Developing Skill-Based Interventions Following Practical Functional Assessments of Problem Behavior

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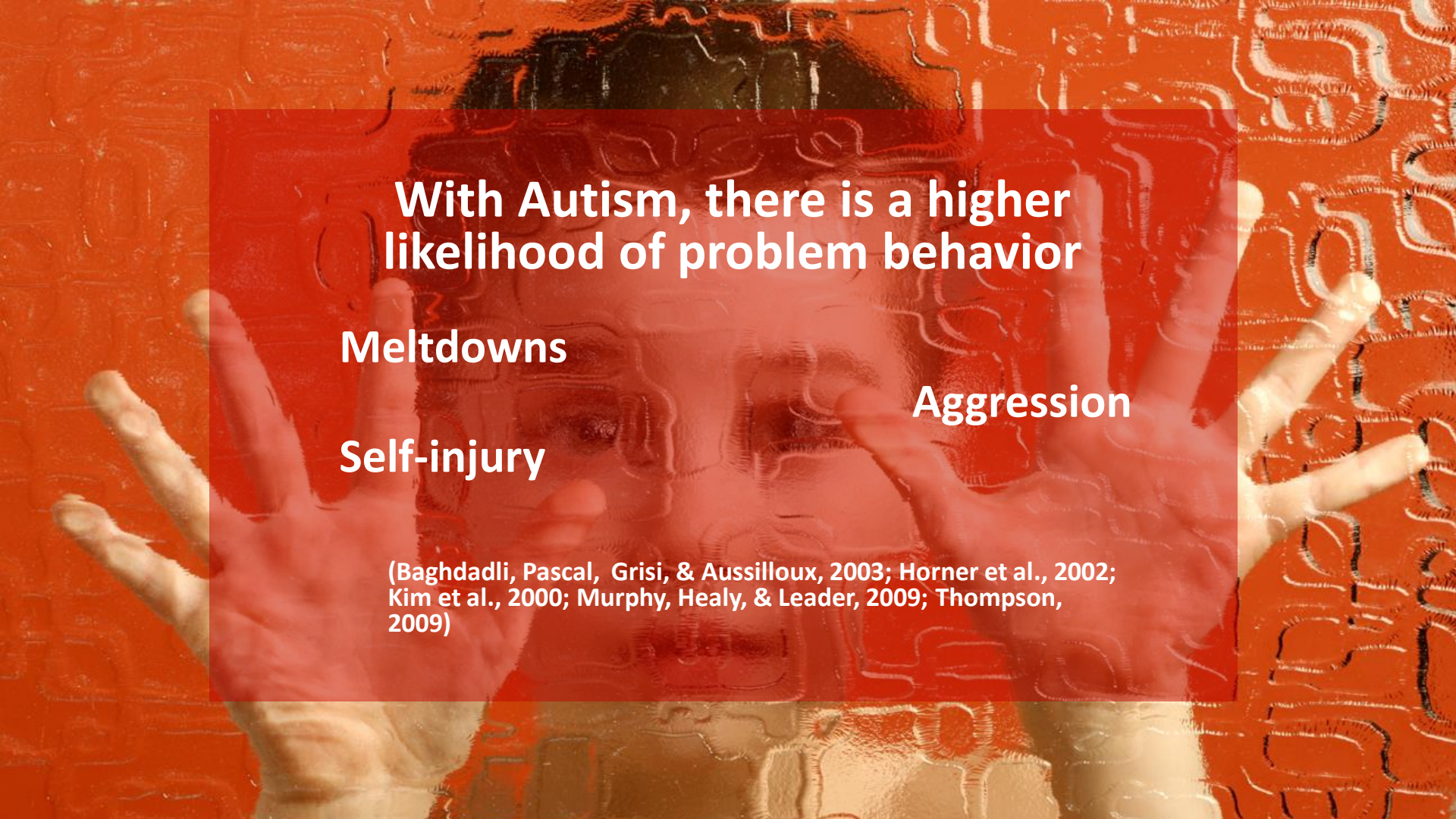
Autism is characterized by
1. Impairments in language development and social interaction
2. Excessive repetitive behavior

But what is the most difficult issue for parents and teachers of most children and young adults with autism?



With Autism, there is a higher likelihood of problem behavior

Meltdowns

Aggression

Self-injury

(Baghdadli, Pascal, Grisi, & Aussilloux, 2003; Horner et al., 2002; Kim et al., 2000; Murphy, Healy, & Leader, 2009; Thompson, 2009)

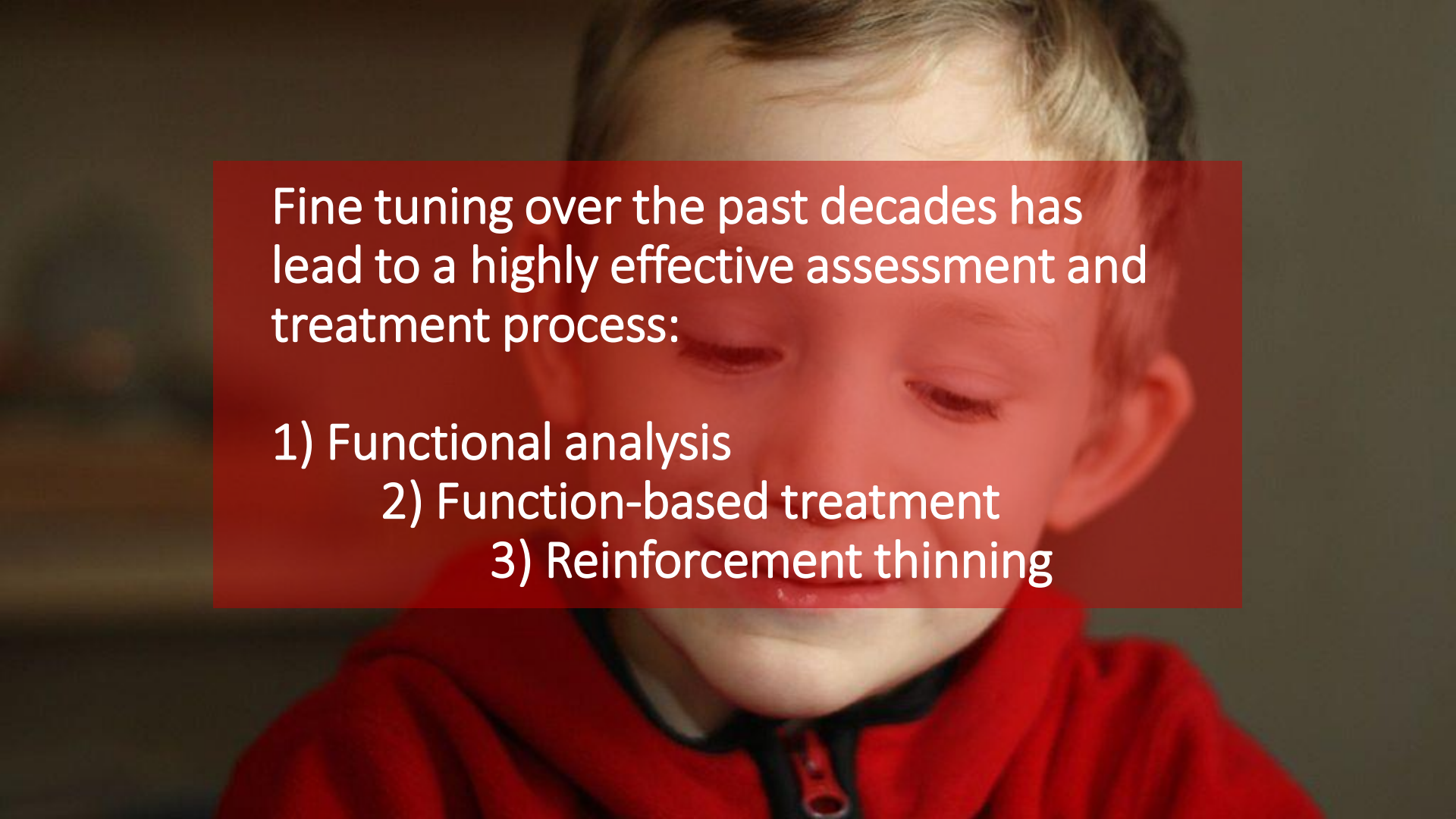
Over 60% of children diagnosed with Autism exhibit some form of problem behavior such as:
Meltdowns
Aggression
Self-injury

I can never eat out with my family because of my son's tantrums in restaurants

Caregiver Testir

Almost every day I have to leave work early to pick up my son from school because his aggression is too severe to manage

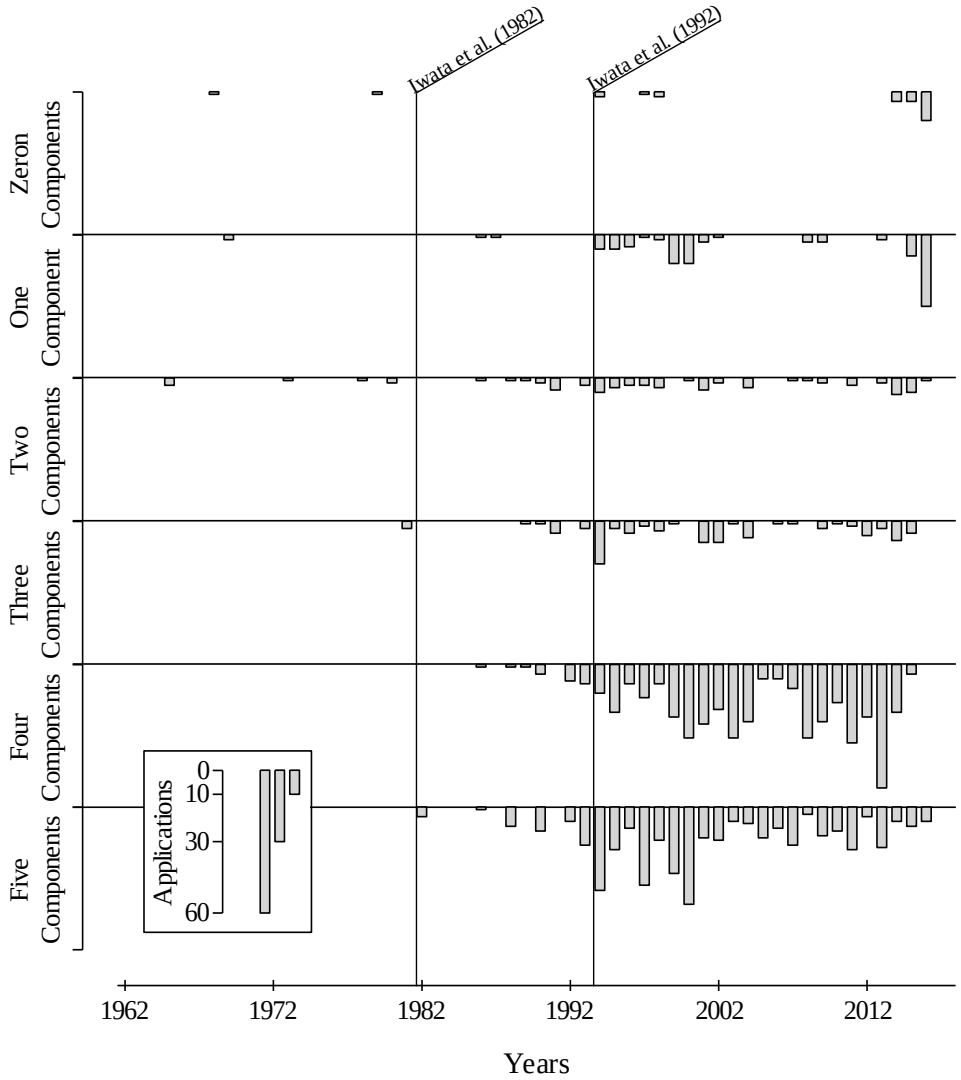
It is hard to see grandma and grandpa because they could really get hurt


Fine tuning over the past decades has lead to a highly effective assessment and treatment process:
1) Functional analysis
2) Function-based treatment
3) Reinforcement thinning

Standardization of a Functional Analysis Model

- **Multiple test conditions**: Attention, escape, alone, tangible
- **Uniform test conditions**: same procedures for all participants
- **Isolated test conditions**: reinforcers evaluated independently
- **Play control**: One control for all test conditions including unrelated leisure items
- **Only dangerous behavior**: Minimal response class excluding precursors or non-dangerous behavior

(Jessel, Hanley, & Ghaemmaghami, under review)



Respondents reported using informant and descriptive assessments more frequently than functional analyses, and a majority of respondents (63%) indicated that they "never" or "almost never" used functional analyses to identify the function of behavior. This is concerning, given the research that has demonstrated the unreliability of indirect FBA methods (Arndorfer

Oliver, Pratt, & Normand (2015)

"…takes too much time and resources…"

"…Seemed unsafe and often inconclusive…"

Results of the current survey indicated that the majority of respondents reported using descriptive assessment more often than functional analysis for identifying the function of problem behavior. Although this finding replicates pre-

Roscoe et al. (2015)

Obstacles:

#1: Take too much time
#2: Too complex
#3: Too risky for client or analyst
#4: Difficult to “sell” to constituents
#5: Can’t be used for dangerous behavior
#6: Can’t address low-rate problem behavior
#7: Can’t address covert problem behavior
#8: Can’t address multiple topographies or functions
#9: Can’t address constantly changing reinforcers

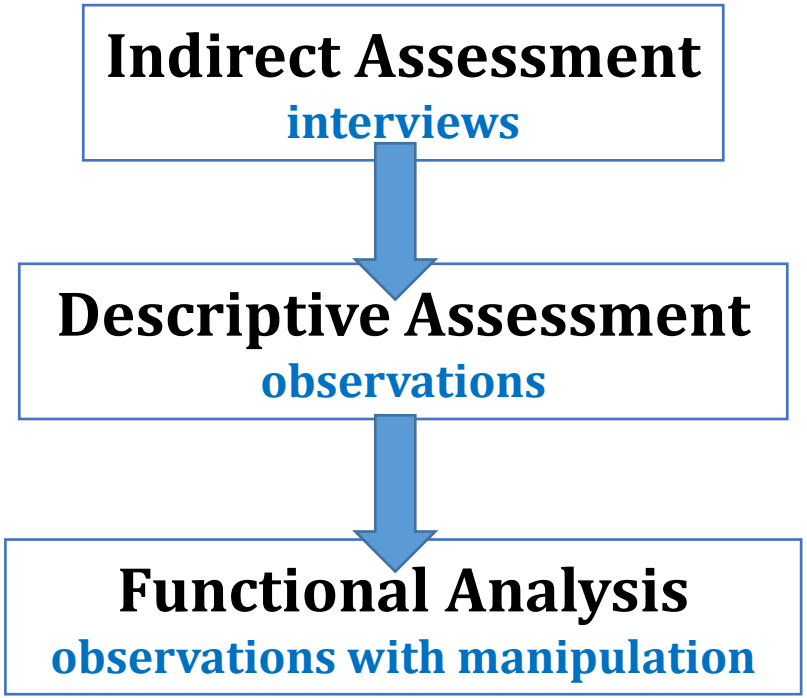
We need an assessment not designed for researchers but an assessment that embodies the elements important to practitioners

