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Slide 2



- Don't blame the rat: if the employee is not performing right, then something is wrong with the workplace environment
- If the employee didn't learn, then the employee wasn't trained

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- Behavior analysts began to move out of the lab
- Often forgot to take basic measurement system with them

Out of the Lab and into Employee Training: The Application of Instructional Lessons to the Training Process

DOUGLAS A. JOHNSON and Julie M. Slowiak

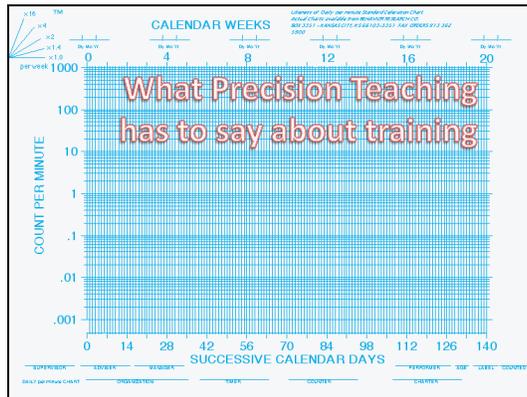
Western Michigan University and University of Minnesota Duluth

September 30th, 2011

Minnesota Northland Association for Behavior Analysis, St. Cloud, MN

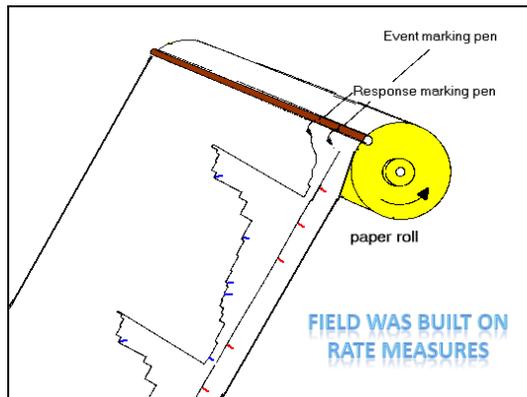
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- Precision Teaching: Charting and selecting the right measures
- We're pretty good with our displaying of graphs
- Measuring just accuracy is not good enough

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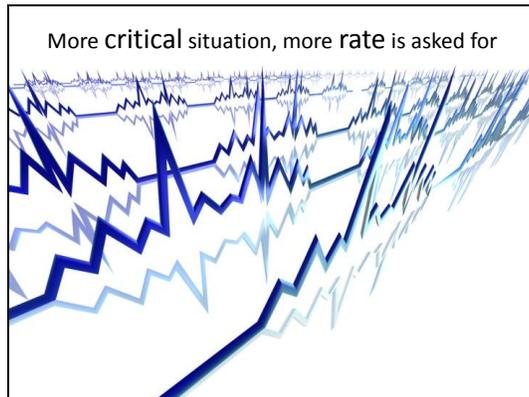
- Field was built on rate measures that led to entire science of behavior
- This can be applied to training

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- Rate is a highly successful and universal measure of performance

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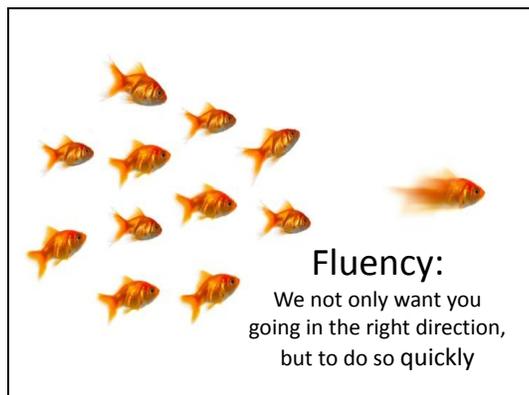
- The more critical the situation, the more we demand rate
- Counting respirations, pulse, etc
- Shouldn't training and performance be critical to our organizations?

