

ABA IV

**B. F. Skinner's Elementary
Verbal Relations**

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Jack Michael, Ph.D.
Emeritus Professor
Psychology Department
Western Michigan University

jack.michael@wmich.edu

phone: (269) 372-3075

fax: (269) 372-3096

Suggestions and References

Concepts and Principles, Revised Edition (2004)

Chapter 3, page 117 (a very brief introduction) Read before studying the slides.

Chapter 13 (a brief introduction to the elementary verbal operants (mand, tact, intraverbal, echoic, textual, etc.)
Read for material very similar to that in the slides.

Chapter 14 (topography-based -- selection-based) Read only when referred to on a slide.

Chapter 12 (overview as a part of the experimental analysis of behavior) Read for general historical information and research themes.

***Verbal Behavior*, by B. F. Skinner (1957)**

Pages and paragraph numbers will be indicated on slides.

(VB 2,1 refers to the first paragraph beginning on p. 2.

VB 81,3 refers to the third paragraph beginning on p. 81. ²

What is unique about language?

unique feature	language	nonlanguage
type of R? No	any striped muscle rsp	any muscle or gland rsp
type of S that evokes R? No	could be visual, auditory, tactile	any sense mode
type of rfmt for R? No	any type of S^R or S^r	any type of S^R or S^r
how R achieves its rfmt? Yes	indirectly , only through someone else's behavior	by direct contact with the environment

Need for a special term

- *Speech?* Too limited to vocal behavior (talking).
- *Language or linguistic* behavior? Strongly implies community practices (the English language, Asian languages, etc).
- *Verbal behavior?* OK "Relatively unfamiliar in traditional modes of explanation." (VB 2,1)
 - verbal behavior:** asking for something, answering a question, writing a note, pointing, gesturing, using sign language to ask another signer for something, (also Morse code, Braille, and others)
 - nonverbal behavior:** walking to get somewhere, looking around to find something, picking something up to see it better, coughing because of a discomfort in the throat.

Verbal vs. Vocal: A Possible Confusion

For Skinner vb) is any behavior reinforced through another person's behavior.

[In some contexts *verbal* is a synonym for *vocal* (making sounds with the vocal musculature). In such contexts, writing, gesturing, etc. would be nonverbal.]

vocal verbal	making sounds with vocal musculature to affect another person --talking to someone
vocal nonverbal	coughing, yawning, making <i>meaningless</i> sounds with vocal musculature (but may be verbal sometimes)
nonvocal verbal	writing, gesturing, signing (ASL), finger spelling , Braille writing: to affect another person
nonvocal nonverbal	walking, picking something up, opening a door, turning lights on, putting a key in a lock

Another Source of Confusion

Confusing *stimulus** and *response* words is common, and makes it difficult to think clearly about Skinner's approach.

Vocal is a response word, *visual* and *auditory* are stimulus words. Sometimes *vocal stimulus* refers to the auditory stimulus produced by a vocal response, but this is potentially confusing and should be avoided.

Sometimes *visual response* and *auditory response* refer to the stimuli produced by certain responses, but this too should be avoided.

Response product is a very useful term for the stimuli produced by a response. Thus vocal behavior has an auditory response product. Writing and signing (ASL) have visual response products.

**Stimulus* is the singular form; *stimuli* is plural. The most common error is to use *stimuli* as a singular form--*a stimuli* is bad grammar. 6

Three Important Features of the Approach

1. **No new principles** are used for vb. The same principles relevant to all behavior of humans and animals are used to analyze vb. These involve mainly operant functional relations, but also unlearned and respondent (Pavlovian) relations.
2. **Elementary relations are first identified** (mands, tacts, etc.), then combined to deal with more complex vb (e.g. vb under the control of private stimuli, multiple control, secondary vb, and others).
3. **Selection-based vb** [such as selecting pictures (PECS), or pointing at words or symbols] can be analyzed as well as topography-based vb (speaking, signing, writing). Also in the next slide, details in slides 27-29 and also see C & P, Chapter 14).

Special VB Usage

Speaker and **listener**: The **speaker** is the verbal behavior, whether the behavior consists of talking, writing, signing, etc. The **listener** is the person who is affected by the stimuli (auditory, visual, etc.) produced by the speaker's verbal behavior.

