Stimulus Equivalence

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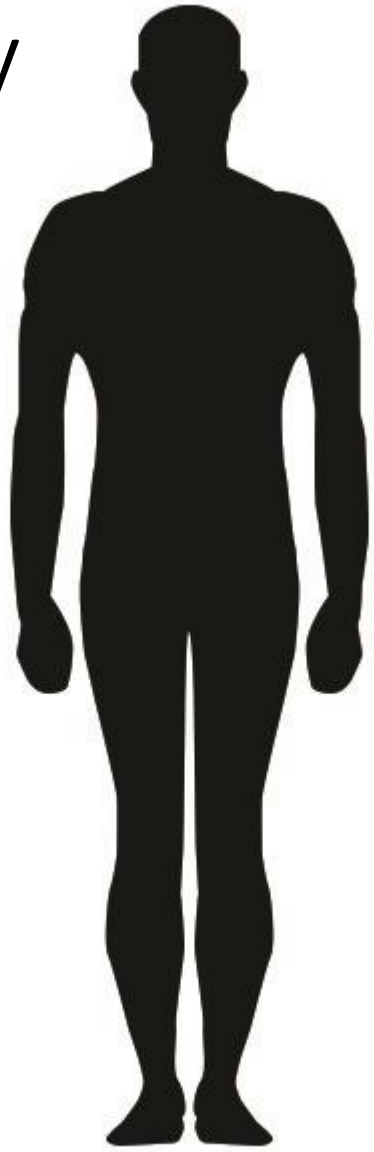
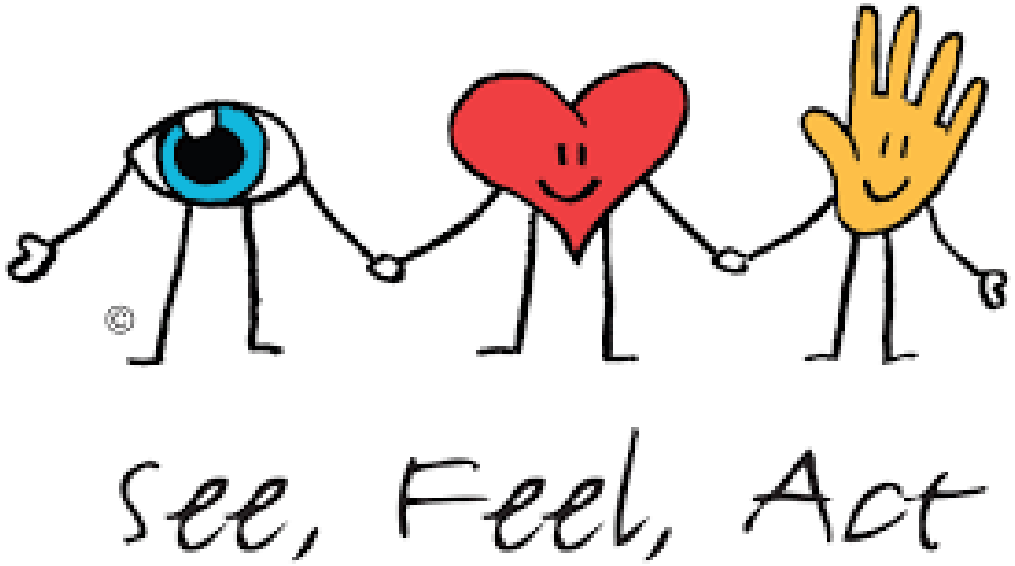
In today's workshop…

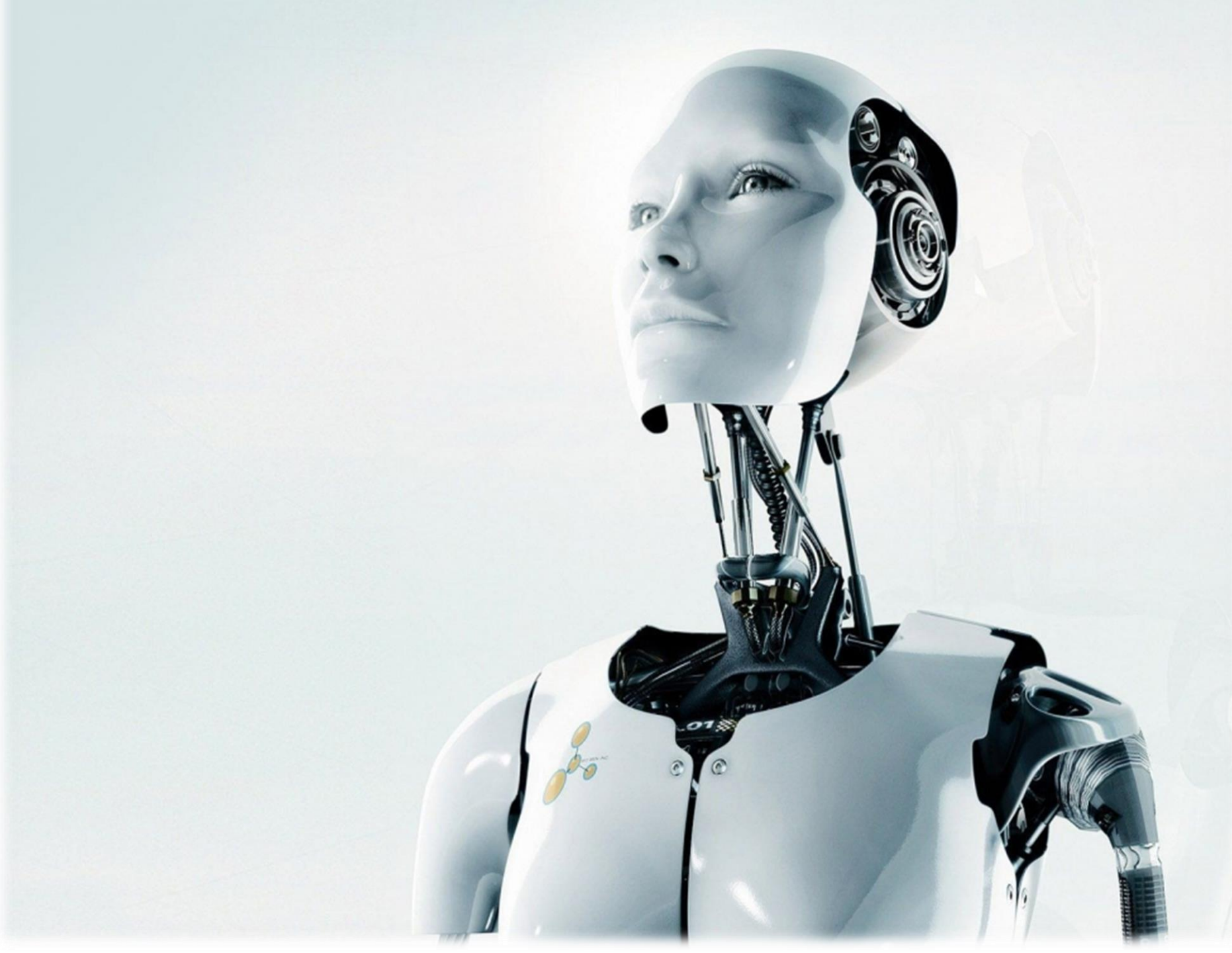
- I'm going to try and convince you of the richness of humanity and language
- I'm going to try to give you a brief primer on stimulus equivalence
- I'm going to point out the paucity of instructional protocols leveraging this area
- I'm going to walk you through a curriculum that does this
- I'm going to provide you a way to create teaching protocols leveraging stimulus equivalence
- You're going to give it a whirl

