

EARLY CHILDHOOD INTERVENTION AUSTRALIA (VICTORIAN CHAPTER)
Annual Conference
Melbourne, 18th August 2006

Concurrent Paper

**From Neural Plasticity to Family Centred Practice:
An Occupational Therapist's journey...**

Anoo Bhojti
Yooralla Society of Victoria
Cardinia Casey Community Health

What We Know:.....

Neural Plasticity:

- The brain development begins within a few weeks after conception and continues through adolescence.
- The most dramatic development occurs during the first few years of life.
- There is never any completion of brain development, due to its nature of plasticity.
- The evidence on neural plasticity demonstrates that the developing brain is capable of being modified by both harmful, and beneficial (rich environments) experiences.

The nervous system is essentially prewired and small but significant portions are constantly reforming.

How do we, as Therapists cause a plastic change???

Learning has repeatedly shown to involve changes like increased branching of dendritic spines and migrating of presynaptic terminals.

The important criteria to bring about this plastic change is the quality and the strength of the stimulus, or environment.

The Basis of Early Intervention

Many studies and literature reviews report that the earlier the intervention, the more effective it is. With intervention at birth or soon after the diagnosis of a disability or high risk factors, the developmental gains are greater and the likelihood of developing problems is reduced (Cooper, 1981; et al)

The Basis of Family Centred Practice

The family plays the central role in the development of the child, and the family, rather than the child is the unit of assessment and intervention, and the parents are the ultimate decision makers in identifying goals and determining intervention strategies (Bailey 1987 & Simeonsson, 1988: Dunst, Trivette & Deal). The child, nuclear family, extended family, friends, neighbours and the larger community are all viewed as different levels of a complex, interconnected system (Bronfenbrenner, 1979).

What We Do?

How has our intervention delivery changed?

From individual, child - focused, to group, family - focused and the new models!

What do parents feel about this? Evaluation questionnaires - 20 parents

What do therapists feel about this? Evaluation Questionnaires - 10 therapists

Neural Plasticity

Neural Plasticity concerns the property of neural circuitry to potentially acquire any function (given appropriate training).

Plasticity can be defined as adaptive phenomena that occur when structural changes coincide with functional modification or the ability of cells to alter any aspect of their phenotype, at any stage in development, in response to changes in their state or environment.

If it is Alive it is Plastic

Genotype V/s Phenotype

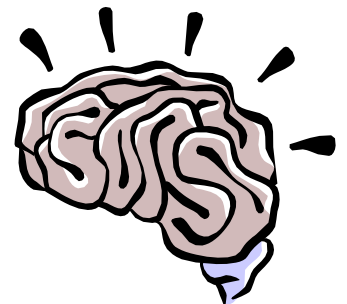
- ◇ All that we have ever been, what we are now and what we could possibly be in the future is held in store by the genome
- ◇ Genotype of an individual is their CV at a cellular level.
- ◇ The sum of characteristics manifested by an organism is referred to as the Phenotype.

Gene Expression

Genotype —————> Phenotype

“To live is to change and to be perfect is to have changed often.”

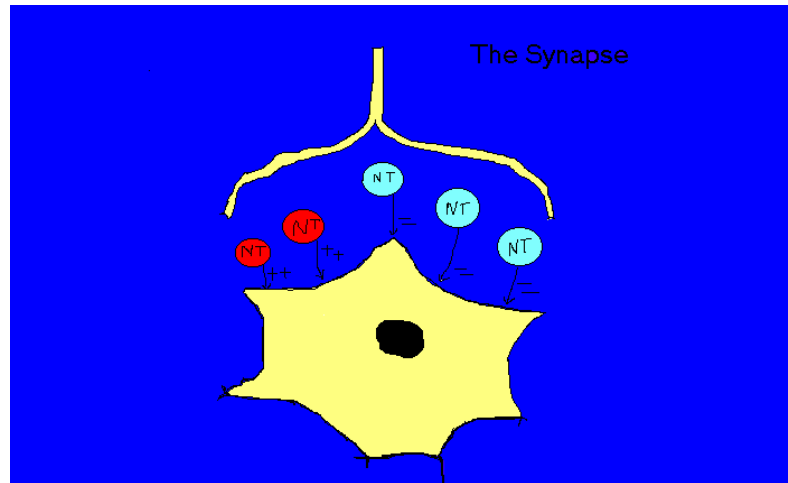
- One hundred trillion connections between nerve cells, yet highly ordered
- The expression of genes....so that toes do not sprout noses.