Topography-based vb (Chap. 14 of C & P): With speaking, writing and signing (ASL), verbal responses differ from one another in terms of the response topography. Thus, saying, writing, signing *dog* consist of different vocal, arm and hand muscle movements than saying, writing, signing *cat*. They also differ in terms of response products, which is the critical feature from the listener's perspective.

Selection-based vb: Vb can consist in selecting a stimulus (pointing at it or handing it to the listener). Verbal responses differ from one another in terms of the stimulus that is selected, not the topography of the response. Thus pointing at the printed word *dog* or at a picture of a dog produces a different stimulus *for the listener* than pointing at the word *cat* or at a picture of a cat. The pointing response itself, will be approximately the same irrespective the picture that is pointed at. Selection-based vb is dealt with more extensively on slides 27-29.

Receptive language (**manded stimulus control**) is considered in detail on slide 30.

A Possible Criticism: Neglect of the Listener

As speakers, writers, or signers (ASL) our vb results in stimuli that alter the behavior of our listeners. Traditionally this is called *expressive language*.

As listeners, readers, or viewers (of signs--ASL) we are affected by the vb response products from the vb of others (as when we comply with a request or a command).

Traditionally this is called *receptive language**.

Skinner clearly emphasizes the behavior of speaker, writer, signer, the so-called expressive language. Why? 2 reasons.

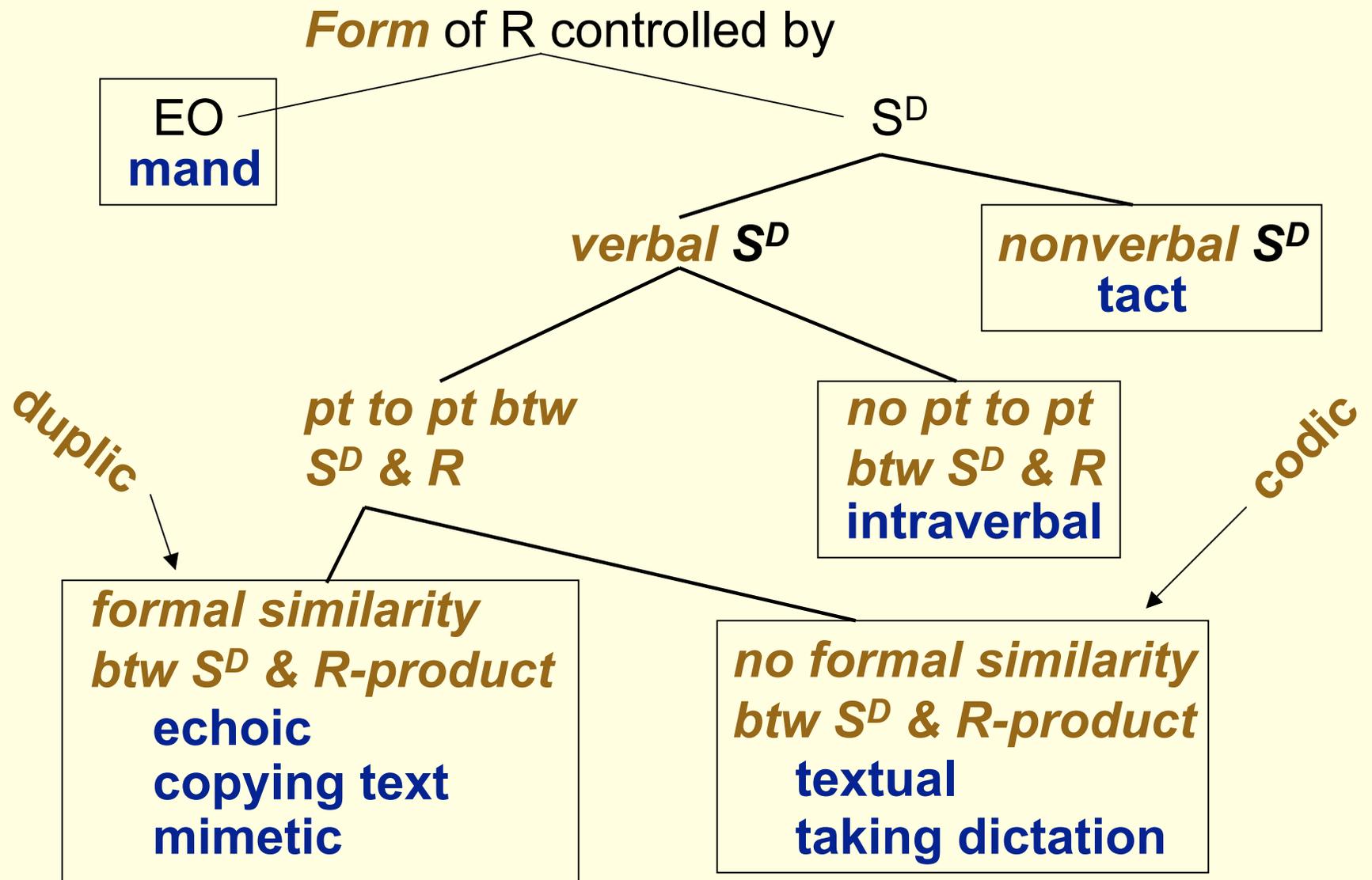
1. Much behavior evoked by a verbal S (response product of someone's vb) does not differ functionally from behavior evoked by a nonverbal S. Stopping when someone says *stop* is not much different from stopping when an object suddenly blocks our path.
2. When behavior evoked by a verbal S seems not like that evoked by nonverbal stimuli, it may be due to the listener's repertoire developed as a speaker.

