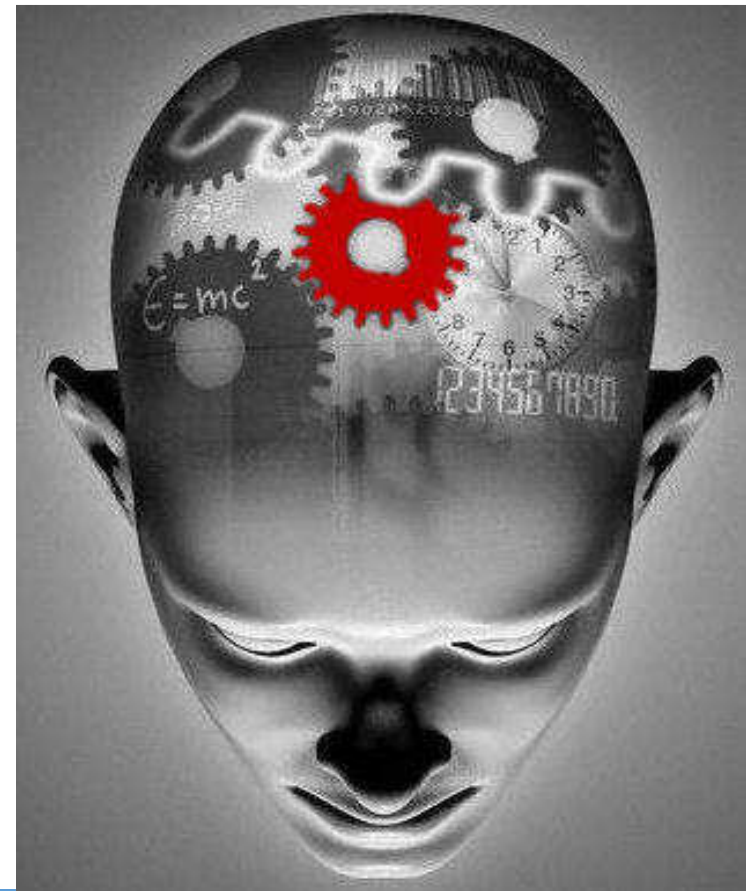




NSW Service for the Treatment
and Rehabilitation of Torture
and Trauma Survivors

The Test of Variables of Attention® (TOVA)



The Use of TOVA Test in the Clinical Practice with Refugee Children

SEJLA MURDOCH, SENIOR PSYCHOLOGIST NEUROFEEDBACK COUNSELLOR
MIRJANA ASKOVIC SENIOR TEAM LEADER NEUROFEEDBACK & BIOFEEDBACK CLINIC
ANNA WATTERS NEUROFEEDBACK RESEARCH OFFICER
SANJA STEFANOVIC CHILD & ADOLESCENT COUNSELLOR

1st Australia and New Zealand Refugee Trauma Recovery in Resettlement Conference 29-31 March 2017 Sydney, Australia

Overview

- Why TOVA?
- What is TOVA
- The TOVA variables
- STARTTS study
- Case presentation





STARTTS' children referrals:

- Behavioural problems
- Learning difficulties
- Issues with attention and focus
- Social isolation
- Affect dysregulation
- Anger
- Sleeping issues
- Bedwetting
- Attachment issues

At STARTTS' we use TOVA to assess the efficacy and determine the use of:

- Group interventions
- Therapy
- Neurofeedback treatment

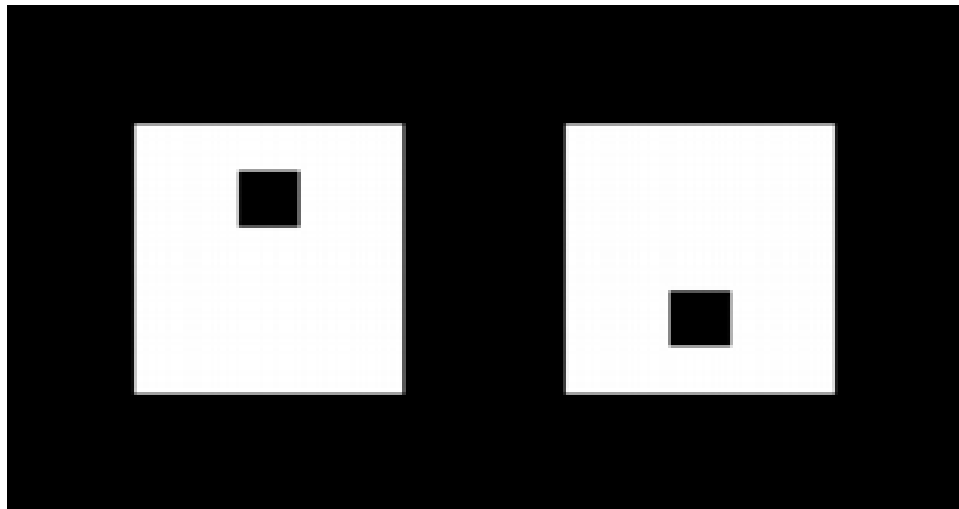


The TOVA Overview



- The Test of Variables of Attention[®] is an objective, standardized, and highly accurate continuous performance test (CPT) that is used to measure attention and impulsivity.
- T.O.V.A. are non-language-based that uses geometric stimuli (to minimize the effects of cultural differences and learning problems)
- The T.O.V.A. 21.6 minutes long computerized tests that require no left-right discrimination or sequencing. Responses are recorded with a specially designed, highly accurate ($\pm 1\text{ms}$) electronic microswitch. For children ages 6 and above, the T.O.V.A. is 10.8 minutes in length.

The T.O.V.A. visual stimuli




'GO'

'No Go'




Why The TOVA?

- Non-language based stimuli minimize the potential confounding of the results by language, cultural effects, and/or a learning disability.
 - Can help indicate the existence and severity of ADHD
 - Can be used to help titrate medication
 - Can give ideas for Neurofeedback training & measures of effectiveness of Neurofeedback training
 - Can assist as the pre-post assessment measure for other interventions
- 

The TOVA scores:

- A score of **100 is average**. 115 is above average. **85 is below average**. 70 is poor. 55 is very poor, and 40 is extremely poor.
- An improvement of 8 points, or half a standard deviation, is clinically significant; that is, observable by others

The TOVA gives 4 major variables:

- **Inattention** (*Omission errors*) – how often the client did not click the “clicker” when they were supposed to
 - **Impulsivity** (*Commission errors*) – how often the client clicked when they weren’t supposed to (“Ooops! I shouldn’t have clicked”)
 - **Response Time** – average response time for correct responses
 - **Variability** – Consistency of the response times (standard deviation)
- 

Presentation of stimuli

Infrequent and frequent target modes

- The infrequent target mode (or low response demand mode subtest) in quarters 1 and 2 is the more boring task and is the traditional form for measuring alertness. Individuals with “low CNS arousal” tend to do poorly on this form.
- The frequent target mode (or high response demand mode/high inhibition demand mode subtest) in quarters 3 and 4 is a more stimulating task during which individuals with “high CNS arousal” can become overstimulated, and individuals with “low CNS arousal” can “wake up”.



The TOVA Report



ID: 65 Example Subject 2 (Apr 15, 1983)
Female - 18y 5m 16d

Visual T.O.V.A. (v7.0.3 sn9192)
Sep 29, 2001 at 12:26 PM

T.O.V.A. Interpretation

The results of this T.O.V.A. test are not within normal limits, and suggest the presence of an attention problem, including ADHD.

Session and Response Validity

The test was completed with no interruptions or excessive errors, and administered at the appropriate time of day (6:00am - 1:00pm), matching the conditions of the T.O.V.A. normative studies.

Symptom Exaggeration Index

The Symptom Exaggeration Index is applicable only to outcomes that are significantly outside of normal limits.