Plasticity in Development

- ◇ It follows that the genes cannot contain a blueprint for the brain, however contain general instructions for growth guided by cues from the cell's environment.
- ◇ The entire human genome probably contains 100,000 genes which is obviously insufficient to code specifically for the branching patterns and connections of each set of cells.
- ◇ The nervous system is essentially prewired and small but significant portions are constantly reforming.
- ◇ Development is a plastic process.

The Synapse - The most sophisticated cell phone



How Do We, As Therapists Cause a Plastic Change???

Learning causes changes in the brain structures eg

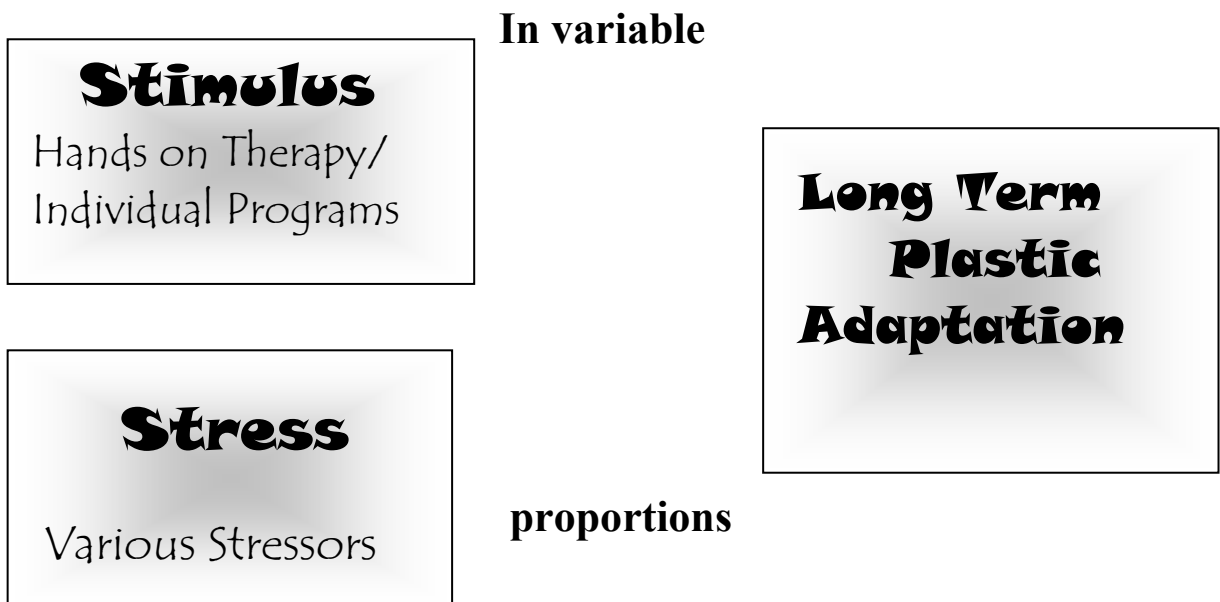
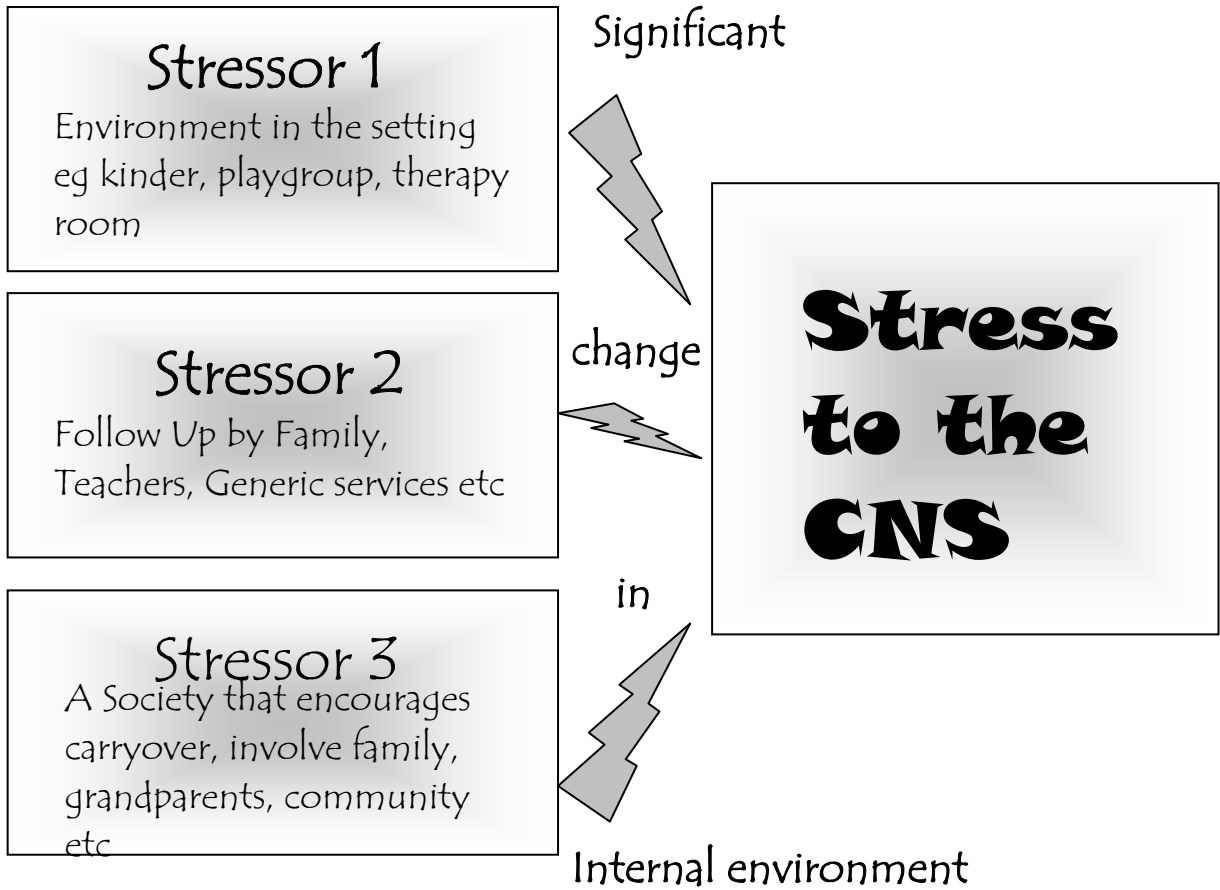
- ◇ increases in the size and number of presynaptic boutons,
- ◇ increased branching of dendritic spines
- ◇ migrating of presynaptic terminals.
- ◇ Increase the effectiveness of a synapse

A Plastic change in the nervous system occurs at any time, when changes in the environment are strong enough or stressful enough to bring about changes in the organisation of the neuronal connections.

E.g. when learning to drive a car,
when learning a new theory
or when learning a new movement
like Pilates, or belly dancing

FORM – FUNCTION: Putting Theory into Practice

- ◇ Stimulus – leads to an immediate response
- ◇ Stress to the System (CNS) – leads to an eventual adaptation
- ◇ Stimulus-Response v/s significant change in the environment



Therapist Responses

- ◇ A Therapist Questionnaire was given out to therapists working in Early Childhood Intervention, to gain an understanding of what their thoughts were on family Centered Practice and how they feel about practising in this way.
- ◇ 18 questionnaires were received and there was an emerging pattern of the answers.
- ◇ Responses have been clustered together and summed up for the presentation