*See slide 30.

But Listener Behavior is Not Actually Neglected in *Verbal Behavior*. Below are identified several explicit treatments of listener behavior.

- The listener's response to the tact (VB 86,2--89,1).
- The Reader (VB 169,1--171).
- Strengthening VB in the Listener (VB, 268,2--288,1).
- Instruction and Knowledge (VB 362,1--367)
- Much of Chapters 15, 16, and 17 involve the speaker as a self-listener.

Elementary Verbal Relations: Topography-Based VB*



*Elementary verbal relations for selection-based vb will be considered later. 11

Some Commonsense Translations*

- verbal S--written or spoken word, number, symbol.
- nonverbal S--object, object property, action, relation.
- pt to pt correspondence--R is same word as S
- no pt to pt correspondence--R is not same word as S
- pt to pt **and** formal similarity--S and R-product are same word, in the same sense mode, and resemble each other.
- pt to pt **but** no formal similarity--S and R-product are same word, but in different sense modes (one visual, one auditory) or in same sense mode but do not resemble each other (heard word and heard Morse code symbols for the letters, seen word and seen finger-spelling of the same word). This is one of the reasons I use the terms *codic* and *duplic*

*Nor precise enough for science, but possibly helpful.

Commonsense Terms* for Elementary VB

- mand--requesting, demanding, asking a question
- tact--naming, labeling
- intraverbal--word sequence, word associates
- echoic--saying words that you hear
- copying a text--writing words that you see
- mimetic--making sign you see someone else make
- textual--saying words that you see
- taking dictation--writing words that you hear

Note that some verbal relations may not fit any of these definitions. I introduced the terms **duplic** (pt to pt **and** formal similarity) and **codic** (pt to pt and **no** formal similarity) to include such relations. For example, Braille writing a word heard (codic) or a word felt (duplic), saying what is Braille read (codic), finger spelling a word heard (codic) or a word seen finger spelled (duplic), saying what is seen finger spelling (codic), and many others.

Not precise enough for science, but possibly helpful.

Special Technical Terms: Topography-based VB

- **Form** of the R(esponse): What the speaker says, writes, or signs.
- **Verbal S^D**: the response-product of someone's verbal behavior (e.g. sounds made by a speaker, visual S produced by writing, visual S produced by signing; words, numbers, symbols (\$,% ,?)). (But the speaker's R will also have nonverbal features--size, color,etc.)
- **Point-to-point** correspondence between S^D and R(esponse): Parts of R can be related to parts of S. In textual behavior the parts of the vocal R can be related to the parts of the visual stimulus (e.g. a written word). Thus, making the *d* consonant sound is related to the *d* part of the visual stimulus *dog*, making the *o* vowel sound is related to the *o* part of the visual stimulus *dog*, making the *g* consonant sound is related to the *g* part of the visual stimulus *dog*. But saying *canine* as a result of seeing the written word *dog* has no such point to point correspondence, and is an example of an intraverbal relation.
- **Formal similarity** between S^D and R(esponse) product: Response product and S^D are in the same sense mode and resemble each other (sound alike, look alike). Thus in saying *dog* as a result of hearing someone else say *dog* (an echoic response), the auditory stimulus that evokes the response has formal similarity to the auditory response-product resulting from saying *dog*.

