



ABA in ABI: Enhancing and Expanding Brain Injury Rehabilitation with the Science of Behavior

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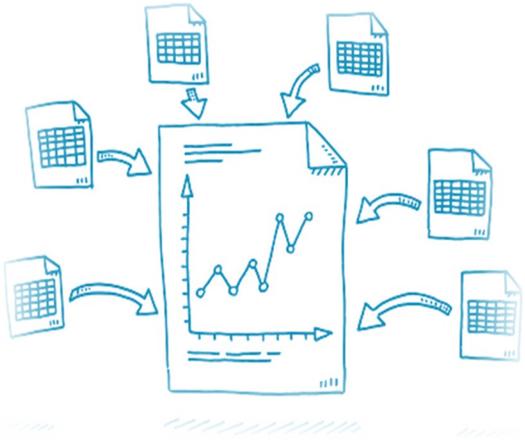
ABA

Applied Behavior Analysis

Behavior Analysts &
the Science of Behavior

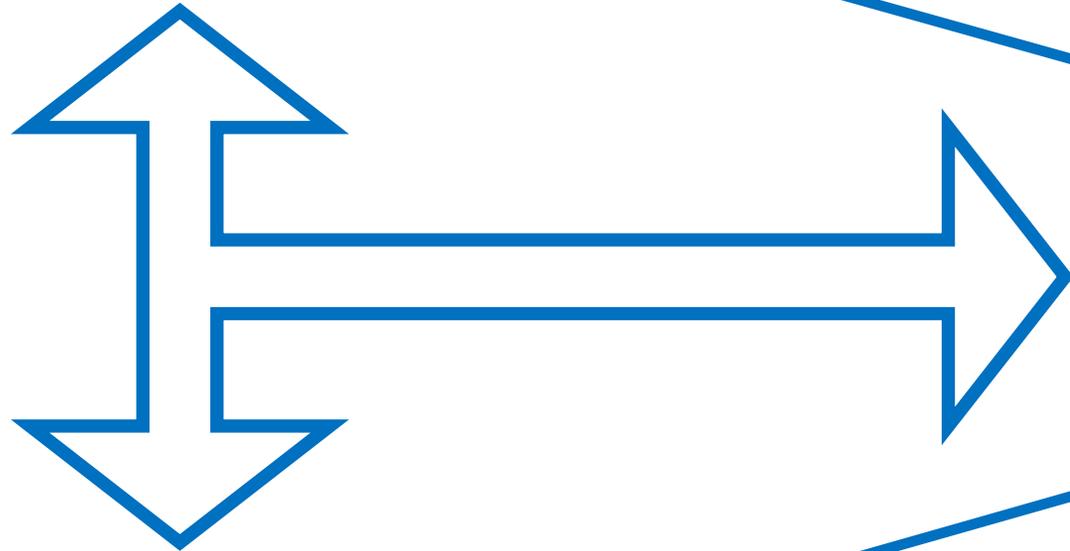
What is a Behavior Analyst?^{1,4}

- A student of B. F. Skinner and the science of behavior, who views behavior as selected by its consequences... what does that mean?
 - When behavior is REINFORCED it becomes more likely to occur in the future, and identifying these relations and types or sources of reinforcement is essential to analysis and intervention...
- A scientist trained in single-subject experimental research, with a goal of predicting and changing behavior
 - Systematically observe the effects of interventions across all treatment areas
- A clinician who gathers objective, quantifiable data to examine the relations between variables
 - Monitor the frequency of behavior(s) over time, as well as time of day features
- A collaborator who enhances and expands the capabilities of the interdisciplinary team
 - Methods to collect data and evidenced-based procedures to change behavior bring powerful tools to the treatment team



How we talk about behavior matters^{1,4,5} ...

INDIVIDUAL



BEHAVIOR

ENVIRONMENT

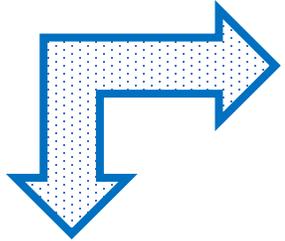
“Behavior is the product of the interaction between the Individual and the Environment”



Behavior is Selected and Governed by its Consequences^{1,3,4}

MO

The “Status” of the individual affects ALL relations



The ABC's

A

Antecedent

Influence chances for the behavior to occur

B

Behavior

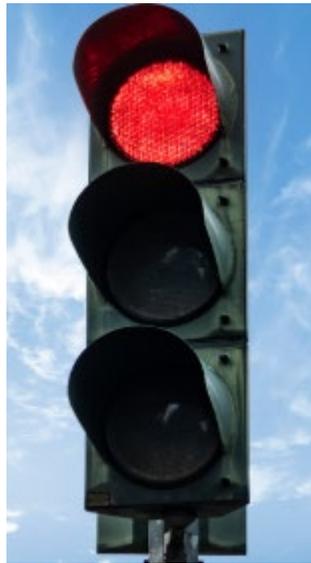
Be specific and clear about the target behavior (including replacement behaviors)

C

Consequence

Determine whether behavior is more or less likely in the future

2 BASIC Functions of Behavior



Negative (-) Reinforcement

Escape or Avoid



Positive (+) Reinforcement

Access

What can change after Brain Injury?^{2,7,8,10}

INDIVIDUAL

- Pain
- Sleep
- Medication
- Vestibular/Sensory
- Motor, Vision & Hearing
- Bowel & Bladder
- Awareness Deficits
- Attention & Memory
- Executive Function
- Communication

ENVIRONMENT

- Access to preferences is structured, limited or absent
- Demand may be increased by need for support and/or effort required to complete routine activities
- Limits and/or control are exerted externally, by unfamiliar people
- Social networks may distance, fracture or fade due to behavior changes
- Profound imbalance of preference and demand



Let's apply these principles to our work...

“I really need to talk to you!”

*Ever heard someone say
“he’s an attention seeker...”?*



- A=** Staff (perhaps preferred) are present/nearby
- B=** Client attempts to engage with question
- C=** Staff stop and talk (but not all the time and for different periods of time)

“Get the %\$#@ outta here!”

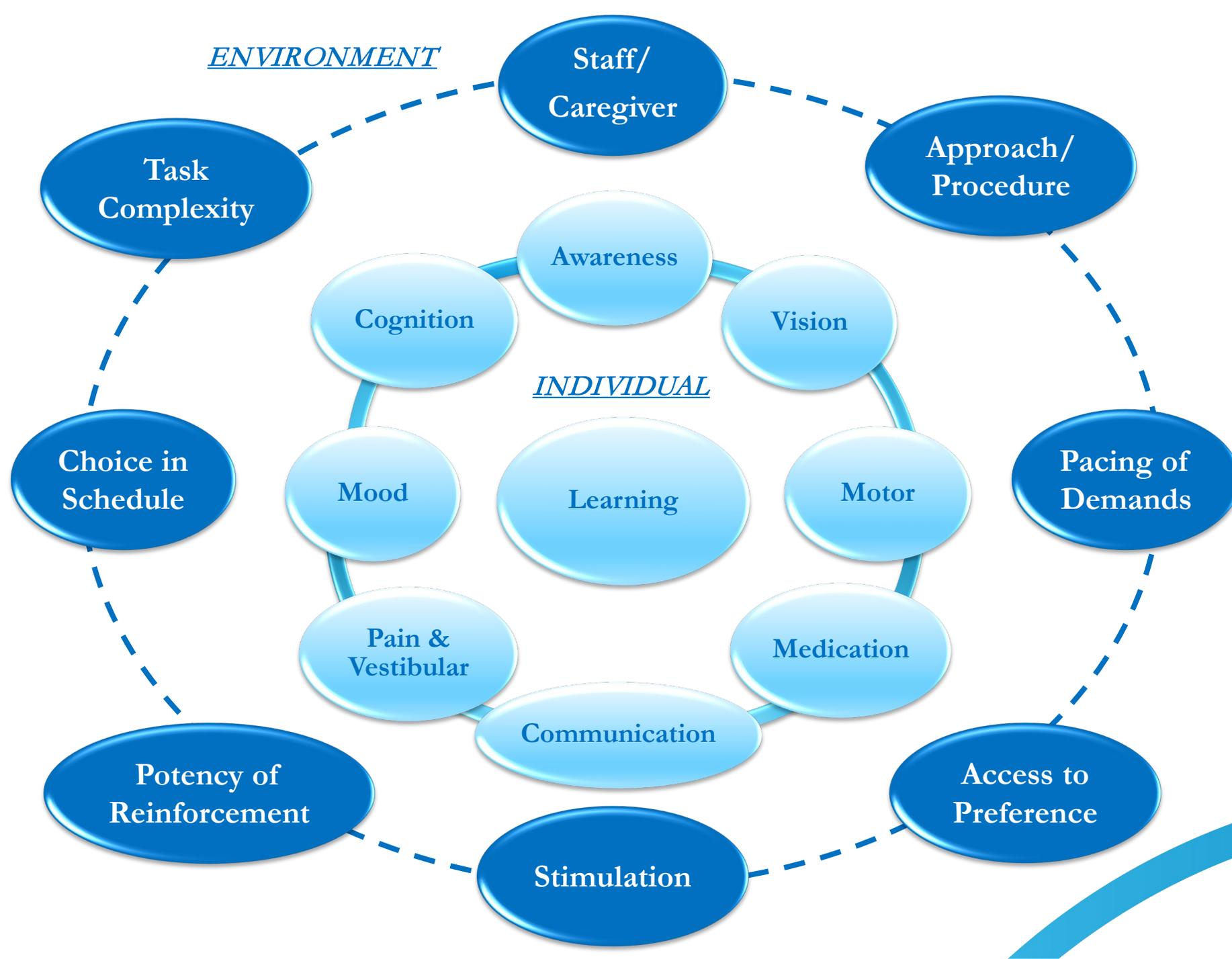
*Ever heard someone say
“he’s non-compliant...”?*



- A=** Staff prompt to non-preferred task (e.g. shower)
- B=** Client becomes verbally aggressive
- C=** Staff leave the room (and sometimes they try again and yelling gets louder before they leave)

In both scenarios challenging behavior is being reinforced by staff but in different ways, knowing the difference drives design and success of any intervention!





Behavior is fundamentally about learning...