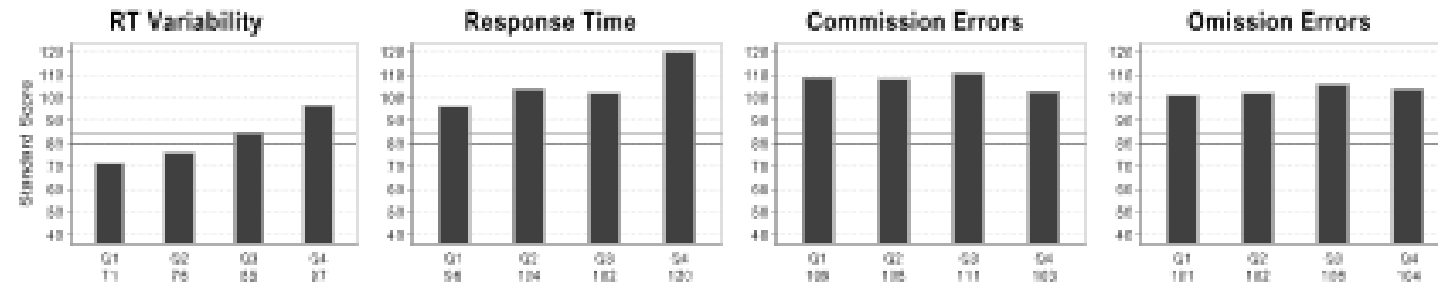
Treatment

Challenge: 0.0mg dose of Minicycline taken 0.0 hours before testing.

Comparison to the Normative Sample

The overall performance was not within normal limits.

Inconsistency (response time variability) was borderline in Q3 and abnormal in Q1, Q2. This finding is important since inconsistency is the most sensitive measure in the T.O.V.A.



Attention Performance Index

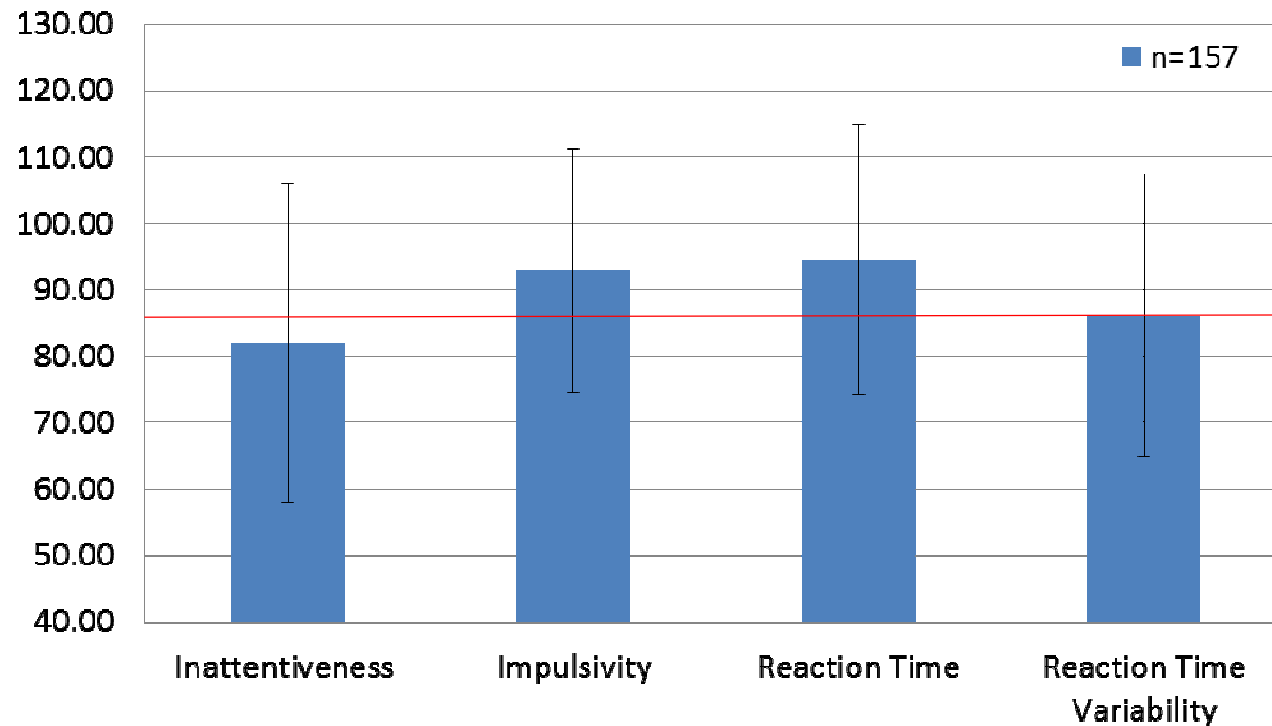
The Attention Performance Index of 1.36 is within the normal range.