Main Features of the Mand Relation

- **Definition** in technical terms: A type of vb with response **form**¹ controlled by a current establishing (motivating) operation, and **not** related to an immediately prior S^D (all other verbal relations are).
- Definition in everyday terms: A type of vb with response form controlled by what the speaker wants from the listener.
- Definition in terms of rfmt history: A type of vb that has typically been followed by a specific type of reinforcing consequence.
- Possible R forms: speaking, writing, signing, finger spelling, sending Morse code, and others. Mand can also consist in pointing at a word, symbol, or picture.
- Things manded: Attention ("Hey", "Pardon me", etc.); objects ("Water."), actions ("Come here.") and more complex events.**
- Softened or disguised mand.
- Mand extension.
- Rfmt for the mand: Something specific to that mand. Rfmt for requests is having the request granted. All other elementary verbal relations are reinforced by some form of generalized conditioned rfmt, or in a more complex way.

¹Mand occurrence does depend on an S^D, but not the form of the response.

²Emotional behavior cannot be directly manded.

Mand Examples and Non Examples

You should try to classify each example as a mand, some other type of vb, or nonverbal behavior.

A tendency to

1. *say out* to get LRV* to open a door
2. open a window. to cool the room
3. *write stop*. on hearing someone say *stop*
4. sign hello to get LRV* to look at you
5. *say coffee* on smelling the odor of coffee
6. point to your wrist so that LRV* will tell you the time
7. *say Jones* in response to LRV* asking for Mary's last name
8. *say taxi* solely as a result of seeing one
9. run as a result of being in a hurry

*LRV = the listener, reader, or viewer of signs

Answers are on slide 31 at the end of the slide show.

Main Features of the Tact Relation

- **Definition:** A type of vb with the response **form** controlled primarily by an immediately prior **nonverbal S^D** (object, action, relation, property, etc.). (Many who wish to use Skinner's classification system but not his technical terms refer to the tact as *naming* or *labeling*. I think this weakens the effectiveness of the user's verbal repertoire. You may have to use everyday terms to communicate with someone who is not familiar with behavior analysis, but you should think in technical terms.)
Freeing vb from MO (EO) control, but S^Ds also depend on MO (EO).
- **Kinds of Response Forms:** speaking, writing, signing, etc. Tacts can also be selection-based (when shown an object and asked what it is, the speaker can point to the name of the object or to a symbol, or a picture, but this is not clearly vb--could be just identity matching--see slide 28.).
- **Sense Mode of the S^D:** Any sense mode.
- **Things Tacted:** Objects, object properties, actions, relations etc.
- **Reinforcement:** Generalized rfmt (approval), speaker knowing that the listener has been helped in some way--but not specific to the particular tact.

Pure and distorted or impure tacts. Tacts of private events.

Tact occurrence depends on different S^Ds from those determining R form.

Tact Examples and Non Examples

You should try to classify each example as tact, mand, some other type of vb, or nonverbal behavior.

A tendency to

1. say *out* as a result of hearing *out**
2. say *window* as a result of seeing a window
3. sign *cat* as a result of seeing *cat**
4. say *coffee* on smelling the odor of coffee
5. write *coffee*. on hearing *tea**
6. open a door in response to a listener saying *open*
7. say *taxi* as a result of wanting one
8. say *taxi* as a result of seeing *taxi**
9. adult points and says *What's that?* Child looks and says *cup*.

*A stimulus word in italics means that it is a verbal stimulus (spoken or written word, or the visual result of a signed response).

Answers are on slide 31 at the end of the slide show.

