Assessing Neuro-Motor Readiness for Learning

Why physical development in the years supports learning at every stage in development

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Why physical development supports learning at every stage in development

Presentation to

Physical Literacy Conference

at

The University of Bedfordshire. Luton.

29th June 2011

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What does INPP do?

1. Assesses children's physical development (reflexes, posture, balance, coordination, visual perception, auditory processing) to investigate whether physical factors underlie specific learning difficulties, behavioural or emotional problems.

INPP individual programme

Develops and implements physical intervention programmes using developmentally appropriate exercises and/or auditory training to improve the physical skills which are essential to support learning.

INPP School Programme

1. Provides training for teachers in the use of screening tests for children from 4 years of age and upwards.
2. How to use the INPP Developmental Movement Programme for whole classes or selected groups of children in schools. (Due to be published by Wiley-Blackwell. Autumn 2011)

Pictures with permission of Krisztina Hajdu from a school in East Hungary

How does Physical Readiness for Learning Develop?

The product of maturation

+ physical interaction with the environment

Learning to move – moving to learn

We begin life by learning *how* to move

All through life we rely on movement to entrain and support learning

Even thought and dreams are an internalised simulation of action (Berthoz A)

Developmental Readiness – the key to learning success

Behaviour is language

If a child is unable to match his or her abilities to the demands of the environment, the difference will be seen in behaviour

Learning the first A,B, C…

A = Attention

B = Balance

C = Coordination

D = Developmental Readiness for

E - ducation

Observing and Identifying Developmental Readiness

Questions to be addressed:

- What is the size and nature of the problem?
- Which types of children are affected?
- What can be done about it and who should do what?

What is the extent of the problem? (UK and Germany)

Country	Type of School	Number of Participants	Age Range	% of sample with evidence of residual primitive reflexes
Northern Ireland (UK)	6 mainstream primary schools	672	4 - 5 years 8 – 9 years	48% 35%
Northumberland	3 primary schools; area of social deprivation	64	4 – 6 years 7 – 8 years	40% 88.5%
Germany	• Primary school • Special class for children with speech impairment • Steiner Waldorf*	164 28	7 – 8 years 7 – 8 years 7 – 8 years	50 – 60% 100% 72%

What is the extent of the problem? (Hungary)

Country	Type of School	Number of Participants	Age Range	% with signs of residual primitive reflexes
Hungary	**Special** for children with **language problems** in class in primary school (Bp II district)	20	7 - 8 years	100%
	Special class for children in Music School (Bp IX district)	21	7 – 8 years	100%
	Special class for socially disadvantaged children (Northern Hungary)	82	7 – 8 years	100%
	Special class (boarding school) for socially disadvantaged children (Southern Hungary)	33	14 – 15 years	93%

North Eastern Education Library Board, N. Ireland Study 2004

Participants: 672 from 6 mainstream schools:

- 48% of P2 children still had traces of retained infant reflexes (4 – 5 years of age) and immature balance and coordination
- 35% of P5 children (8 – 9 years) still had traces of retained infant reflexes; immature balance and coordination
- Higher abnormal infant reflex scores were correlated with lower educational achievement using educational assessments at baseline in P2 children

Small scale evaluations in other countries: Germany

Germany

At (Grundschule Bad Harzburg, Grundschule Immenrode, Grundschule Goslar Unteroker, Grundschule Lutter, Grundschule Vienenburg Niedersachsen. INPP supervisor Giffhorn, M)

- 164 children in mainstream primary schools aged 7 – 8 years.
- 50-60% of sample showed traces of residual primitive reflexes
- In a special class for children with speech problems 100% of the sample had evidence of residual primitive reflexes

At Waldorf School, Wiesbaden, Germany (INPP supervisor Heidrun Findeis, 2010)

- 28 children
- Age range: 7-8 years
- 72% (20 children) had traces of residual infant reflexes
- 6 children out of this group (22%) had very strong traces of residual infant reflexes, 14 children (50%) had noticeable traces.

"These are especially strong figures which do not correspond with the general situation at the Waldorf School.

However, in the last two years I have been involved at that school in testing children for neuro-motor maturity before starting school and had found that there is a clear trend of lesser and lesser maturity and that the figures are similar to those you found in England and Northern Ireland.

Teacher's comment 2010.