Quick

Practical

Cost efficient

Practical Functional Assessment Process

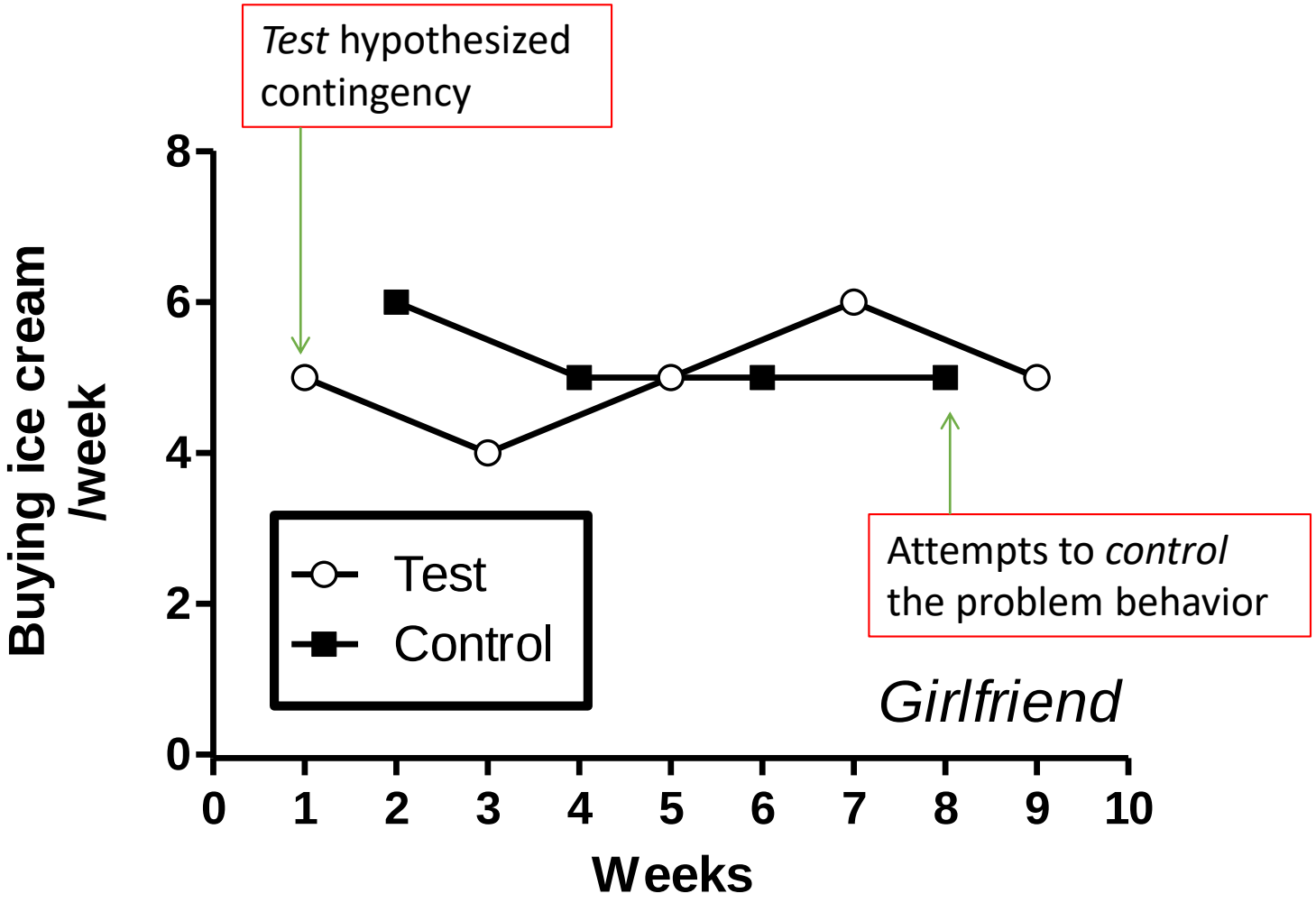


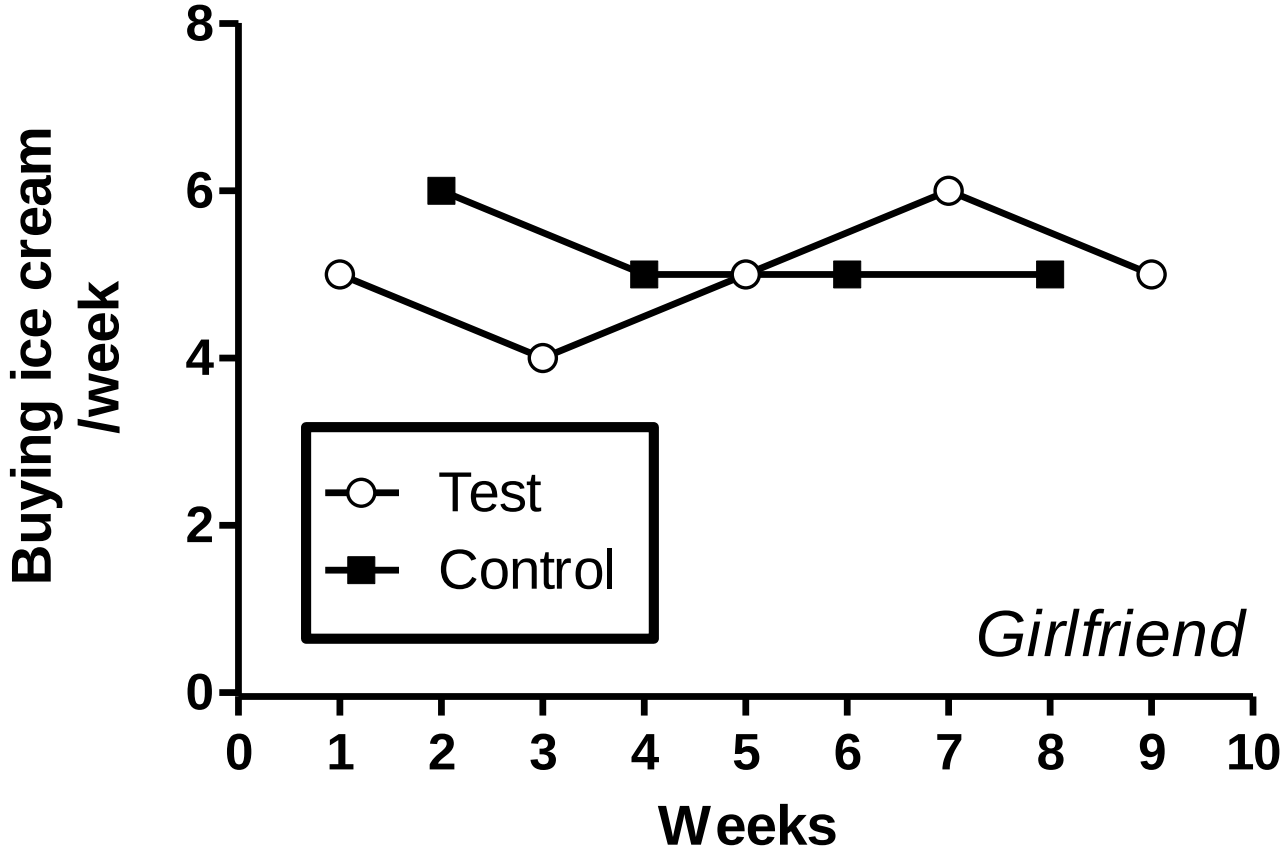
This is your girlfriend →

Your girlfriend likes to get ice cream from this ice cream truck and you want to know why

- **What do you start with?**
  - **Indirect assessment**
  - **Q: “Why do you go to that ice cream truck?”**
  - **A: “To buy ice cream.”**
- **Next step?**
  - **Possibly direct assessment**

- **Last step?**
  - **Functional analysis**
  - **Control condition:**
    - **Give her all the ice cream for free**
    - **Pay truck to not sell ice cream anymore**
  - **Test condition:**
    - **Starve her of ice cream**
    - **Tell the truck to sell ice again**

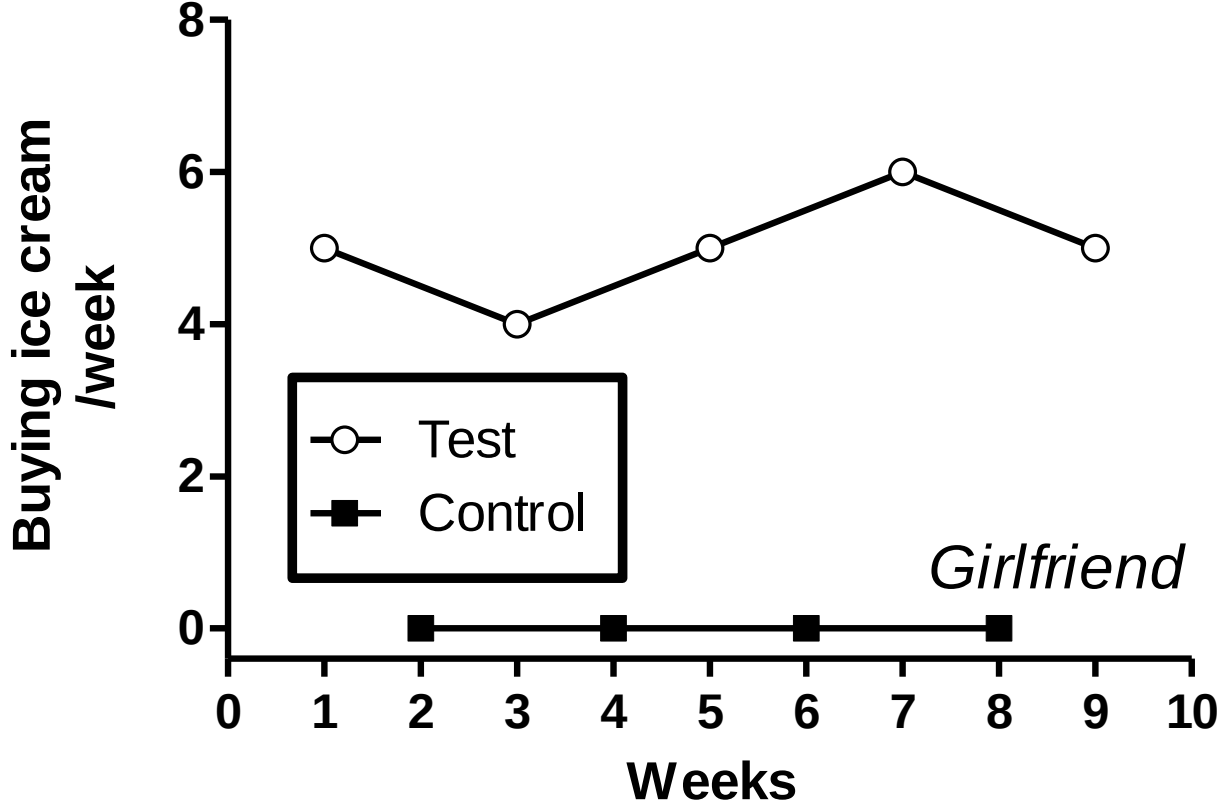

Test hypothesized contingency
Buying ice cream /week
8
6
4
2
0
Test
Control
Attempts to *control* the problem behavior
Girlfriend
0 1 2 3 4 5 6 7 8 9 10
Weeks



Is your girlfriend's buying ice cream maintained by the production of ice cream?

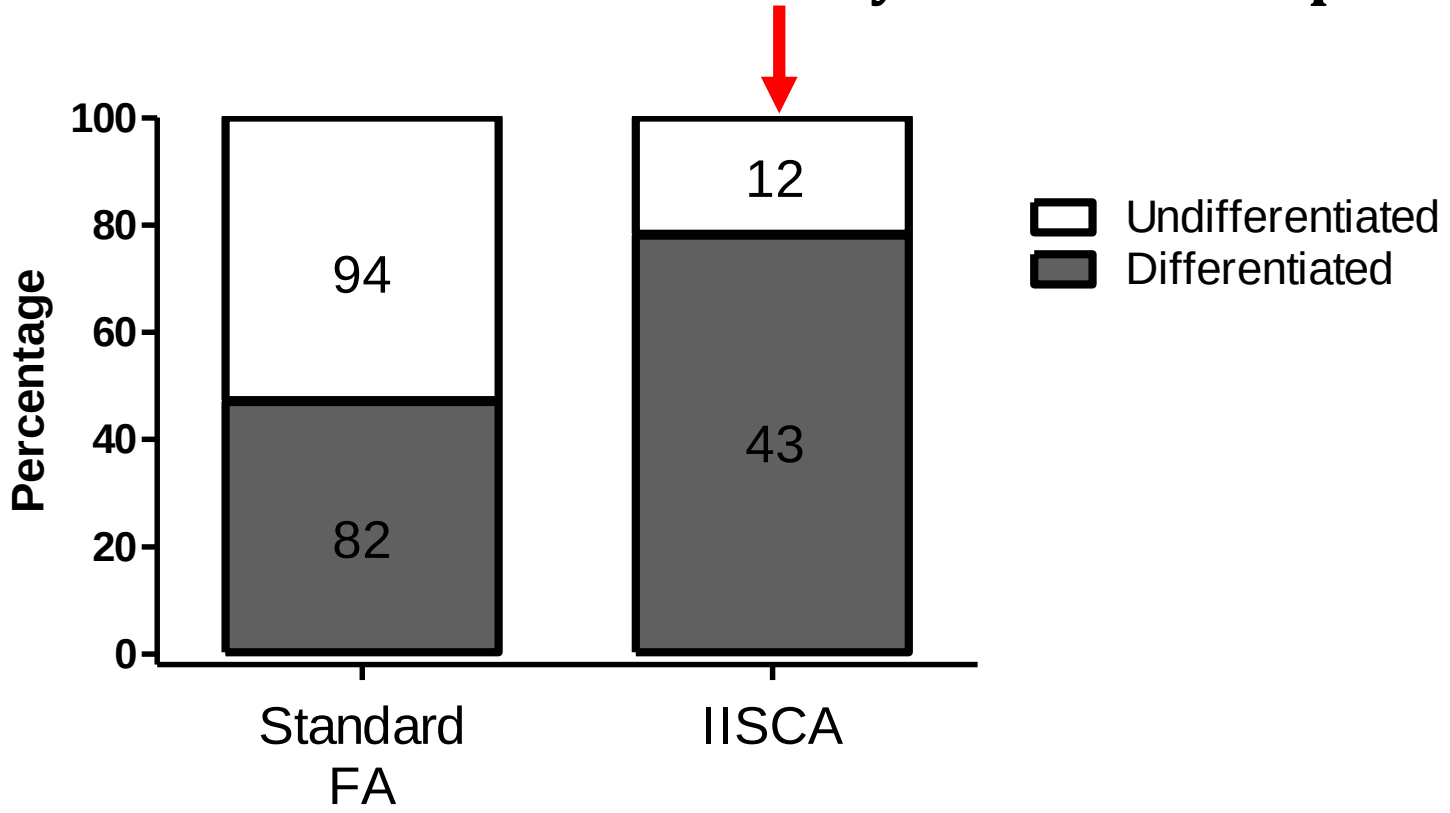
You also noticed during your direct assessment that the ice cream truck driver looks like this

- **So you conduct another functional analysis**
  - **Test condition: Hottie Mc Hottie sells her ice cream**
  - **Control: Not so Hottie Mc Hottie sells her ice cream**



- **So you conduct another* functional analysis**

***Disclaimer: unlikely to need multiple tries**



Data from: Hagopian, Rooker, Jessel, & Deleon (2013); Jessel, Hanley, & Ghaemmaghami (2016); Jessel et al., (2017)

Case Example (Mike, 8 yo, dx: PDD-NOS)

Team: Hillary Kirk, Ruth Whipple (2:1 tutors); Joshua Jessel (supervising BCBA-D)
Setting: Outpatient Clinic

Interview (15 min)

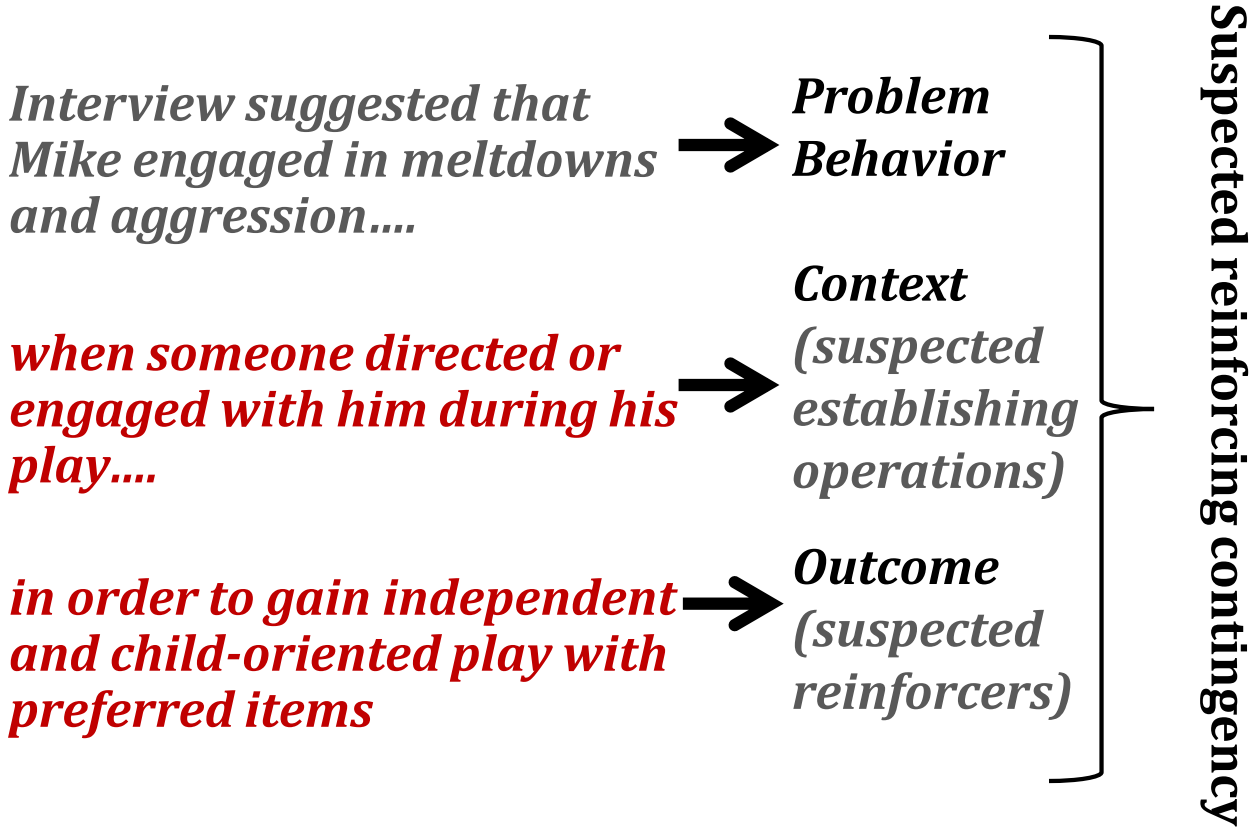
Observation (5 min)

