



I  
THINK  
I'M  
BEING  
WATCHED

# Someone to Watch Over Me: impact of Self-Monitoring Training (SMT) on behavioural symptoms of neurobehavioural disability

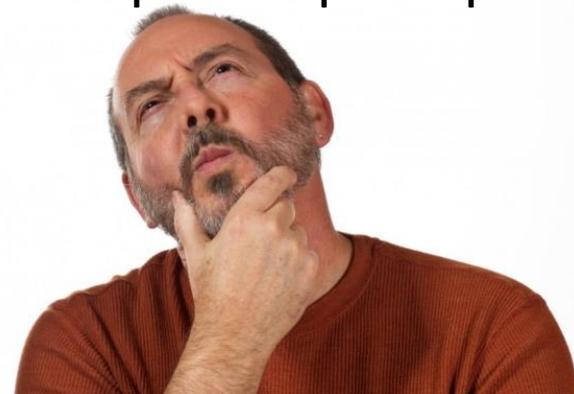
Professor Nick Alderman  
Clinical Director, Neurobehavioural Rehabilitation Services  
Elysium Neurological



# *Questions for this session...*

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1. In this session we are going to examine evidence of a causal relationship between poor self-monitoring skills and ABI behaviour disorders
2. Argue that reduced ability to accurately self-monitor is secondary to attentional impairment
3. Review case study data to determine the efficacy of treatment approaches derived from operant principals and procedures
3. Propose Self-monitoring Training (SMT) has particular relevance



# Outcomes After ABI

Complex, non-homogenous population with a wide range of different needs

- Physical
- Functional
- Cognitive
- Emotional
- Psychosocial
- Behavioural



ABI rarely inflicts just one identifiable problem



## *Outcome After ABI*

In studies conducted over many years, challenging behaviour has been recognized as posing a greater long-term impediment to community integration after TBI than physical disabilities



# *Neurobehavioural Disability (NBD)*

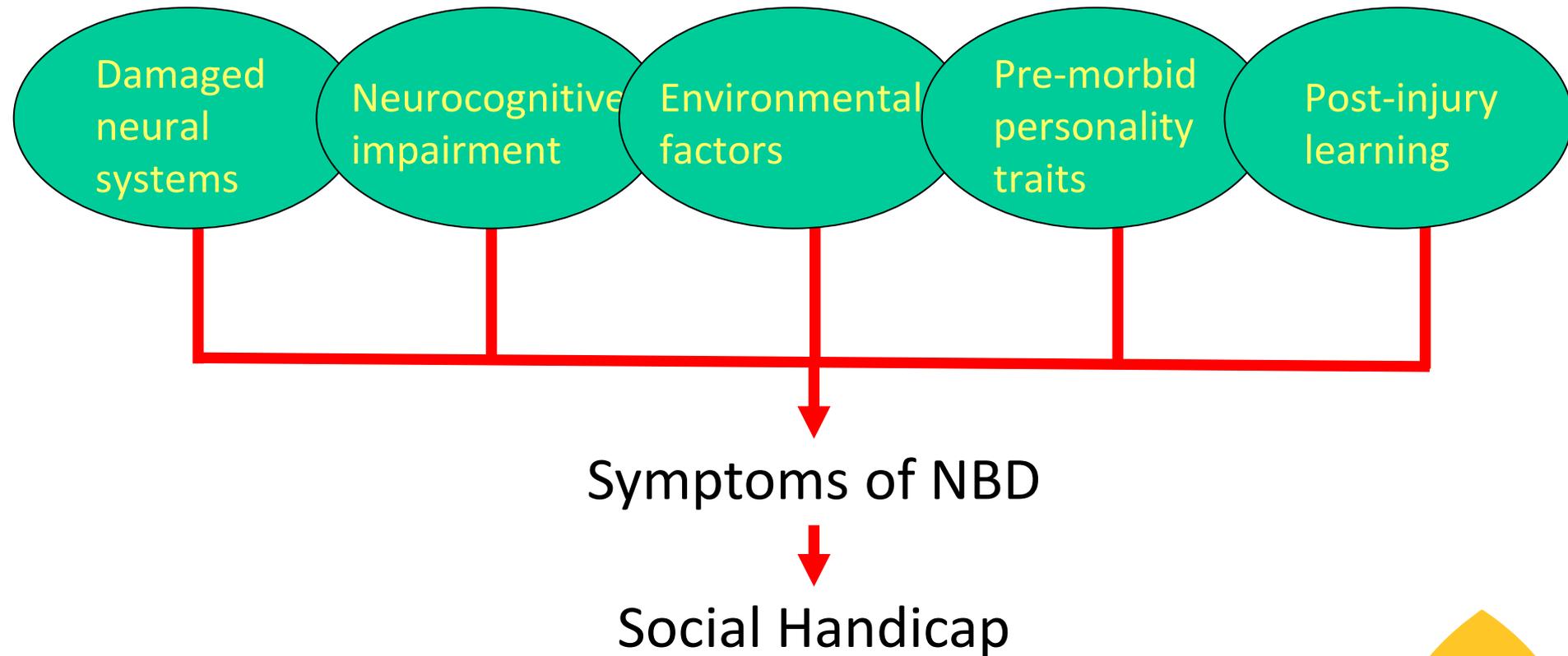
Conceptualising what underpins these difficulties –  
the concept of NBD

Prof Rodger Wood (2001)

Complex, subtle, pervasive  
constellation of cognitive-  
behavioural changes that  
characterise post-acute ABI



# Neurobehavioural Disability



*Questions for this session...*

***Are these behavioural problems 'severe'?***





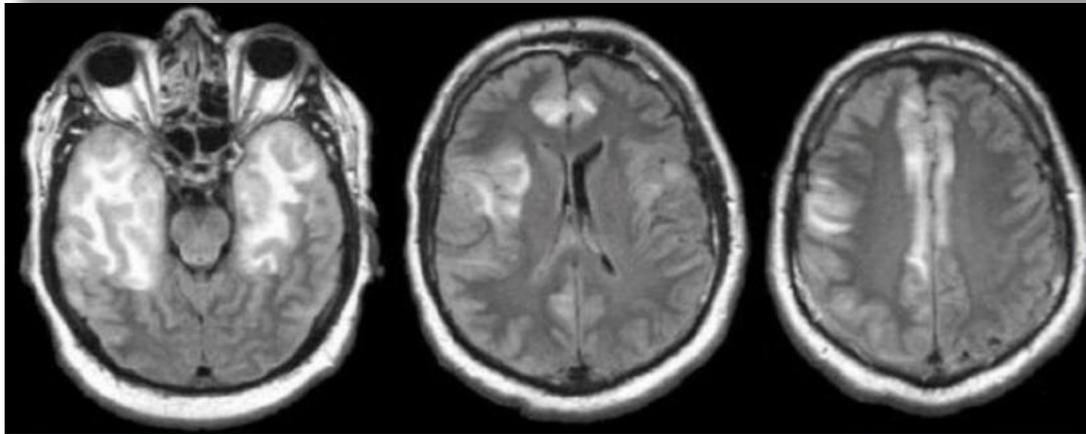
# Severe behavioural problems extend beyond aggression...



## *Case Studies*

Present a series of historical cases with shared characteristics

- All survivors of Herpes Simplex Encephalitis (HSE)



# *Common Characteristics of Case Studies #1*

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## Presentation

Characteristic presentation underlies cases with the most severe challenging behaviour:

1. Anterograde memory disorder
2. Dysexecutive syndrome

Overall level of intellectual ability generally preserved at the premorbid level



# *Dysexecutive Syndrome*

## The 'Executive Functions'

Shorthand for a diverse and varied range of behavioural competencies that include:

- *Planning*
- *Initiation*
- *Sequencing*
- *Ability to sustain attention*
- *Ability to resist interference*
- *Monitoring, ability to utilise feedback*
- *Co-ordinate simultaneous activity (multitask)*
- *Cognitive flexibility (change set)*
- *Ability to deal with novelty*



# *Dysexecutive Syndrome*

These competencies enable a person to determine goals, formulate new and useful ways of achieving them, and then follow and adapt an initial plan in the face of competing goals and changing circumstances, often over prolonged periods of time (*Burgess and Alderman, 2004*)

Damage to these competencies gives rise to a range of behavioural and other symptoms collectively referred to as the 'dysexecutive syndrome' (*Baddeley, 1986; Baddeley and Wilson, 1988*)



# *Common Characteristics of Case Studies #2*

## Behaviour

Garrulous, constant flow of verbal output:

- 1. With and without aggressive/ISB content*
- 2. Impervious to social cues behaviour was inappropriate, lacked awareness*
- 3. Appeared to have little ability to exert inhibitory control*
- 4. Prevented individual and group rehabilitation – increased vulnerability*



## *Common Characteristics of Case Studies #3*

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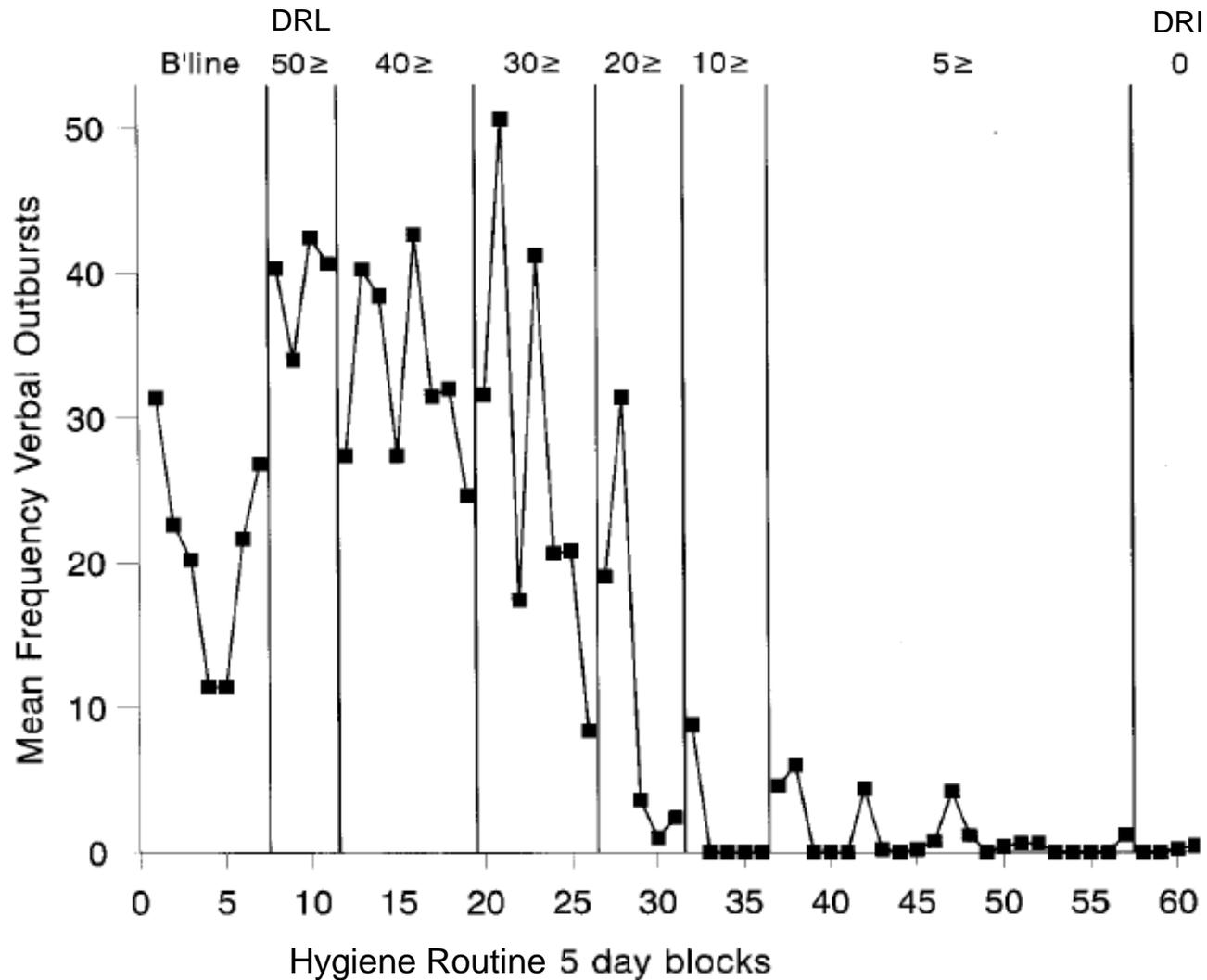
### Lack of Responsiveness to Rehabilitation

Cases were 'treatment' resistive, they did not respond to NbR programmes including mainstream behaviour modification interventions based on operant learning theory:

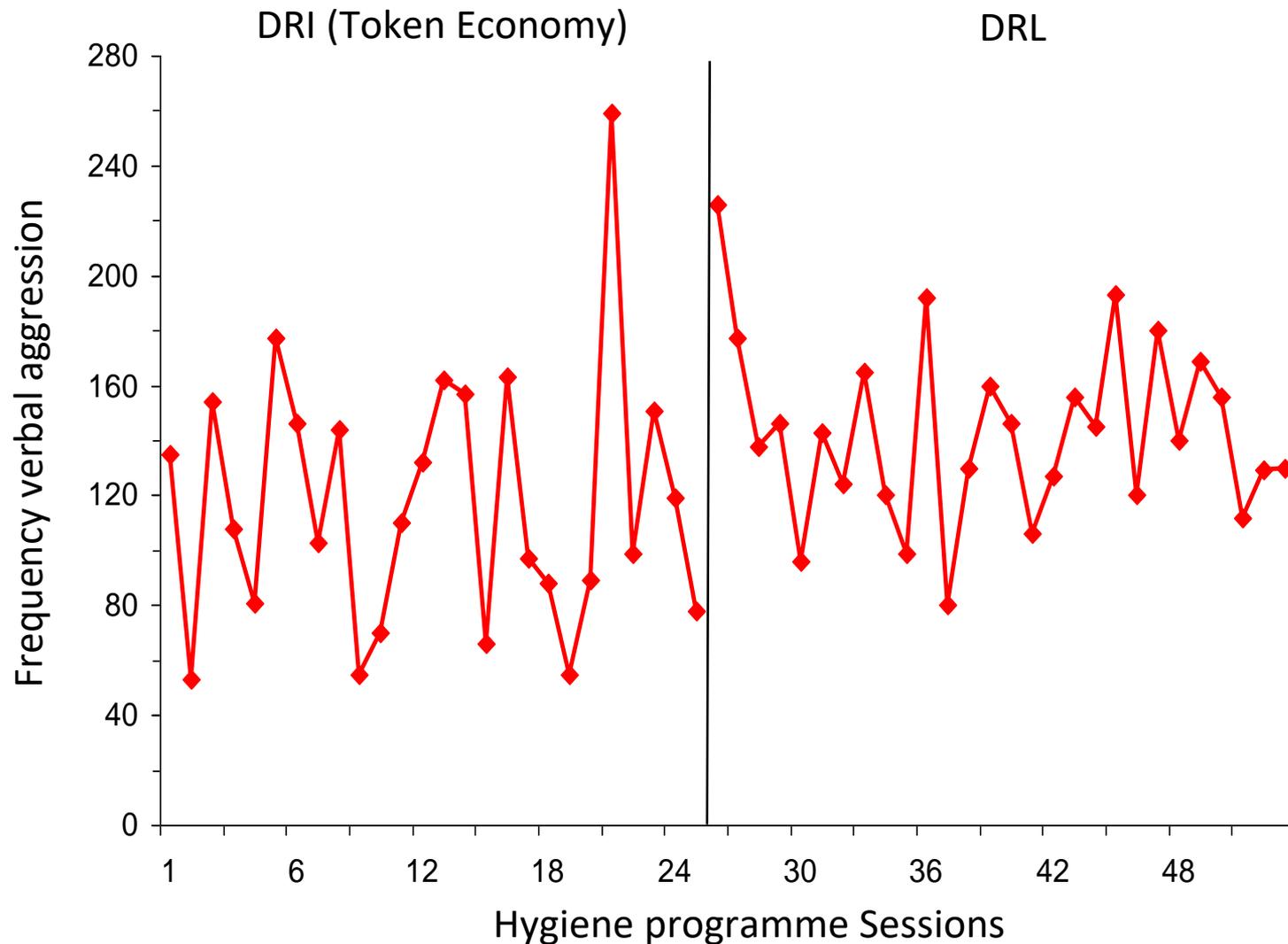
1. Positive reinforcement programmes
2. Use of various types of extinction programmes



# Reducing Verbal Outbursts Using Differential Reinforcement Methods



# Verbal Aggression: Poor Response to Two Differential Reinforcement Interventions



*On further reflection...*

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These rehabilitation participants did not typically respond well to reinforcement procedures and seemed 'treatment resistive'

Concluded that executive difficulties with awareness and monitoring impairments underpinned 'challenging' behaviours

Evidence: observational, theoretical, experimental and response to treatment



# Evidence for Causal Relationship between Poor Self-monitoring and ABI Behaviour Disorders

1. Observational
2. Theoretical
3. Experimental
4. Response to Treatment



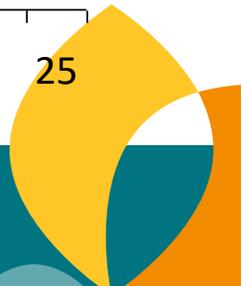
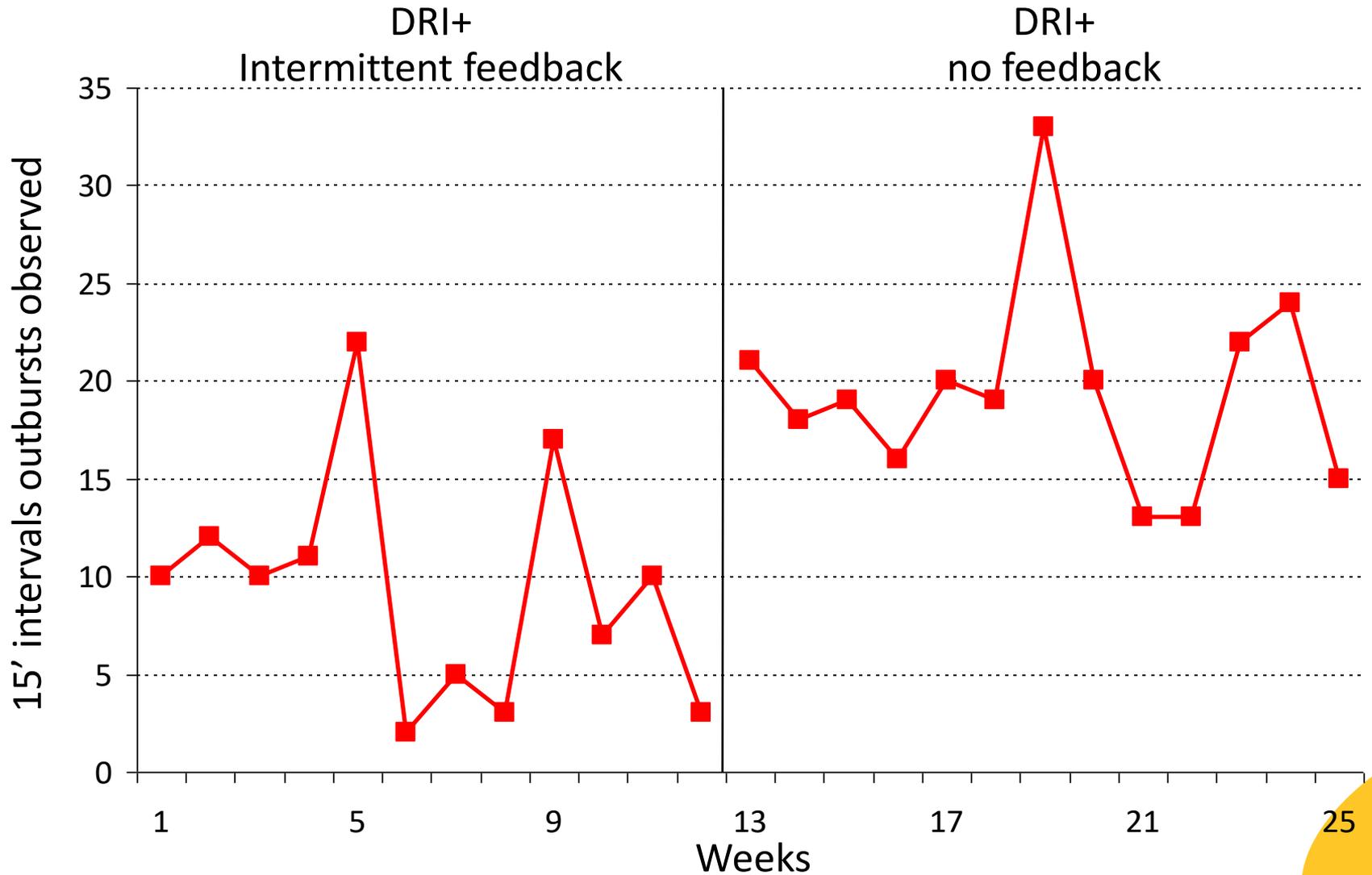
# *A Neurocognitive Explanation for NBD*



No awareness of  
incontinence



# CE: Effect of DRI on Verbal Aggression



# Evidence for Causal Relationship between Poor Self-monitoring and ABI Behaviour Disorders

1. Observational
2. Theoretical
3. Experimental
4. Response to Treatment



Can theories of executive function inform assessment and treatment options?

## Executive Function

“ ”

Regulates, controls and manages thought and actions

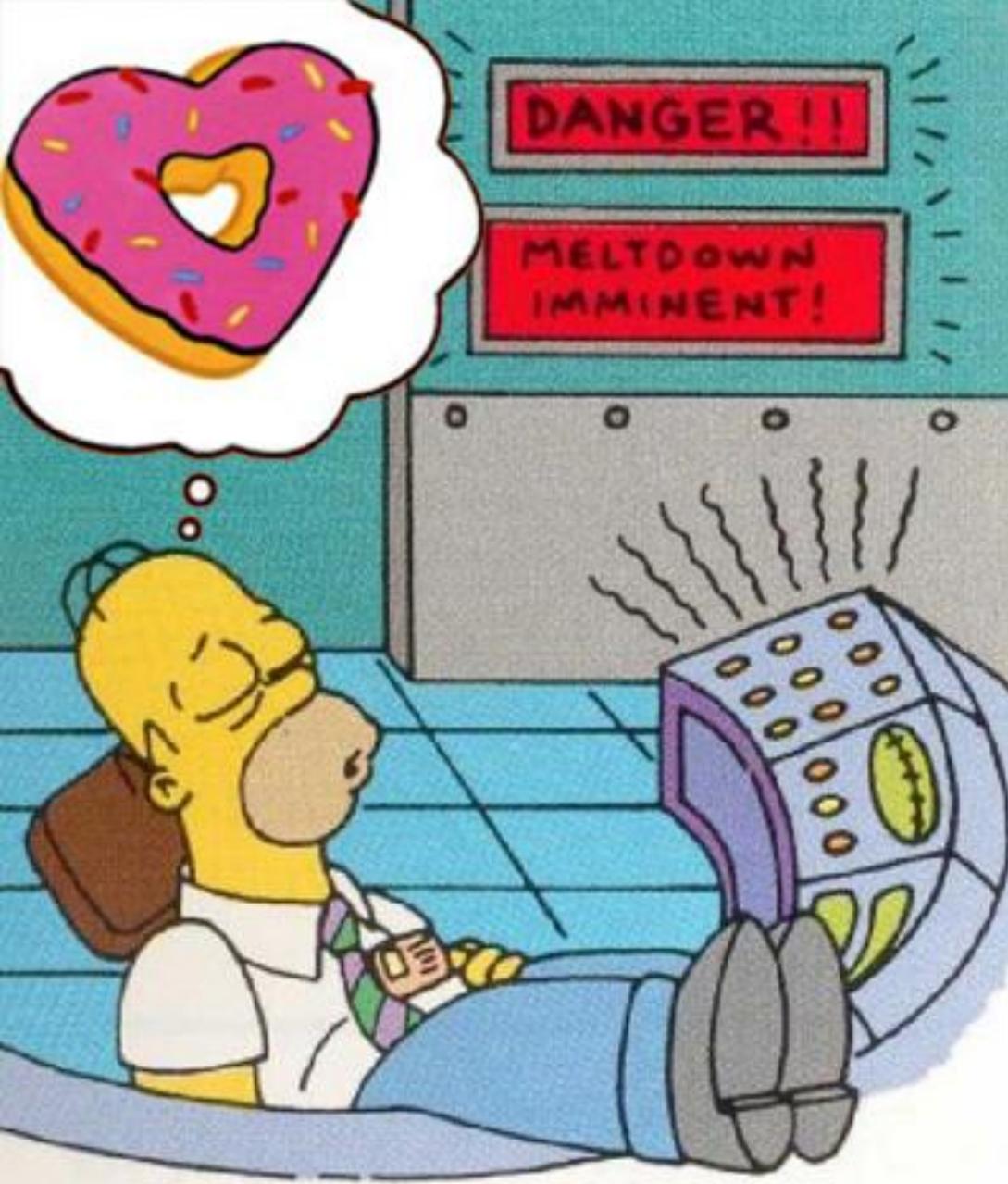


[musingsofanaspie.com](http://musingsofanaspie.com)

# *Dysexecutive Syndrome*

- Increased distractibility
- Poor monitoring of own performance
- Poor monitoring of environmental changes
- Problems utilising feedback
- Secondary memory impairment

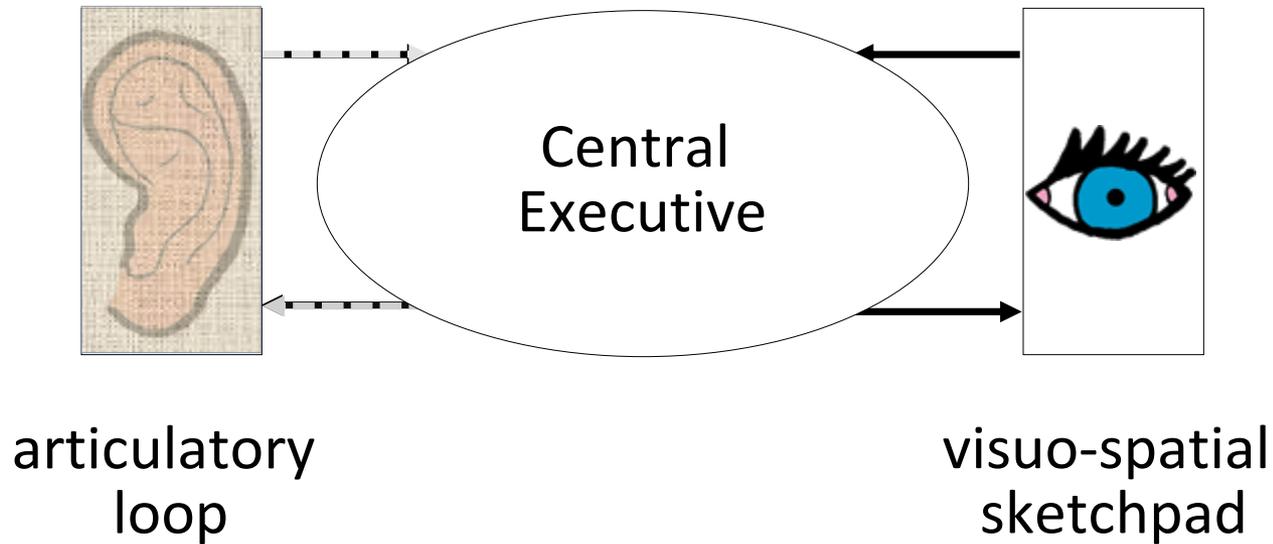




*Reduced ability to monitor and attend to cues can lead to 'behavioural perseveration'*