Small scale studies in other countries:

Australia (Holley P, 2010. Unpublished)

40 children in 2 government schools.

Age range: 6 years 1 month to 8 years 3 months;

2 groups:

Group 1 receiving literacy support;

Group 2 achieving at age expected levels.

Assessed using the QNST and tests for immature reflexes.

Group 1 (literacy support) scored consistently higher on measures for immaturity on 3 reflexes (Palmar, TLR and under-developed HRR's) than Group 2.

Small scale evaluations in school children in other countries:

Although numbers involved in individual studies are fairly small, all reveal a consistent pattern of increased signs of neuro-motor immaturity in children generally, with higher incidence in children who are under-achieving or receiving support for language, learning or behavioural problems.

Percentage of children in this category varies across regions and may or may not be related to socio-economic factors. Poverty is not necessarily the sole determinant, with children in more affluent areas sometimes showing similar signs. This may be the result of changes in early child caring practises including over-use of baby equipment, less time engaged in unrestricted physical play and social interaction, over exposure to electronic media and more sedentary lifestyles.

These are all areas for further investigation.

Factors involved in developmental readiness for formal education

- Neurological maturation
- Developmental age, gender and birth date, gestation of pregnancy in relation to time of school entry
- Environmental opportunity

Why does physical development matter?

- Motor skills at key stages in development provide outward signs of maturity in the functioning of the central nervous system.
- Monitoring children's motor skills can help to identify children at risk of under-achieving as a result of immature motor skills.
- Many motor skill problems will respond to specific physical programmes of intervention

Motor experience – the primary medium for sensory integration

- Information is received through the senses but must be integrated to provide a stable basis for perception (the brain's *interpretation* of information derived from sensation)
- Integration takes place as a result of action or motor response
- Motor control is linked to control of posture and balance
- Balance and posture are depend on a mature reflex system

Why does movement matter?

- Mature visual processing is the product of the sense of vision being used in combination with movement and other sensory experiences such as touch and proprioception.
- Early reflexes provide a mechanism for this in the first weeks of life.

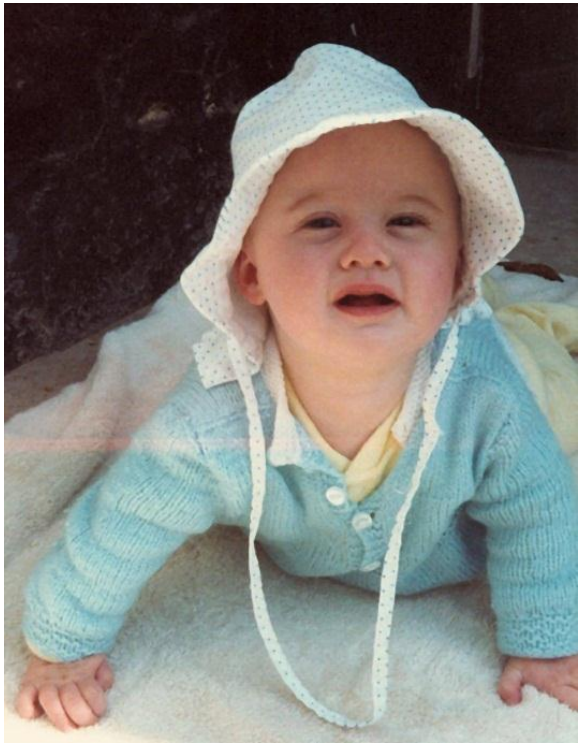
Asymmetrical Tonic Neck Reflex
2 – 3 weeks old

Building an internal map of body awareness

Adult perception is the result of multi-sensory experiences integrated through the medium of movement

Development of extensor tone – the importance of tummy time

Development of head control
Oliver at 6 weeks old



Above: James at 6+ months.
Development of
head, arm and upper trunk control.

Left: Oliver at 5 months

Does over-use of baby equipment reduce tummy time and affect postural development?

How does early physical development support later learning and behaviour?

Early reflex movements provide primary (unconscious) mechanisms for sensory-motor integration.

Rooting reflex uses the sense of touch to lead into visual “searching” for the breast or bottle

Primitive and postural reflexes – medically accepted facts:

Primitive reflexes:

- Emerge in utero
- Fully present at birth in the neonate born at full term (40 weeks gestation
- Inhibited (in their crude form) by higher centres in the developing brain in the first 6 months of post natal life

Picture – with permission of Camden from author's personal collection

Postural Reflexes

Reflexes which develop from birth to 3½ years of age and should remain for life.