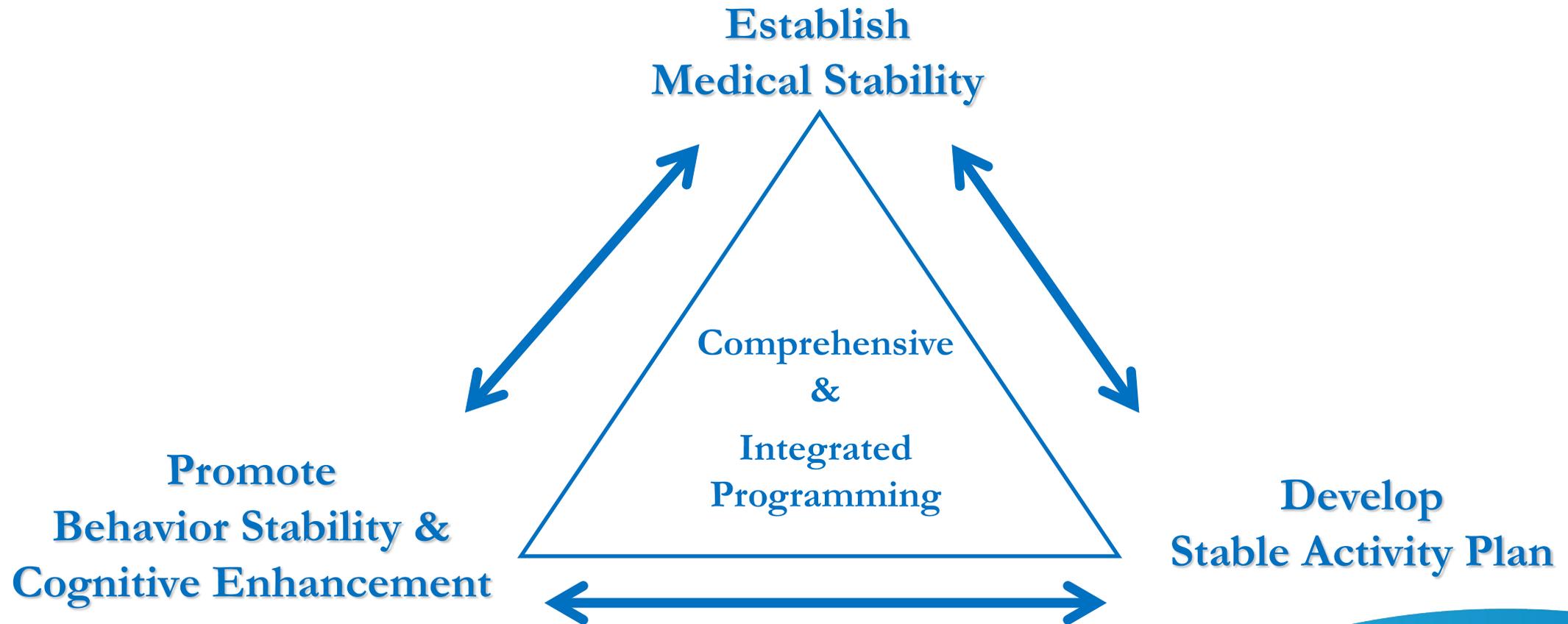
We need to take into account the Individual AND the Environment

Neurobehavioral Philosophy

Scientific Underpinnings

Drive Clinical Practice

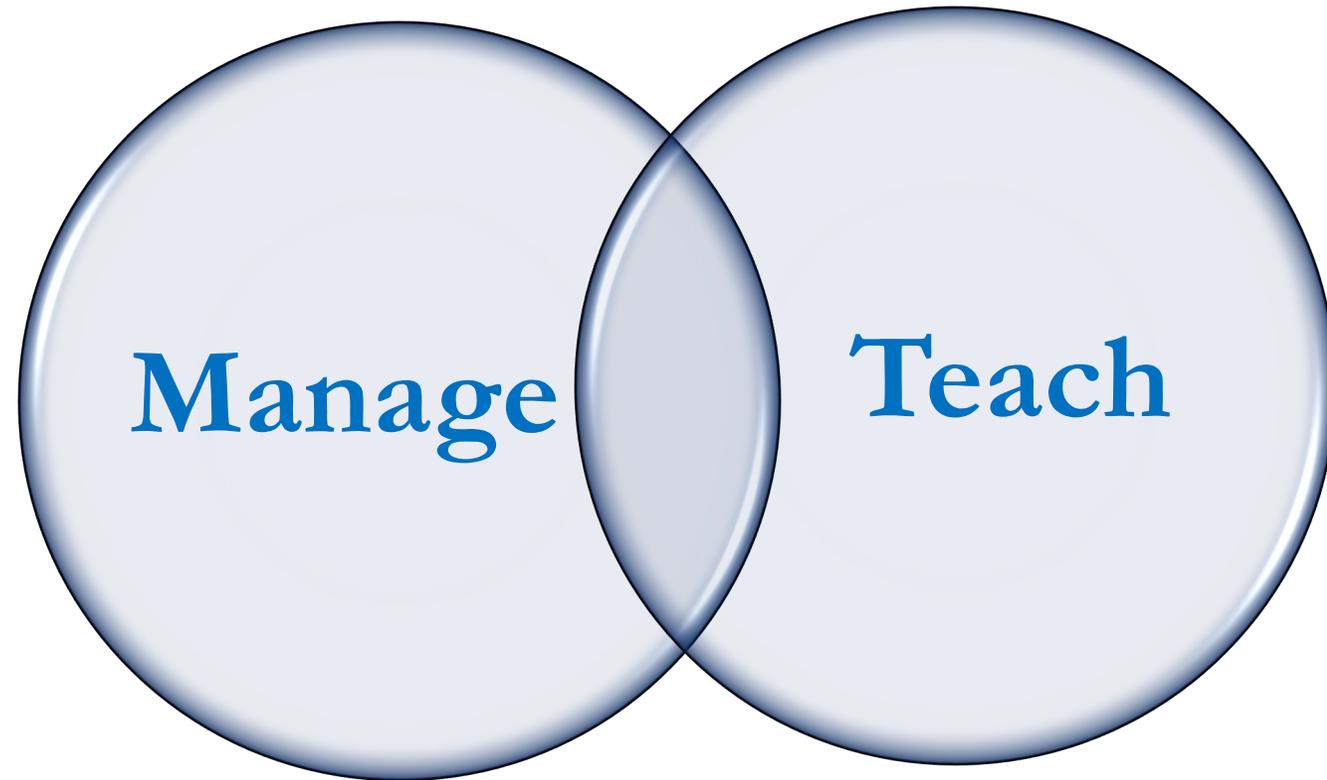
Neurobehavioral Philosophy: 3 Keys to Stability & Success^{6,8}



Behavior is fundamentally about learning^{6,8} ...

Stability impacts learning capacity

- To the extent that complicating variables persist, an individual's learning capacity will be affected
- The clinical team must be prepared to assess and prioritize in an ongoing way to guide and support the individual and the team
- Crisis Plan to Treatment Plan to Discharge Plan



Let's look back at how to address these behaviors...

Structure access to attention and reinforce delay



- Establish tools to record questions, issues, etc. in the moment, then delay to scheduled meetings
- Establish the schedule for these meetings based on frequency of the behavior
- Identify key staff who can facilitate them, with a plan to generalize to others
- Add extra reinforcement for tolerating delay and sustained success (of differing potencies)

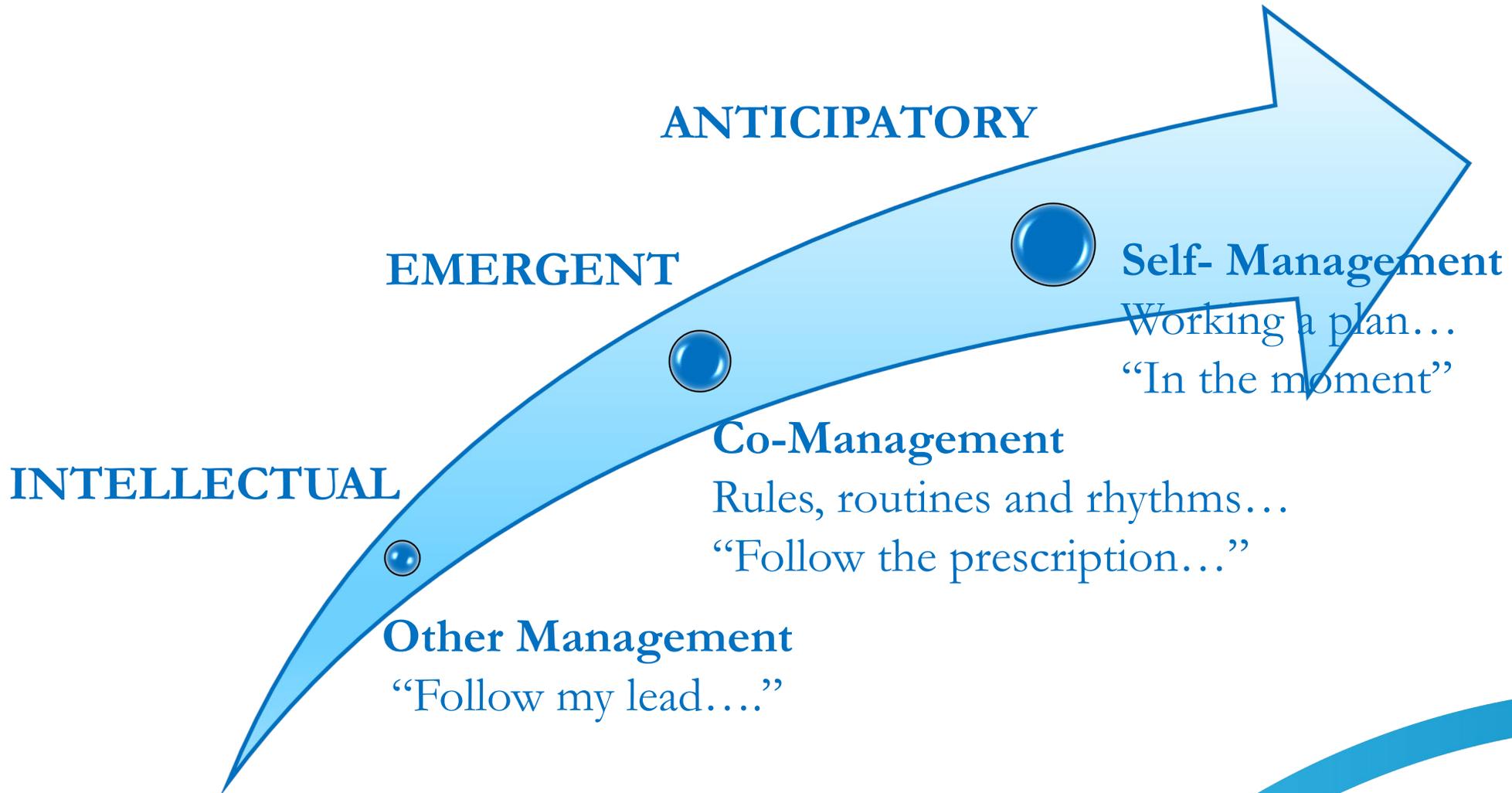
Pace demands and reinforce tolerance



- Minimize the demands of the task by breaking it down, using high preference staff, music, etc.
- Teach and reinforce requests to “stop” or “take a break” (or prescribe them, if needed)
- Consider higher preference task first or immediately after, e.g. coffee then shower, or ride after shower
- Provide reinforcement for engagement, completion and sustained success (of differing potencies)

In both scenarios we are addressing challenging behavior by matching the function!

