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Use of Functional Analysis and Treatment Analysis in the Development of a Home-Based Pica Intervention

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Pica

- ▶ Ingestion of inedible objects (Fisher et al., 1994)
 - ▶ Etymology (Lofts, Schroeder, Maler, 1990)
- ▶ Described as the most dangerous form of self-injurious behavior (Foxx & Martin, 1975; McAdam, Sherman, Sheldon, & Napolitano, 2004; Williams & McAdam, 2012)



Pica

- ▶ Due to the serious nature of pica further research is warranted (Call, Simmons, Lomas Mevers & Alvarez, 2015; Hagopian, Rooker, & Rolider, 2011; Williams & McAdam, 2012)



Previous pica treatments

- ▶ Behavioral interventions
 - ▶ Differential reinforcement procedures (Casey, Cook-Catone, & Beck-Joslyn, 2012; Hagopian, Gonzalez, Rivet, Triggs & Clark, 2011; Kern, Starosta, & Adelman, 2006; Piazza, Hanley & Fisher 1996)
 - ▶ Punishment procedures (Ferrerri, Tamm, & Wier, 2006; Hagopian, & Adelinis, 2001; McCord, Grosser, Iwata, & Powers, 2005; Mitteer, Romani, Greer, & Fisher, 2015)
 - ▶ Discrimination training (Bogart, Piersal & Gross, 1995; Falcomata, Roane, & Pabico, 2007; Fisher et al. 1994; Johnson, Hunt, & Siebert, 1994)
 - ▶ Noncontingent reinforcement (Madden, Russo, & Cataldo, 1980; Piazza, Hanley, & Fisher, 1996)



NCR / schedule thinning

- ▶ **Noncontingent reinforcement an effective treatment for problem behavior**
(Baker, Hanley, & Rapp, 2006; Carr, Dozier, Patel, Adams & Martin, 2002; Khang, Iwata, Thompson, & Hanley, 2000; Lanovaz, Sladeczek, & Rapp, 2011; Piazza, Adelinis, Hanley, Goh, & Delia, 2000; Wilder, Register, Register, Bajagic, & Neidert, 2009)
- ▶ **Suppression of responding can be maintained at low/zero levels while non-contingent reinforcement schedules are thinned** (Kahng, Iwata, DeLeon, & Wallace, 2000)
- ▶ **NCR has been found to be more effective than DRO procedures as a treatment**
(Vollmer et al. 1993)



Functional Analyses

- ▶ FA and Treatment analyses have been used together in previous literature (Beavers, Iwata & Lerman, 2013; Goh, Iwata, & Kahng, 1999; Piazza, Hanley, & Fisher, 1996)



Treatment analysis

- ▶ A treatment analysis systematically evaluates potential treatments (Rodriguez, Thompson, Schlichenmeyer, & Stocco, 2012)
- ▶ Previous research used a matched/unmatched stimuli assessment to treat behaviors maintained by automatic reinforcement (Rapp 2007; Piazza, Adelenis, Hanley, Goh, & Delia, 2000)



Method

- ▶ Participant
 - ▶ Wendy
 - ▶ 10 year old female
 - ▶ Primary diagnosis of autism
 - ▶ Full time school, 10 hours of ABA in-home per week
 - ▶ History of pica and mouthing



Method

- ▶ Setting
 - ▶ Home-based setting
 - ▶ All analyses and assessments provided within regular home-based services time (two-hour sessions)
 - ▶ Sessions took place in various rooms throughout the home
 - ▶ At least one parent and younger sibling present for all sessions



Method

- ▶ Materials
 - ▶ Video recording equipment (iPhone® and Vivitar® DVR508)
 - ▶ Data sheets
 - ▶ Pens
 - ▶ Tally counters used in some sessions
 - ▶ Toshiba® Satellite Laptop computer for graphing
 - ▶ Baited pica items
 - ▶ Chewelry necklace, water bottle, toys, and edible items



Dependent Variable

- ▶ Response: pica, defined as any instance of Wendy placing a non-edible item past the plane of her lips, may or may not include consumption of the item
- ▶ Measurement: rate per minute

Number of responses
Number of minutes



Experimental Design

- ▶ FA and Treatment Analysis utilized multi-element design (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994)
- ▶ Intervention utilized a multi-treatment reversal (Barlow & Hayes, 1979)



PI and IOA

- ▶ Procedural Integrity:
 - ▶ 42% of sessions
- ▶ Interobserver Agreement:
 - ▶ 41% of sessions



PI and IOA

Table 1

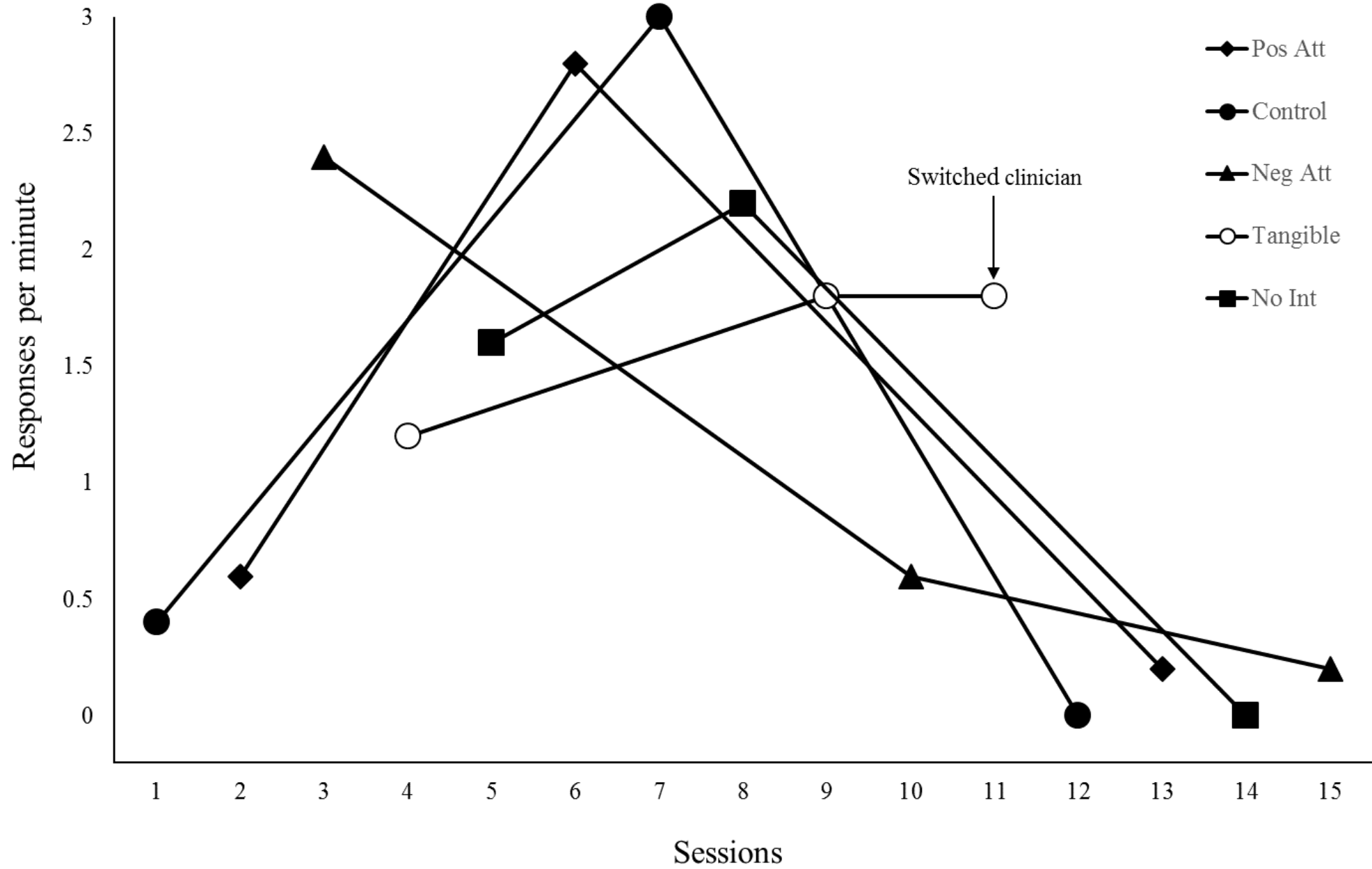
Procedural Integrity (PI) and Interobserver Agreement (IOA)

Data	Average (%)	Range (%)
PI	99.4	95-100
IOA	97.8	93-100



Procedures -FA

- ▶ Prior to analysis, informal interview conducted with the parent
- ▶ All sessions were 5 minutes in length
 - ▶ Control
 - ▶ No interaction
 - ▶ Tangible
 - ▶ Attention, Positive Affect
 - ▶ Attention, Negative Affect





Procedures - Treatment Analysis

- ▶ No Interaction
- ▶ Tangible



Procedures - Treatment Analysis

- ▶ No Interaction
- ▶ Tangible
- ▶ Similar edible: free access (Piazza, Fisher, Hanley, LeBlanc, Worsdell, Lindauer, & Keeney, 1998; Piazza et al., 2000)
- ▶ Similar edible: FT15s



