Differential Reinforcement as a Way of Life

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My backgroud

University of Florida with Brian Iwata, self-injurious behavior

Louisiana State University—School psychology

University of Pennsylvania– Medical school

University of Florida– schools, foster care, autism centers

Overview

I will review evidence that severe problem behavior is learned, operant behavior.

I will discuss the concept of "choice" as it relates to operant behavior.

I will describe how differential reinforcement is a logical treatment and should be adopted as a "way of life."

I will describe ways of transferring behavioral treatment into everyday life via care provider training.

Behavior Disorders/Problem Behavior

Self-Injurious Behavior (SIB)

Aggression

Property Destruction

Tantrums

Severe Stereotypic Behavior

Classroom Disruptive Behavior

Operant Functions of Behavior Disorders

Socially mediated positive reinforcement

Socially mediated negative reinforcement

Automatic positive or negative reinforcement

Examples of socially mediated positive reinforcement maintaining problem behavior

Attention in the form of comfort statements

Attention in the form of proximity

Attention in the form of reprimands

Attention in the form of social interaction

Tangible items such as preferred toys, food items, drinks, videos, computers, etc.

Examples of socially mediated negative reinforcement

Escape or avoidance of instructional activity (includes reduced duration of instructional activity)

Escape or avoidance of self-care or daily living routines

Escape or avoidance of medical routines

Escape or avoidance of aversive sounds or situations

Important Note:

Sometimes the individual has alternative behavior, such as communication, in their repertoire, but…

Problem behavior produces consequences more reliably and more immediately

Examples of automatic reinforcement

The sensation produced by the behavior functions as positive reinforcement.

Behavior, such as self-scratching, temporarily attenuates aversive stimulation.

Bio-behavioral theories (e.g., endorphin hypothesis).

Functional analysis

An experimental manipulation of independent variables thought to potentially control target behavior (the dependent variable).

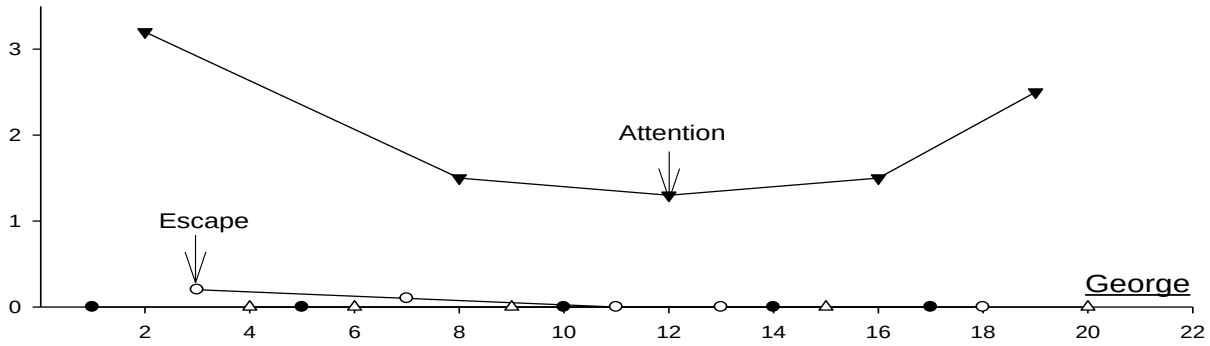
The term has a more general meaning, but has come to be used to refer to a specific type of assessment for behavior disorders.

The utility of a FA

Scientific: To learn more about the nature of and controlling variables for behavior disorders.

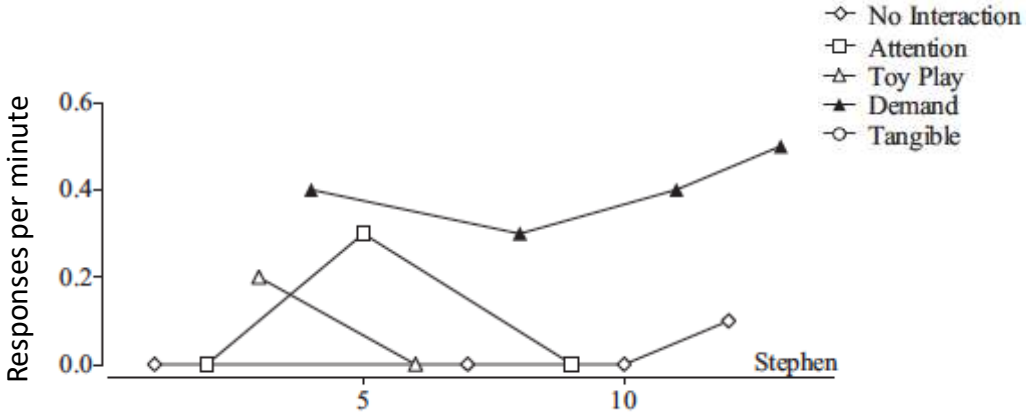
Research screening: To identify appropriate subjects for a research question.

Clinical assessment: To isolate variables maintaining or suppressing problem behavior.