# What is the functional explanation for such a pattern of deficits?



A Simplified Model of Working Memory (from Baddeley, 1986)



## *Functional explanation for behaviour*

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Unable to allocate attentional resources efficiently, less able to monitor two or more ongoing events so may neglect:

- Physiological changes
- Changes in own behaviour
- Changes in the environment

May help to explain actions that are 'no longer appropriate' through 'behaviour perseveration'

Poor response to some operant programmes may be because of this

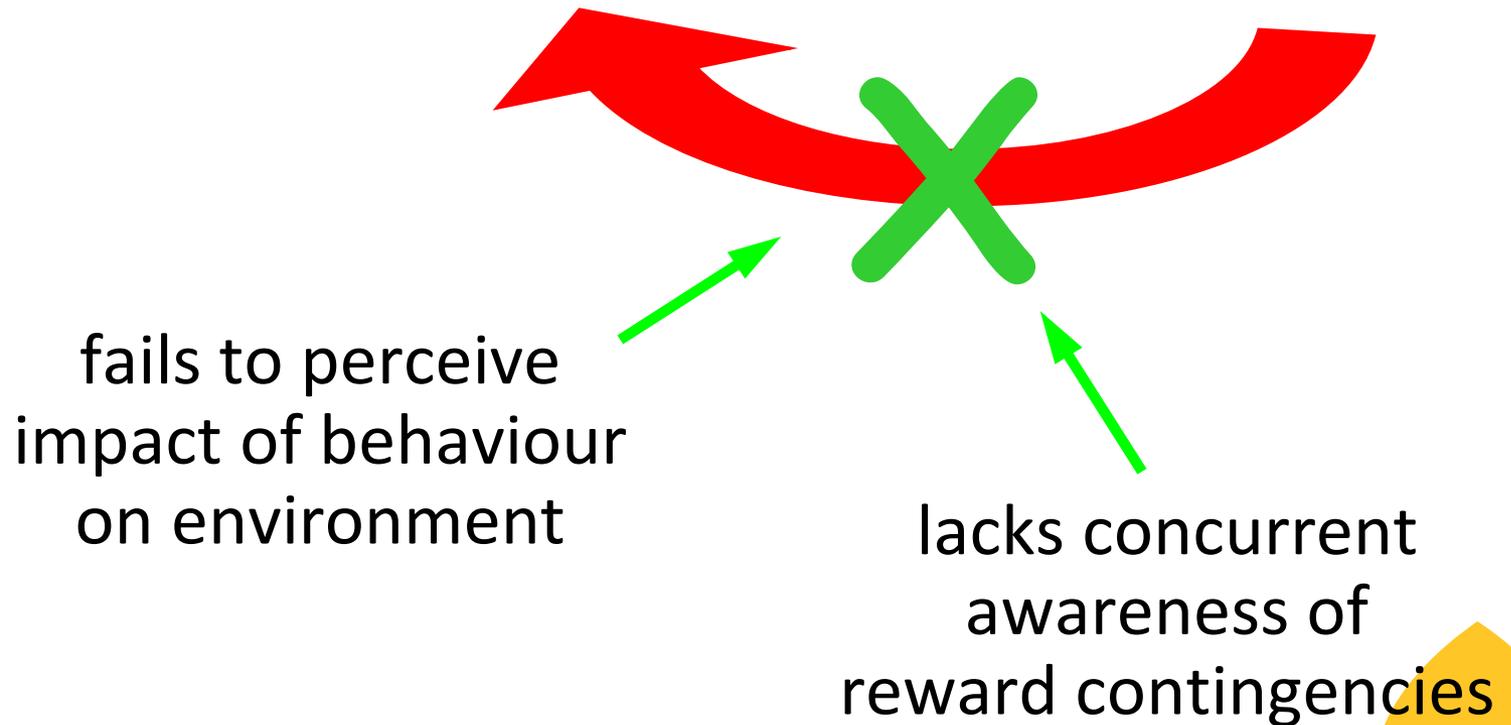
Consistent with observation of NbR participants



# Operant Conditioning

All behaviour has consequences; the nature of these consequences is a powerful determinant of whether that behaviour is repeated

**STIMULUS** → **BEHAVIOUR** → **CONSEQUENCES**

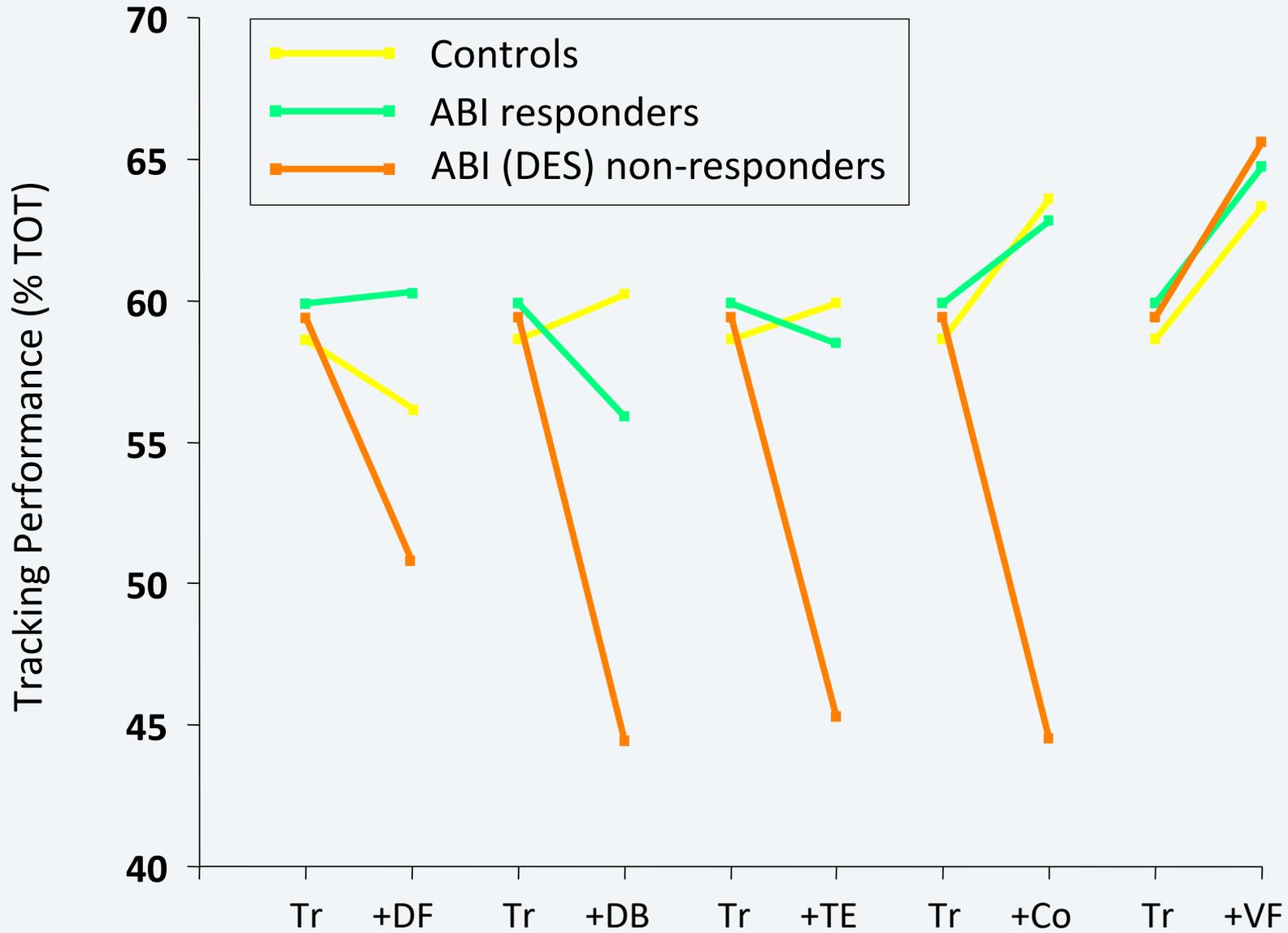


# Evidence for Causal Relationship between Poor Self-monitoring and ABI Behaviour Disorders

1. Observational
2. Theoretical
3. Experimental
4. Response to Treatment



# Multitasking: motor task performance & secondary verbal tasks



# Evidence for Causal Relationship between Poor Self-monitoring and ABI Behaviour Disorders

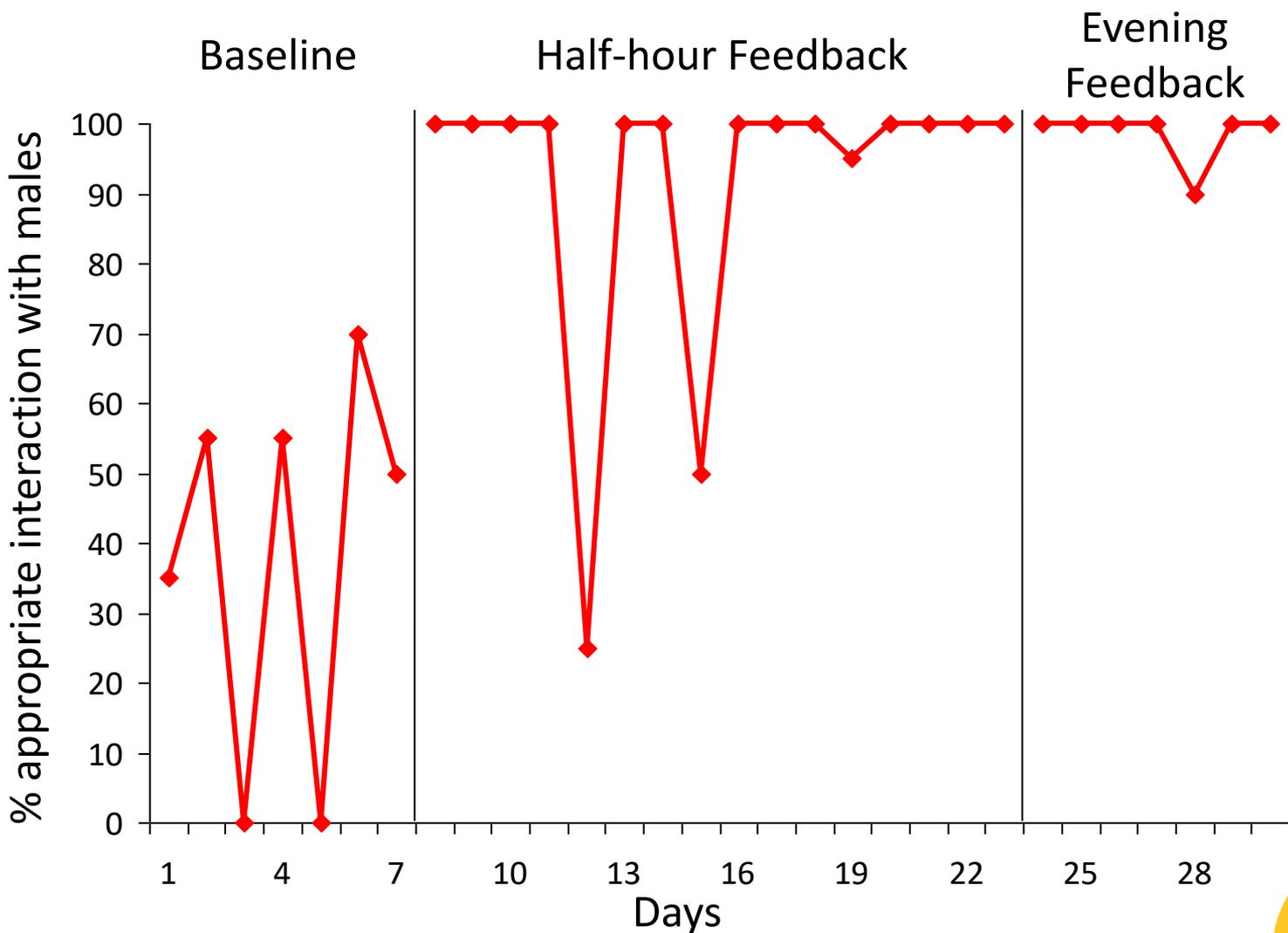
1. Observational
2. Theoretical
3. Experimental
4. Response to Treatment



Encouraging people  
to monitor using behavioural  
approaches can lead  
to reduction in  
challenging behaviour



# Effect of Scheduled Feedback on Inappropriate Interaction with Males in a 19 year Old Female with Severe ABI



# *Improving self-monitoring*

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Ultimately a self-management strategy that requires:

## 1. Self-evaluation

*Person is able to evaluate their behaviour against some yardstick*

## 2. Self-recording

*Person is able to maintain a record of whether or not a behaviour occurred*



# *A Hypothesis and Suggestions for Intervention Characteristics*

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- Baddeley's Working Memory Model suggests disinhibition attributable to impairment of skills that enable multiple monitoring of self and environment: DR interventions can be helpful
- However, not all have sufficient attentional resource to maintain concurrent awareness of programme contingencies and own behaviour/cues in social environment
- Collective evidence suggests intervention requires:
  - ▶ *Immediate feedback*
  - ▶ *Immediate contingency*
  - ▶ *Low demand on memory*
  - ▶ *Motor component (procedural learning)*