humanity





robots



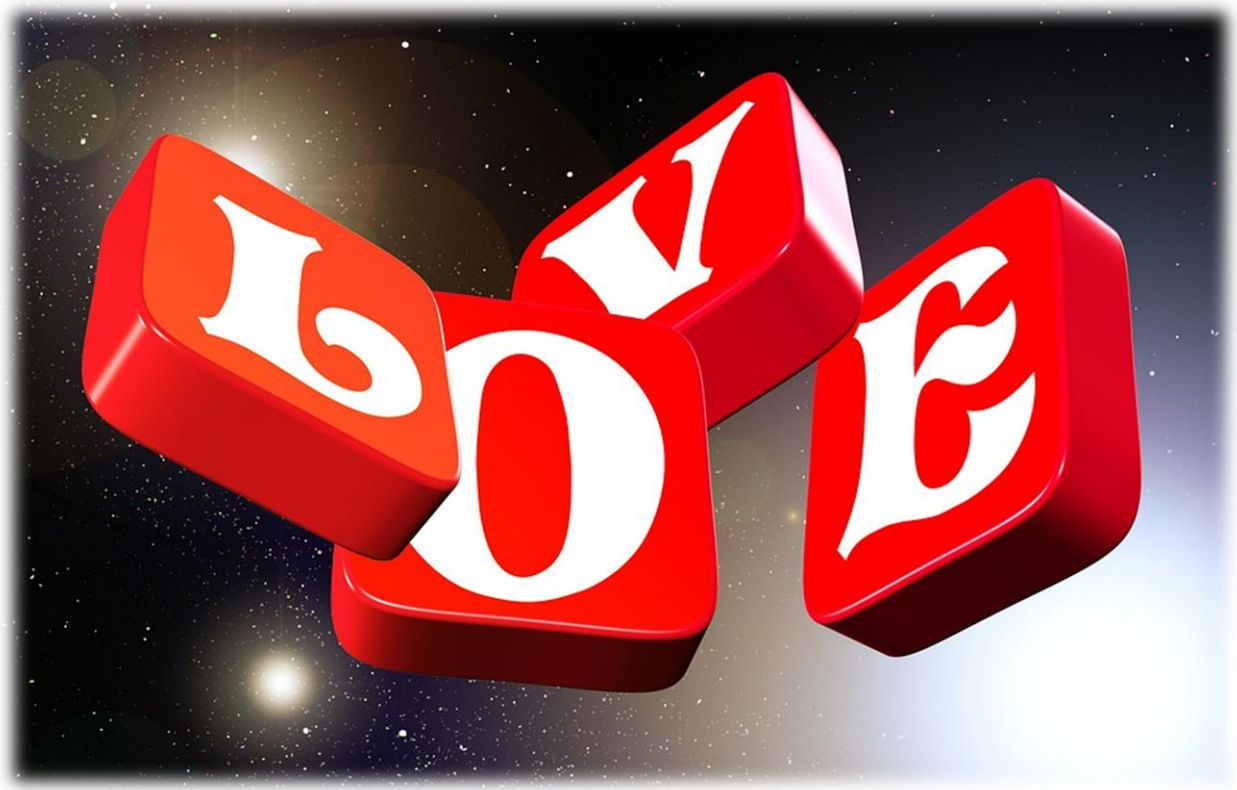
Intraverbal Training

Common intraverbals I see:

- Fill-in Songs
- Category
- Feature/Function/Class
- Answer questions

What else is being human…?


LiES


LOVE

Metaphors

Intro and Review

- Remember reinforcement and punishment create a behavioral repertoire
- Like a quilt

How do we learn everything?

- Each time behavior happens – and is reinforced, it is “added” or “strengthened” in our repertoire
- Things like learning to label stuff…
- Consider it a pebble

How do we learn our skills?

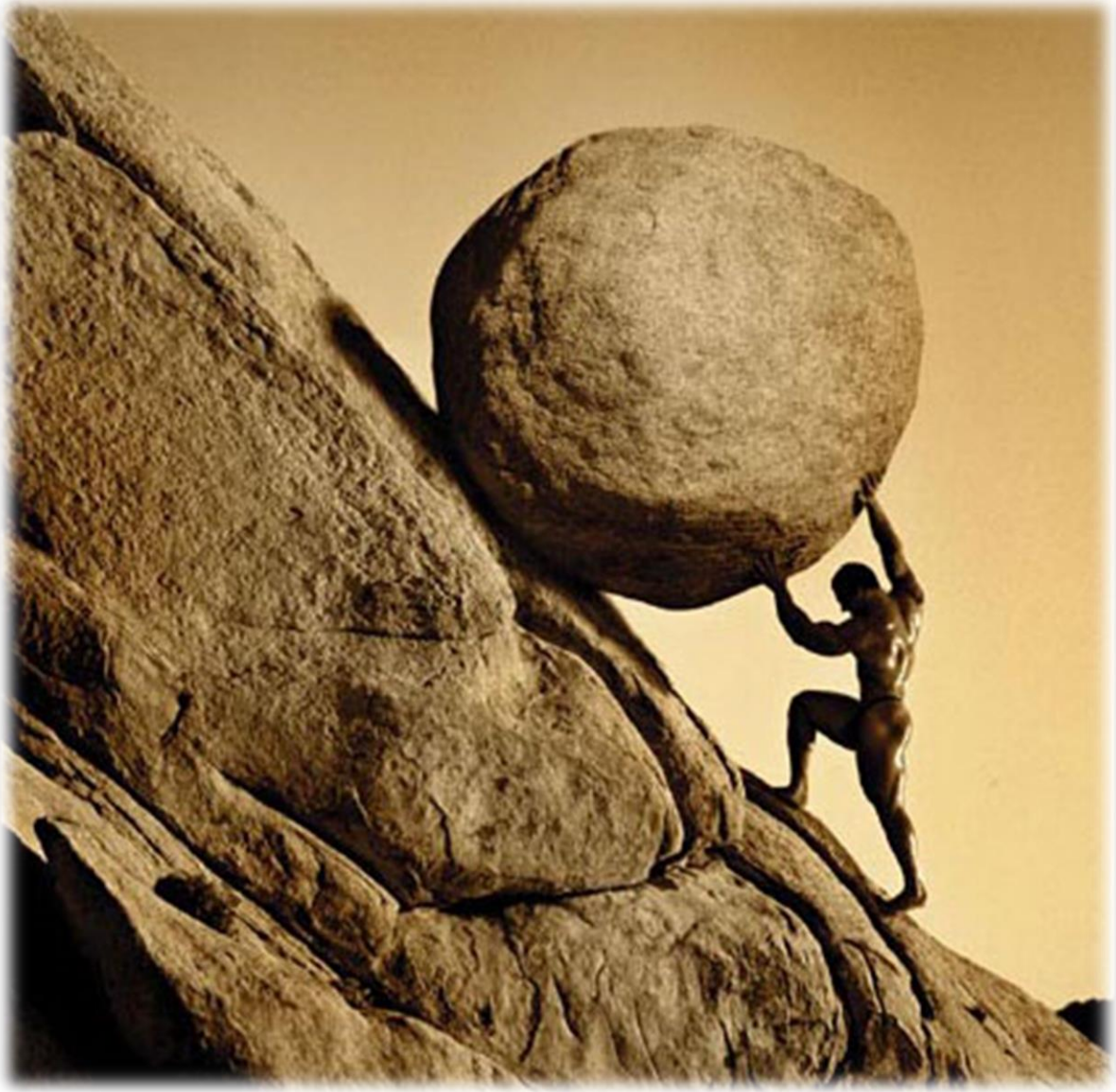
- Some skills require a lot of component responses (talking, zipping a shirt, writing a paper, etc.)