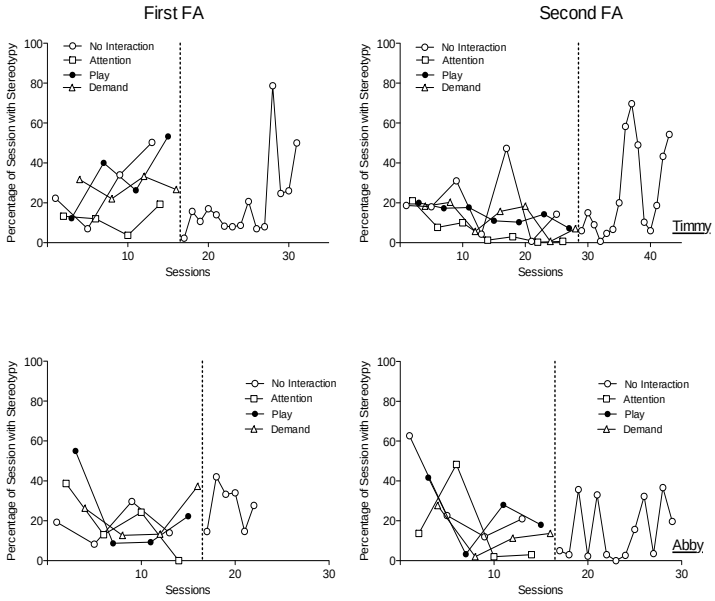
Athens & Vollmer, 2010

Negatively reinforced (escape) behavior



Slocum & Vollmer, 2015

Automatically reinforced behavior (Wunderlich & Vollmer, in press)



Revisiting Differential Reinforcement of Alternative Behavior

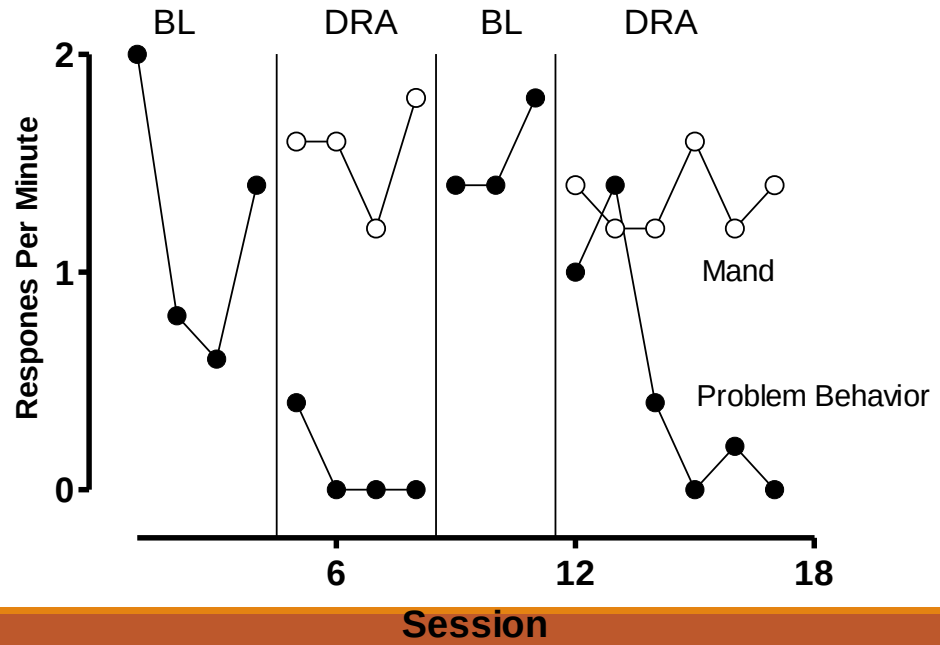
Old definition: Reinforcement of some alternative response while placing the problem behavior on extinction.

New definition: Providing greater reinforcement, along at least one dimension, for alternative behavior in comparison to reinforcement for problem behavior.

Differential Reinforcement

Minimize reinforcement for problem behavior (preferably via extinction-- withholding reinforcement*)

Maximize reinforcement for appropriate alternative behavior



Differential Reinforcement of Alternative Behavior (DRA)

- DRA is essentially a concurrent schedule.
- Baseline circumstances (reinforcement schedules) usually favor problematic behavior.
- Treatment circumstances represent schedules that favor appropriate behavior.
- Ideally, Extinction vs. Reinforcement.
- However, there are circumstances when extinction is not possible or practical.

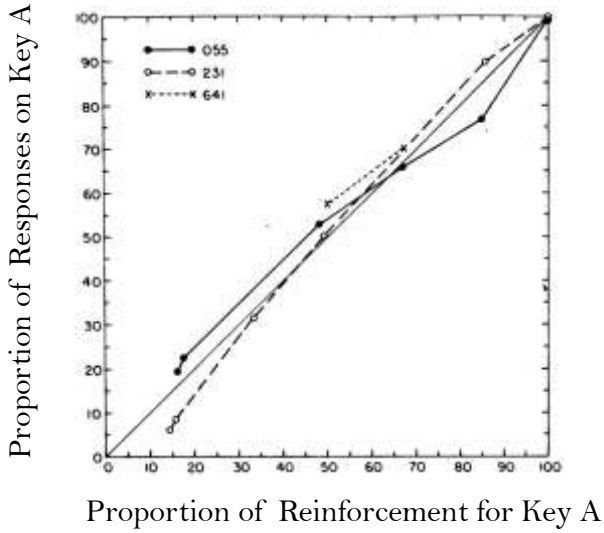
Examples of factors influencing the application of extinction schedule

- Treatment integrity failures.
- Legal or ethical requirement to block attention-maintained self-injury or aggression.
- Extinction burst is too dangerous.
- Automatic reinforcement.
- Large and/or fast individuals may produce escape even if we attempt escape extinction.

The Matching Law

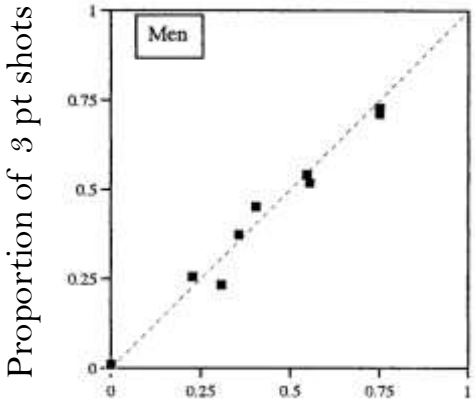
In a concurrent arrangement, the relative rate of one response alternative will essentially "match" the relative rate of reinforcement available for that response alternative.