Beginning with automatic head-righting reflexes, they provide the basis for unconscious control of balance, posture and co-ordination in a gravity based environment

Neurological Dysfunction
(Neuro-motor immaturity or developmental delay)

The continued presence of a cluster of primitive reflexes above 6 months of age

with or without

Under-developed postural reflexes above 3 ½ years of age

Reflex maturity at key stages in development provides a reflection of the functioning of the Central Nervous System

Reflex assessment in children from 4 years of age can provide indications of developmental readiness in the physical skills that are needed to support cognitive learning

Effects of abnormal reflexes on functioning:

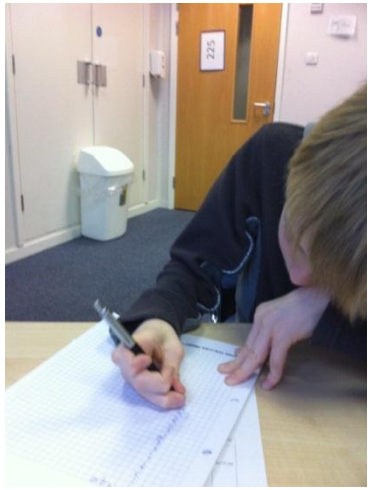
- Postural Control
- Balance
- Motor Skills
- Oculo-motor functioning
- Visual-motor integration (VMI)
- Learning
- Emotional functioning
- Behaviour

What is the impact of the above on school performance?

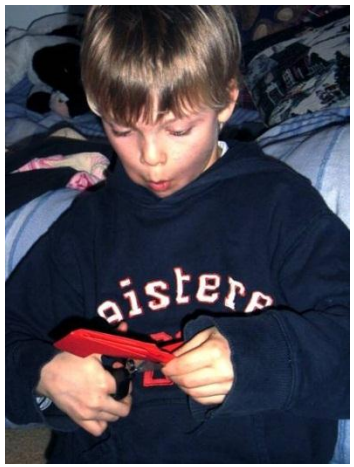
Early signs of immaturity include difficulties with:

- Attention
- Sitting still
- Receptive and expressive language
- Pencil grip (writing)
- Control of eye movements (reading)
- Body awareness (self) and the ability to read and respond appropriately to the body language of others.
- Coordination – using a knife and fork, catching a ball etc.
- Immature behaviour including poor impulse control, ability to take turns etc.

Examples of the effects of retained reflexes in the school-aged child - Palmar reflex



- If retained can result in difficulty developing independent hand and mouth movements
- Can affect fine motor skills



Examples of reflex related postural problems

Hypotonia in upper body when sitting. Possible Symmetrical Tonic Neck Reflex and/or under-developed Head Righting Reflex.

W leg position often associated with retention of the STNR

Asymmetrical Tonic Neck Reflex

Effects if retained:

- Balance
- Crossing the midline – bilateral integration
- Crawling on the stomach
- Hand-eye coordination - handwriting