- Consider these as a stack of pebbles:

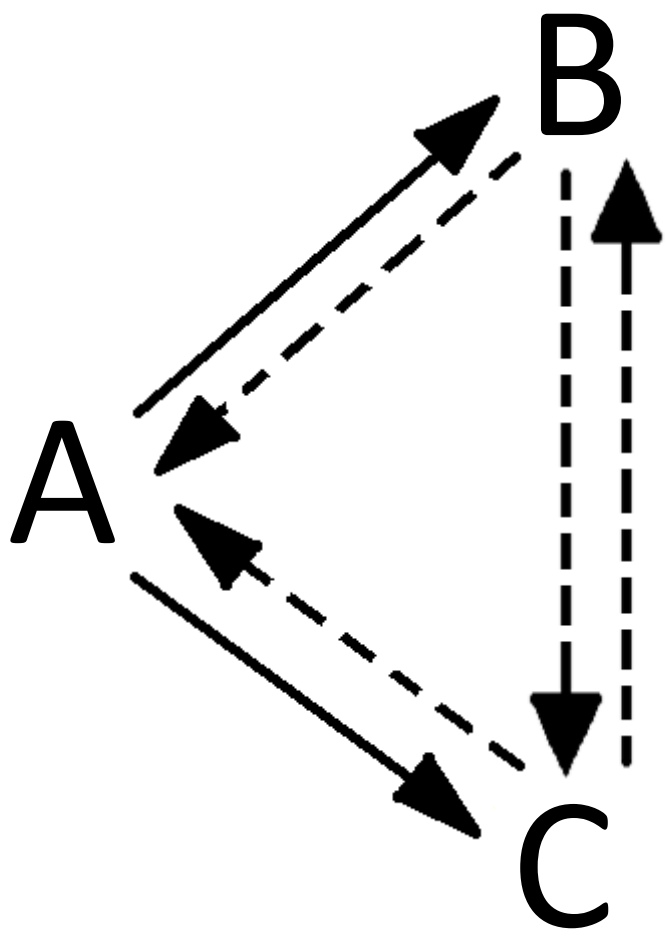
How do we learn our skills?

- But – we're complex humans, with *huge* and diverse repertoires…
- Consider an adult's repertoire as a mountain

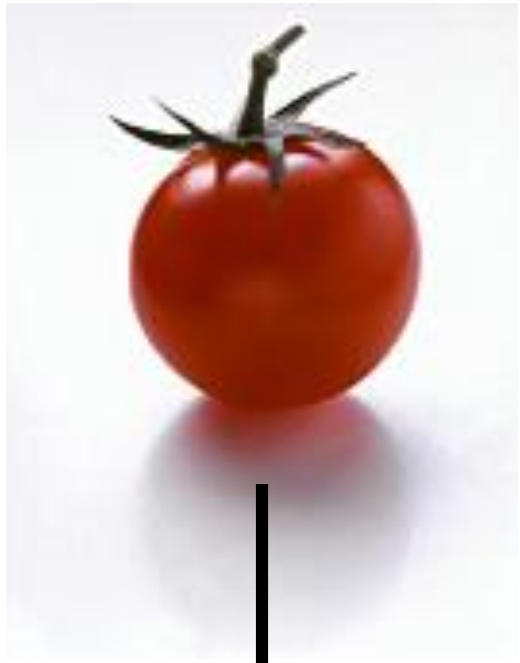
Building a mountain…one pebble at a time?



Let’s look at some equivalence…



What made folks so excited?



choose

A

B

C

Clarter

choose

A

Clarter

B

Jesste

C

Landst

Clarter

“Clarter”

Listen to me

A

B

C

I trained you two things:

- See word and match item
- See word and say word

For free, you got all of this:

- See item and match item
- See text and match item
- See item and match text
- Hear word and match item
- Hear word and match text
- Hear word and say word
- See item and say word
- See text and say word

Stimulus Equivalence

- Describes the emergence of accurate responding to untrained and non-reinforced stimulus-stimulus relations following the reinforcement of responses to some (other) stimulus-stimulus relations.

Stimulus Equivalence

- Exists when a learner correctly identifies a symbolic relationship between two or more non-identical stimuli without specific training on that relationship.
  - In other words, the learner makes untrained but accurate connections between stimuli

Stimulus Equivalence

- As indicated by the name, the derived relations are ones of “sameness”
- In some way or other, the stimuli share some similar property or feature
- The organism reacts to them in similar manners because of the derived relation

Components

- Reflexivity
  - A=A
- Symmetry
  - Train: A=B;
  - Derived: B=A
- Transitivity
  - Train: A=B;B=C
  - Derived: A=C