Analysis (25 min)

Total time until treatment: 45 min

Case Example (Mike, 8 yo, dx: PDD-NOS)

Team: Hillary Kirk, Ruth Whipple (2:1 tutors); Joshua Jessel (supervising BCBA)
Setting: Outpatient Clinic



Case Example (Mike, 8 yo, dx: PDD-NOS)

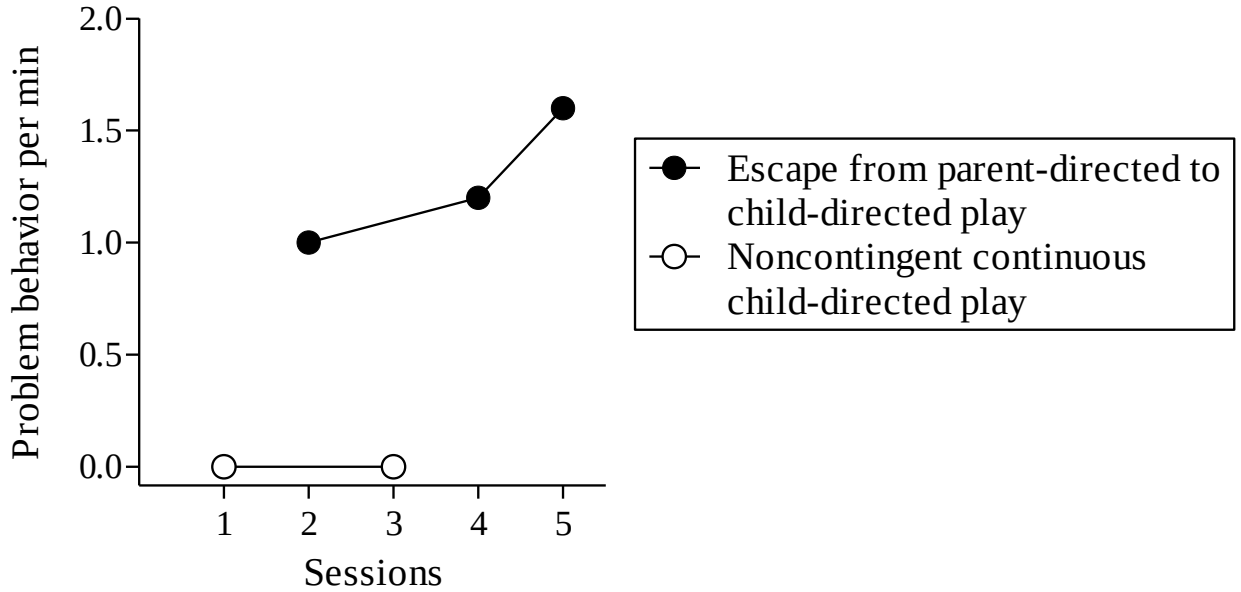
Team: Hillary Kirk, Ruth Whipple (2:1 tutors); Joshua Jessel (supervising BCBA)

Setting: Outpatient Clinic

Hypotheses:

Mike engages in meltdowns and aggression in order to obtain:

Independent access to leisure items



Journal of Applied Behavior Analysis

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2014, 47, 16–36 NUMBER 1 (SPRING)

PRODUCING MEANINGFUL IMPROVEMENTS IN PROBLEM BEHAVIOR OF CHILDREN WITH AUTISM VIA SYNTHESIZED ANALYSES AND TREATMENTS

GREGORY P. HANLEY, C. SANDY JIN, NICHOLAS R. VANSELOW, AND LAURA A. HANRATTY

WESTERN NEW ENGLAND UNIVERSITY

What is and is not our approach?

Our approach is

Inductive – we never know what the analysis will look like until we meet the family

Intuitive – we listen to the families and solve the problems they tell us they have

Our approach is NOT

Standardized – we do not fit each child in a ready made analysis

Assumptive – we do not believe we know the problem better than the family

Three Steps to Conducting a Practical Functional Assessment

Step 1:
Open-Ended Interview

The open-ended interview allows the therapist to:

a) **Develop rapport with parents or teachers**
b) **Identify unique contingencies**
c) **Develop “function hunches”**
d) **Set up a safe and quick analysis**

Disclaimer: Information from the interview is to be used to inform the subsequent observation and analysis and not interpreted alone.

2. **Describe his/her language abilities.**

☐ **Non-verbal** ☐ **1-word utterances** ☐ **Short disfluent sentences** ☐ **Full fluency**

Comments:

7. **What are the problem behaviors? What do they look like?**

☐ **Aggression** ☐ **Disruption** ☐ **SIB** ☐ **Other**

Comments:

TO DETERMINE THE ANTECEDENT CONDITIONS

12. Under what conditions or situations are the problem behaviors most likely to occur?

13. Do the problem behaviors reliably occur during any particular activities?

14. What seems to trigger the problem behavior?

TO DETERMINE THE CONSEQUENCES

17. How do you and others react or respond to the problem behavior?

18. What do you and others do to calm him/her down once he/she engaged in the problem behavior?

19. What do you and others do to distract him/her from engaging in the problem behavior?

7. **What are the problem behaviors? What do they look like?**

☐ **Aggression** ☐ **Disruption** ☐ **SIB** ☐ **Other**

Comments:

Bobby hits himself and scratches himself. He starts to scream and then will repeatedly slap himself in the face until it is red and raw.

13. **Do the problem behaviors reliably occur during any particular activities?**

I would say it definitely occurs most during his cleaning time. He as OCD like behaviors and every time he comes home he has to put his papers in a certain way, reorganize stuff, and move things around.

19. **What do you and others do to distract him/her from engaging in the problem behavior?**

There is no way of distracting him. We try to give him the activities that he likes or try to move him to a different area but the second we get close he will start screaming and slapping himself. The only way to calm him down is to give him his space and let him do his thing.

1. **Target problem behavior:**

Topography #1 *Screaming*

Operational definition:
Vocalizations louder than conversational speech including screeches, yelling, or howling

Topography #2 *Face slapping*

Operational definition:
Attempts to or successful open handed hit to face from more than three inches away from face and causes audible hit

Topography #3 *Self scratching*

Operational definition:
Attempts to or successfully moving nails at least one inch down arm or stomach creating visible redness and tearing of skin

Test condition procedures

Bait the room with items he likes to clean and arrange in somewhat disarray. For example, have papers unorganized, have drawers open with items on the ground, etc. Give him 30 s access to the items before session and then begin to block him while providing the prompt, "you can't clean anymore. It is time to come with me." If he engages in SIB say, "ok, don't worry, you can clean" and give him at least one arms length of space for 30 s. Repeat after 30 s.

Control condition procedures

Bait the room with items he likes to clean and arrange in somewhat disarray. Provide him with independent access to the same items with at least one arms length of space the entire time. Ignore any problem behavior if it occurs.

12. Under what conditions or situations are the problem behaviors most likely to occur?

I would say it happens randomly but he sure does love his iPad. We can only afford one and sometimes his sister, Sarah, tries to play with him. She'll sit next to him and sort of look over his shoulder telling him how to play, touching some buttons. You can usually see him start to get annoyed with her and at some point he will explode.

17. How do you and others react or respond to the problem behavior?

It's like clockwork. If I am in the other room I'll hear him scream and before you know it Sarah will get hit and come crying to us. We try to just explain to her that he has autism and that we just need to give him his own time with the iPad.

Describe what you would do in the test condition of the functional analysis.

Describe what you would do in the control condition of the function analysis.

Interview tips:

1. Let the interviewee determine the pace but keep control of the conversation
2. You don’t need to ask every question or go in order
3. You are finished when you know the problem behavior and can arrange the context
4. Be as detailed as possible with relevant information
5. Always keep the analysis structure in mind
6. Ask for descriptions not explanations

Step 2
Brief Observation

The brief observation allows the therapist to:

a) Test some of those hunches from the interview

b) See the topographies of problem behavior first hand

c) Formalize the analysis conditions

Disclaimer: Do not rely on extended periods of indirect observations. Keep it brief and try those contingencies out. Tweak when necessary and go until you are confident in the variables you will be evaluating in your analysis.

Brief observation tips:

1. If you consistently see problem behavior evoked by the removal/presentation of parent described event(s) and problem behavior eliminated by the removal/presentation of parent described consequence(s) move to the analysis
2. Keep the parent in the room when possible for continued input
3. Look for less severe precursors that may not have been mentioned during the interview
4. When in doubt use parents
5. Remember, you're not trying to cause a problem, you're trying to understand one

Step 3
Functional Analysis

The functional analysis allows the therapist to:

a) **Create an understanding of behavior rather than a hunch**

b) **Hold themselves to the same standards as any medical professional**

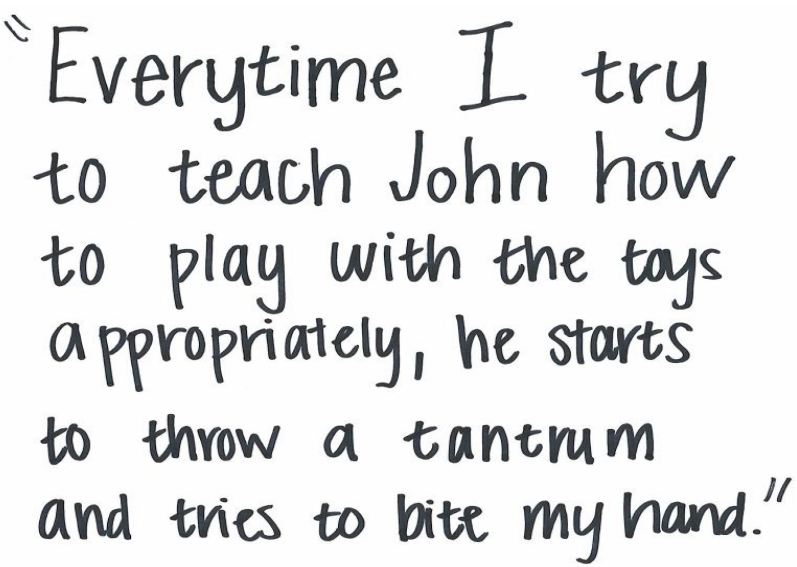
c) **Establishes a baseline from which to evaluate the treatment**

Definition: Direct observation of behavior under *two* conditions in which some event is manipulated

<u>Two Conditions:</u>

Test: Contains the reinforcing contingency thought to maintain severe problem behavior

Control: *Does not* contain the reinforcing contingency thought to maintain severe problem behavior



Based on this example how will you arrange your analysis?

a) **Two test conditions: One in which I provide him with prompts and give him 30-s of escape contingent on problem behavior. And a second condition where I take away toys and give him 30-s access to the toys contingent on problem behavior.**

b) **One test condition: I provide him with prompts teaching him how to play with the toy and give him 30-s of escape to independent access to those toys contingent on problem behavior.**

c) **On test condition: I only test the tangible function because the prompts are related to play and irrelevant.**

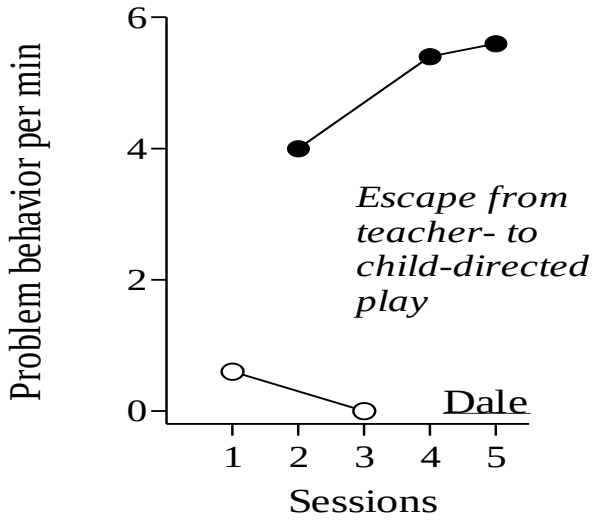
Hint: How many sushi lovers are there out there?

Now how many of you love sashimi?

SPOILER ALERT
Rice
+ Sashimi
Sushi
?!?!

For some of you the synthesis of rice and sashimi (i.e., sushi) is a reinforcer whereas the isolated components of rice alone or sashimi alone would not be

"Everytime I try to teach John how to play with the toys appropriately, he starts to throw a tantrum and tries to bite my hand."



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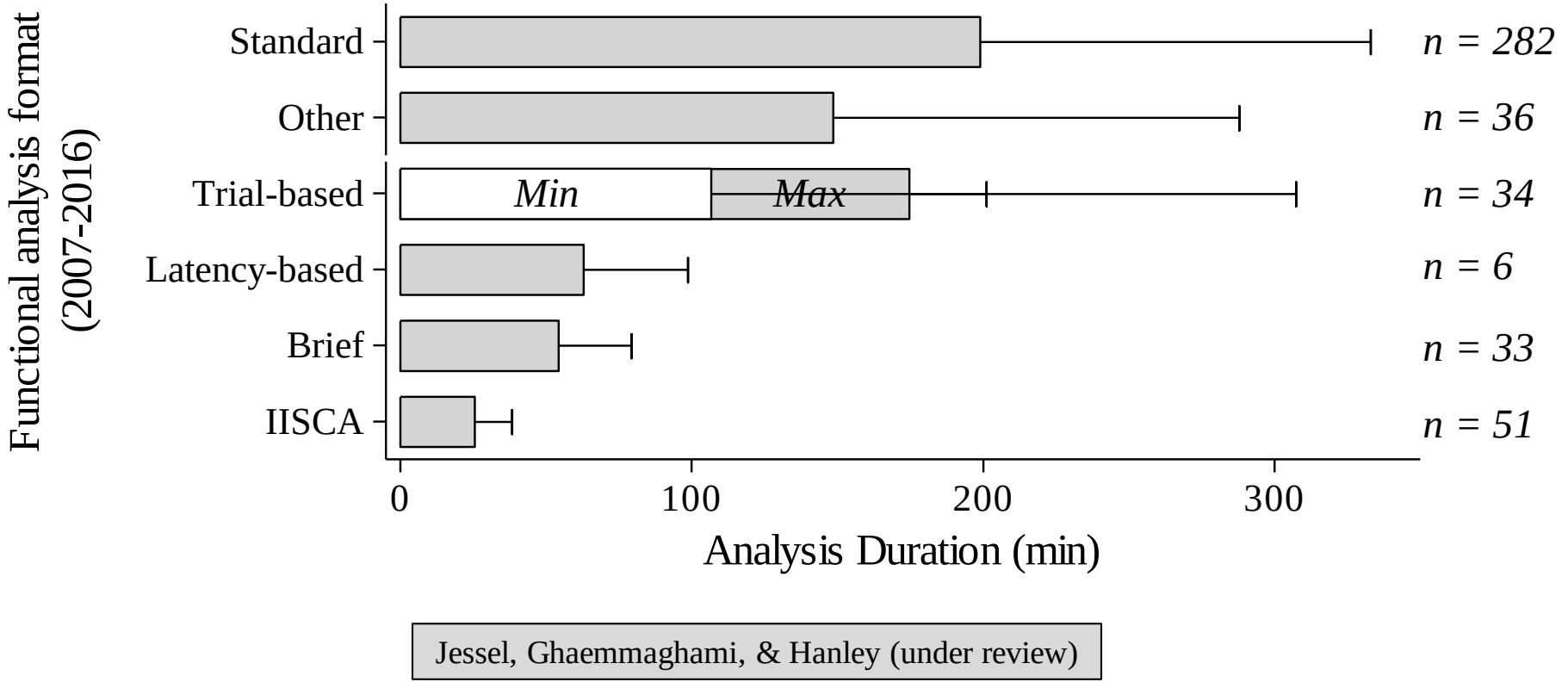
Final Commitments to a Practical Functional Assessment

