

Promoting Delay Tolerance in Differential-Reinforcement Interventions for Severe Problem Behavior

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What do we mean?

- Differential Reinforcement
 - Identify reinforcers for problem behavior
 - Conduct a functional analysis
 - Arrange extinction for problem behavior
 - Provide reinforcement for an appropriate alternative
 - Social Positive Reinforcement: FCT
 - Social Negative Reinforcement: DR-Compliance

What do we mean?

- Tolerance to delayed reinforcement
 - Tolerance = waiting
 - Waiting is really hard
 - https://www.youtube.com/watch?v=QX_oy9614HQ

Waiting is hard

- Waiting is even harder for children with disabilities
 - Verbal behavior can play a large role in mediating delays
- We're usually not asking them to wait to eat marshmallows

Severe Problem Behavior



- Self Injury
 - Head hitting, head banging, self biting, eye poking, self scratching
- Aggression
 - Hitting, kicking, biting scratching, shoving, grabbing
- Property Destruction
 - Throwing materials, overturning furniture

Introducing Delays

- EO-----Alt---Reinforcer

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Introducing Delays

- EO-----Alt-----Reinforcer

Introducing Delays

- EO-----Alt-----Reinforcer
 - Delays weaken Alt—Sr contingency
 - Alt becomes less likely to occur
 - Sets the occasion for resurgence
 - Increase in problem behavior
 - Reinforcement of problem behavior
 - Possibility of “other” problem behavior
 - Intermittent Reinforcement of Alt
 - High rate requesting

What do we do?

- EO-----Alt-----Reinforcer
- Borrow from Sidman (1960)
 - Arrange Chained FR 1:DRO contingencies
 - Timer resets following problem behavior
 - Minimizes adventitious reinforcement of problem behavior
 - Still allows “other”
 - Still may promote repeated Alt
 - Arrange Chained FR 1: DRA contingencies
 - Specifies what behavior occurs during delays
 - Incompatible with problem behavior, “other” behavior, and repeated Alt

Part 1: Social Positive Reinforcement

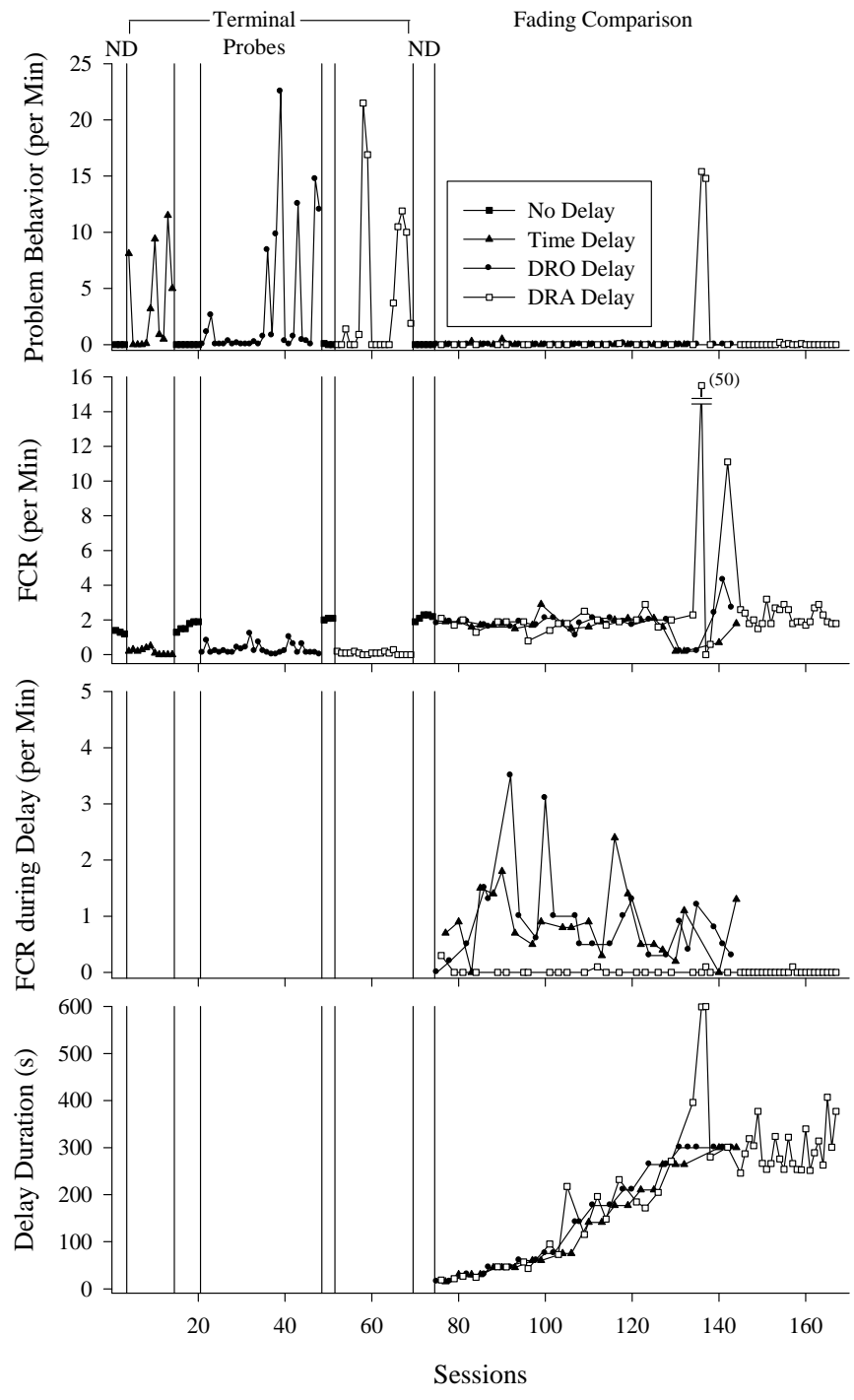
- Ghaemmaghmi and Hanley (2016)
 - “Simpsons did it” (South Park, 2002)
- Compared progressive time-based and contingency-based delays
 - DRO for problem behavior
 - DRA for engagement
- Contingency-based delays promoted greater tolerance
- Limitations of analysis
 - Not clear if fading was necessary
 - DRO and DRA contingencies were combined
 - DRO is a pain in the butt to implement

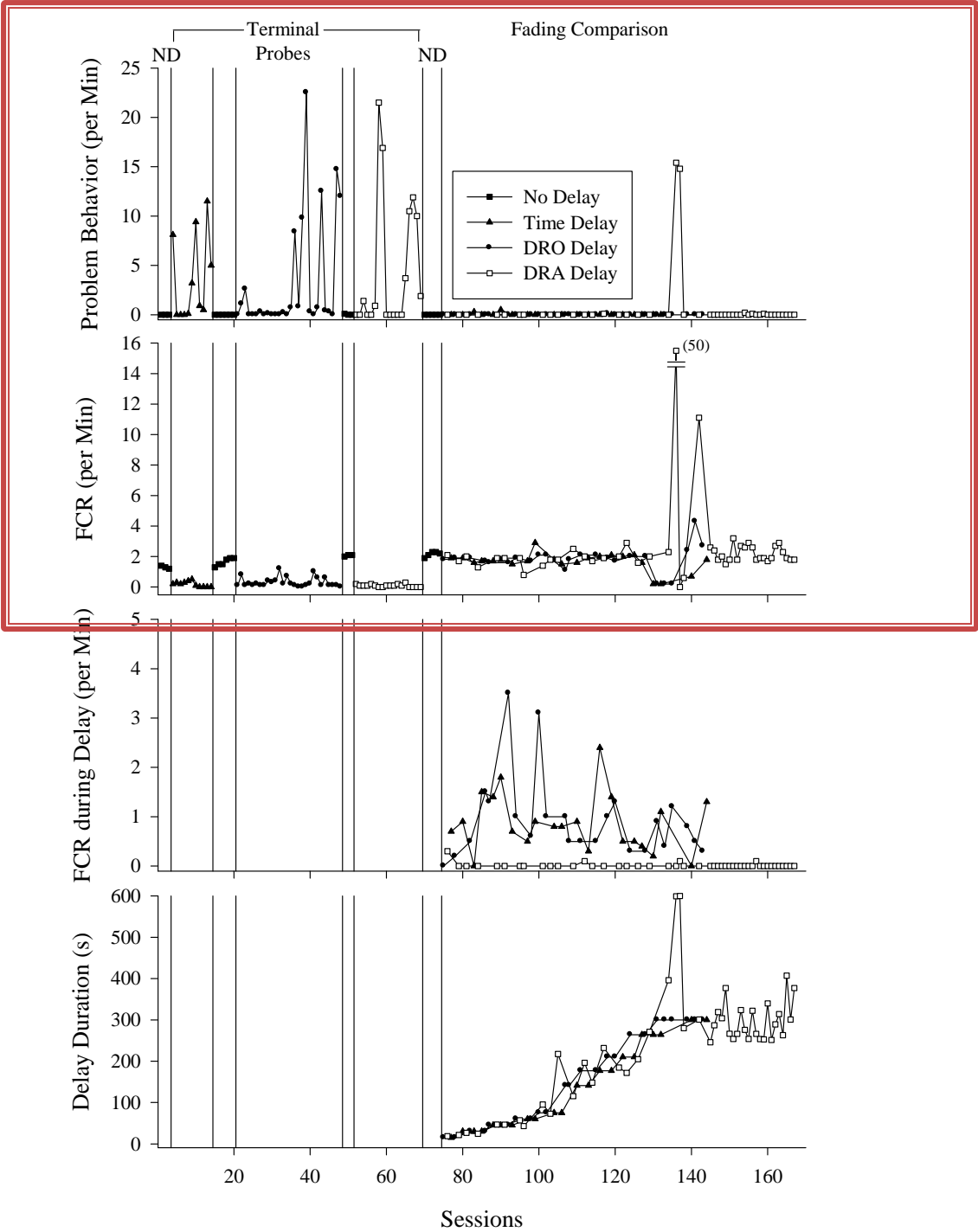
Purpose

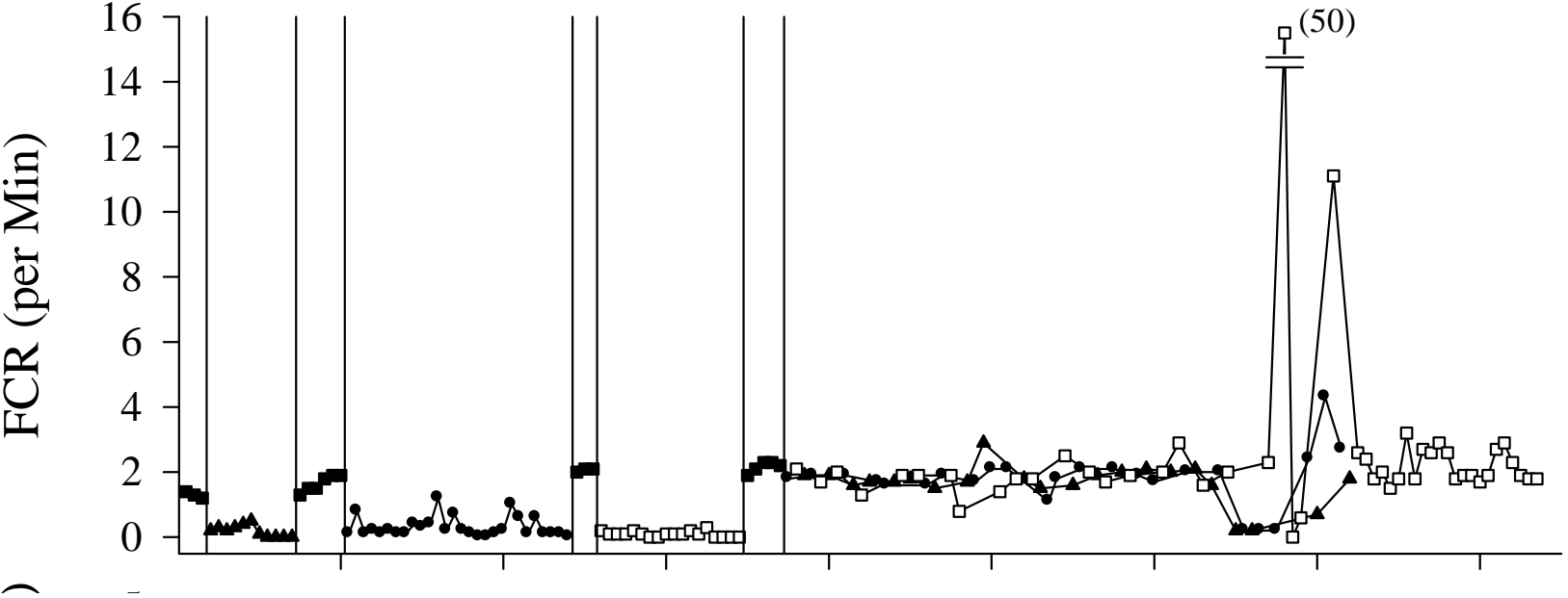
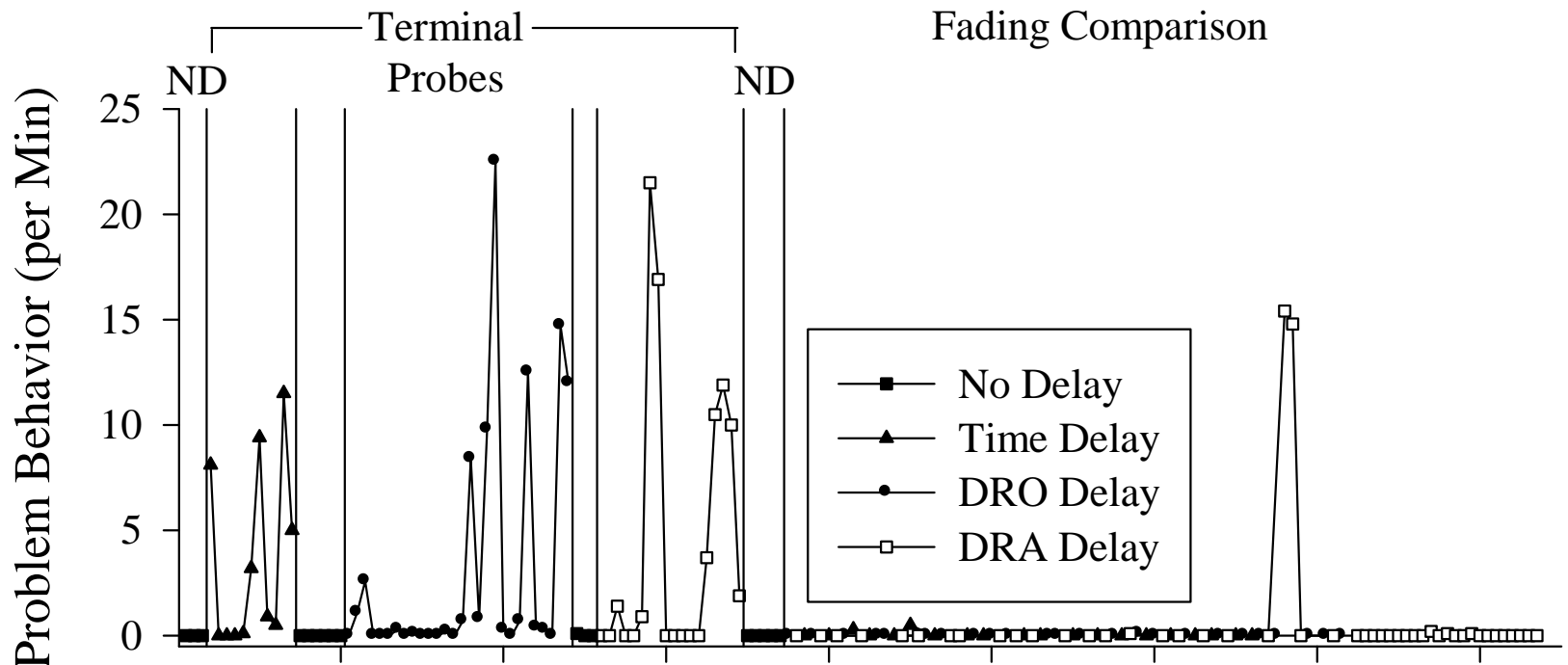
- Compare:
 - Time-based delay
 - DRO-based delay
 - DRA-based delay
- Dependent Variables:
 - Maintaining FCR
 - Minimizing FCR during delays
 - Minimizing problem behavior
 - Efficiency of fading