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- Training someone sufficiently so that he or she can then think on their feet when working

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- Many valuable organizational benefits to training to fluency
- Retention despite distraction
- Rapid application to new situations
- Facilitates later acquisition

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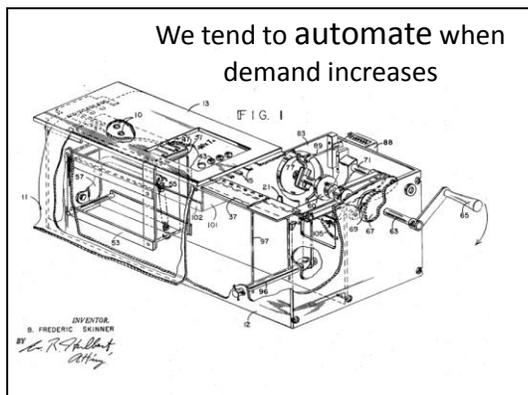
- Fluency in actual performance?
- Fluency in finding job aids and other forms of resource searching?
- Partial fluency?
- Or no fluency, just in training cause it has to be

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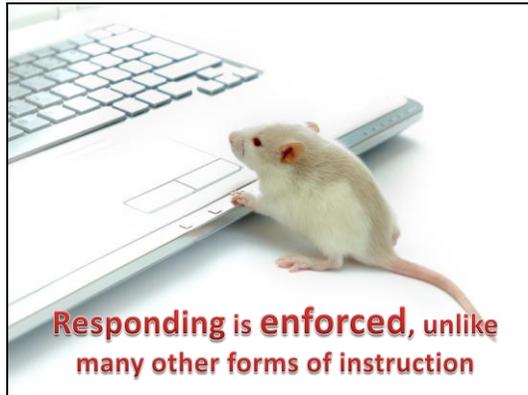
- Why learn on the job and make expensive and reputation harming mistakes?

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- Automation of parts of the training process
- Lost for awhile, but returned. We call it computer-based training

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- Training manuals, training sessions, workshops: Typical (non)consequence of inattention
- Enforcement of interacting with material
- Demonstrating understanding

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- Reinforcement for right immediately
- Correction of wrong immediately
- Valuable feedback for both trainee and trainer

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- Not only respond, but respond right
- Complex repertoires require solid fundamentals
- Build upon a solid foundation, otherwise may collapse

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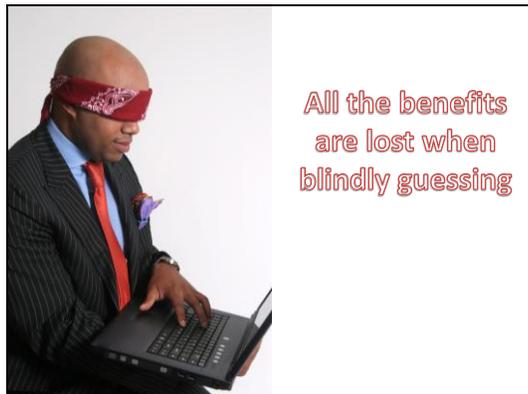
- Example of why analysis, not bells and whistles, is needed: Danger of computer-based racing

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- Mistakes on things we would not expect them to get wrong
- Reinforcement of "being done"
- Access to competing contingencies

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- Multiple behavioral strategies exist to combat this problems, such as outcomes contingent on quality of responding or partial reduction of user control
- There is a strong need for understanding the user of computer training; too often the emphasis is on the software gimmicks in the absence of behavior-based principles
- Computer-based training is not magic, we need to utilize good instructional design and behavioral contingencies

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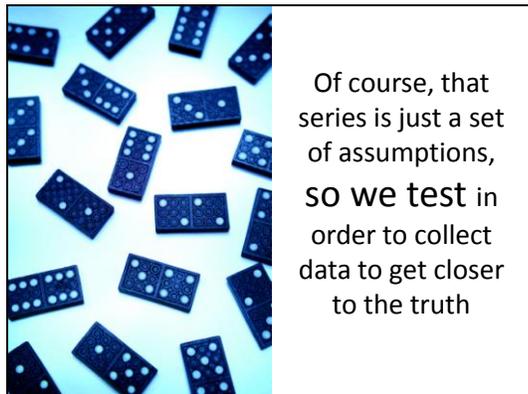
- The machine really doesn't teach, the program underneath teaches
- The better the instructional design, the better the training outcomes