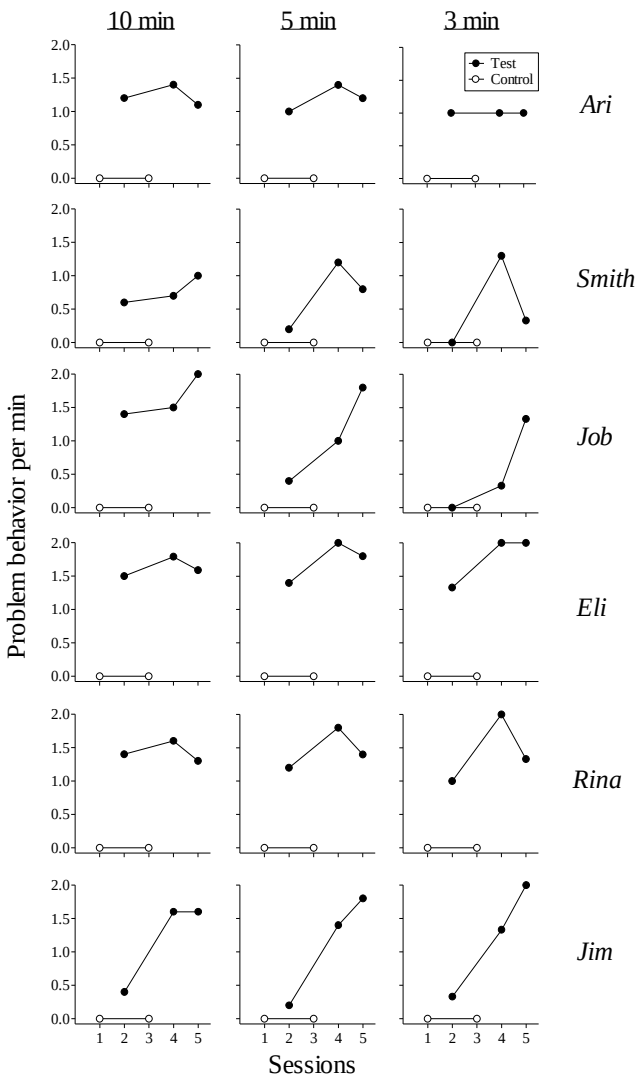
Commitment #1

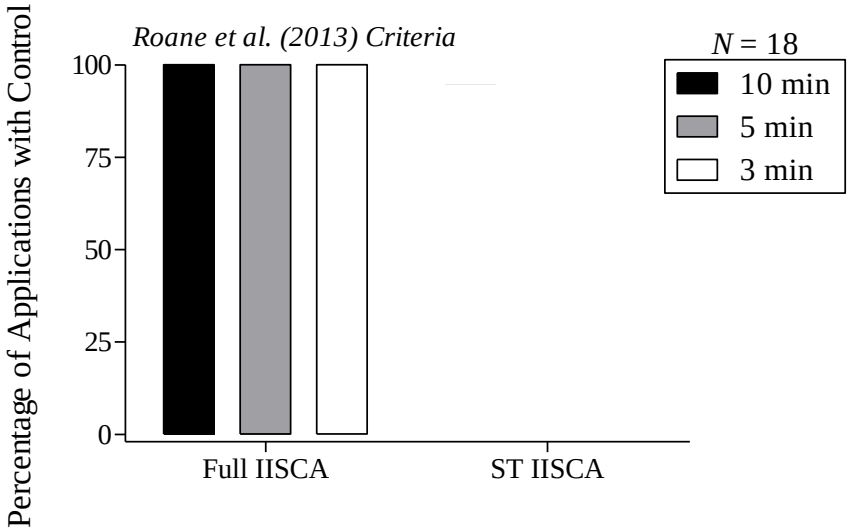
We are committed to an *efficient* analysis that minimizes assessment time and maximizes treatment exposure



Jessel, Ghaemmaghami, & Hanley (under review)

Jessel, Hanley, & Metras (in prep)





With this format you don't need:

20 min sessions

15 min sessions

10 min sessions

You can use:

5 min sessions

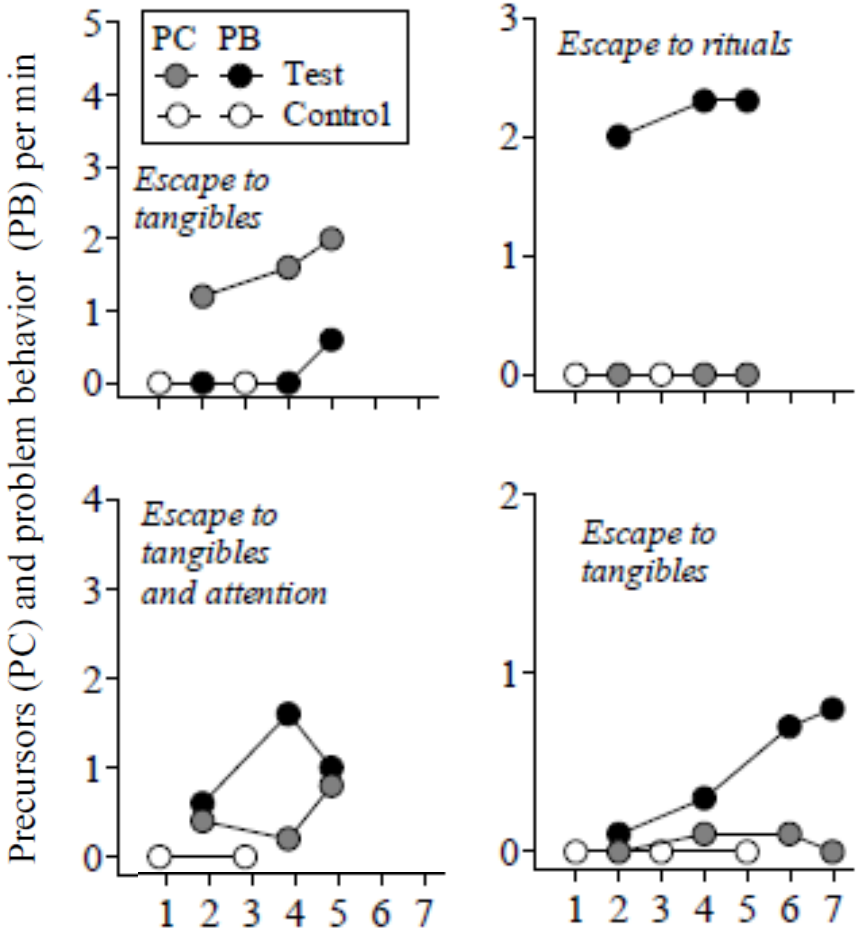
3 min sessions

And still produce clear and consistent results

Commitment #2

We are committed to a *safe* analysis that minimizes exposure to potentially dangerous contexts intended to evoke problem behavior

Slaton, Hanley, & Raftery (2017)



10. Describe the range of intensities of the problem behaviors and the extent to which he/she or others may be hurt or injured from the problem behavior.

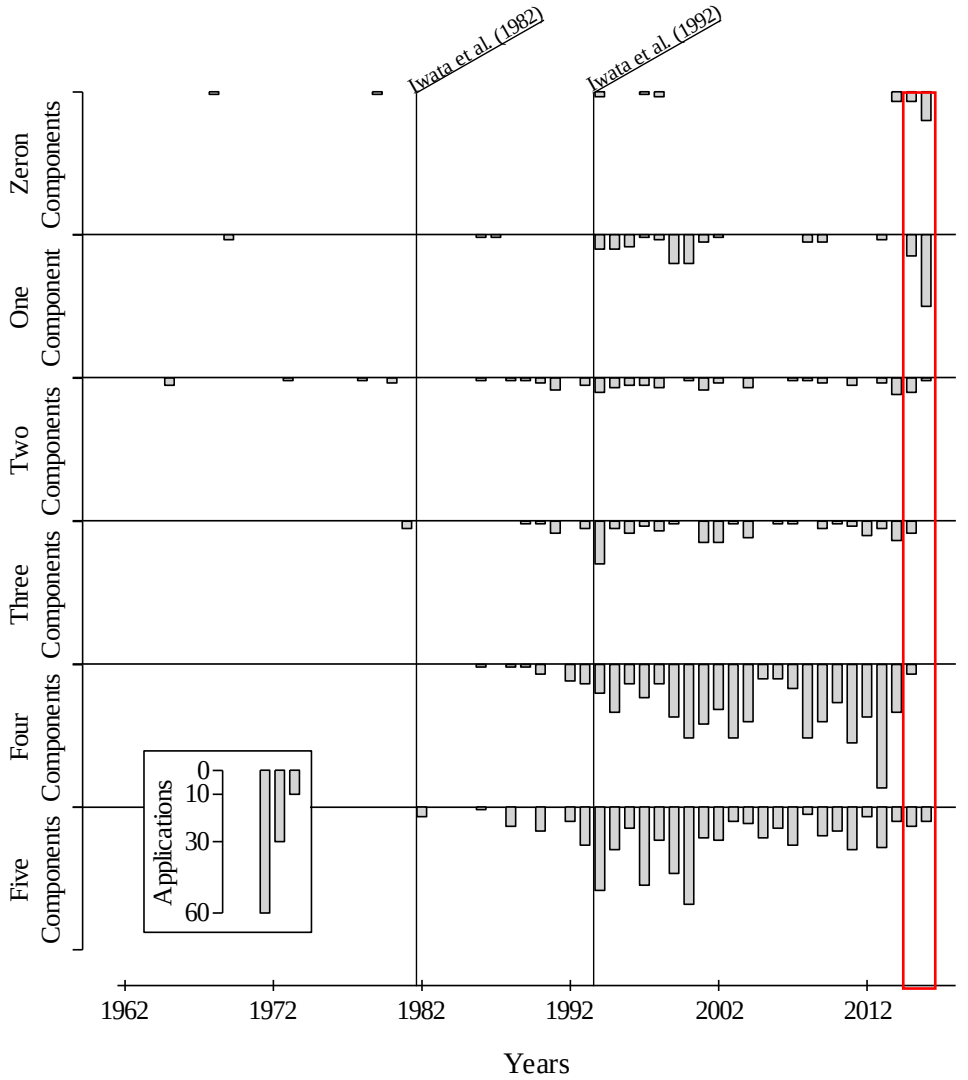
High range:	*Johnny has hit is sister so hard that she has gotten a concussion before*
Moderate range:	*He scratches her daily but it is more manageable than his hitting*
Low range:	*The yelling is definitely on the low range but it can get very annoying*
Comments:	*Johnny's hitting is the bad behavior we are most worried about. We hope that you can help us to get him to stop hitting.*

Would you:

A) Only include the severe problem behavior of hitting
B) Only include the moderate problem behavior of scratching
C) Only include the non-dangerous behavior of yelling
D) Include A and C
E) Include A, B, and C

Change in Components

- Multiple test conditions→**Single test condition**
- Uniform test conditions→**Individualized test codition**
- Isolated test conditions→**Synthesized test condition**
- Play control→**matched control**
- Only dangerous behavior→**Include non-dangerous behavior**



Replications of the IISCA

(Jessel, Hanley, & Ghaemmaghami, 2016)

Age and Sex
1.8 to 30 years old males and females

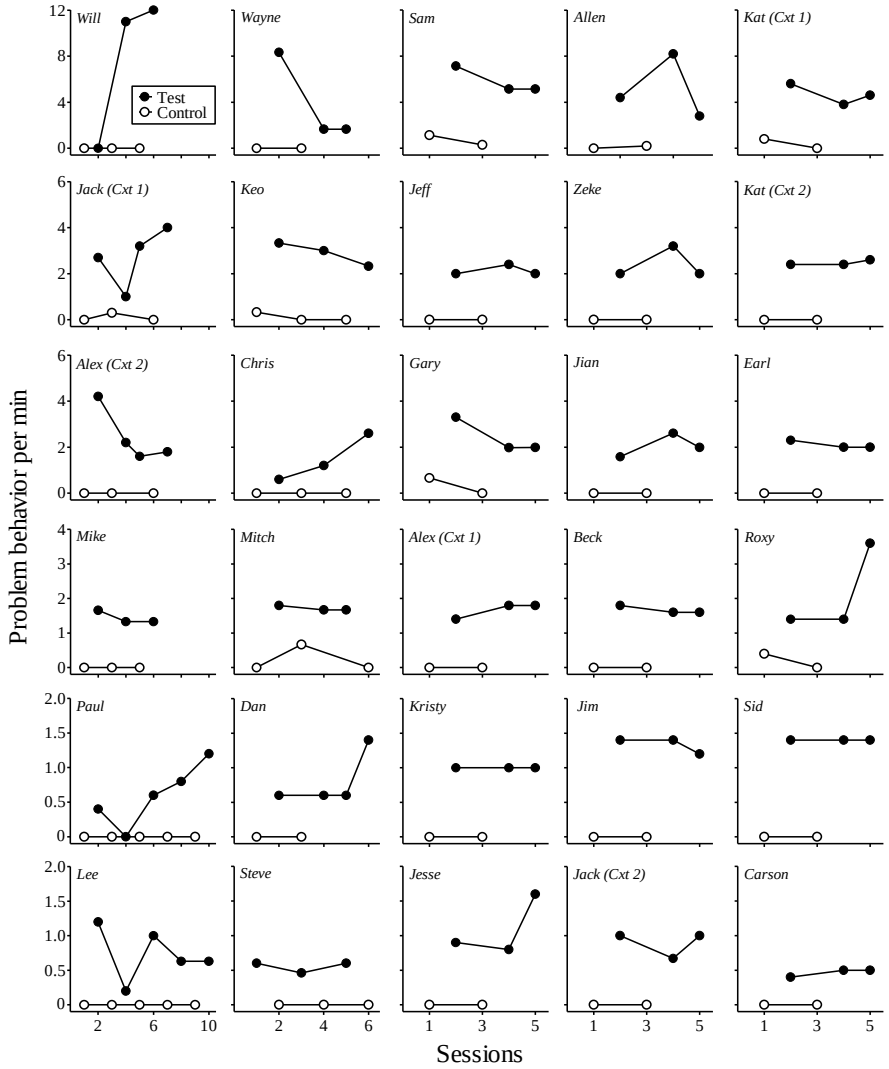
Diagnoses
ASD, PDD-NOS, GAD, ADHD, no diagnosis

Language Ability
Non-verbal,1-word utterances, diffluent sentences, fluent sentences

Problem Behavior
Loud vocalizations, disruption, aggression, SIB

Analyst
Supervised caregivers, master's candidates, BCBA

Settings
Outpatient clinic, home, school, day habilitation center



Median number of sessions:
5 sessions

Mean analysis duration:
25 min

Remember what a practical functional analysis provides

1. **A valid demonstration of the function of behavior**

2. **A stable and sensitive baseline from which to evaluate treatment**

3. **A properly motivating set of conditions to teach functional communication AND other important skills like:**
   - **delay/denial tolerance**
   - **independent play**
   - **compliance with adult instructions**

And keep in mind…

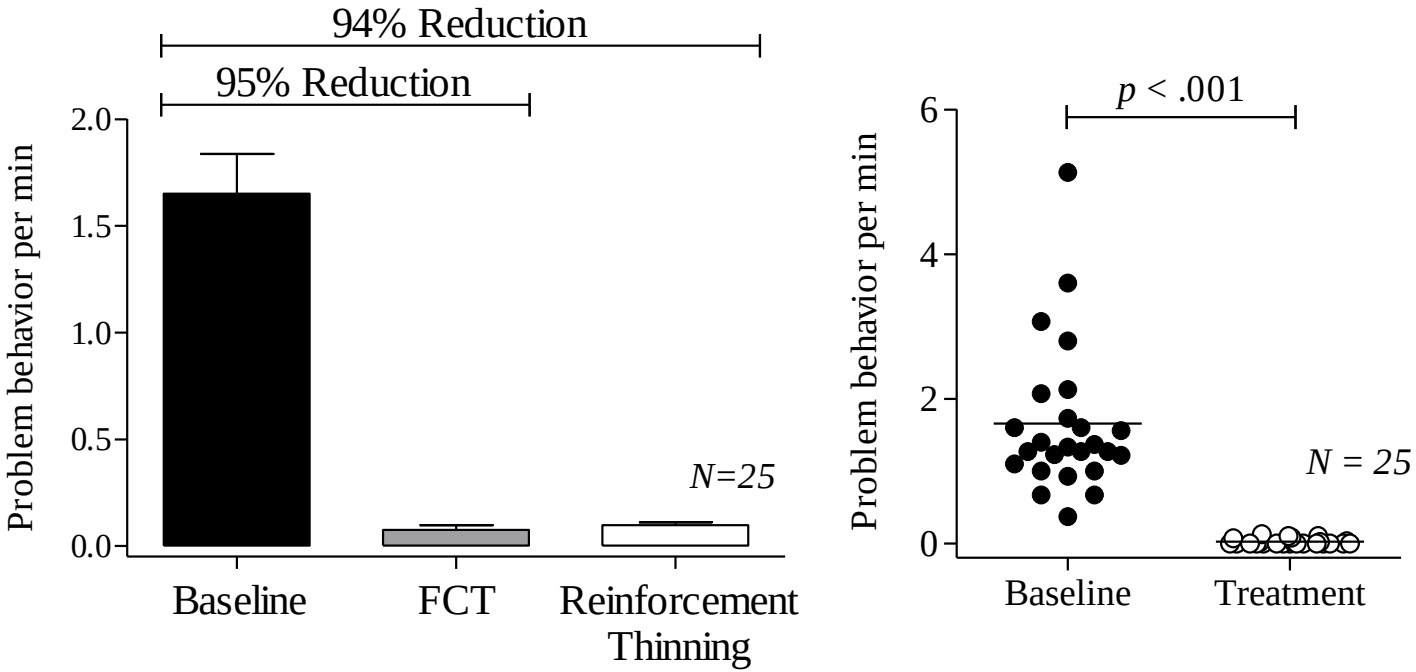
An effective analysis will lead to an effective treatment