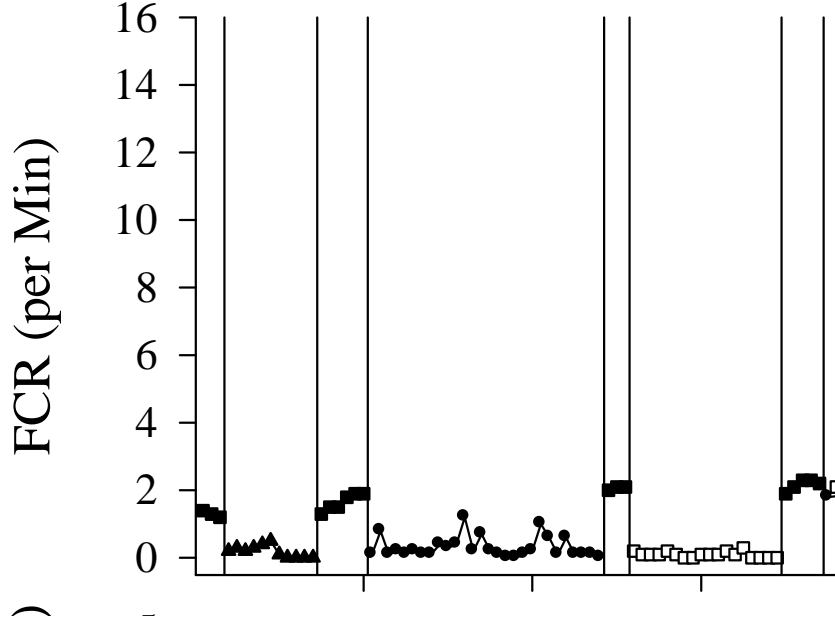
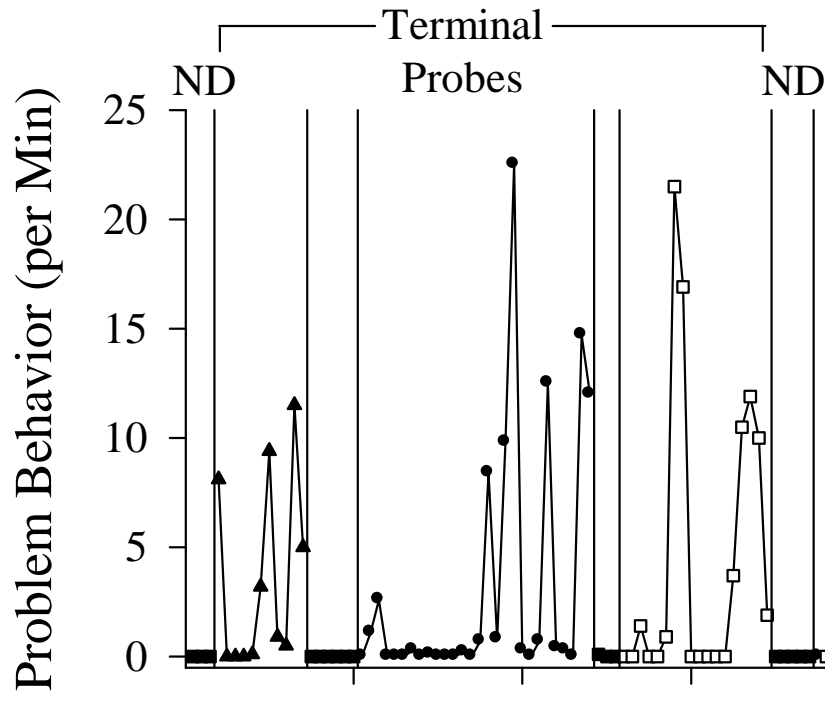
Participants

- Logan
 - 11 y/o boy with PDD-NOS and ADHD
 - Target behavior: aggression and property destruction
- Andy
 - 14 y/o boy with autism, ADHD, & schizencephaly
 - Target behavior: property destruction
- Tanner
 - 9 y/o boy with moderate mental retardation
 - Target behavior: aggression and property destruction





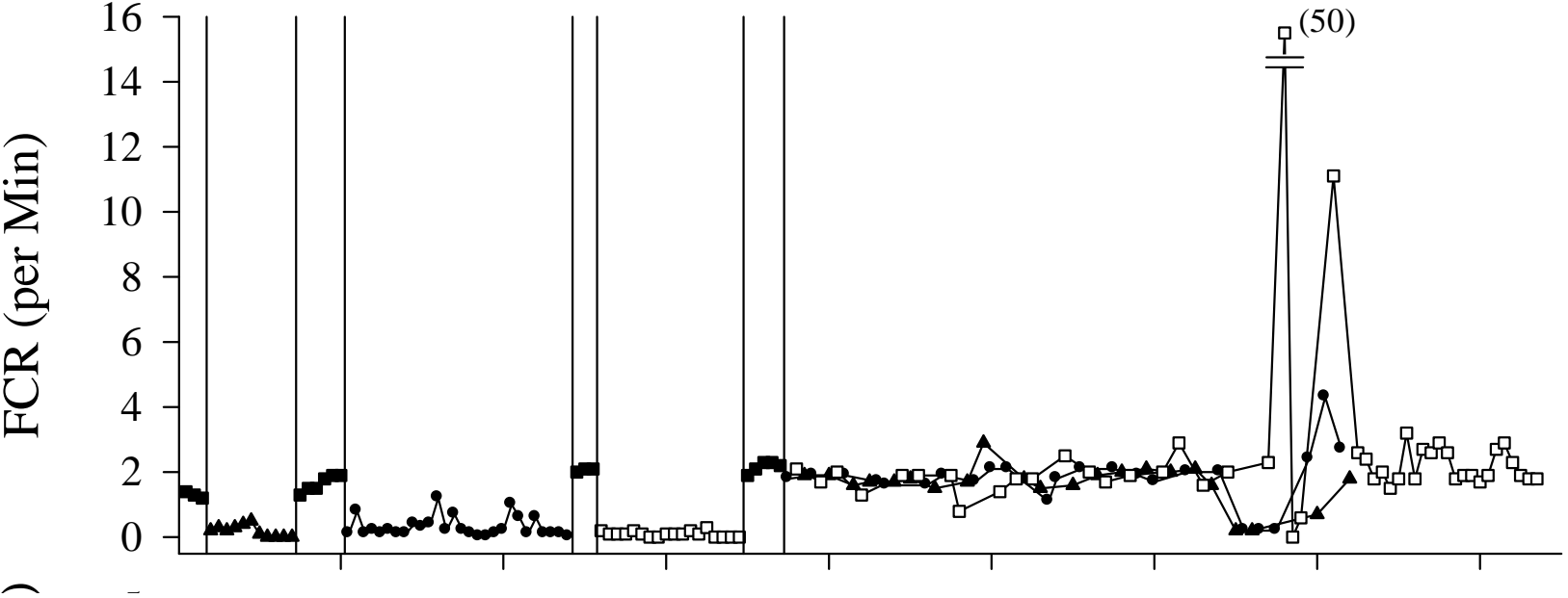
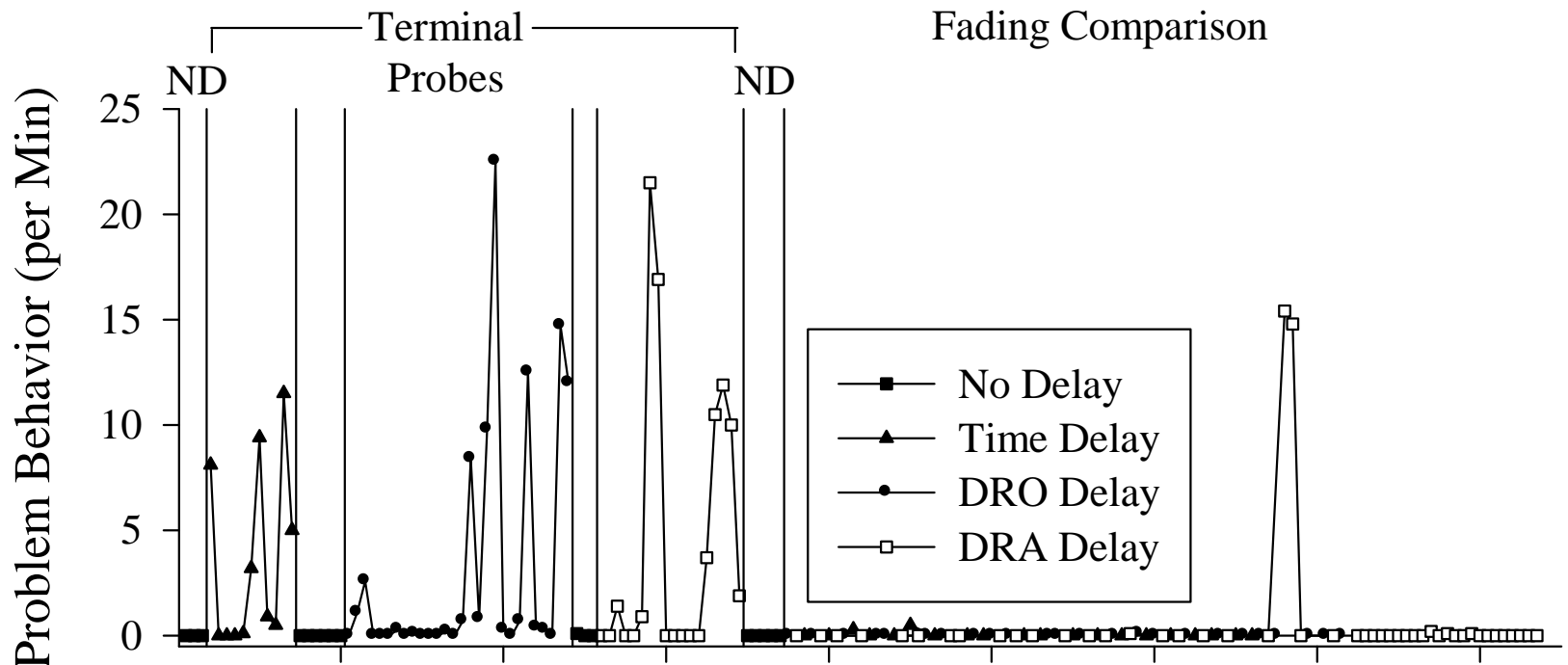




Fading Step	Time Delay	DRO	DRA
1	15		
2	30		
3	45		
4	60		
5	75		
6	141		
7	177		
8	210		
9	264		
10	300		

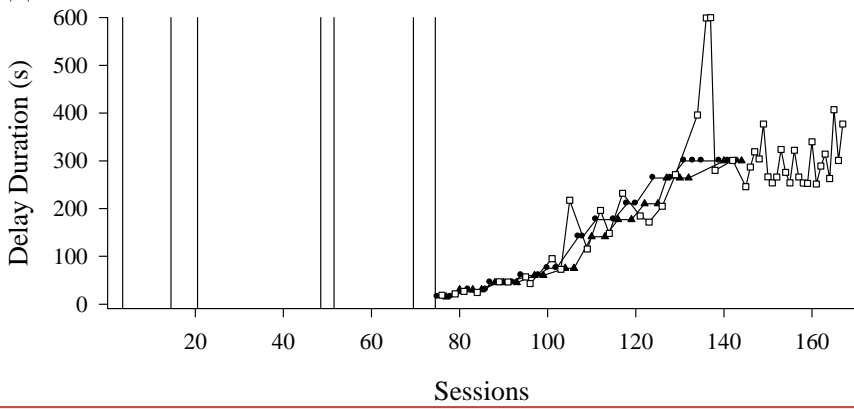
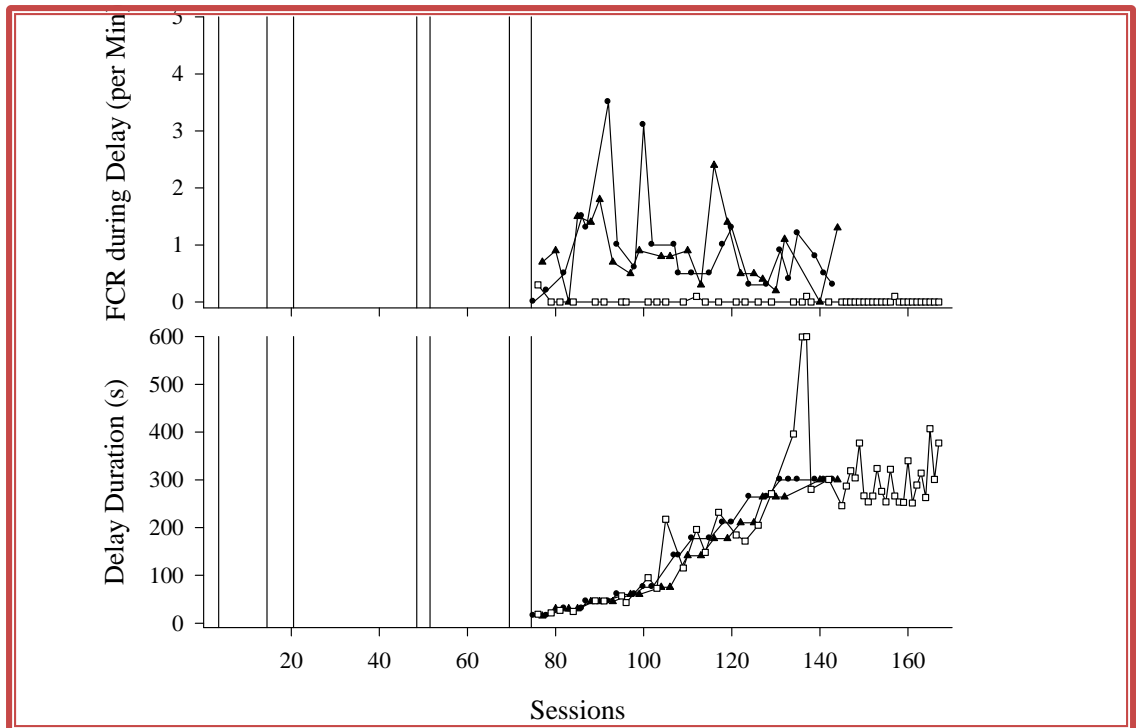
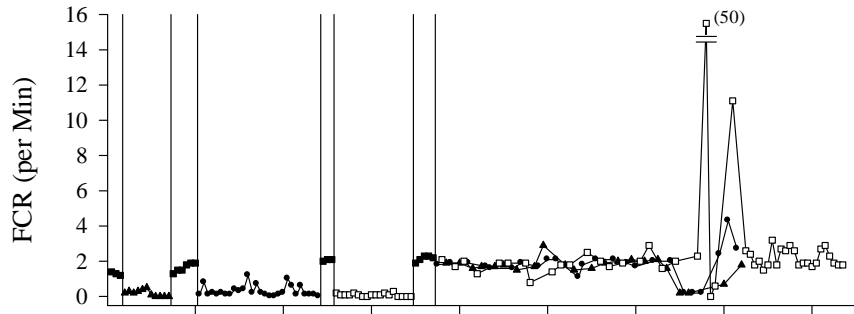
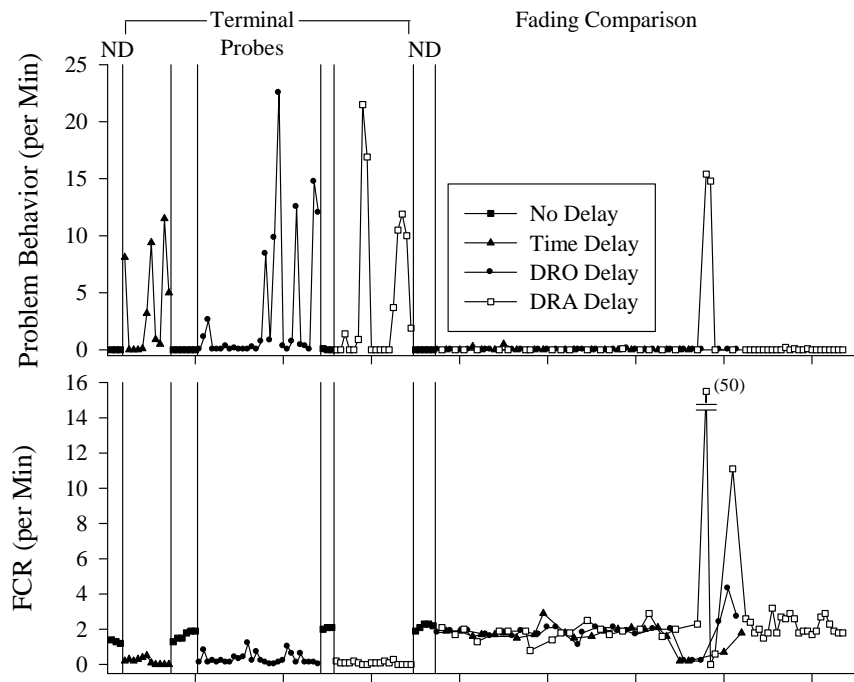
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7	177	177	
8	210	210	
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10	300	300	