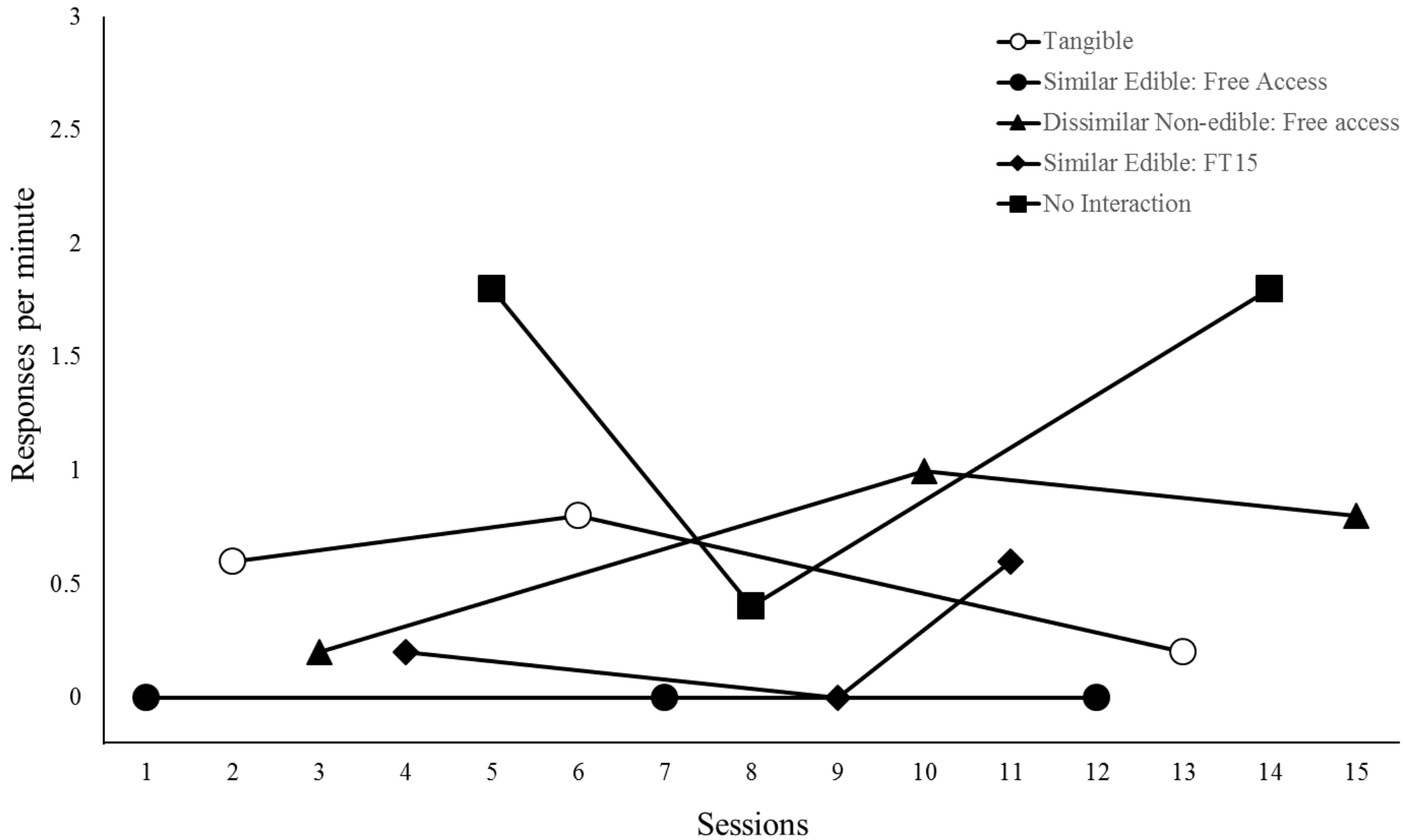
Procedures - Treatment Analysis

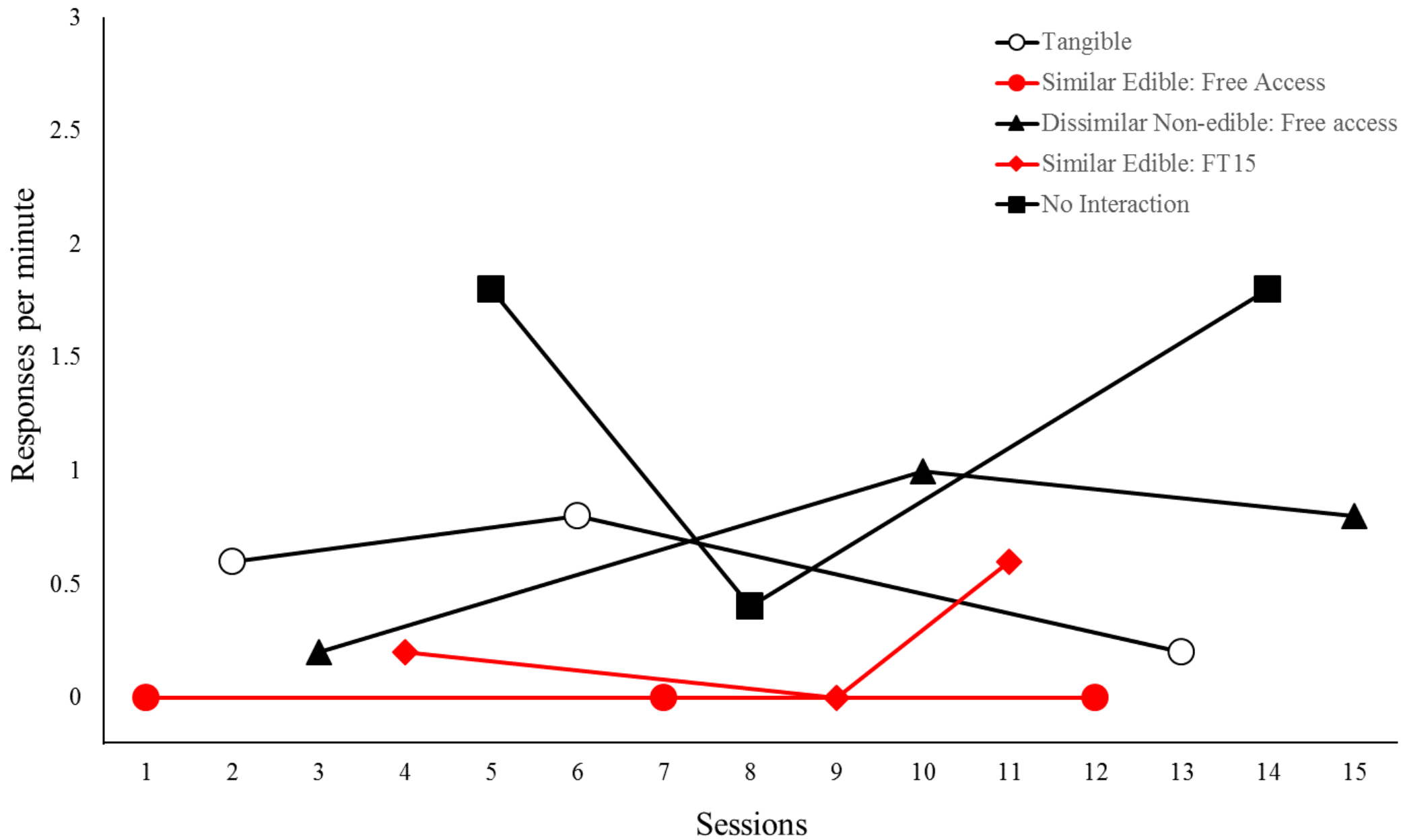
- ▶ No Interaction
- ▶ Tangible
- ▶ Similar edible: free access (Piazza, Fisher, Hanley, LeBlanc, Worsdell, Lindauer, & Keeney, 1998; Piazza et al., 2000)
- ▶ Similar edible: FT15s
- ▶ Dissimilar inedible: free access