25 additional participants

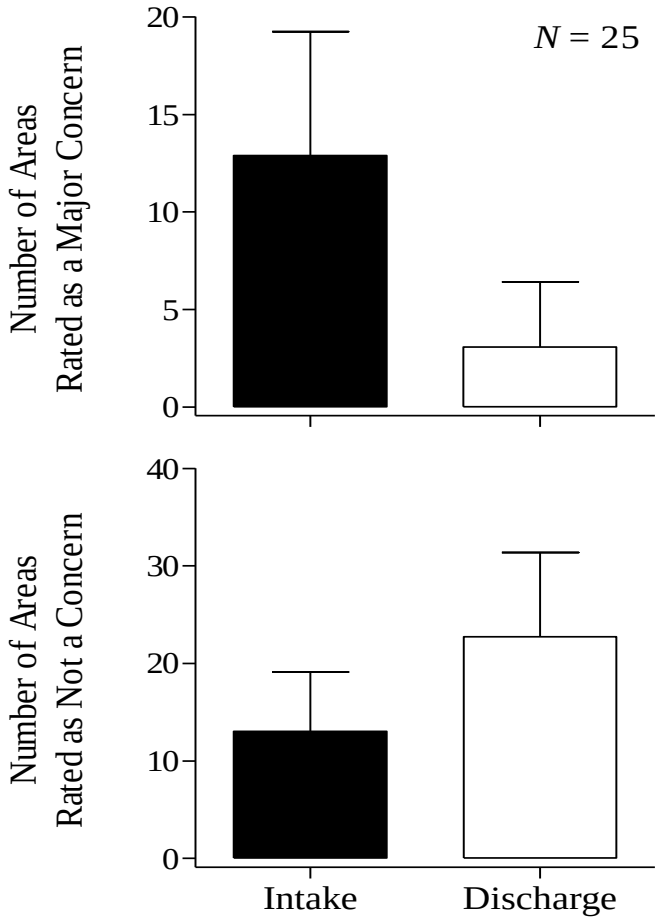
(Jessel, Ingvarsson, Kirk, Whipple, & Metras, in press)

Negative Reinforcement	Positive Reinforcement
Escape from transitions	Access to iPad
Escape from interactive play	Access to independent play
Escape from adult interaction	Access to interactive play
Escape from instructions	Access to child-directed play
Escape from group work	Access to independent work
Escape from parent-selected DVDs	Access to child-selected DVDs
Escape from adult-direct play	Uninterrupted access to leisure items
Escape from blocked access to leisure items	

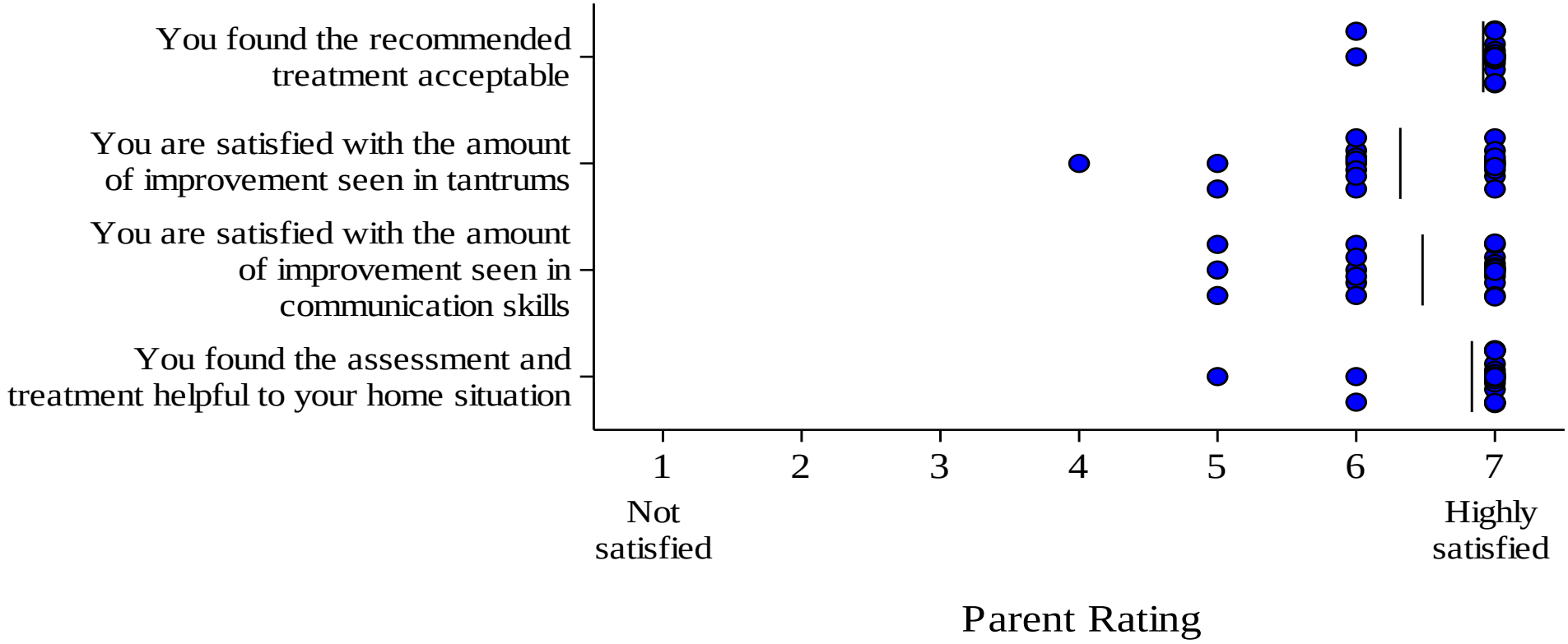
Socially Meaningful Outcomes: Over 94% Reduction in Problem Behavior



Socially Meaningful Outcomes: A 76% Reduction in Parental Concerns



Socially Meaningful Outcomes: High Satisfaction in Parental Reports



Developing Skill-Based Interventions

DRO
Extinction
NCR
DRA
Punishment
The
Treatment
Buffet

Side step #2

What exactly makes a treatment effective?

1. Appropriate reduction in problem behavior
2. Maintenance of effects in typical environment
3. Meets expectations of caregivers, teachers, and clients
4. Improves overall living standards of the clients

How does some of our treatment buffet stack up? Consider *DRO*:

1. Appropriate reduction in problem behavior
2. Maintenance of effects in typical environment
3. Meets expectations of caregivers, teachers, and clients
4. Improves overall living standards of the clients

How does some of our treatment buffet stack up? Consider *Punishment*:

1. Appropriate reduction in problem behavior
2. Maintenance of effects in typical environment
3. Meets expectations of caregivers, teachers, and clients
4. Improves overall living standards of the clients

Four Steps to Creating a Effective Skill-Based Intervention

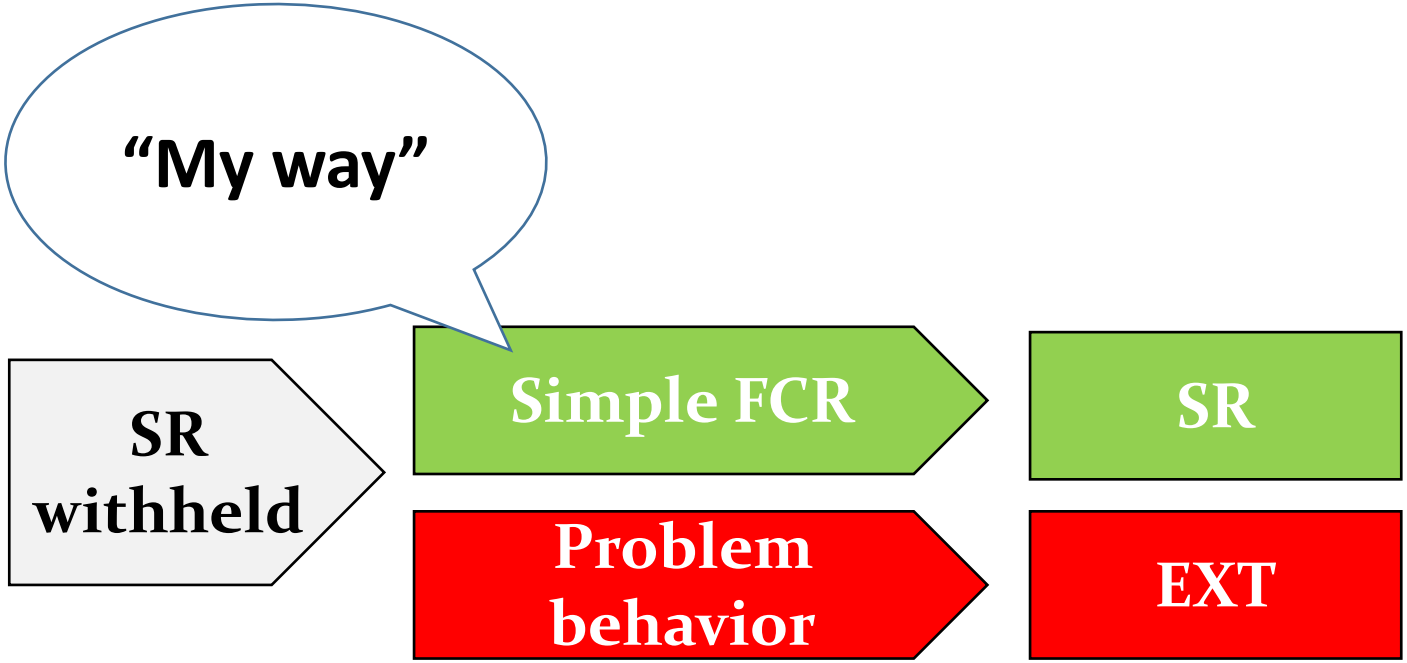
Step 1
Functional Communication Training

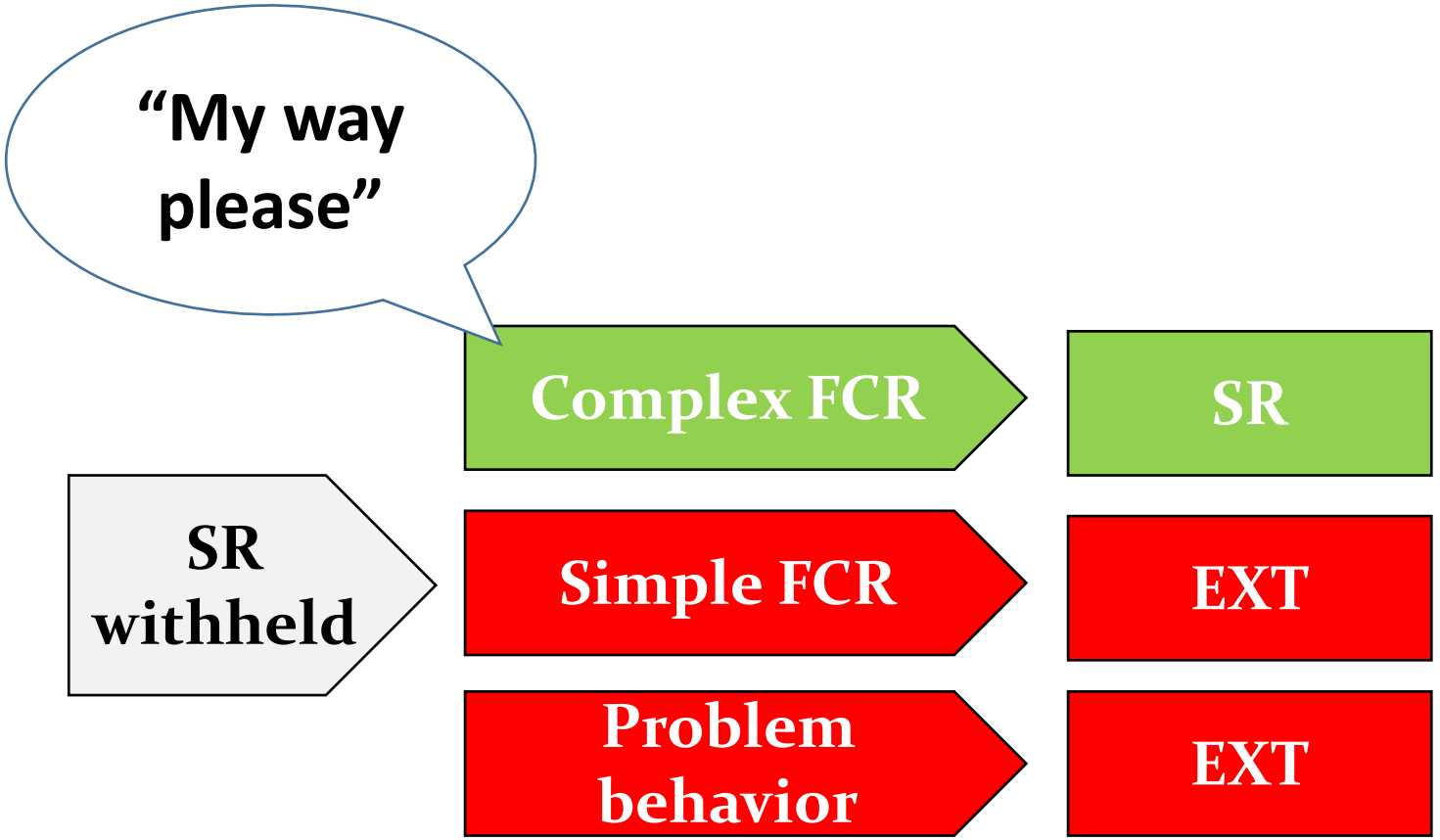
a) Present reinforcers from FA contingent on a low effort and easy FCR only

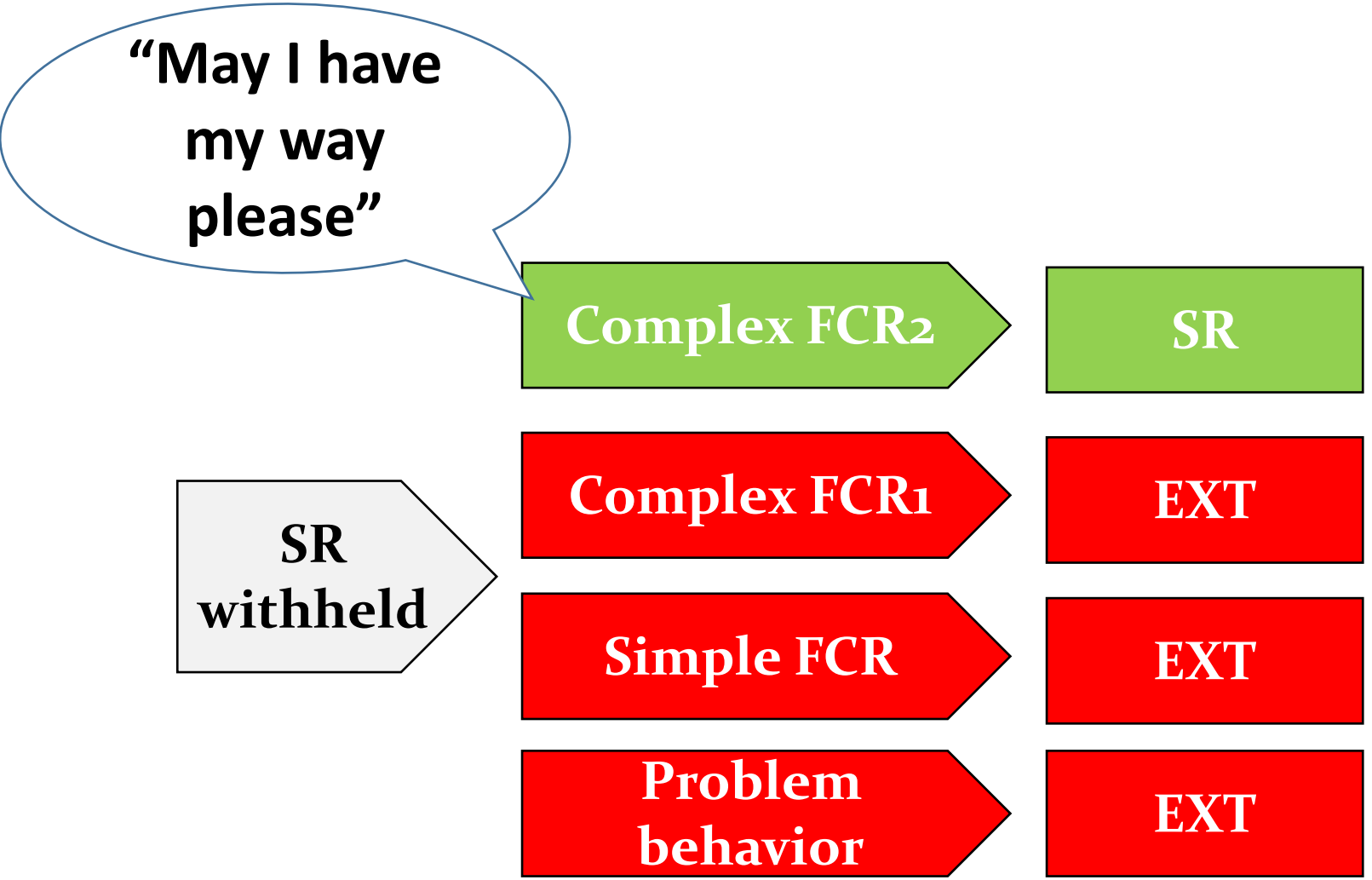
b) Present on a continuous reinforcement schedule

c) After mastery of the first FCR build the complexity of the response until it is socially acceptable and recognizable means of communication

d) Final FCR can include: eye contact, seeking communication partner, multiple mands, conversational niceties


"My way"
SR withheld
Simple FCR
SR
Problem behavior
EXT


"My way please"
Complex FCR
SR
SR withheld
Simple FCR
EXT
Problem behavior
EXT


"May I have my way please"
Complex FCR2
SR
SR withheld
Complex FCR1
EXT
Simple FCR
EXT
Problem behavior
EXT

Simple FCRs

4x4 picture icon

"My"

"My time"

"My way"

"My way please"

"Excuse me, can I have my way please?"