Note: This finding does not rule out a diagnosis of ADHD. The clinician needs to consider additional sources of information, such as Comparison to the Normative Sample (see above), as well as history and collateral information (such as behavior rating scales).



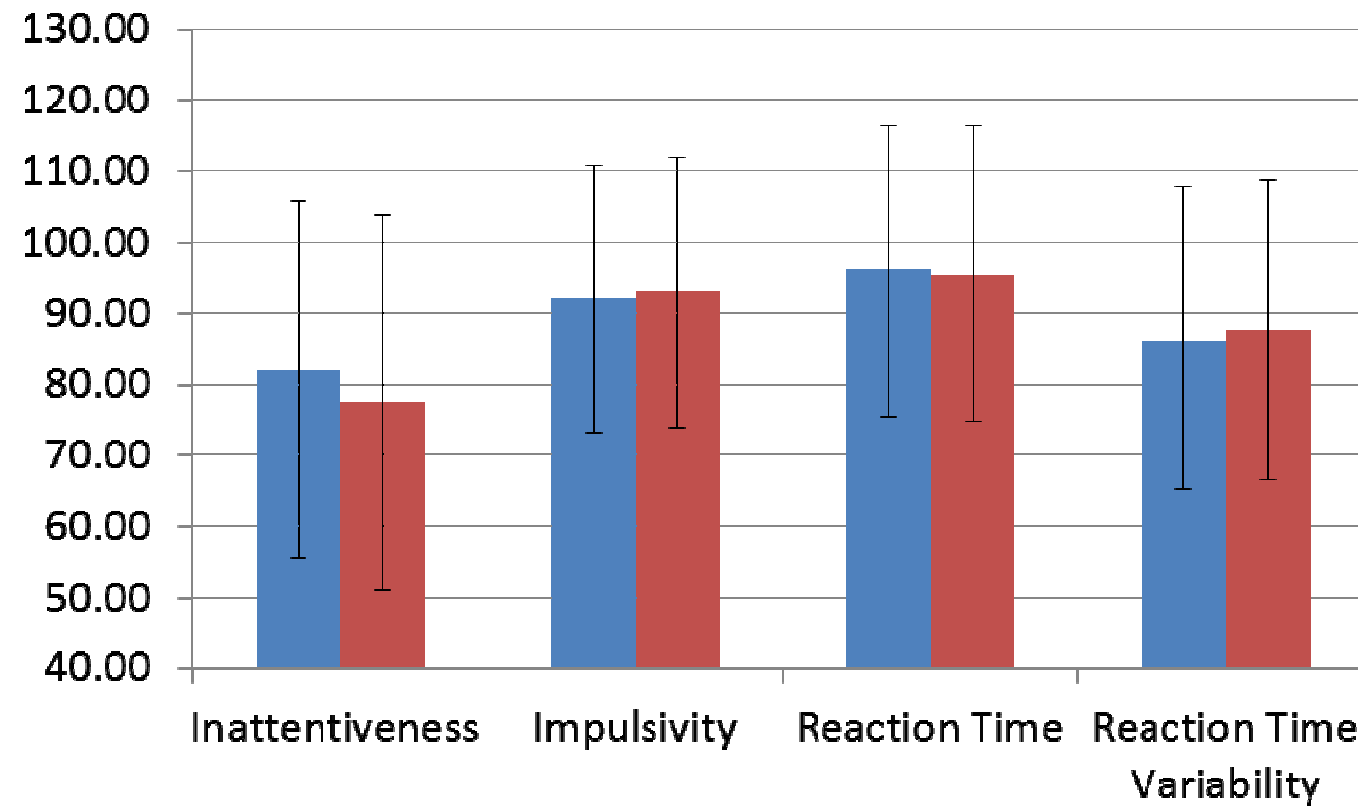
STARTTS sample of 157 children

| Demographics | |
|-------------------|-------------------|
| Total number | 159 |
| Age range | 6-20 years |
| Mean Age \pm SD | 12.4(3.1) |
| % male | 62 |
| Ethnicity % | 48 Middle Eastern |
| | 19 African |
| | Other |



A score of 100 is average. 115 is above average. 85 is below average. 70 is poor. 55 is very poor, and 40 is extremely poor.

