Disseminating ABA into Public Schools: Prior and Current Research at the University of Houston, Clear Lake

Dorothea C. Lerman, Ph.D., BCBA-D
Students in U.S. Public Schools

<table>
<thead>
<tr>
<th>Year</th>
<th>Autism</th>
<th>Intellectual Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012-2013</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Barriers to Dissemination

- Training time
- Resources
- Availability of qualified trainers

Our Model: Focused Training on Core ABA Teaching Procedures

- Outcomes of a five-day summer training program
  Lerman, Vorndran, Addison, & Kuhn (2004)
  Lerman, Tetreault, Hovanetz, Strobel, & Garro (2008)

- Comparison of written, vocal, and video-assisted feedback
  Luck, Lerman, Wu, Dupuis, & Hussein (in press)

- Pyramidal training of paraprofessionals
  Lerman, Luck, Smothermon, Zey, Custer, & Smith (in preparation)
Our Model: (continued)

- Comparison of data collection procedures for monitoring procedural integrity
  Smothermon, Lerman, & Luck (in preparation)

- Training to detect antecedents/consequences of problem behavior
  Leman, Hovanetz, Stroble, & Tetreault (2009)
  Scott, Lerman, & Luck (in press)
Five-Day Focused Training

**Topics**

Basic Concepts

*Preference Assessments*

Behavioral Assessment

*Discrete Trial Teaching*

Shaping and Chaining

Generalization and Maintenance of Skills

*Incidental Teaching*

IEP Goals/Objectives

Data Collection

*Managing Problem Behavior*

Other topics (token economies, toilet training, visual schedules)

*Includes both didactic and hands-on training*
Lerman et al. (2008)

Behavioral Skills Training

1. Baseline (in situ)
2. Handouts, Discussion, Modeling
3. Role Play with Feedback
4. In-Situ Practice with Feedback
5. Follow-up in Teacher’s Classroom

“Whole-Session” Data Collection
<table>
<thead>
<tr>
<th>Check one</th>
<th>Percentage Correct: __________________(# Yes / # Yes + # No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>_________</td>
<td>Materials ready/organized</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Instructions delivered when child attending.</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Instructions clear, concise, and consistent.</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Appropriate and consistent prompting strategy</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Reinforcement delivered immediately for correct responses</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Highly preferred tangible reinforcers paired with praise</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Varied reinforcers used.</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Problem behavior managed appropriately.</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>_________</td>
<td>Data collected appropriately.</td>
</tr>
<tr>
<td>Yes No N/A</td>
<td></td>
</tr>
</tbody>
</table>
Lerman et al. (2008)

Preference Assessment
Lerman et al. (2008)

Discrete Trial Teaching
Conclusions From Outcome Studies

- Brief, intensive training effective
- Practical for practitioners
- Monthly feedback sufficient to maintain skills
- Adequate sensitivity of measurement?
- What about paraprofessionals?
Pyramidal Training of Paraprofessionals: A Descriptive Analysis
Lerman et al. (in preparation)

Goals:

- Large-N extension of pyramidal training for paraprofessionals
- Examine objective measure of social validity
- Evaluate link between training integrity and outcomes

Procedures

- 16 teacher-paraprofessional pairs
- Targeted Skill: DTT using LTM + Error Correction
- Trained teachers to implement DTT via BST
- Lecture/handout about BST as teaching approach for classroom staff
- Given all necessary materials
- Told “teach as you think practical in classroom”
- Descriptive analysis of outcomes
Trainer (Teacher) Integrity – Use of Components

Initial BST

In-Situ (Simulation)

In-Situ (Child)
Teacher Integrity –
Correct Use

Best Outcomes

Worst Outcomes
Results

- Average training was 263 min (125-325 min)

- Trainers used essential BST components, BUT
  - Less likely to give feedback for correct than incorrect
  - Least likely to collect integrity data

- “Best” versus “Worst” outcomes → difference in type/frequency of feedback
  - Unrelated to trainer’s collection of integrity data
<table>
<thead>
<tr>
<th></th>
<th>Discrete-Trial Training components</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Materials placed correctly</td>
</tr>
<tr>
<td>B</td>
<td>Instructions delivered when learner is attending</td>
</tr>
<tr>
<td>C</td>
<td>Instructions clear, concise, consistent</td>
</tr>
<tr>
<td>D</td>
<td>Initial instruction presented without prompt</td>
</tr>
<tr>
<td>E</td>
<td>Prompts delivered appropriately with instruction</td>
</tr>
<tr>
<td>F</td>
<td>Independence probe used correctly</td>
</tr>
<tr>
<td>G</td>
<td>Reinforcer delivered correctly</td>
</tr>
<tr>
<td>H</td>
<td>Problem behavior is managed appropriately</td>
</tr>
<tr>
<td>I</td>
<td>Data collected appropriately</td>
</tr>
</tbody>
</table>
Trial-by-trial vs Whole-Session

- Trial (TBT): Each component (A-I) scored on each trial
  
  \[
  \frac{\text{# correct}}{\text{# of opportunities}} \times 100
  \]

- Whole Session (WS): Each component (A-I) scored as correct if implemented correctly on ALL trials
  
  \[
  \frac{\text{# components correct}}{\text{# components}} \times 100
  \]

Easier but less precise; likely underestimates integrity
Sessions (9-trial block)

Percentage of Correct Responses

Baseline

In-situ practice

Test

TBT

WS

Sarah
Percentage of Correct Responses

Baseline

In-situ practice

Test

Sessions (9-trial block)