Matching in Pigeon Key Pecks



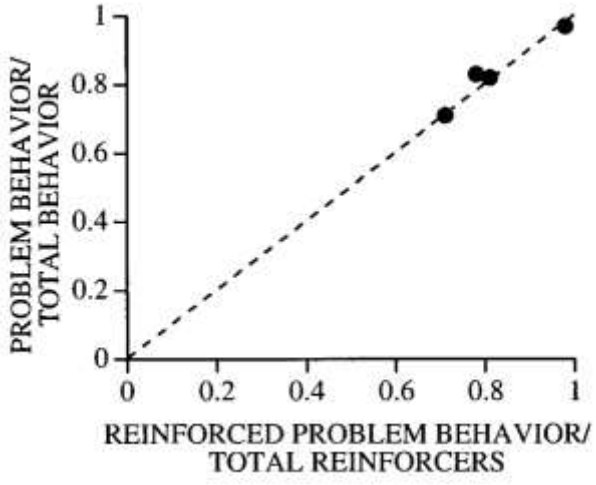
Herrnstein, 1961

Matching in College Basketball: 2 and 3 point shots



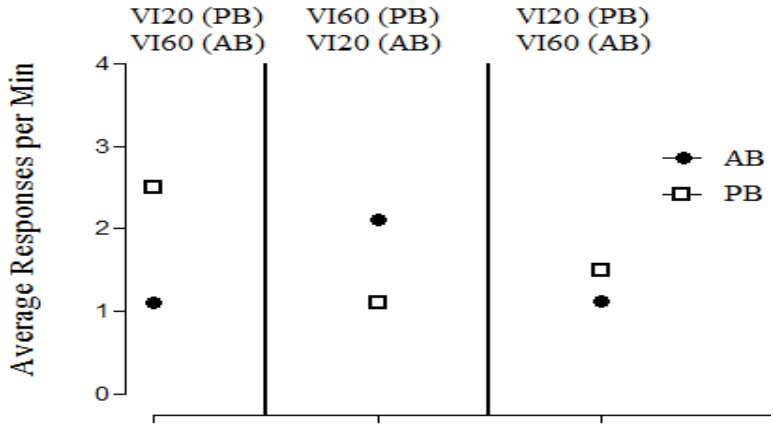
Bourret & Vollmer, 2000

Matching in Child Problem Behavior



Borrero & Vollmer, 2002

Averages



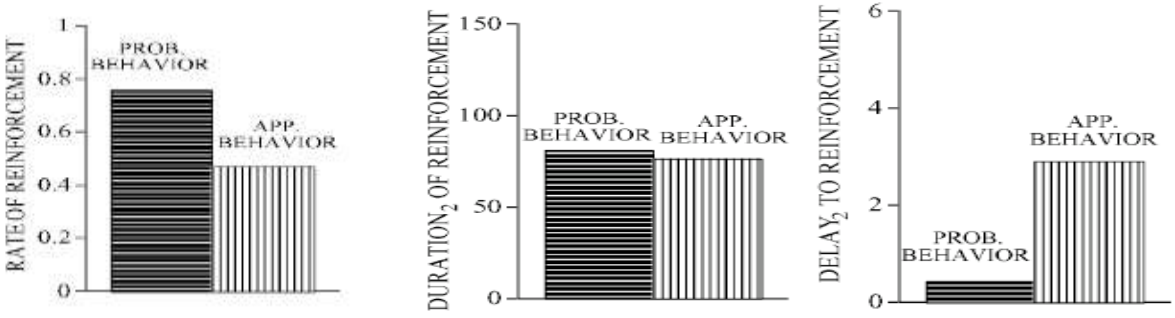
Borrero et al., 2010

What do Behavior Analysts mean by "choice"?

- Allocation of responding on two or more response alternatives
- Each alternative is associated with some schedule of reinforcement, punishment, or both
- Allocation of responding is governed by the outcome of responding (consequences to behavior)

Other factors influencing response allocation

- Quality of reinforcement
- Magnitude/duration of reinforcement
- Delay to reinforcement
- Response effort
- Punishment



Borrero et al. (2005)

Differential Attention: Baseline Example

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	0.2
Delay to Attention		
Quality of Attention		
Duration of Attention		

Differential Attention: Baseline Example

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	0.2
Delay to Attention	< 3 sec	on average > 20 sec
Quality of Attention		
Duration of Attention		

Differential Attention: Baseline Example

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	0.2
Delay to Attention	< 3 sec	on average > 20 sec
Quality of Attention	Verbal and Physical Attention	Brief Verbal Attention
Duration of Attention		

Differential Attention: Baseline Example

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	0.2
Delay to Attention	< 3 sec	on average > 20 sec
Quality of Attention	Verbal and Physical Attention	Brief Verbal Attention
Duration of Attention	> 20 sec	< 3 sec

Differential Attention: Solution

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	1.0
Delay to Attention		
Quality of Attention		
Duration of Attention		

Differential Attention: Solution

	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	1.0
Delay to Attention	< 3 sec	< 3 sec
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Differential Attention: Solution