Awareness & Behavior Change¹¹



Case Studies

Sarah...

Background:

- Onset of MS at the age of 27
- Lived independently in the community and raised a son (who later graduated from High School during her admission)
- Significant change in cognitive and functional status reported following experimental drug therapy
- Emergence of functional decline, confusion, memory impairment, at risk behaviors including falls, agitation, elopement, etc...
- Psychiatric admission followed by admission to acute rehabilitation facility where behaviors persisted
- Eventual admission to Collage for neurobehavioral rehabilitation

Complications:

- Admission was necessary for stabilization, evaluation, and treatment but she strongly opposed
- Nursing home available through funding but Medical and behavior instability significant factors related to candidacy for these settings
- Goal was to increase safety, stability and establish readiness for an eventual transfer

Neuropsychiatry

Bowel & Bladder Issues

Neurology

Positioning & Skin

Physiatry

Poor Sleep

Nursing

Medication Changes

Urology

UTI's

Hydration & Nutrition

Progression of MS

**Establish
Medical Stability**

Comprehensive
&
Integrated
Programming

**Develop
Stable Activity Plan**

Memory Impairment

Verbal
Aggression

Psychology

Behavior
Analysis

Elopement

Promote

**Behavior Stability &
Cognitive Enhancement**

Unstable community engagement

Family burned out

Occupational
Therapy

Falls

Physical Therapy

Mood Lability

Threatening & Demanding

911 Calls

No social network

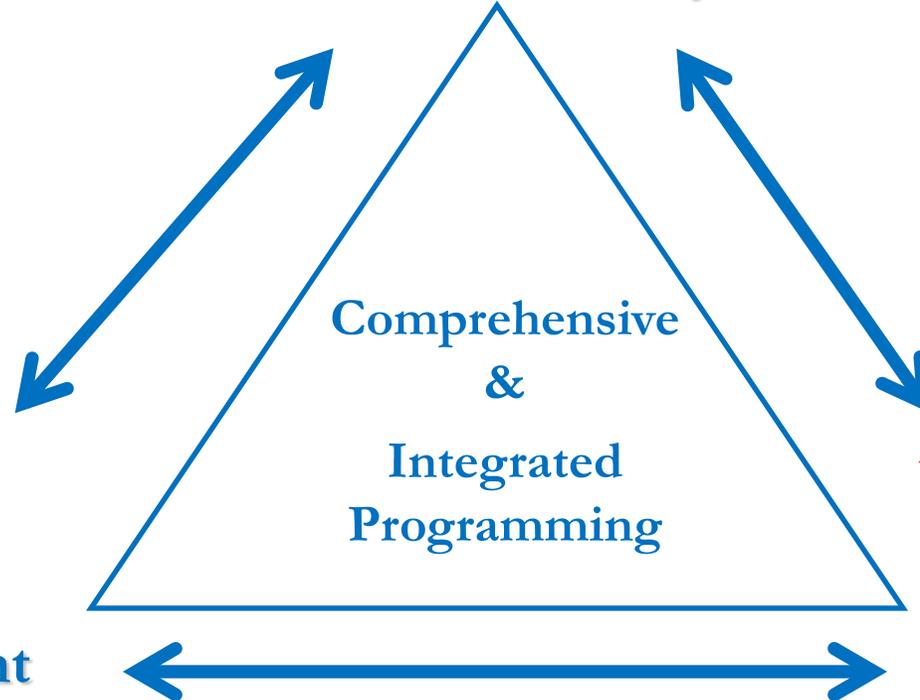
Therapeutic Recreation

Neuropsychology

Unsafe in Power Chair

No access to driving

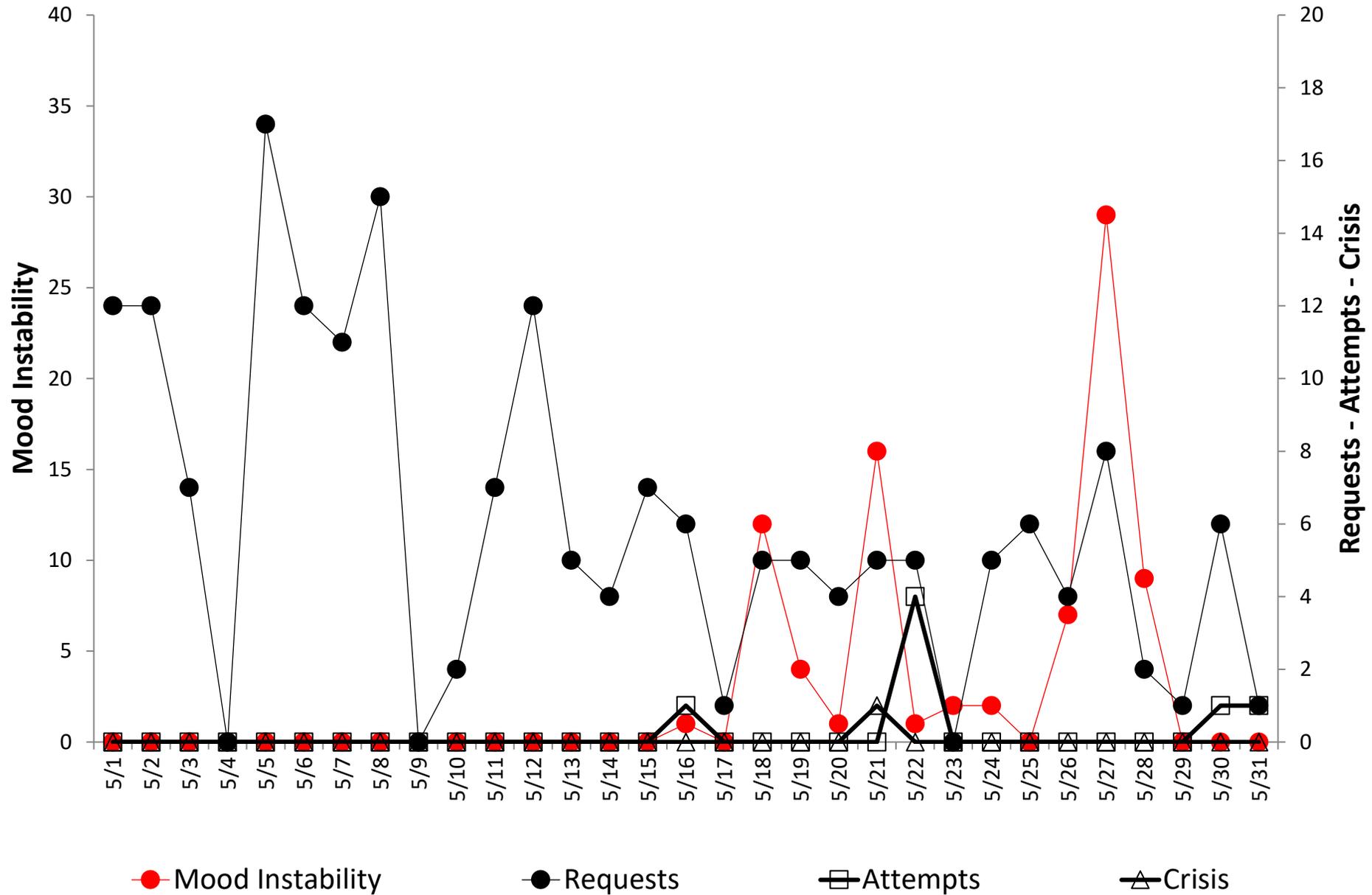
Limited Activity
Participation



Mood Instability defined as tearfulness or disruption to milieu due to verbal upset

Requests & Attempts defined as requests or attempts to transfer, self-cath or self-disimpact at non-scheduled time

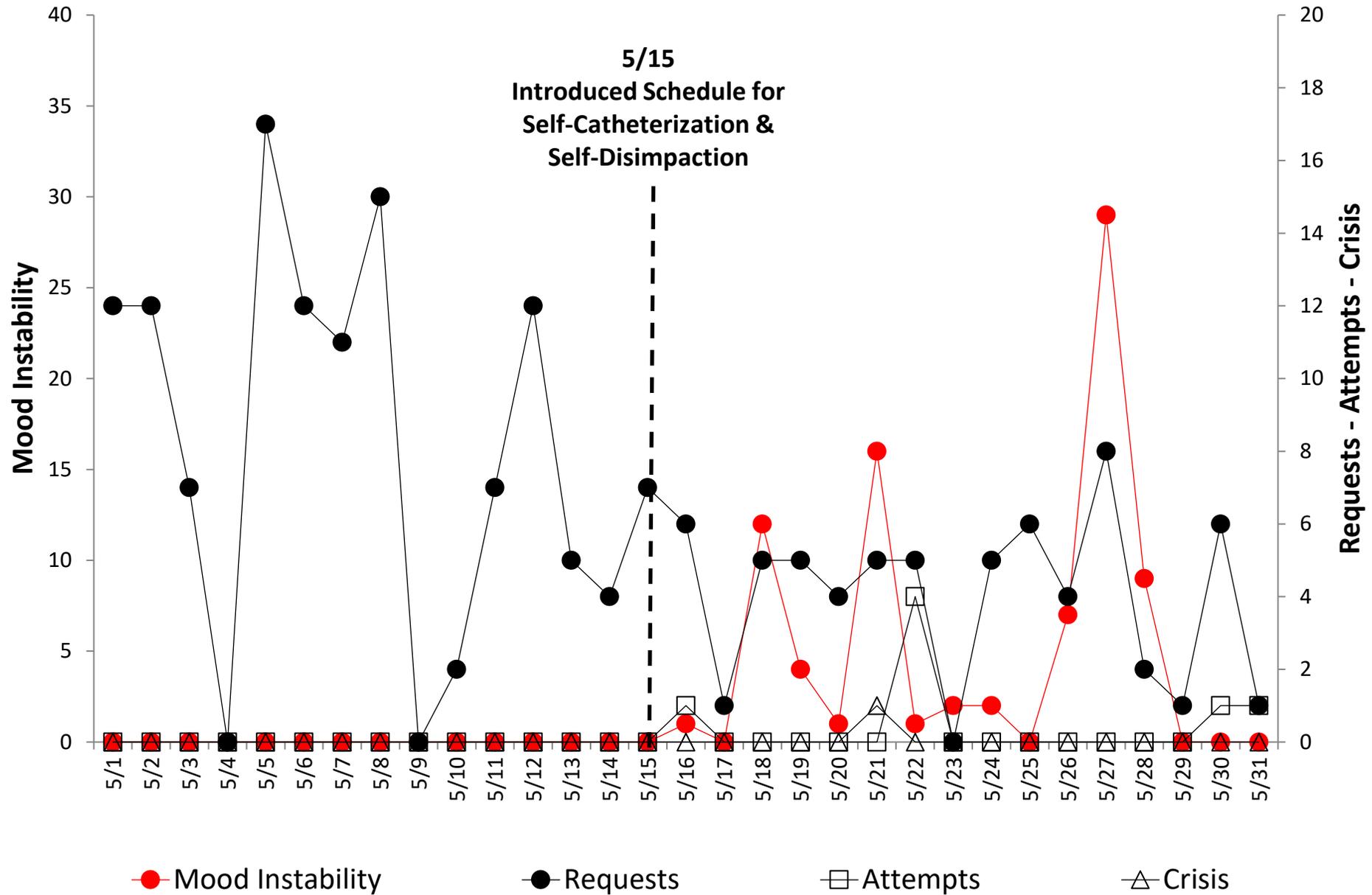
Crisis defined as calls to 911, elopement attempts or sliding out of chair

