Moscow State University of Psychology & Education
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Co-Founder, AnswersNow
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Are you ready to start?
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Who are you without language?
The answer to a question never asked.

Antonio Demasio
Descartes' Error

Antonio Damasio

A NEW YORK TIMES BOOK REVIEW EDITORS' CHOICE

The Feeling of What Happens

Antonio Damasio

Bestselling author of Descartes' Error

Body and Emotion in the Making of Consciousness
# Theory of consciousness

<table>
<thead>
<tr>
<th>Layer</th>
<th>Characteristic</th>
<th>Lifeform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher extended consciousness</td>
<td>Possesses complex language, strong memory, sense of self, conscience, art science</td>
<td>Modern humans</td>
</tr>
<tr>
<td>Extended consciousness</td>
<td>Possession of some language skills, limited sense of autobiographical self, limited short/long term memory</td>
<td>Neanderthals, chimpanzees, dolphins</td>
</tr>
<tr>
<td>Core consciousness</td>
<td>Conventional memory, strong sense of self, No ability to use complex language</td>
<td>Higher mammals</td>
</tr>
<tr>
<td>Consciousness of self</td>
<td>Detect changes in self, Rudimentary memory</td>
<td>Fish, reptiles, Primitive mammals</td>
</tr>
<tr>
<td>Proto self</td>
<td>Wakefulness, Image making, object detection</td>
<td>Simple animals</td>
</tr>
</tbody>
</table>
“No black scorpion is falling upon this table”

Alfred Whitehead (1934)
Verbal Behavior...

- Is behavior whose reinforcement is mediated by another person.
- The effect a speaker has on a listener

Verbal Behavior Analysis
- “Is a subfield within basic and applied behavior analysis devoted to researching and identifying sources and instructional procedures that produce functional verbal repertoires when they are missing”
  - Greer, 2007, VBA p.2
### Verbal Behavior Developmental Theory

<table>
<thead>
<tr>
<th>Verbal Milestones</th>
<th>Effects on Independent Functioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-listener</td>
<td>Total dependency. Entrance to the social community not possible</td>
</tr>
<tr>
<td>Listener status</td>
<td>Still dependent BUT entrance into social community possible. Can respond to others speaking to them (Follow directions, tasks etc.)</td>
</tr>
<tr>
<td>Speaker Status</td>
<td>Can govern others behavior through talking.</td>
</tr>
<tr>
<td>Speaker-listener exchanges</td>
<td>Basic talking/listening skills.</td>
</tr>
<tr>
<td>Speaker-as-own-listener Status</td>
<td>YOU are born...</td>
</tr>
</tbody>
</table>
Speaker v. listener

• Speaker
  • Someone who can govern or direct the behavior of others using various topographies of verbal behavior or language as a tool.
    • Vocal, gesture, sign, text

• Listener
  • Someone who is affected by the verbal behavior of others
Verbal Milestones

• Pre-listener
• Listener
• Speaker
• Speaker-Listener exchanges with others
• Listener-as-own-speaker
  • Say-do
  • Conversational units
  • Naming
• Reader Status
• Writer Status
• Writer as Own Reader
• Verbal Mediation for Solving Problems
Verbal Behavior Analysis (2007)

Designing Teaching Strategies (2002)
How many of you are familiar with B.F. Skinners analysis of verbal behavior?

Show of hands please.
How is this different from other theories of language development?

• Based on **Function** and **not Form**

• Focus is placed on the relationship of a spoken word and the **environmental context** around it rather than its relationship to linguistic structure
For example...

How do we teach the word: "Pen"

What do you write with?

Pen!
Verbal Operants

Examples
Mand

- A “mand” is essentially a **request**

- It is defined by:
  - A **motivation** for something, and
  - It can be spoken, signed, or delivered with PECS
Mand for an item

- **Context**
  - Motivation for Something

- **Behavior**
  - Vocally ask
  - Sign
  - Give an icon
Mand for information

What is 6 x 8???
Mand for attention

Show & Tell

Look at me!