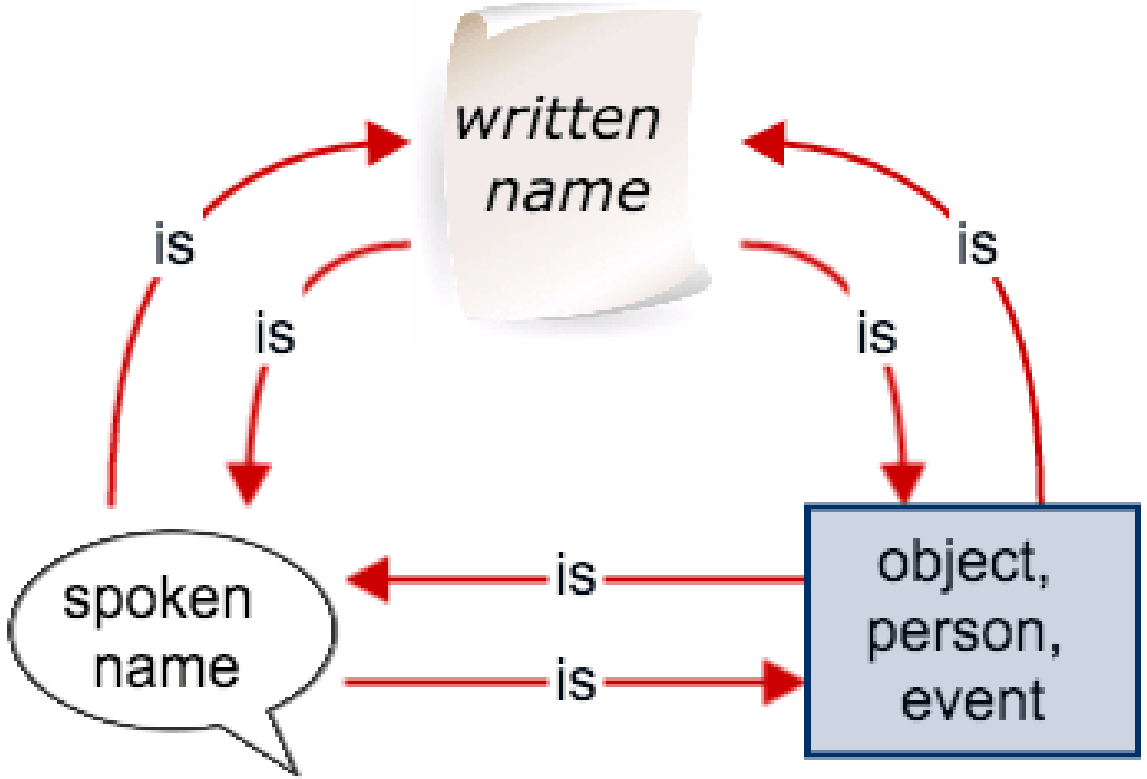
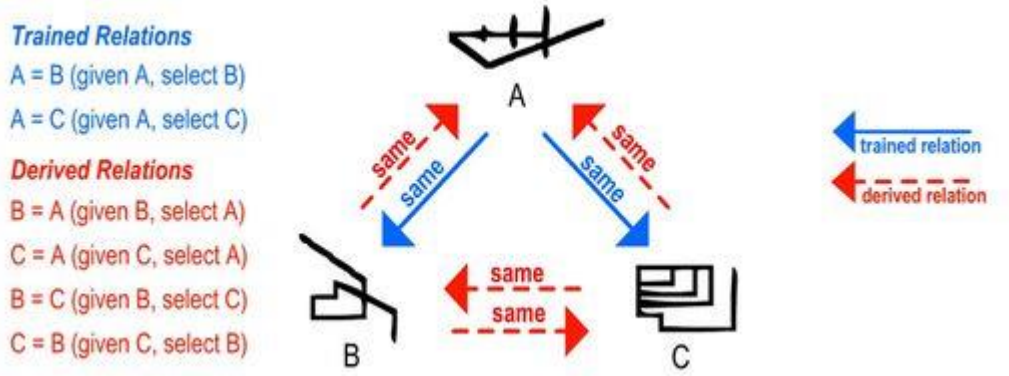


Image courtesy FoxyLearning.com



Relational Frame Theory

- Relational Frame Theory (RFT) is an explicitly behavioral account of human language and cognition.
- It is an approach designed to be a pragmatically useful analysis of complex human behavior, and provides the empirical and conceptual tools to conduct an experimental analysis of virtually every substantive topic in this arena.
- Further, the contextual approach of RFT provides a *functional* account of the *structure* of verbal knowledge and cognition, creating an important link between the traditionally disparate perspectives of cognitive and behavioral sciences.

But we already have Verbal Behavior!

- Why do we need RFT if we have Skinner's VB?
- Let's check the research!

The life and times of VB…

- Although Chomsky has been approbated as Skinner's grim reaper, some within the field took exception to the functional approach to language.
- "Verbal Behavior" was seen as speculative and containing little experimental data
- Several behavior analysts quickly came to its defense, examining this issue (e.g., Eshleman, 1991; Michael, 1984; E. Vargas, 1986) and claimed it to be unsubstantiated.
- However, Skinner's verbal behavior has not fulfilled its promise over the past 50 years (new and viable attempts to account for language and cognitive processes other than those in a small percentage of our population)

New Approach?

- Hayes, et al. (2001) propose an extension of the Skinnerian interpretation that has re-invigorated behavioral research in the area of language and cognition
- RFT incorporates some aspects of Skinner's treatment while expanding it based on experimental procedures that generated significant data
- It can account for over 30 years of stimulus equivalence findings that a Skinner's VB approach alone remains unable to do

RFT

- RFT is not different
- RFT is an extension – they add a new operant to the game
- But…this operant plays with all the others!
- In fact, this operant can turn other operants on their heads sometimes
- This operant means that we may need a different approach to complex human behavior

RFT

- There is growing support of this approach
- **Empirical** support
  - Why is this important?
  - What have been other approaches?
- This is not a purely conceptual analysis or extension

RFT is hard

- One of the greatest challenges is picking up RFT
- Its got a lot of new concepts and techniques and has been difficult for many to grasp
- I’m going to ask you to try and bear with me as we try to do a very difficult task in a very short amount of time

Let’s begin…RFT

- RFT rests on the fact that human beings readily derive stimulus relations that are based on properties OTHER than formal
  - What does this mean?
  - Stimulus equivalence is an example of this

Stimulus Relations

- Non-verbal organisms can be trained to select based on size
  - Always choose the smallest
  - Always choose the biggest

Pick the biggest

Pick the Biggest

Pick the biggest

What is this?

- These are all based on immutable structural properties of the coins
- They are physically bigger
- They will always be that way
- However – once we add some verbal magic
- I can get verbal organisms to do this (but not nonverbal)

Pick the biggest (value)

Pick the biggest (value)

Pick the biggest (value)

Let me show you…

- Pick the biggest (size)
- Pick the biggest (weight)
- Pick the one worth most
- You're going to go to the store and can have 1000 of any of these. Pick the best
- You can have 1000 of any of these, but you receive a shock for each dollar you possess. Pick the best

Entailments

- When two stimuli are related, organisms tend to also derive the reverse [i.e. – you train A to B and you get B to A]
  - you may know this as what?
- This is **mutual entailment**
- Then, we find that If A is related to B and B is related to C then A is related to C
- This feature is called **combinatorial entailment**