  Horizontal tracking - reading

Symmetrical Tonic Neck Reflex in flexion and extension

Flexion of the head causes the arms to bend the legs to extend

Extension of the head causes the arms to straighten and legs to bend

Picture source: Laura Pellico © SGB/Hawthorn Press

Symmetrical Tonic Neck Reflex

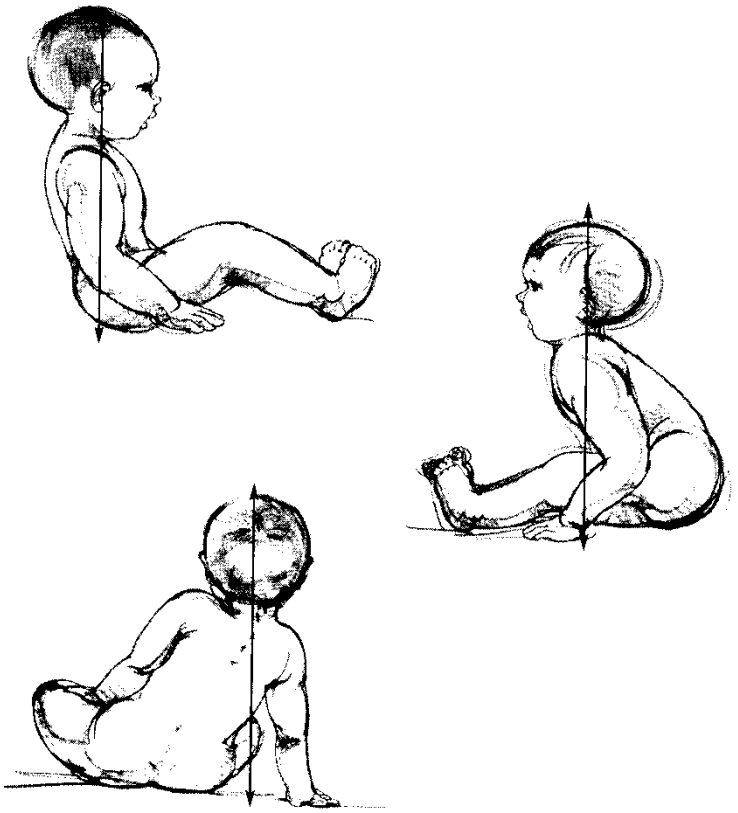
Effects if retained:

- Interfere with crawling on hands and knees in first year
- Posture - **sitting** and standing
- Upper/lower body integration - swimming
- Attention/concentration
- Hand-eye coordination
- Slow visual accommodation – copying, catching a ball
- Vertical tracking

STNR in flexion – sitting posture

Postural Reactions: Head Righting Reflexes

- Balance – proprioceptive-visual conflict
- Control of eye movements
- Visual perception
- Motion sickness
- Spatial skills



Head Righting Reflexes

Labyrinthine HRR's:

- Respond to changes in head position to correct **head** position to the midline irrespective of body position. This provides a reference point for control of eye movements

Oculo-HRR's:

- Respond to visual cues.

Developmental Norms

- Children who are delayed in their physical development need **more** time involved in **general physical activities** before being ready to integrate fine motor and visual integration tasks

1. **1 Leg Stand**

   3 ½ - 4 years – 8 seconds

2. **Thumb and finger opposition**

   5 years

3. **Crossing the midline**

   4 years

Examples of testing reception children with permission of Battle Hill School, North Tyneside

St Margaret Mary School, Carlisle
DVD produced by www.youthsporttrust.org

Use of the Draw a Person Test

1. The INPP battery (7 years +) yields a possible total score /40.

   0/40 = no abnormality detected

   40/40 = 100% dysfunction on all tests (neurological dysfunction)

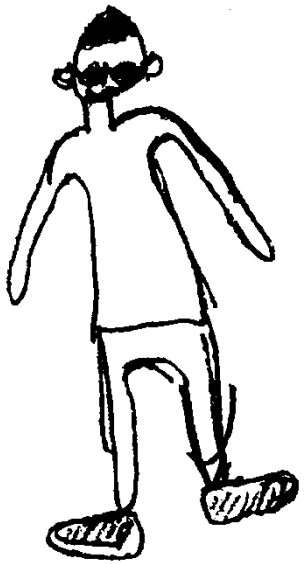
2. The Draw a Person test yields a percentile score (PS) or a mental age (MA).

   Results of both tests can be compared before and after intervention to assess the impact on non-verbal performance

Draw a Man Test (Goodenough)
St Margaret Mary School, Carlisle. Child 1

Age range 8 - 10

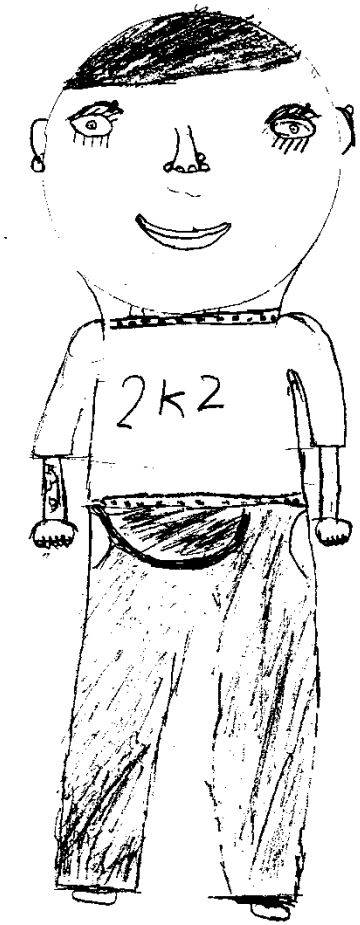
June 2001
Neurological Score
21/40
Percentile Score
14



