

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

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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:

Access	Escape
Direct	Direct
Socially Mediated	Socially Mediated

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.

Condition	Antecedent	Consequence
Attention	No attention	Attention
Escape	Academic demand	Termination of demand
Alone	Impoverished environment	None
Control	Enriched environment (no demands)	None

(Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S., 1994).

Current Case

- Methods

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

Current Case

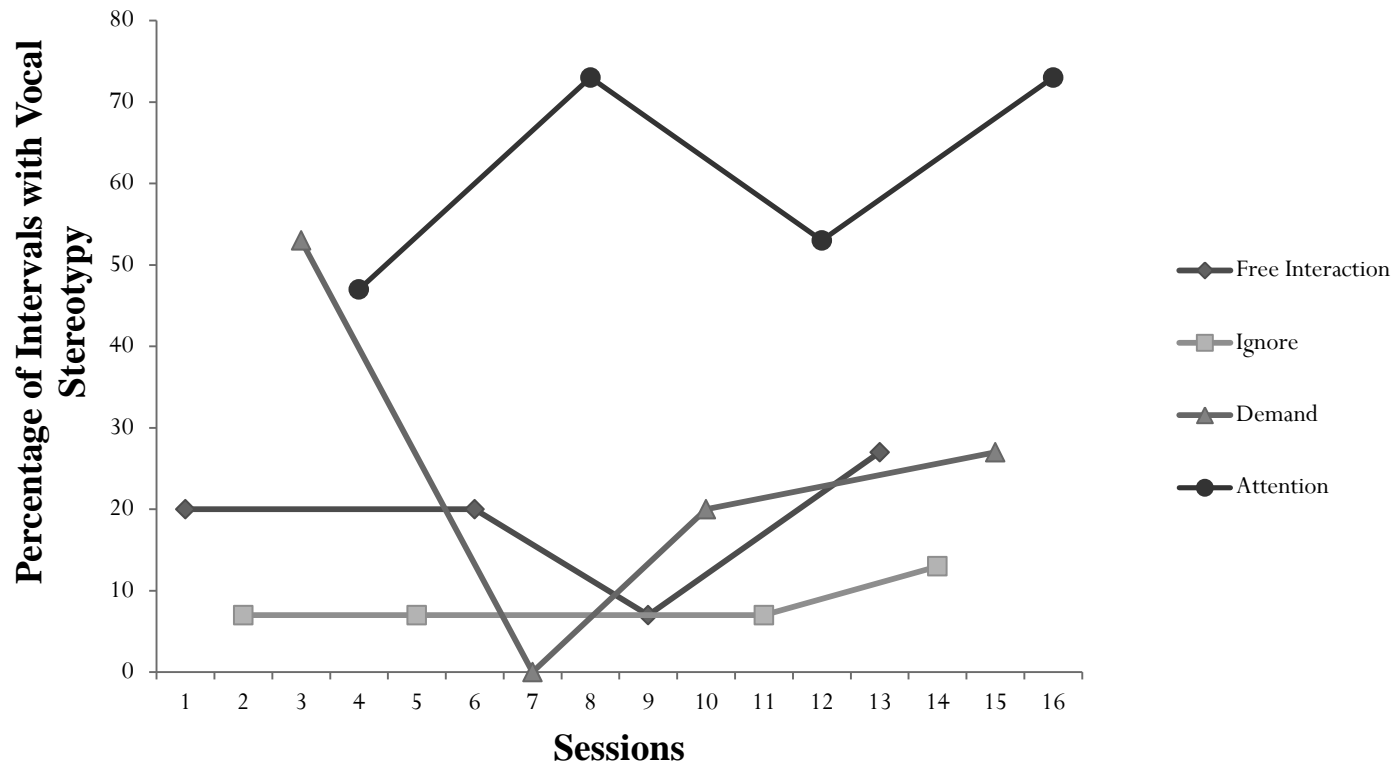
- Methods
 - Hypotheses tested:
 - Attention
 - If the behavior was maintained by attention, it would increase in situations when the therapist attended to the behavior.
 - Demand
 - If the behavior was maintained by escape from task demand, it would increase in situations where the therapist removed a rehabilitation task contingent on the behavior.
 - Ignore
 - If the behavior was maintained by its 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%)