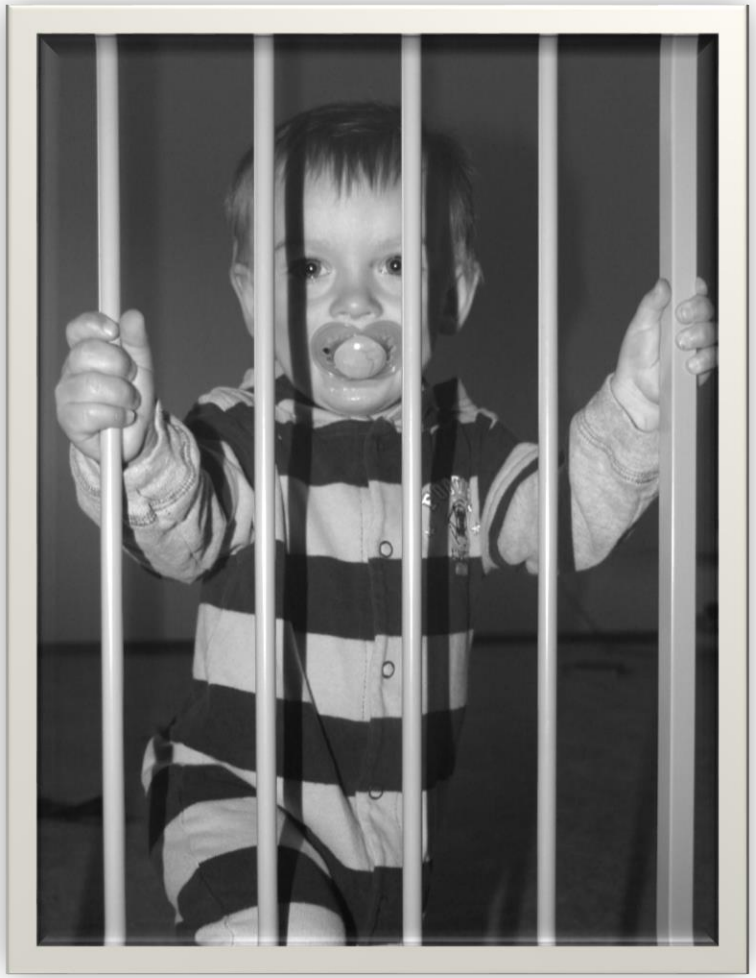
Context Counts

- Now – this would be messy if it all just occurred this way
- AARR must come under contextual control
  - Remember the parachute example?
  - Derive this: putting on parachute *before* jumping
- These contextual cues are critical
  - Crel identifies how the relata are related (identical, opposite, etc.)
  - Cfunc identifies what properties are related (value, pain, etc.)

Stimulus Transformers

- Once stimuli are brought into relations
- Any change to them then changes all others in the "network"
- This is called **stimulus transformation**
- RFT uses transformation rather than the traditional "transfer" for a reason
- How does stimulus transfer work (hearken back to basic concepts/principles)
- So transformation is critical and contextual
  - Why is the latter important?
  - Do you eat the word lemon?

Framing



Framing

Relational Frames

- Relational frames are metaphors for the relations in which all these verbal events participate
  - “They are specific classes of AARR that show contextually controlled properties of mutual and combinatorial entailment and the transformation of stimulus functions, not due solely to formal properties or to direct training with the stimuli involved, but due to a history of such relational responding and the presence of contextual cues that evokes this pattern of responding”
- They are not a *thing*

Framing

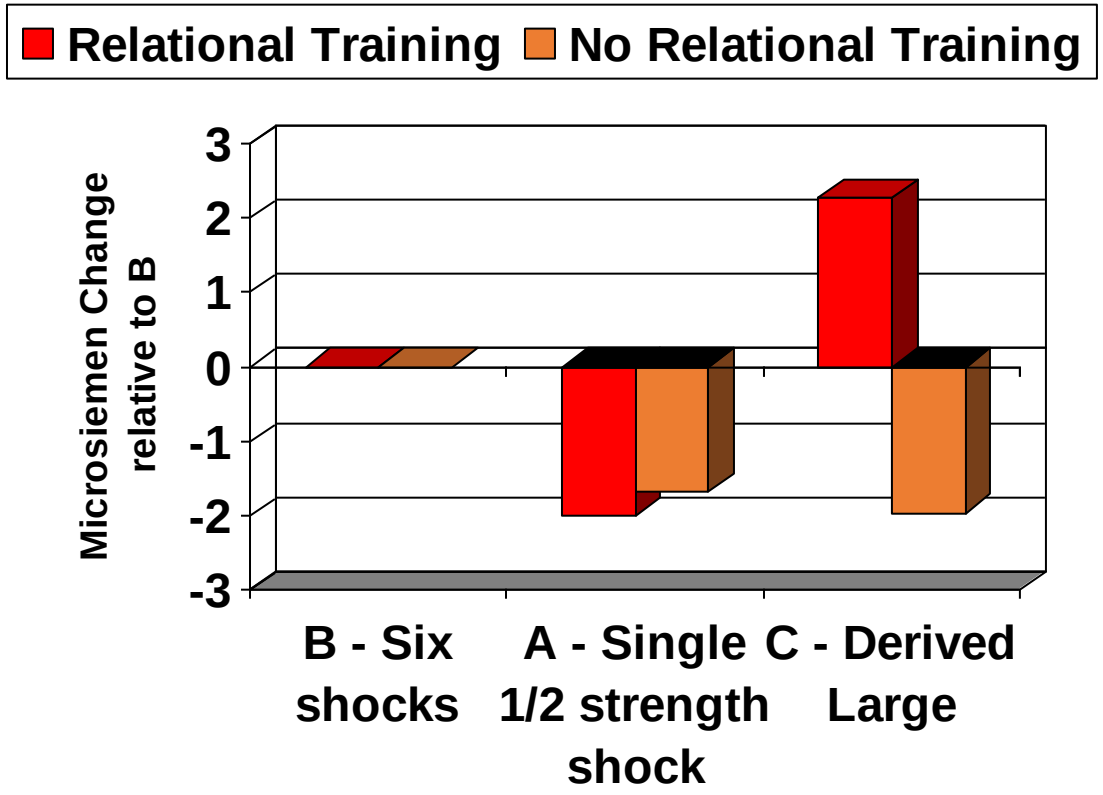
- When we say “frames” we are using shorthand to mean “relationally framing”
- When a person relationally frames, they are engaging in arbitrarily applicable relational responding (AARR)
- To simplify: framing is relating stimuli in a specific way
- The word “frame” is a metaphor to emphasize that the relational responding can involve any stimuli much like a picture frame can contain any picture.

Derived Relations and the Transformation of Functions

15 normal subjects
Establish this relational network in half of them using arbitrary stimuli:

A < B < C

Give B a CS shock function and then present a single ½ strength shock in the presence of A
Test the C stimulus. . .