St Margaret Mary School, Carlisle.
Child 1

October 2002

Neurological Score:2/40
Percentile Score: 77



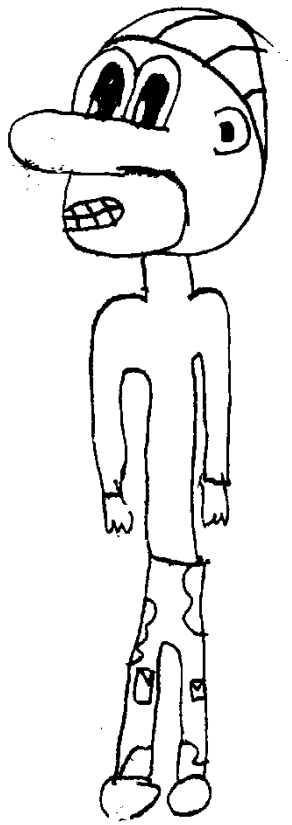
Draw a Man Test. St MM School, Carlisle

June 2001

Age range 8 - 10

Neurological Score 23/40

Percentile 68



Draw a Man Test: 2nd assessment

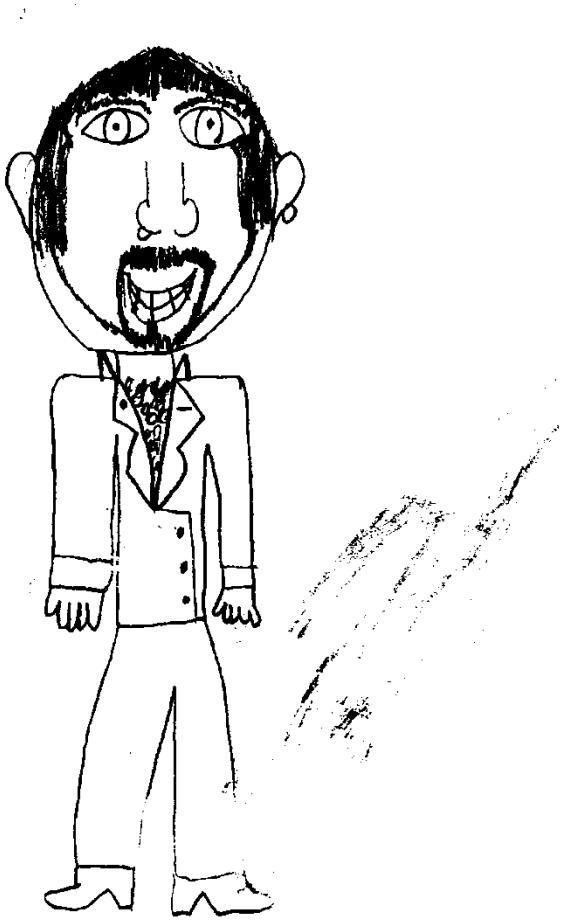