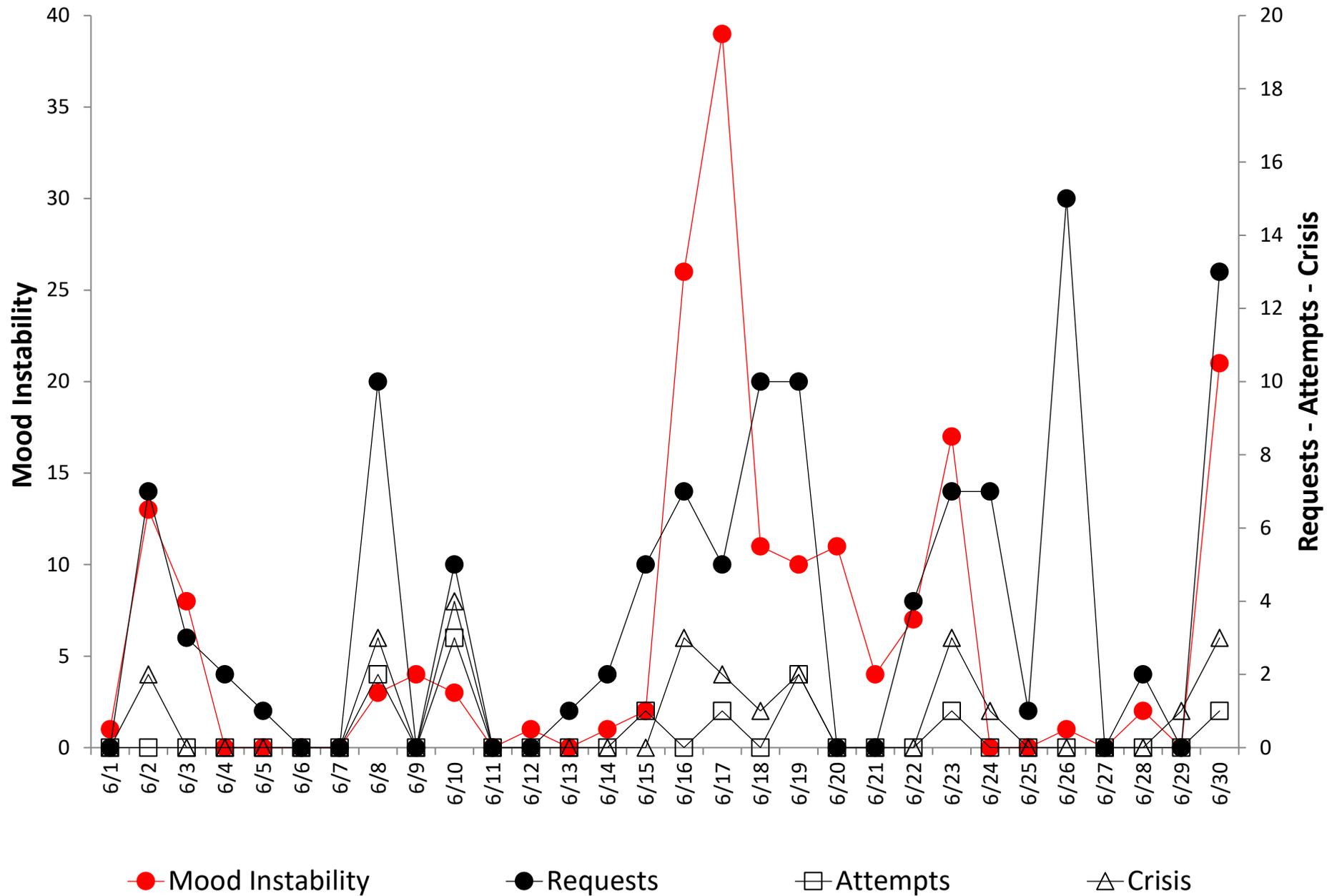


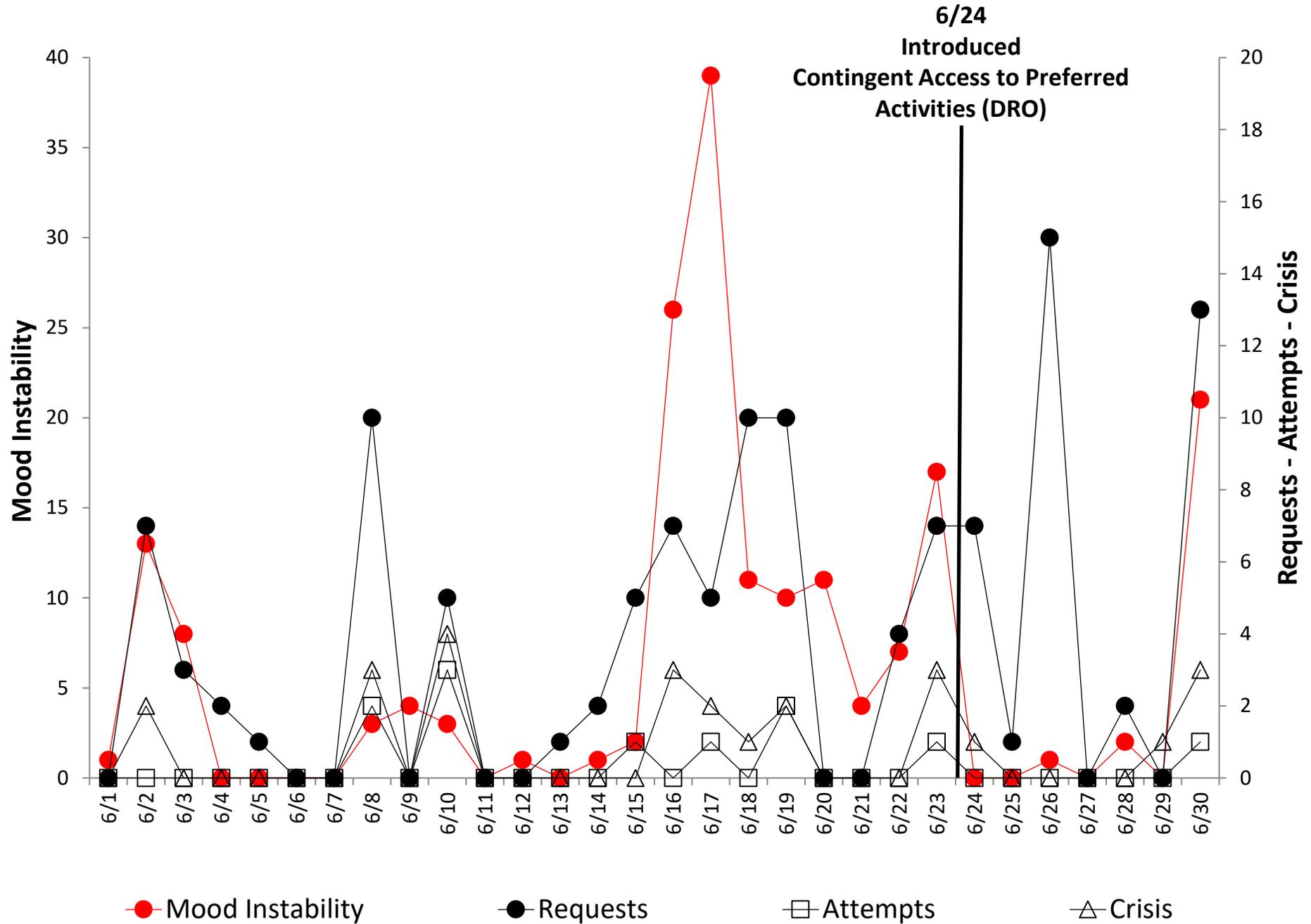
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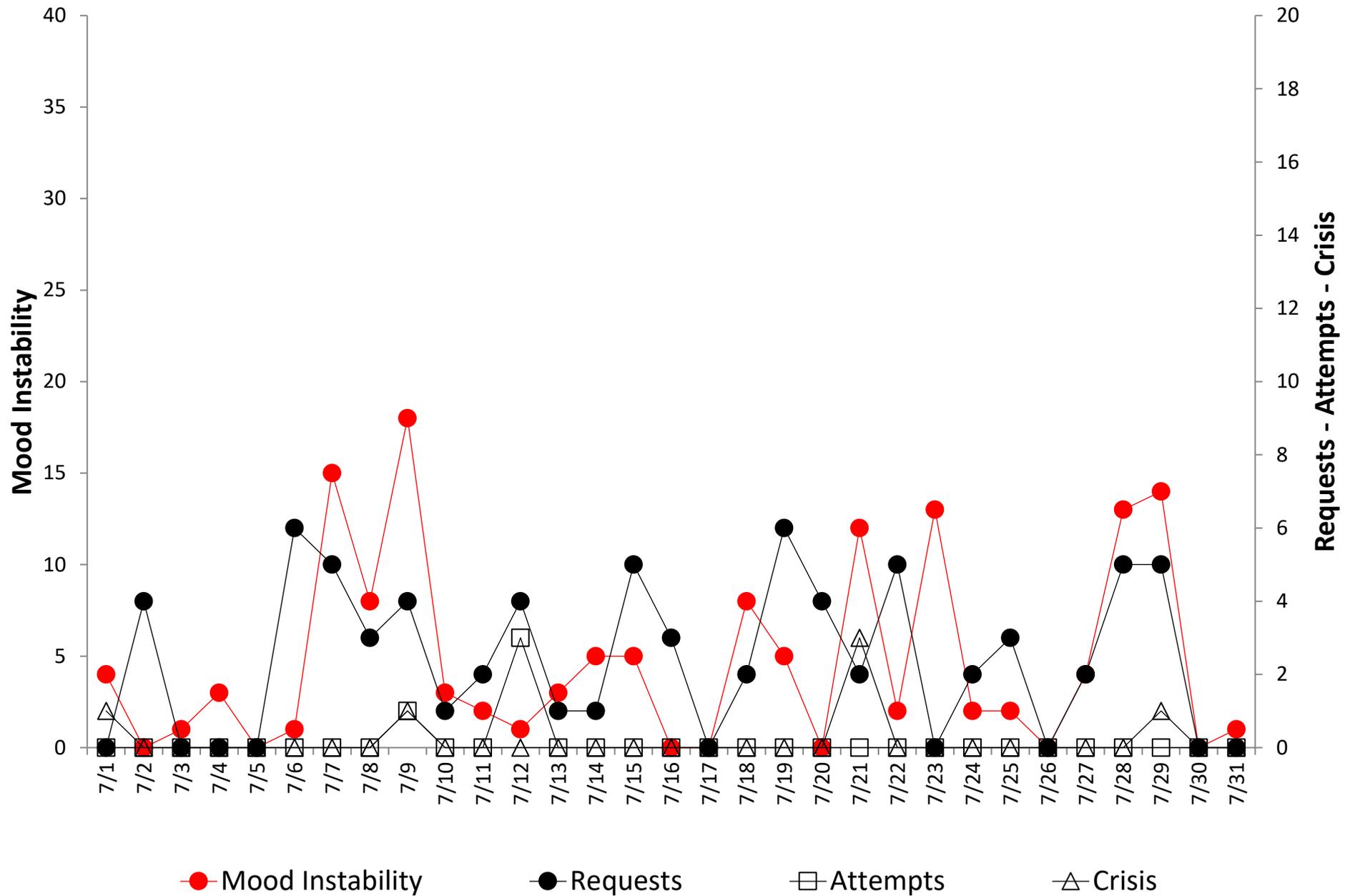