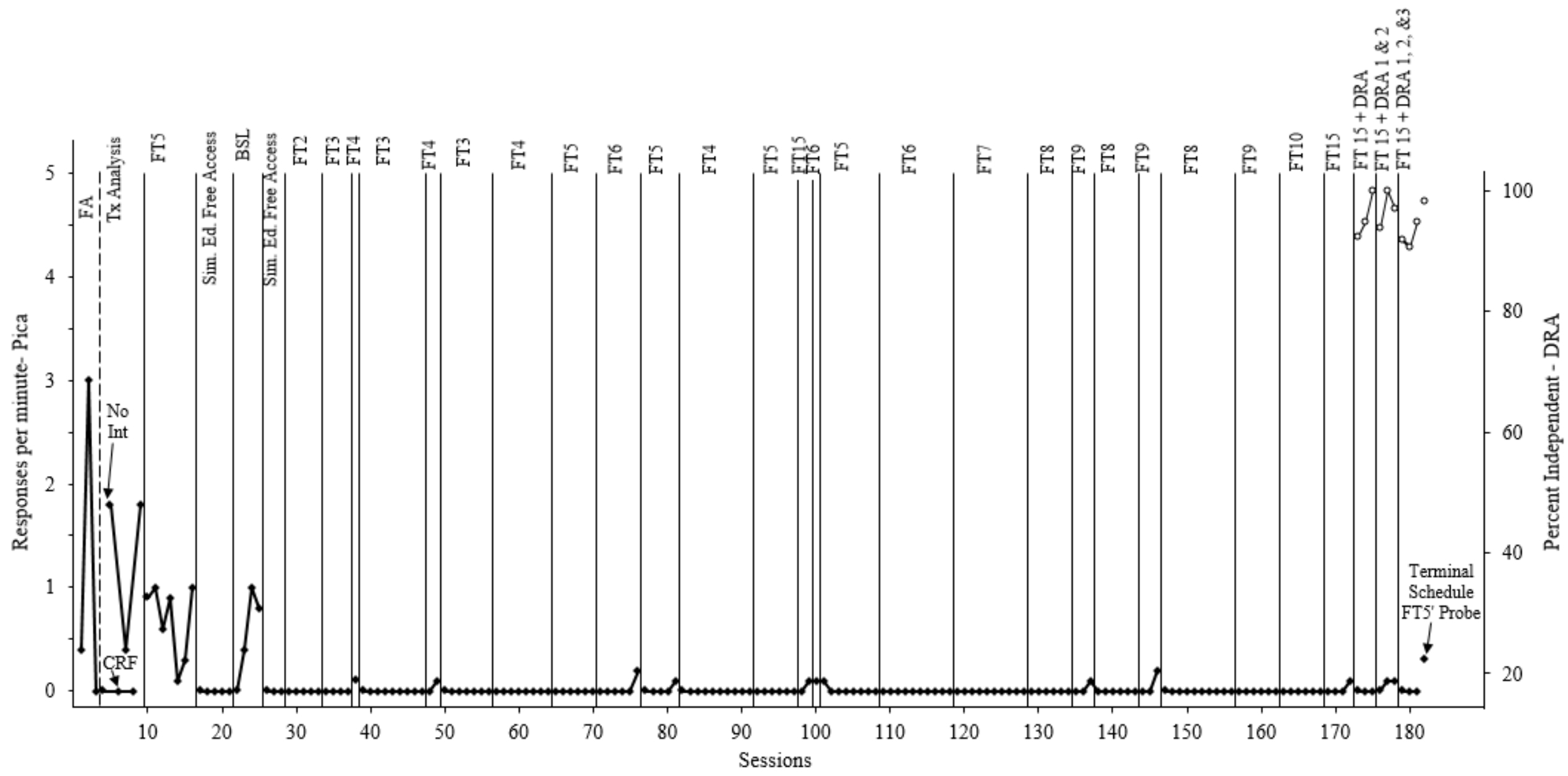


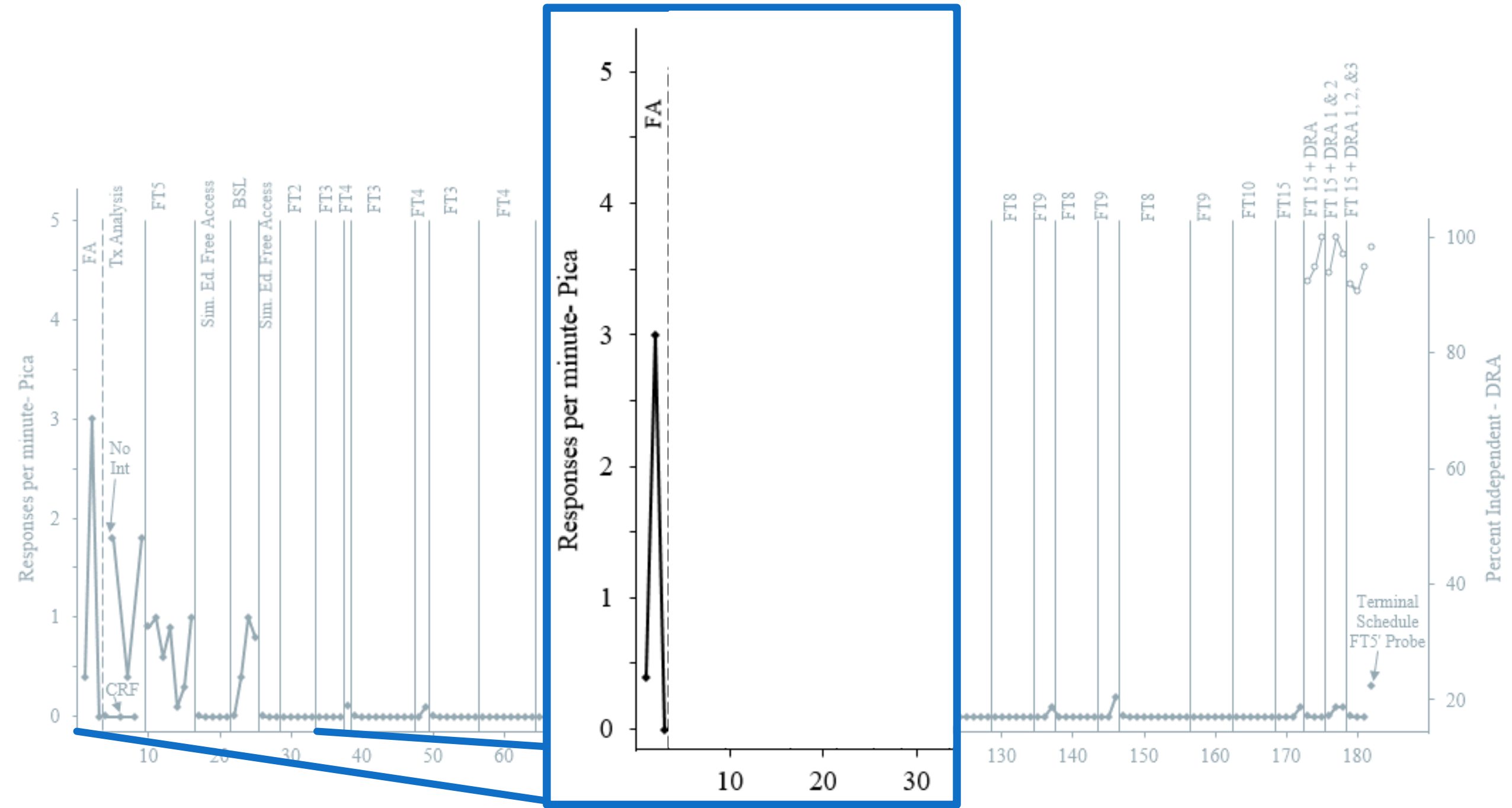
Procedures - Intervention

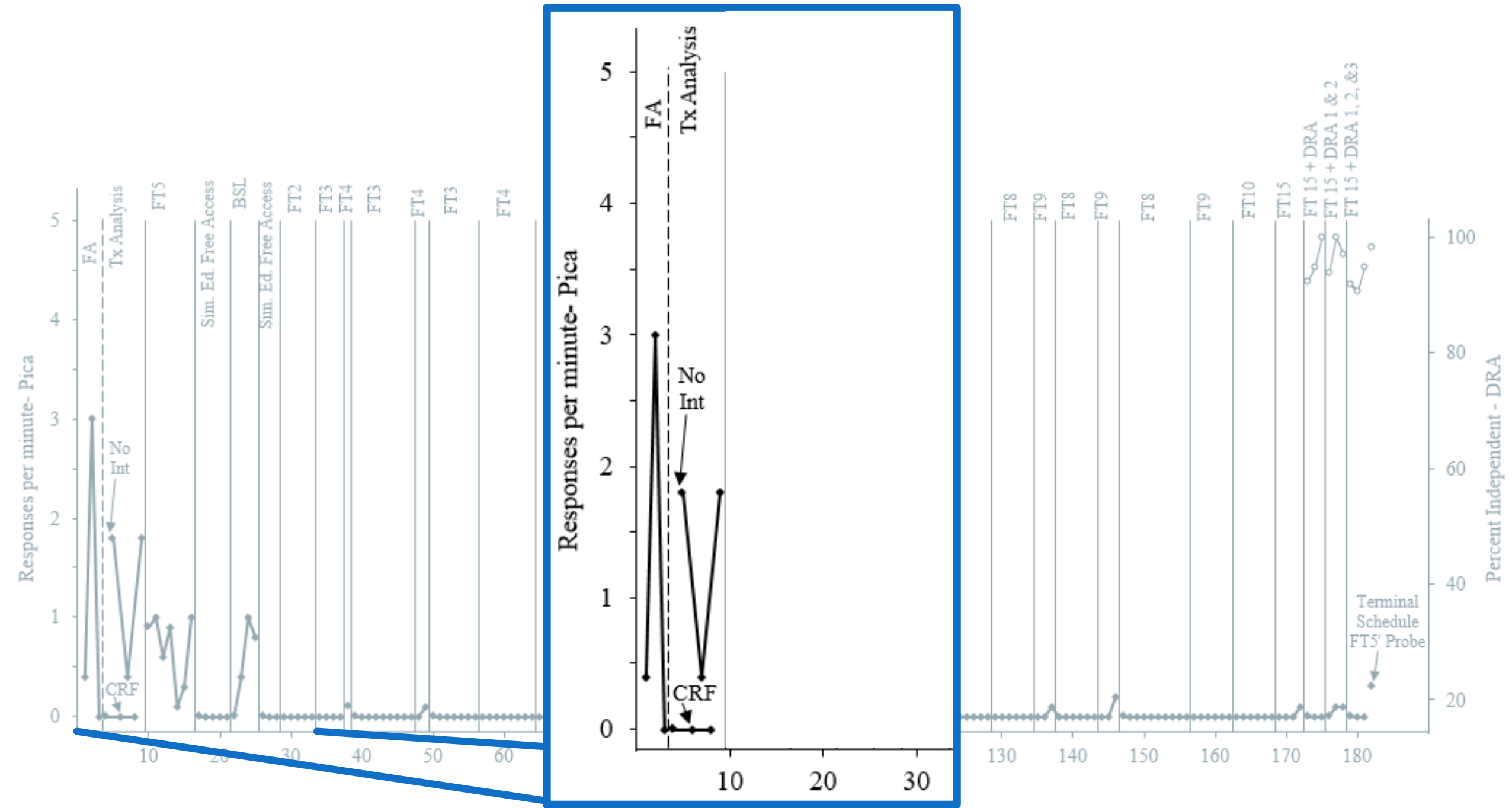
- ▶ All sessions 10 minutes in length
- ▶ Initial intervention: Similar edible: FT5
- ▶ Criteria to thin schedule:
 - ▶ Responding at zero rates for varying number of sessions
 - ▶ Thin by one second at a time
- ▶ Criteria to decrease to previous schedule
 - ▶ One occurrence of pica