St Margaret Mary School, Carlisle

October 2002

Age Range 8 – 10 years

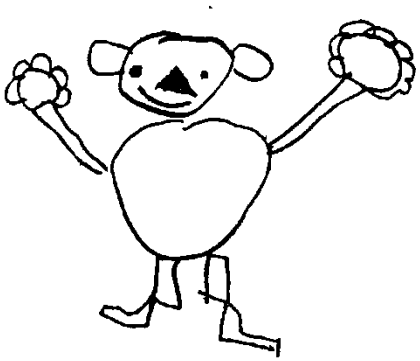
Neurological Score 3.5/40

Percentile Score 99

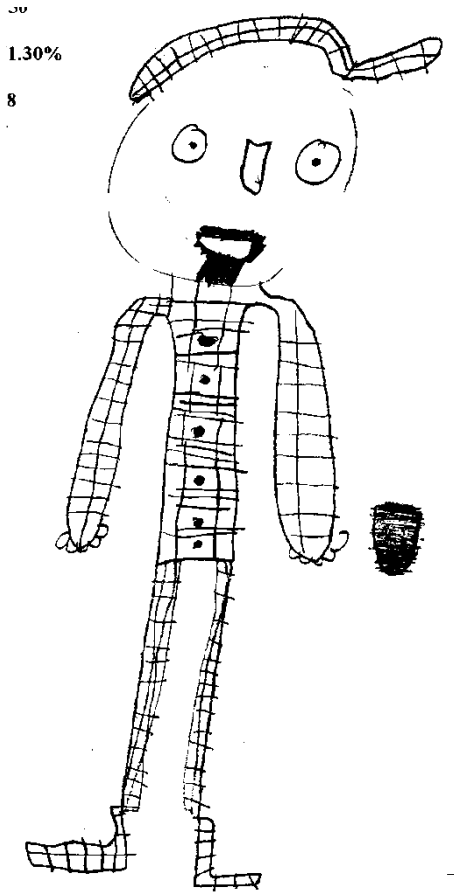


Draw a Man Test

St Margaret Mary School, Carlisle



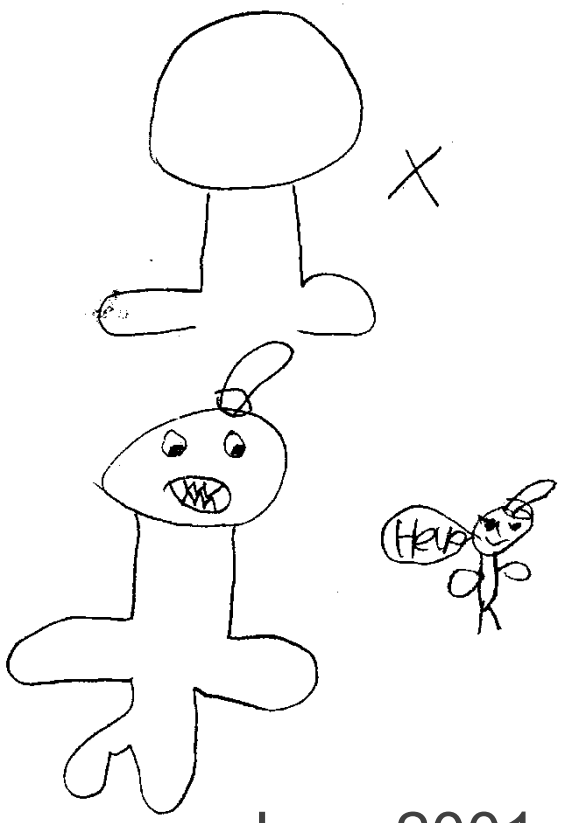
June 2001
Neurological Score
28/40
Percentile Score 4