1 3 5 7 9 11 13

0 20 40 60 80 100

TBT

WS

Christine
Summary

- Match - good performance
  - 8 out of 16
- Match - poor performance
  - 4 out of 16
- Miss
  - 4 out of 16

Can we increase precision by examining performance on individual components?
Global versus Component Data Analysis

**Global**

- Components of intervention collapsed
- Data represent an average across components for each session

**Component**

- Components of intervention separated
- Data are examined for each individual component
Average Percentage of Correct Responses

Components

A  B  C  D  E  F  G  H  I

Sessions (9-trial block)

Baseline  In-situ practice  Test

TBT  WS

Percentage of Correct Responses

0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Christine
Conclusions

- Whole-session data collection
  - Adequate sensitivity in most cases
    - Underestimates performance
  - Examine components to increase sensitivity, improve training efficiency
Detecting Antecedents/Consequences of Problem Behavior Through A-B-C Recording

- Teacher-collected A-B-C data provides information to
  - Generate hypotheses
  - Design functional analysis
- Reduces inadvertent reinforcement of problem behavior?

- Narrative vs structured A-B-C recording
  - Lerman, Hovanetz, Strobel, & Tetreault (2009)

- Computer-based training (detection of multiple/subtle events)
  - Scott, Lerman, & Luck (in press)
Can we improve the detection of subtle/simultaneous events?

- Subtle Events (examples)
  
  Antecedents:
  - class-wide instruction delivered
  - materials presented without vocal instruction
  
  Consequences:
  - neutral attention delivered
  - demand delayed

- Simultaneous Events (examples)
  
  Antecedents:
  - demand delivered + tangible removed
  
  Consequences:
  - escape + attention
Computer-Based Training
(Scott et al., in press)

Goals:
- Evaluate outcomes of a stand-alone computer-based program
  Elements of BST (lecture, models, practice)
  Progress from simple to more complex:
  Single exemplars →
## Single Exemplars

<table>
<thead>
<tr>
<th>Function</th>
<th>Antecedent</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td>Teacher discontinues interaction with student by walking away.</td>
<td>Teacher delivers reprimand, tells student to stop.</td>
</tr>
<tr>
<td><strong>Tangible</strong></td>
<td>Teacher removes toy in student’s possession or stops ongoing activity.</td>
<td>Teacher returns the removed toy or permits resumption of activity.</td>
</tr>
<tr>
<td><strong>Escape</strong></td>
<td>Teacher delivers vocal instruction to student (with or without materials).</td>
<td>Teacher removes task materials, does not follow through with demand.</td>
</tr>
</tbody>
</table>
Goals:
- Evaluate outcomes of a stand-alone computer-based program
  Elements of BST (lecture, models, practice)
- Progress from simple to more complex:
  Single exemplars → Multiple exemplars →
# Additional Exemplars

<table>
<thead>
<tr>
<th>Function</th>
<th>Antecedent</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td>Teacher ignores vocal or physical (hand raise) request for attention.</td>
<td>Teacher delivers statements of concern. Teacher touches student without saying anything.</td>
</tr>
<tr>
<td><strong>Tangible</strong></td>
<td>Student attempts to grab item that is out of reach.</td>
<td>Teacher delivers an item that is different than the one desired/requested.</td>
</tr>
<tr>
<td><strong>Escape</strong></td>
<td>Teacher hands task materials to the student with no vocal instruction.</td>
<td>Teacher delays task. Student leaves area or activity.</td>
</tr>
</tbody>
</table>
Goals:

- Evaluate outcomes of a stand-alone computer-based program
  Elements of BST (lecture, models, practice)
  Progress from simple to more complex:
  Single exemplars $\rightarrow$ Multiple exemplars $\rightarrow$ Simultaneous

- Identify necessary & sufficient elements of training

- 20 “Test” Videos:
  - 6 responses (3 single/3 simultaneous)
  - 22 ant/con (4 initial exemplars; 18 additional exemplars)
Experiment 1: (N = 19)
  - Part 1: Single Exemplar Training
  - Part 2: Multiple Exemplar Training
  - Part 3: Simultaneous Event Training
STRUCTURED ABC DATA ANALYSIS FORM

**INSTRUCTIONS**

- Each row represents an EPISODE of behavior.
- Document any antecedents and/or consequences that occur within 10s of the target behavior by placing an ‘X’ in the corresponding box.

**Target Behavior:** Screaming – Any sound that is not a clear word and is vocalized above conversation level.

<table>
<thead>
<tr>
<th>Antecedent (Before Behavior)</th>
<th>Consequence (After Behavior)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demand Placed</td>
<td>Escaped Demand</td>
</tr>
<tr>
<td>Attention Withheld</td>
<td>Got Attention</td>
</tr>
<tr>
<td>Tangible/Activity Withheld</td>
<td>Got Tangible/Activity</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Test Sessions

Percentage of Antecedents and Consequences

Susan

Claire

Jean

Danetta

Summer

Velmia

Hits

False Alarms
Experiment 2: (N = 20)

Was multiple exemplar training critical to success of training on simultaneous events?

- Part 1: Simultaneous Single Exemplar Training
- Part 2: Multiple Exemplar Training
Conclusions

- Efficient alternative to traditional BST
- Training on simultaneous events critical
- But false alarms!
- Improves detection in the classroom?
Take-Home Points

- Integrate ABA practices into more teacher preparation programs
- Prioritize paraprofessional training
- Use “bootcamps” to disseminate and maintain effective practices
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University of Houston, Clear Lake

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