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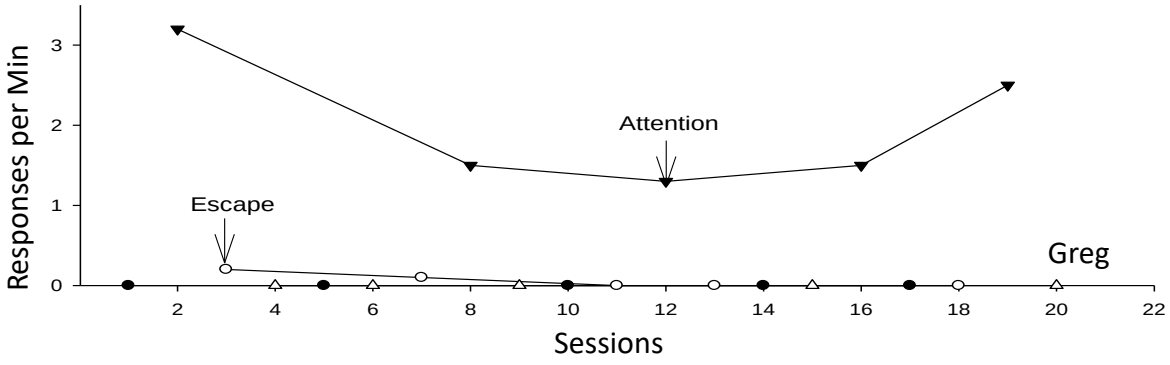
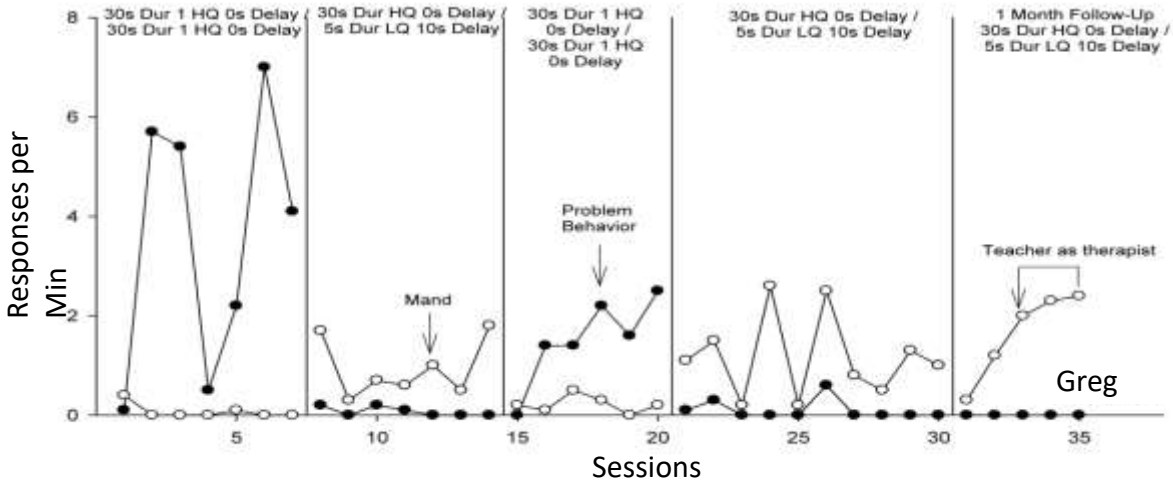
Probability of Attention	1.0	1.0
Delay to Attention	< 3 sec	< 3 sec
Quality of Attention	Physical Attention	Verbal and Physical Attention
Duration of Attention		

Differential Attention: Solution

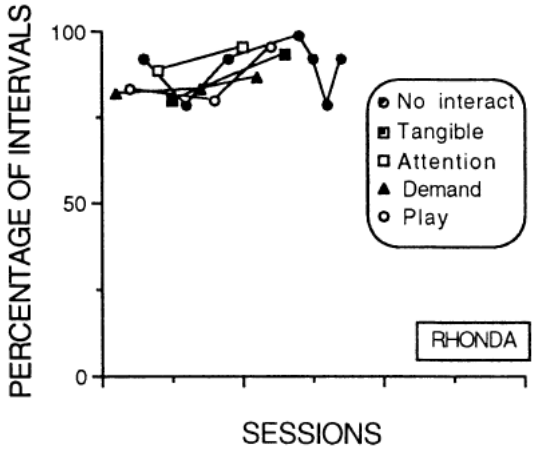
	Aggressive Behavior	Appropriate Behavior
Probability of Attention	1.0	1.0
Delay to Attention	< 3 sec	< 3 sec
Quality of Attention	Physical Attention	Verbal and Physical Attention
Duration of Attention	< 10 sec	> 20 sec



Athens & Vollmer, 2010



Athens & Vollmer, 2010


PERCENTAGE OF INTERVALS
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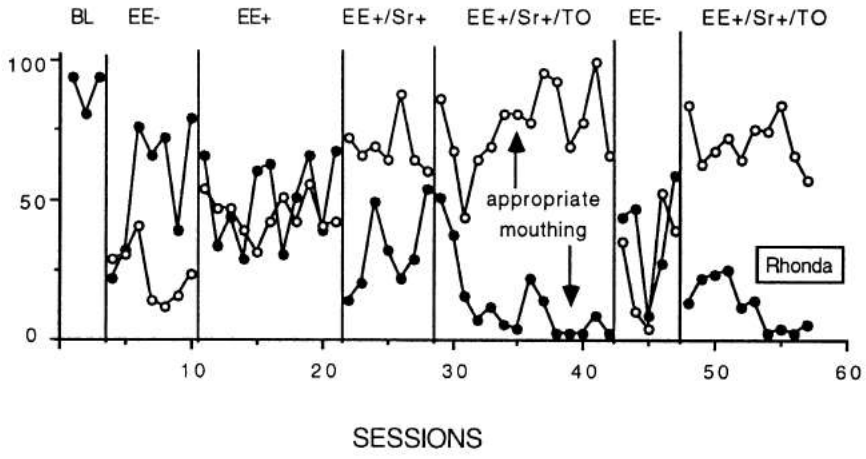
Attention
Demand
Play
RHONDA
SESSIONS