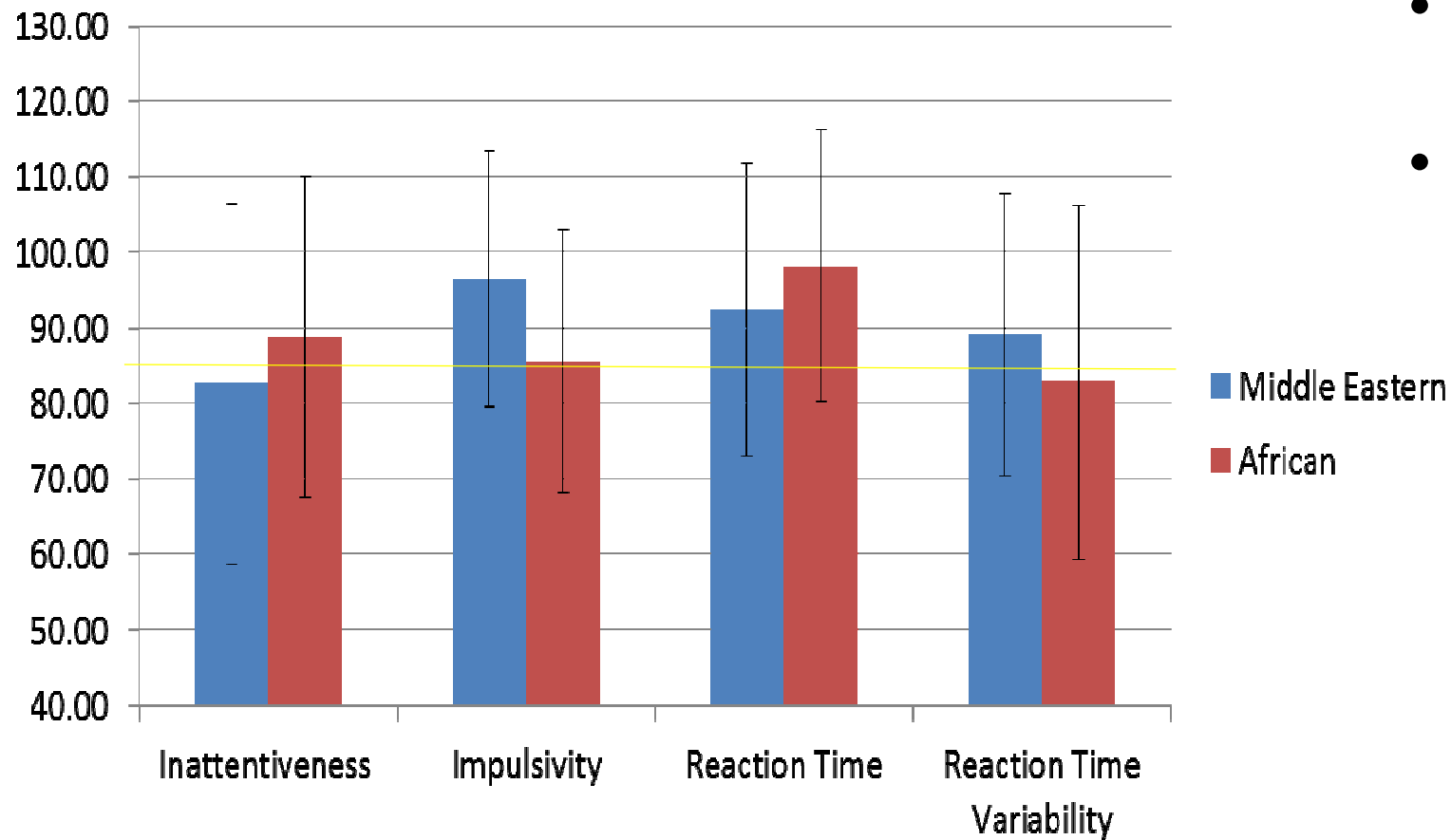
Gender



- No significant differences between genders in our sample

■ Males
■ Females

Ethnicity



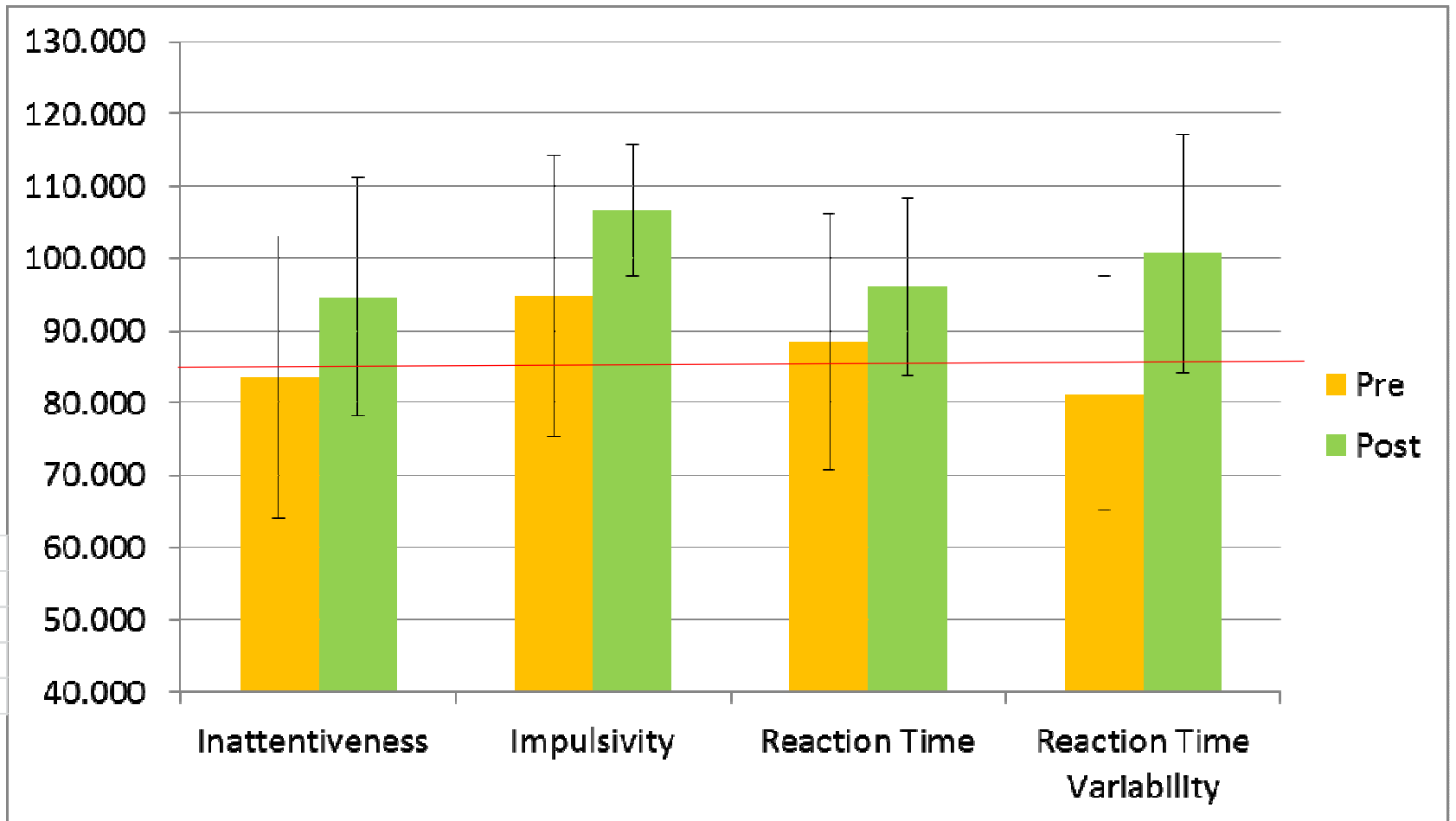
- No significant differences (controlling for age and gender)
- Even by selecting clients that would match on age and gender there were no significant differences between ethnicities

| | Middle Eastern | African |
|----------|----------------|------------|
| Number | 77 | 30 |
| Age (SD) | 10.9 (3.0) | 13.2 (2.1) |
| % male | 53 | 87 |

Pre and Post Neurofeedback treatment

| Demographics | |
|-------------------|-----------|
| Total number | 24 |
| Mean Age \pm SD | 10.4(2.6) |
| % male | 58 |
| Interval weeks | 39 (18) |

| | p=value |
|-----------------|---------|
| Inattentiveness | <.0001 |
| Impulsivity | <.001 |
| Reaction Time | <.05 |
| Reaction Time \ | <.0001 |



Lea's story 9 y.o.