Complex FCRs

2x2 icon in binder

"My way"

"My time please"

"Excuse me, my way please"

"Excuse me, may I have my way please?"

"Excuse me, may I have my way please? Let's play with the [item]"

"Excuse me [name], [name] took my [item]. Could you please help me get it back?"

Case Example (Luke, 5 yo, dx: Autism)

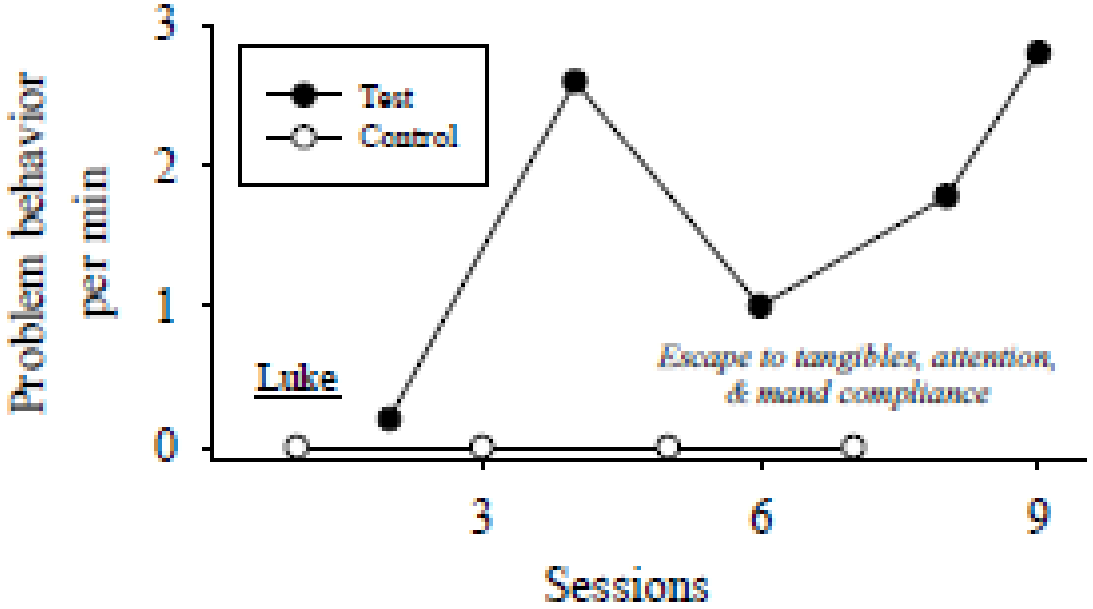
Mahshid Ghaemmaghami, Gregory Hanley, Joshua Jessel, & Robin Landa (in press)

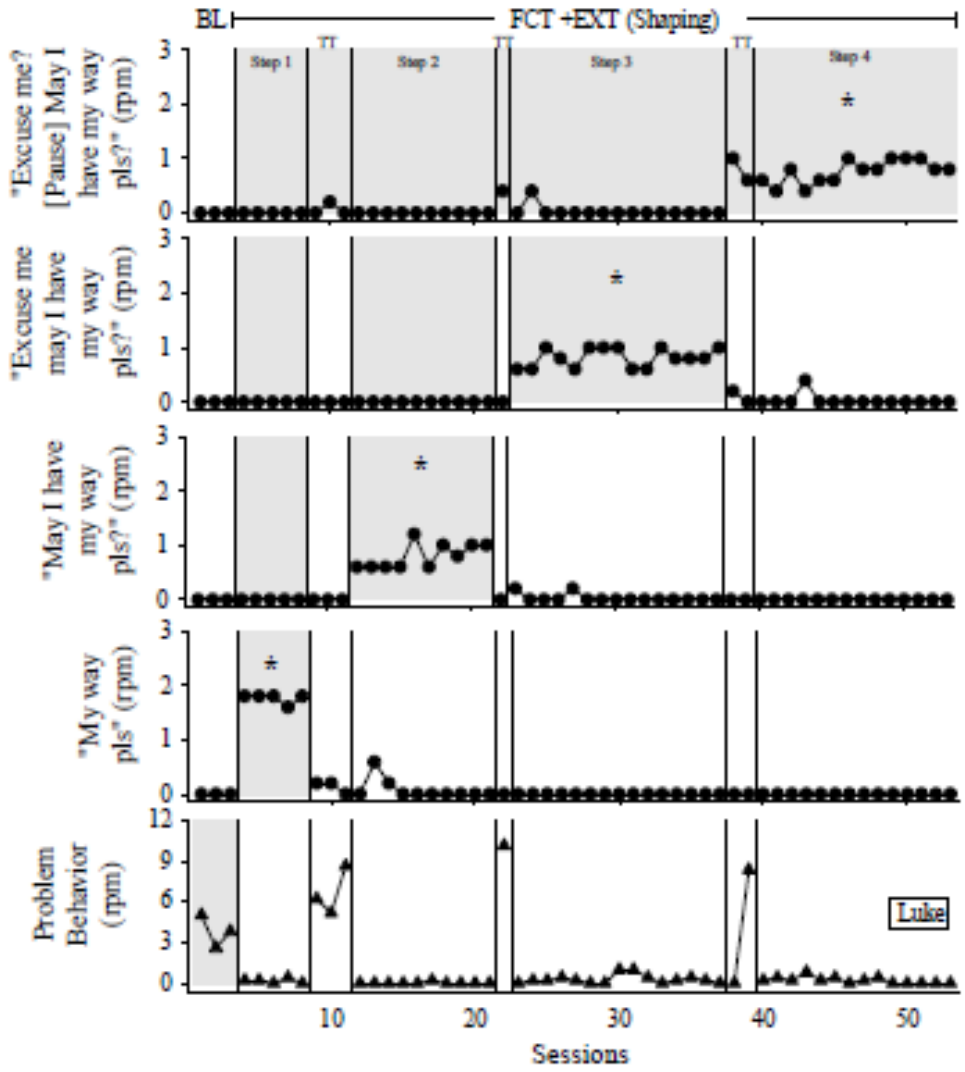
Setting: University Outpatient Clinic

***Hypotheses*:**

Mike engages in meltdowns and aggression in order to:

Escape from parent-lead tasks to child-directed play





Phase 4
FCR3 reinforced, PB/FCR1,2,3 on extinction

Phase 4
FCR3 reinforced, PB/FCR1,2 on extinction

Phase 3
FCR2 reinforced, PB/FCR1 on extinction

Phase 2
FCR1 reinforced, PB on extinction

Phase 1
PB reinforced

Pop Quiz

2. Describe his/her language abilities.

☐ **Non-verbal** ☐ **1-word utterances** ☐ **Short disfluent sentences** ☐ **Full fluency**

Comments:

Johnny can say "milk" when he is thirsty or "toy" when he wants his iPad. We heard him say it before but it usually relies on pointing and grunting.

- How would you describe his language abilities?
- What simple and complex FCRs would you teach following the functional analysis?

Step 2
Delay/Denial Tolerance Training

a) Teach an appropriate response to denials

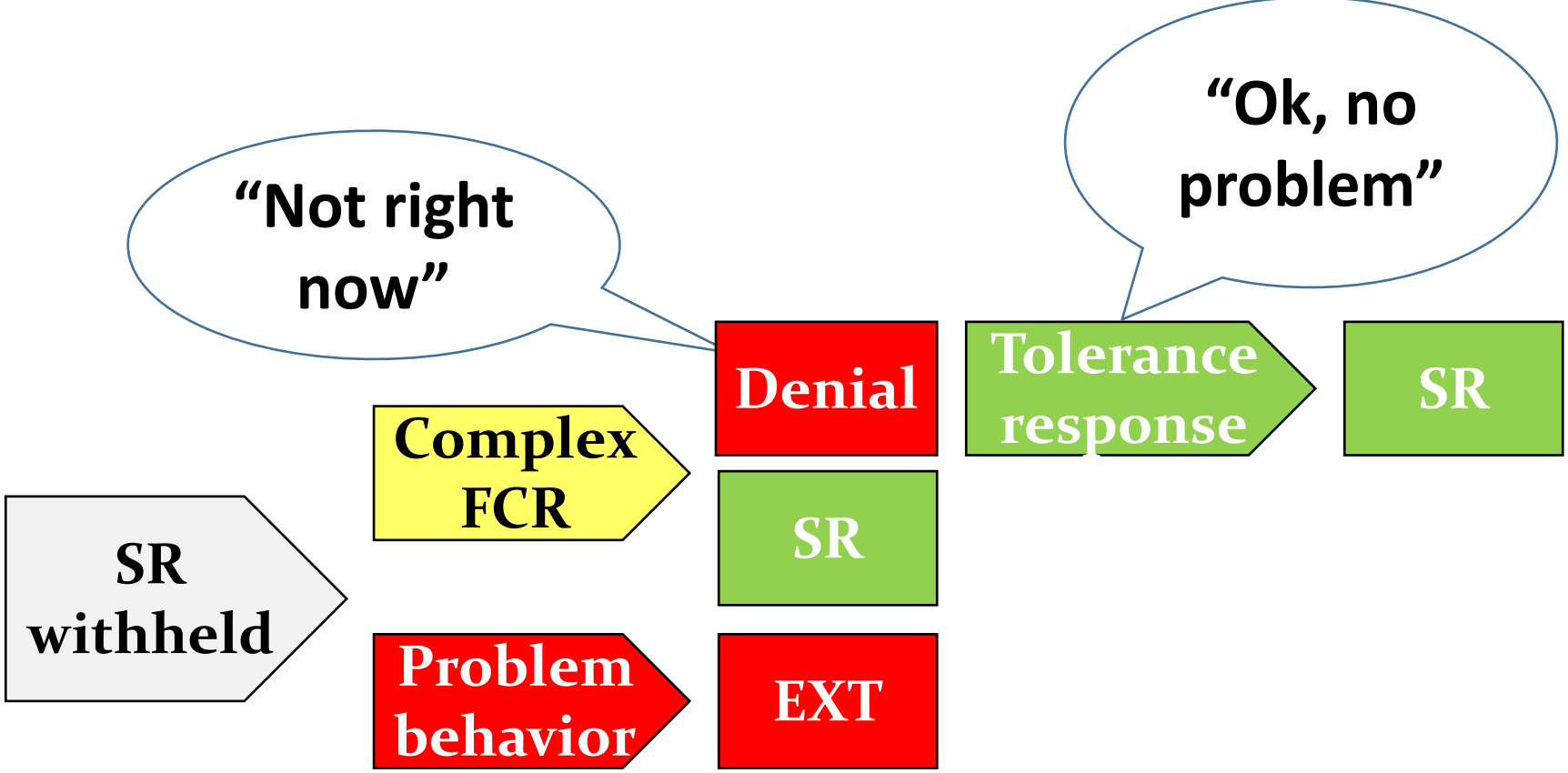
b) Reinforce this response as you would any other response you want to strengthen

c) Present reinforcers randomly (50/50) between the complex FCR and the tolerance response

d) Build small delays naturally

What is the face you get when you tell a child no?

We don’t want “no” to become aversive. We want “no” to signal options for getting everything back.


"Not right now"
"Ok, no problem"
Denial
Tolerance response
SR
Complex FCR
SR
SR withheld
Problem behavior
EXT

What is the face you’re teaching children to make after hearing no?