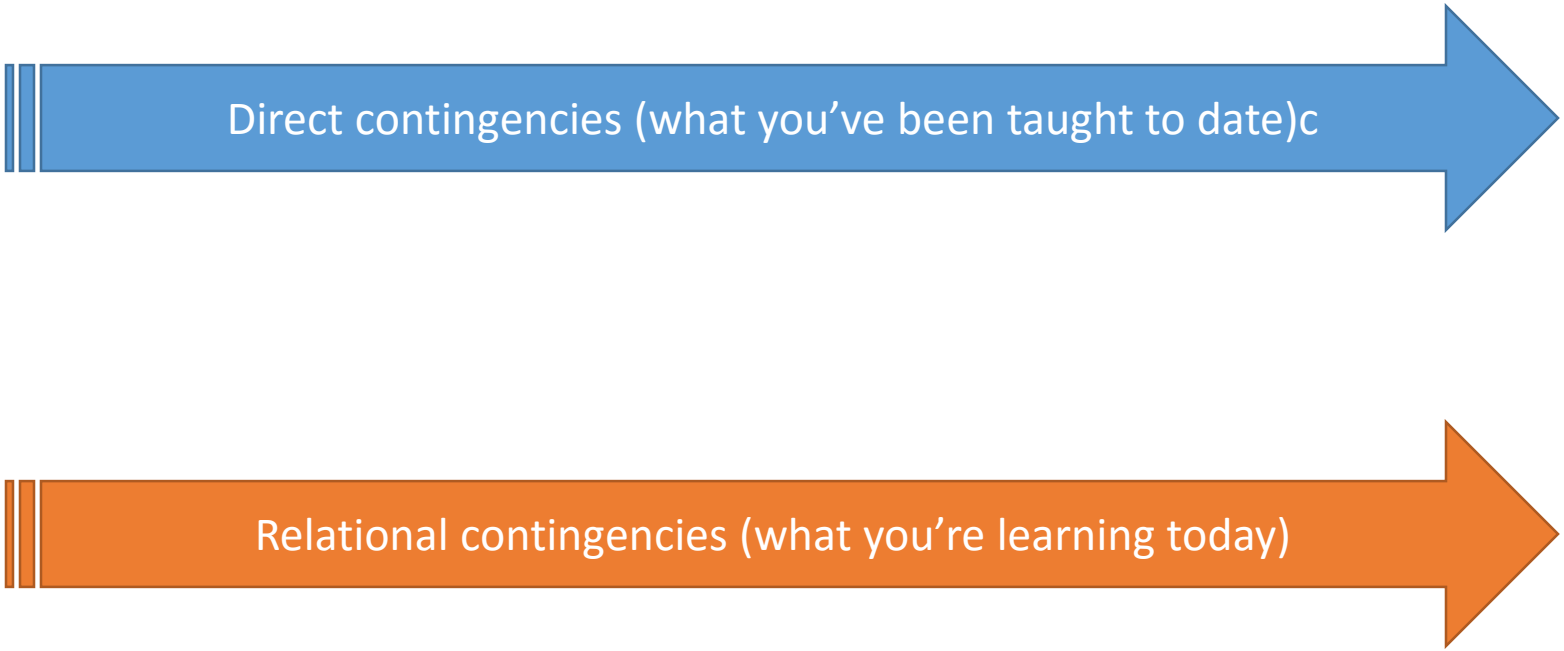


Dougher, Hamilton, Fink, & Harrington (2007)

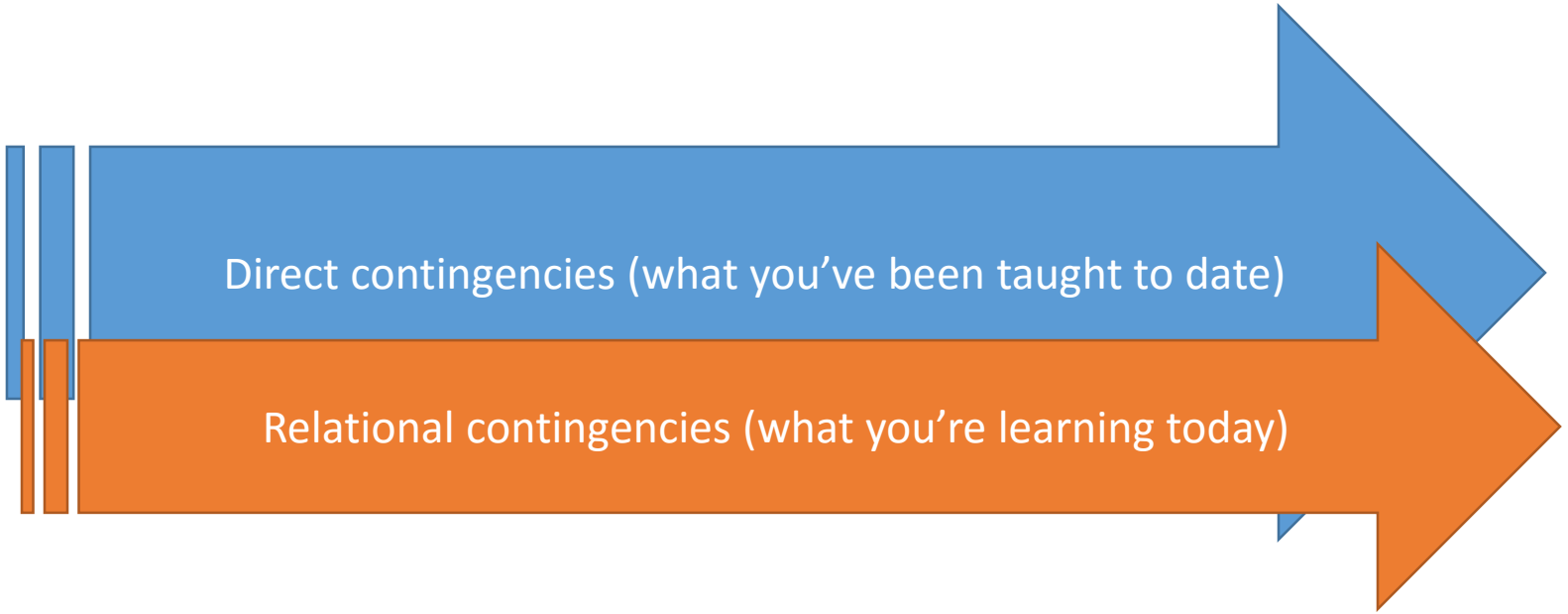
So what?

- This is a fundamentally important shift
- This is where everything we know turns on its head.
- Derived relations interact with direct relations, meaning that with verbal organisms, everything we know must be re-examined with this new principle in mind
- Holy Kaw!

Let me illustrate



Let me illustrate



Relational Frames:
The Foundation of Language and Cognition?

Let’s Learn four relations and see what happens. . .

RELATION 1:

OLDER THAN

Relational Frames:
The Foundation of Language and Cognition?

RELATION 2:

OLDER THAN

Relational Frames:
The Foundation of Language and Cognition?

RELATION 3:

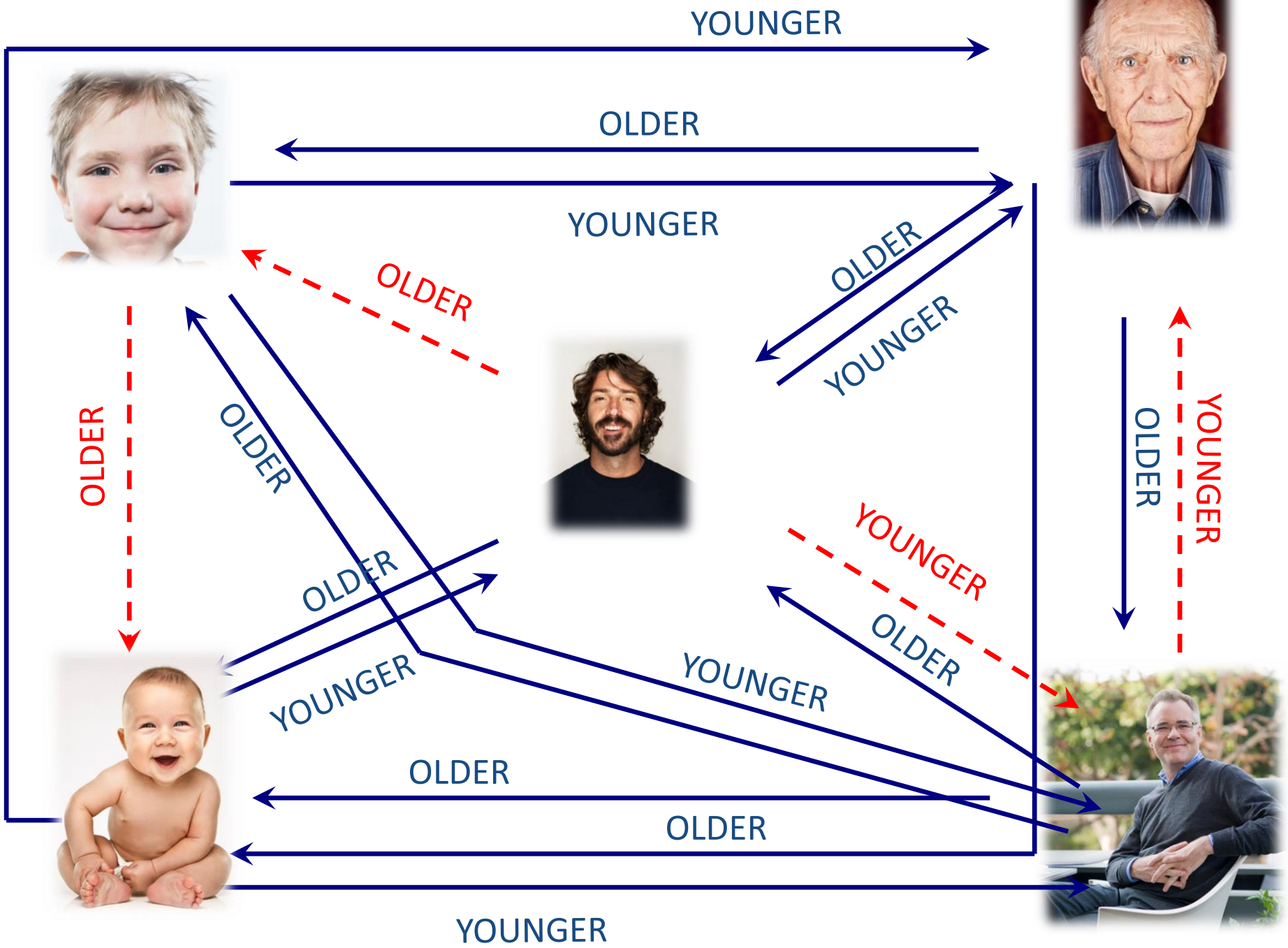
YOUNGER THAN

Relational Frames:
The Foundation of Language and Cognition?

RELATION 4:

YOUNGER THAN

From 4 Trained Relations. . .



Its Just Stimulus Equivalence!

- Not quite!
- Stimulus equivalence cannot easily deal with the older/younger relation
- They are not equivalent!
- It’s a different family of “framing”

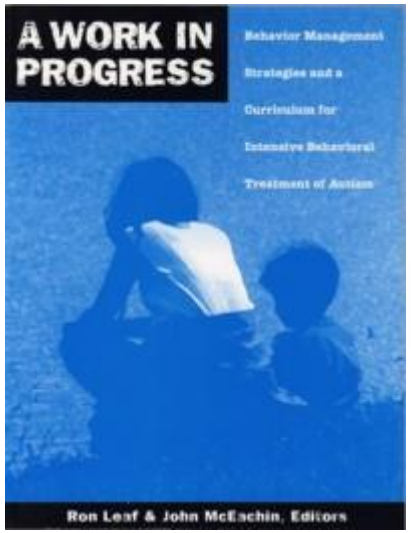
Frame of Coordination

- stimulus equivalence **is the same as** frame of coordination

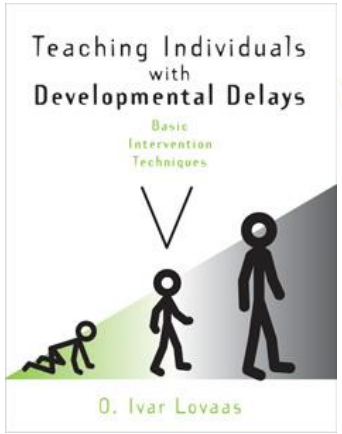
…using stimulus equivalence!

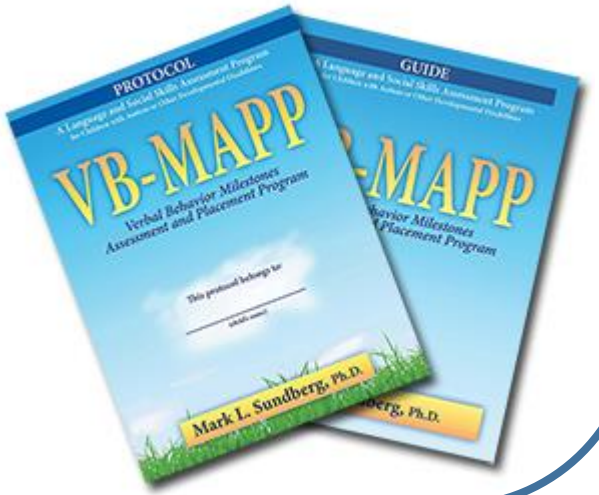
- We can jump-start the acquisition of a variety of language skills for children with autism
- There must be tons of research…right?!
  - Wrong
- Imho – this is a severely understudied area for teaching those w/autism

Why?


A WORK IN PROGRESS
Behavior Management Strategies and a Curriculum for Intensive Behavioral Treatment of Autism
Ron Leaf & John McEachin, Editors

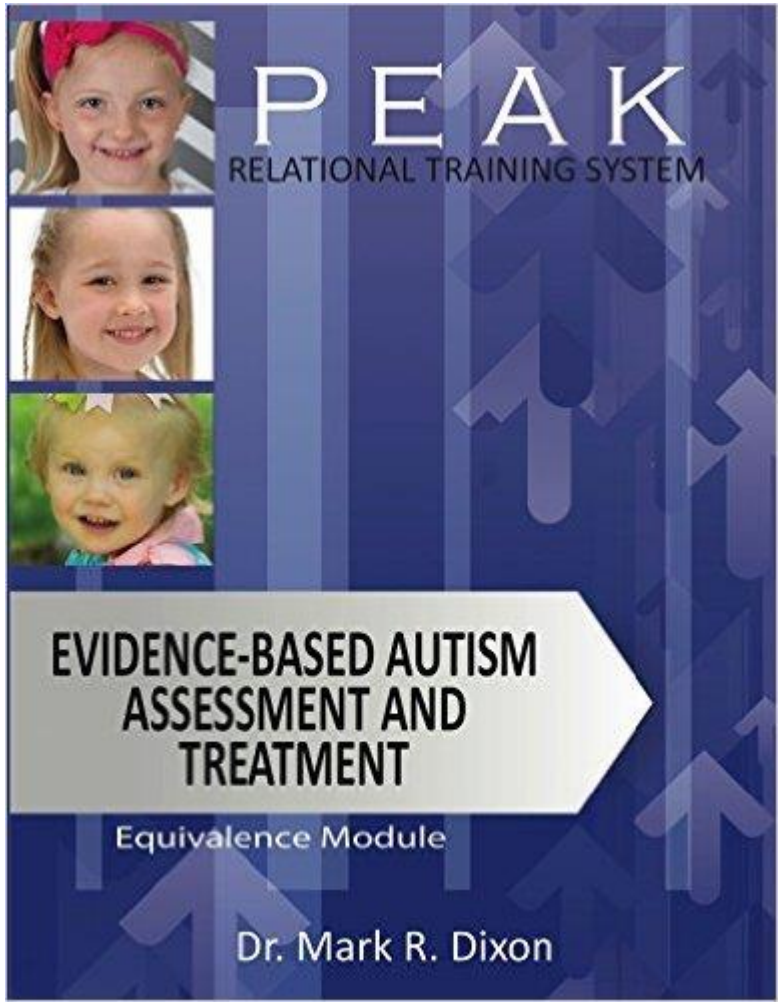

ABLLS-R
The Assessment of Basic Language and Learning Skills
ABLLS-R Protocol
James W. Partington, Ph.D., BCBA-D
Partington Behavior Analysts


Teaching Individuals with Developmental Delays
Basic Intervention Techniques
O. Ivar Lovaas


PROTOCOL
VB-MAPP
Verbal Behavior Milestones Assessment and Placement Program
Mark L. Sundberg, Ph.D.
GUIDE


WORK

What's a BCBA to do?