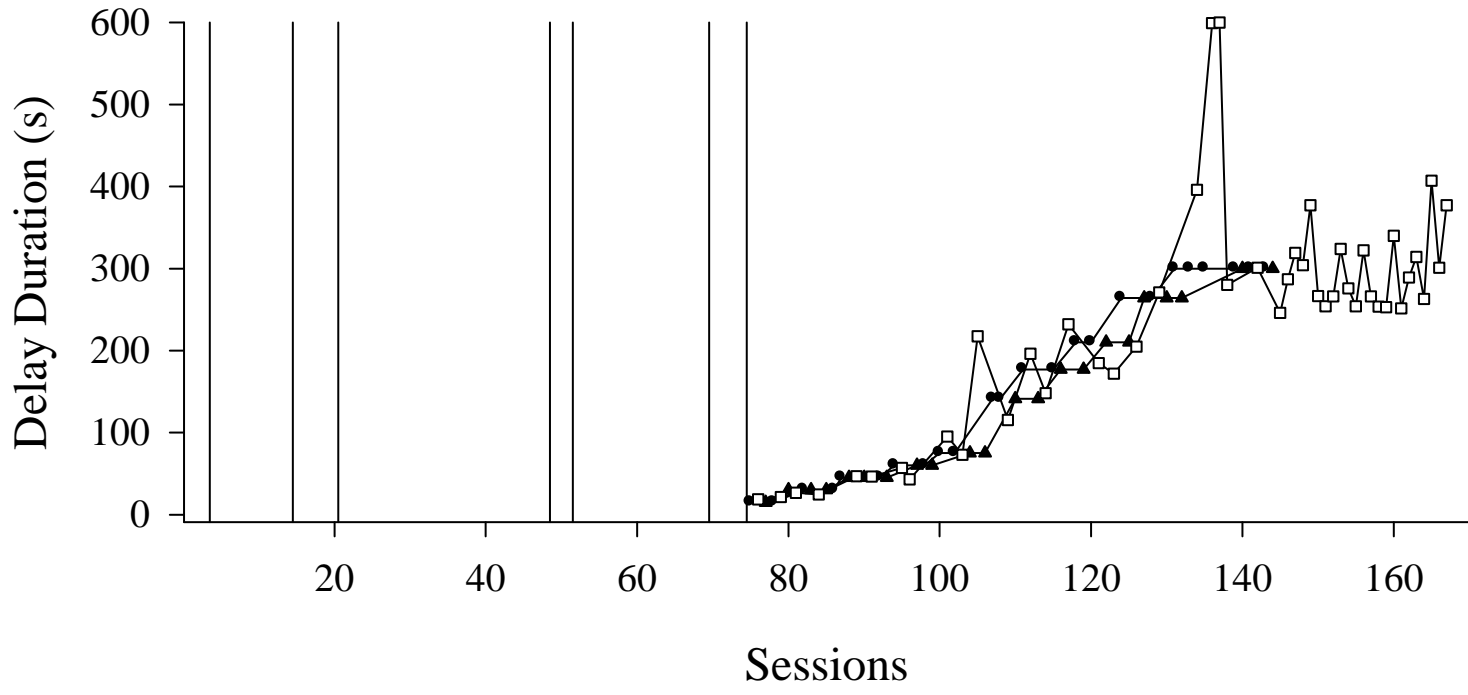
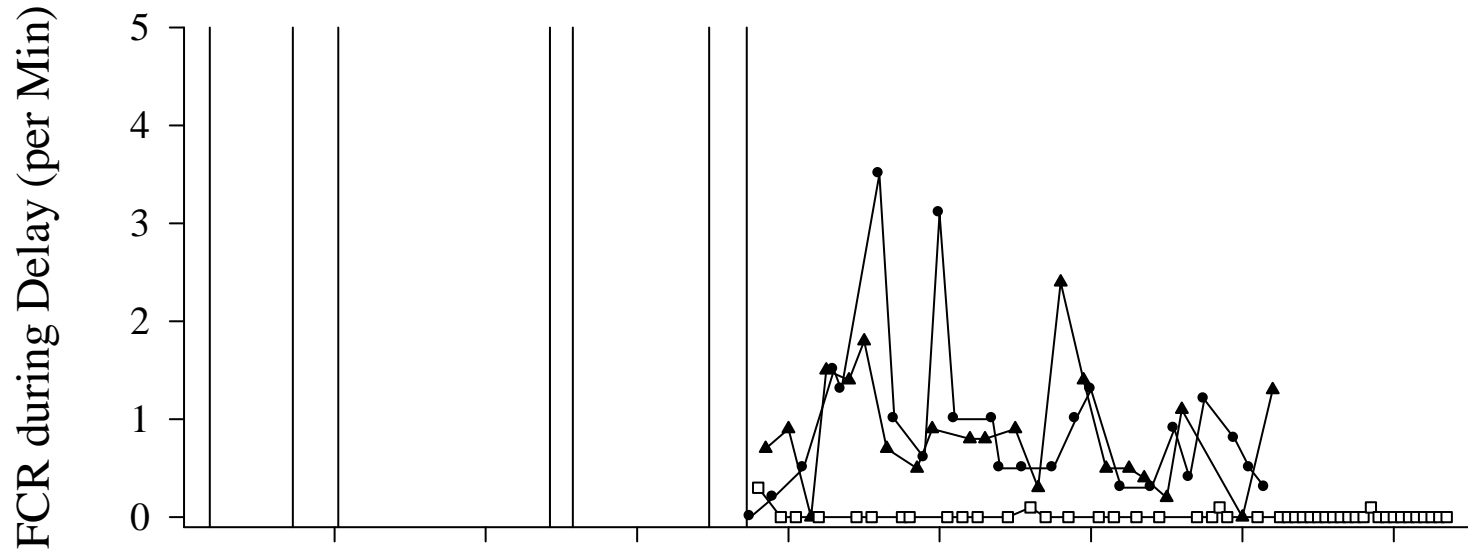
Fading Step	Time Delay	DRO	DRA
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2	30	30	2
3	45	45	3
4	60	60	4
5	75	75	5
6	141	141	8
7	177	177	10
8	210	210	12
9	264	264	15
10	300	300	17

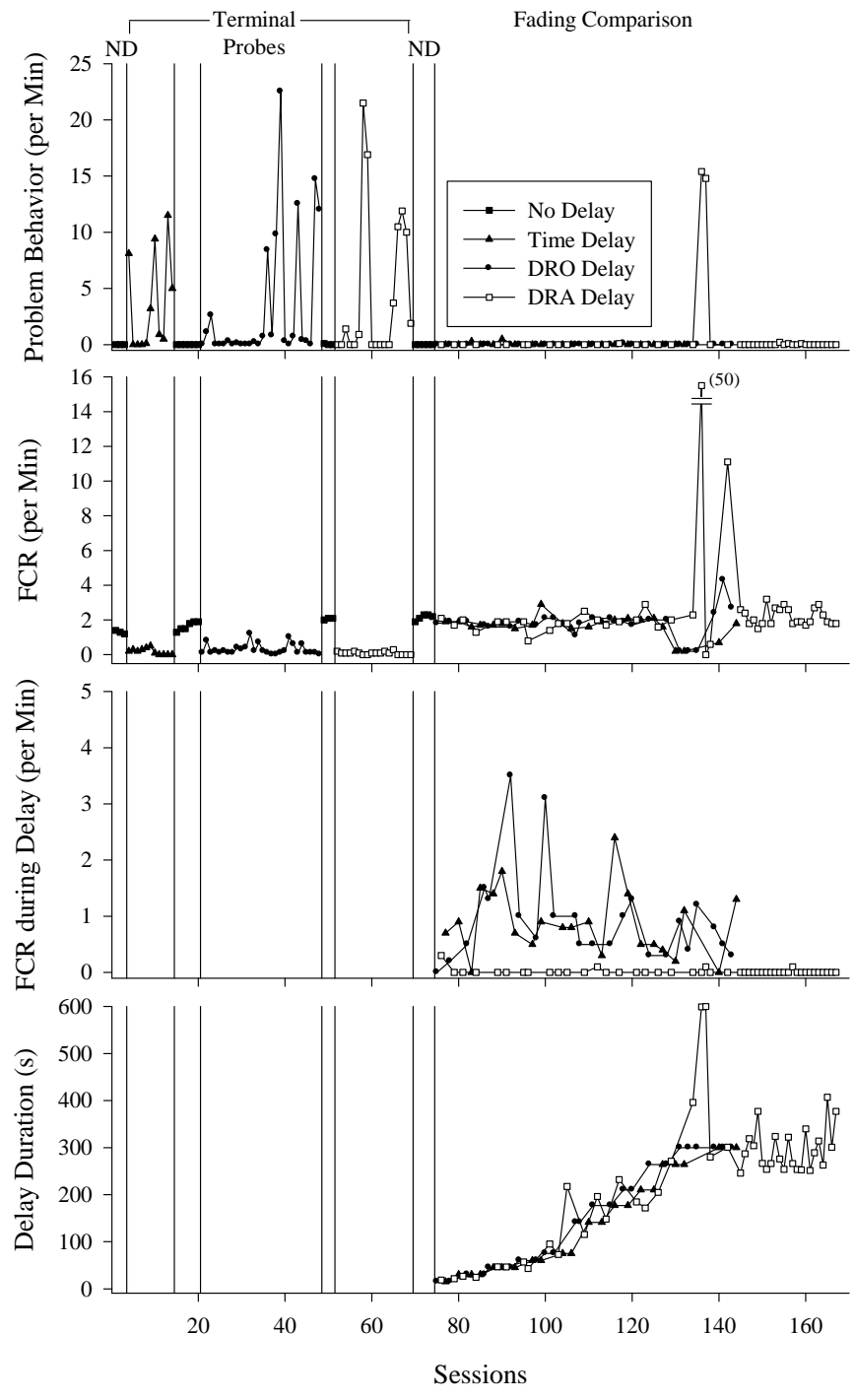


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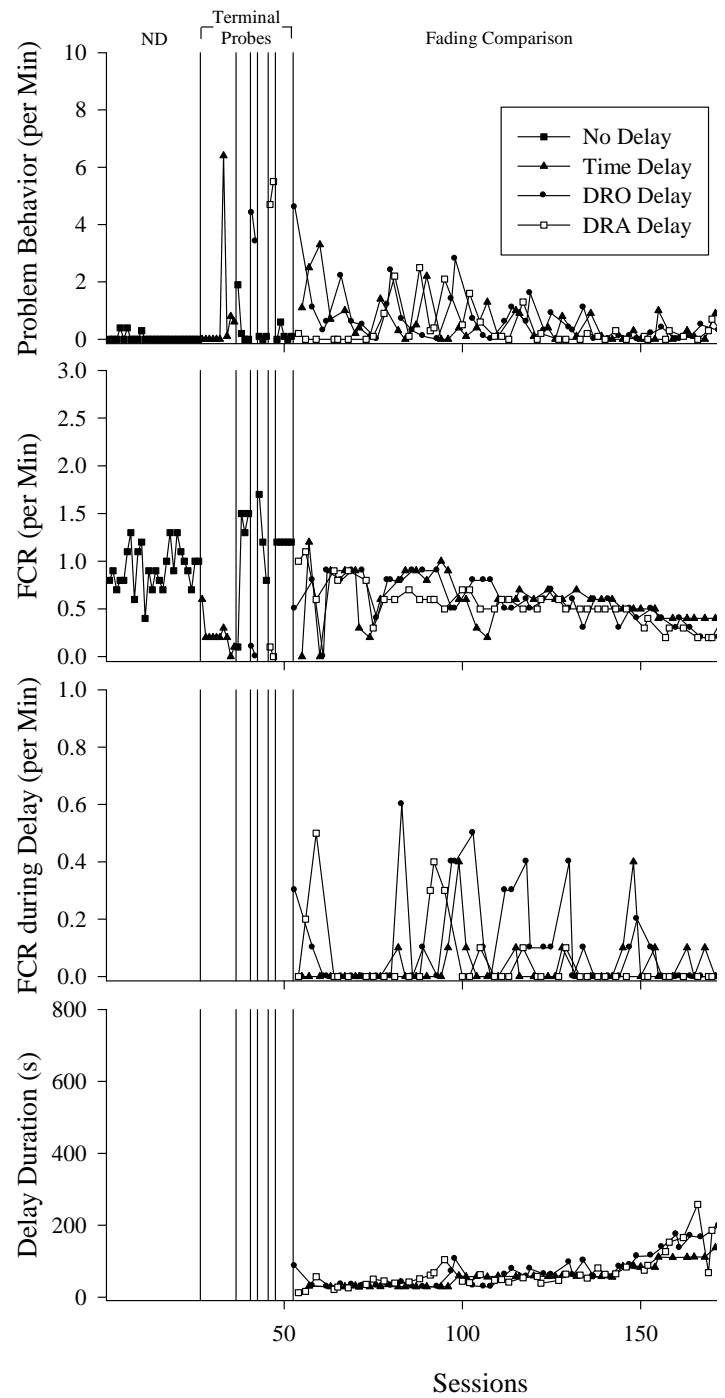
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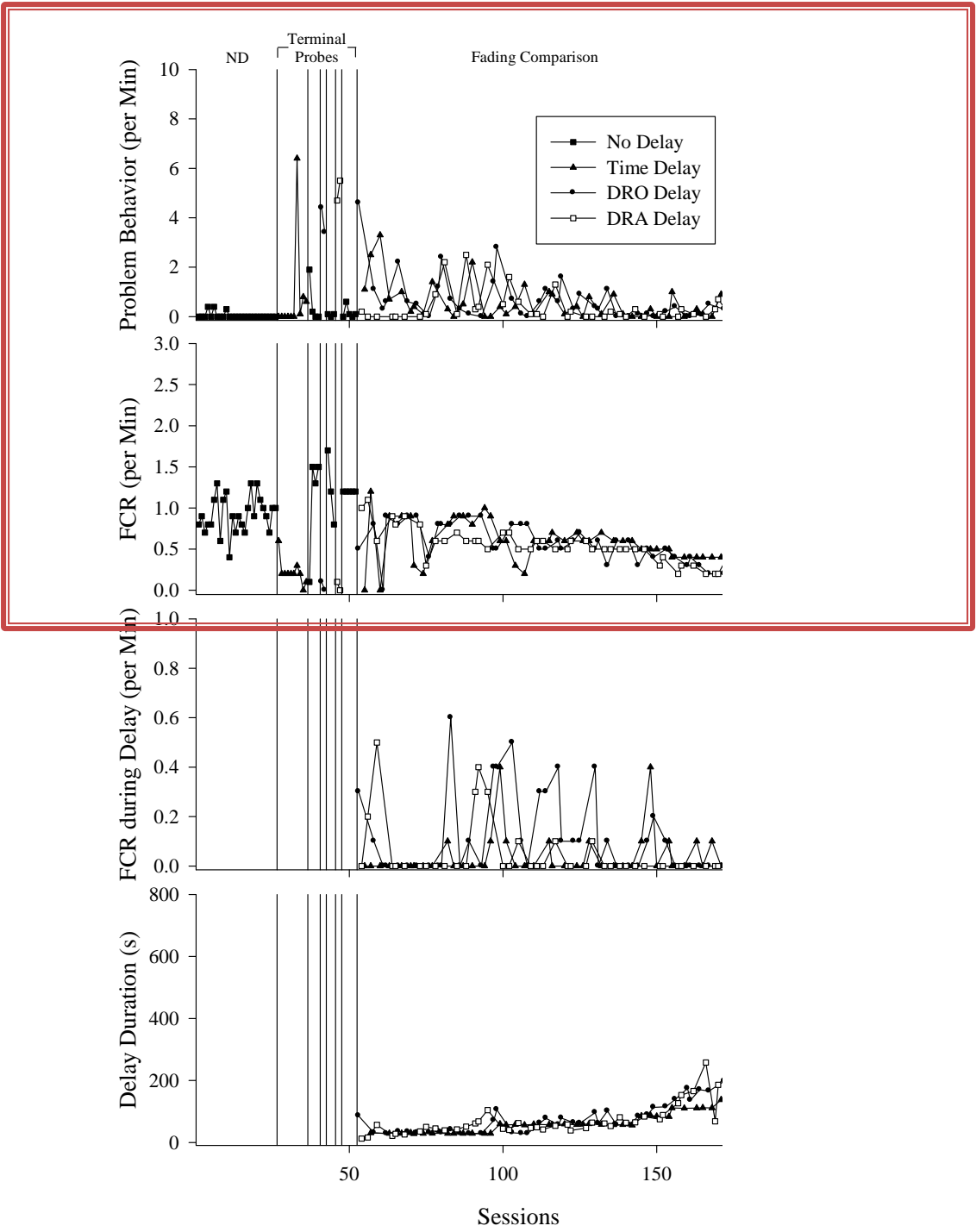