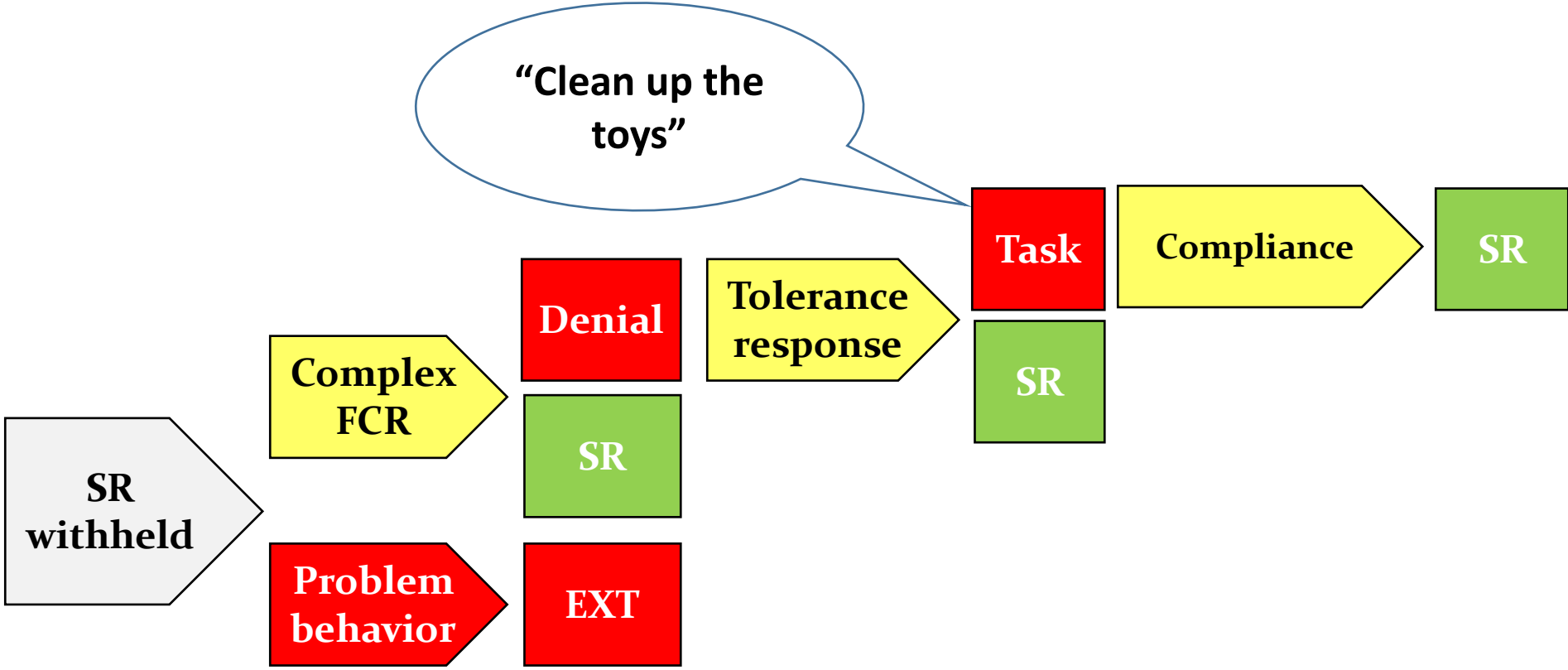
Step 3
Skill Building Training

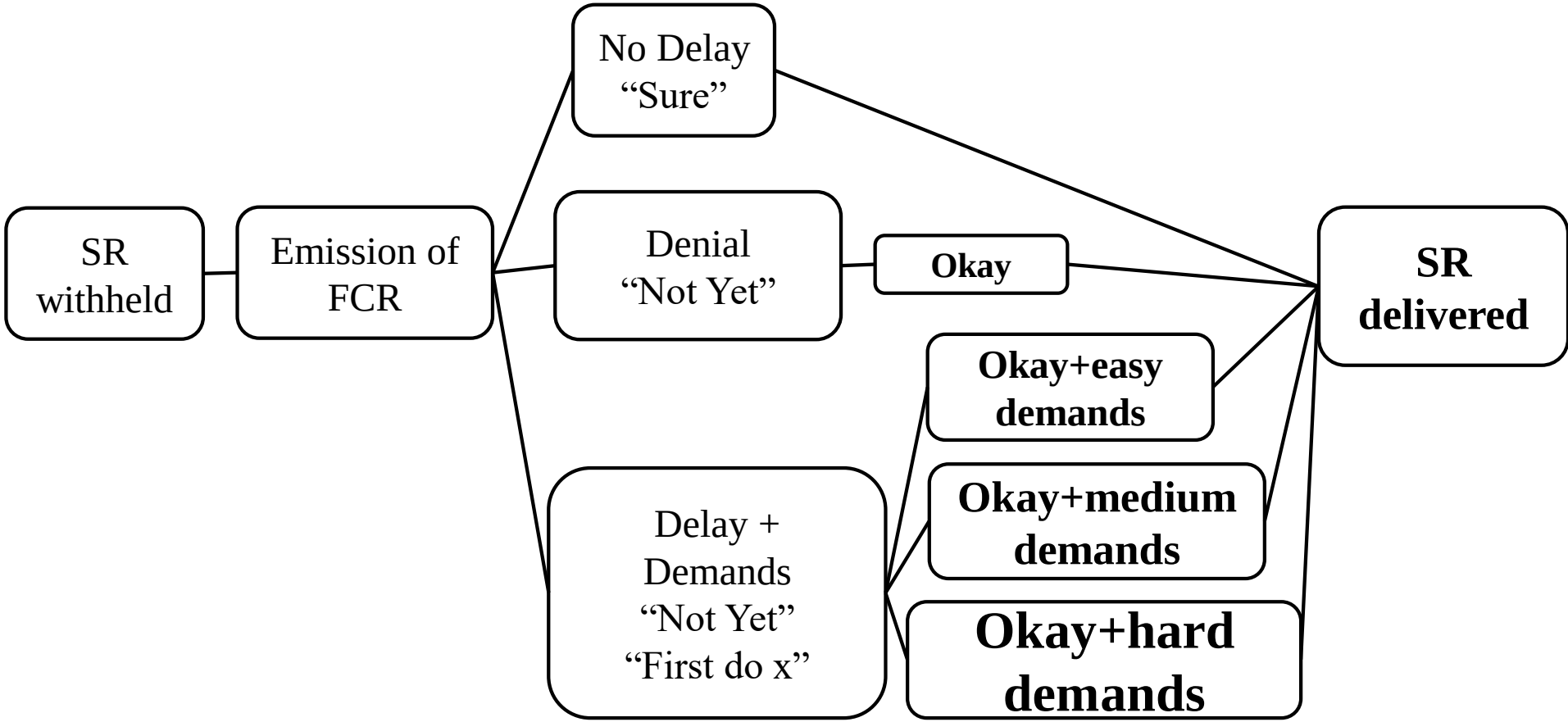
a) Teach alternative tasks following denials

b) Reinforce this repertoire as you would any other repertoire you want to strengthen

c) Present reinforcers randomly between the complex FCR, tolerance response, and the alternative available tasks

d) Build the delays based on their behavior


"Clean up the toys"
Task
Compliance
SR
Tolerance response
SR
Denial
Complex FCR
SR
SR withheld
Problem behavior
EXT


SR withheld
Emission of FCR
No Delay "Sure"
Denial "Not Yet"
Okay
Delay + Demands "Not Yet" "First do x"
Okay+easy demands
Okay+medium demands
Okay+hard demands
SR delivered

Case Example (John, 7 yo, dx: Autism)

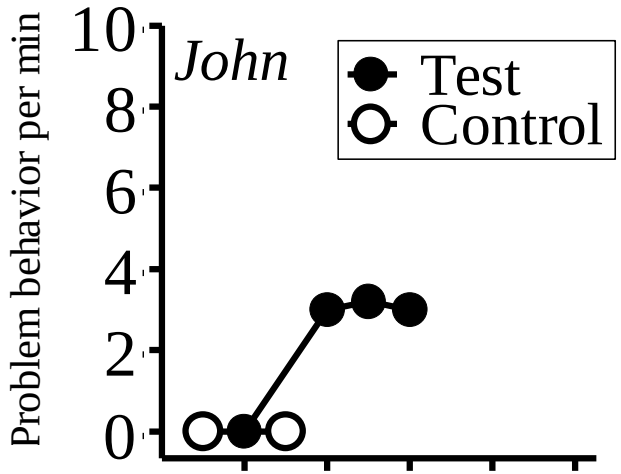
Jessel, Ingvarsson, Kirk, Whipple, & Metras (in press)

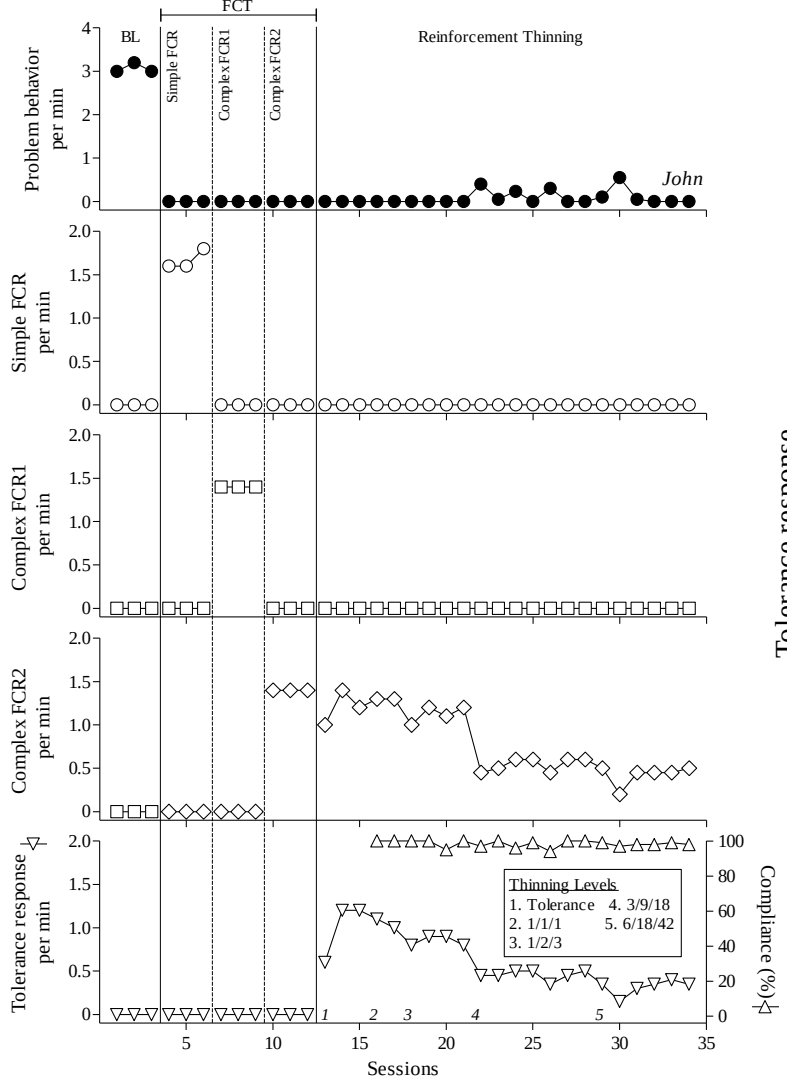
Setting: Outpatient Clinic

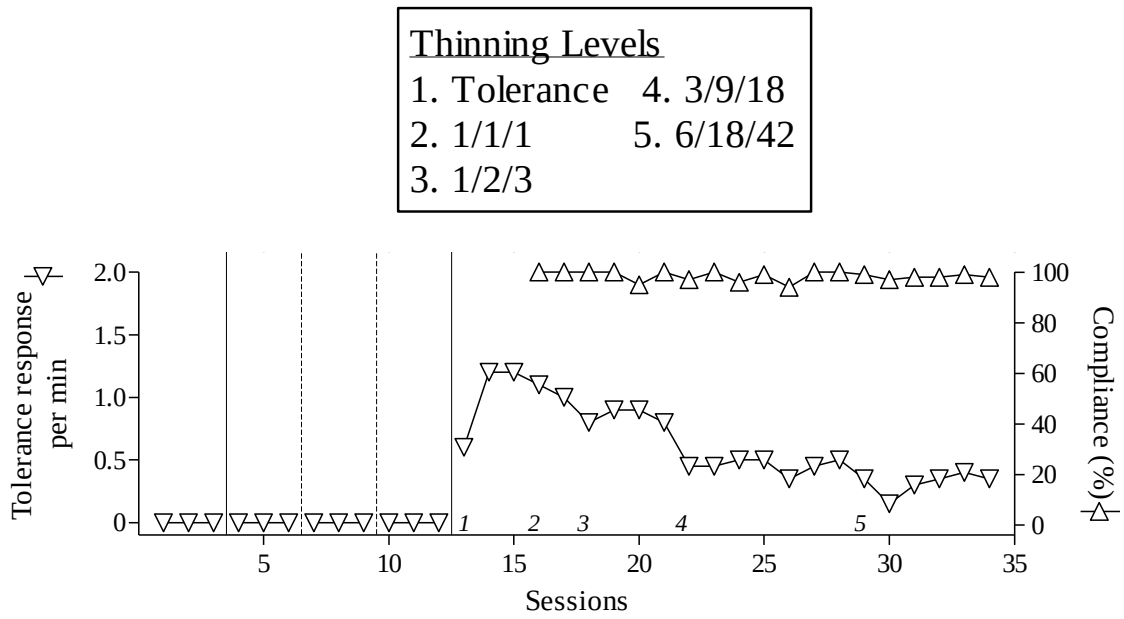
***Hypotheses*:**

John engages in problem behavior in order to:

Escape from instructions to interactive play

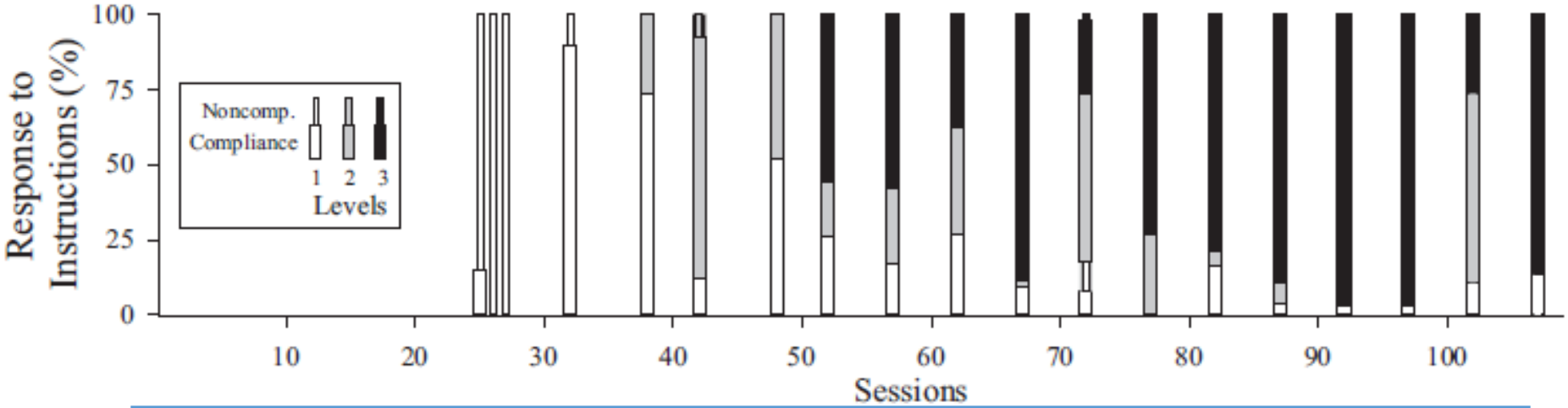



FCT
BL
Simple FCR
Complex FCR1
Complex FCR2
Reinforcement Thinning
Problem behavior per min
John
Simple FCR per min
Complex FCR1 per min
Complex FCR2 per min
Tolerance response per min
Compliance (%)
Thinning Levels
1. Tolerance 4. 3/9/18
2. 1/1/1 5. 6/18/42
3. 1/2/3
1 2 3 4 5
Sessions


Thinning Levels
1. Tolerance 4. 3/9/18
2. 1/1/1 5. 6/18/42
3. 1/2/3
Tolerance response per min
Compliance (%)
1 2 3 4 5
Sessions

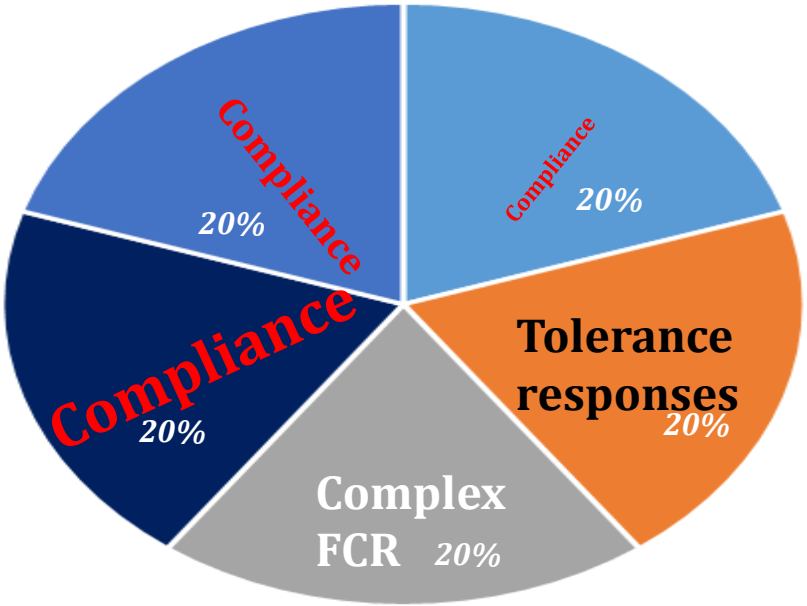
Step 3
Tolerance for Unpredictability Training

a) Remove any signals for
   a) When the reinforcers will be presented
   b) How much is work is required
b) Thin reinforcement to more natural/unpredictable schedules
c) Slowly introduce different people, places, things
d) Slowly introduce more difficult and natural instructions



Progressive Increase in Complexity of Instructions		
1	Simple motor movements	Walk over here, stand up, sit down, clap hands, touch [body part]
2	Simple academics	Draw shape, write name, copy what I write
	Homework/Task preparation	Unzip backpack, take out book, erase the board, put books on shelf
3	Complex academic: Reading skills	Read paragraph, answer question, sound out words
	Complex academic: Math skills	Solve addition/subtraction problem
	Self-help skills	Wash hands, do chores
	Play skills	Throw/kick ball

The world is a scary and unpredictable place. Make sure you train for that.