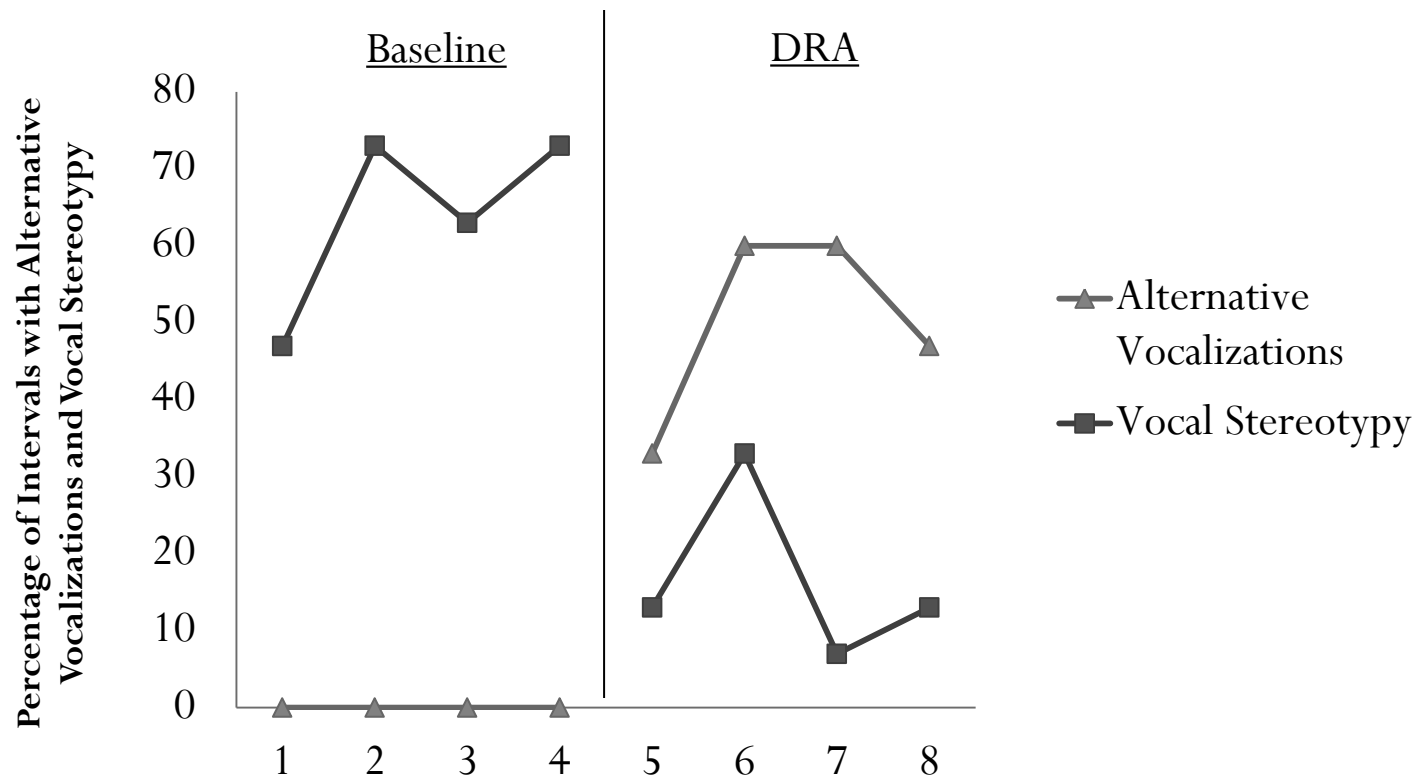
Results

- 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

Access	Escape
Direct	Direct
Socially Mediated	Socially Mediated

Discussion

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

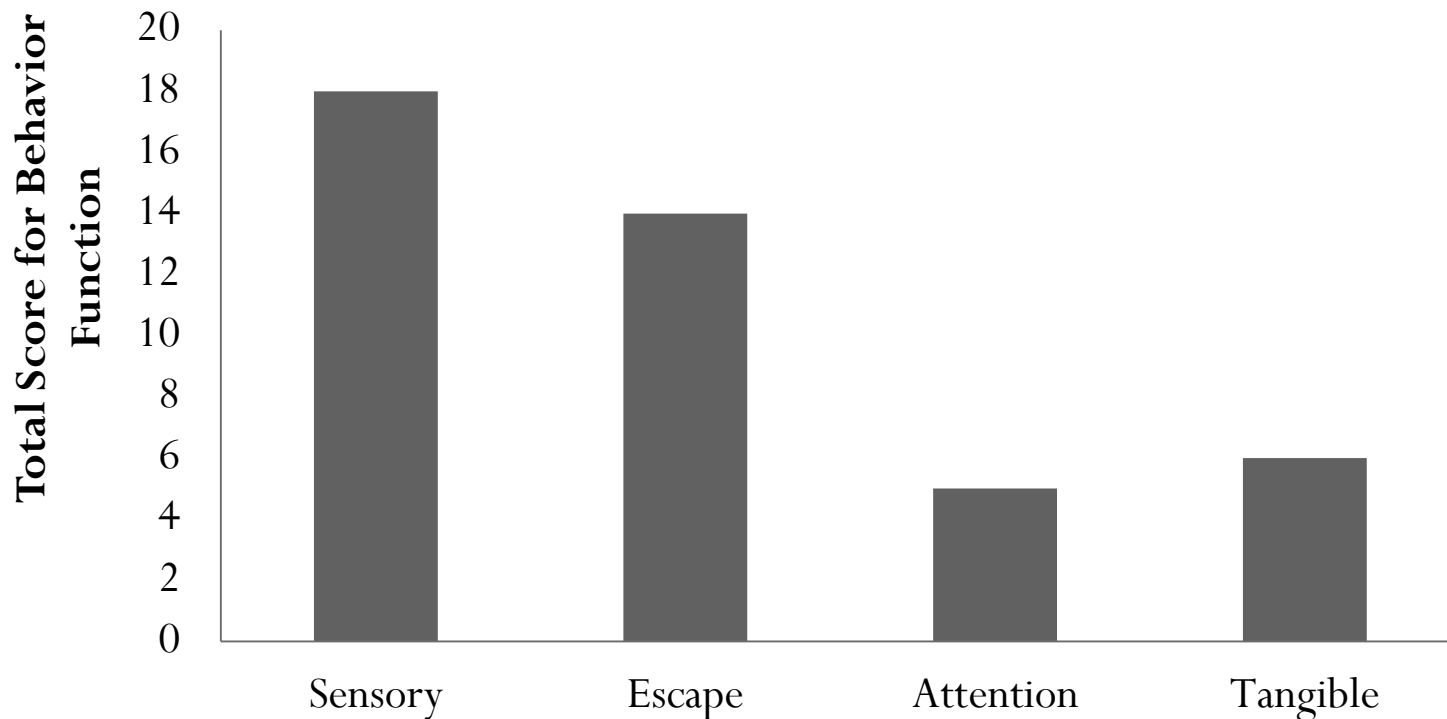
Antecedent (Conditions in the environment that may signal availability of reinforcement)	Behavior (Person's response)	Consequence (Conditions in the environment that may reinforce the response)
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- Observations describe correlations between events, but do not provide cause-effect results regarding functional relations.
 - (Iwata & Dozier, 2008)

Discussion

- Results of Questionnaires/Correlational Data:

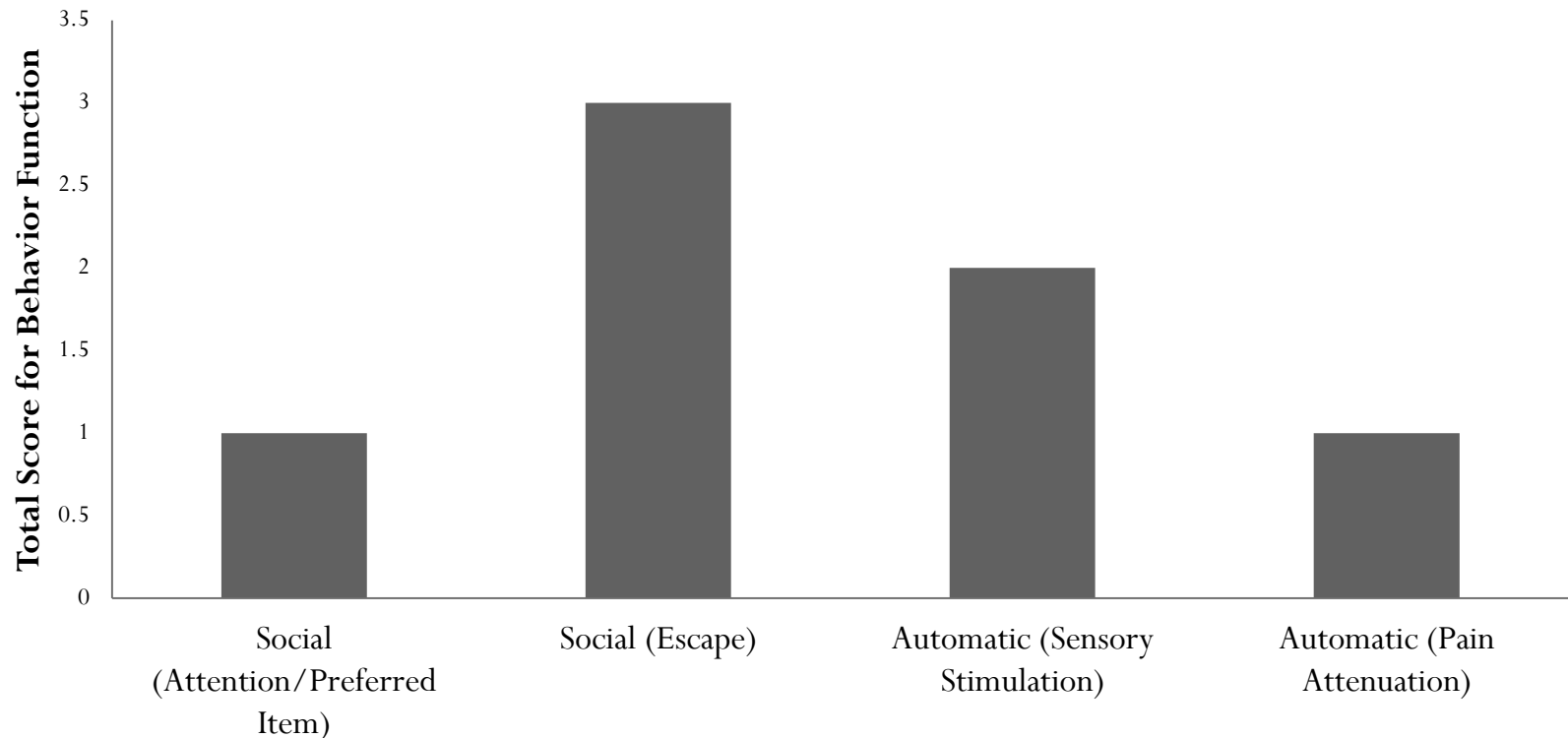
Motivation Assessment Scale (MAS)