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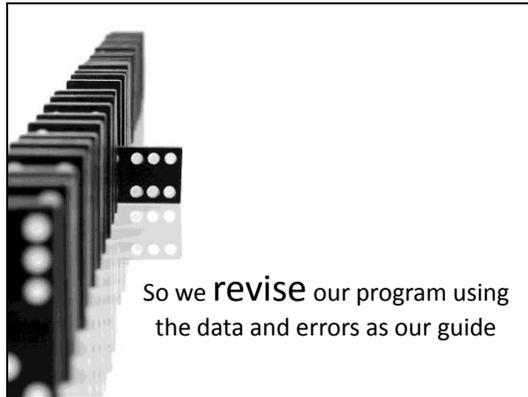
- Arrogantly assuming we knew it all, or test ourselves?

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- When the rubber meets the road, you're guaranteed to find many errors
- Bad employees (but program good) or take responsibility

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- Errors as valuable information
- Again, feedback is critical for the trainer and designer

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- Test on new trainees so program doesn't become optimized for an idiosyncratic crowd

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- More revisions

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- More testing

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- Can never tell if training works simply by looking at it
- Feedback is as critical for the trainers as it is for the trainees
- Lots of work, but guarantees a training programs that a) adapts and b) will reliably work

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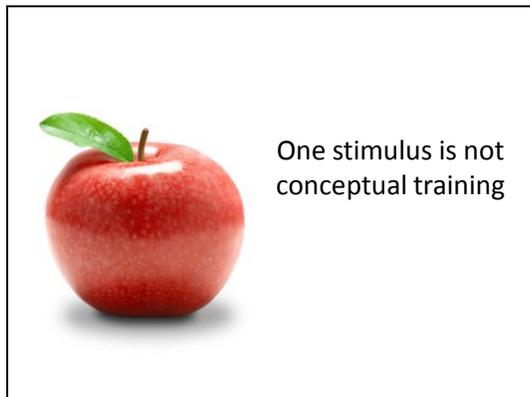
- Lacking in front-end analysis (this is true for both behaviorists and non-behaviorists alike)
- Most stop right after step 1
- Different types of learning may require different training approaches.
- For example, being able to state some important policy or concept versus understanding the concept

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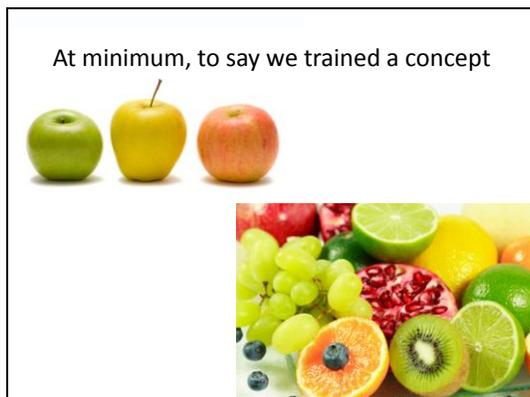
- Conceptual understanding
- Generalizing within and discriminating across stimulus classes
- Not just academic (recognize good and bad customer service)

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- Mentioning name of concept: will not lead to conceptual stimulus control
- Giving definition: will not lead to conceptual stimulus control
- Giving an example: will not lead to conceptual stimulus control
- Who knows what they're reacting to?

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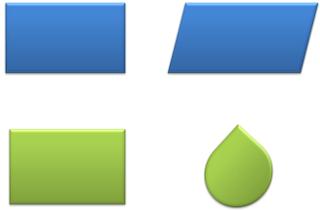


- More than one example to illustrate concept
- Multiple nonexamples that are almost examples
- Practice until fluency with novel examples and nonexamples
- However, multiple exemplar training is not the same as concept training (doesn't tell them what the concept is not; may not necessarily cover all relevant aspects of the concept)

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Which pair is best test?

- “Which of these is a rectangle?”