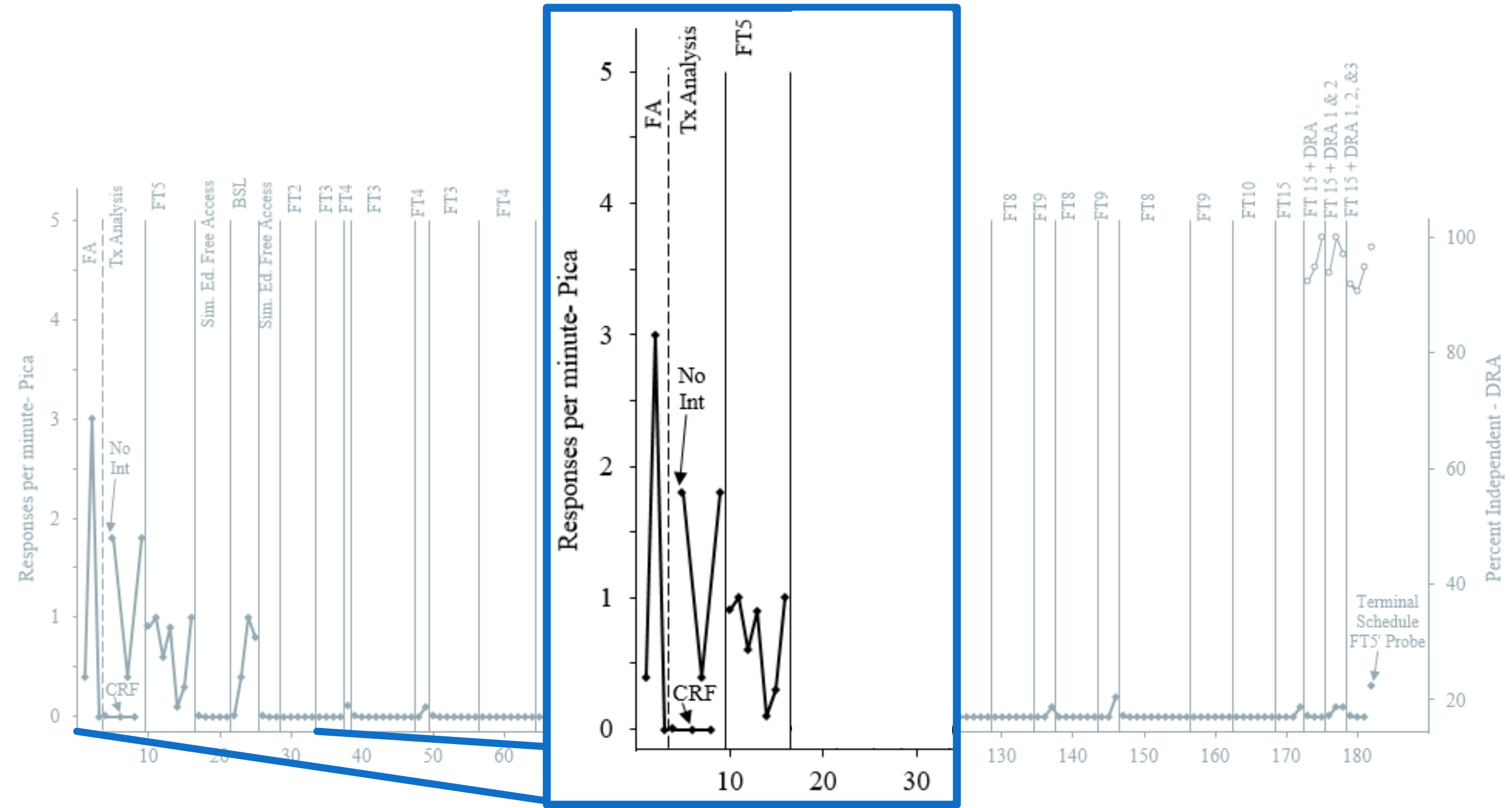


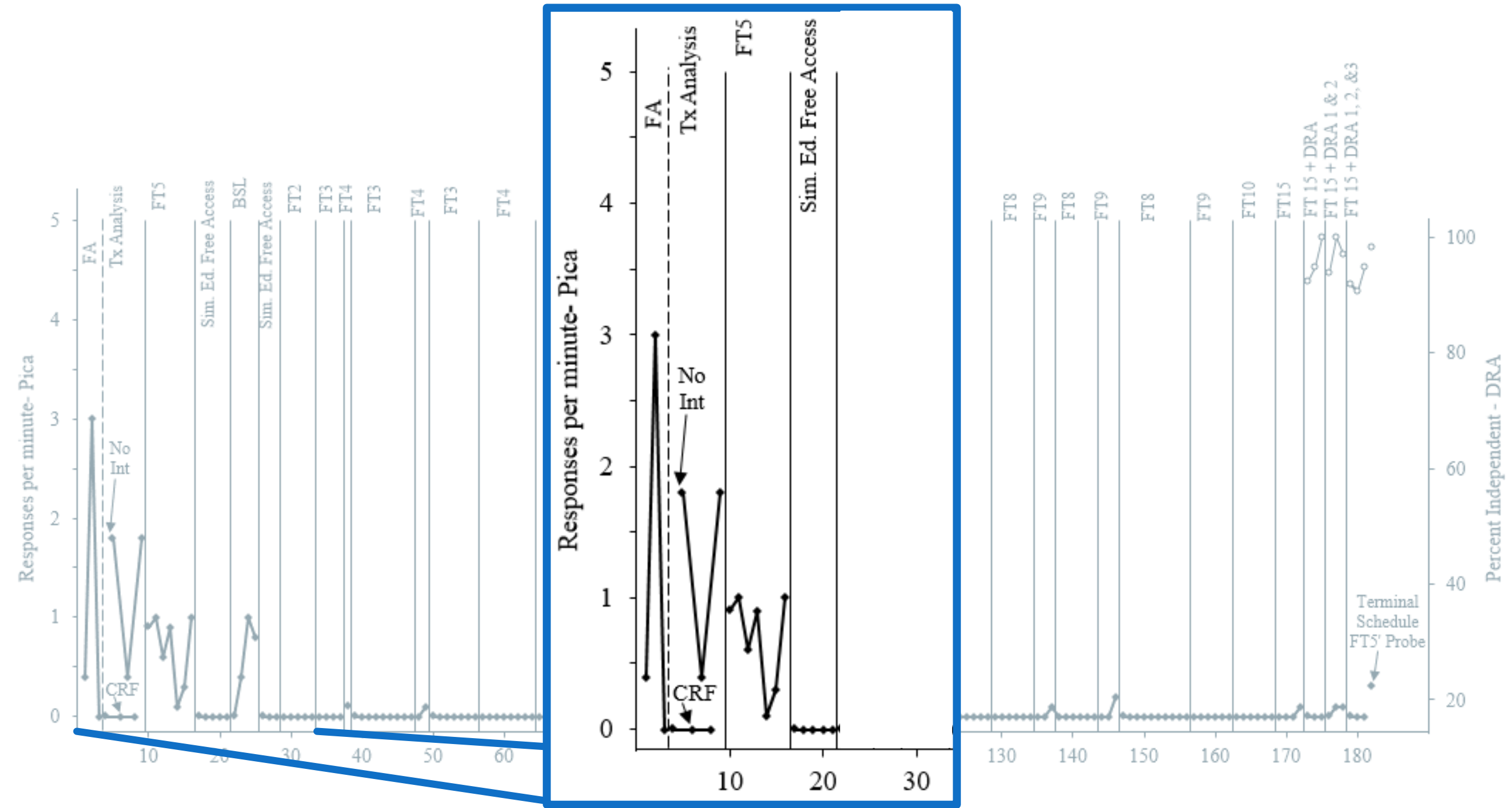


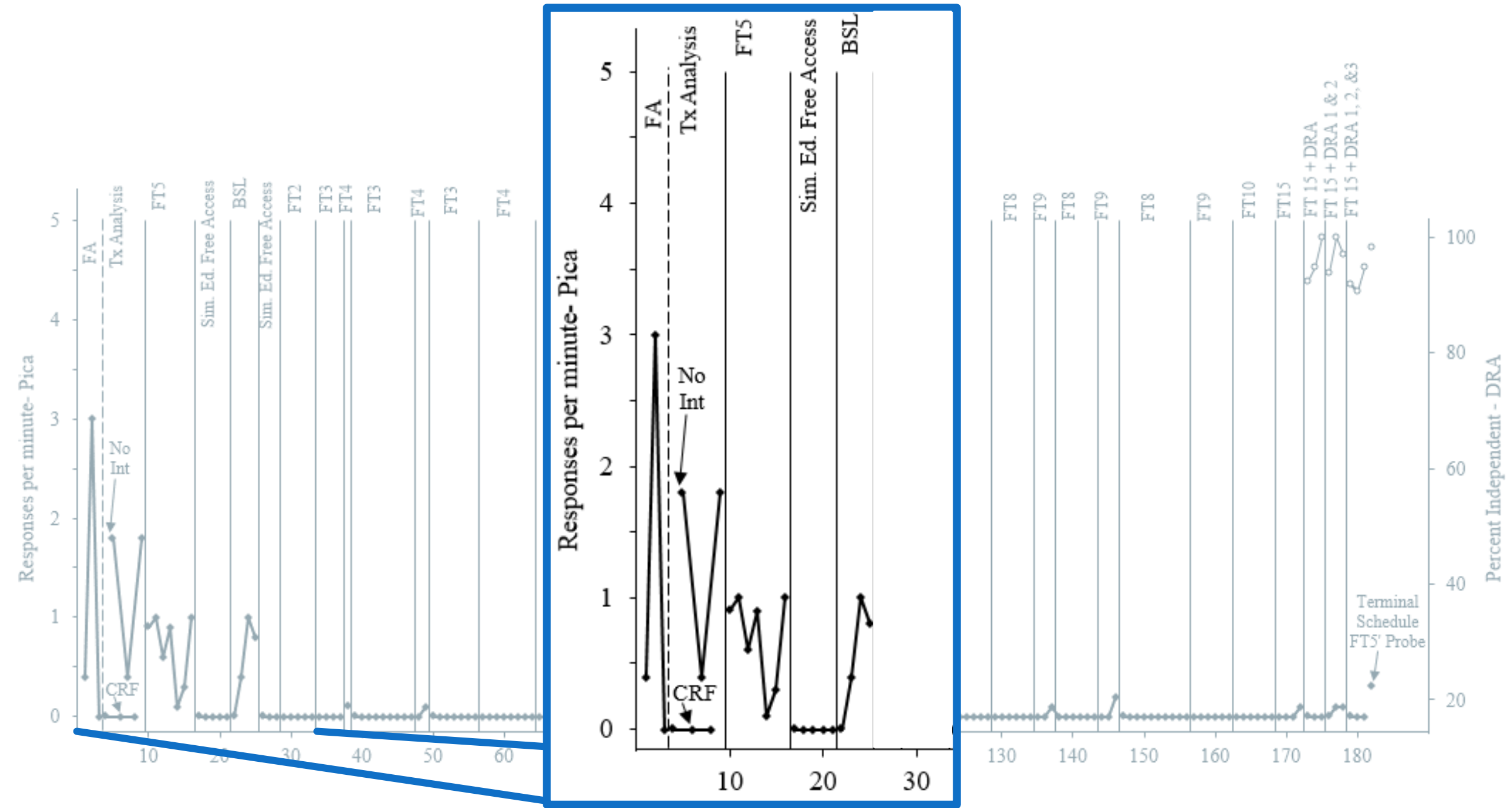


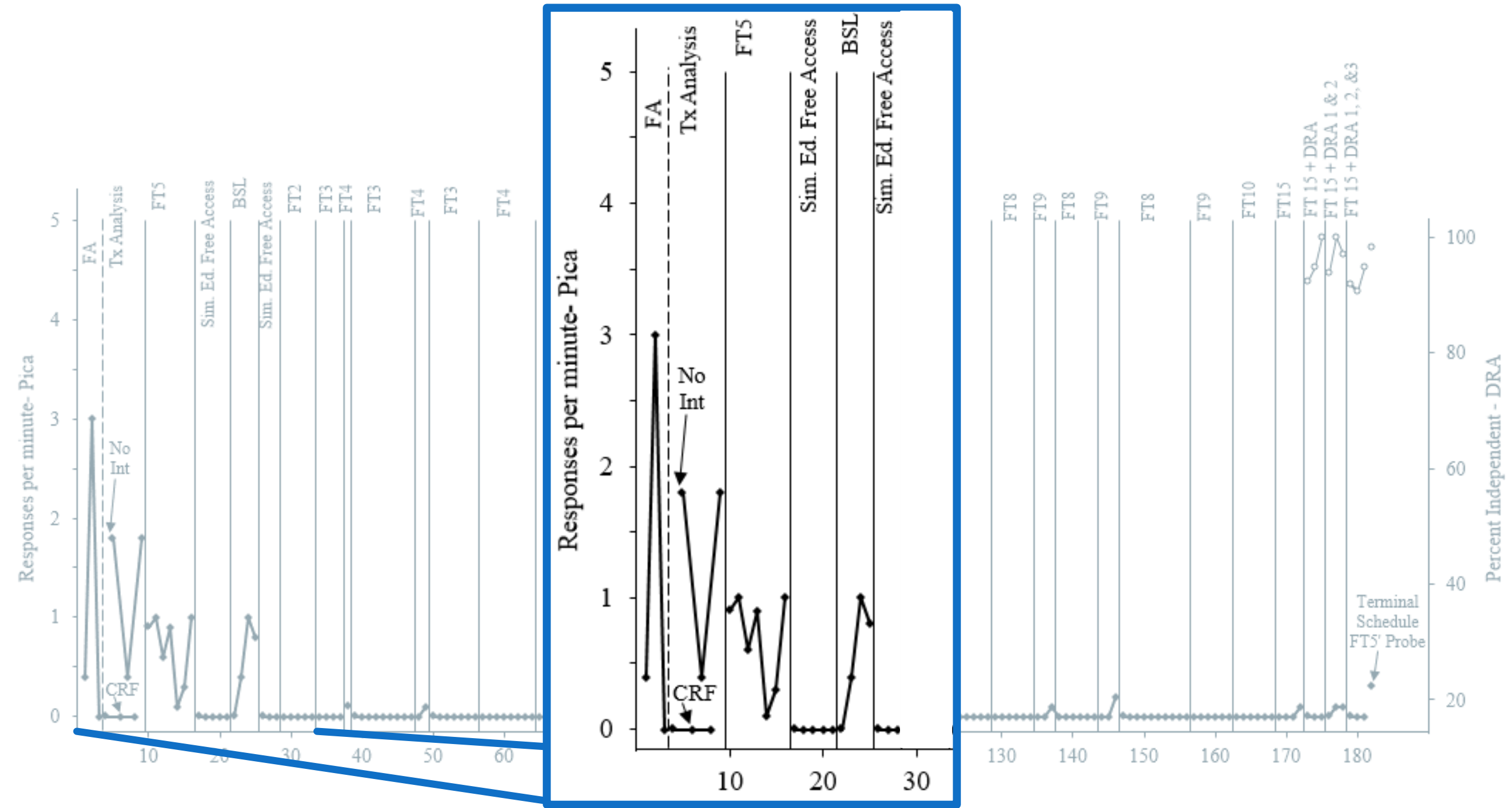


