Does hearing equal behavior? Academic and behavioral benefits of Bérard AIT in clinical practice

Cristina M. Vellinga-Firimita*
Paula van Dam **

Sensory function & development

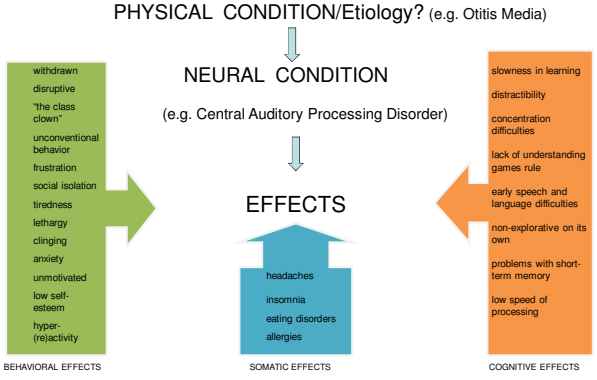
Introduction: The **Bérard Auditory Integration Training (BAIT)** attempts a normalization of the auditory function based on the auditory peaks as reflected in the audiogram of the subject. According to Bérard & Brockett (2011) a deficit in senses may be the main cause of a cognitive impairment or abnormal behavior, even when the deficit is not obvious. For example, hearing may be in the normal range, but optimal functioning may be present only when a person hears all frequencies well (no peaks). Therefore, distortions should be reduced or eliminated.
In the following, we will present a series of effects of the BAIT as applied in a private practice in The Netherlands, in a mixed population and in several cases of autism (7;10, 10;5 & 10;11 yrs.). We will argue that the normalization of sensory input and processing through the BAIT method leads to academic and behavioral benefits, but the long term effects may be moderated by a diet-related (GF) factor (Van Dam, 2011).

➢**BRAIN – BEHAVIOUR framework:** All behaviour is a function of the brain and malfunctions of the brain give rise to disturbances of behaviour. Behavior, in turn is shaped by learning and learning produces changes in the effectiveness of neural connections ➔ Biological and social determinants of behavior do not act on separate levels of the mind (Kandel, Schwartz & Jesell, 2000, p. 1247/1275).
➢**SENSORY INTEGRATION (S.I.) FUNCTION** = neurological process that organizes sensations from one's own body and from the environment and makes it possible to use the body effectively within the environment (Ayres, 1979).
➢ **SENSORY INTEGRATION THEORY =** explains the relationship between behavior and neural functioning, especially sensory processing or integration (Fisher, Murray, & Bundy, 1991).

➢**Learning** = Receive/ take in sensory stimuli → Interpret →Process the stimuli into a response → Adaptively respond to the stimuli

Sensory integration dysfunction

➢A deficit in senses may be the main cause of a cognitive impairment or abnormal behavior, even when the deficit is not obvious (Bérard & Brockett, 2011).
➢Not necessarily a brain abnormality from birth, but difficulties in sensory processing may be acquired later in life, affecting normal brain functioning (Peer, 2005).



➢" A minor childhood complaint (glue ear), occurring at a time when auditory and vestibular skills are developing rapidly, may be sufficient in itself to lead to the symptoms of dyslexia." (Peer, 2005, p. 22)
➢"Even a slight auditory abnormality can be enough to block a child's intellectual potential." (Bérard & Brockett, 2011, p. 125)

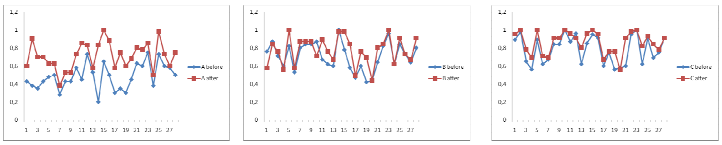
Remediating S. I. dysfunction

E.g. auditory integration: reeducation of hearing mechanism towards a normalization of the response to the frequencies involved through the BAIT method.
➢**Principles of BAIT:**
Resetting or rebalancing the Acoustic Reflex (the function of this reflex is to reduce the volume of sound transmitted through the inner ear so as to protect the cochlea from damage. The stapedius muscle triggers the acoustic reflex immediately before we speak so our own speech can be tolerated);
Integrated communication networks (interdependency of brain regions including sensory functions): any distortion or breakdown in any of the subsystems affects the network and makes it ineffective;
Neural plasticity (capacity of the neuron to change or develop itself under proper stimulation). The stimulation must be novel or unique, and provided with intensity and repetition.
Hemispheric integration (optimal function occurs when left and right hemispheres communicate effectively with each other)
➢ **Mechanisms of BAIT:** several possible explanations (none proved yet):
The middle ear theory (Tomatis, Bérard): work-out given to tensor tympani muscle and stapedius muscle to reconstruct the acoustic reflex;
Cerebellar-vestibular theory (Brockett): cerebellar-vestibular system (CVS) is the sensory-motor processing center of the brain. Stimulation of the CVS helps reorganizing a dysfunctional system;
Opioid hypothesis of AIT (Panskepp): modulated music stimulates and normalizes certain areas of the brain which release endogenous opioids;
➢ **Effects of BAIT (Bérard & Brockett, ch.8):**
Dyslexia: 76, 2% improvement, 23,8% partial improvement;
Depression, suicidal tendencies: 97,7% cured;
Autism: disappearance of fear of noise (47/48 cases), improved behaviour (47/48 cases), restoration (31/48) or development of speech (16/48), 1 case of complete cure.
" we see many high-functioning five-years old with autistic features who can often be mainstreamed into first grade a few months after auditory training, particularly **if they change to a school** where their prior history of autism is unknown, and where normal behavior and learning ability are expected of them (Bérard & Brockett, p. 157)."