- Not all training examples and nonexamples are created equal

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Critical Attribute:
If removed, then
becomes non-example

- Classic example of a chair for illustrating concepts
- Critical attribute: If removed or altered, then becomes a non-example (is removed from stimulus class)
- Figure out what stimuli are evoking the responses (necessary features of S^D)

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Not a chair

- Determine what the concept is by figuring out what does and does not evoke the response in the verbal community

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A particularly useful type of nonexample:
The close-in nonexample

- Lacks one and only one of the critical attributes.



- A very useful nonexample for training purposes: The close-in nonexample
- Lacks one and only one critical attribute

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Minimum Rational Set of
Close-In Nonexamples



Lacks "back" Lacks "for one person" Lacks "feet on ground with bent knee shape"

These nonexamples have everything but one critical attribute

- Show the boundaries of the stimulus class (i.e., concept)
- Facilitates appropriate S^Δ responding
- This is one important aspect of training conceptual stimulus control

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Variable attributes:
If changed, become a new example



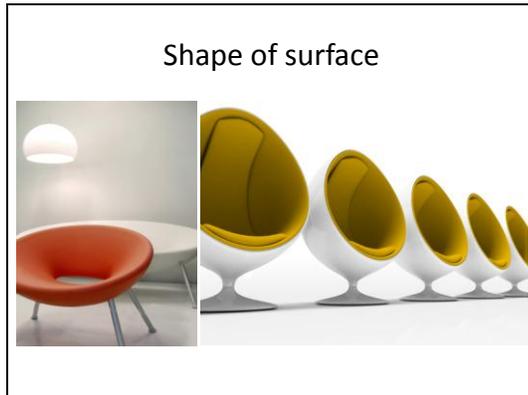
Such as number of legs

- Some attributes can be removed or altered without the stimulus being removed from the stimulus class
- In other words, some changes result in new examples

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Minimum Rational Set of Examples

- **Variable attributes:**
- Number of legs may be:
 - Four
 - Three
 - One
 - None
- Material may be:
 - Wood
 - Metal
 - Plastic
- General shape may be:
 - Flat-planed
 - Curvaceous
- Size of back may be:
 - High
 - Medium

- Variable attributes help us to train the breadth of the S^D conditions
- These are highly relevant to training someone to fully grasp a concept
- If any attribute can vary, then it must vary

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Minimum Rational Set of Examples



One leg Three leg Zero leg Four leg

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Minimum Rational Set of Examples



One leg
Metal material Three leg
Wood material Zero leg
Plastic material Four leg

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Minimum Rational Set of Examples



One leg
Metal material
Curved surface

Three leg
Wood material

Zero leg
Plastic material

Four leg
Flat surface

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Minimum Rational Set of Examples



One leg
Metal material
Curved surface

Three leg
Wood material
Medium back

Zero leg
Plastic material

Four leg
Flat surface
High back

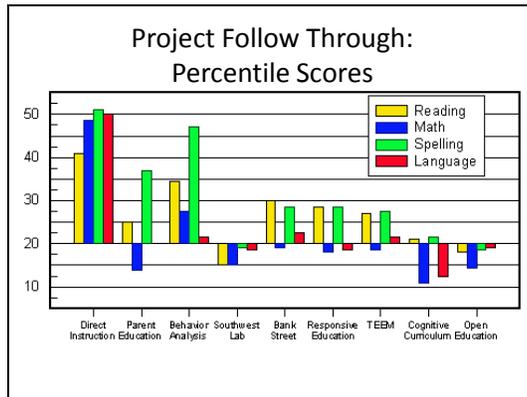
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The minimum to train a concept:



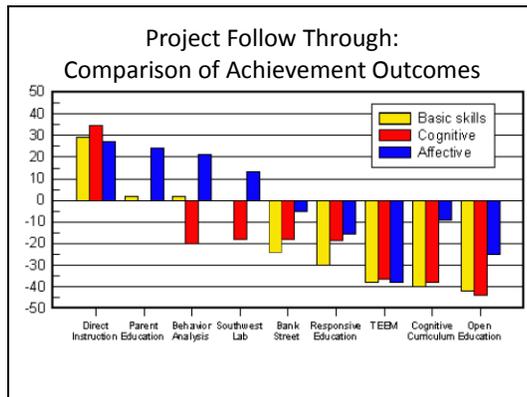
- This set is the minimum for training anything conceptual.
- It may or may not be adequate (adequacy will be discovered through testing and revising)
- Will fully cover all the relevant S^D and S^{Δ} aspects
- Will not necessarily bring responding to a useful level of accuracy or fluency
- Some data to illustrate why behavior analysis needs instructional design.

