Promoting Generalization of Play and Social Skills in Individuals With Autism

Sharon A. Reeve, Ph.D., BCBA-D
Caldwell College

7th Annual Autism Conference: Novel Autism Solutions for Practitioners, Parents, and Researchers
Association for Behavior Analysis International
Portland, Oregon
January 26, 2013
### 7 Dimensions of Applied Behavior Analysis (ABA)

<table>
<thead>
<tr>
<th>Applied</th>
<th>Technological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral</td>
<td>Conceptual</td>
</tr>
<tr>
<td>Analytic</td>
<td>Effective</td>
</tr>
</tbody>
</table>

**Generality**: Behavior change is durable over time and occurs under a variety of conditions or spreads to a variety of related behaviors.
Today’s Presentation

• Definition of Terms

• Discriminative Stimuli & Social / Play Responses
  – Identify and define

• Program & Assess Stimulus Generalization
  – Teach to and measure multiple conditions to respond socially

• Program & Assess Response Generalization
  – Teach to and measure multiple social / play responses
Modeling

• Match topography of model’s actions

• Motor and vocal imitation skills necessary

• Model types: video, audio, live (in vivo)

• Promotes generalization of skills from training to novel situations / stimuli

(Charlop, Schreibman, & Tyron, 1983; Haring, Kennedy, Adams, & Pitts-Conway, 1987; Poulson & Kymissis, 1988)
Social Skills

• Interactions directed to a partner
  – *Directed* = saying partner’s name and/or orienting to partner
  – e.g., sharing, helping, engaging in bids for joint attention

(Brown, Krantz, McClannahan, & Poulson, 2007)
Play Skills

• Manipulating toys to explore or represent objects or working together or alone on pretend themes

(Athanasiou, 2007; Jordan, 2003)
Stimulus Control Analysis of Social / Play Skills

• **Antecedents**: Discriminative stimuli that set occasion for social / play responses
  – Program for and assess stimulus generalization

• **Behavior**: Topography of social / play responses
  – Program for and assess response generalization

• **Consequences**: Reinforcers that maintain social / play responses in natural environment
Discriminative Stimuli

• Should occasion social responses
  – Natural observation and survey

• Signal reinforcement for social responses
  – Assess functioning of social stimuli as reinforcers

• Ways that discriminative stimuli promote generalization from training situations to new/novel situations

(Morrison & Bellack, 1981)
Discriminative Stimuli

• Challenges
  – Children with autism may attend to irrelevant features in social situations

• Solution
  – Increase salience of relevant features of complex social stimuli

(Lovaas, Koegel, & Schreibman, 1979; Lovaas, Schreibman, Koegel, & Rehm, 1971)
Stimulus Generalization

- Emitting learned responses under novel conditions

(Stokes & Baer, 1977)
Programming for Stimulus Generalization

• General Case Analysis
  – Identify exemplars depicting diversity of stimulus characteristics found in generalization setting

• Multiple Exemplar Training
  – Provide multiple variations of stimuli that should evoke target behavior

(Engelmann & Carnine, 1982; Kirby & Bickler, 1987; Horner, Sprague, & Wilcox, 1982; Sprague & Horner, 1984; Stokes & Baer, 1977)
Moinhos, Reeve, Reeve, & Sidener (in preparation)

• **Strategy Demonstrated**
  – General case analysis and multiple exemplar training with play stimuli

• **Skill Taught**
  – Playing
  – Manipulating objects and characters in a playset with contextual vocalizations

• **Teaching procedures**
  – Video modeling, prompt/prompt fading and reinforcement
Campers (RVs)
Castles
Pirate Ships
<table>
<thead>
<tr>
<th>Stimulus Category</th>
<th>Multiple Exemplar Training</th>
<th>Within-Category Generalization Probes</th>
<th>Across-Category Generalization Probe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campers</td>
<td>3 campers</td>
<td>1 novel camper</td>
<td></td>
</tr>
<tr>
<td>Dollhouses</td>
<td>3 dollhouses</td>
<td>1 novel dollhouse</td>
<td></td>
</tr>
<tr>
<td>Castles</td>
<td>3 campers</td>
<td>1 novel castle</td>
<td></td>
</tr>
<tr>
<td>Pirate Ship</td>
<td></td>
<td></td>
<td>1 novel pirate ship</td>
</tr>
</tbody>
</table>
Ongoing Assessment of Generalization

• Within-category probes
  – e.g., generalization to a novel camper

• Across-category probes
  – e.g., generalization to a novel play set: pirate ship
Teaching Procedure

• Simultaneous Video Modeling
  – Learner engages in response while video is shown

• Manual / Vocal Prompts
  – Faded with prompt delay
* = Within-Category Gen
◊ = Across-Category Gen
General Case Analysis for Social Interactions