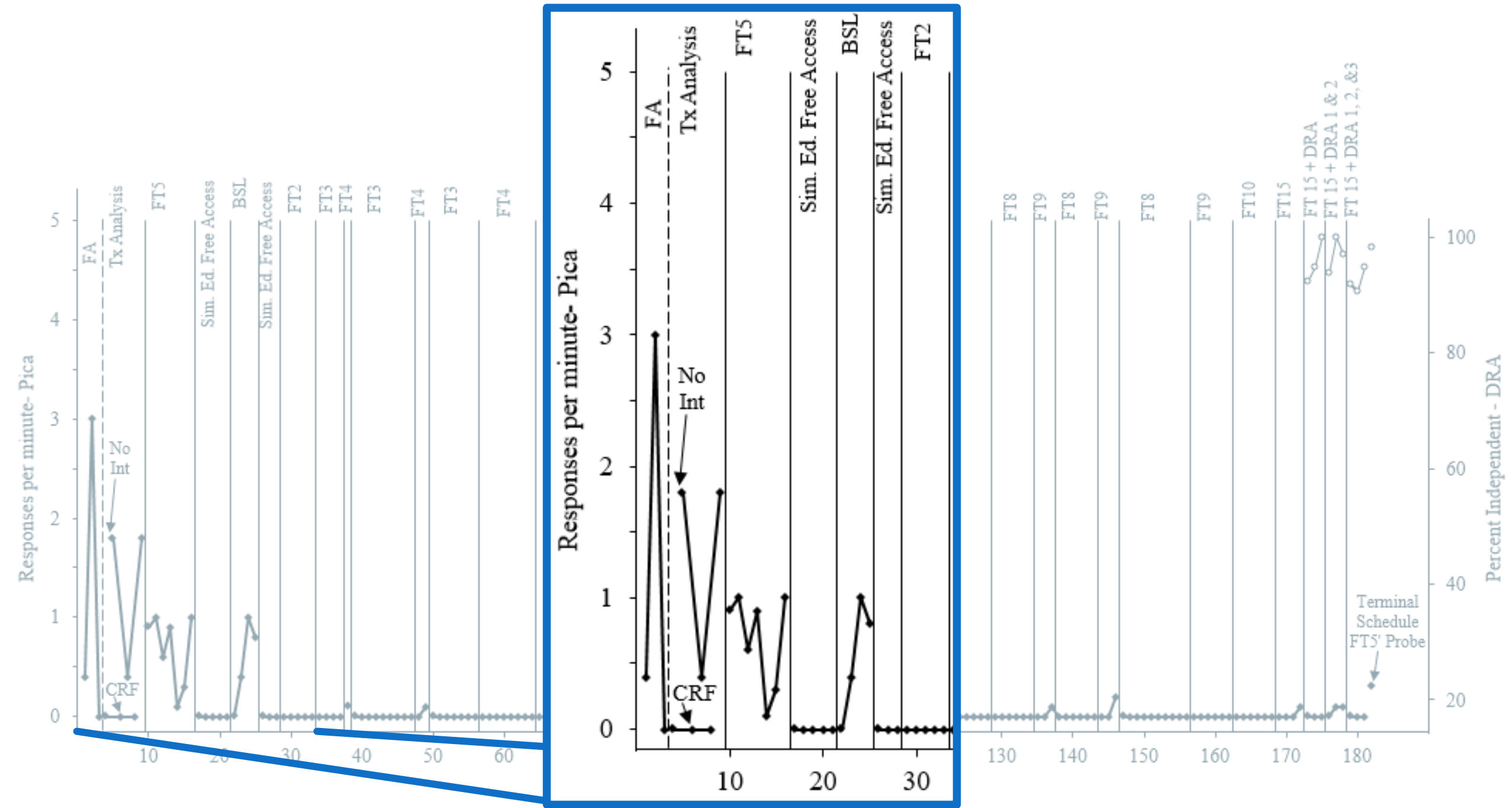


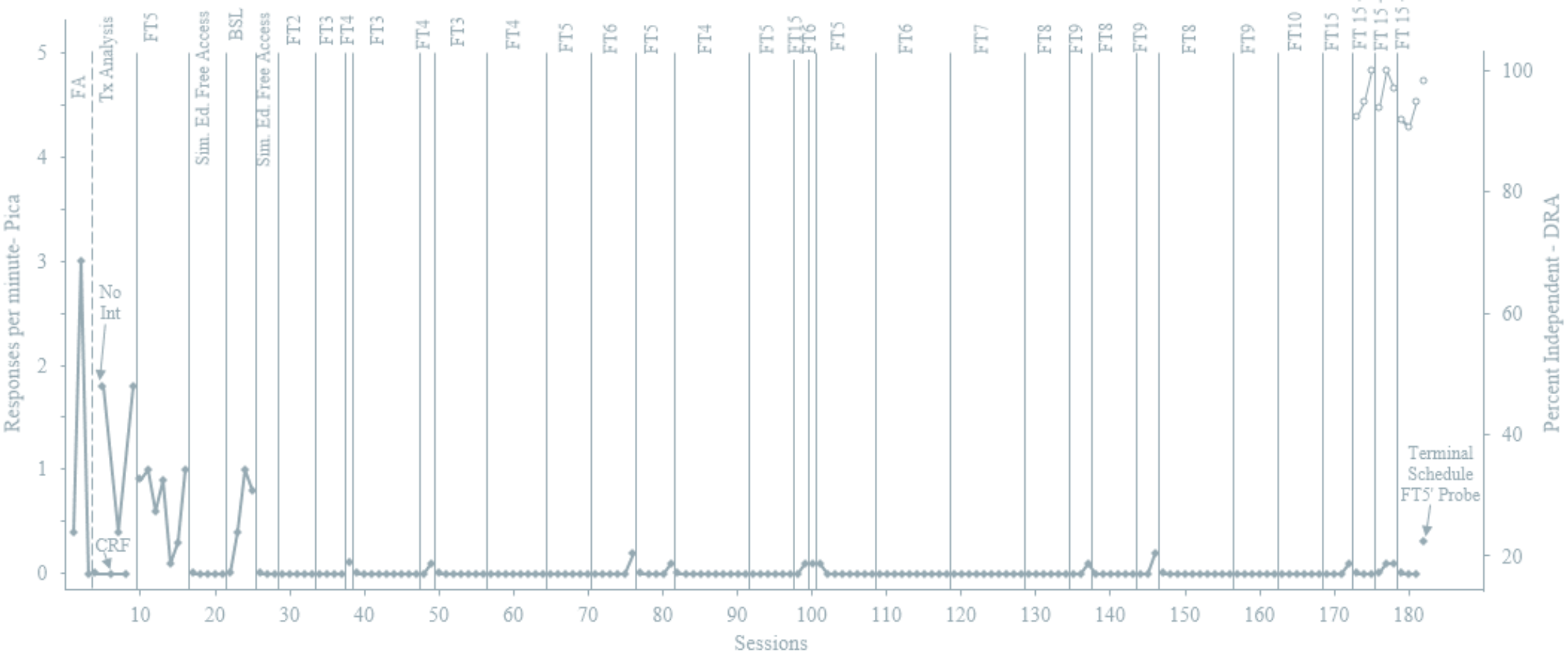




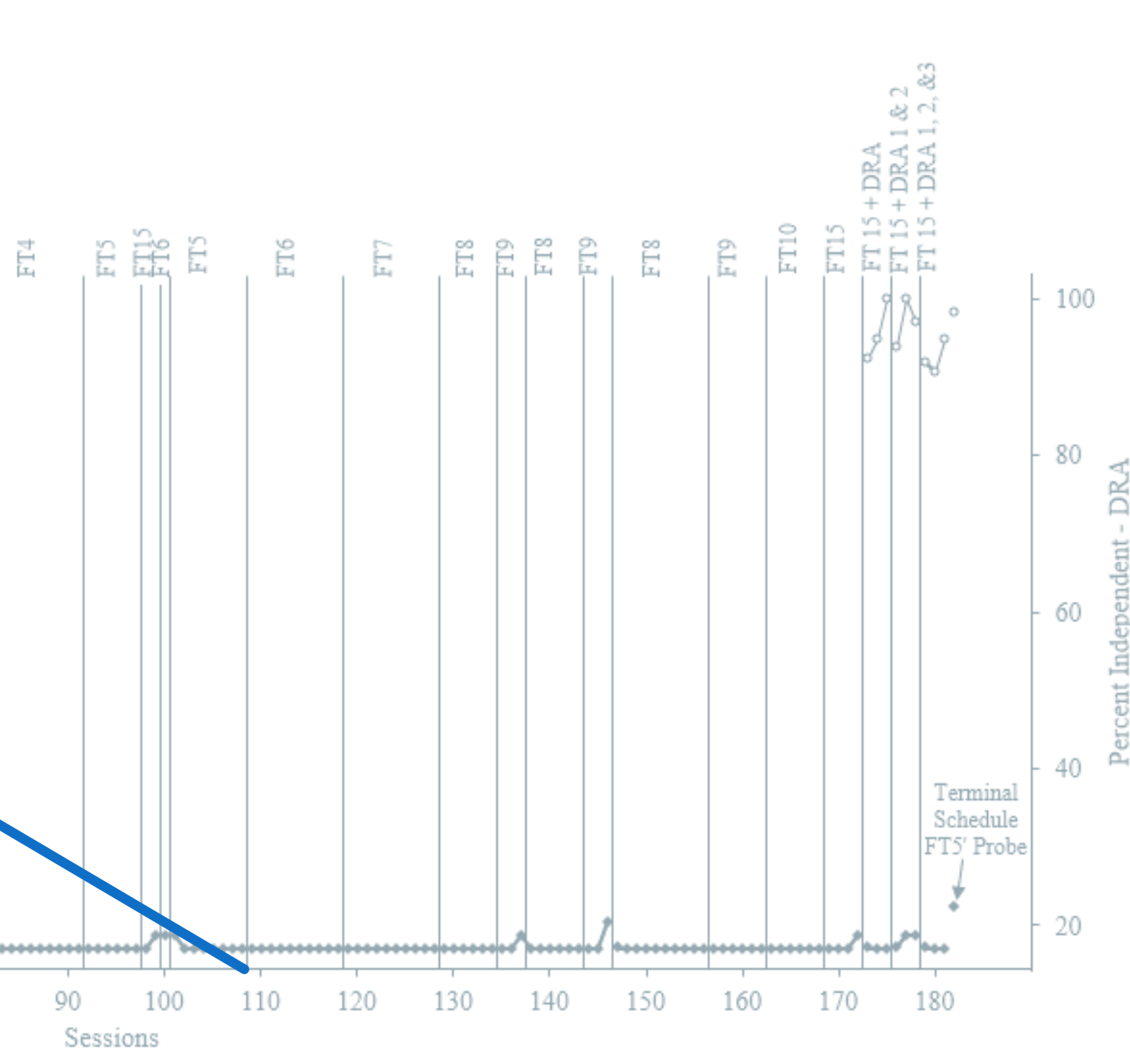
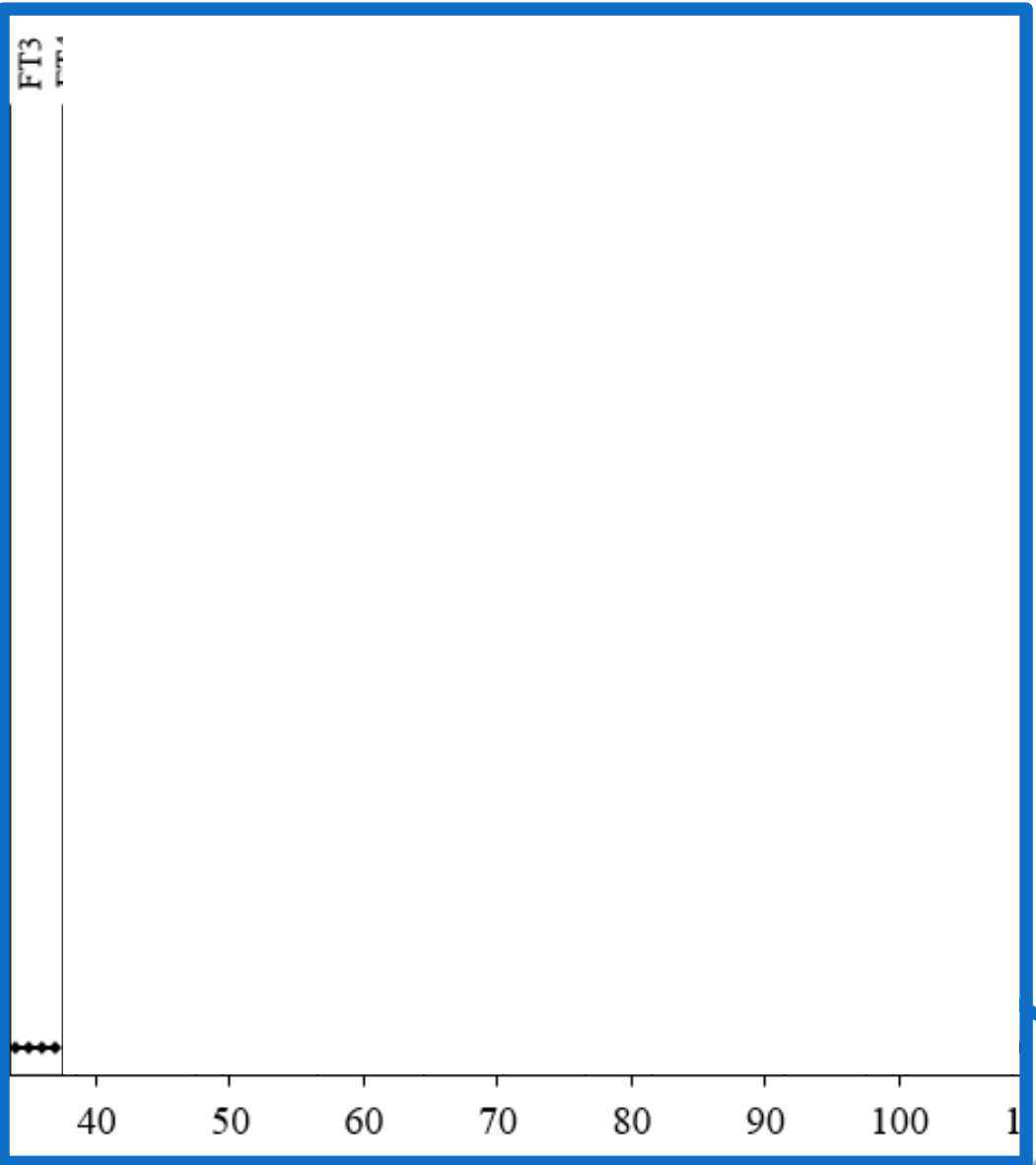