RESULTS

Method: pre- & post screening based on *Sensory Profile* (Dunn, 2006), audiogram pre-, mid- & post treatment, Bérard AIT training (BAIT).
Population: clinical, N=28 (mixed), ages 3-11 yrs., several diagnoses (mostly ADD, autism, dyslexia, Tourette).

Processing of stimuli pre- & post-treatement (after 3 months)



A= auditory stimuli B = visual stimuli C= vestibular stimuli

GF diet: 6; 7; 12; 19

CASES:

Case A (4): F, 10;5 Yrs
Diagnosis: ADHD/PDD-NOS
Medication: Yes
Medical history: otitis media, allergy, stomach ache, infections;
Method used: BAIT + heavy blanket;
Before: can't tolerate sounds; is afraid of sounds;
Flapping hands, panic to change, avoiding people;
Fears, worried, insecure, sensitive to critique.
Follows regular education with special support.
After: can tolerate sounds, plays with other children, explorative behavior
Follows regular education. Touch sense improved as well.
School reports: " a totally different child."

	Normal from	Before AIT	After AIT	Difference
Auditory (A)	0,75	0,43	0,70	0,27
Visual (B)	0,71	0,60	0,56	-0,04
Vestibular (C)	0,87	0,56	0,69	0,13

Case B (11) M, 7;10 Yrs
Diagnosis: autism
Medication: yes
Medical history: otitis media; casein-free diet.
Method used: BAIT
Before: sensitive to hard sounds, sensitive to critique, cries a lot, few friends, abrupt change of activities, problems with balance. Wants to play drums.
After: can swim, can waveboard, improved social contact, better handwriting, better concentration, better articulation, increased vocabulary, plays drums and acoustic guitar. Effect holds several months until patient undergoes an operation under narcosis, then it diminishes.

	Normal from	Before AIT	After AIT	Difference
Auditory (A)	0,75	0,45	0,85	0,40
Visual (B)	0,71	0,67	0,89	0,22
Vestibular (C)	0,87	0,87	0,96	0,09

Case C (16): M, 10;11 Yrs
Diagnosis: PDD-NOS, Tourette, dyslexia, ADHD, dyspraxia;
Medication: unknown.
Medical history: otitis media.
Method used: BAIT
Before:
fears, panic, strong emotional reactions to failure, very low frustration tolerance
sensitive to critique, vocal and motor tics
smells on purpose to objects
difficulties in automatisation of tasks, disturbed by noises, concentration problems
Follows regular education.
After: no fears and panic anymore, accepts critique, not distressed by failure;
Makes lots of friends, no vocal tics anymore but one, few motor tics.
Substantially improved concentration, reading speed, comprehension and communication skills, explorative behavior.

	Normal from	Before AIT	After AIT	Difference
Auditory (A)	0,75	0,50	0,88	0,38
Visual (B)	0,71	0,58	0,84	0,26
Vestibular (C)	0,87	0,91	0,95	0,04

Further research: Double-blind random controlled trial
- Why should we expect a difference in sensory integration function after BAIT? What are the neural mechanisms involved? (*Hypothesis of two-stages synaptic plasticity*:
1. initial steps of synapse formation occurs early in development ← under control of genetic and developmental processes;
2. the second stage = fine tuning of developed synapses by experience; begins during late stages of development and continues throughout life.

Activity-dependent cellular mechanisms involved in the associative learning of the mature organism may be similar to the activity-dependent mechanisms at work during critical periods of development (Kandel, Schwartz & Jesell 2000, p. 1277).

- Is this difference significant?
- How long does the effect last?
- What is the significance of GF- diet in maintaining a long-term effect?

Relevance:
- consequences of S.I. and its etiology on development are not communicated from the medical world to the educational world (Peer 29, 69: behavior is not the root cause of a learning difficulty, but a result of it➔ educators need to understand this);
- no formal method for passing on relevant information from health to educational services;
- need for appropriate assessment and support of sensory integration dysfunction.

References

Ayres, A. J. (1979). *Sensory integration and the child. Los Angeles: Western* Psychological Services.
Bérard, G. & Brockett, S. (2011). *Hearing equals behaviour.* Manchester Ctr.: Shires Press.
Dunn, W. (2006). *The Sensory Profile –NL.* Amsterdam: Harcourt Publ.
Fisher, A., Murray, E., & Bundy, A. (1991). *Sensory integration: Theory and practice. Philadelphia: F. A. Davis.*
Kandel, E. R., Schwartz, J. H., & Jessell, T. M. (Eds.). (2000). *Principles of neural science (4th ed.).* New York etc.: McGraw-Hill.
Peer, L. (2005). *Glue ear. An essential guide for teachers, parents and health professionals.* London: David Fulton Publishers Ltd.

* Cristina M. Vellinga-Firimita is psychologist and independent researcher, The Netherlands. Contact: cvellinga@yahoo.com
**Paula van Dam is child health psychologist in an AIT practice, The Netherlands.
Data are provided by P. van Dam with the permission of all those involved. The analysis of results, discussion, theoretical embedding and further research are under the responsibility of C. Vellinga.
The observation regarding the possible role of a gluten-free diet on the long term effect of the BAIT treatment belongs to P. van Dam.

Neuroscience and Education – EARLI SIG 22, May 2012, London UK