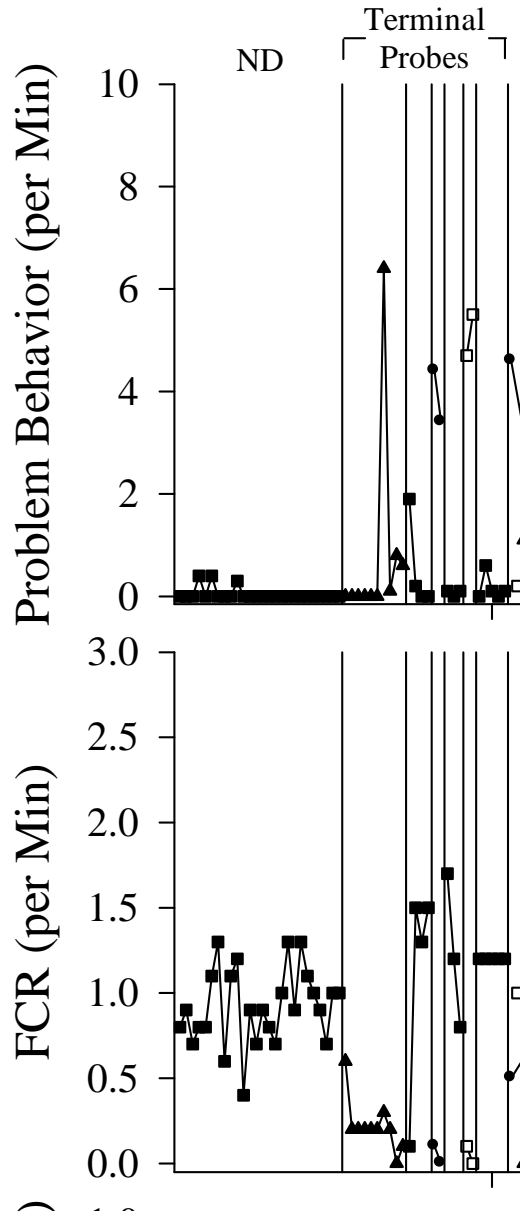




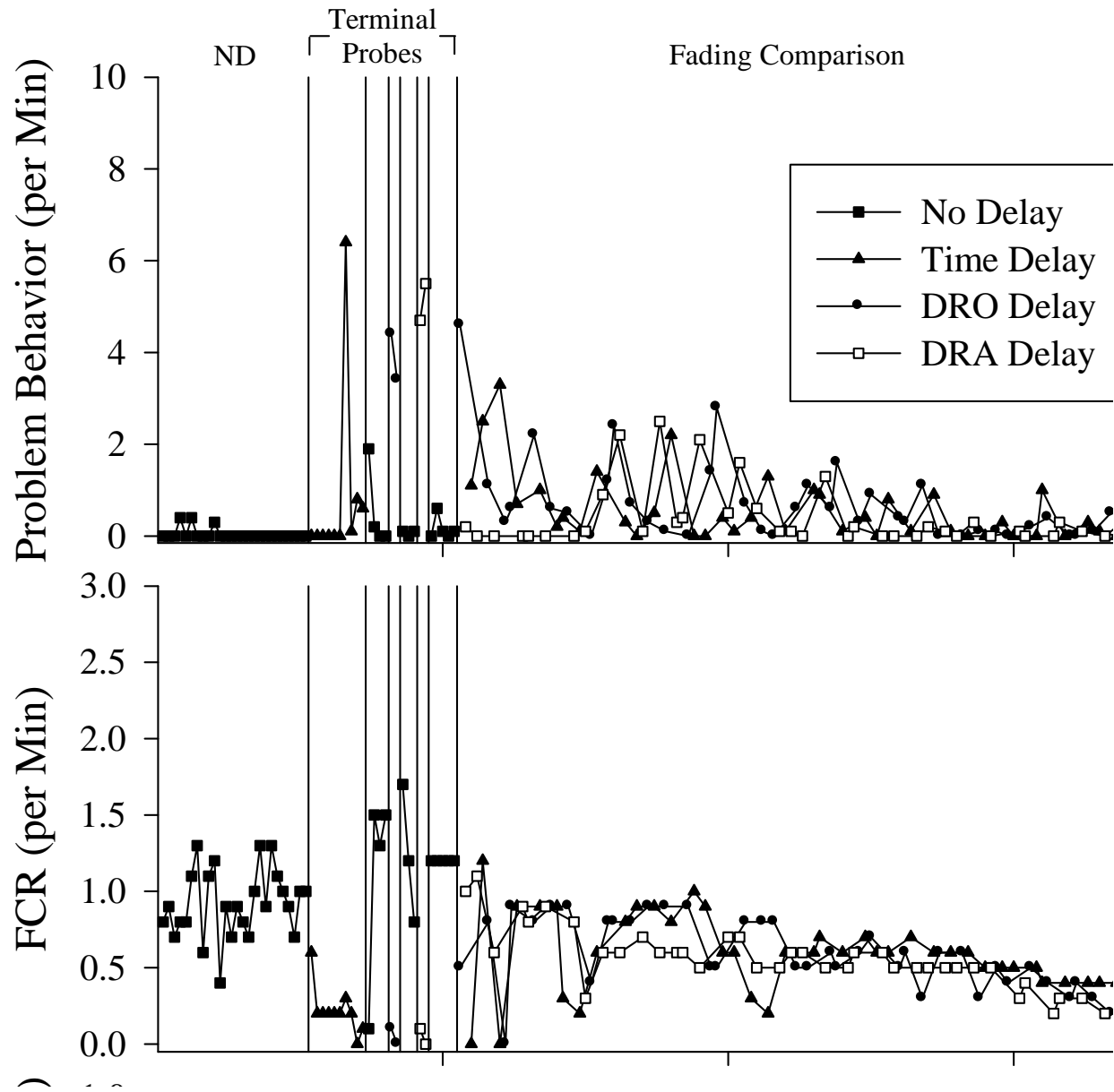
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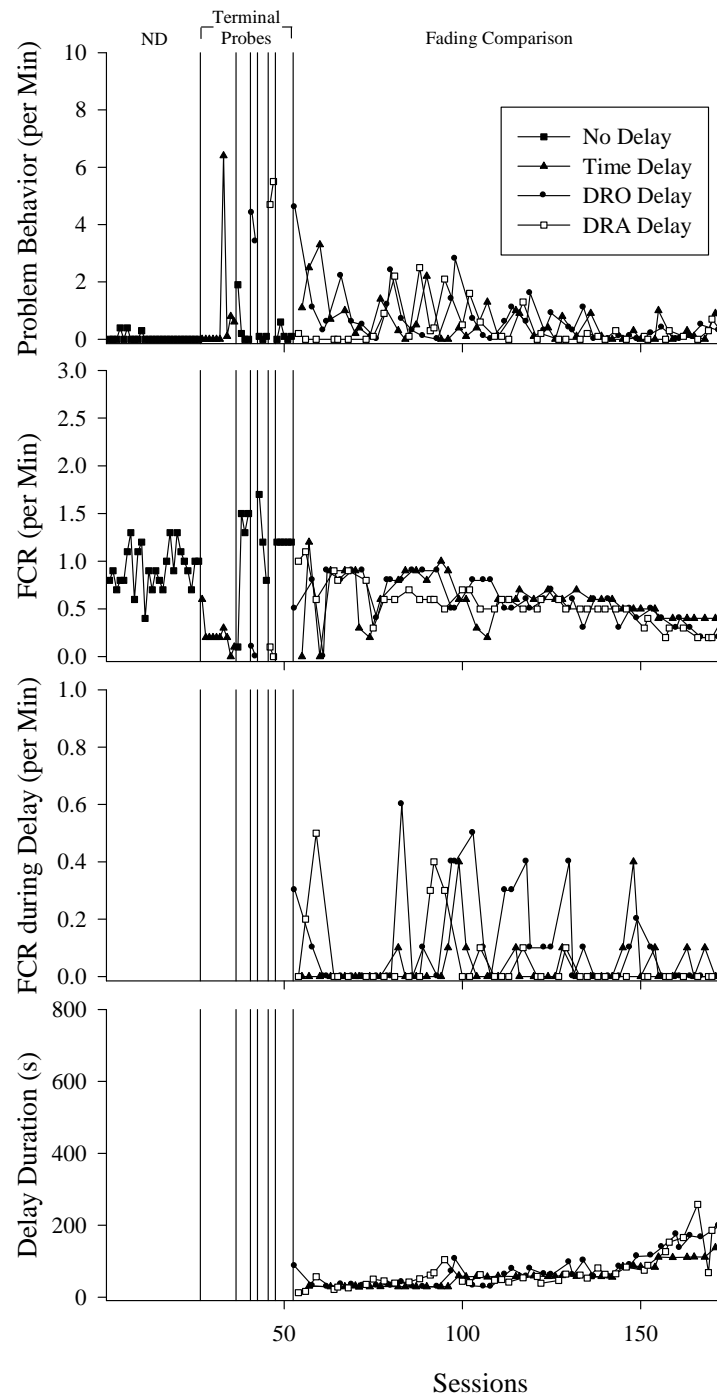


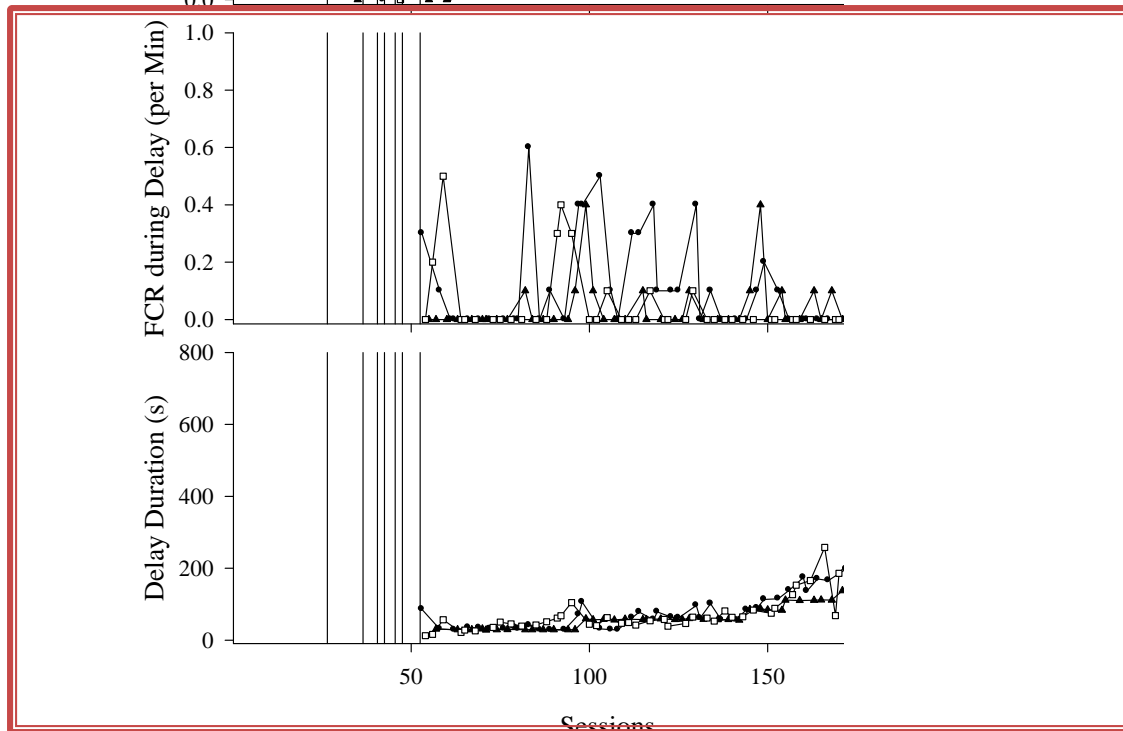
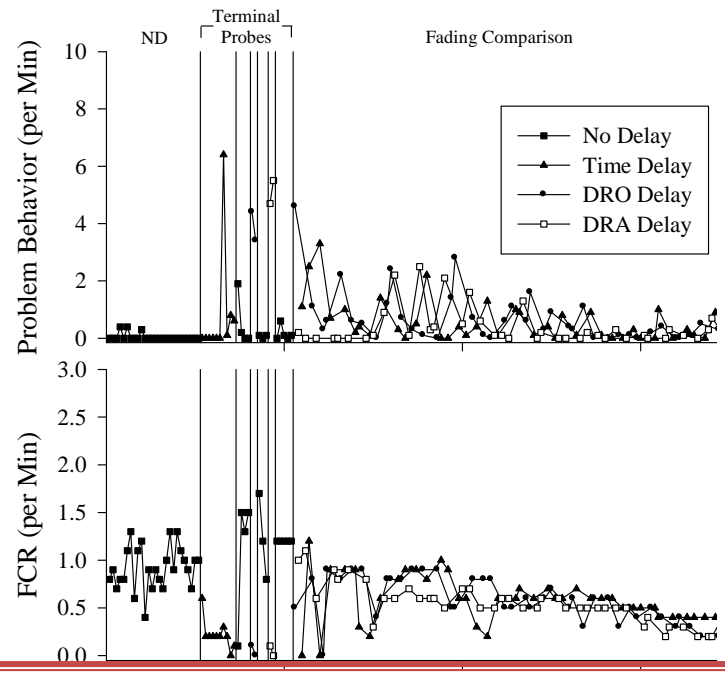