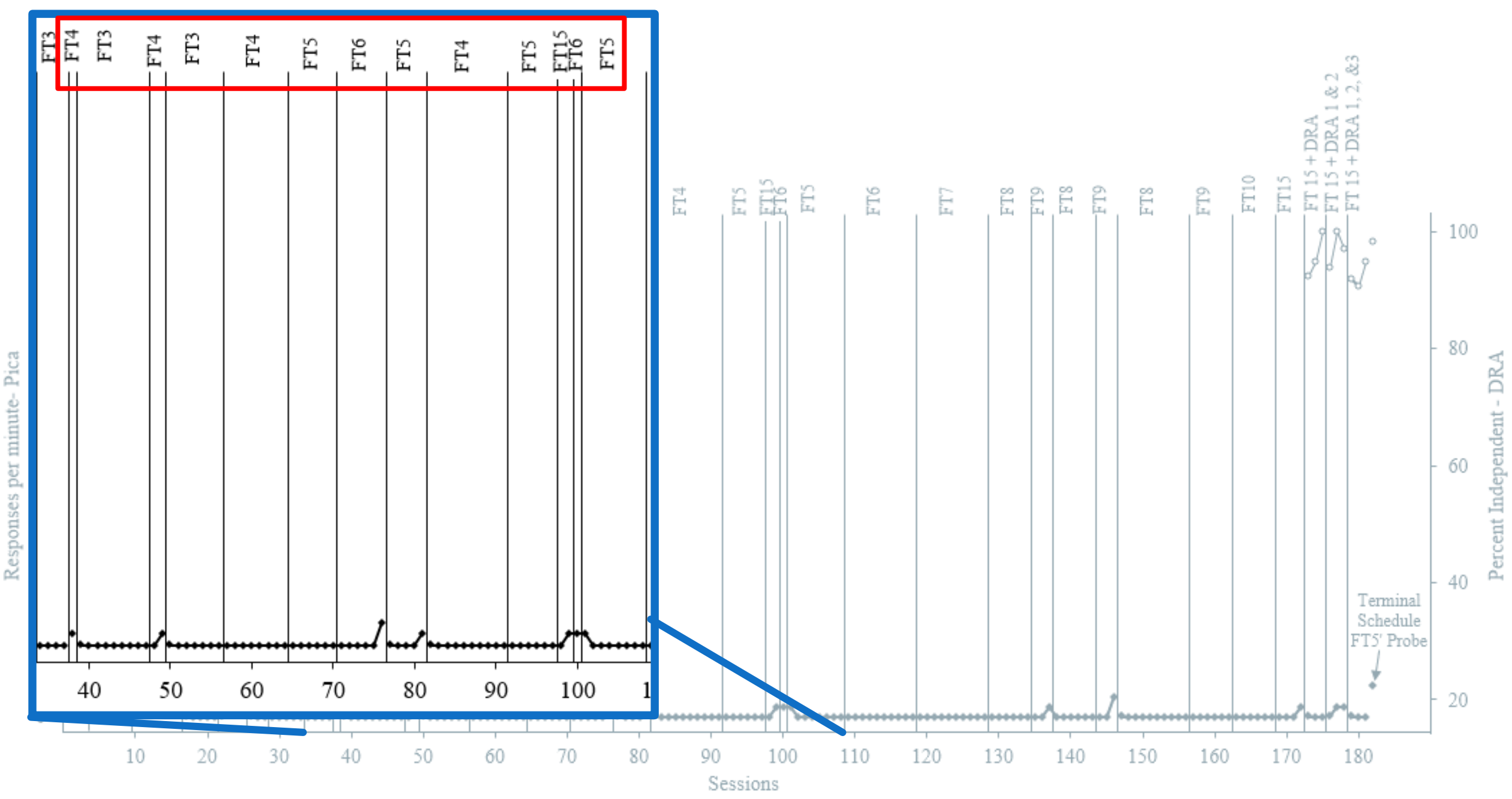


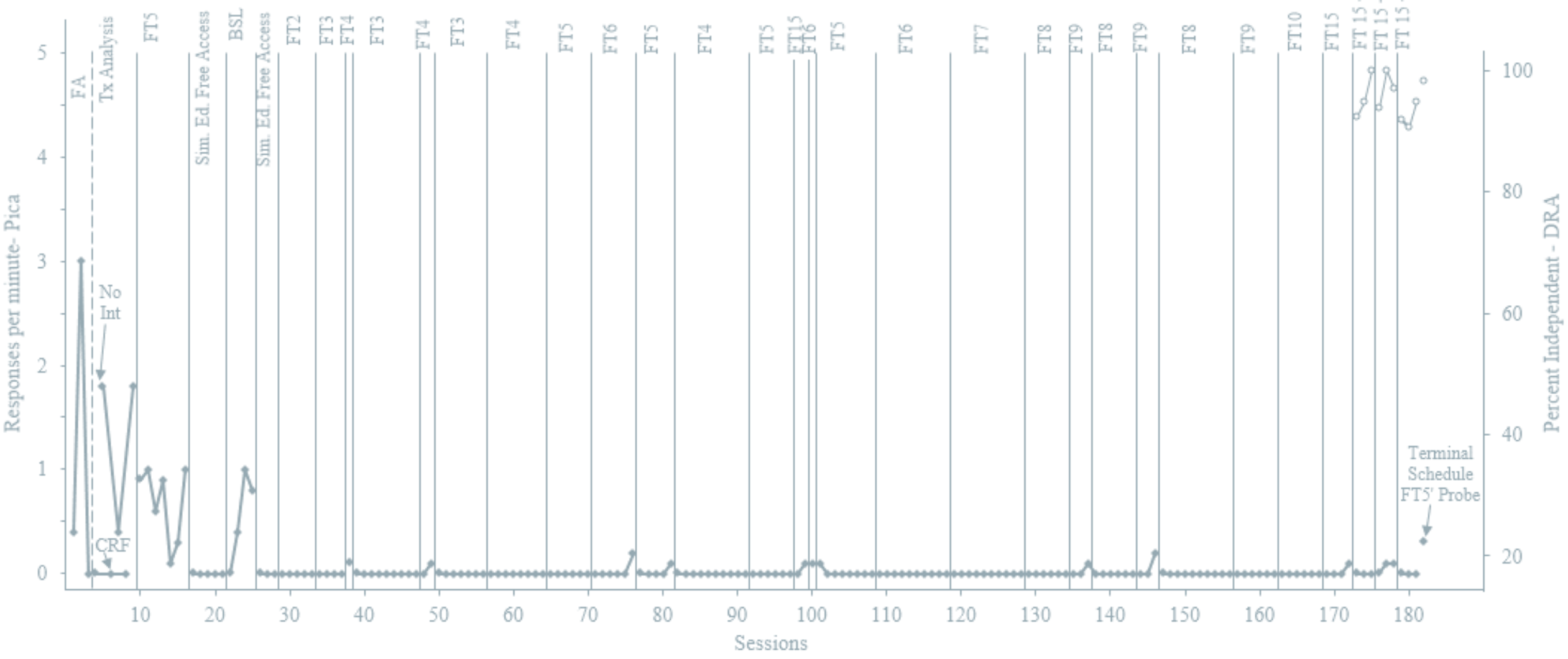


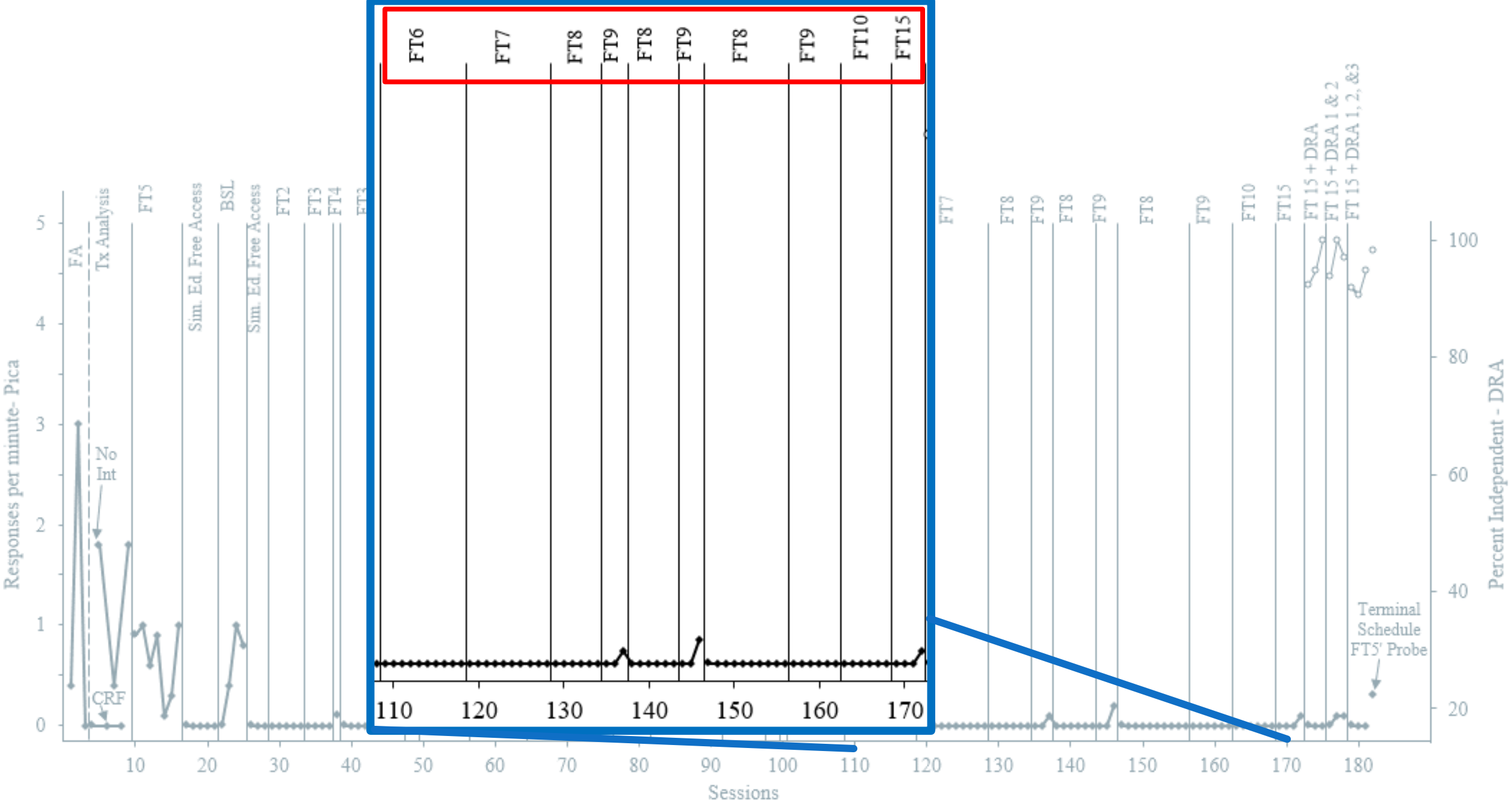
Responses per minute- Pica

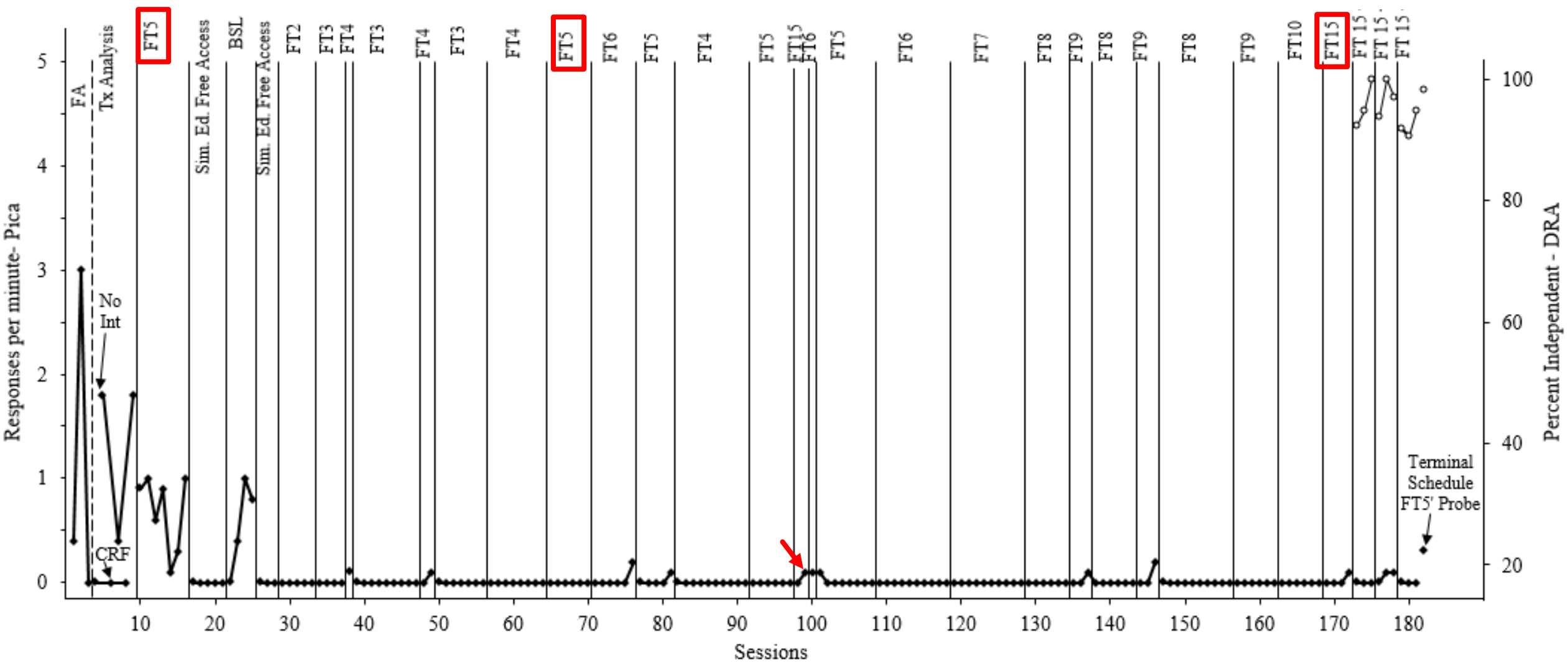


Terminal Schedule FT5' Probe











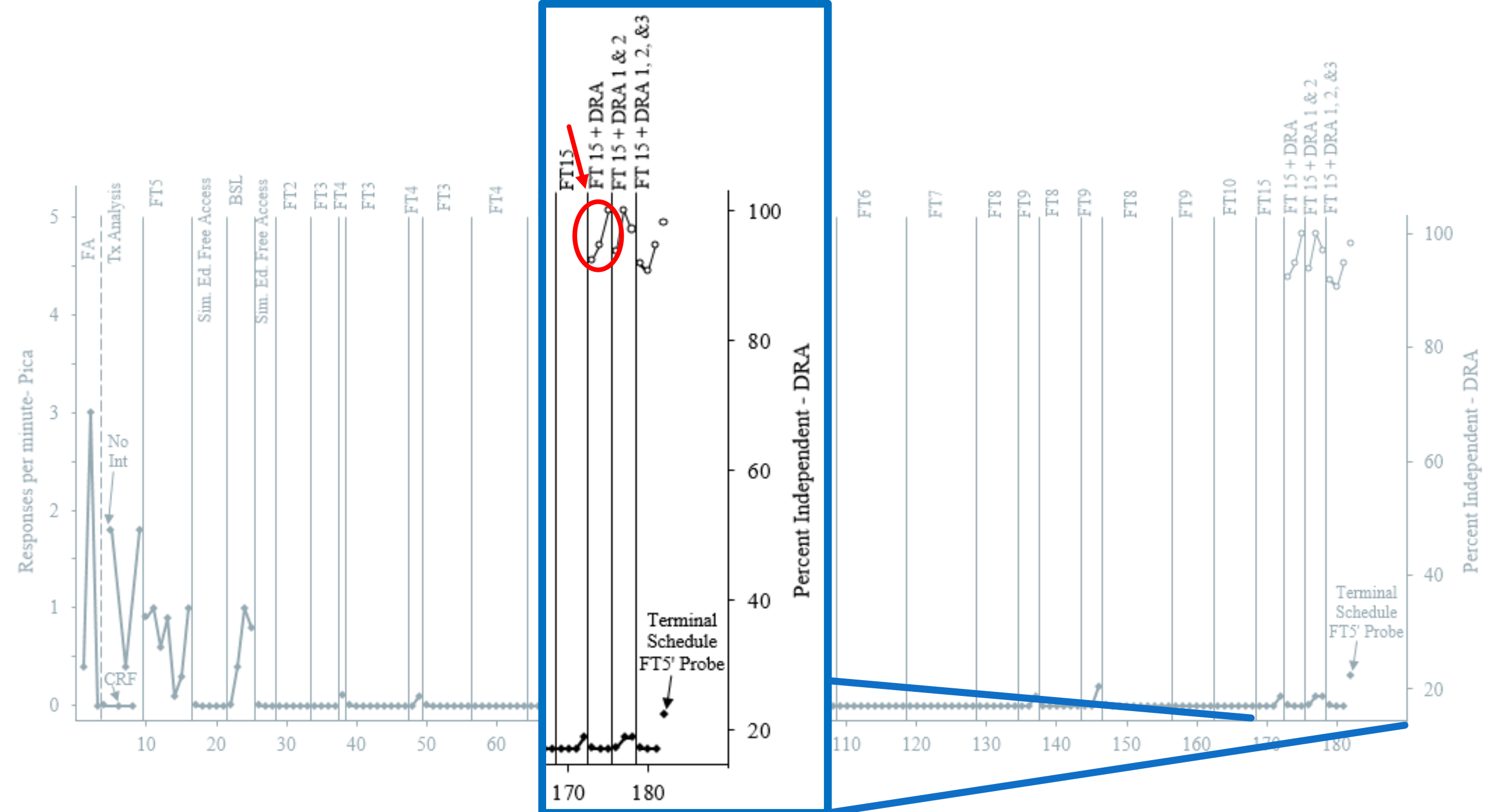