Parental (family) trauma

- Civil war in her country of origin (West Africa)
- People get wounded, killed
- Moving from place to place

Refugee camp in the neighboring country

- Lea was born in a refugee camp
- Violence
- Attacks from outside
- Uncertainty
- Disruption of normal life

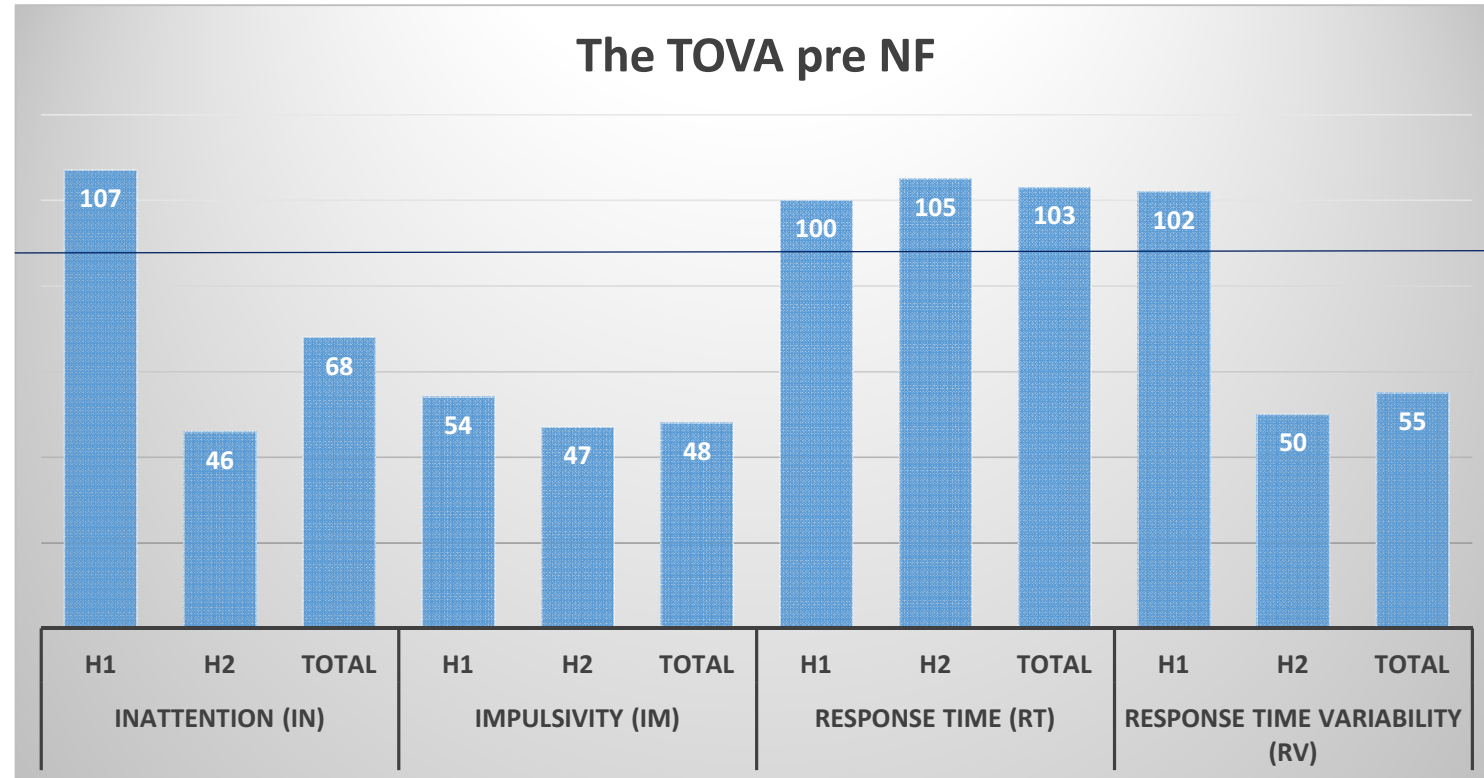
Settlement issues:

- Supported by a single mum
- Language, culture & financial issues
- Mum working never at home
- Never met her father



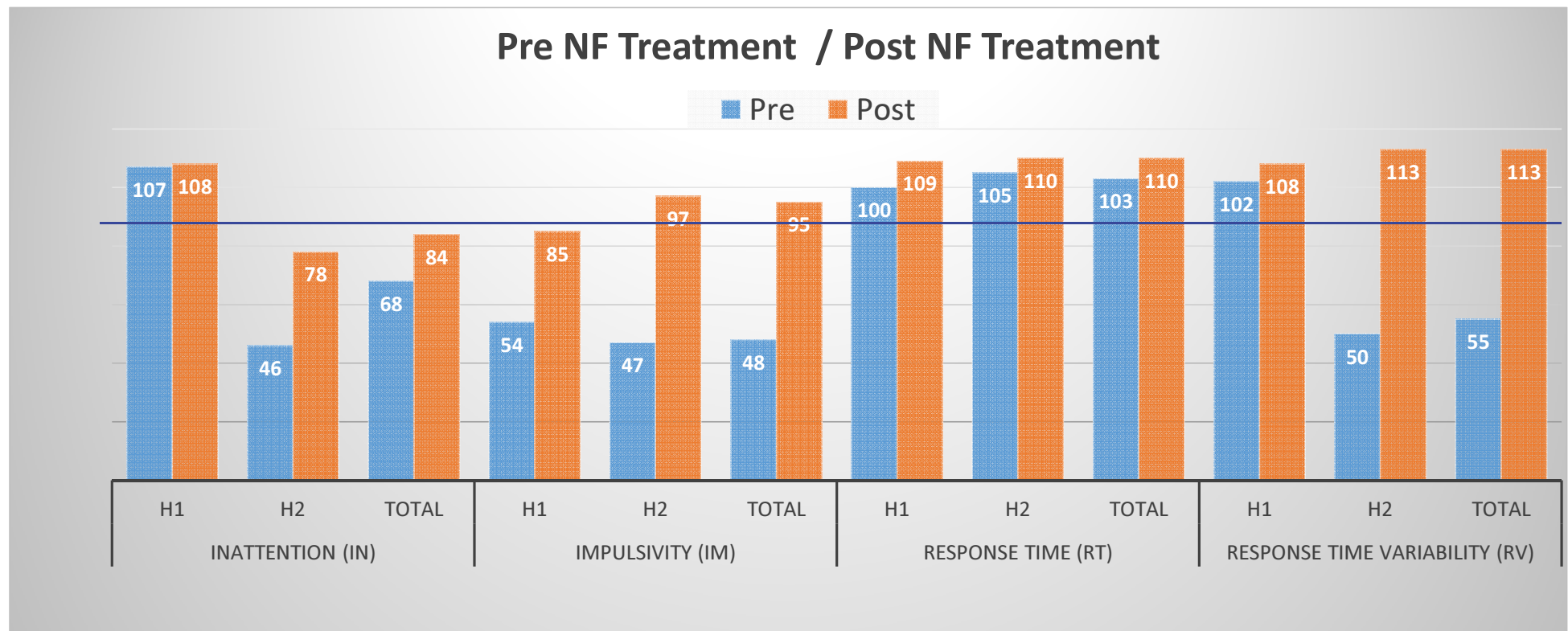
Presenting symptoms:

- Learning difficulties
- Anger and irritability
- Socially withdrawn
- Would not speak or keep an eye contact
- No information about her behaviour at home



- A score of 100 is average. 115 is above average. 85 is below average. 70 is poor. 55 is very poor, and 40 is extremely poor.

Lea's Post NF TOVA:



- A score of 100 is average. 115 is above average. 85 is below average. 70 is poor. 55 is very poor, and 40 is extremely poor.
- An improvement of 8 points, or half a standard deviation, is clinically significant; that is, observable by others

Lea - Summary

- Socially much more open – is dancing in her school play
- Her grades have improved
- Teachers see a big change in her focus/attention



The TOVA was useful:

- In understanding her symptoms
- In guiding NF treatment
- In getting teachers on board
- In normalizing her symptoms





Thank you for listening