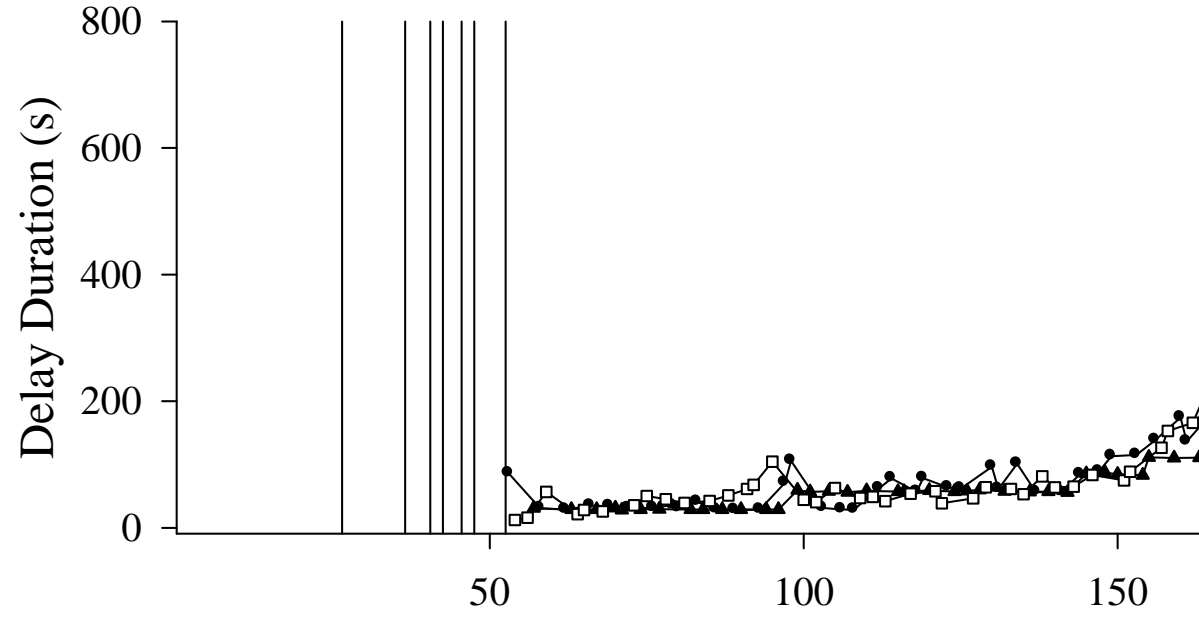
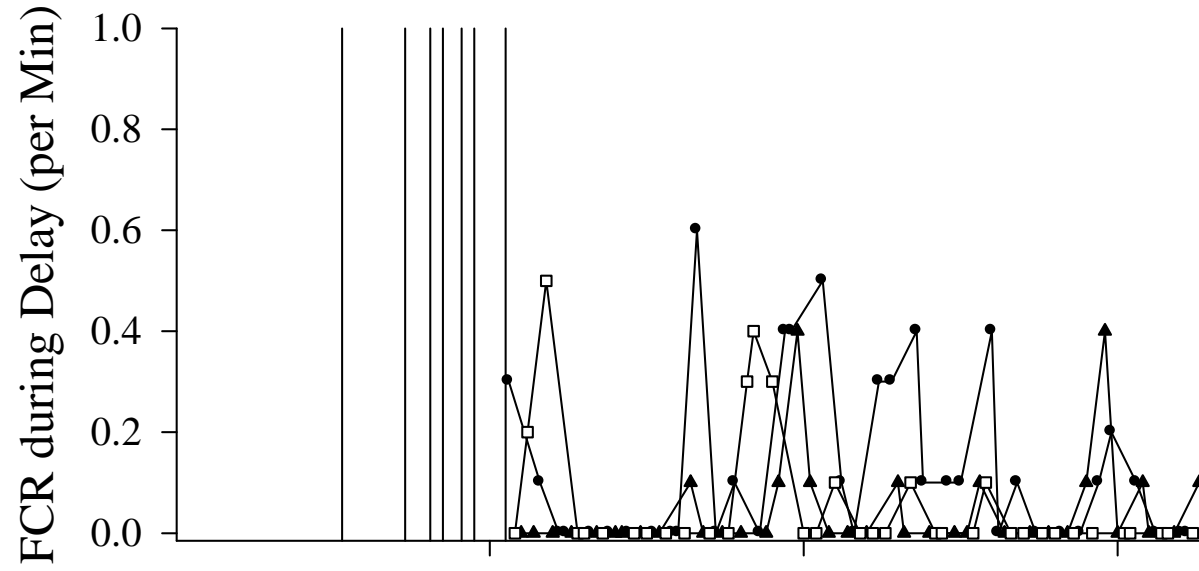


Fading Step	Time Delay	DRO	DRA
1	27	27	1
2	55	55	2
3	82	82	3
4	109	109	4
5	136	136	5
6	163	163	6
7	190	190	7
8	218	218	8
9	245	245	9
10	300	300	10

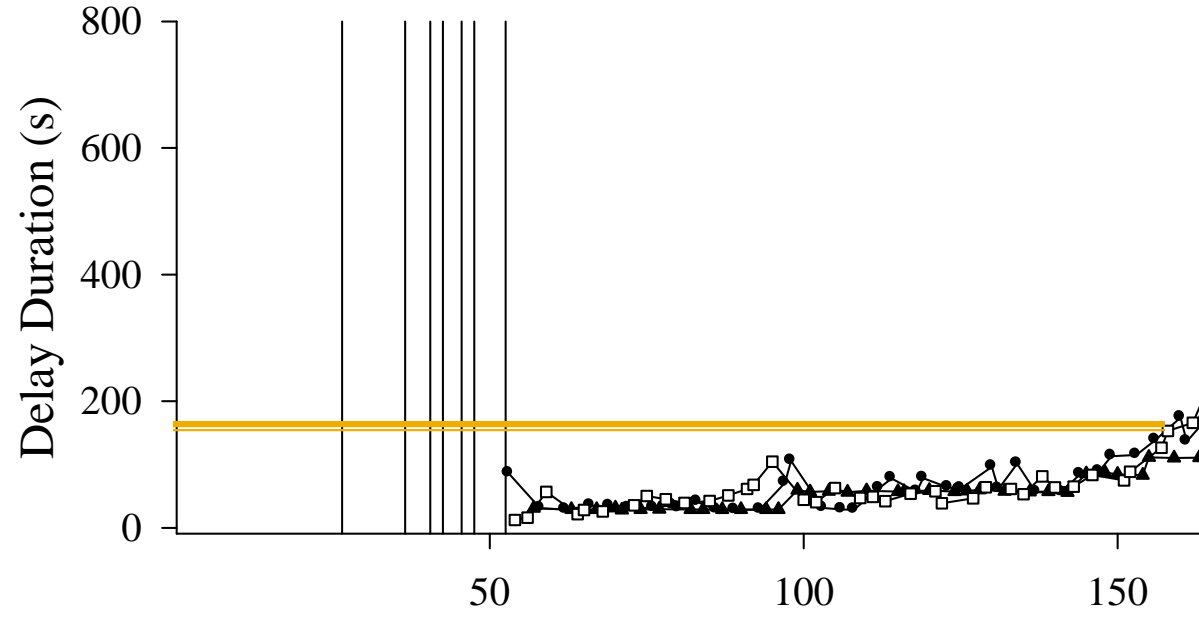
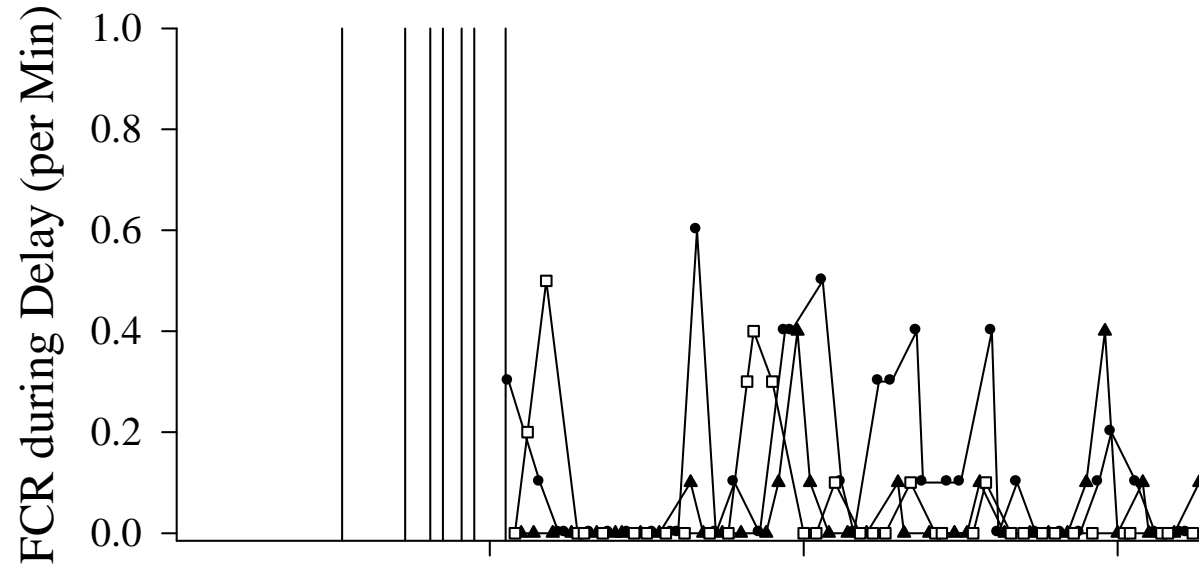