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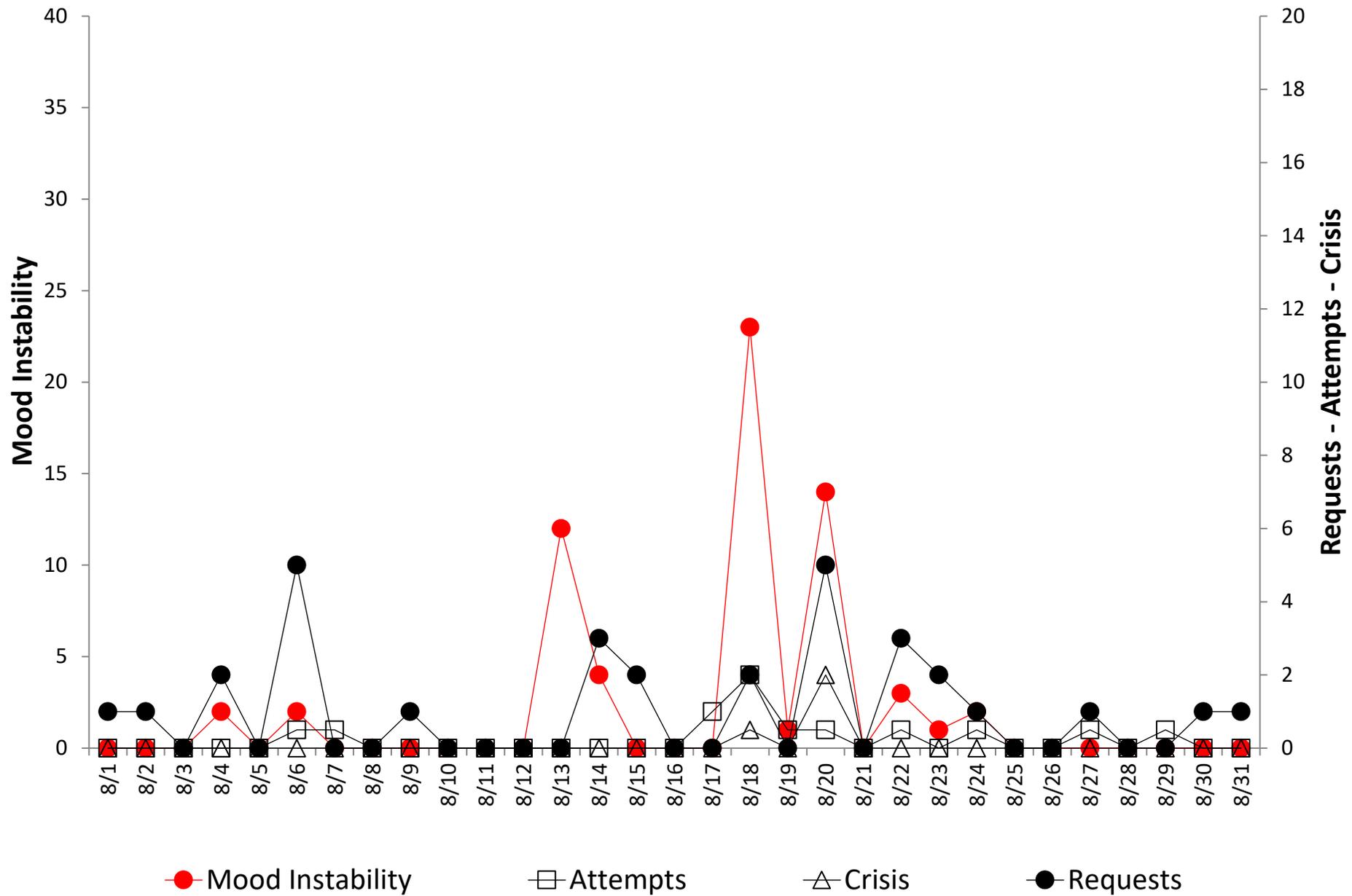
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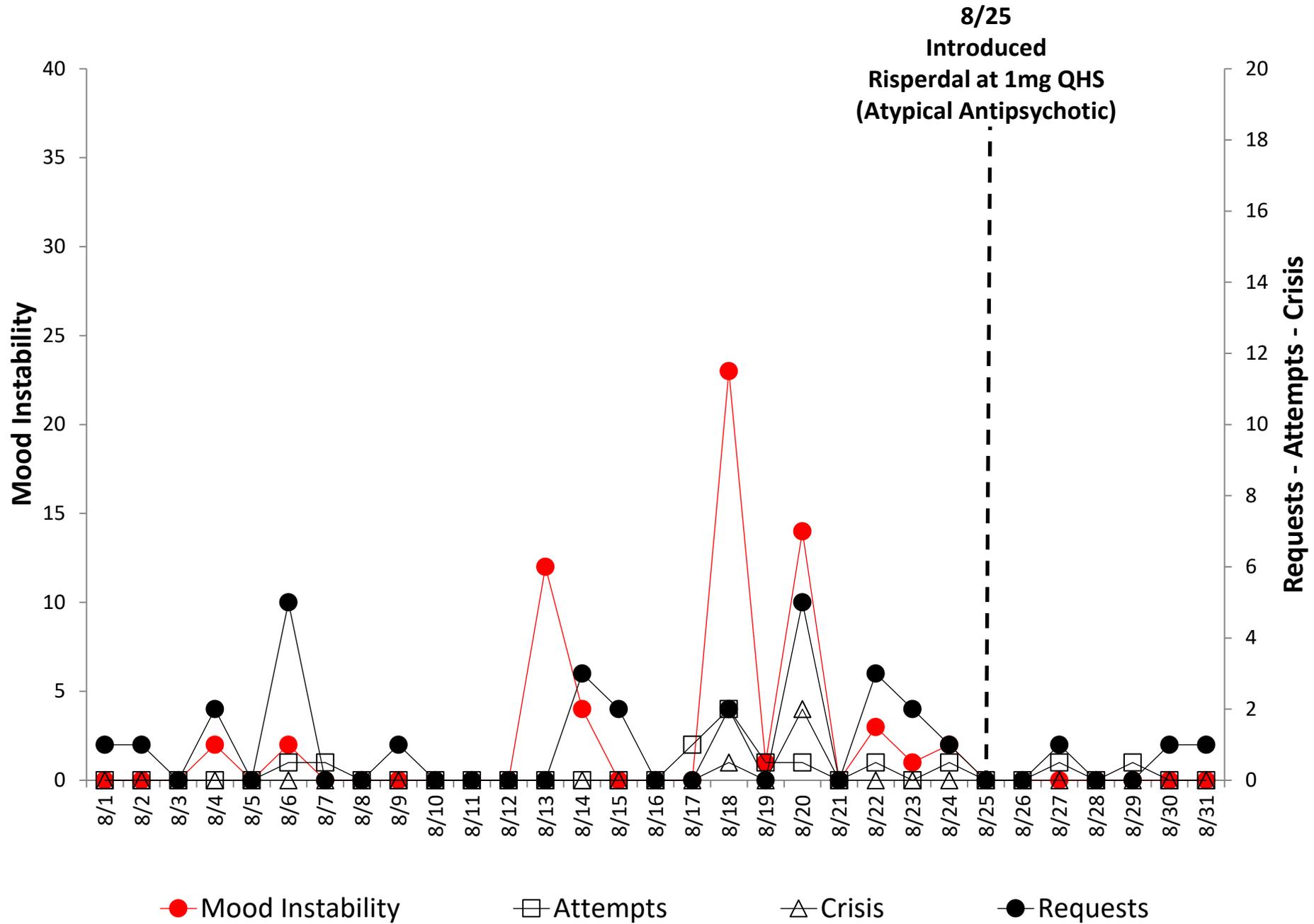