Discussion

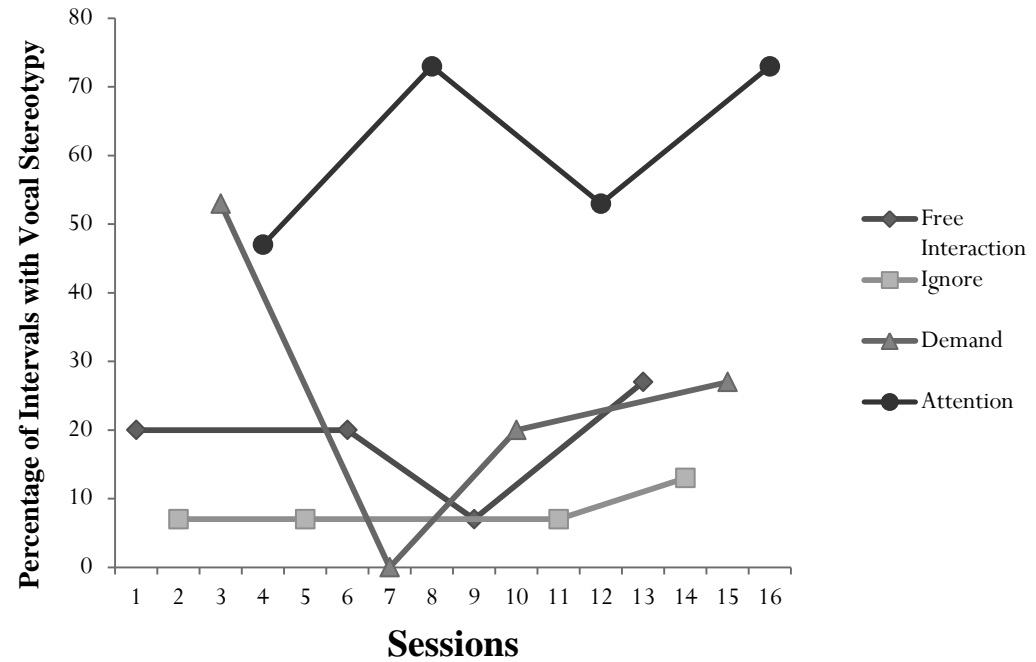
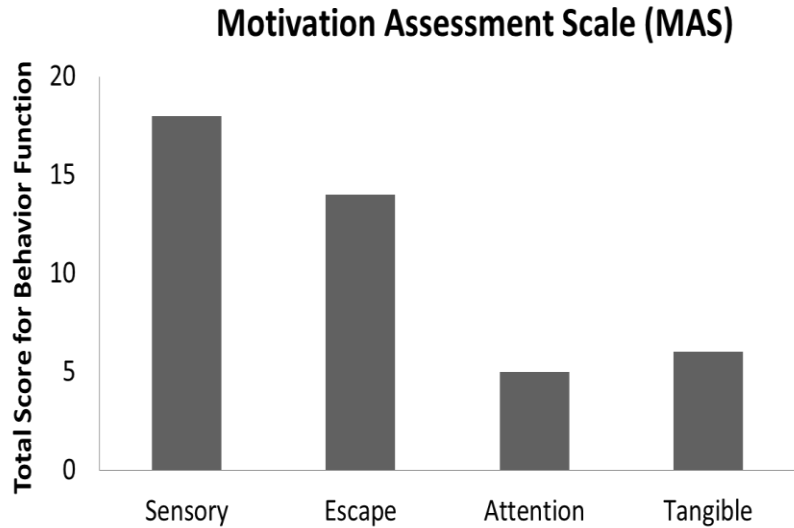
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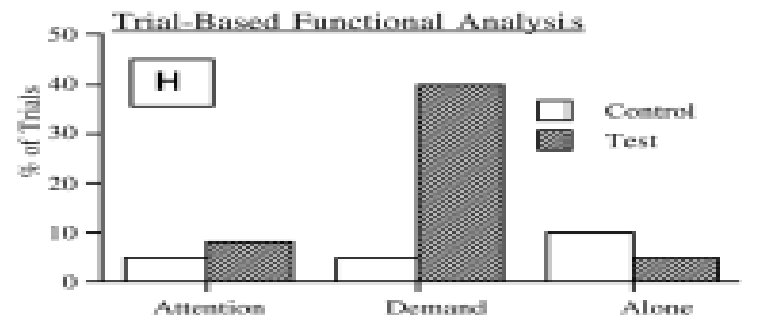
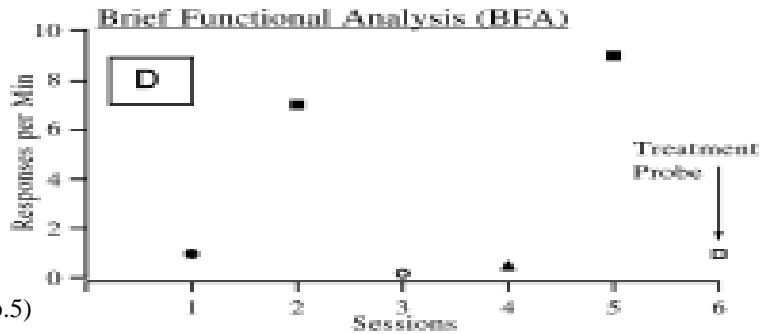
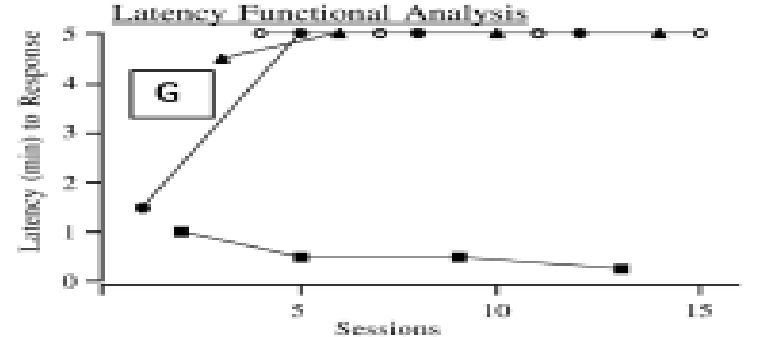