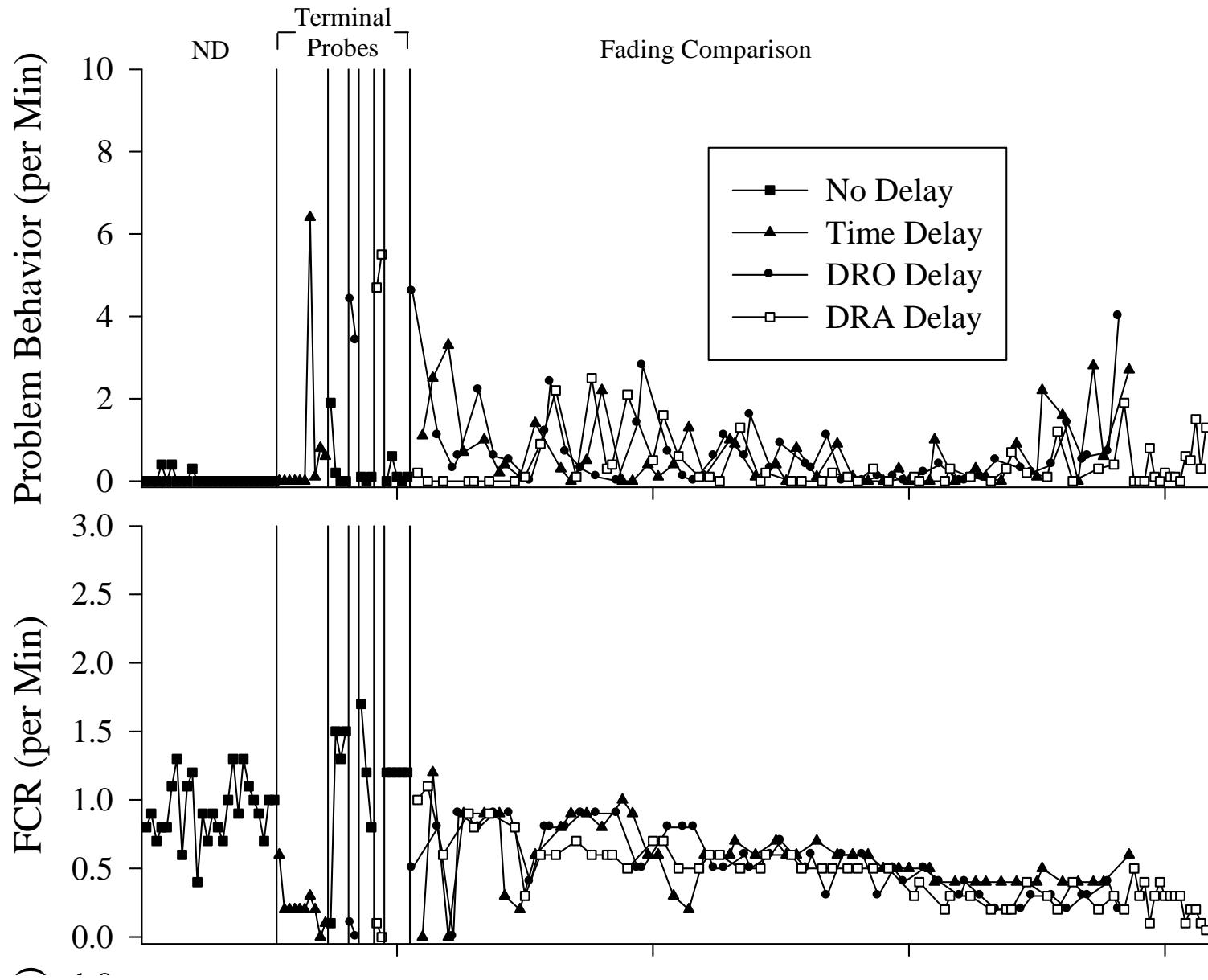


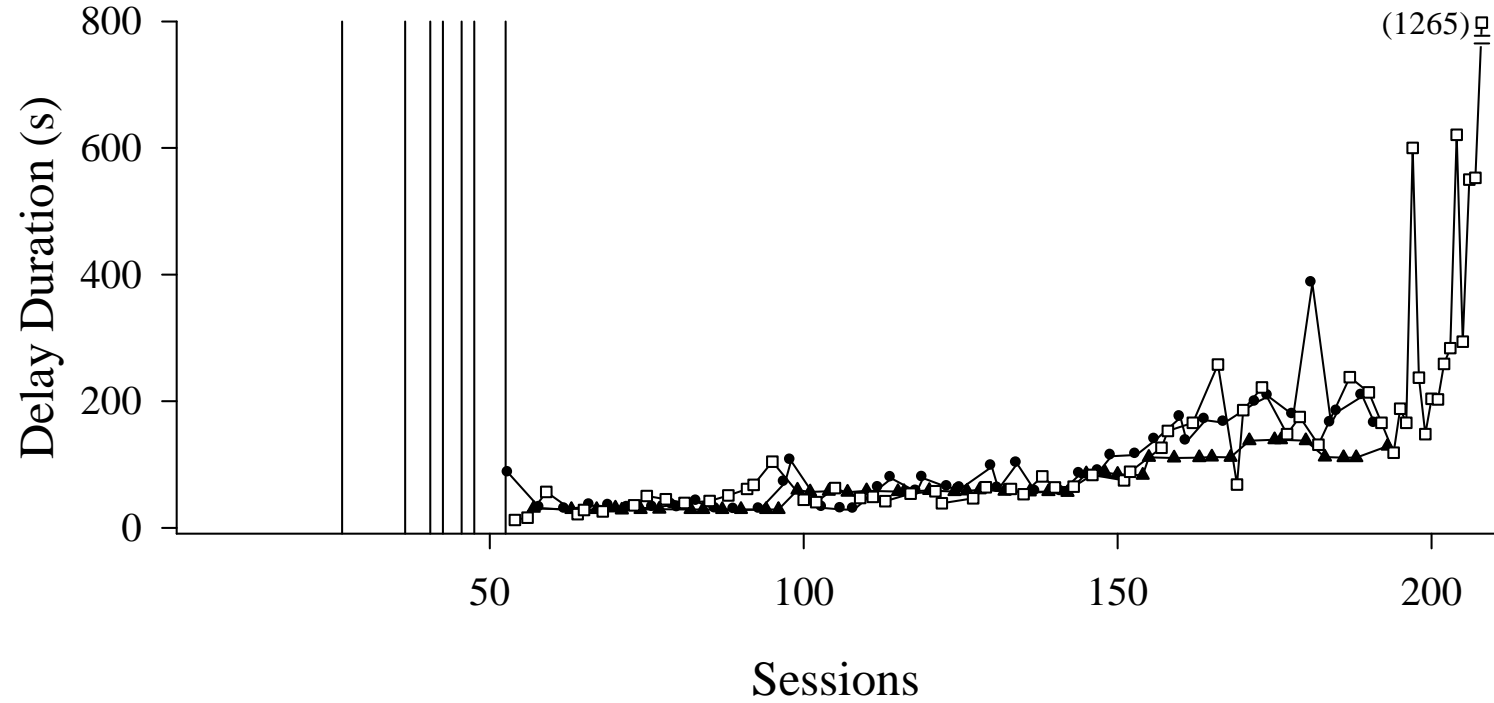
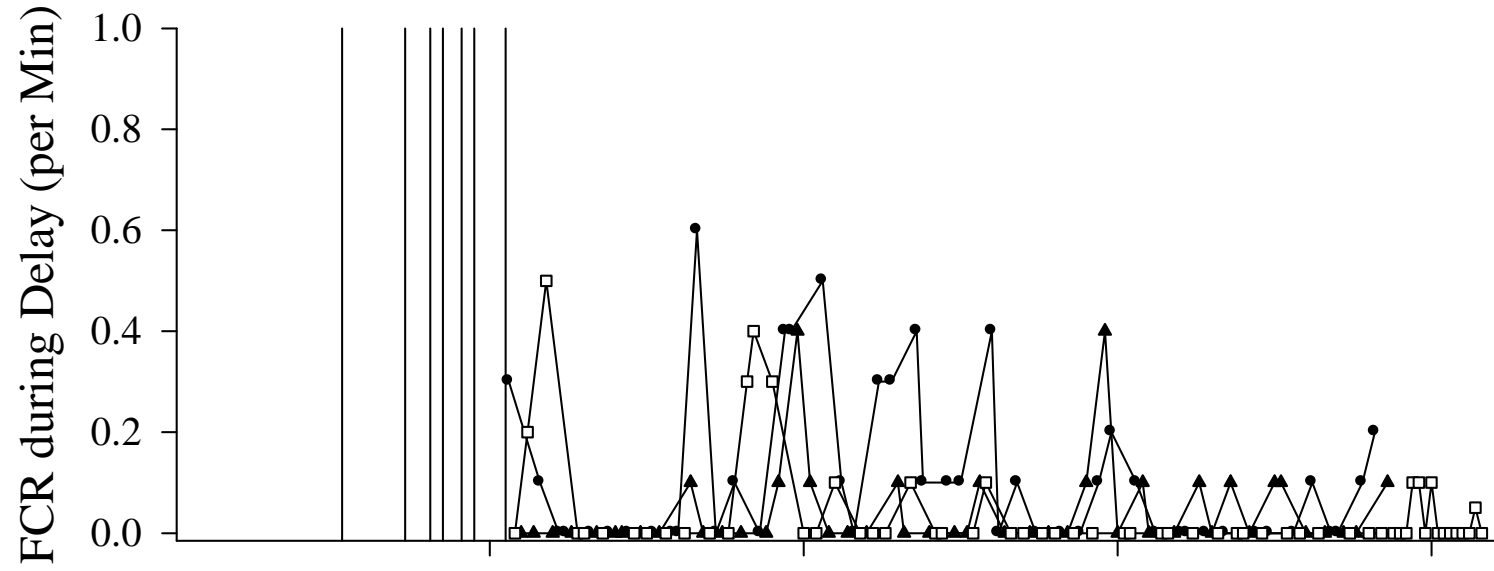
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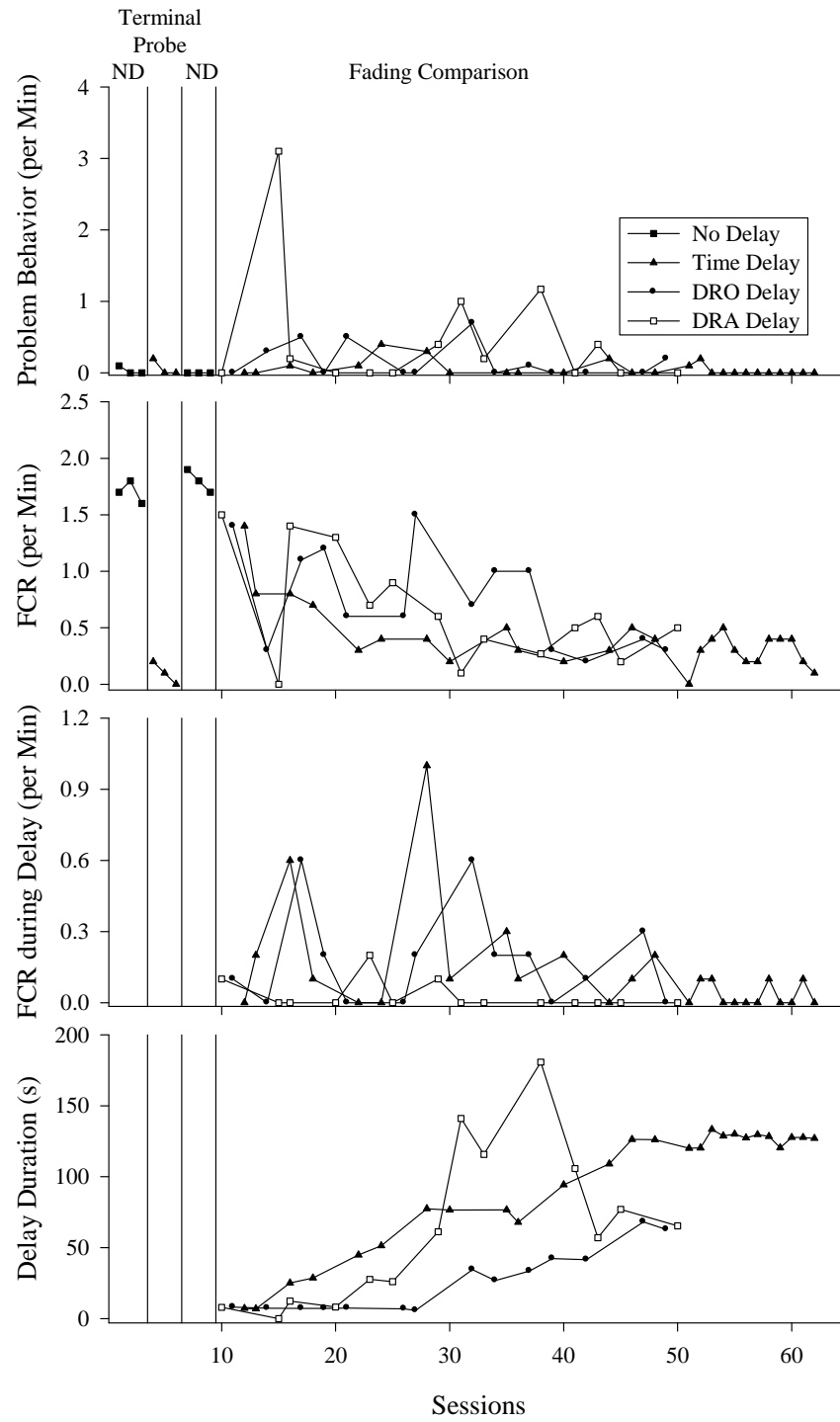


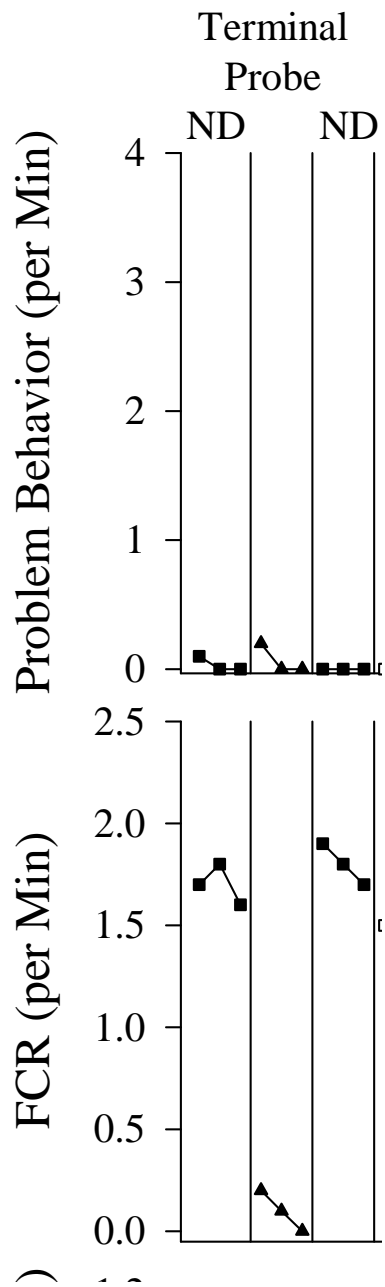
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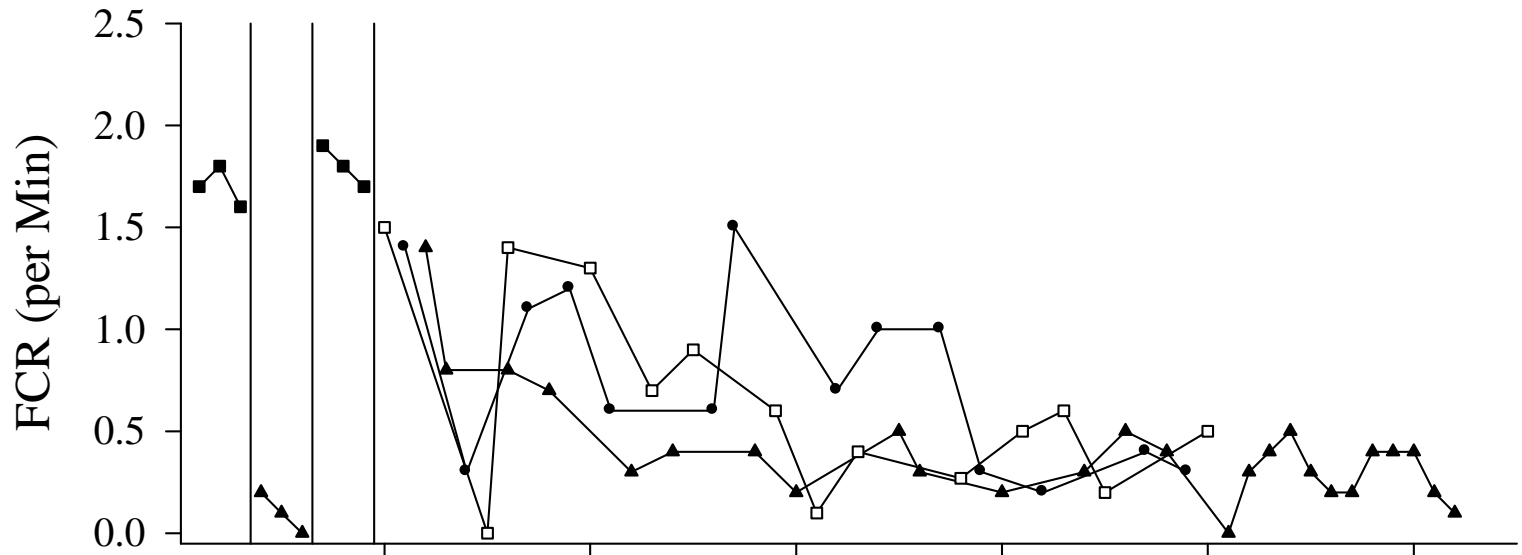
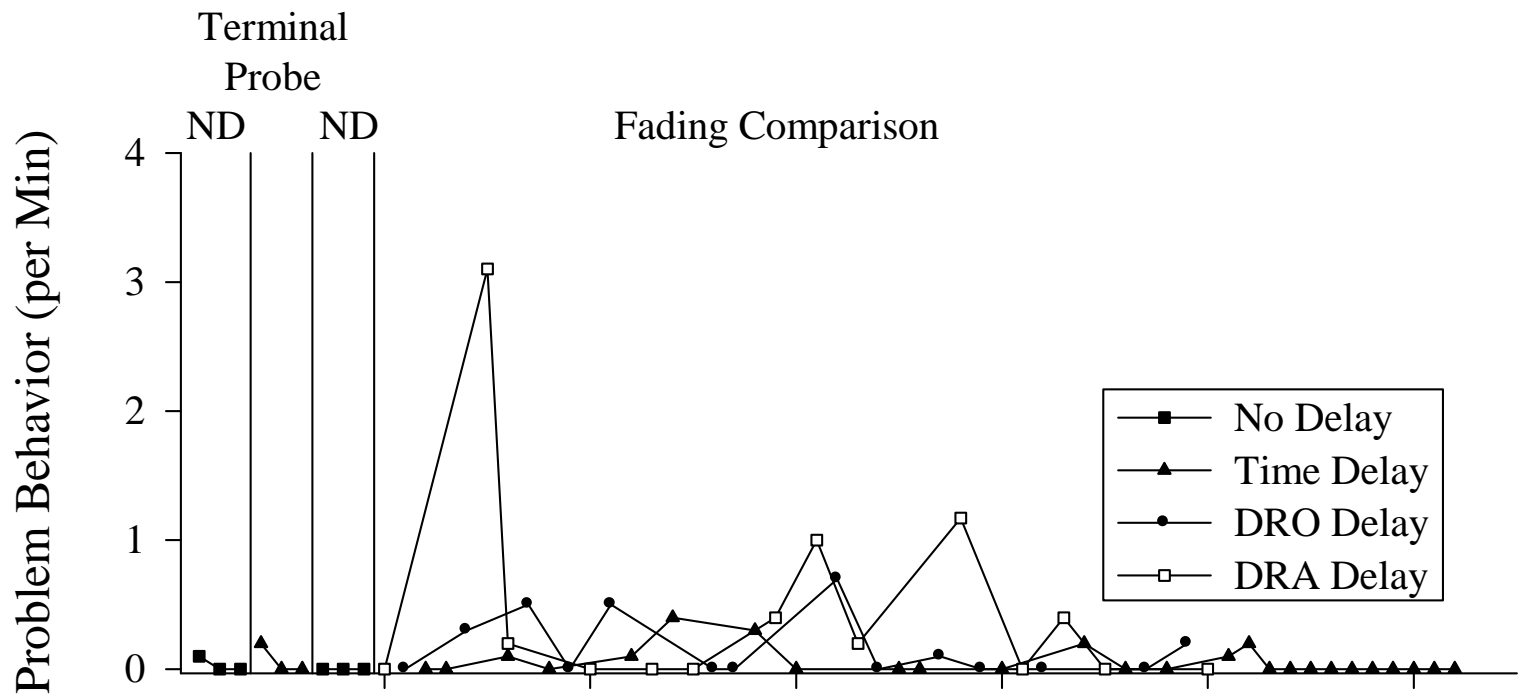