• Identify many discriminative stimuli that set occasion to engage in a social response

• Stimuli can be grouped into categories

• Multiple examples within a category and multiple categories
• Strategy Demonstrated
  – General case analysis
  – Multiple exemplar training with social stimuli

• Skill Taught
  – Helping someone in need of assistance

• Teaching Procedures
  – Video modeling, prompt/prompt fading, and reinforcement
Categories of Helping

- Cleaning
- Locating lost objects
- Replacing broken materials
- Picking up objects
- Sorting materials
- Carrying objects
- Putting items away
- Setting up an activity
<table>
<thead>
<tr>
<th>Response Category</th>
<th>Nonverbal S&lt;sup&gt;D&lt;/sup&gt;</th>
<th>Verbal &amp; Affective S&lt;sup&gt;D&lt;/sup&gt;</th>
<th>Verbal Response</th>
<th>Motor Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>1. Wiping a black board</td>
<td>1. “Oh, time to clean the black board” while shaking head</td>
<td>“May I help?”</td>
<td>1. Wiping a black board</td>
</tr>
<tr>
<td></td>
<td>2. Wiping a white board</td>
<td>2. “Boy, how did this get messy?” wrinkling brow</td>
<td></td>
<td>2. Wiping a white board</td>
</tr>
<tr>
<td></td>
<td>3. Wiping a desk</td>
<td>3. “Oops, I have to clean this desk” while rolling eyes</td>
<td></td>
<td>3. Wiping a desk</td>
</tr>
</tbody>
</table>
Promoting Generalization Across Settings and People

• Treatment sessions conducted
  – Across 2 rooms
  – Across 2 experimenters
<table>
<thead>
<tr>
<th>Stimulus Category</th>
<th>Multiple Exemplar Training</th>
<th>Within-Category Generalization</th>
<th>Across-Category Generalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>4 cleaning scenarios</td>
<td>1 novel cleaning scenario</td>
<td></td>
</tr>
<tr>
<td>Replacing Broken Materials</td>
<td>4 broken material scenarios</td>
<td>1 novel broken material scenario</td>
<td></td>
</tr>
<tr>
<td>Picking up Items</td>
<td>4 picking up items scenarios</td>
<td>1 novel picking up items scenario</td>
<td></td>
</tr>
<tr>
<td>Sorting Items</td>
<td>4 sorting items scenarios</td>
<td>1 novel sorting items scenario</td>
<td></td>
</tr>
<tr>
<td>Locating Items</td>
<td></td>
<td></td>
<td>1 novel locating lost items scenario</td>
</tr>
<tr>
<td>Carrying Items</td>
<td></td>
<td></td>
<td>1 novel carrying items scenario</td>
</tr>
</tbody>
</table>
Live Discriminative Stimuli

No Helping Response by child

Video Model

Re-present live Discriminative Stimuli

No Helping Response by child

Prompting

Re-present live Discriminative Stimuli

Correct Response

Reinforcement (token + praise)
Additional Measures to Assess Generalization

• Pre-Post Intervention Probes to Assess Generalization Across Novel Settings, People and Stimuli
  – Snapshot of generalization
  – Useful when assessment is too time-consuming
### Mean Percentage of Generalization Trials With Helping

<table>
<thead>
<tr>
<th>Name</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irene</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Tom</td>
<td>0%</td>
<td>95%</td>
</tr>
<tr>
<td>Eddie</td>
<td>0%</td>
<td>97%</td>
</tr>
<tr>
<td>Nathan</td>
<td>0%</td>
<td>97%</td>
</tr>
</tbody>
</table>
Novel responses occurring in presence of previously taught discriminative stimuli

(Stokes & Baer, 1977)
• Strategy Demonstrated
  – Response Generalization

• Skill Taught
  – Sharing play or leisure activities

• Teaching Procedures
  – Video modeling, prompt/prompt fading, and reinforcement
• Child engaged in a leisure/play activity
• Another person approaches and stands near child
Categories for Sharing

• Art Materials
• Snack Foods
• Toys
• Gym Materials
<table>
<thead>
<tr>
<th>Stimulus Category</th>
<th>Multiple Exemplar Training</th>
<th>Scripted Verbal Responses</th>
<th>Within-Category Generalization</th>
<th>Across-Category Generalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Materials</td>
<td>3 art materials</td>
<td>“Do you want to try?”</td>
<td>1 novel art material</td>
<td></td>
</tr>
<tr>
<td>Snack Foods</td>
<td>3 snack foods</td>
<td>“Try this.”</td>
<td>1 novel snack food</td>
<td></td>
</tr>
<tr>
<td>Toys</td>
<td>3 toys</td>
<td>“Would you like to try this?”</td>
<td>1 novel toy</td>
<td></td>
</tr>
<tr>
<td>Gym Materials</td>
<td></td>
<td></td>
<td></td>
<td>1 novel gym material</td>
</tr>
</tbody>
</table>
Live Discriminative Stimuli