Hey!

Listen!
Tact

- A “tact” is essentially a label

- It is defined by:
  - Sensing something, and
  - It can be spoken or signed
Tact an object

• **Context**
  • Any nonverbal stimulus

• **Behavior**
  • Vocally say
  • Sign
Tact an action
Echoic

• An “echoic” is what it says that it is – it’s echoing

• It is defined by:

  • Something *spoken* to the student

  • A *Matching Spoken* response
Echoic

"Mama"
Intraverbal

• An “intraverbal” is best summed up as **conversational speech**

• It is defined by:
  
  • Something **spoken** to the student
  
  • A **Non-Matching Spoken** response
Fill-in’s as Intraverbals

“Twinkle, twinkle, little...”
“Wh” Questions are Intraverbals

“What are some colors?”

Purple!

Red!

Blue!
“What grows outside?”

Trees!

Flowers!
Listener Behavior

• “Listener Behavior” includes what is traditionally called **receptive** language

• It is defined by:
  - Something spoken *to* the student
  - A **nonverbal action** *by* the student
Listener Behavior

• Examples include:

• Following an **explicit** direction
  • As in, “Close the window”

• Following an **implicit** direction
  • As in, “It’s cold in here”
Verbal Behavior Developmental Theory
Research Based Tactics

Learn units
Contingent reinforcement
Planned ignoring
Brief time-out from reinforcement
Time out toy/item
Good behavior ribbon
Interspersal of known items
Response prompts
Response delay
Modeling
Peer reinforcement conditioning
Visual feedback
Generalized reinforcers
Tokens
Preferred activities for reinforcement (Premack Principle)
Activity deprivation as Establishing Operation
Extrinsic stimulus prompt
Intrinsic stimulus prompt
Matching-to-sample as prerequisite repertoire training
Topography of response changed for same function
Interrupted chain as establishing operation for mands
Protocols
(Research Based Interventions)
Protocols for inducing missing capabilities

• ...the acquisition of an ability that allows one to learn components of a previously inaccessible repertoire.

• Behavioral Cusp: changes in person-environment interactions that enable multiple new interactions
  (Rosales-Ruiz & Baer, 1997)

• Speaking
• Listening
• Walking
• Fluent reading
Protocols
Listener

- Basic Attentional Programs
- Listener Literacy
- Listener Emersion
- Conditioning Visual Tracking
- Conditioning Voices for Reinforcement
- Auditory Matching
- Listener Component of Naming
Basic Attentional Programs

- Sit
- Sit still
- Look at me
- Do this (Imitation)
- Do this as Generalized Imitation (See-Do)
Listener Emersion

- Identify 16 listener commands
  - Come here, touch nose
- 4 nonsense commands
  - Blah blah, snooki, blum, smoosh
- Arrange into sets of 5 (4 listener/ 1 nonsense)
- Using errorless learning, teach student correct responses
- Fade using 1, 2 sec delays
- Track progress graphically using decision tree protocol

Conditioning Visual Tracking

• Select 3 identical semi-opaque cups
• Select preferred items (cookies etc.)
• Place preferred item under cup and rotate the cups (Think of the ‘hidden quarter game’)
• A correct response is when student picks up correct cup and gets item.

• Keohane, Greer & Ackerman (2006b)
Conditioning Voices for Reinforcement

• Stimulus-Stimulus pairing procedure
• Student places hand on a button switch
• He is reinforced in a pair-test sequence
  • 5 sec. reinforcement
  • 5 sec. test
  • 5 minute session
• If the student stops playing the tape, the interval is started over until the student holds the button for all 5 sec.
• Criterion: 90% of 5 sec. intervals over 5 min. free play probe