Why am I sold on PEAK?

PEAK scores are directly correlated with:

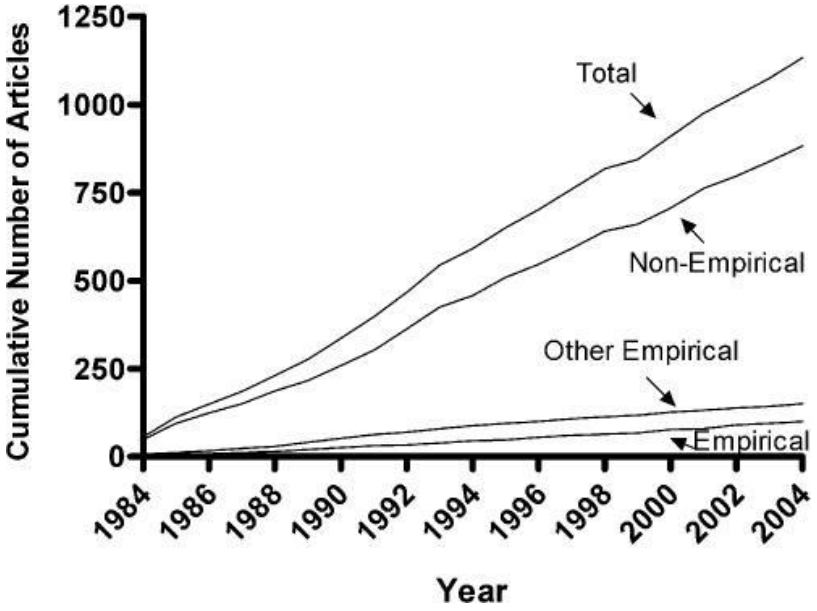
- IQ
- Illinois Early Learning Standards
- Peabody Picture Vocabulary Tests
- Common Core State Standards
- One Word Expressive & Receptive Tests

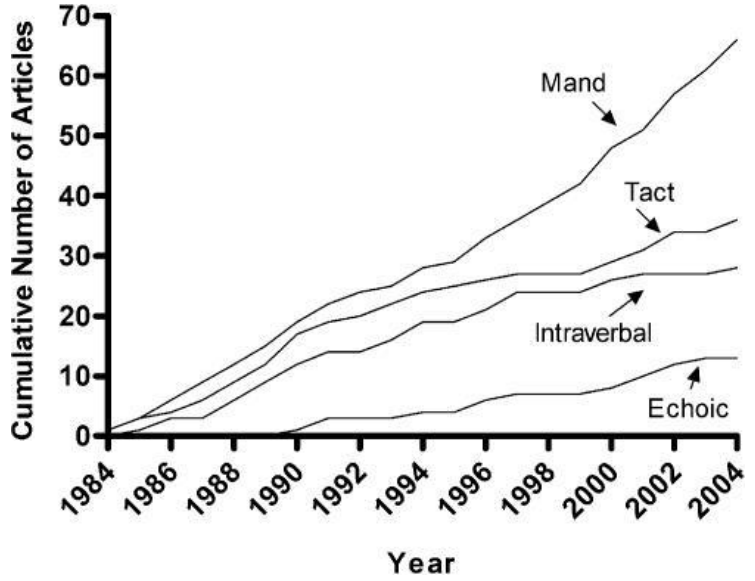
PEAK is the only ABA assessment and curriculum that has:

- Normative data to benchmark a student to a neuro-typical peer group
- Test-retest reliability
- Inter-observer agreement
- A Randomized Controlled Trial (RCT) of effectiveness
- Convergent validity
- Demonstration of front-line unskilled staff implementation effectiveness
- Incorporating skills that are greater than age 4-5 years old (PEAK is 16 yrs + neurotypical)

Skinner’s operants are a good start…

But we are only covering half of his book from 1957…





Elementary Operants…

- Manding isn’t really about being a human
  - Animals can do it!
- Tacts and intraverbals don’t necessarily indicate *understanding*

Scottish Guy

Pine Martin

- Has anyone heard of one of these?

Pine Martin

- They’re basically the Scottish version of a weasel

Now – what do we know about Pine Martins?

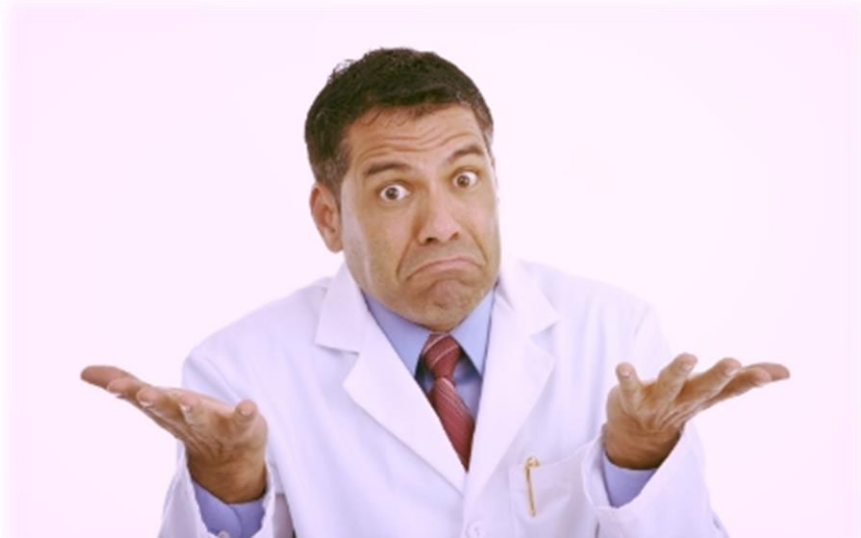
- Are they tricky, or dimwitted?
- If you wanted to see a Pine Martin, how would you get there?
- What instrument would a Pine Martin play?
- What would a Pine Martin's voice sound like?
- You make a business deal with a Pine Martin. Is he going to be honest, or try and find a way to pull one over on you?

Pine Martin

Which verbal operants are these?

- Intraverbals?
- Tacts?
  - You weren't taught those answers

- Generalization?
  - Do these sounds have similarities:
    "Pine Martin" and "Weasel"?



Now, think about a child with autism…

- To do this a person must understand complex relationships
- This includes *words and concepts* as well as their meanings
- Is it possible to teach all that makes a person human, using solely Skinner's basic verbal operants?
- Each question would have to be trained individually!