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- Reinforcement of desired behaviors, but learning with lousy training materials.
- Good, clear antecedents cannot be neglected in favor of focus on only consequences.

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- Cognitive stuff: that higher level creative thinking that is critical in many industries

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- Can we train this thing?
- Or do behavioral training approaches only apply to repetitive job tasks, things easily understood and quantified
- What is creativity?
- Definitions generally are pretty useless
- Theme: Something is coming from nothing
- In behaviorism, we reinforce behaviors after they occur
- What is a behaviorist to do?

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- Is this the best we can do, just hope for it?
- Does it really come out of nowhere?

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- Some would say behaviorism cannot explain creative and cognitive skills
- Example of insight: Wolfgang Köhler
- The "aha" moment.

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- Köhler did not know the learning history of his subjects
- Cannot say the insight came from nowhere

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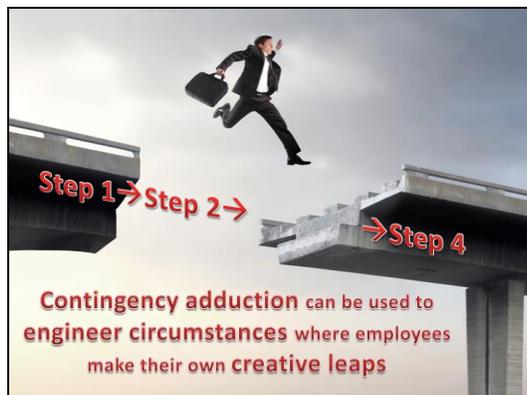
- Epstein replication with pigeons
- To climb a box
- To peck a banana
- To push a box in a direction
- A combinational repertoire emerged when put in novel situation

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- "Insight" is impossible without the prerequisite repertoire
- It may be a more complex "cognitive" type performance, but it still ultimately based on the behavioral learning history
- Without the training, the repertoire doesn't emerge

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- Contingency Adduction: Recruitment of skills (established under differing previous circumstances) to a new set of circumstances
- We can use engineered discovery learning in our training processes
- Since not directly training each and every step, save time and money
- We have long been dealing with the emergence of untrained skills
- Stimulus and response generalization involve untrained relations
- $A = B, B = C$ leads to $A=C$ (without direct training)
- Or recombination of previous skills when solution is not obvious

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- We deal with new problems by recombining the behaviors that have, in the past, brought us success in similar situation.
- Finding and directly training generalizable rules will be very helpful!
- Solution: Train basic behaviors that are likely to be applied in a variety of circumstances. These may be recruited and recombined as necessary. This is more likely to occur when the component behaviors have been trained to fluency. The more pieces you have and the better you are at using them, the more likely you'll come up with the right novel solution.
- Note: The new solution only seems to come out of nowhere (be insightful or creative)
- Truth: Actually depends on learning history
- We can and should train for this

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Training employees to think outside the box and more

- If conceptual understanding is important, fully train across the critical and variable aspects
- General rule trained to fluency
- Valuable component skills at fluency – let adduction do the rest
- Engineering discovery, rather than blindly fumbling around
- Collect feedback on own training results
- Much of this training can be automated, but don't blindly trust the machine to be a magic solution

THINK

- Panic: Do I have to train everything? No
- If conceptual understanding is important, fully train across the critical and variable aspects
- General rule trained to fluency
- Valuable component skills at fluency – let adduction do the rest
- Engineering discovery, rather than blindly fumbling around
- Collect feedback on own training results
- Much of this training can be automated, but don't blindly trust the machine to be a magic solution
- You can and should train a lot more than you normally do. But don't expect training to solve everything.

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- One piece of the much larger organizational puzzle
- A very important piece that should not be neglected

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