• Greer & Keohane (2005), Greer, Keohane, Ackerman, Kang & Walsh, 2006; Greer, Keohane & Delgado, 2006; Keohane, Greer, Nuzzolo, Kang, Solow, Bayard, Reilly & Walsh, 2006
<table>
<thead>
<tr>
<th>Phase</th>
<th>Target Items</th>
<th>Non-exemplar Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: Sound v. No Sound</td>
<td>Baby crying, cat meowing, phone ringing</td>
<td>No-Sounds</td>
</tr>
<tr>
<td>Phase 2: Sound v. White Sound</td>
<td>Baby crying, cat meowing, phone ringing</td>
<td>White Sound</td>
</tr>
<tr>
<td>Phase 3: Sound v. Sound</td>
<td>Baby crying, cat meowing, phone ringing</td>
<td>Water running, Trumpet playing, Clapping Hands</td>
</tr>
<tr>
<td>Phase 4: Word v. Sound</td>
<td>Juice, Bus, Pen</td>
<td>Water running, Trumpet playing, Clapping Hands</td>
</tr>
<tr>
<td>Phase 5: Word v. Nonsense Word</td>
<td>Juice, Bus, Pen</td>
<td>Baba, Tete, Aha</td>
</tr>
<tr>
<td>Phase 6: Word v. Word</td>
<td>Juice, Bus, Pen</td>
<td>House, Clock, Door</td>
</tr>
<tr>
<td>Phase 7: Word v. Word</td>
<td>Mouse, Pen, Hat</td>
<td>House, Ten, Pat</td>
</tr>
</tbody>
</table>
Auditory Matching
MEI (Multiple Exemplar Instruction)

• Match
• Point
• Tact
• Intraverbal
• Write (Production)
• Spell (Production)
• Circle/Underline (Selection)

• Arrange sequence so that there are an equal number of presentations

• Stokes & Baer (1977), Horner, Sprague & Wilcox (1982), Hughes (1992)
## Multiple Exemplar Instruction

**Protocol/Instructional Procedure**—Multiple Exemplar Instruction Across Saying and Writing (Greer & Speckman, In Press; Greer, Yuan, & Gautreaux, 2005).

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Probe</th>
<th>Procedure</th>
<th>Criterion</th>
<th>Educational Outcomes</th>
<th>What if the procedure didn’t work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-listener, listener, speaker, emergent reader, emergent writer components. Basic listener literacy, instructional control, etc. Print stimuli is conditioned, books are conditioned</td>
<td>Probe written and vocal spelling for novel words. After the intervention, probe the words again (these words are not taught in the intervention).</td>
<td>MEI across saying and writing is implemented in which students are taught to spell words vocally and in written form.</td>
<td>Criterion for MEI is 90% for 2 consecutive sessions. Criterion for the probe is 90%</td>
<td>Students can now spell novel words in the written response and in the vocal response. Students can spell words in both responses without being taught in each response. In other words, students can be taught to spell a word in written form, and they can spell it vocally without direct instruction.</td>
<td>Continue to teach using MEI across saying and writing. Try increasing EO, implement a selection response (students spell with letter tiles), typing response.</td>
</tr>
</tbody>
</table>
MEI (Multiple Exemplar Instruction)
MEI (Multiple Exemplar Instruction)
Protocols
Observing

• Sensory Matching
• Conditioning Books & Toys to Replace Stereotypy
• Conditioning faces
• Conditioning for Voices
• Conditioning 3D/2D stimuli
<table>
<thead>
<tr>
<th>Level 1</th>
<th>Basic Mand Teaching Procedure</th>
<th>Basic Tact Teaching Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Echoic-to-Mand</td>
<td>Echoic-to-Tact</td>
</tr>
<tr>
<td>Establishing Operation</td>
<td>Student is deprived of cookie before session</td>
<td>Student is R+ by attention (Brief deprivation)</td>
</tr>
<tr>
<td>Antecedent Stimulus</td>
<td>Teacher shows child cookie and says “Cookie” Waits 3 sec.</td>
<td>Teacher shows child a picture of a ball, says “Ball” and waits 3 sec.</td>
</tr>
<tr>
<td>Student’s response</td>
<td>Student says “Cookie” within 3 sec.</td>
<td>Child says “Ball” within 3 sec.</td>
</tr>
<tr>
<td>Consequence</td>
<td>Teacher gives student small piece of cookie.</td>
<td>Teacher says “Awesome”, and provides opportunity to mand</td>
</tr>
<tr>
<td>Level 2</td>
<td>Basic Mand Teaching Procedure</td>
<td>Basic Tact Teaching Procedure</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>Echoic-to-Mand</td>
<td>Echoic-to-Tact</td>
</tr>
<tr>
<td>Establishing Operation</td>
<td>Teacher waits until cookie is consumed before next presentation.</td>
<td>Student is R+ by attention (Brief deprivation)</td>
</tr>
<tr>
<td>Antecedent Stimulus</td>
<td>Teacher shows child cookie and waits 3 sec.</td>
<td>Teacher shows child a picture of a ball waits 3 sec.</td>
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<td>Student’s response</td>
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Rapid Motor Imitation
What do we know?