# Comparison of operant procedures to facilitate learning in cases with monitoring impairments

	Reinforcement Interventions	Ideal Characteristics
Memory load	high	low
Comprehension of programme contingencies	high	low
Motor involvement/ component	low	high

*(Alderman & Burgess, 1994)*

*Also consider*

Cue saliency	low	high
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*(Alderman, Fry & Youngson, 1995)*



# *Response Cost*

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- An operant conditioning intervention
- Based on principle of negative punishment, that is, removal of something of value contingent on a target behaviour, leading to a decrease in the frequency of that behaviour (Alderman & Burgess, 1990)
- Person given a set amount of tokens to carry
- Exchanges tokens for a reinforcer at a set time if has retained minimum target number of tokens
- Loses one token each time target behaviour observed



# Response Cost

Loses one token each time target behaviour observed

1. Staff immediately draw the person's attention

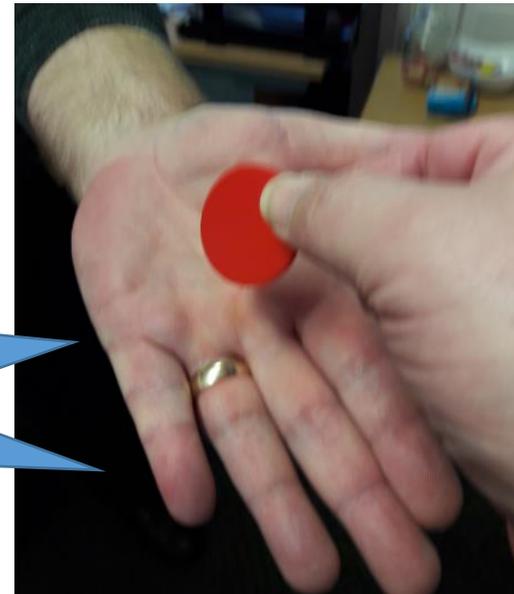
2. State the behaviour that occurred

3. Prompt person to hand over token

4. Give record of how many tokens of how long

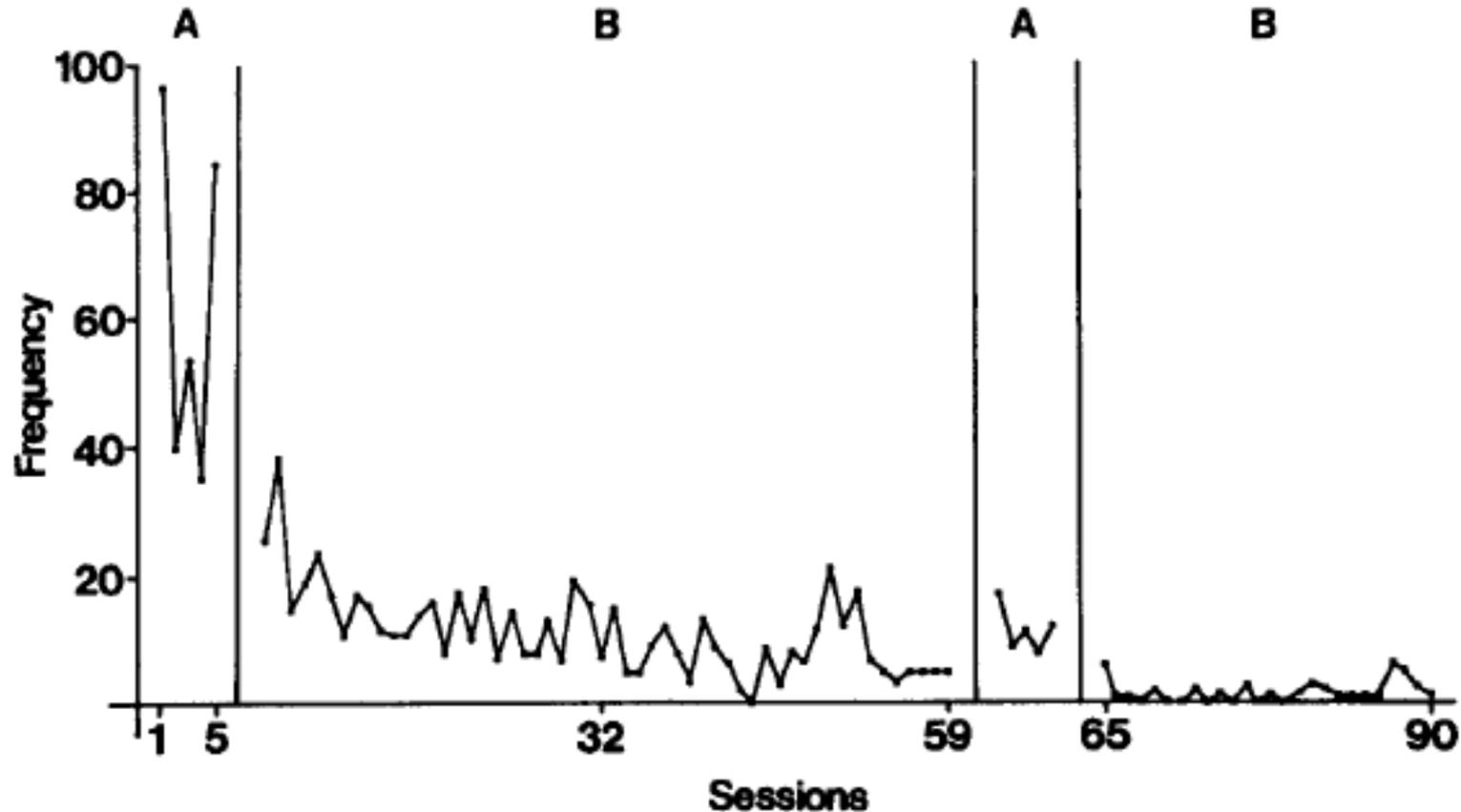
*Promotes self-evaluation*

*Record of behaviour*



# *GAS: management of behaviour disturbance*

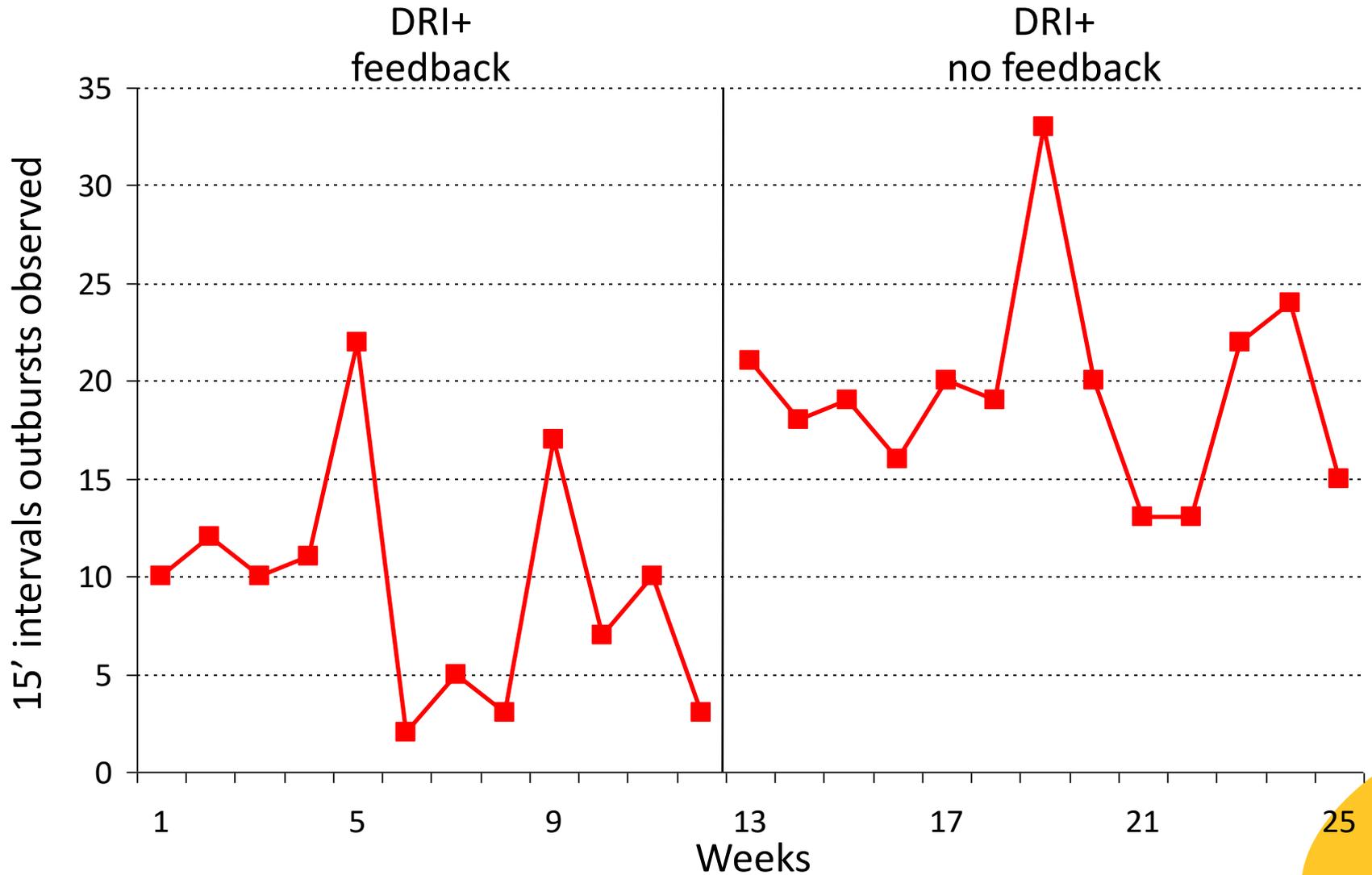
Effect of response cost on frequency verbal aggression, rhyming & swearing



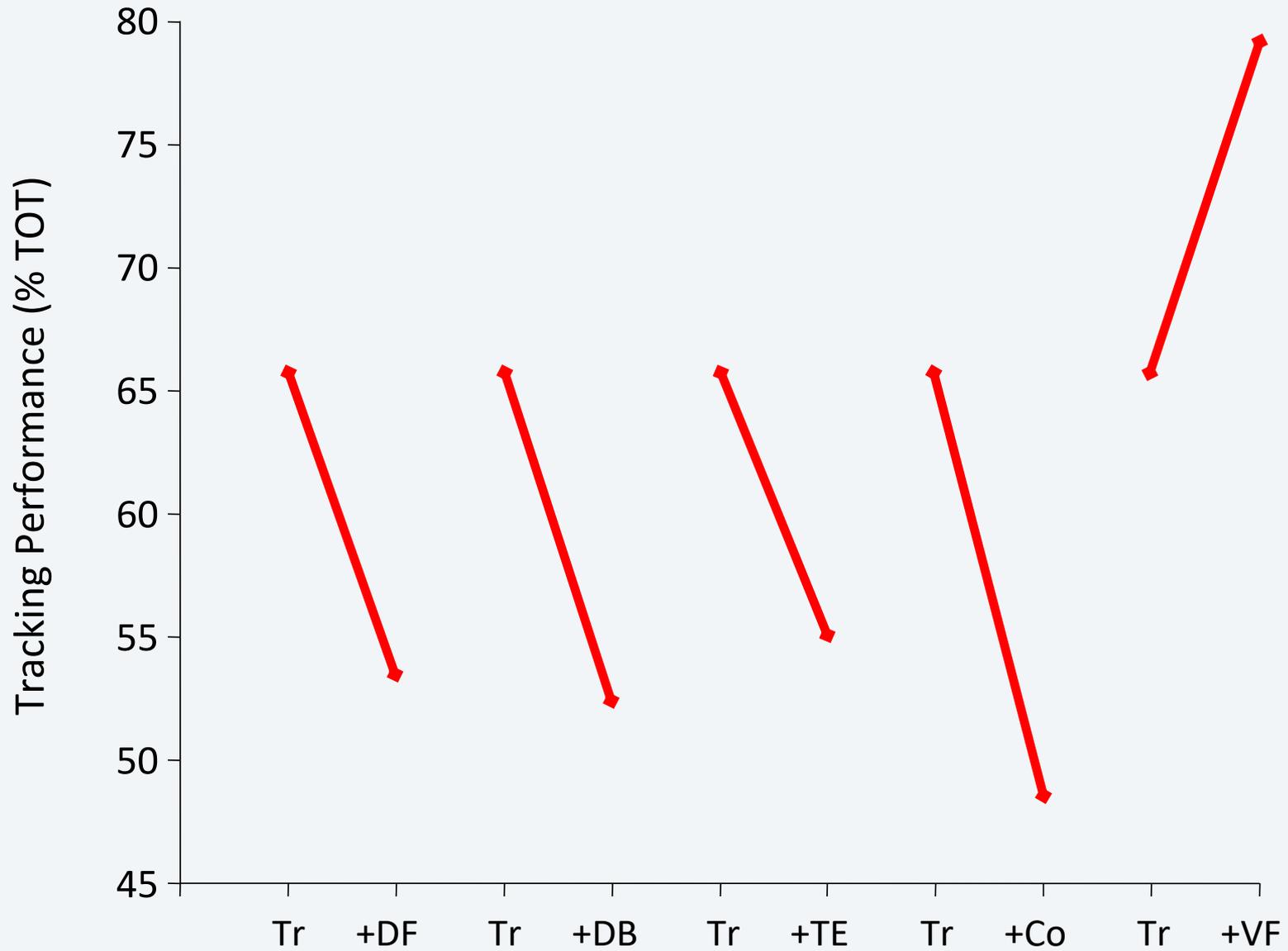
'A' - behaviours "timed-out-on-the-spot". 'B' - response cost. Each data point represents the total number of target behaviours recorded across the two 30-minute trials comprising each session.