Mand-Tact Contrasts

Empowering

- **Mands** permit speakers to alter the environment through listeners' behavior (thus extending the power of the speaker to affect the environment).
- **Tacts** permit listeners to react to stimuli that are affecting the sense organs of speakers (thus extending the sensory capacity of the listener).
In this way the development of verbal behavior enhances the effectiveness of a verbal community

Listener's Inference

- **Mands** permit listeners to infer something about the condition of the speaker *regardless of external conditions*.
- **Tacts** permit listeners to infer something about the circumstances *regardless of the condition of the speaker*.

Audience Relation (see VB Chapter 7)

- The **audience*** is a nonverbal S that controls the form of a verbal R, like the nonverbal S that controls the form of the tact; but the audience typically controls a much larger repertoire than the tact. With a bilingual speaker, the presence of an English speaking person (audience variable) strengthens a large part of the English repertoire, and a table evokes the tact *table*. The presence of a Spanish speaking person strengthens a large part of the Spanish repertoire, and the table evokes *mesa*.
- Audience control is always exerted **in combination with** stimuli controlling more specific forms of response, and involves a form of multiple control. *Table* is the joint result of a table as a relatively specific nonverbal S, plus the audience variable--a nonverbal S related to an English speaking listener.
- The **listener stimulus** need not be a person, but any stimulus where that language has typically been spoken such as a house, classroom, etc.
- Within a single language community there are many repertoires controlled by **special audiences**. Behavior analysts speak in behavioral language to other behavior analysts, but in commonsense language to parents or lay persons. A sailing enthusiast speaks sailing jargon to another sailing enthusiast, but will use simple descriptive terms when talking with others.
- The audience variable also controls the style of verbal behavior, e.g. formal vs. colloquial; and to some extent what is talked about.

Audience* refers to the listener, and in this usage does **not imply groups of people attending a performance.

Main Features of the Intraverbal Relation

- Definition: A type of vb with (1) response form controlled by a verbal stimulus with which the response does **not** have pt to pt correspondence (parts of the S do not control parts of the R). (Commonsense language: Stimulus is a word and response is a different word.)
- Possible response forms: Speaking, writing, signing, and others.
- Possible controlling stimuli: auditory, visual, tactile. Note that in general there is **no** pt to pt correspondence between any word (as S or R) and any sign (as S or R). (Illustrate with the word *cat* and the sign for *cat*.)
- Examples: Tendency to say *swamp* as a result of hearing someone say *alligator*--the *sw* part of the response is not any more related to the *al* part of the stimulus than to the *ig* part of the stimulus, and so on. But with saying *swamp* as a result of seeing finger-spelled *swamp*, the finger spelled letters *s* and *w* **are** related to *sw* part of the response.

Intraverbal Examples and Non Examples

You should try to classify each example as intraverbal, tact, mand, some other type of vb, or nonverbal behavior.

A tendency to

1. say *over* as a result of hearing *under**
2. say *window* as a result of seeing *window*
3. write *cat* on seeing someone sign *cat* (*compare below*)
4. say *cup* on seeing a cup of *coffee*
5. sign *cat* on seeing someone sign *dog* (*compare above*)
6. say *cat* seeing a dog (careful!)
7. write *cat* as a result of seeing *cat*
8. say *taxi* on hearing *taxi*
9. Hungry child enters kitchen and would really like a cookie, but there is no one there (no appropriate audience), so no vb occurs. Then a parent comes into the kitchen, and child immediately says *cookie*.

*A stimulus word in italics means that it is a verbal stimulus (spoken or written word, or the visual result of a signed response). Answers on slide 32.

Pt to pt, but **No** Formal Similarity (Codic Relation)

- **General S^D---R relation:** R form controlled by (1) a verbal stimulus, with which it (2) has pt to pt, but (3) no formal similarity.
- **Textual Relation:** S is visual (written or printed words) and R consists in saying those words. Textual behavior is reading out loud (but with no implication that the reader *understands*--can react in any other way to the verbal stimuli). *Reacting as a listener.*
- **Taking Dictation:** S is auditory (spoken words) and R consists in writing the words that are heard. Term comes from what stenographers do, but with is no implication that a large sample of behavior is being recorded.)
- There are similar relations that have no special names, e.g. finger spelling what one hears spoken, sending Morse code what one sees written, Braille writing what one hears spoken, and others.
- **Interesting point:** There is no form of written sign language analogous to the phonetic writing system related to vocal behavior in use by members of the deaf community. Signers who are literate in English can produce signs related to English words, or can write English words that are related to signs, but these do not have any kind of S^D---R pt to pt relation. Some such writing systems have been proposed, but they are not much used by the deaf community.