- BETTER INSTRUCTION
- Vandalism and truancy decreased when instruction improved and resulted in better academic skills (Sulzer-Azaroff & Mayer, 1986)
- MORE INSTRUCTION
- Assaultive and self-injurious behaviors eliminated by multiplying daily learn unit presentations (Kelly & Greer, 1992; Martinez & Greer, 1997)
Developmental Cusps
Pre-listener

- Total
- Individual
- Interpersonal

The main point on the left: Other people are not possible.
Listener Status

- Individuals can perform verbally governed behavior.
- They can comply with instructions and avoid negative consequences while gaining socially appropriate skills.
- They can enter social community and while they are still dependent, can contribute to the well-being of their social community.
Speaker Status

• Individuals can govern consequences in their environment through mediating the behavior of others (Help me, eat please, toilet, jacket etc.)

• The capacity to be a part of the social community is hugely expanded.
Speaker-Listener Exchanges with Others (Sequelics and Conversational units)

• Individuals respond as speakers and listeners to intraverbals including impure tacts, “what is that? And impure mands, “What do you want?”

• As a listener, they are reinforced by speaker responses.

• The emit conversational units when they are reinforced as both speaker and listener.

• The individual is reinforced as a listener by sensory extension and as a speaker by the behavior of the listener.
Speaker-as-own-Listener

• Three types of speaker-as-own-listener identified by research:
  • Say-do – First I do this, then I do that.
  • Self-talk – child functions as both speaker and listener in imaginative play
  • Naming – Individual can learn words as a listener and use them as a speaker or learn words as a speaker and use them as a listener.
Reader Status

• Individuals with reader repertoires greatly extend their sensory experiences across time, distance and accessibility to the speaker (writer)

• Reader may use material without the time-constraints of a speaker-listener experience.

• The writer’s advice is under the reader’s control without the writer being present.
Writer Status

• A writer can control environmental contingencies of a reader across seconds or centuries.
• This is an expansion of speaker skills but does not require a listener to be present.
Writer-as-own-Reader
Self-Editing Status

• Writers can read their own writing from the perspective of a potential audience (listener).
• Writing can be geared towards different audiences.
Verbal Mediation for Problem Solving

• A sophisticated self-editor whose behavior is governed by verbal expertise in a specific community
  • Scientists, programmers, doctors, engineers, mathematicians, university professors

• Individuals can solve increasingly complex problems using precise verbal definitions.
Data Collection

1 STO (Sweeping/Pushing)
7 Months
Data cont.

<table>
<thead>
<tr>
<th>Number ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

7 Months!!!
STO – Animals/Plants
8 Months
No Answer
STO – Jump/Sit on Floor  
TRT: 8 Months
Probe Data
Probe Data
Continuous Data
Continuous Data
Continuous Data

Spelling Words
Verbal Behavior Analysis (2007)

Designing Teaching Strategies (2002)
PaTTAN Autism Initiative Applied Behavior Analysis Support: Introduction to Teaching Procedures

Speaking: Amiris, Mike
07/16/2010

>> Aden, come on up.

Links and Downloads

- Link to Download Additional Resource Files
- Link to Download Additional Resource Files
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