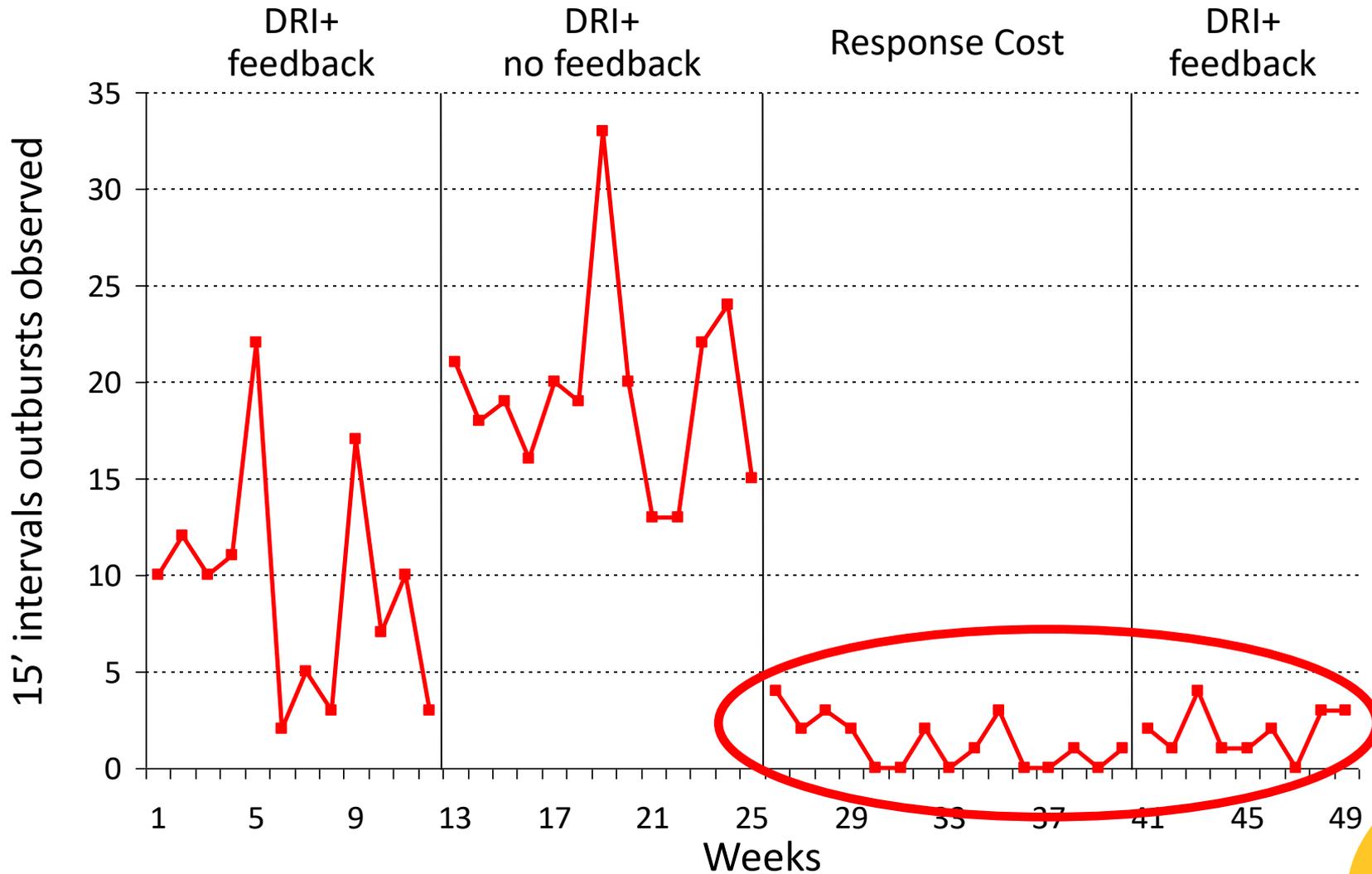
# CE: Effect of DRI on Verbal Aggression



# CE: motor task performance & secondary verbal tasks



# CE: Reduction in Verbal Aggression Using Response Cost



# Comparison of operant procedures to facilitate learning in cases with monitoring impairments

	Reinforcement Interventions	Response Cost
Memory load	high	low
Comprehension of programme contingencies	high	low
Motor involvement/ component	low	high

*(Alderman & Burgess, 1994)*

*Also consider*

Cue saliency	low	high
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*(Alderman, Fry & Youngson, 1995)*



## *The Case of AB*

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- 36 year old woman
- HSE one year before admission
- Diagnosed with “Frontal Lobe Syndrome”
- Multiple behaviour problems
  - Stealing food
  - Disinhibition
  - Lack of social awareness
  - Blunt social behaviour
  - Repetitive, stereotyped speech



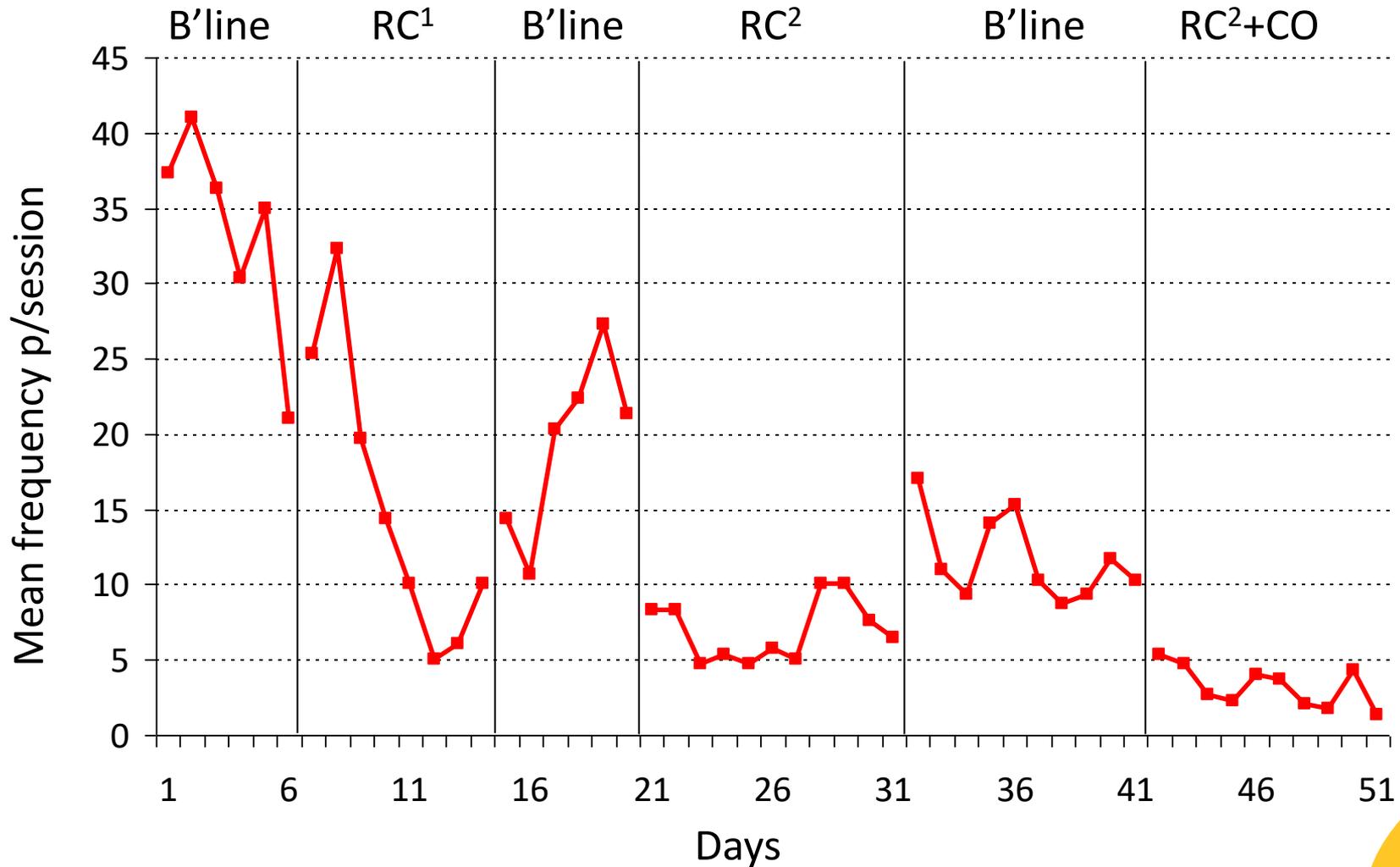
# The Case of AB

- Poor response to differential reinforcement interventions
- Problems with monitoring, utilising feedback and memory
- 5 hour time-sample of repetitive speech
  - 985 in total
  - 581 in rehab sessions
  - 404 at other times

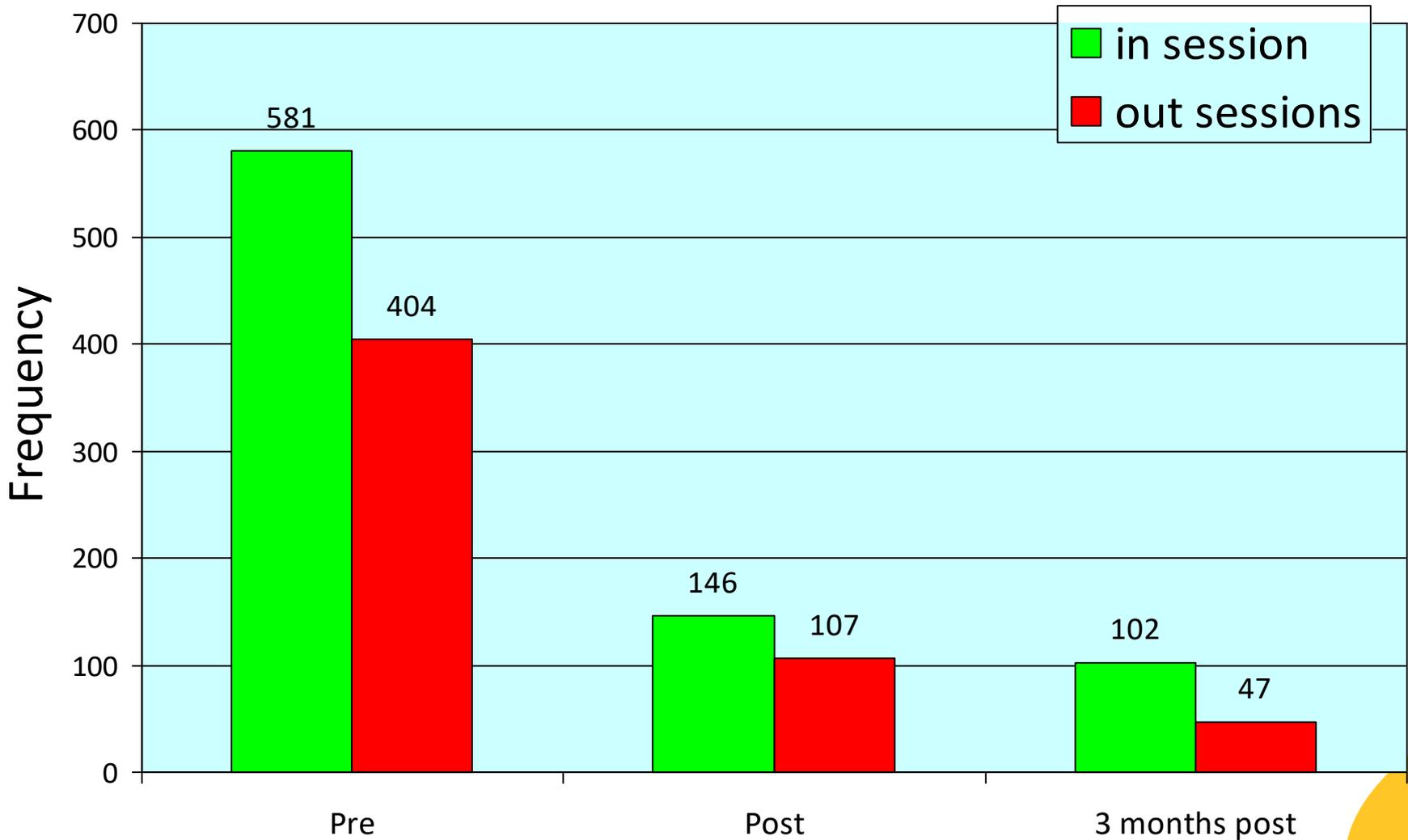


*(Alderman & Ward, 1991)*

# The Case of AB



# The Case of AB





Cognitive rehabilitation  
of monitoring problems  
that drive post-ABI  
behaviour disorders:  
from response cost to  
self-monitoring training



# Self-Monitoring Training (SMT) was first described in the treatment of SK\*

\* Alderman, N., Fry, R.K. and Youngson, H.A. (1995). Improvement of self-monitoring skills, reduction of behaviour disturbance and the dysexecutive syndrome: comparison of response cost and a new programme of self-monitoring. Neuropsychological Rehabilitation, 5, 193-221.