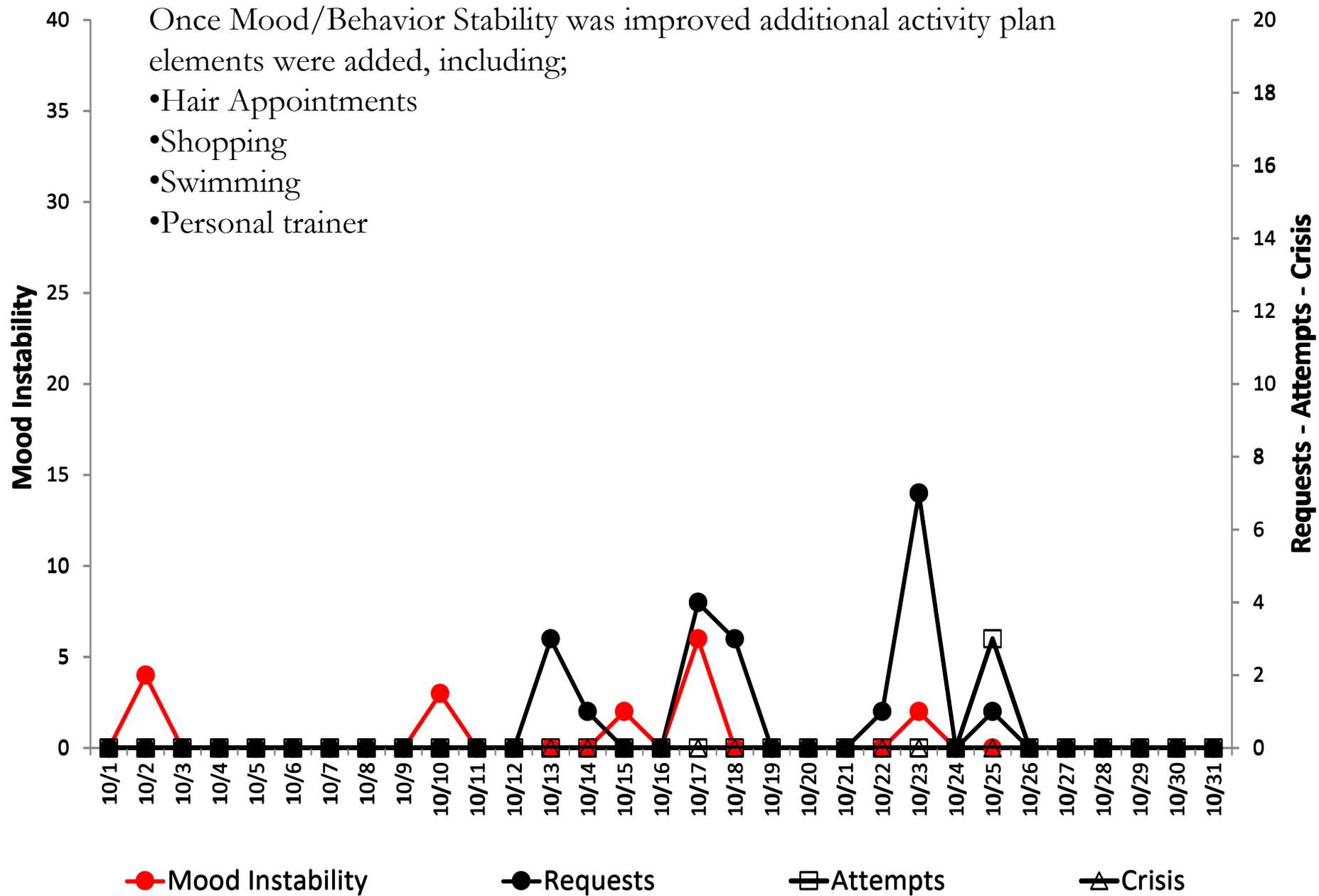












John...

31-year-old male, sustained a severe TBI in 2018, as a result of a work-related MVA

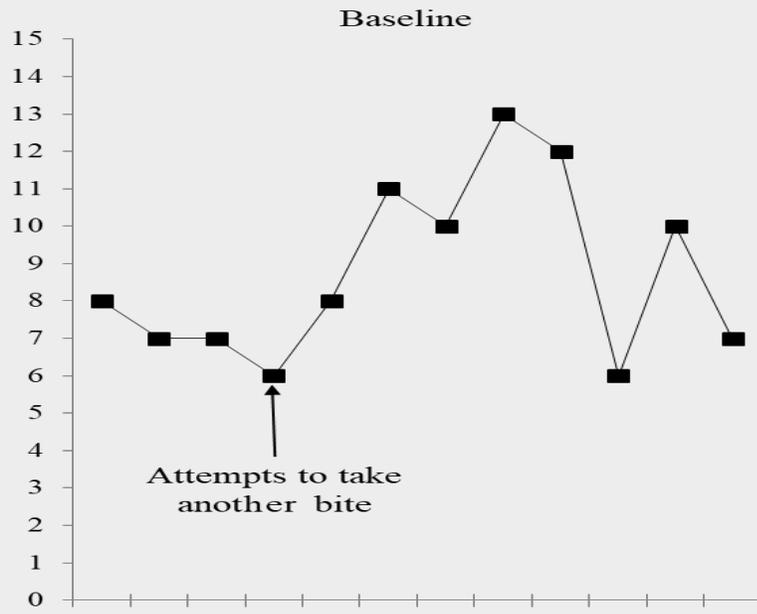
Admitted to our short term intensive rehab setting, approx. 5 mos. post-injury

Residuals & Risk Factors:

- Left-sided hemiparesis, tone, spasticity, and pain
- Significant motor and sensory deficits
- Blind in R eye, impaired vision in L eye
- Executive dysfunction, including affective instability with periods of tearfulness
- Limited expressive, but generally preserved receptive communication
- Dysphagia, requiring modified diet; pureed foods and honey-thickened liquids
- Hx of impulsive and unsafe eating behavior; high risk for aspiration

Intervention(s):

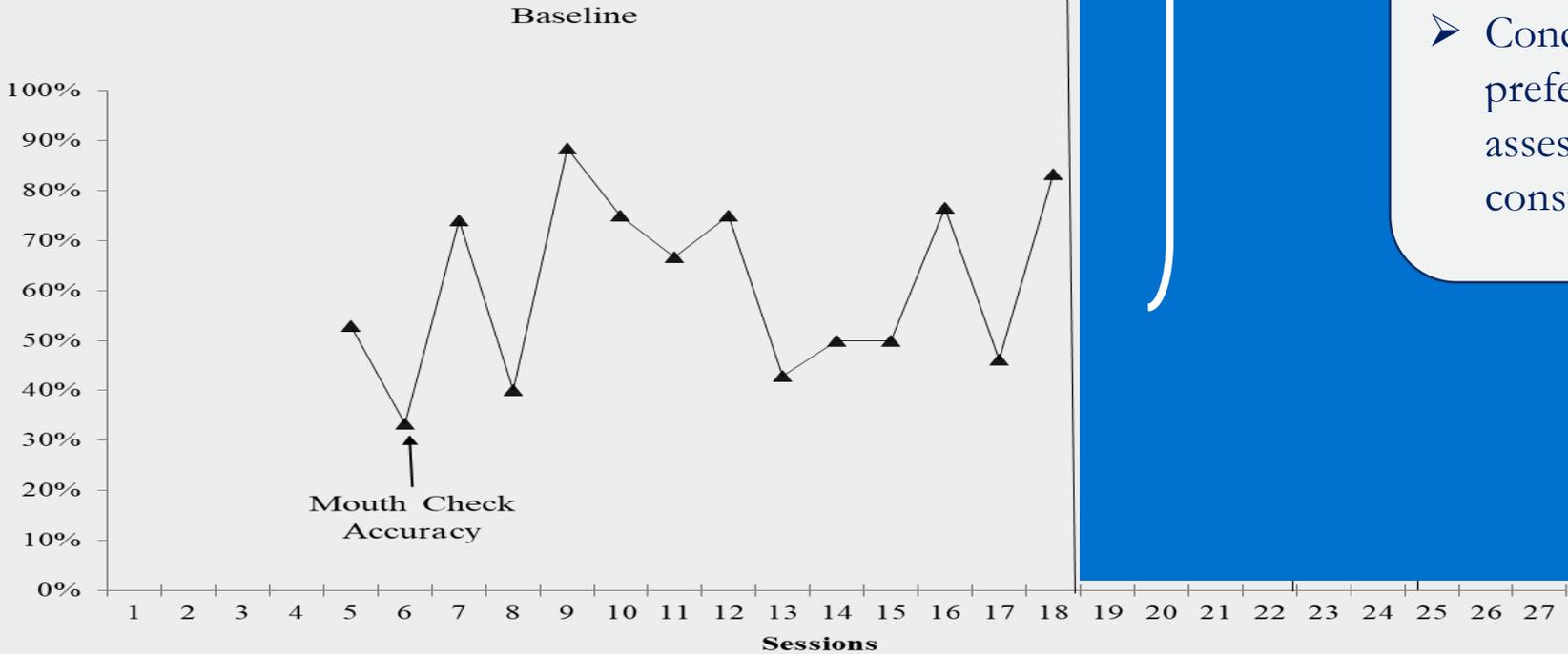
- Intensive SLP intervention did not result in safer eating behavior
- Persistent issues with impulsive eating resulted in the need for one-to-one supervision for meals, in a distraction-free environment
- Food preparation (puree`) diminished food preferences; client's goal was to have access to more preferred foods and normal textures (e.g. cheesesteaks)
- Goal was to establish self-feeding behavior that maintains safety and establishes candidacy for trialing high preference foods at mech soft consistency...eating with housemates too
- Ongoing collaboration with SLP, to establish protocols and parameters for intervention; OT also involved to inform intervention based on visual deficits 