Procedures -Treatment Package

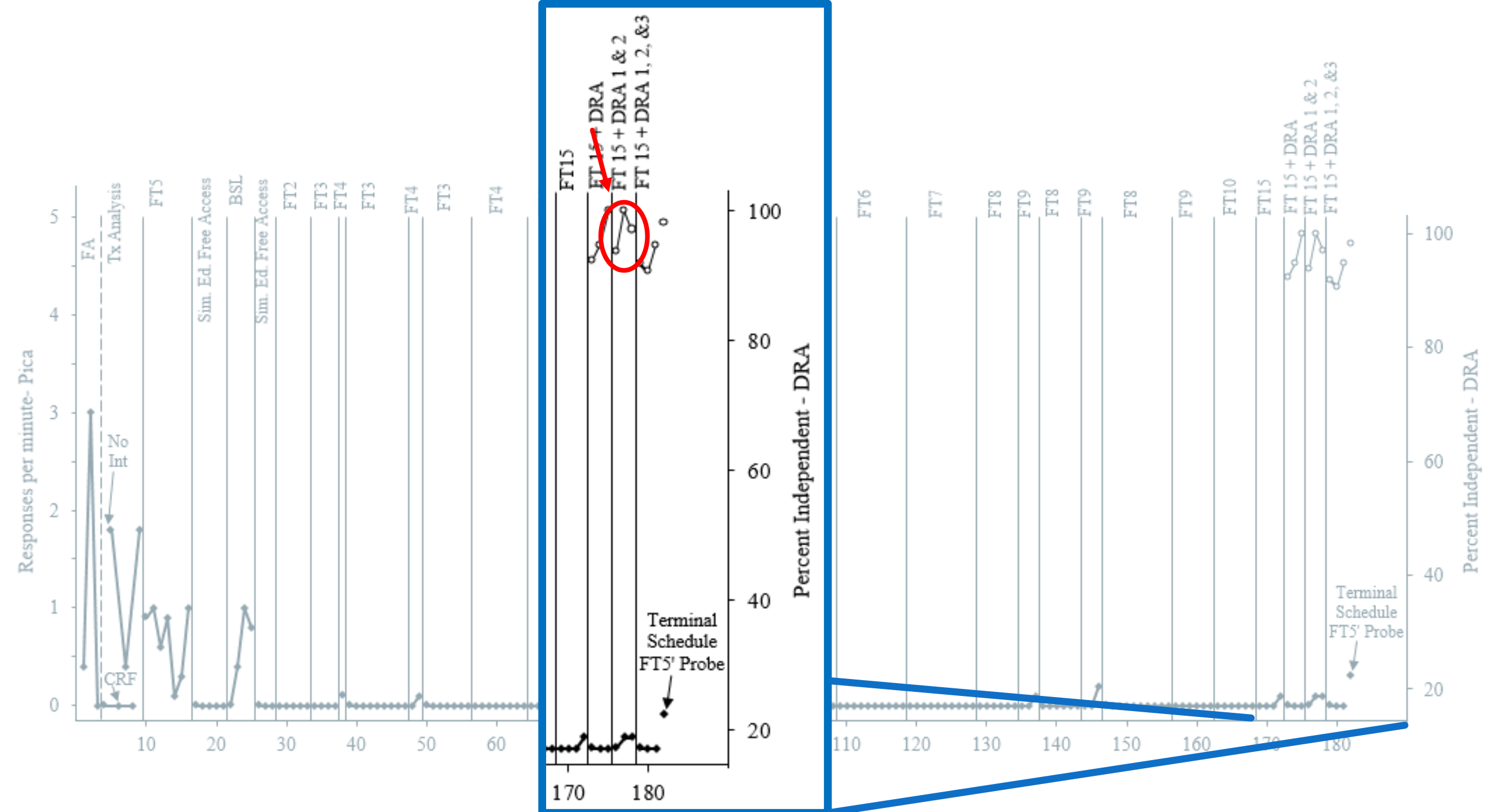
- ▶ Response Interruption and Differential Reinforcement of Alternative Behaviors (Hagopian, González, Rivet, Triggs & Clark, 2011)
 - ▶ DRA1: Discard
 - ▶ DRA2: Use appropriately
 - ▶ DRA3: Return