BL
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EE-
EE+/Sr+/TO
100
50
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appropriate
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10
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40
50
60
SESSIONS

Using Differential Reinforcement

Maximize reinforcement for appropriate behavior

Present only the minimal amount of reinforcement necessary for inappropriate behavior; when possible, this would be none at all

Just remember this rule of thumb: Maximize/Minimize

Translating to everyday life

Care providers make errors

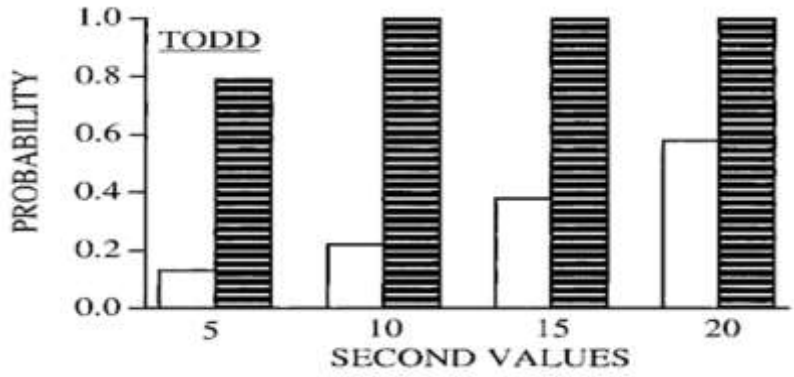
- Errors are made by care providers of all sorts.
- These errors can be interpreted as resulting from contingencies of reinforcement and punishment.
- As behavior analysts, we should be exploring contingencies on care provider behavior, rather than complaining when they do not follow our rules or instructions.

Care Provider Errors

- **Delivery of potential reinforcers for problematic behavior**
- Failure to promote independence

Attention as an Example

Attention given disruptive behavior

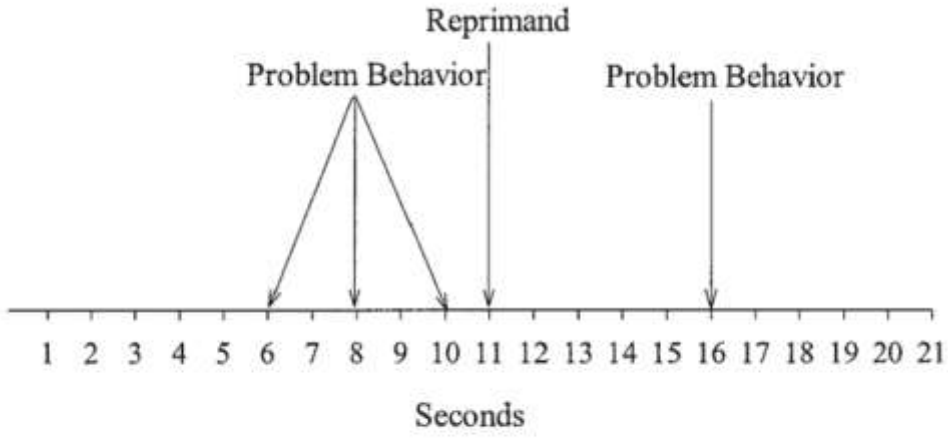


Vollmer et al., 2001

Why?

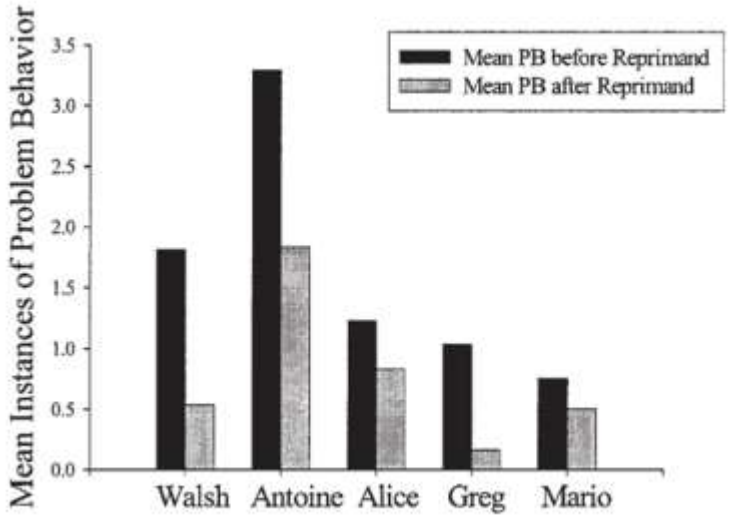
Contingencies Influencing Care Provider Reprimanding

- It is likely that the child's behavior is an aversive stimulus
- If the child's behavior temporarily goes away when the reinforcer is delivered, a possible negative reinforcement contingency maintains the care provider's behavior.
- If care provider behavior produces problem behavior, the care provider behavior is likely punished
- Rules provided by behavior analysts relate to delayed and probabilistic contingencies that the care provider may have never contacted
- We should not be surprised these rules do not work; they cannot compete with immediate reinforcement