# The Case of SK

- 21 year old female
- HSE 13 months prior to admission
- Continuous flow of verbal output
- “...she tends to bark out standard repetitive statements like a computer or a parrot”
- Commented incessantly on actions of others
- Loud, inappropriate, provoked others



*(Alderman et al., 1995)*

# The Case of SK

- Time-sampled for 382 minutes
- 3388 self-initiated utterances (mean 8.9 p/min)
- No response to reinforcement/extinction interventions
- Rehabilitation could not proceed, behaviour increased risk
- Responded to Response Cost

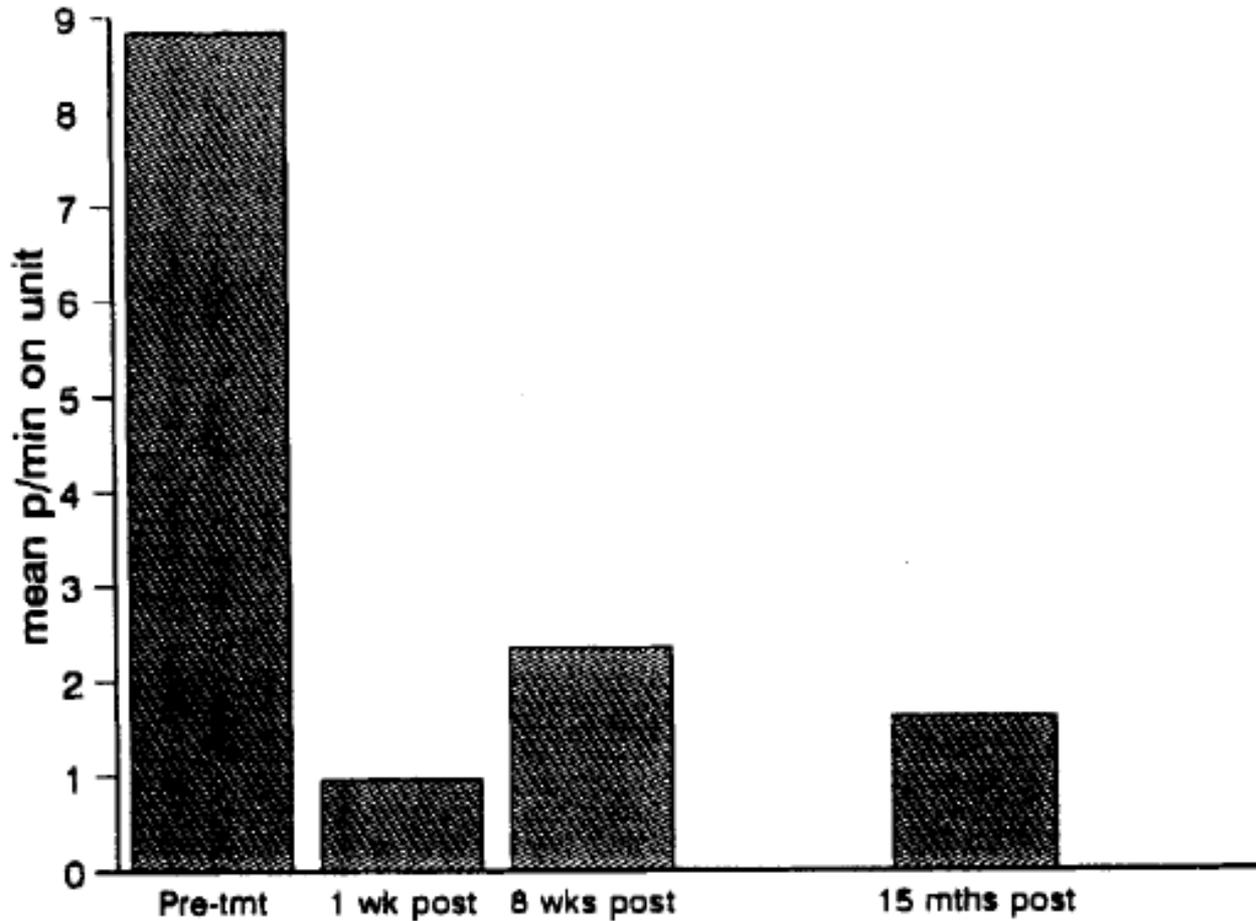


the  
up or  
!!!



# *SK: management of behavior disturbance*

Mean frequency per minute self-initiated verbal utterances before and after intervention, within the rehabilitation unit



# The Case of SK

- Time-sampled for 382 minutes
- 3388 self-initiated utterances (mean 8.9 p/min)
- No response to reinforcement/extinction interventions
- Rehabilitation could not proceed, behaviour increased risk
- Responded to Response Cost
- Did not generalise to community rehab



the  
up or  
!!!



# The Case of SK

Response Cost

- Longer sessions
- Too many trials
- Too frequent
- Would high

Intervention  
needed to  
incorporate:

	Response cost
Memory load	low
Comprehension of programme contingencies	low
Motor involvement/ component	high
Cue saliency	high

because:



# *The 5 Stages of Self-monitoring Training (SMT)*

First, re-establish self-monitoring skills

Second, encourage reduction in target behaviour

1. Baseline
2. Spontaneous self-monitoring
3. Prompted self-monitoring
4. Independent self-monitoring + accuracy reward
5. Independent self-monitoring + DRL











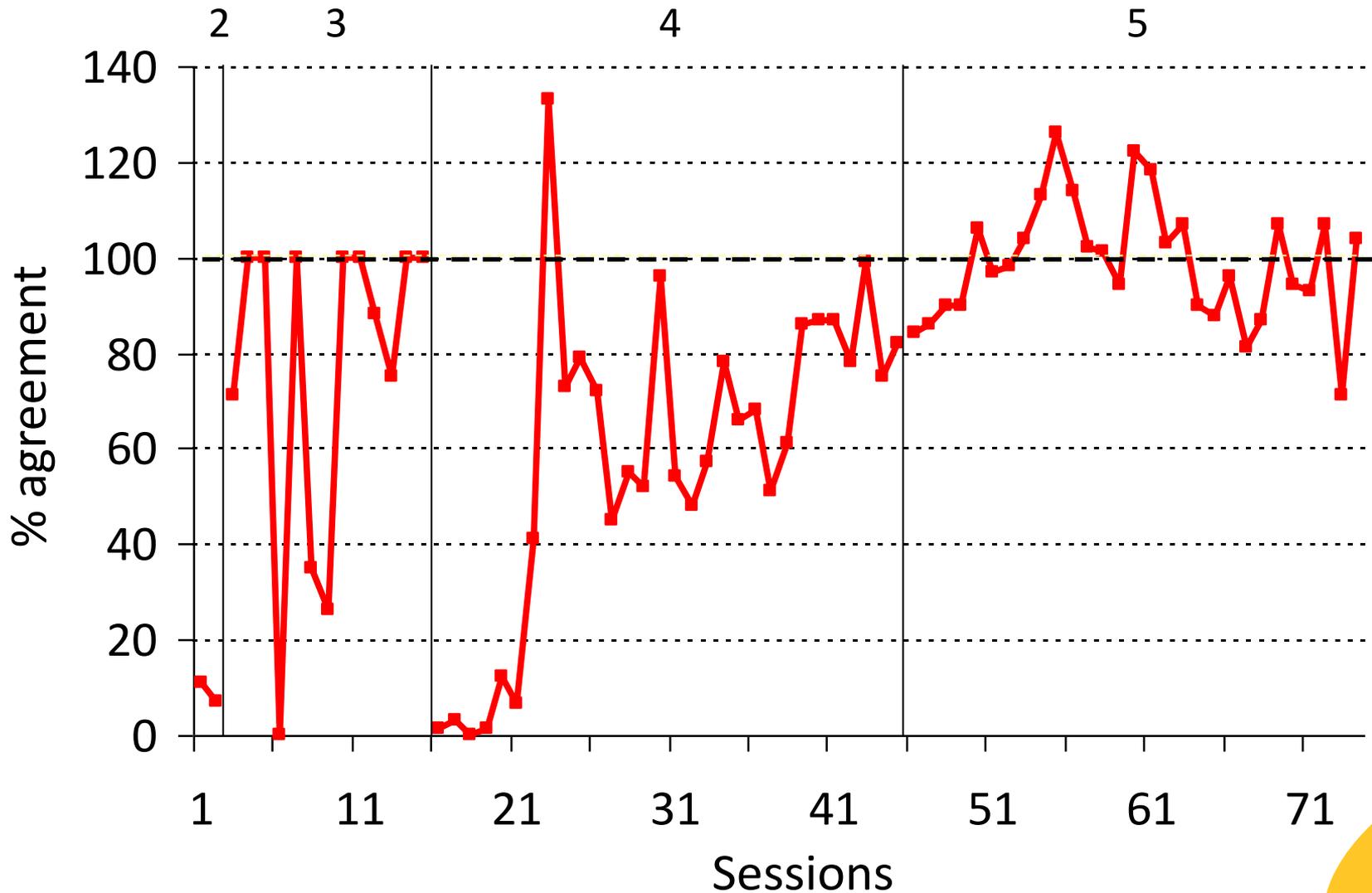




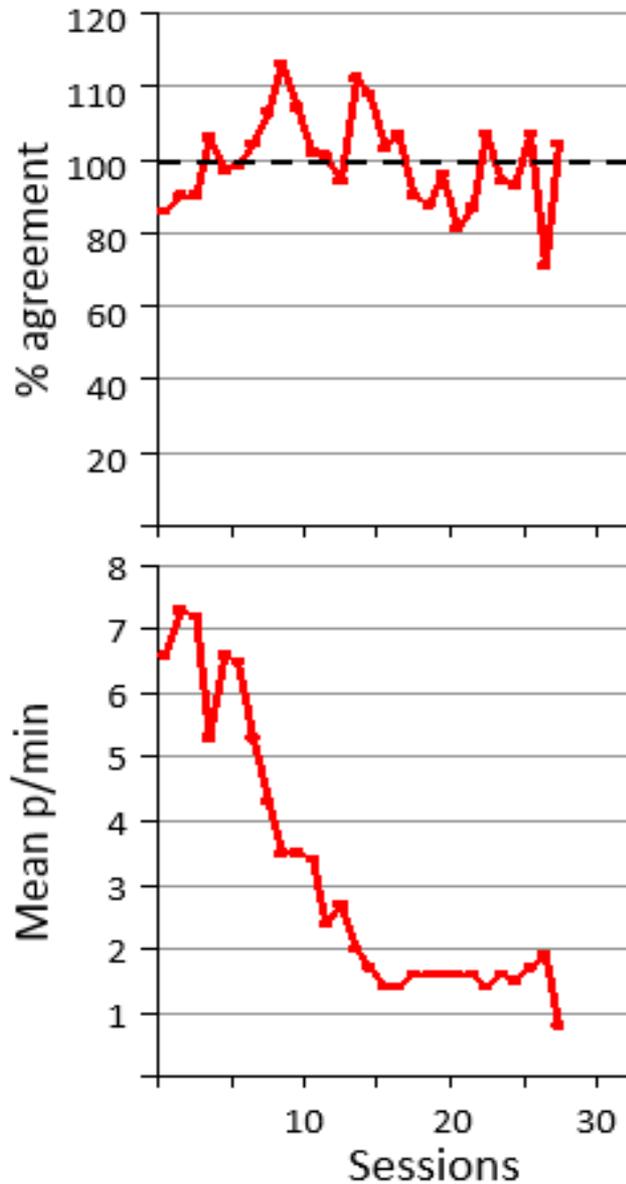




*SK: improvement in ability to self-monitor verbal output through participation in SMT*



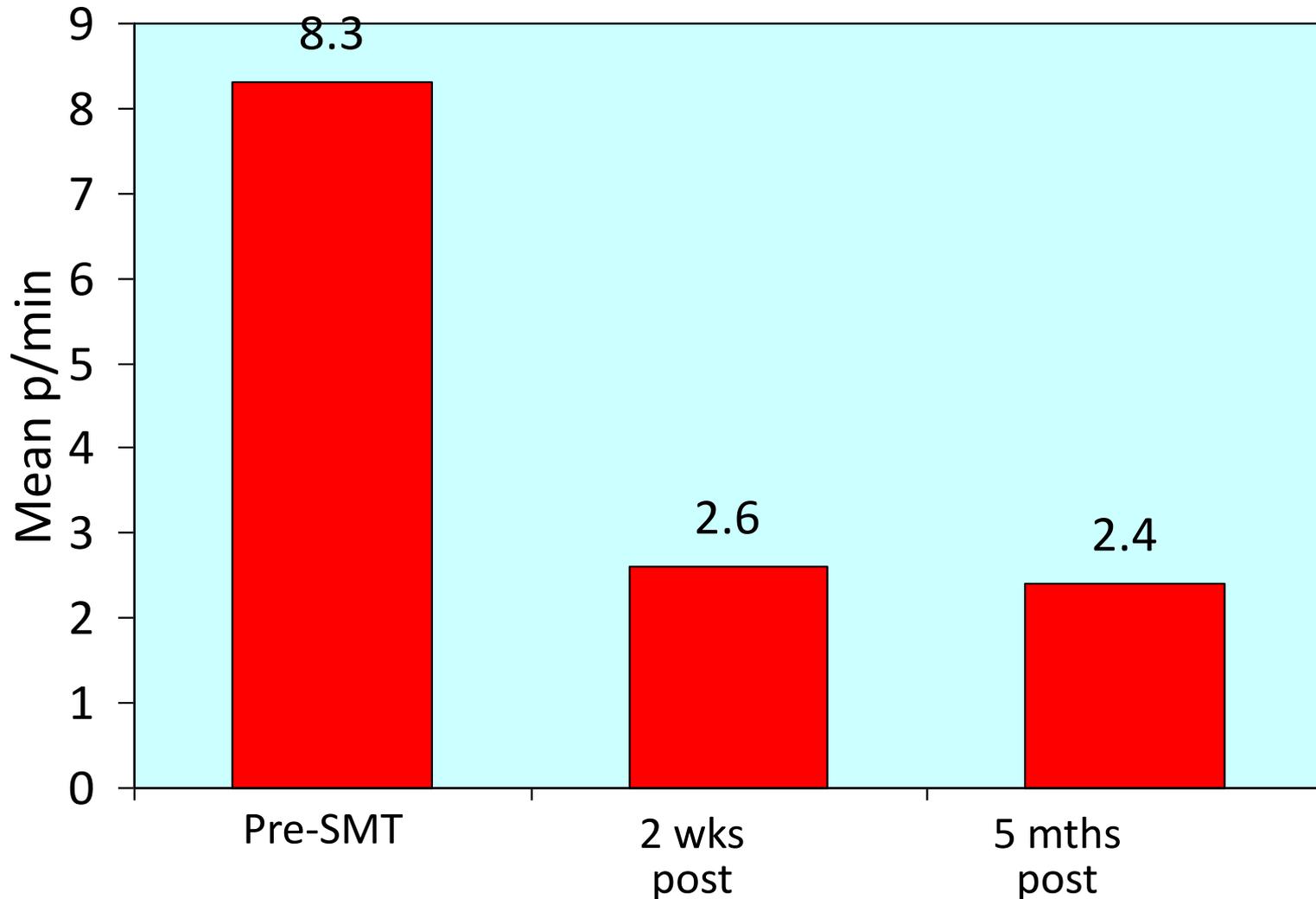
*(Alderman, Fry & Youngson, 1995)*



SK: reduction in verbal output and improvement in self-monitoring skills in Stage 5 of SMT



