

NEURONAL IMBALANCE OBSERVED IN EEG

- Autism is characterized by an imbalanced inhibitory/excitatory ratio in local cortical network,
- High theta/beta ratio & Disordered low power gamma oscillations in ASD, reflected at the electroencephalographic level.
- Conventional neurofeedback has had success in improving symptoms related to focus in high functioning autistic children
- Many case reports from NeurOptimal trainers of good individual responses
- NeurOptimal is ideally suited to train autistic children as there is very low demand on participants.
 - Set up and let Autonav determine the individual's boundaries for feedback, based upon instantaneous analysis of EEG patterns

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AUTISM TREATMENT EVALUATION CHECKLIST (ATEC)

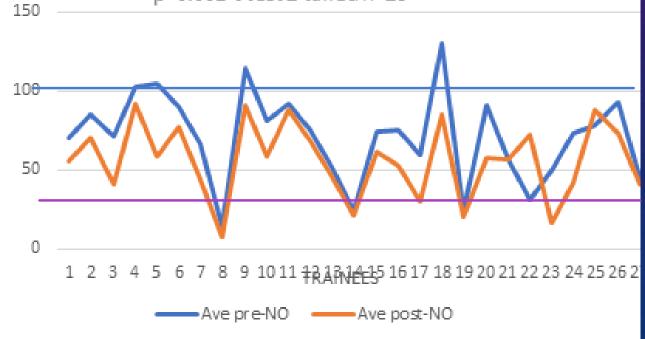
- ATEC: A care-giver administered questionnaire to assess ASD symptoms
 - High level of internal consistency
 - Highly correlated with assessments used to measure the same capacities in children with ASD.
- ATEC is a 77 question inventory, comprised of four subscales:
 - (1) Speech/Language/Communication,
 - (2) Sociability,
 - (3) Sensory/Cognitive Awareness,
 - (4) Health/Physical/Behavior.
- These four subscales are used to calculate a total score that ranges from 0 to 179
- The questionnaire was translated into Thai and back-again for consistency

 Ave. Pre
 71.2
 Ave. Post 56.1
 p
 0.0002

 Ave. reduction in ATEC Scores 10 week training
 21%

 SEM
 5.4
 SEM = 4.6
 4.6

ATEC Pre Training vs Post-training Ave. reduction in ATEC Scores 20% p<0.001 t test 2 tailed n=26

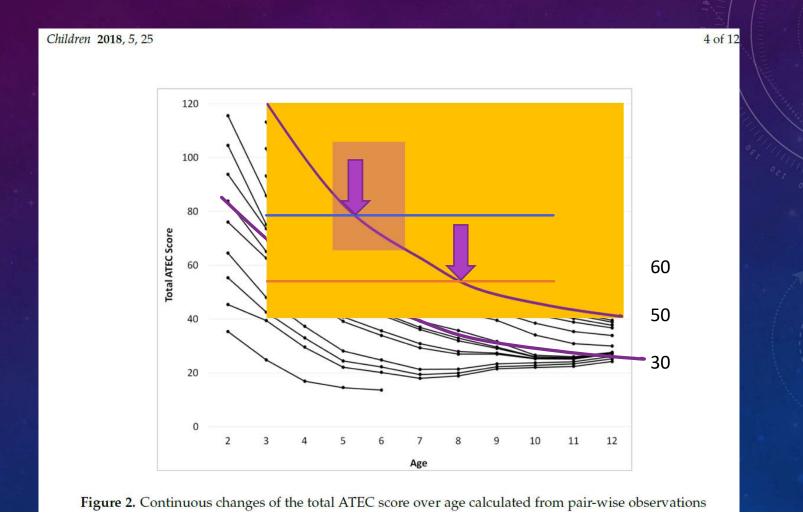


KEIKO SAMUELS PILOT STUDY N=26

Thai translation of ATEC

Percentile	ATEC score		
mild autism 0 – 9	0-30		
10 – 19	31 – 41		
20 – 29	42 – 50		
30 – 39	51 – 57		
40 – 49	58 – 64		
50 – 59	65 – 71		
60 – 69	72 – 79		
70 – 79	80 – 89		
80 – 89	90 – 103		
90 – 100 severe autism	104 – 180		

ATEC SCORE DECLINES WITH AGE



SPEECH AND SOCIABILITY

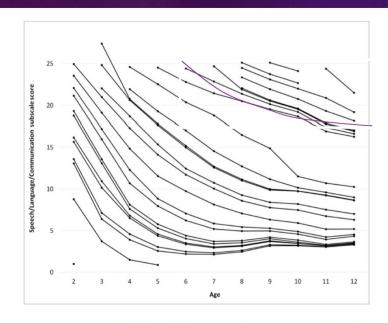


Figure 3. Continuous changes of the Speech/Language/Communication subscale score over age calculated from pair-wise observations using the "relay" procedure.