Pt to Pt and Formal Similarity (Duplic Relation)

- **General S^D--R Relation:** R form is controlled by (1) a verbal stimulus, with which it (2) has pt to pt correspondence, and (3) there **is** formal similarity between S^D and R-product.
- **Echoic:** The S is auditory and the R is speaking (echoing what one hears). *2 kinds of behavior that seem echoic but are not.*
- **Copying Text:** The S is visual and the R is writing (writing what one sees in written form).
- **Mimetic Behavior:** Imitating someone's signs.
- There are similar relations that have no special names, e.g. finger spelling what one sees finger spelled, sending Morse code what one hears being sent in Morse code, Braille writing what one feels Braille written, and others.

Elementary VB with Verbal S^D

		Response			
		<i>say fish</i>	<i>write fish</i>	<i>finger-spell fish</i>	<i>sign fish</i>
Stimulus	<i>hear fish</i>	echoic (duplic)	taking dictation (codic)	codic-no common name	intra-verbal
	<i>see fish</i>	textual (codic)	copying text (duplic)	codic-no common name	intra-verbal
	<i>see fish</i> finger spelled	codic-no common name	codic-no common name	duplic-no common name	intra-verbal
	<i>see</i> someone <i>sign fish</i>	intra-verbal	intra-verbal	intra-verbal	mimetic

All VB by Verbal S, Examples and Non Examples

Classify each as echoic, textual, copying text, taking dictation, mimetic.

A tendency to

- | | |
|------------------------------|--------------------------------------|
| 1. say <i>over</i> | as a result of seeing <i>over</i> |
| 2. say <i>window</i> | as a result of hearing <i>window</i> |
| 3. write <i>cat</i> | on seeing someone sign <i>cat</i> |
| 4. write <i>cup</i> | on seeing a cup of <i>coffee</i> |
| 5. sign <i>cat</i> | on seeing someone sign <i>cat</i> |
| 6. say <i>cat</i> | as a result of seeing <i>dog</i> |
| 7. write <i>cat</i> | as a result of seeing <i>cat</i> |
| 8. say <i>taxi</i> | on hearing <i>taxi</i> |
| 9. write <i>running</i> | on hearing <i>running</i> |
| 10. sign <i>stand up</i> | seeing someone sign <i>stand up</i> |
| 11. say <i>happy</i> | as a result of seeing <i>happy</i> |
| 12. write <i>running</i> | as a result of seeing <i>running</i> |

Answers on slide 32 at the end of the slide show.

Elementary Verbal Relations: Selection-Based VB*

R consists in pointing at or in some way identifying to a listener one stimulus among an array of stimuli. The stimulus selected could be a printed word, a symbol, or a picture. There are a number of selection-based vb systems in use at the present time. One of the oldest is Blissymbolics (<http://home.istar.ca/~bci/>) developed by Charles K. Bliss for use with adults and children with language deficits. Another is the system for studying the communicative ability of chimpanzees (<http://www.iowagreatapes.org/bonobo/language/index.htm>) developed by Dwain Rumbaugh and Susan Savage-Rumbaugh, currently in use with Bonobo chimpanzees. The one that is probably most familiar to most of you attending this presentation is the Picture Exchange Communication System (PECS) of Andrew Bondy and his colleagues (<http://www.pecs.com/>). The examples of elementary verbal relations on the next two slides (28 and 29) will be based loosely on PECS.

*See Chapter 14 in Concepts and Principles.

Selection-Based VB Examples

A child has a communication book containing removable picture cards showing objects and events. The child's vb consists in selecting one of the picture cards and handing it to the adult communication partner.