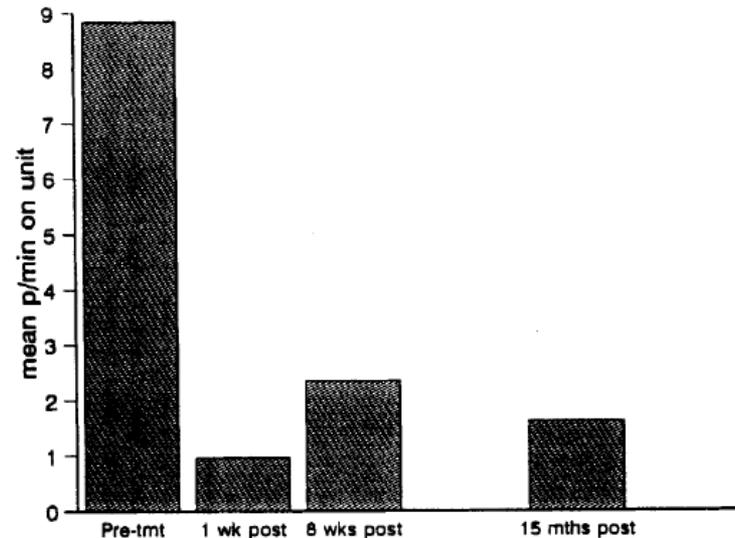
*SK: acquisition of improved inhibitory control over verbal output in the community following SMT*



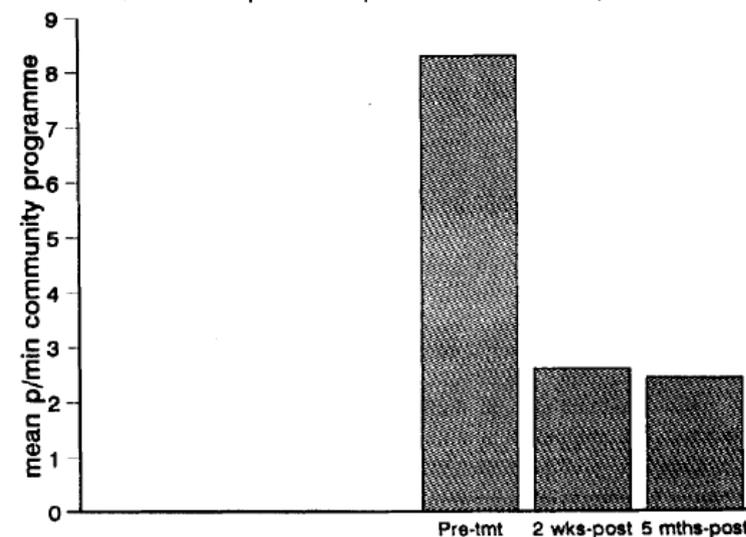
*(Alderman, Fry & Youngson, 1995)*



# SK: management of behavior disturbance



Mean frequency per minute self-initiated verbal utterances before and after intervention, within the rehabilitation unit and the community



# SMT has proved effective with NbR participants since SK

- Behaviour especially characterised by high frequency, unregulated verbal output
- Patients presenting with this behaviour typically have acquired neurological impairment as a consequence of anoxia or infection
- Gains in increased awareness and greater inhibitory control over behaviour tend to maintain



## *Self-monitoring training (SMT)*

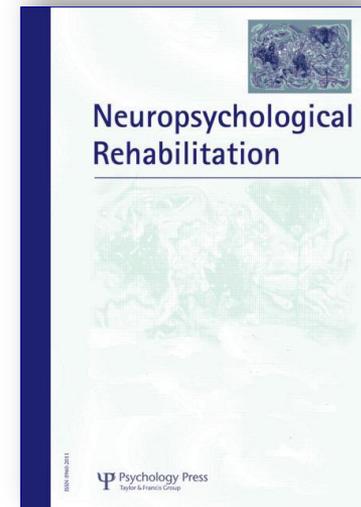
- Effective, growing evidence base
- Cognitive remediation (skill-building) approach underpinned by neuropsychological theory and behavioural methods
- Fully engages the recipient, helps create positive therapeutic relationships
- Applicable across a wide range of contexts and environments, including community settings
- Training and support available



# Treatment of stable delusional confabulations using self-monitoring training

B. Dayus and M.D. van den Broek

NEUROPSYCHOLOGICAL REHABILITATION,  
2000, *10* (4), 415–427



# Response Cost

VS.

# SMT



## *Response Cost vs. SMT*

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- When clinical situation necessitates rapid solution response cost best option
- Response cost may be used as pilot to evaluate longer-term investment of implementing SMT
- Response cost readily incorporated within environment, gives staff clear and consistent means of responding
- SMT offers a community solution
- SMT 'cognitive rehabilitation for NbR symptoms'

*(Alderman, et al., 1995)*





*Putting it all together...*



# The Case of FO

- 25 year old male
- HSE 7 years previously
- Severe anterograde memory impairment, dysexecutive syndrome
- Bizarre behaviour problems
  - *Repetitive hip thrusting & rocking*
  - *Repetitive body rubbing & patting*
  - *Odd walking patterns*
  - *Prolific, constant stream of verbal output*



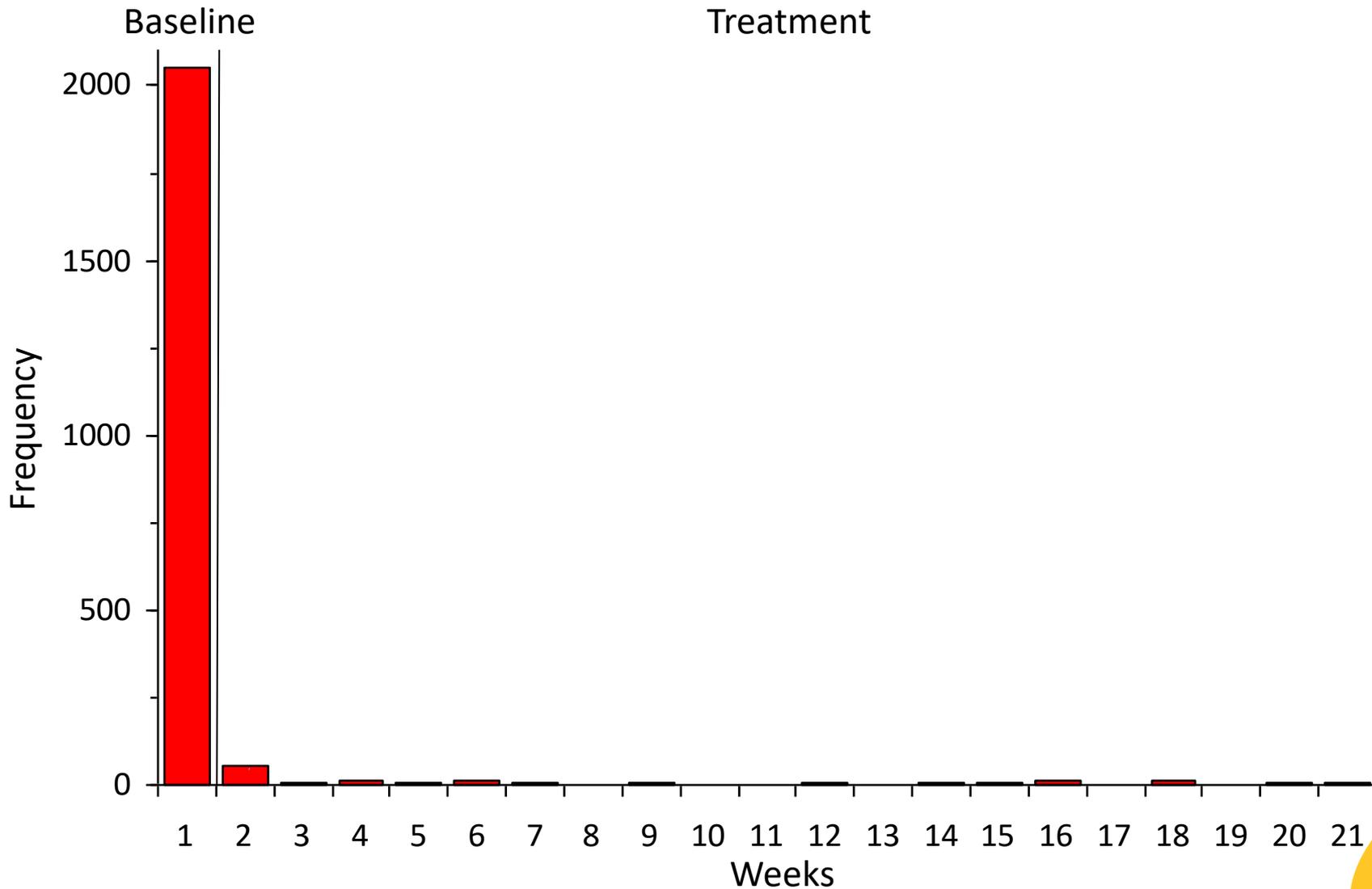
# The Case of FO

Behaviour recordings showed that in a week:

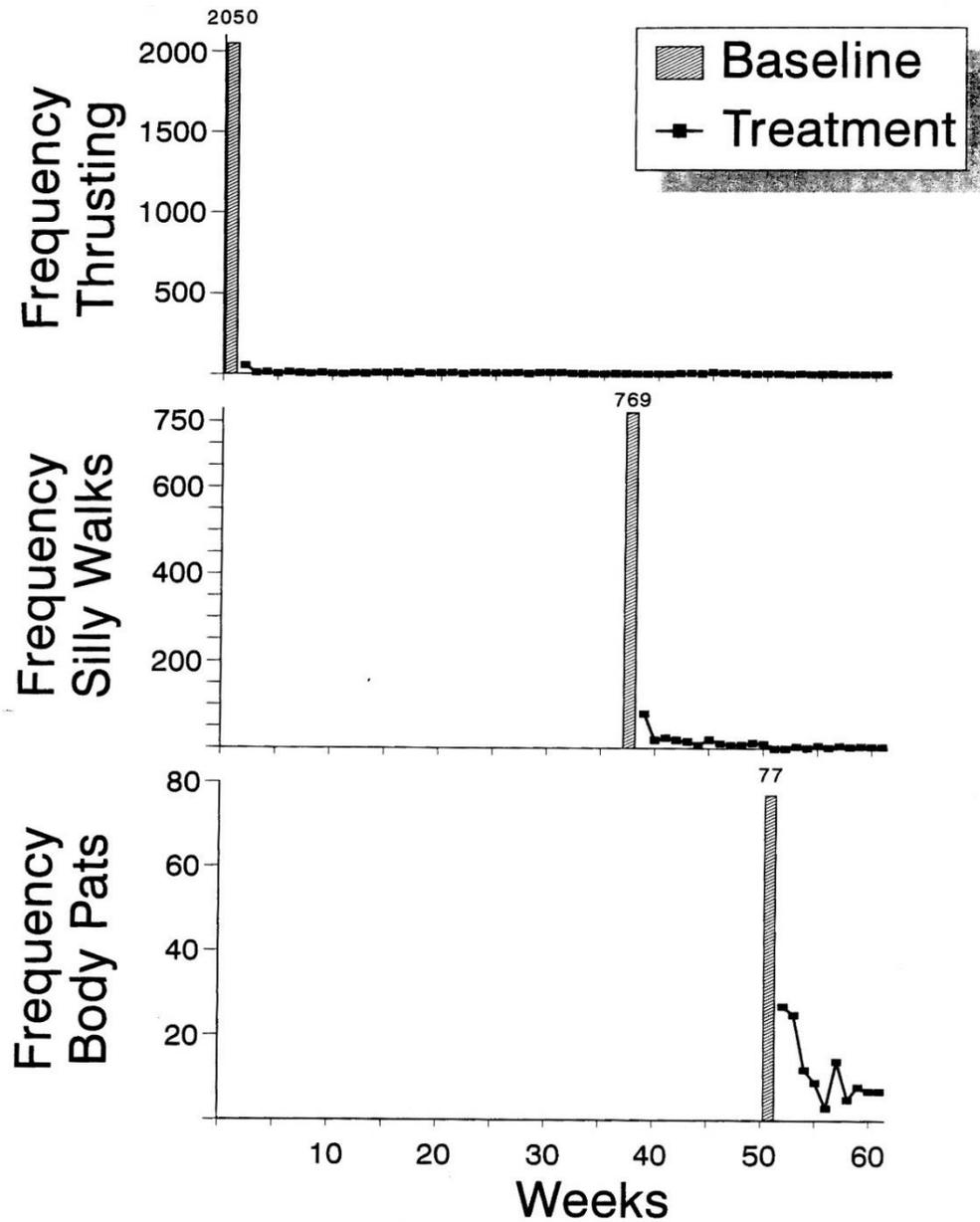
Body rubbing/patting = 77?  
Odd walking = 769?  
Hip thrusting/rocking = 2050?



