Functional Analysis of Vocal Stereotypy for an Adult with Acquired Brain Injury

Craig Strohmeier, Ed.M., M.S.
Philadelphia College of Osteopathic Medicine

Karen Lindgren, Ph.D.
Bancroft Brain Injury Services
Introduction
Introduction

- Upwards of 40% of participants in post-acute rehabilitation settings exhibit some form of challenging behavior (Kim et. al., 2007):
  - Impulsive outbursts that do not seem related to current situation.
  - Aggression when redirected by rehabilitation staff.
Introduction

- What does this mean for cognitive, physical, and speech rehabilitation services?

- Suspended or avoided.

- Terminated altogether.

(Hegel & Ferguson, 2000)
Introduction

- Challenging behaviors may be conceptualized as neuropsychiatric or neurological in nature.
  - Psychosis
  - Depression
  - Mania
  - Post-Traumatic Stress Disorder
  - Aggression
Introduction

- Alternative conceptualization:
  
  - TBI may result in changes in reinforcement sensitivity. (Schlund & Pace, 2000)
  
  - Altering environmental contingencies may assist an individual in successfully navigating their environment.
  
  - Alter contingencies in a controlled setting, then generalize to other environments.
Current Case

- Participant
  - 48-year-old male with a history of anoxic encephalopathy and subdural hematoma secondary to a seizure-related fall.
  - Prior to the TBI, the participant was a medical professional with a doctoral level degree, was reported to have enjoyed social events, and was in a long term relationship.
  - Since his injury he has resided in a group home and participated full-time in a rehabilitation program for adults with moderate to severe TBI.
  - He received cognitive, occupational, and physical therapies on a weekly and/or daily basis.
Current Case

- **Participant**
  - **Target Behavior: Vocal Stereotypy**
    - Defined as noncontextual stereotypic vocalizations, or contextual vocalizations that had been emitted and responded to within the previous 120 seconds.
    - Typically occurred when asked to engage in rehabilitation activities, when introduced to someone, or any time he was prompted to talk without any explicit guidance.
    - Vocal stereotypy present at high rates since admission.
    - *Examples.*
      - “Hey, I’m having a going home party tomorrow.”
      - “Don’t care, going home tomorrow.”
      - “I won a free trip, got a letter in the mail.”

*modified to mask identity*
Current Case

- Functional Assessment of Behavior

- Obtain information regarding the function of a behavior. Function = WHY

- Functions of behavior:

<table>
<thead>
<tr>
<th>Access</th>
<th>Escape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Socially Mediated</td>
<td>Socially Mediated</td>
</tr>
</tbody>
</table>
Current Case

- Functional (Experimental) Analysis
- Experimentally demonstrating a cause and effect relationship (Bijou, S. W., Peterson, R. F., & Ault, M. H., 1968)
- Various conditions are constructed in an analogue setting to observe how the person responds.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Antecedent</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>No attention</td>
<td>Attention</td>
</tr>
<tr>
<td>Escape</td>
<td>Academic demand</td>
<td>Termination of demand</td>
</tr>
<tr>
<td>Alone</td>
<td>Impoverished environment</td>
<td>None</td>
</tr>
<tr>
<td>Control</td>
<td>Enriched environment (no demands)</td>
<td>None</td>
</tr>
</tbody>
</table>

Current Case

- Methods

<table>
<thead>
<tr>
<th>Condition</th>
<th>Antecedent</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td>No attention</td>
<td>Oh, really that sounds interesting, but let’s talk more later.</td>
</tr>
<tr>
<td>Demand</td>
<td>Rehabilitation Task (Pencil and paper activity)</td>
<td>Escape/Termination of demand.</td>
</tr>
<tr>
<td>Ignore</td>
<td>“I’ll be on the computer for a few minutes</td>
<td>Ignore</td>
</tr>
<tr>
<td>Control/Free interaction</td>
<td>Enriched environment (no demands)</td>
<td>Ignore target behavior, deliver noncontingent attention every 30s</td>
</tr>
</tbody>
</table>
Current Case