- **mand:** The picture selected depends upon an MO (EO). In commonsense terms, the child has previously handed a particular picture of something wanted to the communication partner and as rfmt has received the object or event related to the picture. E.g. selecting a picture of a glass of clear liquid has been followed by receiving a glass of water. This is like saying *water* as a result of current water deprivation. For manding something other than an object the picture can be related in some way to the event, or can be completely arbitrary. To get the adult to open a door, the picture could show a door in an open position. To listen to music the picture could show the small tape player used in the classroom, or it could be a picture of a cartoon character with mouth open (singing).
- **tact:** The picture selected depends on a nonverbal S^D. E.g. as a result of seeing a book, the child has previously selected the picture of a book and as rfmt has received praise or some other form of social rfmt. This is like saying *book* as a result of seeing one (but not because of having received a book). Matching-to-sample training could result in this behavior, without being a part of a communication system, which makes the status of some such tact relations problematic.

Selection-Based VB Examples (cont'd.)

A child has a communication book containing removable picture cards showing objects and events. The child's vb consists in selecting one of the picture cards and handing it to the adult communication partner.

- **Intraverbal:** The picture selected depends on a verbal stimulus, but does not have pt to pt correspondence with the verbal stimulus. E.g. any picture selection determined by auditory or visual *word* stimuli would illustrate an intraverbal relation. As a child who has been using PECS begins to use vocal behavior, a number of such intraverbal relations might develop. Also selecting a picture on the basis of being shown a different picture would qualify as intraverbal behavior. Objects and events that commonly occur together might result in the development of an intraverbal relation analogous to the vocal and written intraverbals of this sort, e.g. a tendency to select the picture of an egg as a result of seeing a picture of a chicken.
- Elementary verbal relations with pt to pt but no formal similarity (codic behavior) are not a part of the PECS system. Selecting a picture as a result of being shown the same picture could qualify as dupic behavior, somewhat like echoic or copying text.

Comment on PECS and vocal behavior.

Receptive Language, or Manded Stimulus Selection*

- Closely related to the selection-based tact is what is ordinarily called *receptive language*, better referred to as manded stimulus selection. In such training a child is presented with a set of stimuli (objects or pictures) and asked to point to or touch a particular item in the set. *Show me the apple. Touch the apple.*
- This is a form of multiple control. The correct pointing or touching R is jointly controlled by (1) the auditory stimulus *apple* provided by the teacher, and (2) the nonverbal visual stimulus provided by the object or picture. Rfmt is typically praise, an edible, etc. (but not the receiving either the object or the picture).
- Manded stimulus selection is the opposite of a selection-based tact repertoire, which consists in presenting an array of verbal stimuli (words) and asking "What is this?" while indicating a nonverbal stimulus. In manded stimulus selection an array of nonverbal stimuli is presented and the learner is asked to touch or point to the object named by the teacher. Both involve joint control by a verbal and a nonverbal stimulus.
- Receptive language or manded stimulus selection is used a great deal (possibly too much?) in work with children lacking effective vb. *Why so popular? Three reasons: meanings of words, no shaping needed, control by teacher.*

*See Chapter 14 in Concepts and Principles

Answers

Mand examples and nonexamp.

1. mand
2. nonverbal behavior
3. other vb (taking dictation)
4. mand
5. other vb (tact)
6. mand
7. not a mand; (intraverbal??)
8. other vb (tact)
9. nonverbal behavior

Tact examples and nonexamp.

1. other vb (echoic)
2. tact
3. other vb (intraverbal)
4. tact
5. other vb (intraverbal)
6. nonverbal behavior (let's discuss)
7. mand
8. other vb (textual)
9. tact

Answers (cont'd.)

Intraverbal examples and non.

1. intraverbal
2. other vb (textual)
3. intraverbal
4. tact
5. intraverbal
6. tact (odd but S is nonverbal)
7. other vb (copying text)
8. other vb (echoic)
9. mand

VB controlled by verbal S

1. textual
2. echoic
3. intraverbal
4. tact
5. mimetic
6. intraverbal
7. copying text
8. echoic
9. taking dictation
10. mimetic
11. textual
12. copying text

ABA IV

The session on B. F. Skinner's
elementary verbal relations has ended.
Thank you for your attention.

Jack Michael, Ph.D.
Emeritus Professor
Psychology Department
Western Michigan University

jack.michael@wmich.edu

phone: (269) 372-3075

fax: (269) 372-3096