# FO: Effect on Hip Thrusting & Rocking of Behavioural Programme

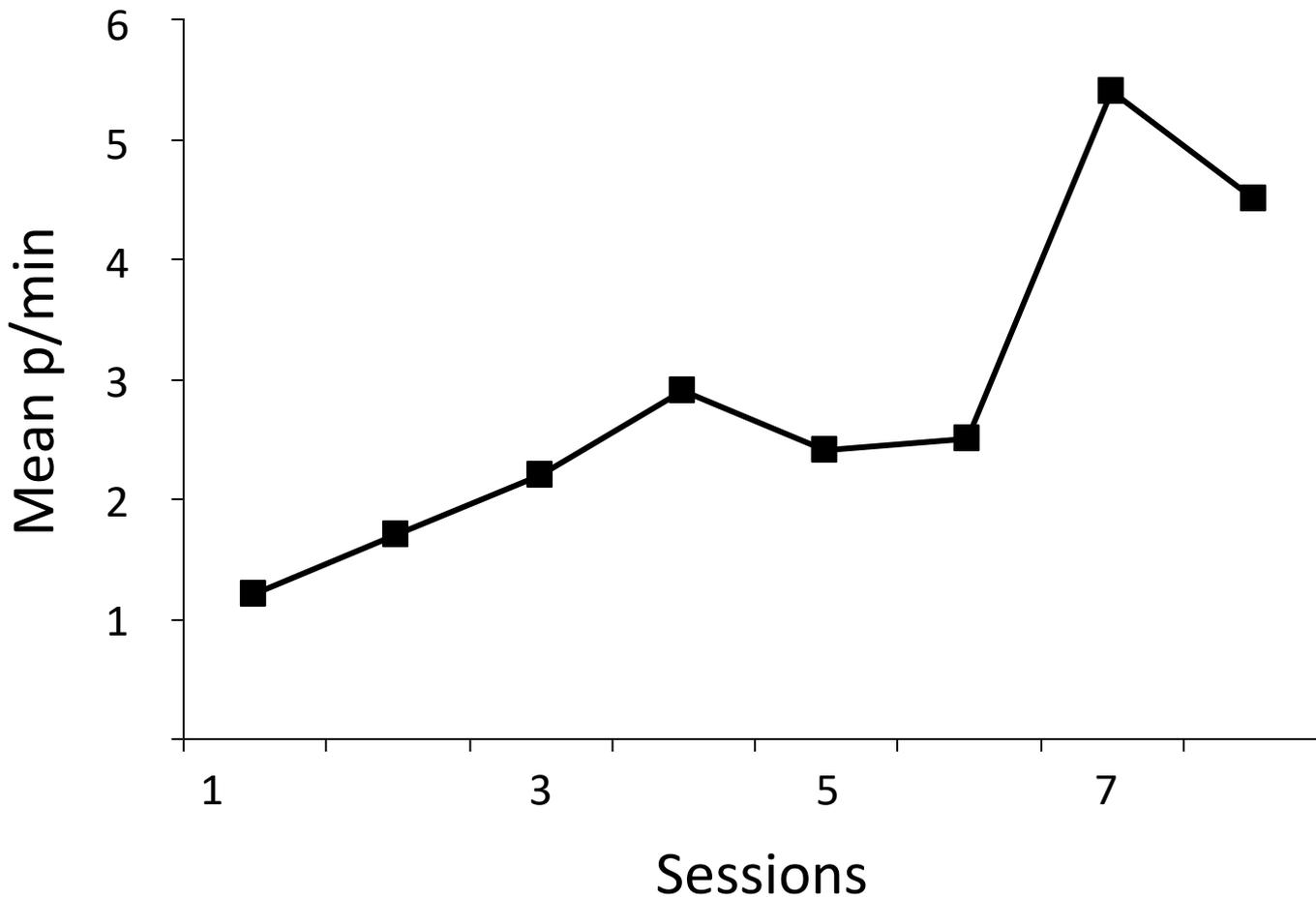


FO: Reduction in Hip Thrusting, Inappropriate Walking & Body Patting using Response Cost



# The Case of FO

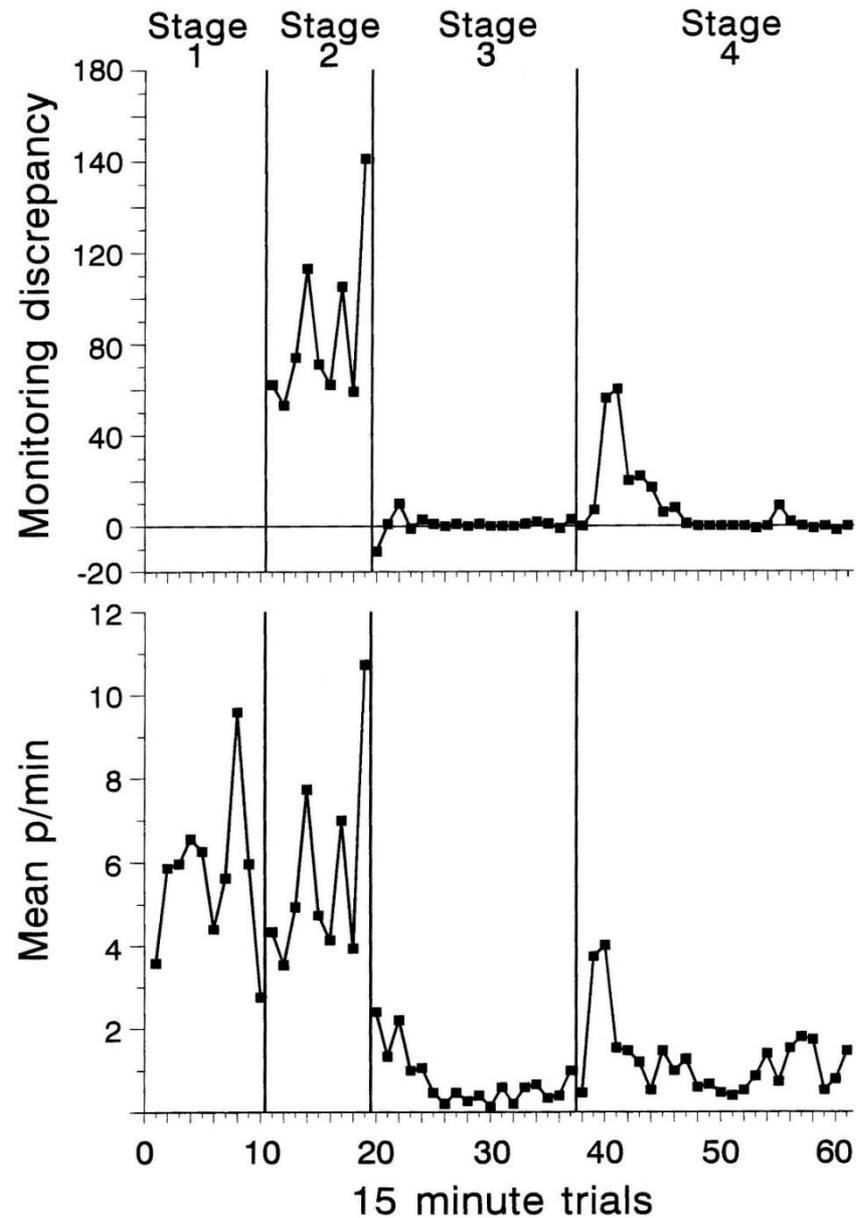
## Self-initiated verbal utterances



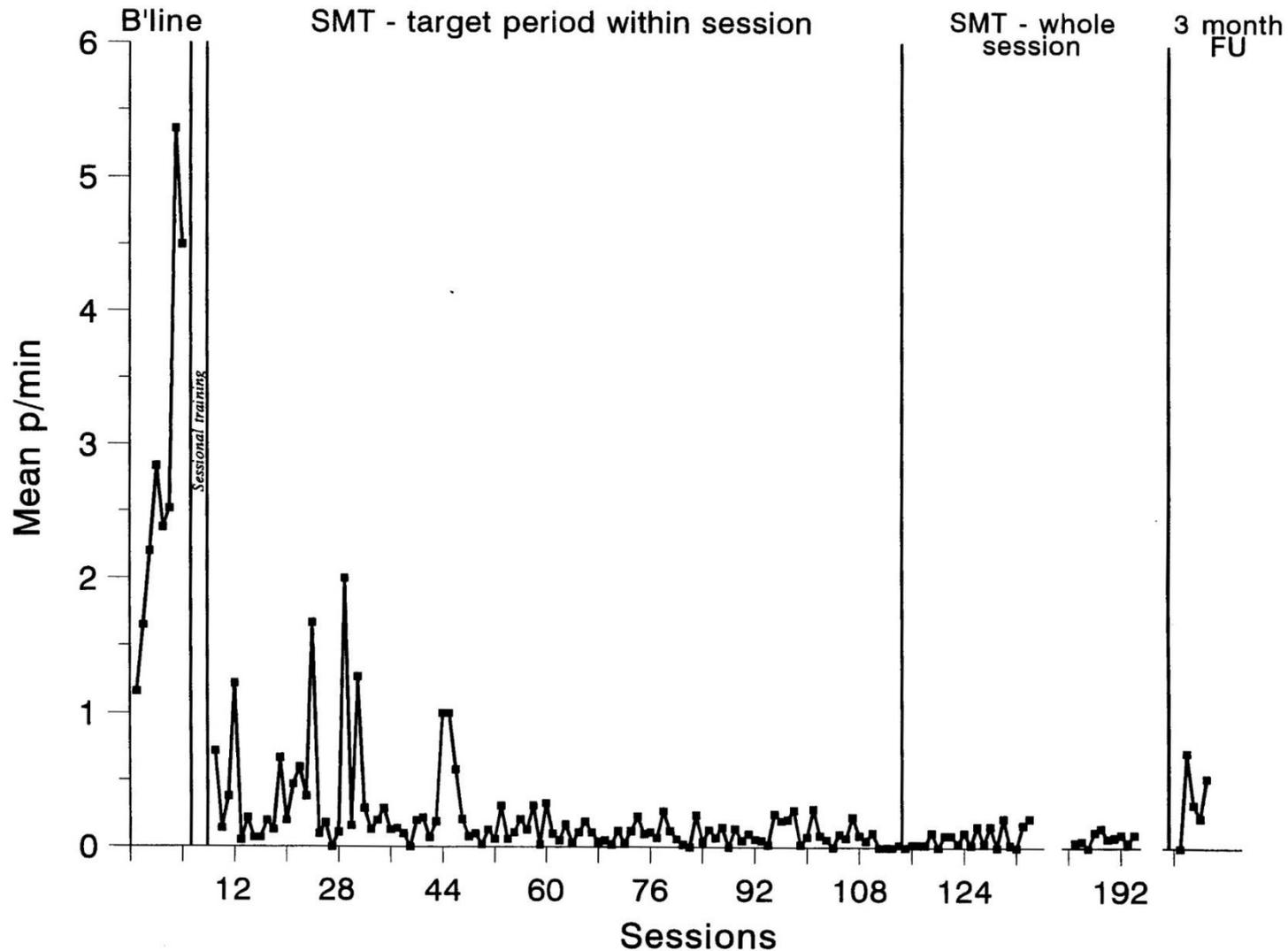
*(Alderman, 2002; Alderman, 2003)*



FO: Effect of  
SMT on  
Accuracy Self-  
monitoring &  
Frequency of All  
Self-initiated  
Verbal Output



# FO: Reduction in Self-initiated Verbal Output Pre & Post-SMT



# Someone to Watch Over Me: impact of Self-Monitoring Training (SMT) on behavioural symptoms of neurobehavioural disability

- A range of evidence has been reviewed that supports a causal relationship between poor self-monitoring skills and behavioural symptoms of NbD
- Two treatment approaches appropriate for people with self-monitoring impairments have been described
- Case study data presented to underpin the efficacy of these approaches – effective and gains maintain



# Thanks for Listening!



**Neurobehavioural Disability after Acquired Brain Injury: Recent Innovations in Clinical Practice and Delivery**

Presented in partnership with:  
Elysium Neurological

**Elysium**  
Neurological

Swansea University  
Prifysgol Abertawe

Building on the success of our 2016 and 2017 conferences and extremely positive feedback from delegates, we are pleased to announce our third annual conference in our series of events concerned with acquired brain injury.

"Neurobehavioural Disability after Acquired Brain Injury: Recent Innovations in Clinical Practice and Delivery" will bring together leading experts in acquired brain injury to provide authoritative accounts of the latest clinical innovations and cutting-edge developments in the management of challenging behaviour following brain injury.

The varied, dynamic and practical programme will support a wide range of rehabilitative practices and will appeal to all those interested and/or involved in the care of individuals with an acquired brain injury, including case managers, commissioners, rehabilitation and healthcare professionals, clinicians, academics and legal fraternity.

**26 November 2018 from 09:00 – 16:30**  
Swansea Marriott Hotel, Maritime Quarter, Swansea, SA1 3SS

**Registration:**

- Professional/Corporate: £100\*
- Student/Trainee: £75\*

\*Eventbrite booking/service fee applies

- Survivors – a limited number of free places are available
- Exhibitor Spaces Available: contact [claire.williams@swansea.ac.uk](mailto:claire.williams@swansea.ac.uk)

**Pending CPD Accreditation:**

An application has been made to the European Accreditation Council for Continuing Medical Education (EACCME) for CME accreditation of this event. The EACCME is an institution of the European Union of Medical Specialists (UEMS); [www.uems.net](http://www.uems.net)

For further information and to register your place:  
<https://abiswan18.eventbrite.com>