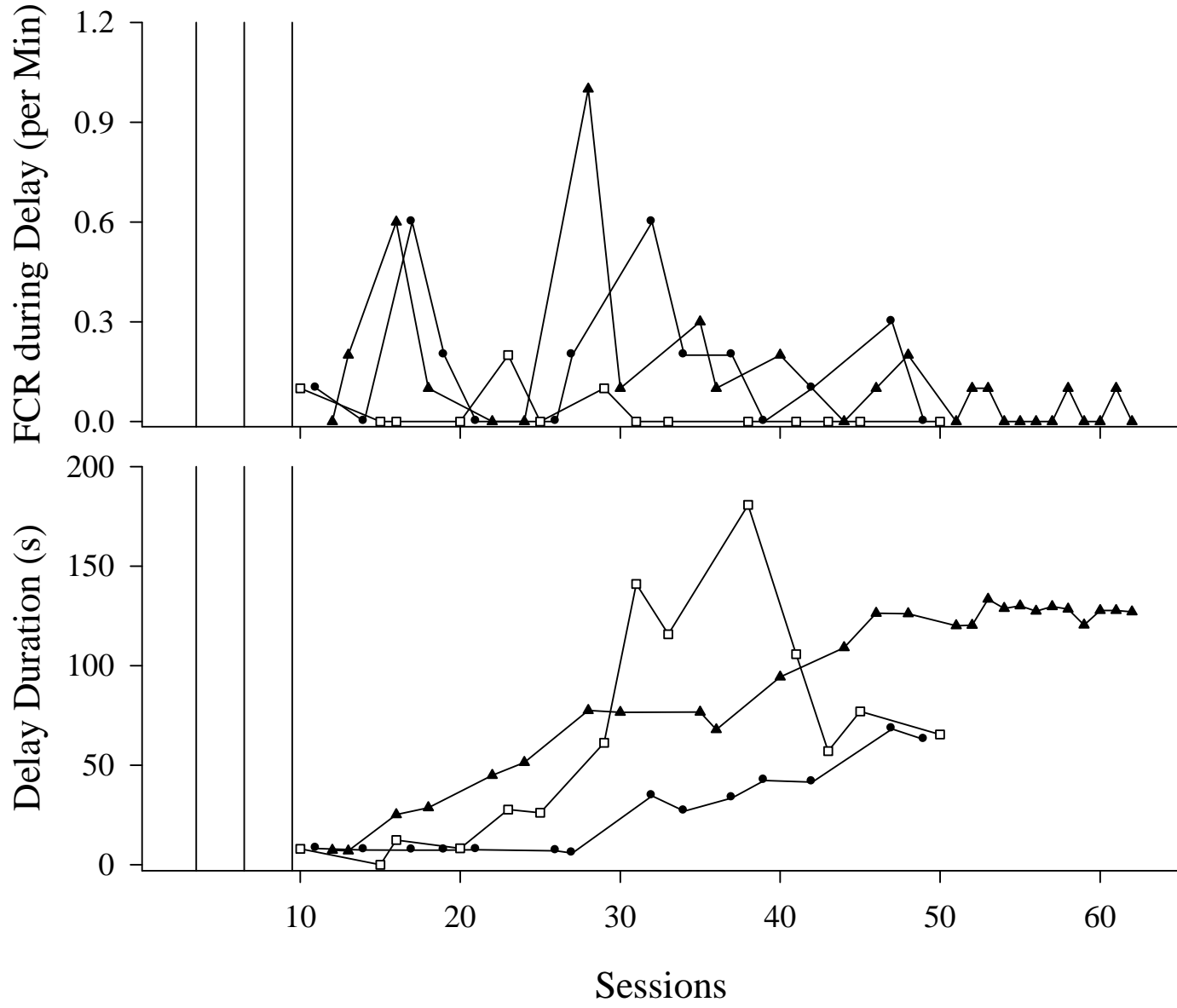






Fading Step	Time Delay	DRO	DRA
1	5	5	1
2	25	25	5
3	50	50	10
4	75	75	15
5	100	100	20
6	125	125	25





Fading Step	Time Delay	DRO	DRA
1	5	5	1
2	25	25	5
3	50	50	10
4	75	75	15
5	100	100	20
6	125	125	25

Summary

- Delay introduction (terminal probes) resulted in reduced treatment efficacy
 - Loss of FCR
 - Resumption of PB (2/3 cases)
- Arranging contingencies did not prevent this
 - Delay fading was a necessary element
- With fading, each procedure was effective at:
 - Introducing a delay to reinforcement
 - Maintaining low levels of problem behavior
 - Maintaining appropriate levels of mands

Discussion

- DRO-based delay
 - Conferred no benefit in any case
- DRA-based delay
 - Lower levels of problem behavior
 - Less manding during delay periods
- Presenting demands can evoke problem behavior
 - Future direction: Assess task preference

What about Sr-

- Differential Reinforcement of Compliance (DRC)
 - Common intervention for escape-maintained problem behavior
 - (Lalli et al., 1999; Piazza, Moes, & Fisher, 1996; Piazza et al., 1997; Payne & Dozier, 2013)
 - Involves arranging positive and/or negative reinforcers to follow compliance
 - Break with leisure items
- Initiated with brief work periods followed by reinforcer access
 - Piazza et al. (1997)
 - Compliance with 1 demand resulted in 30-s access to break with positive reinforcers

Introduction

- Rationale for brief work periods in DRC
 - Limits participant exposure to EO for escape
 - Increases likelihood of compliance contacting reinforcement
 - Creates frequent opportunities for compliance to contact reinforcement

Introduction

- DeLeon et al. (2014)
 - Distributed vs. Accumulated

	Work	Reinforcer Access
Distributed	1 task	30 s
Accumulated	10 tasks	300 s

- Similar results from Bukala et al. (2015)

Introduction

- DeLeon et al. (2014)
 - Did not include individuals with escape-maintained problem behavior
 - Accumulated reinforcement arrangements require
 - Increased exposure to aversive demands
 - Delayed access to demand termination

Introduction

- Current Investigation
 - Compared distributed and accumulated reinforcement arrangements with two individuals with escape-maintained problem behavior

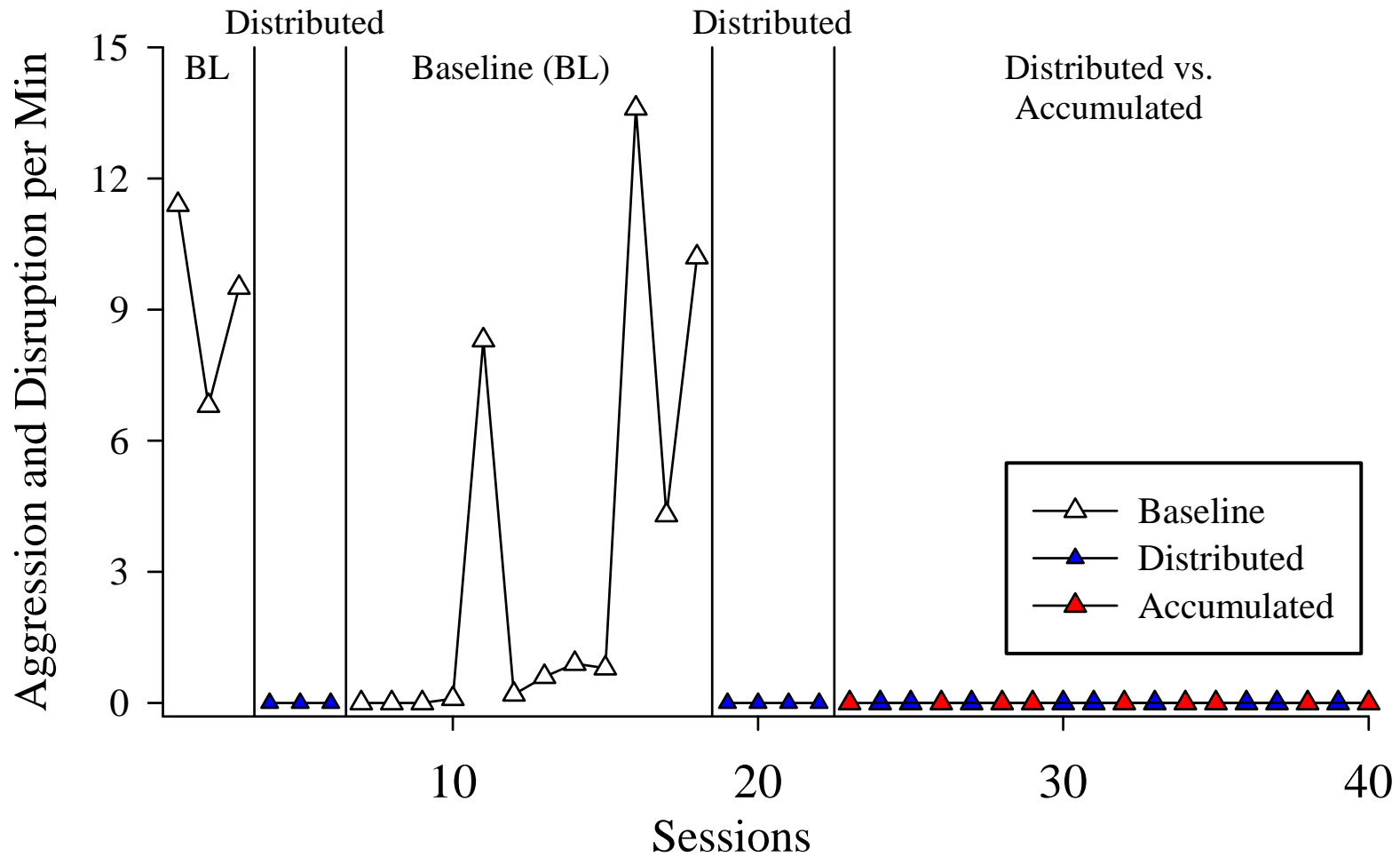
Method

- Participants
 - Logan
 - 12 years old
 - Diagnosed with autism and ADHD
 - Referred for aggression and property destruction
 - Hugh
 - 13 years old
 - Diagnosed with autism
 - Referred for aggression
- Parker
 - 11 years old
 - Diagnosed with autism
 - Referred for aggression

Logan's Evaluation

- **Baseline:**
 - Academic instructions delivered via three-step prompting
 - Problem behavior resulted in 30-s break from demands
 - Identical to the escape condition of the functional analysis
- **Distributed Reinforcement**
 - Academic instructions delivered via three-step prompting
 - Problem behavior placed on extinction
 - Compliance (FR-1 schedule) resulted in 0:30 break with preferred tangibles (iPad)
- **Accumulated Reinforcement**
 - Compliance (FR-15 schedule) resulted in 7:30 break with iPad

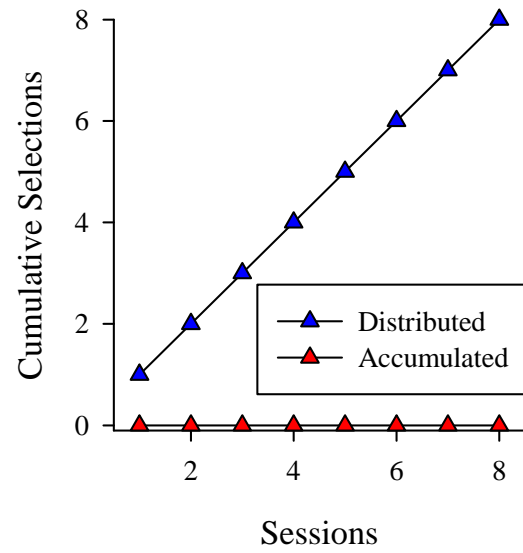
Results



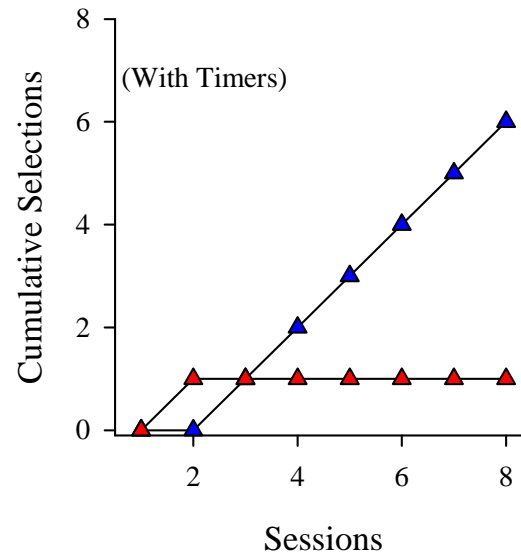
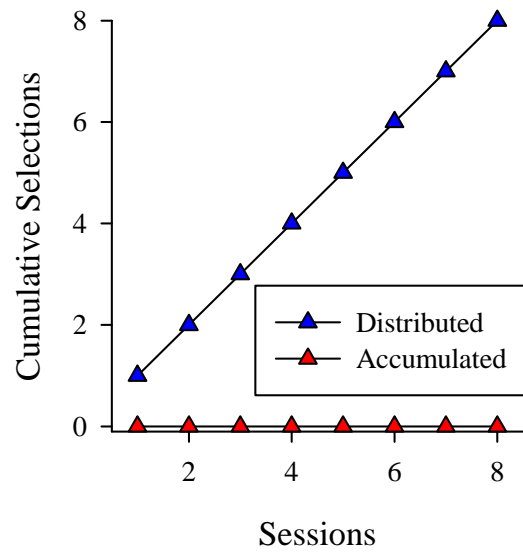
Logan's Preference Evaluation

- We arranged a concurrent-chains preference assessment
 - Presented Logan with Blue and Red worksheet
 - Blue selections = Distributed Reinforcement
 - Red selections = Accumulated Reinforcement