• Methods
  • Hypotheses tested:
    • Attention
      • If the behavior was maintained by attention, it would increase in situations when the therapist attended to the behavior.
    • Demand
      • If the behavior was maintained by escape from task demand, it would increase in situations where the therapist removed a rehabilitation task contingent on the behavior.
    • Ignore
      • If the behavior was maintained by it’s own sensory consequences, it would increase in the absence of any social contingencies.
    • Control/Free Interaction
      • Enriched environment to serve as a control (various pleasant activities present)
Current Case

Methods

- Attention, ignore, demand, and free interaction (control) conditions were randomly alternated in a multielement design across 16 total sessions, four sessions per condition, each session lasting 5 minutes.
- Partial interval recording was conducted in 20s intervals for each session.
- All sessions were recorded and sent to an independent review for inter-observer agreement (IOA; Intervals with agreement/total # of intervals).
  
  (IOA = 93%; Range = 67%-100%)
Results

- Functional Analysis results:
Results

- Results of function-based treatment probe sessions:
Discussion

- Most familiar method of assessing function, Functional Behavior Assessment (FBA):
- Information gathered through:
  - Indirect Interviews
  - Questionnaires
  - Observations

<table>
<thead>
<tr>
<th>Access</th>
<th>Escape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Socially Mediated</td>
<td>Socially Mediated</td>
</tr>
</tbody>
</table>
Discussion

- Indirect interviews and questionnaires.
  - Interviews with family and/or staff.
  - Questionnaires/checklists to assess function (ex. MAS, FAST).
- Descriptive assessment.

<table>
<thead>
<tr>
<th>Antecedent (Conditions in the environment that may signal availability of reinforcement)</th>
<th>Behavior (Person’s response)</th>
<th>Consequence (Conditions in the environment that may reinforce the response)</th>
</tr>
</thead>
</table>

- Observations describe correlations between events, but do not provide cause-effect results regarding functional relations.
  - (Iwata & Dozier, 2008)
Discussion

- Results of Questionnaires/Correlational Data:

![Motivation Assessment Scale (MAS)](image)

- Total Score for Behavior Function:

  - Sensory
  - Escape
  - Attention
  - Tangible
Discussion

- Results of Questionnaires/Correlational Data:

![Graph of Functional Analysis Screening Tool (FAST)](image)

- Total Score for Behavior Function

- Social (Attention/Preferred Item)
- Social (Escape)
- Automatic (Sensory Stimulation)
- Automatic (Pain Attenuation)
Discussion

- Contrast with FA results:

![Motivation Assessment Scale (MAS) and Percentage of Intervals with Vocal Stereotypy graphs](image)
Discussion

- If FBA data is not reliable and valid…
  - Behaviors may increase.
  - Implementation of other therapies may be further delayed.
  - Valuable rehabilitation time and resources are compromised.
  - Clear function was identified in 80 minutes total for this case.
Final Comments

- Not just for the “Problem Child” at the rehabilitation facility.
Final Comments

- Or the “Problem Adult.”
Final Comments

- Functional analysis/Functional assessment of behavior methods can also be utilized to analyze replacement behaviors/compensatory strategies.
  - **Misdirected Contingency**
    - Rehabilitation-interfering behavior is more reinforcing than compensatory strategy/replacement behavior.
  - **Inept Repertoire**
    - Skill-set is absent.
  - **Faulty Discrimination**
    - Skill-set may be present, but behavior occurs at low to zero levels when significant prompting is absent.

(Cipani & Schock, 2011)
General Conclusions/Discussion

- Rehabilitation programming should consider teaming with behaviorally oriented professionals to define target behaviors and alter environmental contingencies.

- More rehabilitation staff training in FA methodology.
  - Similar strategies have been developed for teachers.

  (Moore, et al, 2002)
References