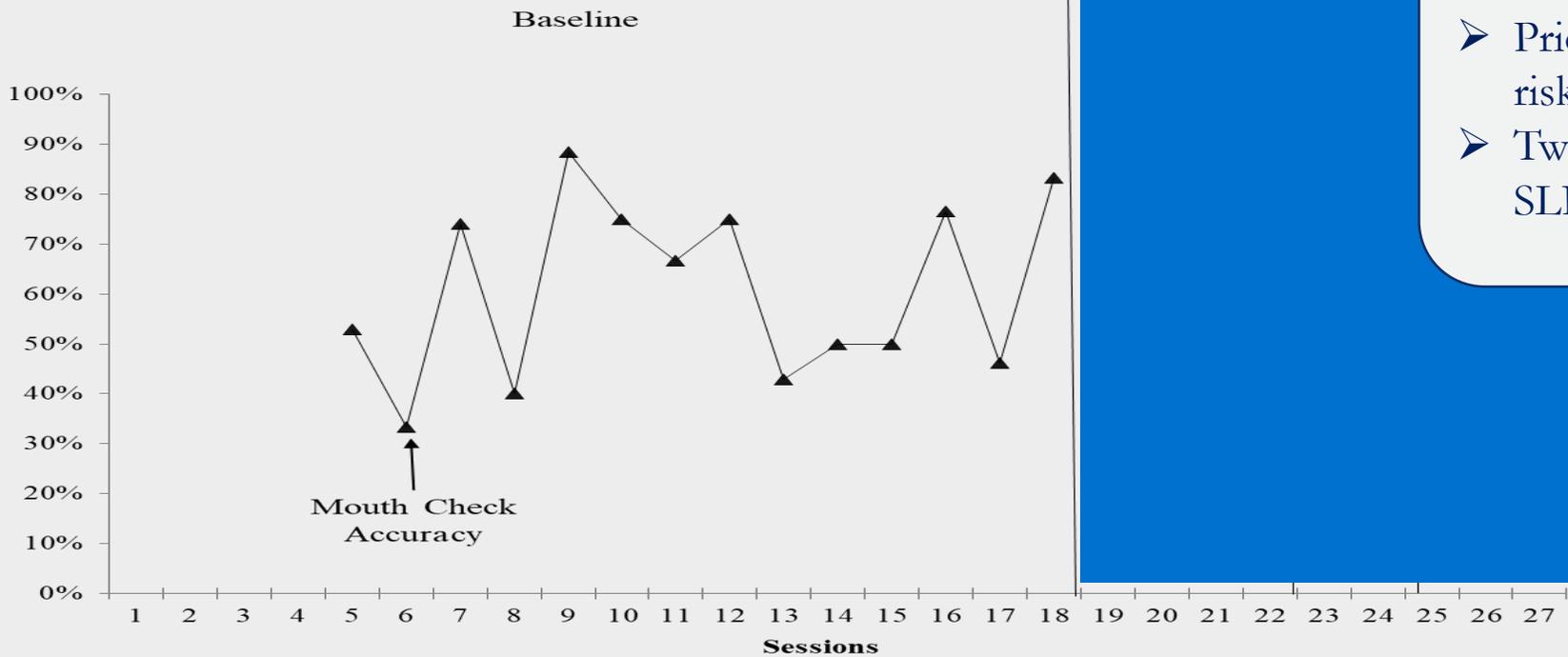
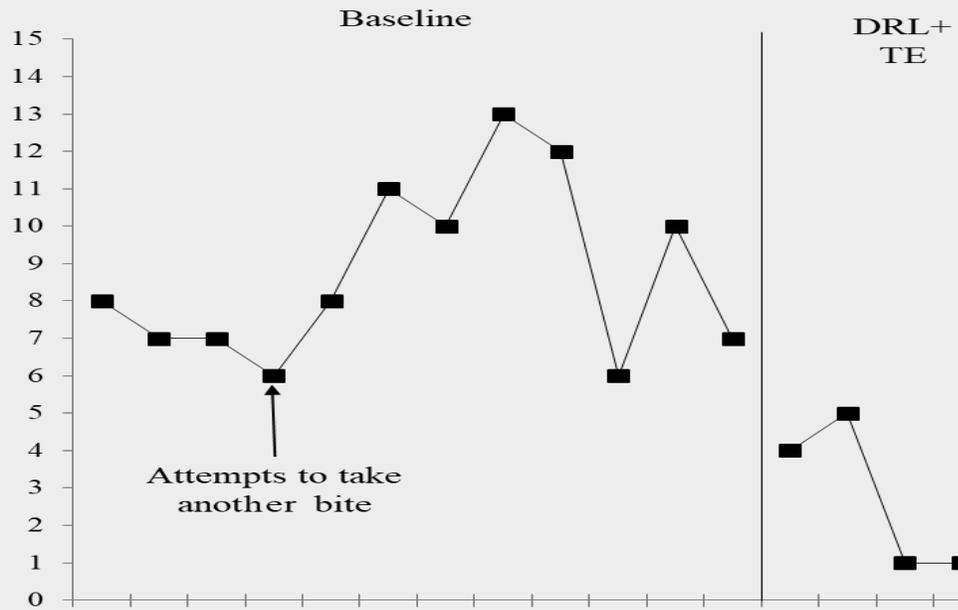


SLP participated in trials and informed protocols for bolus size, technique, and timing...

Baseline Phase

- Establish and assess baseline data
- Conduct preference assessment of consumables

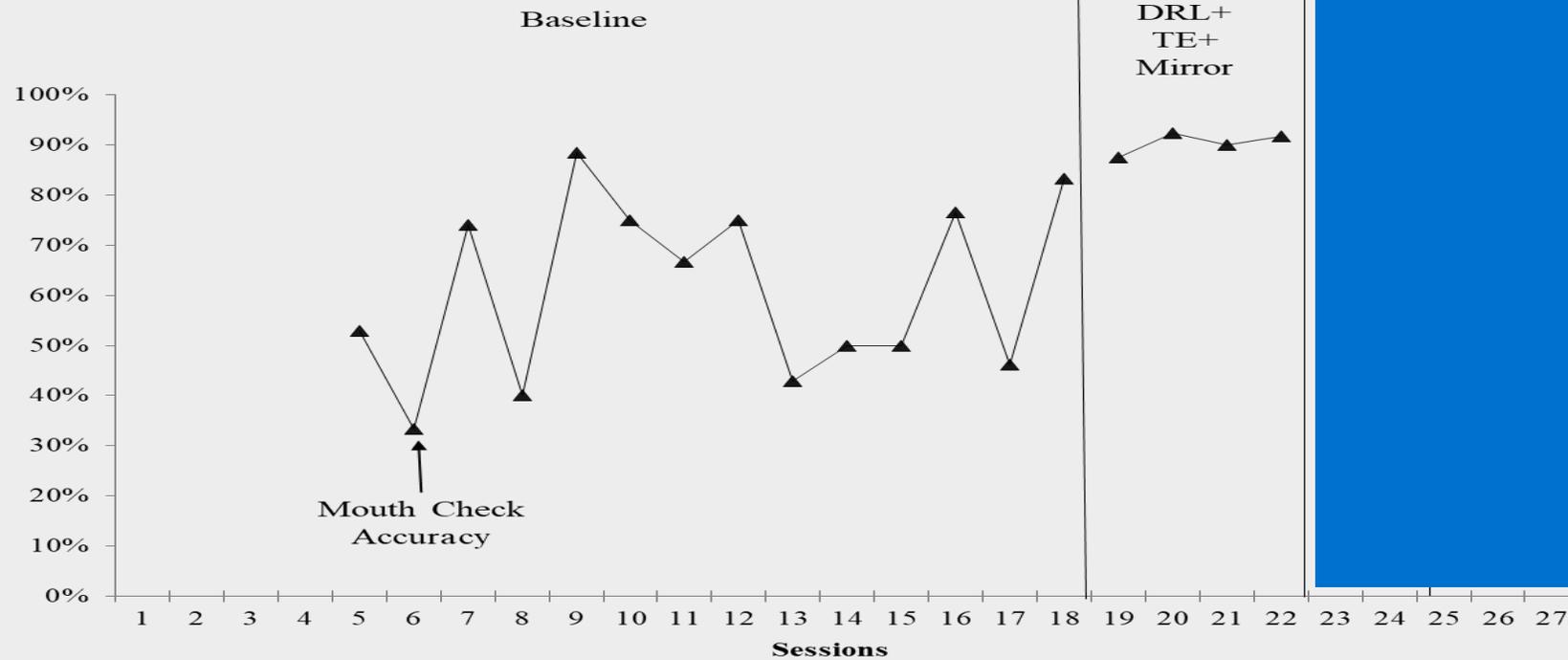
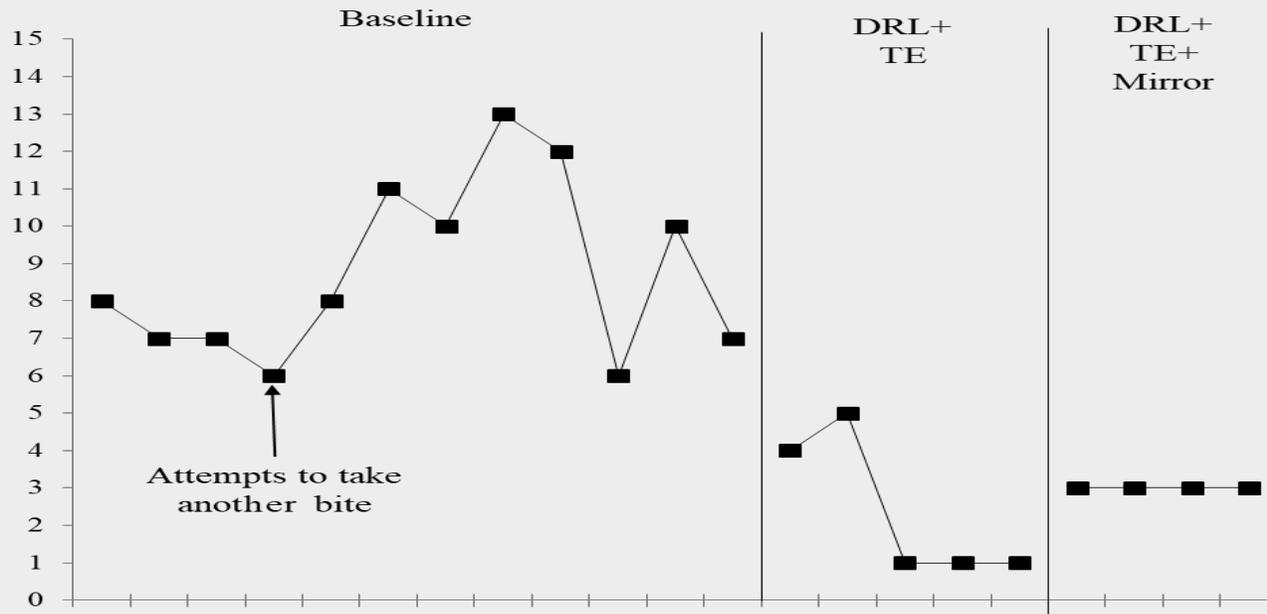