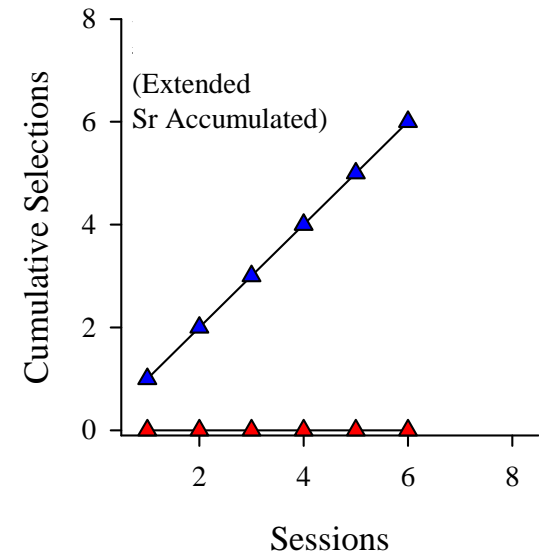
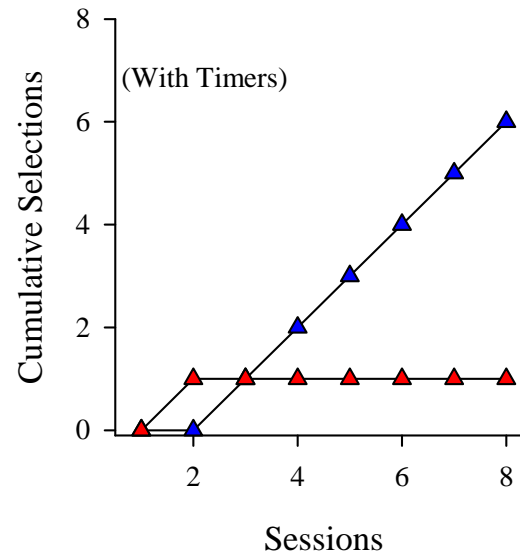
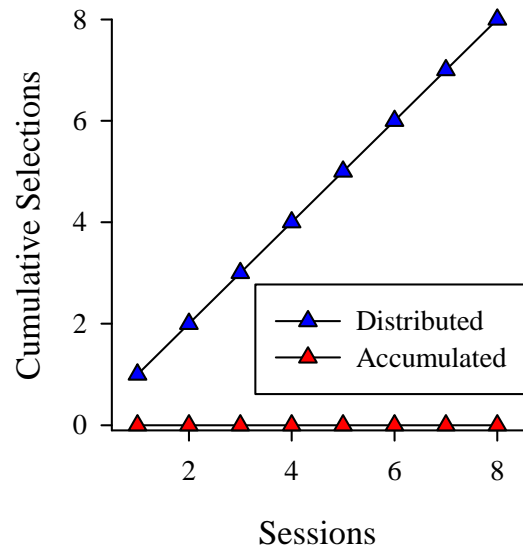
Results - Logan



Results



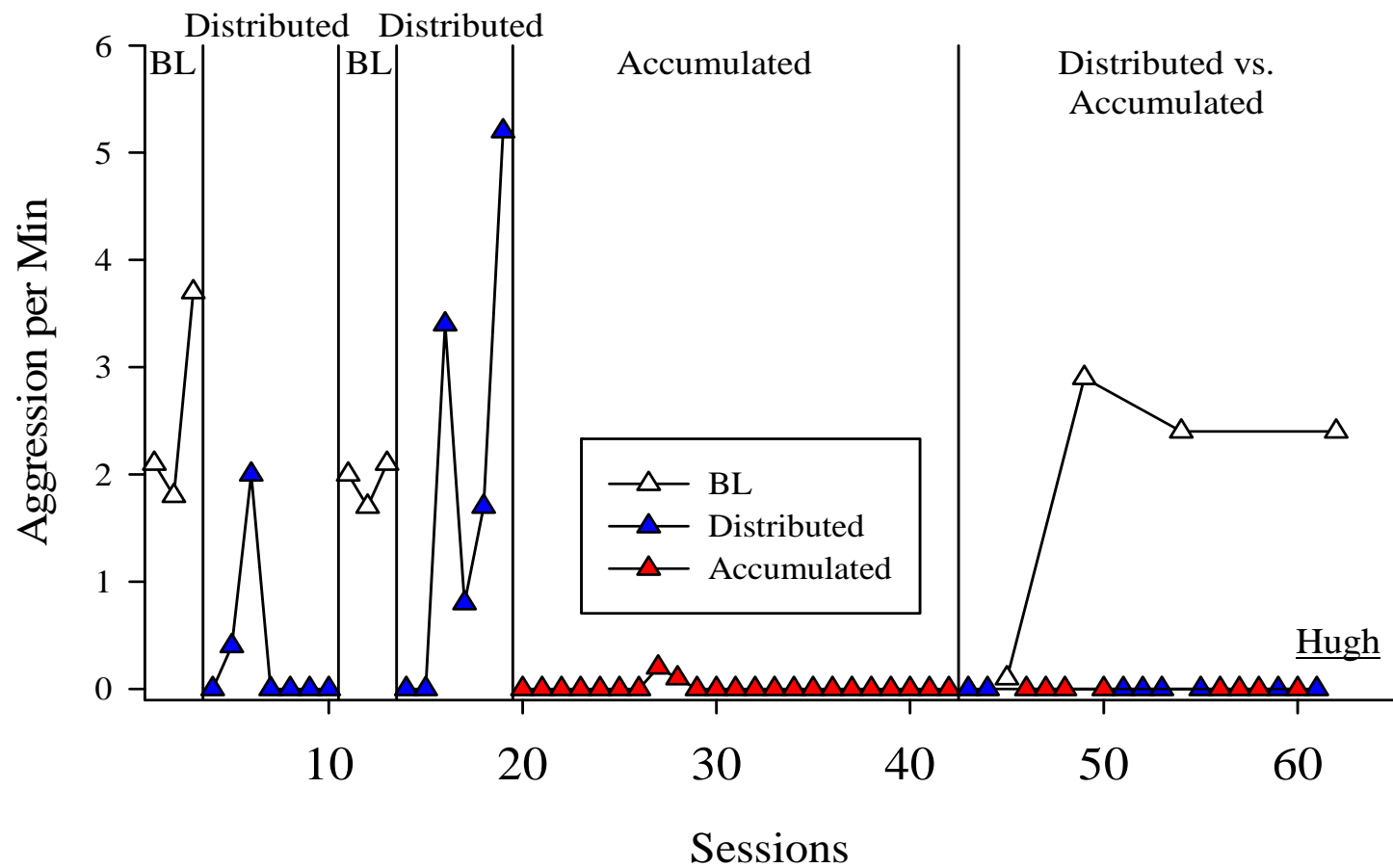
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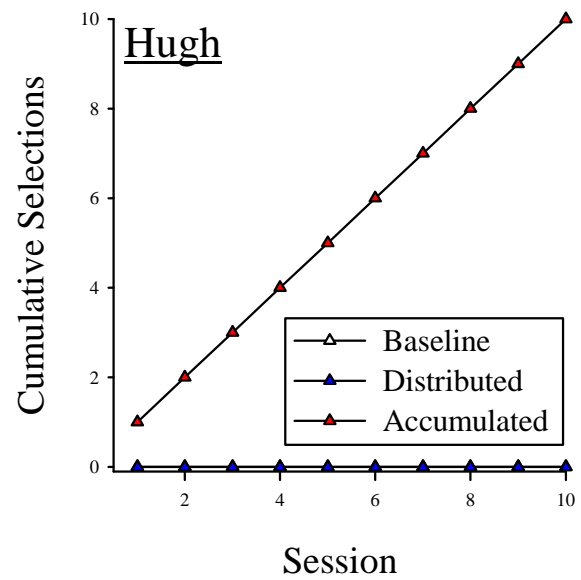
Hugh's Evaluation

- Baseline:
 - Academic instructions delivered via three-step prompting
 - Problem behavior resulted in 30-s break from demands
 - Identical to the escape condition of the functional analysis
- Distributed Reinforcement
 - Academic instructions delivered via three-step prompting
 - Problem behavior placed on extinction
 - Compliance (FR-1 schedule) resulted in 0:30 break with preferred tangibles (Xbox)
- Accumulated Reinforcement
 - Compliance (FR-15 schedule) resulted in 7:30 break with Xbox

Results



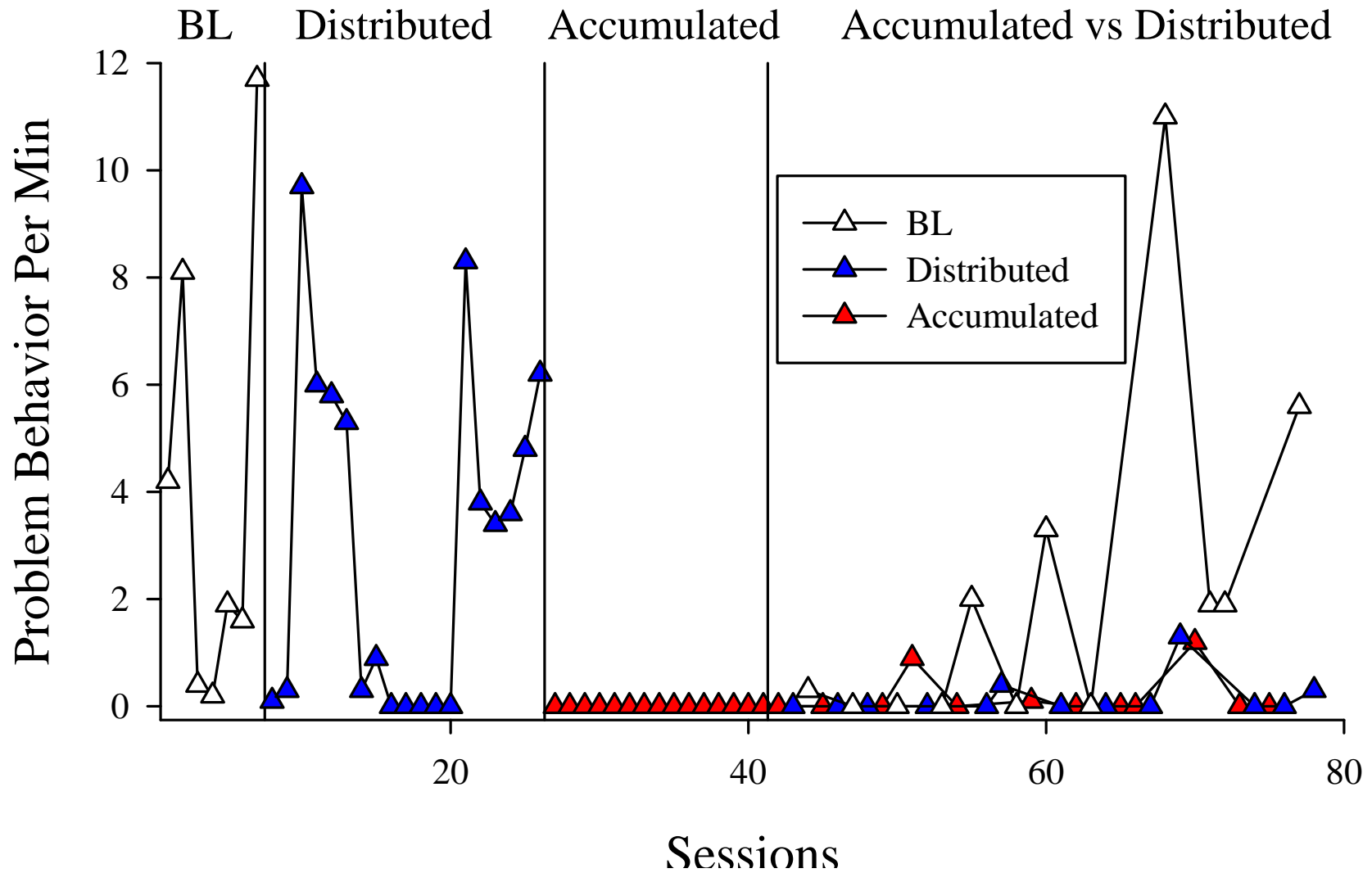
Results



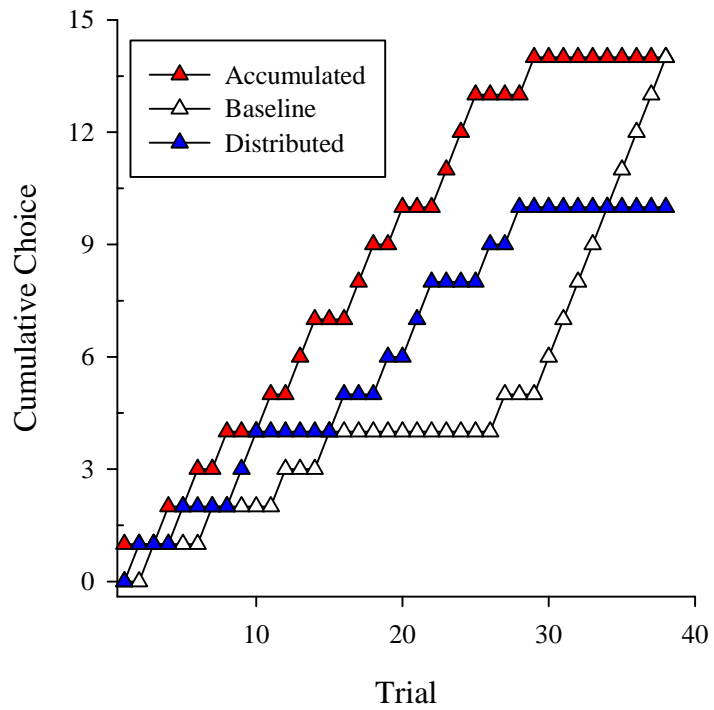
Parker's Evaluation

- **Baseline:**
 - Academic instructions delivered via three-step prompting
 - Problem behavior resulted in 30-s break from demands
 - Identical to the escape condition of the functional analysis
- **Distributed Reinforcement**
 - Academic instructions delivered via three-step prompting
 - Problem behavior placed on extinction
 - Compliance (FR-1 schedule) resulted in 0:30 break with a tablet and therapist attention
- **Accumulated Reinforcement**
 - Compliance (FR-15 schedule) resulted in 7:30 break with a tablet and therapist attention

Results



Results



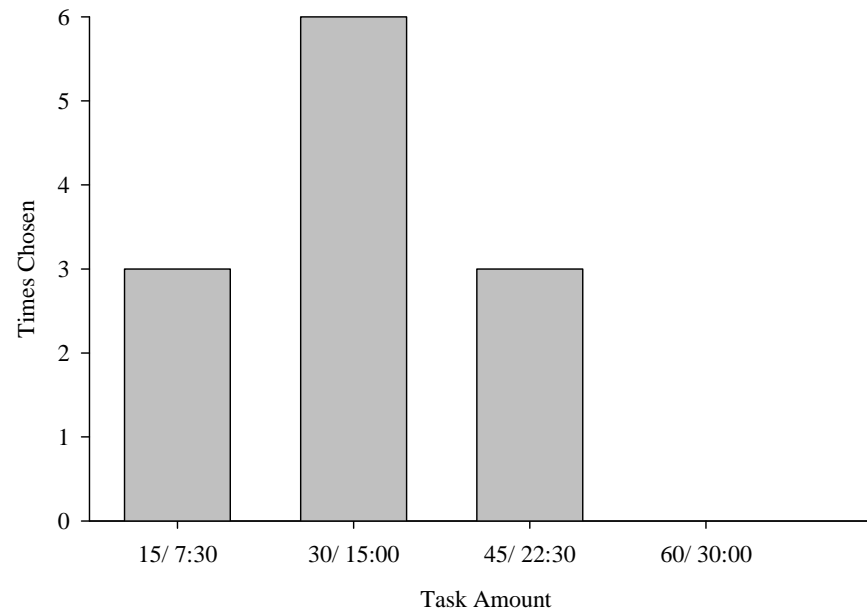
Discussion

- We compared distributed and accumulated reinforcement arrangements
 - With 3 children with escape-maintained problem behavior
- Both arrangements effectively treated problem behavior
 - Accumulated was more consistently effective than distributed for Hugh and Parker

Discussion

- Preference for arrangements was idiosyncratic
 - One child preferred distributed
 - One child preferred accumulated
 - One child was ambivalent
- This preference is a competition between smaller sooner and larger later rewards involving both $Sr+$ and $Sr-$
 - Presumably can shift preferences by relative reinforcer values

Results



Summaries: What's new here?

- Tolerance to delayed reinforcement
 - Tolerance not waiting
 - Waiting is really hard
- Tolerance is a series of intervening behaviors
 - Provide alternative stimuli or tasks to promote engagement
 - Arrange contingencies to promote engagement if needed

Acknowledgements

- Graduate Student Contributors:
 - Melissa A. Drifke, Ph.D., BCBA-D
 - Hannah M. Meitzen, MS, BCBA
 - Madelyn A. Lillie, MS, BCBA-D
 - Caitlin J. Fulton