what they have said
- Poor control by prior verbal stimuli: Poor listener behavior
- Too tight intraverbal control: failure to follow the subtle thread of a conversation and change of direction.
- Narrow range of topics engage them. (MO control)
- (Palmer, 2016)

A continuum

- **Conversational ability lies on a continuum**
- "Our task is to try to help people move up the scale of conversational complexity" (Palmer, 2016)
- It is not just a combination of mands for information and "intraverbals"

Prerequisites

- Manding for information (nonverbal and verbal MO)
- Reciprocating and extending comments (verbal attention as an Sr+)
- Past events recall
- Social interaction as a conditioned reinforcer, but sometimes we may have to bypass that…

Stages of conversation

- Initiating (opening)
- Maintaining (theme/topic, variations)
- Ending (closing)
- Remembering information (learning new content)
- Sameness and predictability generally diminish the MO - variations are fundamental

Structural and functional elements

- Conversational partners are both speakers and listeners. Conversational volley
- Each conversational turn contains both Sds and MOs that are verbally established
- Comment – comment/mand - answer/mand - answer/comment - mand

Beyond structure

- Turn taking: holding and giving up the floor
- Monitoring listener's cues of interest or disengagement
- Monitoring shared MO
- Pausing
- Varying intonation
- Reinforcing the speaker, giving signals of interest, maintaining eye-contact, posture, distange, clarifying if signals of confusion

Conclusions

- A behavioural cusp: A related set of behaviours that lead the person to contact, be exposed to novel natural contingencies; they open a lot of doors that permit the automatic expansion of one's repertoire

- Regardless of wether conversational skills are explicitly taught through rules and structured programmes or emerge as a result of naturalistic interventions, any progress we can make toward increasing this repertoire in individuals with autism is likely to be strengthened and supported by the natural environment

Thank you!

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