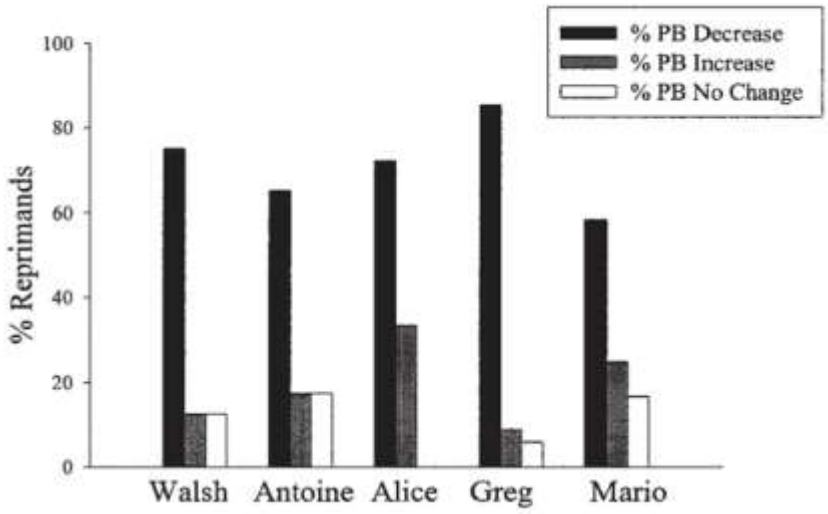


3 instances of problem behavior before the reprimand ⟶
1 instance of problem behavior after the reprimand

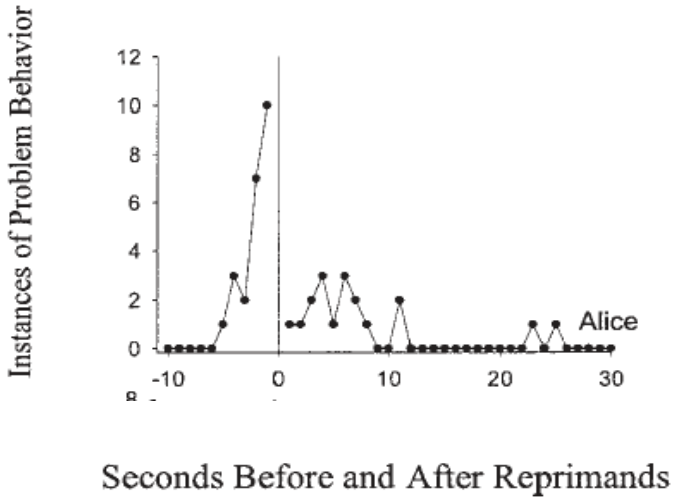
Sloman et al., 2005



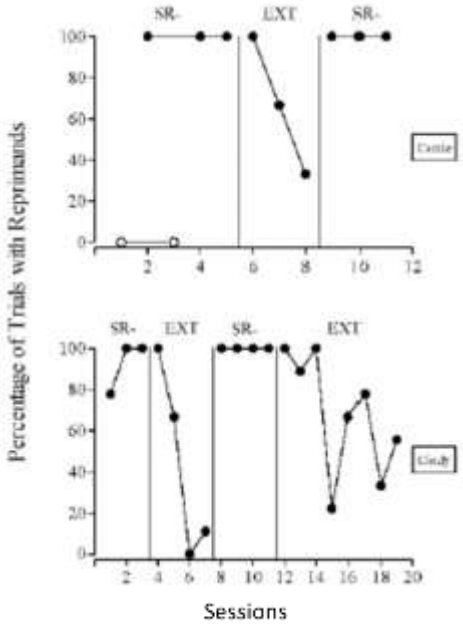
Sloman et al., 2005



Sloman et al., 2005



Sloman et al., 2005



Miller, Lerman, & Fritz, 2010

Escape/Avoidance as an Example

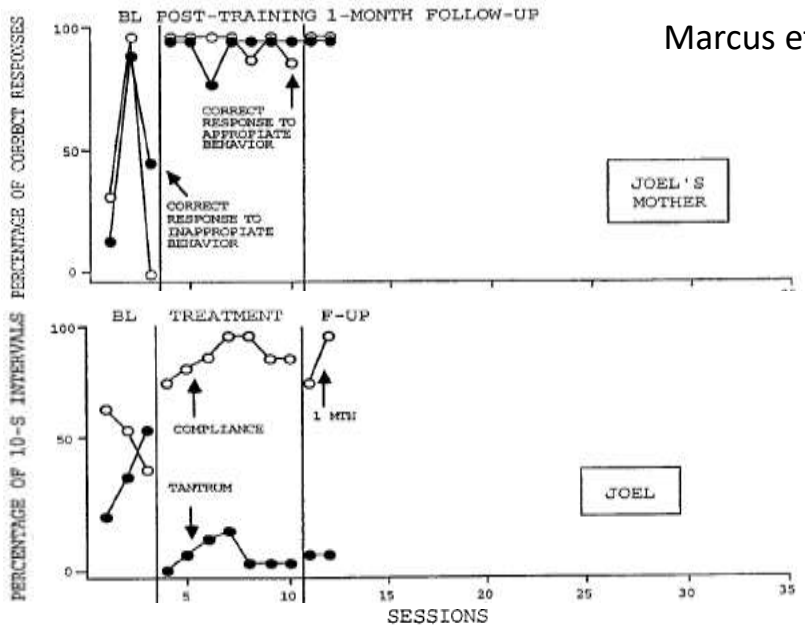
Three Cases (FAs Showing Escape Behavior)

1. Probability of problem behavior given instruction:
   - Child 1: .93
   - Child 2: .89
   - Child 3: .67
2. Probability of problem behavior given casual social interaction:
   - Child 1: .12
   - Child 2: .15
   - Child 3: .04
3. Probability of problem behavior given no social interaction:
   - Child 1: 0
   - Child 2: 0
   - Child 3: .02