Phase 1

- Introduce DRL using TE
- Prioritize high risk behavior
- Tweak with SLP input

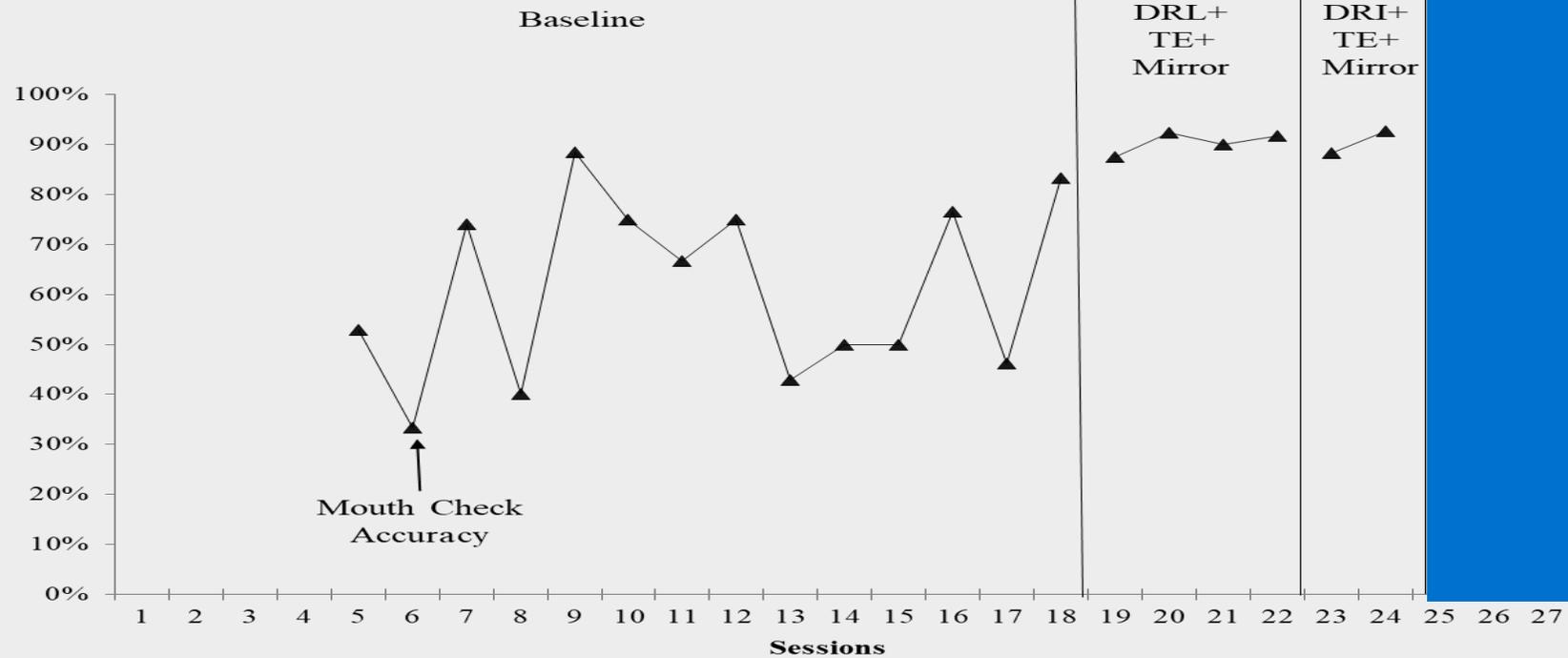
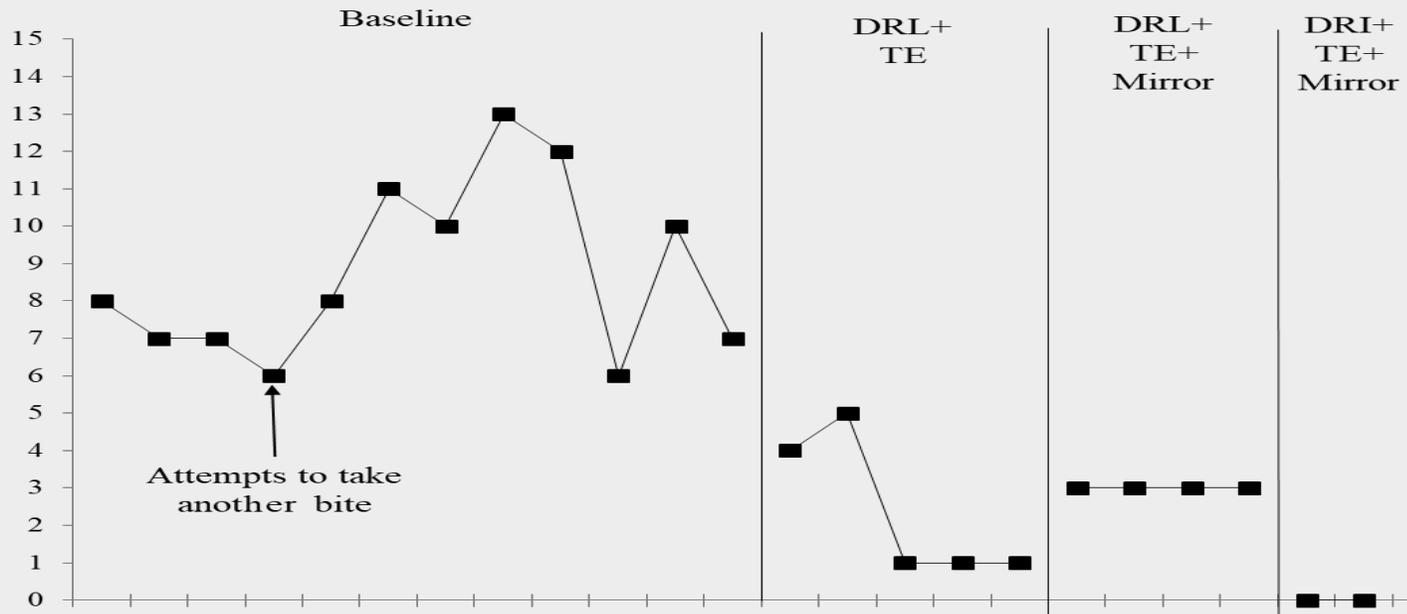




Phase 2

- Introduce mirror for self-management
- Discuss change to DRI (put down utensil)
- Pause for Baclofen

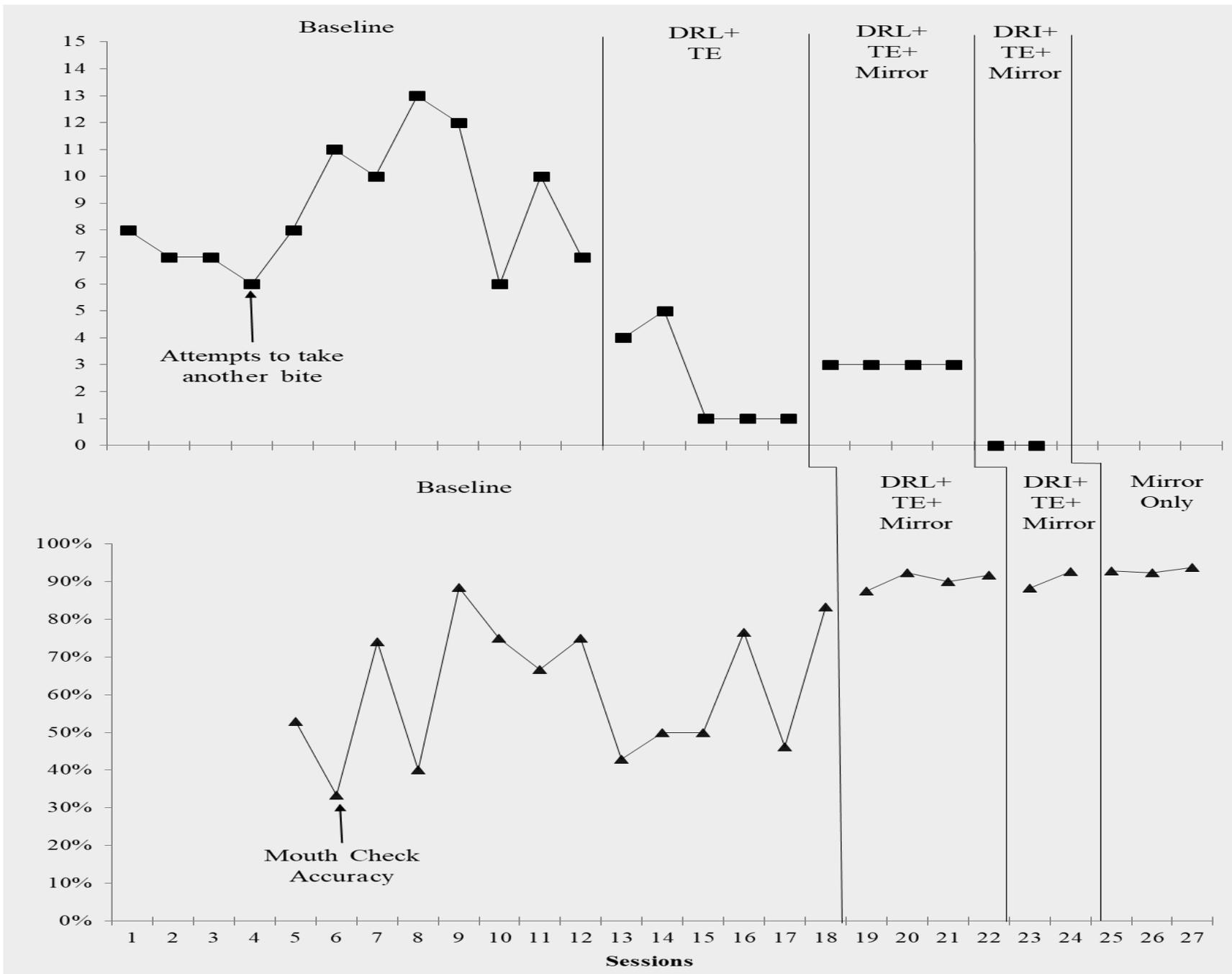




Phase 3

- Time between bite intervals stabilizes
- Change to DRI
- TE and mirror continue





- Phase 4**
- Fade reinforcement procedure
 - Generalize strategy across staff and location
 - Mechanical soft trials begin with SLP... time for a cheesesteak!



Thank You!



“The analysis of behavior need not wait until brain scientists have done their part... brain scientists may discover other kinds of variables affecting behavior, but they will turn to a behavior analysis for the account of those variables”⁹

Skinner (1989)

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