N = 18	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
I use FCP and feel very comfortable	8	10			
Parents demand one on one therapy and seek it from outside sources	2	11	4	1	
Parents do not have a clear understanding of FCP and expect us to practice as traditional therapists		9	5	3	1
There needs to be more training targeting EC staff, New Graduates and medical field	6	10	1		1
If given a choice all over again I would choose a clinical set up to practice	1	1	2	5	9
I would continue to practice FCP as it is very important to me	12	6			

Parent Responses

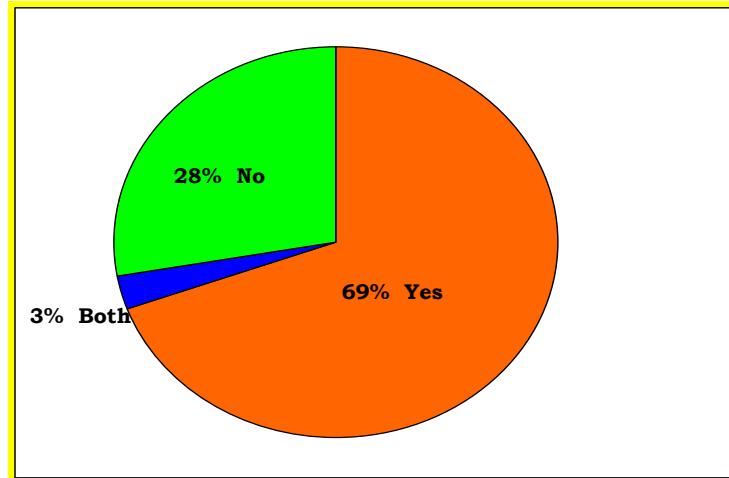
- ◇ 36 questionnaires were received from families attending various Yooralla ECI agencies.
- ◇ 3 questions were asked and answers had to be ticked. There was some room for comments.

Question 1: 36 Parents

<u>Do You have an understanding of:</u>	None	A little, would like more	Enough
Family Centered Practice	8	12	16
Family Service and Support Plan	2	8	26
Family Service Coordination	7	17	12
Trans disciplinary approach	16	10	10
Evidence Based Practice	13	11	12

Question 2 : Parents

Do you think attending a program with a team of professionals is more effective than individual hands on therapy?



Question 3: Parents

How would you like to gain more understanding?

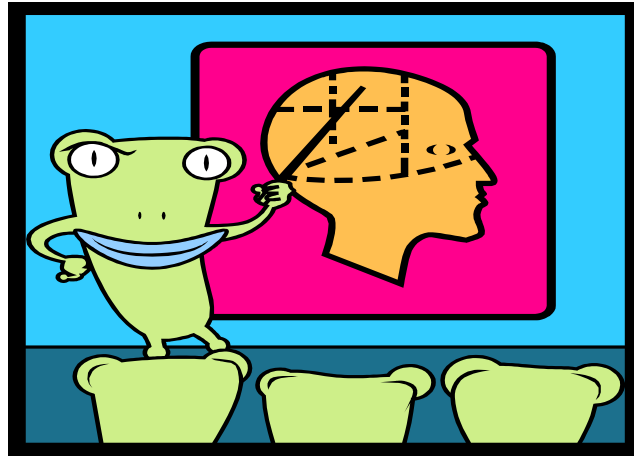
Parent workshop	17
Reading Material	23
Presentation to be taken home with follow up discussion	5
Individual one to one	10
Other	0

A Model Of Service

Mossgiel Park 3 year Old Kinder

- ◇ 3 year old kinder has two groups of 9 children with additional needs and 6 from the local community
- ◇ Staffing – Teacher, Assistants, Physiotherapist, Occupational Therapist and Speech pathologist
- ◇ Goals
- ◇ Learning through fun.... for all children
- ◇ Incorporate therapy within this setting
- ◇ Involving family and extended family

PLASTICITY IS AT WORK RIGHT NOW.....



Anoo Bhojti,
Yooralla Society Of Victoria, Endeavour Hills
anoob@yooralla.com.au
Cardinia Casey Community Health
anoobhojti@southernhealth.org.au
www.southernhealth.org