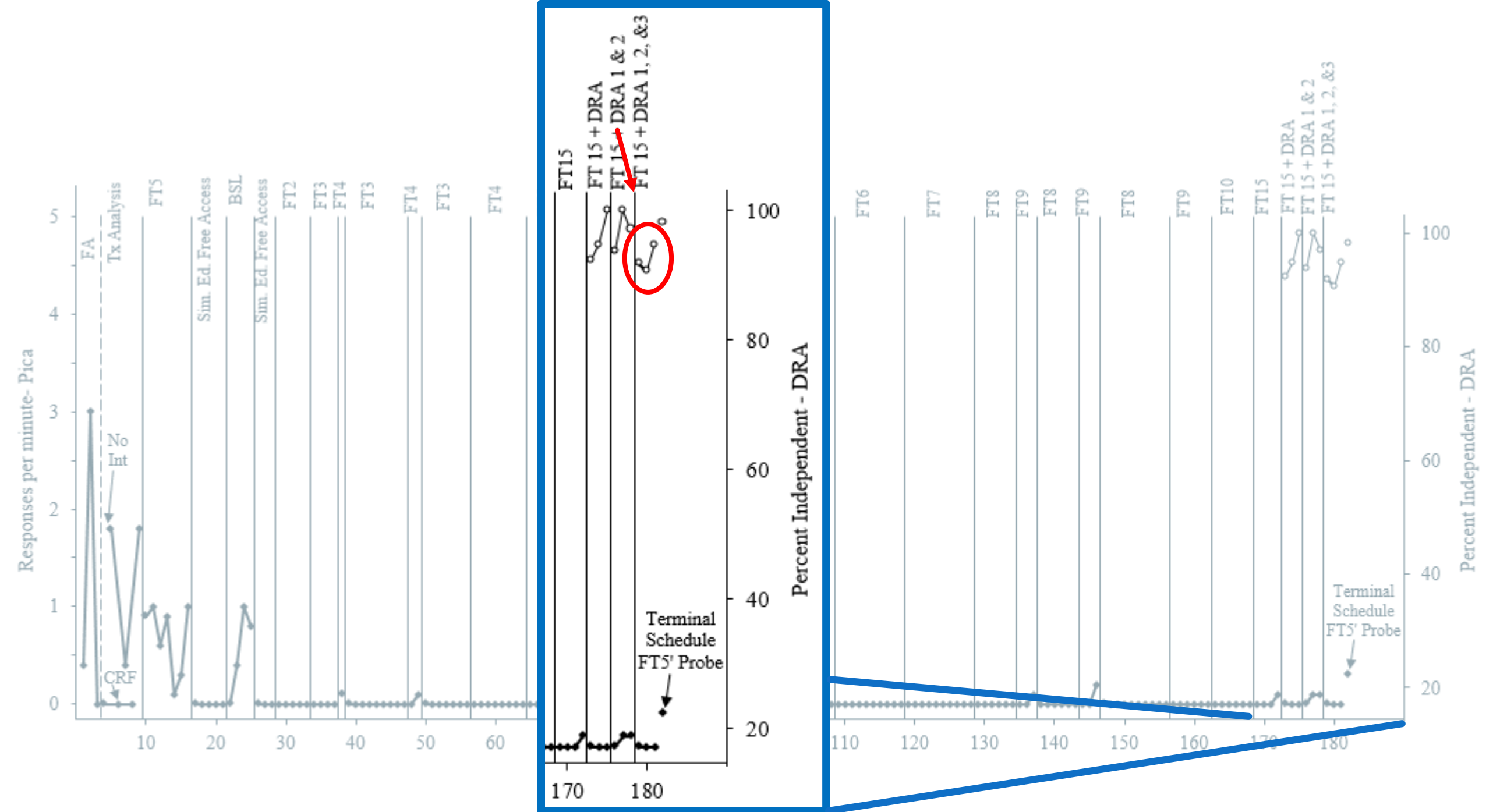


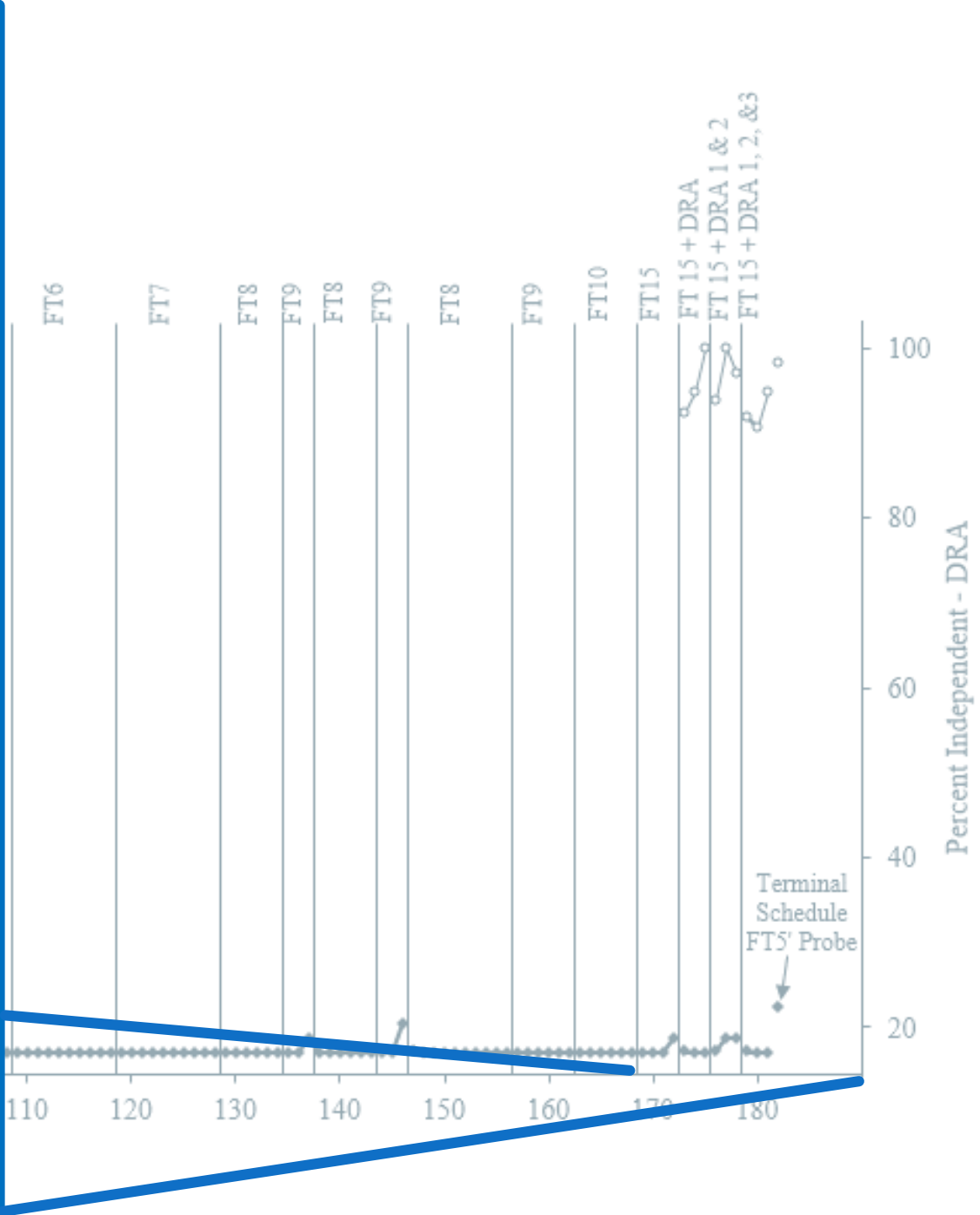
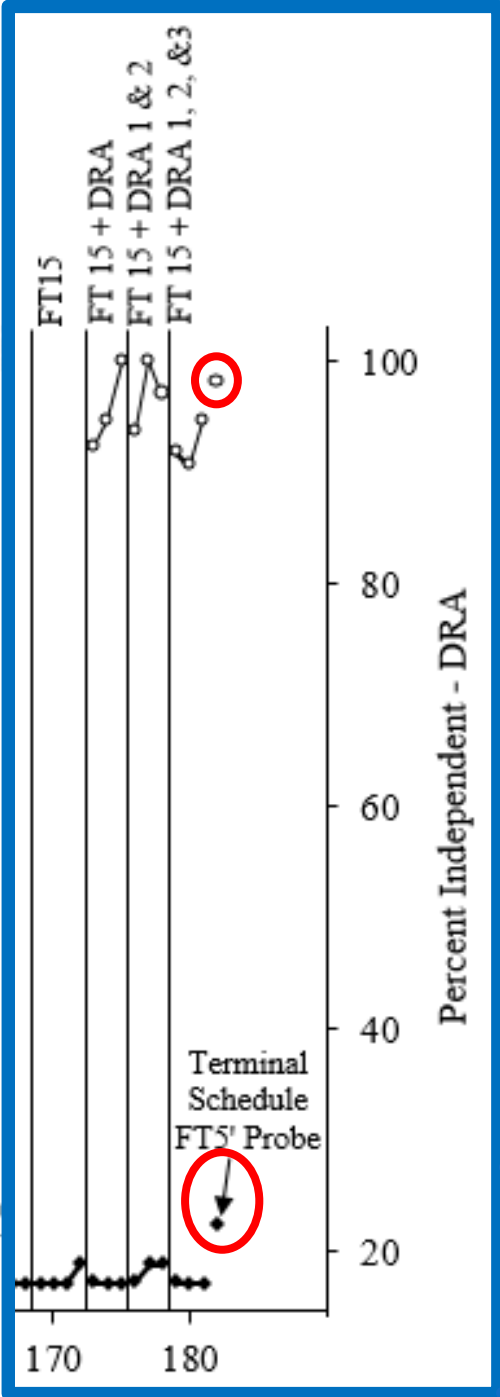
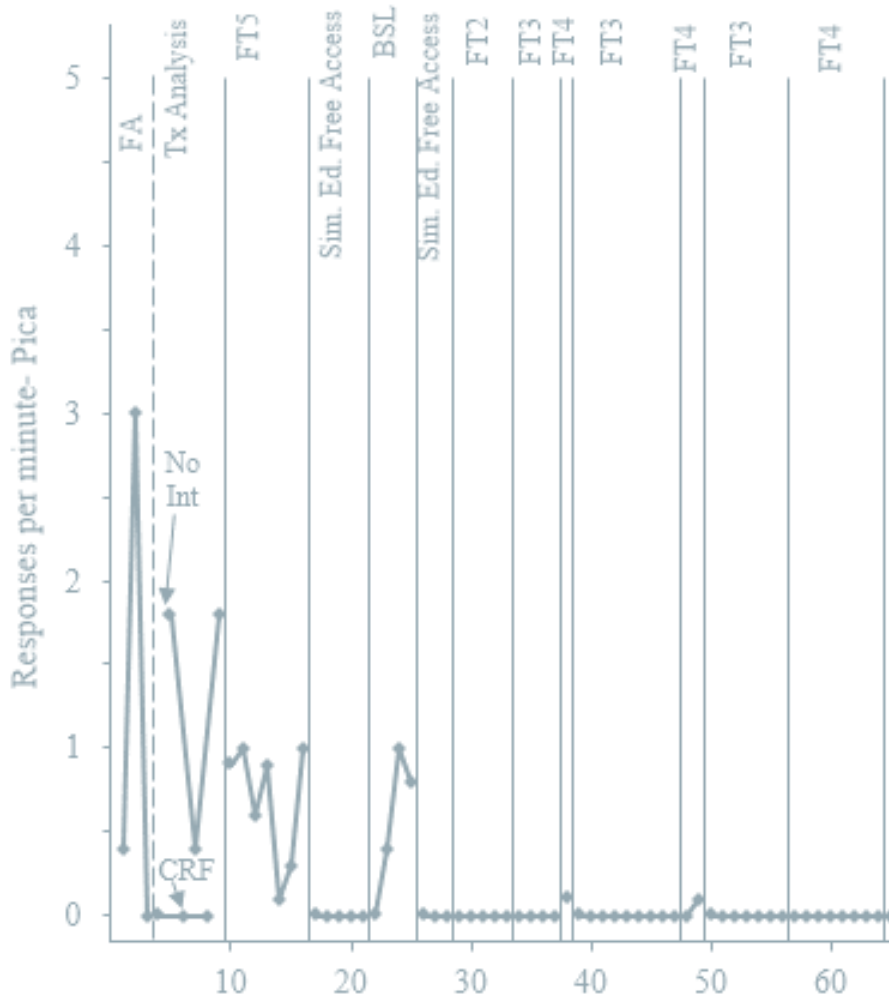
Procedures

- ▶ NCR
- ▶ DRA1: Discard
 - ▶ Throw item in trash
- ▶ DRA2: Use it appropriately
 - ▶ Functional response with item
- ▶ DRA3: Return
 - ▶ Put item back on ground or where located











Limitations

- ▶ We did not complete a preference assessment to determine whether items used in the analysis were matched or unmatched
- ▶ NCR: Thinning schedule by only one second at a time
- ▶ Sessions only occurred four days per week
 - ▶ and one staff taking leave January - April



Future research

- ▶ Future researchers should evaluate generality of intervention
- ▶ May also consider looking at edibles that are sustained for longer periods



Discussion

- ▶ FA led to successful identification of function
- ▶ Treatment analysis led to effective treatment
- ▶ Maintained near-zero levels of pica during schedule-thinning
- ▶ Current schedule relative to terminal schedule
- ▶ Study is ongoing - will continue thinning schedule and conducting discrimination training



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