Reinforcement is:

Function-based
Differential
Intermittent

Reinforcement is:
- Function-based
- Differential
- Intermittent
- Variable in duration

Response requirement is:
- Variable
- Unpredictable

Complex FCR → "No" → Tolerance response → Sr

Complex FCR → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Complex FCR → "No" → Tolerance response → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Complex FCR → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Complex FCR → "No" → Tolerance response → Instruction → Compliance → Sr

Start with your end goal and work your way backwards

Case Example (Lenny, 8 yo, dx: Autism)

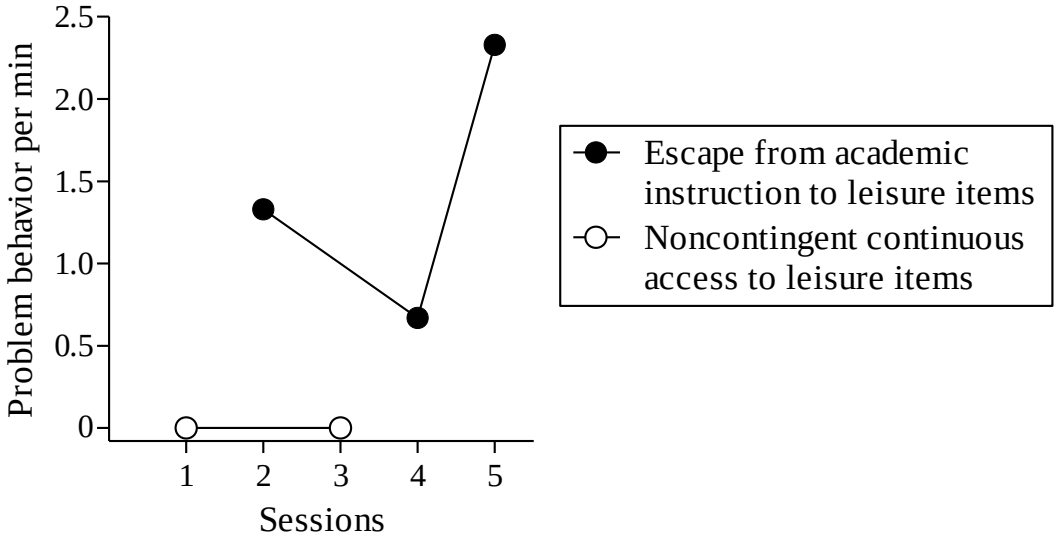
Team: Rachel Metras; Joshua Jessel (supervising BCBA-D)

Setting: Outpatient Clinic

***Hypotheses*:**

Lenny engages in aggression, property destruction, and meltdowns in order to obtain:

Escape from academic instructions to access to preferred items

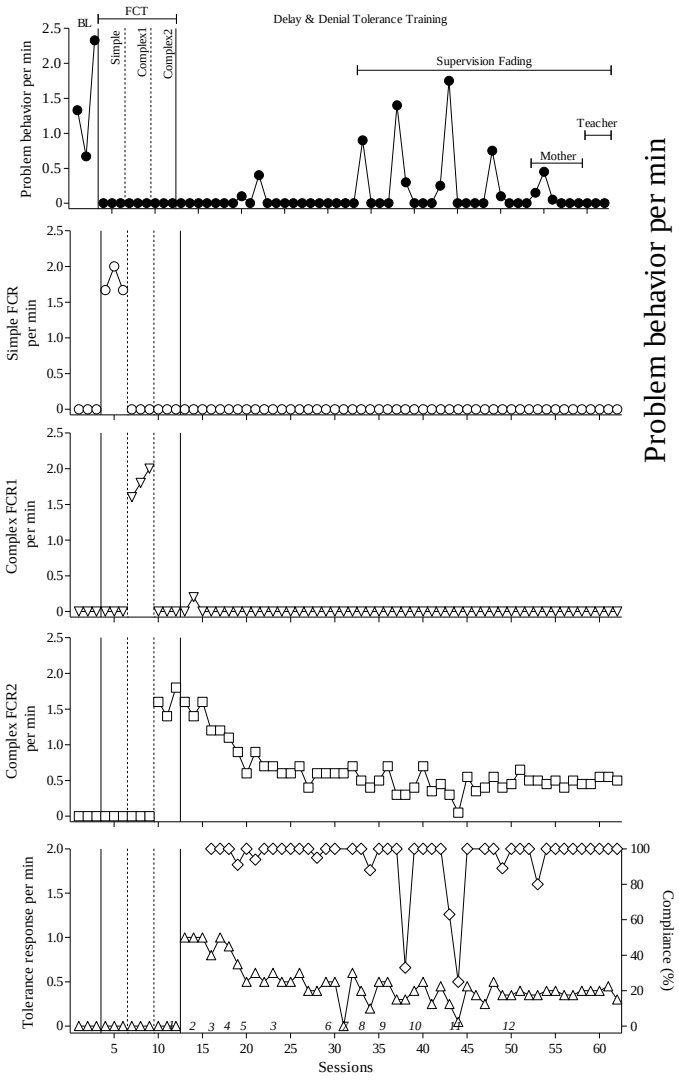


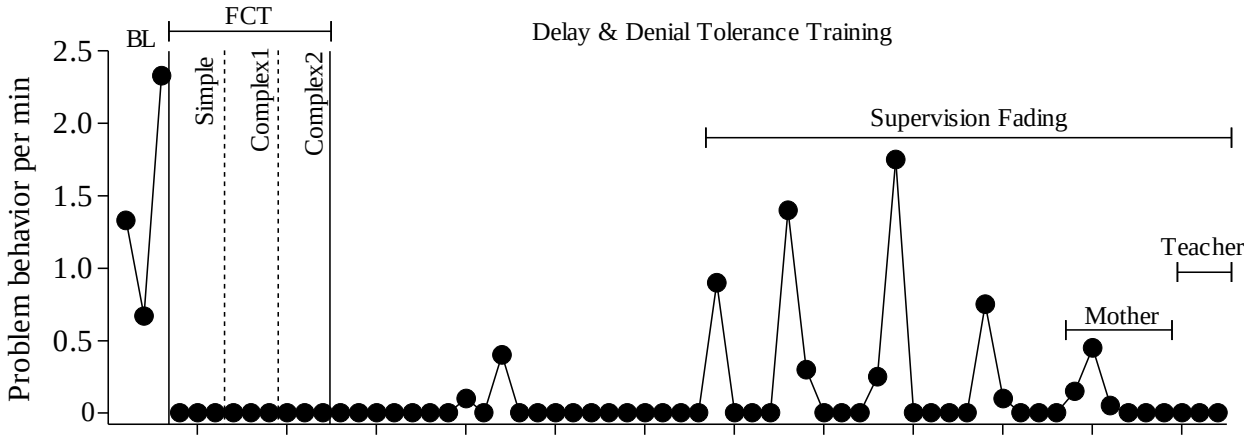
Parent and teacher end goal:

Lenny needs to be able to sit at a table and do his work independently without the need to of constant one-to-one supervision so the teacher can work with other students.

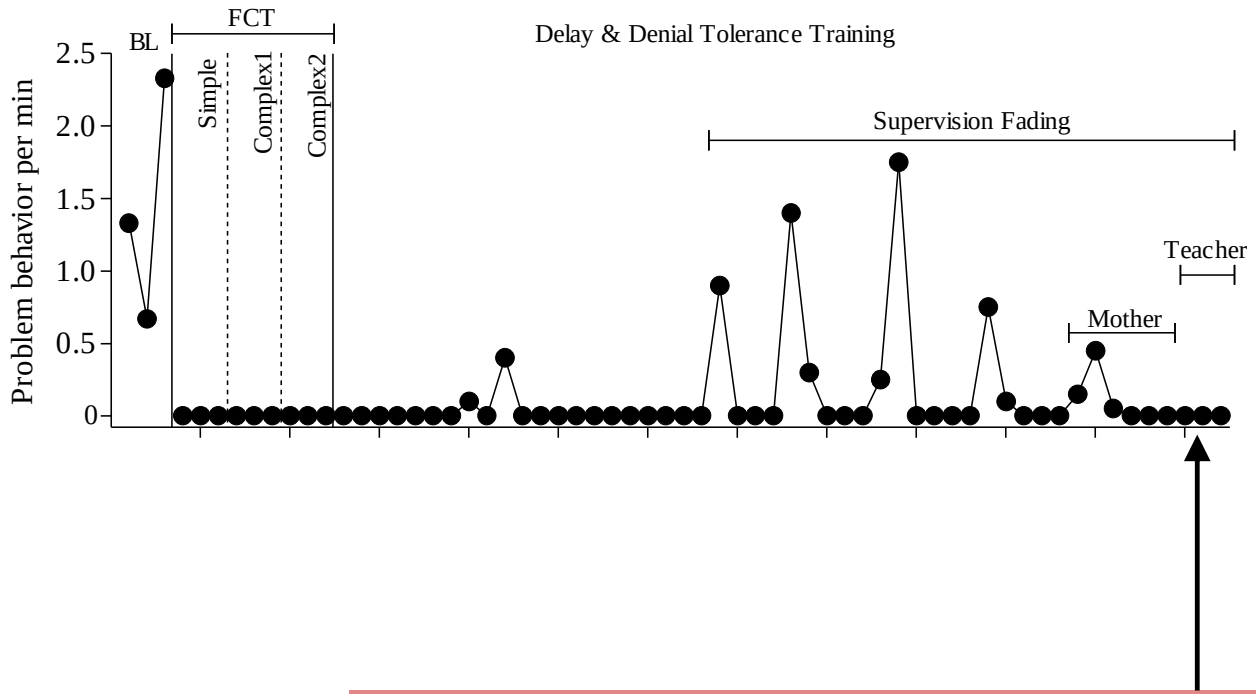
Backwards Design of Treatment:

5) Independent work completion without supervision
4) Work completion without problem behavior
3) Compliance with instructions
2) Socially acceptable communication for wants and needs
1) Simple communication for wants and needs


BL
FCT
Simple
Complex1
Complex2
Delay & Denial Tolerance Training
Supervision Fading
Teacher
Mother
Problem behavior per min
Simple FCR per min
Complex FCR1 per min
Complex FCR2 per min
Tolerance response per min
Compliance (%)
Sessions


BL
FCT
Simple
Complex1
Complex2
Delay & Denial Tolerance Training
Supervision Fading
Teacher
Mother
Problem behavior per min

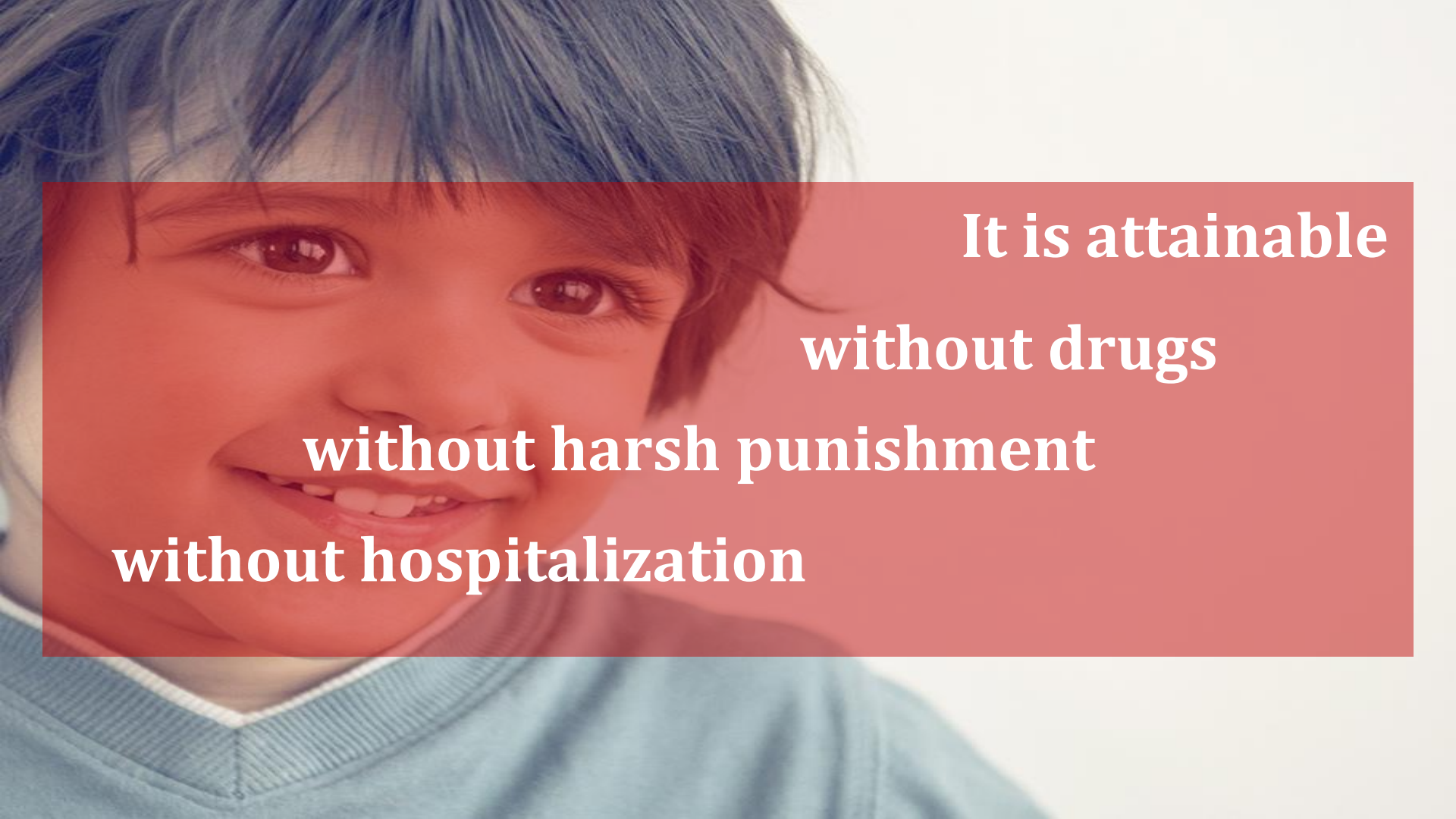
Reinforcement Thinning Steps	
1	1/1/1 instructions
2	1/2/3 instructions
3	2/4/6 instructions
4	4/6/12 instructions
5	6/8/14 instructions
6	6/8/14 with 5 s checks
7	6/8/14 with 10 s checks
8	6/8/14 with 30 s checks
9	6/12/15 with 1 min checks
10	6/12/15 away from table and raise hand when done

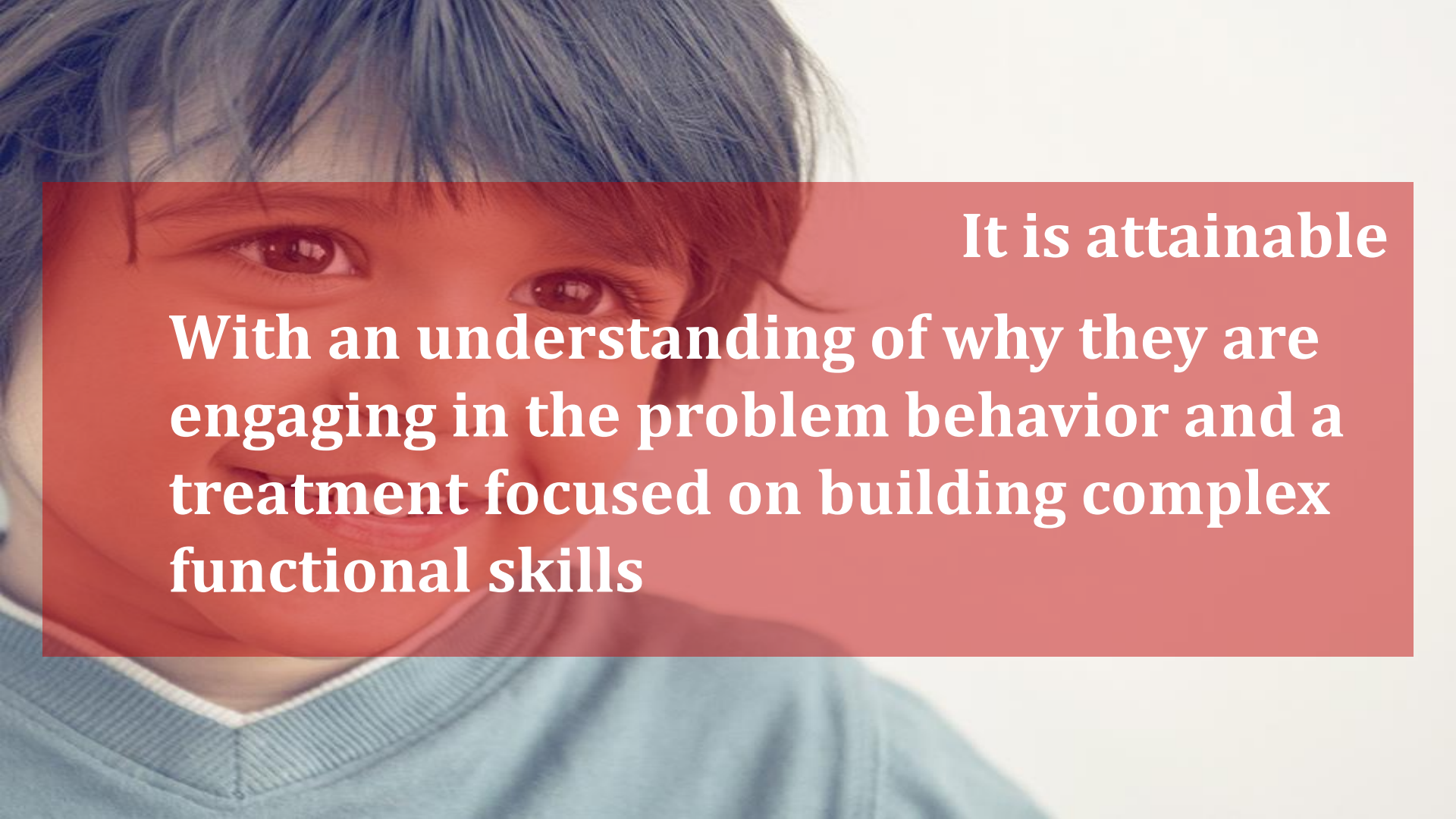


Results:
Elimination of problem behavior with the teacher or parent in the classroom and independent completion of work without constant access to preferred items

Final thoughts

Elimination of problem behavior is attainable


It is attainable
without drugs
without harsh punishment
without hospitalization



It is attainable

With an understanding of why they are engaging in the problem behavior and a treatment focused on building complex functional skills