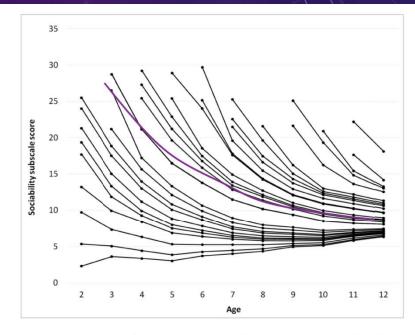


Figure 4. Continuous changes of the Sociability subscale score over age calculated from pair-wise observations using the "relay" procedure.

AGE PROGRESSION OF ATEC SUB-SCORES

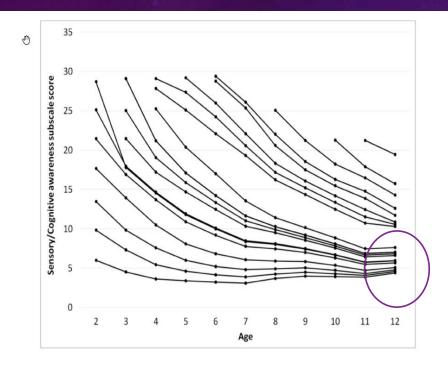


Figure 5. Continuous changes of the Sensory/Cognitive awareness subscale score over age c from pair-wise observations using the "relay" procedure.

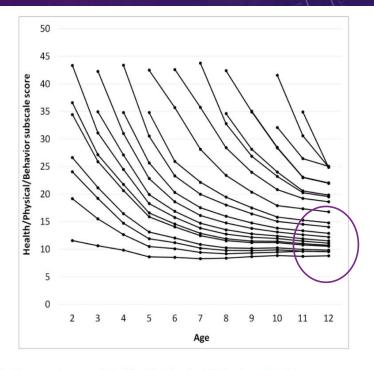


Figure 6. Continuous changes of the Health/Physical/Behavior subscale score over age calculated from pair-wise observations using the "relay" procedure.



RAJANAGARINDRA INSTITUTE OF CHILD DEVELOPMENT CHIANG MAI THAILAND

Center of Excellence on child development by providing medical services for the patients and supporting knowledge in this area for other public health facilities, such as health stations, community hospitals and general hospitals of the Ministry of Public Health, Thailand.

A RANDOMIZED

STUDY OF

NEUROFEEDBACK
IN AUTISTIC
CHILDREN USING
THE
NEUROPTIMAL™
BRAIN TRAINING
SYSTEM

Guidelines for the preparation of a research proposal submitted to the Ethical Review Committee for Research on Human Subjects, Ministry of Public Health

The Thai protocol (original 1 set and 20 copies) is combined with details as follow. (English protocol can attach for review)

Title of the project:

A randomized study of neurofeedback in children diagnosed with autism, using the NeurOptimal® brain training system.

Title of the project must be stated precisely in Thai language.

2. Name and address of the principal investigator(s) and the institution(s).

Dr. Panu Khuwuthyakorn, M.D. Rajanagarindra Institute of Child Development (RCID)

3. Project Summary

We intend to conduct a study to evaluate the effects of a passive, whole brain neuro-feedback training (NFT) on 40 young children with autism spectrum disorder. Using a very safe, convenient and simple approach, we will conduct 20 neurofeedback training sessions and evaluate a range of clinical and behavioural Autism symptoms with an ATEC questionnaire, before and after training. The design of the trial will be a RANDOMIZED, PLACEBO and WAITING-LIST controlled trial. The ATEC questionnaire is a widely used, parent-administered scoring system across a broad selection of autistic symptoms.

PROPOSED STUDY OUTLINE

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Weeks	1	2,12	13-14	15-25	26-27
STUDY 1 Recruit N=50 subjects ENROLL N=40 RANDOMIZE ATEC 1		Group 1.1 NeurOptimal Training N=20	ATEC 2	Follow up	ATEC 2.1
	Group 1.2 Sham 20 Sessions N=20	ATEC 2	Group 1.2 NeurOptimal Training N=20	ATEC 2.1	



One day I'll be able to say "Thank-you Keiko!