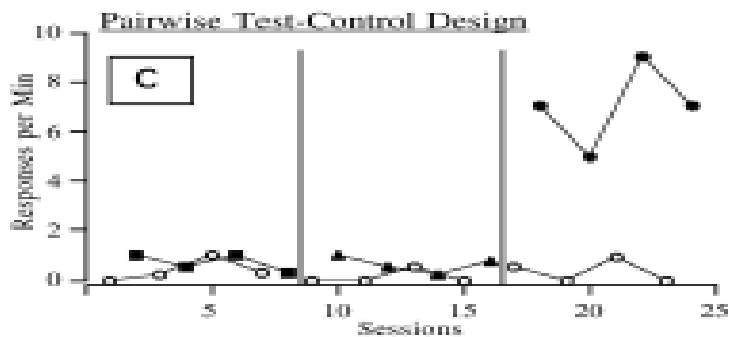
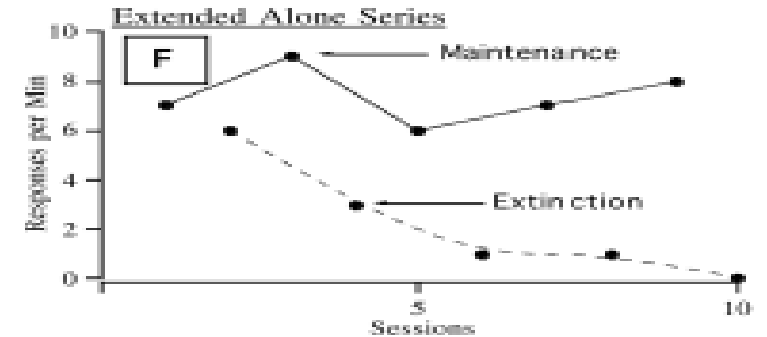
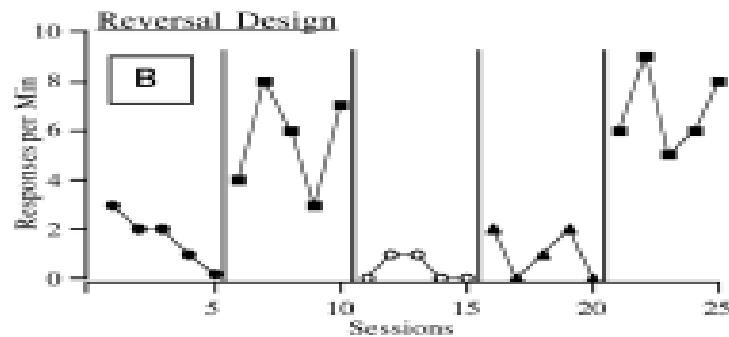
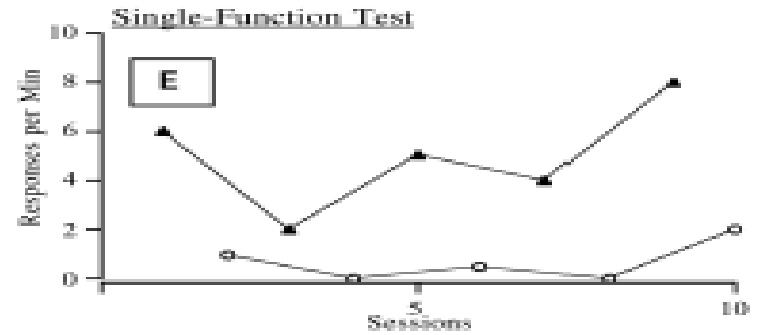
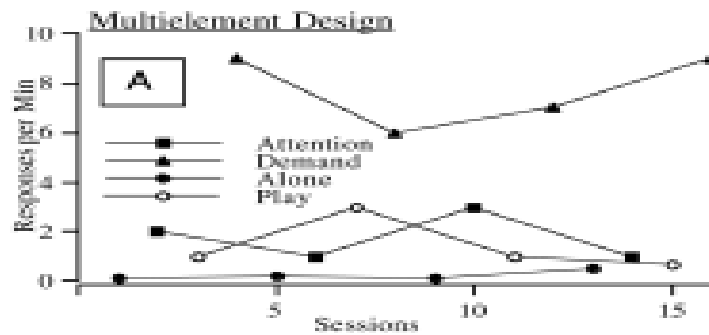
Functional Analysis Screening Tool (FAST)