No Sharing Response by child

Video Model

Re-present live Discriminative Stimuli

No Sharing Response by child

Prompting

Re-present live Discriminative Stimuli

Correct Sharing Response

Reinforcement (token + praise)
Ongoing Assessment of Response Generalization

- Number of \textit{scripted} and \textit{unscripted} statements related to sharing
# Vocal Initiations of Sharing

<table>
<thead>
<tr>
<th>Scripted</th>
<th>Unscripted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to try this?</td>
<td>Would you like to build?</td>
</tr>
<tr>
<td>Try this.</td>
<td>Would you like to draw?</td>
</tr>
<tr>
<td>Do you want to try?</td>
<td>Would you like to try some?</td>
</tr>
<tr>
<td></td>
<td>Would you like to try?</td>
</tr>
<tr>
<td></td>
<td>Do you want some?</td>
</tr>
<tr>
<td></td>
<td>Would you try this?</td>
</tr>
<tr>
<td></td>
<td>Will you try it?</td>
</tr>
<tr>
<td></td>
<td>Do you want to try this?</td>
</tr>
<tr>
<td></td>
<td>Here.</td>
</tr>
</tbody>
</table>
# Pre- and Post-Intervention Probes Across Novel Settings, Peers, and Stimuli

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Isaac</td>
<td>0%</td>
<td>92%</td>
</tr>
<tr>
<td>Bobby</td>
<td>0%</td>
<td>59%</td>
</tr>
</tbody>
</table>
Gomes, Reeve, Brothers, Sidener, & Reeve (in preparation)

• Strategy Demonstrated
  - Extensive response and stimulus generalization

• Skill Taught
  – *Joint attention* defined in this study as orienting to an activity, orienting to the experimenter, and then orienting back to the activity while saying something contextually appropriate

• Teaching Procedures
  – Audio scripts/script fading, prompt/prompt fading and reinforcement
Discriminative Stimuli

- Presence of adult
- Unusual or interesting event in environment
Discriminative Stimuli

- Unusual or interesting events
  - 4 categories
  - 12 exemplars in each category
Programming for Response Generalization

• Three scripts per item
  – Similar in theme
  – Related to environmental arrangement
<table>
<thead>
<tr>
<th>Category</th>
<th>Example Item</th>
<th>Scripts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toys</strong></td>
<td>Robot Dinosaur</td>
<td><em>Check out that robot.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Look at that!</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Cool robot,</em></td>
</tr>
<tr>
<td><strong>Unusual Placement</strong></td>
<td>Clown wig on giraffe</td>
<td><em>That’s silly!</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Who did that?</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Look at that?</em></td>
</tr>
<tr>
<td><strong>Pictures</strong></td>
<td>Picture of child</td>
<td><em>Hey, that’s me!</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>It’s me over there?</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Why is my picture there?</em></td>
</tr>
<tr>
<td><strong>Sounds</strong></td>
<td>Glass Breaking</td>
<td><em>What’s that noise?</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Oh no, something broke?</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Uh oh, what’s that?</em></td>
</tr>
<tr>
<td>Category</td>
<td>Multiple Exemplar Training</td>
<td>Within-Category Generalization</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Toys</td>
<td>4 toys</td>
<td>1 novel toy</td>
</tr>
<tr>
<td>Unusual Placement</td>
<td>4 unusual placements</td>
<td>1 novel unusual placement</td>
</tr>
<tr>
<td>Pictures</td>
<td>4 pictures</td>
<td>1 novel picture</td>
</tr>
<tr>
<td>Sounds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional Strategies to Promote Generalization

- Treatment sessions conducted across multiple
  - Locations
  - Instructors
Teaching Procedures

• Audio Scripts
  • Faded systematically

• Manual Guidance to Orient to:
  • Activity / event / sound
  • Experimenter
  • Activity
Assessing Generalization

• Ongoing Response Generalization Probes
  – Number of scripted, unscripted, and novel statements
Number of Bids for Joint Attention Pre- and Post-Intervention

with peer

with teacher

Dan

Pretest
Post test
In Summary: Design Before You Teach

• Discriminative Stimuli and Social Responses
  – Observe, identify, and define using general case analysis

• Stimulus Generalization
  – Program: Multiple exemplar training
  – Assess: Within- and across-category generalization

• Response Generalization
  – Program: Teach multiple responses
  – Assess: Scripted, unscripted, novel responses

• Use Effective Teaching Procedure
  – Modeling
Thank You!