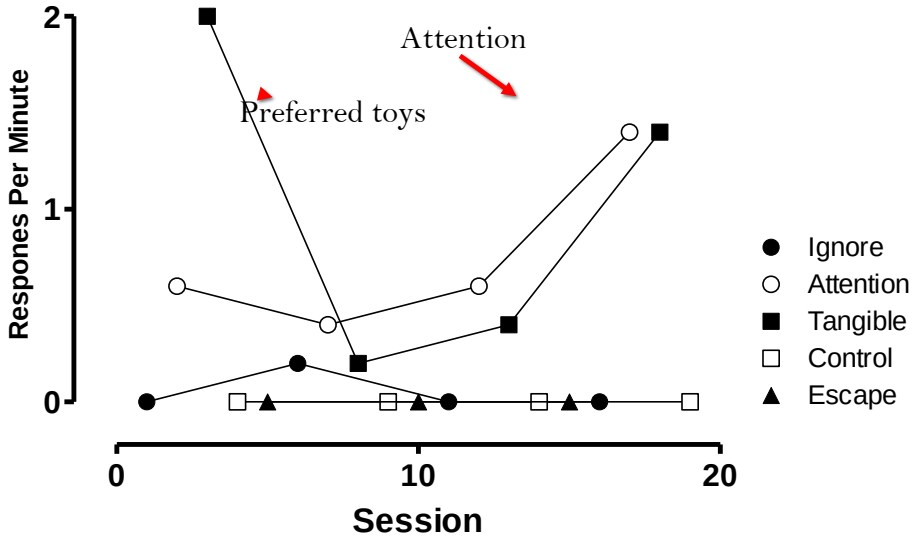
One Possible Solution: Competency-Based Training

Competency-Based Parent Training Accomplishes Two Aims

1. Brings the parent's behavior into contact with the reinforcer of reduced child problem behavior and increased appropriate behavior, and…
2. Results in correspondence between the behavior analysts instructions and longer-term outcomes



Marcus et al, 2001


Attention
Preferred toys
Respones Per Minute
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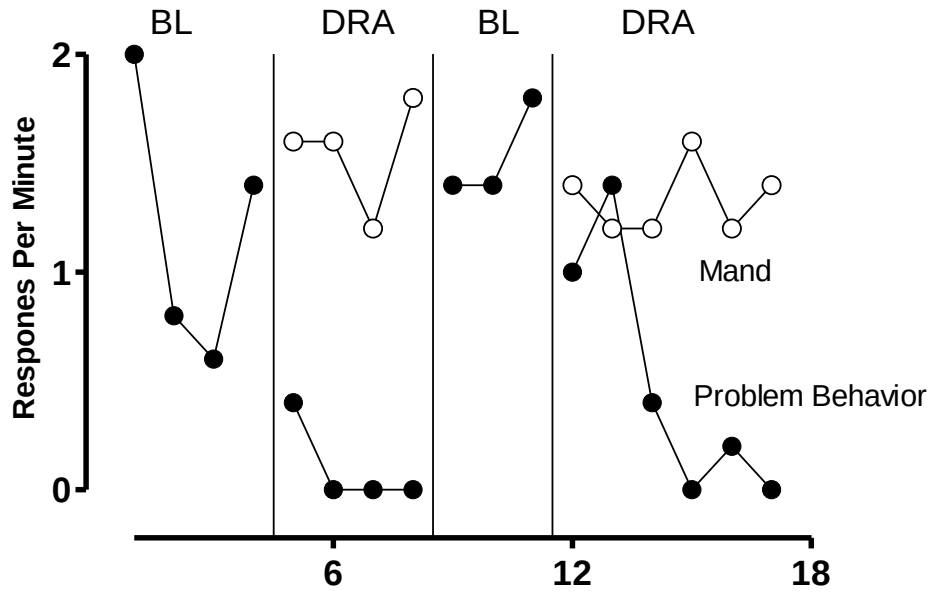
Ignore
Attention
Tangible
Control
Escape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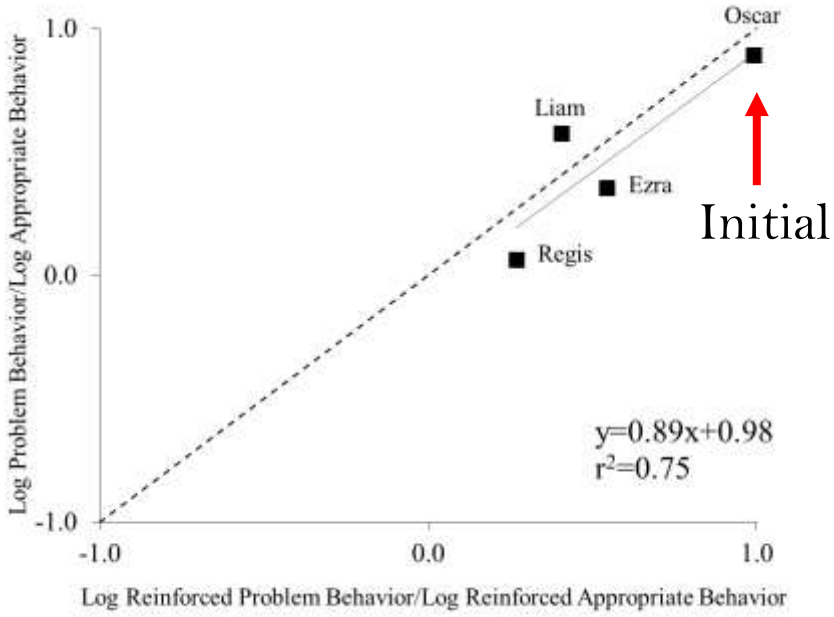


Marcus, Swanson, & Vollmer, 2001

Behavioral Skills Parent Training

Identify effective treatment in highly controlled circumstances, then:

Step 1: Didactic interaction

Step 2: Role play A—parent as kid

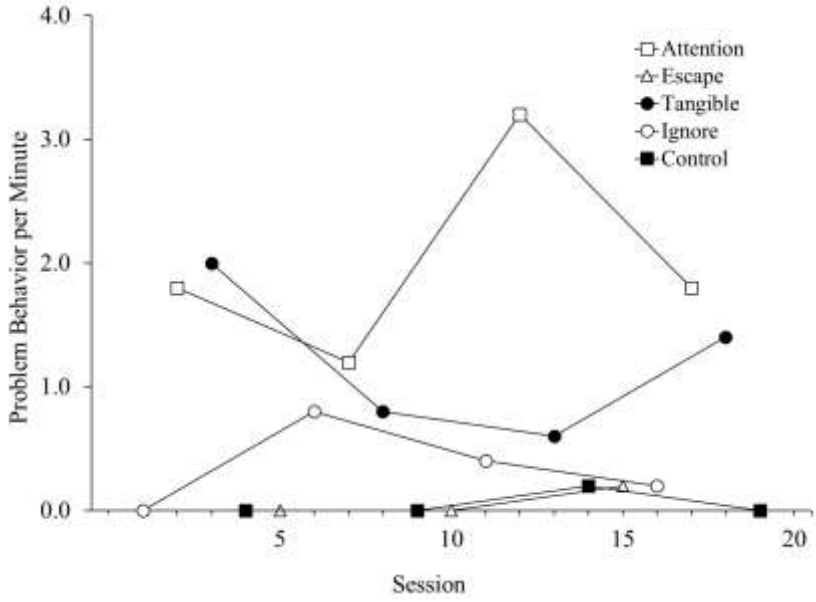
Step 3: Role play B– therapist as kid

Step 4: Immediate feedback

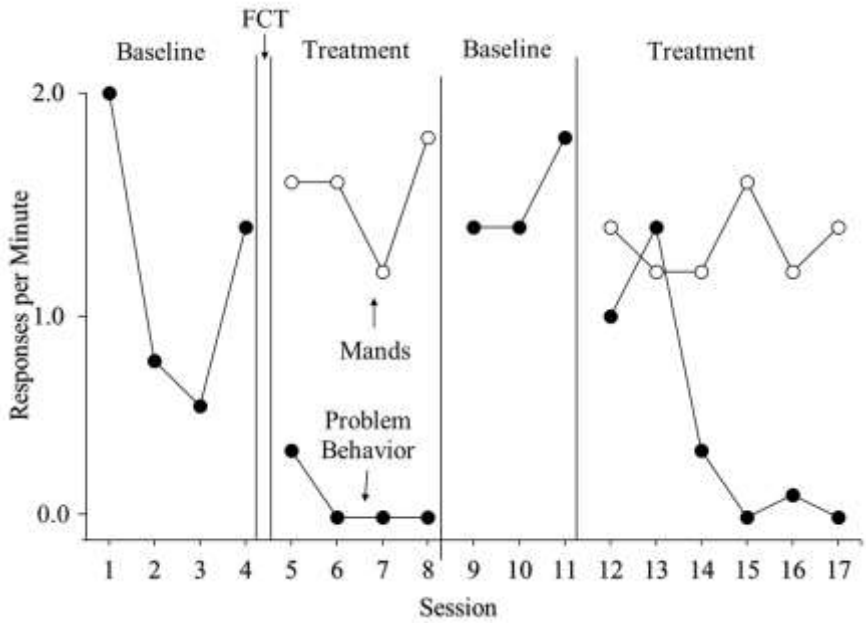
Step 5: Delayed feedback

Step 6: Monitoring and follow up

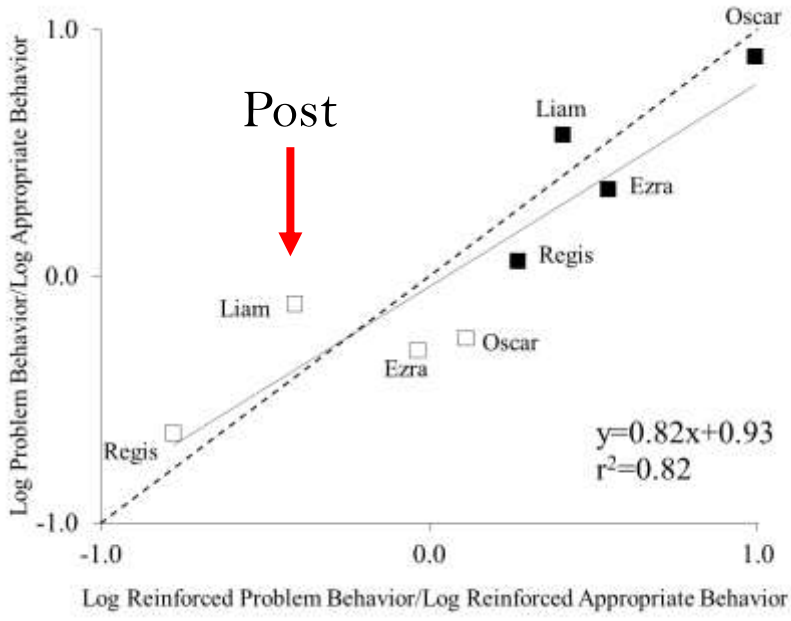
Booster training as necessary



Kronfli & Vollmer, in progress



Kronfli & Vollmer, in progress



Conclusions

- Problem behavior is often predictable and lawful
- Differential reinforcement is an ideal treatment because it involves minimizing reinforcement for problem behavior and maximizing reinforcement for appropriate alternative behavior
- The matching law is useful in developing interventions, especially when extinction is not likely or even not possible
- Care-provider behavior is sensitive to contingencies of reinforcement and punishment
- It is our job to understand those contingencies in order to implement successful interventions
- Differential reinforcement is not just a treatment, it is a way of life!