Discussion

- Contrast with FA results:





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

- Bijou, S. W., Peterson, R. F., & Ault, M. H. (1968). A method to integrate descriptive and experimental field studies at the level of data and empirical concepts. *Journal Of Applied Behavior Analysis, 1*(2), 175-191. doi:10.1901/jaba.1968.1-175
- Cipani, E. & Schock, K.M. (2011). *Functional behavioral assessment, diagnosis, and treatment: A complete system for education and mental health settings*. New York, NY: Springer Publishing Company, LLC
- Hegel, M. T., & Ferguson, R. J. (2000). Differential reinforcement of other behavior (DRO) to reduce aggressive behavior following traumatic brain injury. *Behavior Modification, 24*(1), 94-101. doi:10.1177/0145445500241005
- Iwata, B. A., & Dozier, C. L. (2008). Clinical application of functional analysis methodology. *Behavior Analysis In Practice, 1*(1), 3-9.
- Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis, 27*, 197–209. (Reprinted from *Analysis and Intervention in Developmental Disabilities, 2*, 3–20, 1982).
- Kim, E., Lauterbach, E. C., Reeve, A., Arciniegas, D. B., Coburn, K. L., Mendez, M. F., & ... Coffey, E. C. (2007). Neuropsychiatric complications of traumatic brain injury: A critical review of the literature (A report by the ANPA committee on research). *The Journal Of Neuropsychiatry And Clinical Neurosciences, 19*(2), 106-127. doi:10.1176/appi.neuropsych.19.2.106
- Moore, J. W., Edwards, R. P., Sterling-Turner, H. E., Riley, J., DuBard, M., & McGeorge, A. (2002). Teacher acquisition of functional analysis methodology. *Journal Of Applied Behavior Analysis, 35*(1), 73-77. doi:10.1901/jaba.2002.35-73
- Rahman, B. B., Oliver, C. C., & Alderman, N. N. (2010). Descriptive analysis of challenging behaviours shown by adults with acquired brain injury. *Neuropsychological Rehabilitation, 20*(2), 212-238. doi:10.1080/09602010903021097
- Schlund, M. W., & Pace, G. M. (2000). The experimental analysis of human operant behavior following traumatic brain injury. *Behavioral Interventions, 15*(3), 155-168. doi:10.1002/1099-078X(200007/09)15:3<155::AID-BIN53>3.0.CO;2-F