October
2002
NS: 4/40
PS: 68

Draw a Man Test

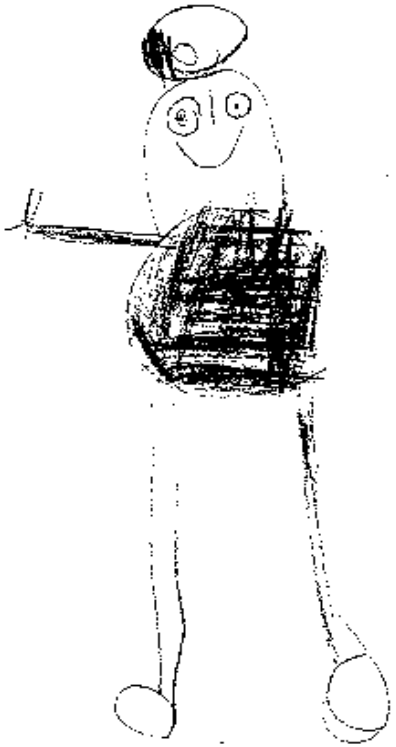
St Margaret Mary School, Carlisle



June 2001
Neurological Score 17/40
Percentile Score 4

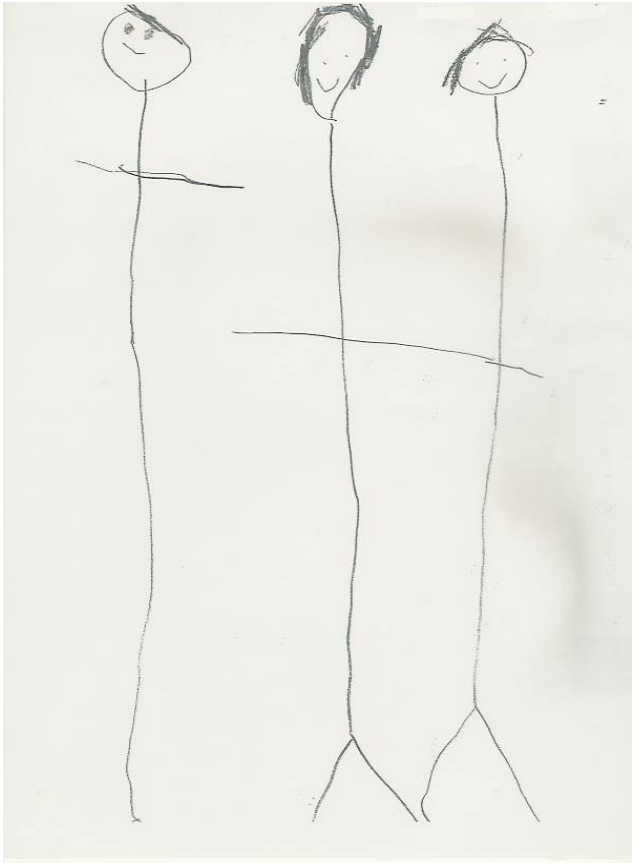
October 2002
NS: 2.5/40
PS: 68

Draw a Person
Kingstanding EAZ Birmingham



1st assessment
CA: 7 years MA: 5.5

Draw a Person
Kingstanding EAZ 2007



1st assessment
CA: 6 years MA: 4.5 years

2nd assessment
CA: 7.5 years. MA: 8.5 years

North Tyneside Pilot Project with reception children

Children selected for participation on the basis of general immaturity.

"Overall the children are demonstrating better balance, control and coordination. Their improved physicality has led to better concentration and focus. We have also observed a marked change in self-esteem and in their confidence"

Early Years Newsletter 26/2008.North Tyneside

INPP Developmental Movement Programme in Schools

Research Findings (UK)
Identification and Intervention

Why focus on immature primitive and postural reflexes?

The presence or absence of Primitive and Postural reflexes at key stages in development provide:

- Acknowledged diagnostic signposts of Central Nervous System immaturity. A cluster of abnormal reflexes – Neurological Dysfunction.
- Indicators of the level of development at which physical remediation should be targeted.
- Tools with which to measure change within the CNS as a result of remedial intervention

Cognition, learning and behaviour linked to motor functioning

- Reading – an oculo-motor function
- Writing – visual motor integration with the support of the postural system.
- Maths – spatial awareness necessary to support cognitive operations in space; problem solving involves inter-hemispheric cooperation in both directions.
- Posture - product of balance and adaptation; muscle tone and balance both depend upon a mature reflex system.
- Reflexes act as the deputies of the brain freeing up higher centres in the brain for executive functions.

ATNR, TLR and STNR selected because:

All Tonic Neck and Labyrinthine Reflexes are connected to the functioning of the vestibular (balance) system and its relationship to proprioception. They also influence the operation of:

- The vestibular-spinal system **(balance and body control)**

- The vestibular-cerebellar system (**balance and coordinated movement as well as some higher functions)**

- The vestibular-ocular- reflex arc **(stability of the visual image on the retina and the basis for stable eye movements)**

Continued presence of the above reflexes in the school aged child can affect the motor capabilities upon which academic learning is based.

INPP

Independent Pilot Studies in 11Schools (5 districts) using Controls.

1. Mellor Primary School, Leicester 2000
2. Prince Albert School, Birmingham 2001
3. Knowle C of E Primary School and Kingsley Prep School, 2003
4. Swanwick Primary School, Derbyshire, 2004
5. North Eastern Education Library Board, Northern Ireland, 2003 – 2004

Published in: Child Care in Practice (2005). 11/4:415-432

Participants 2001 - 2005

School	Age Range	Experimental	General	Control	Total
Mellor	8 – 10 years	11	0	7	18
Prince Albert	7 – 8 years	24	0	10	34
Knowle and Kingsley	7 – 8 years	9	0	9	18
Swanwick		32	31	30	93
NEELB P2	4 – 5 years	(339)	0	0	339
NEELB P5	8 - 9 years	168	0	156	324
Total		**234**	**31**	**212**	**826**

Individual differences in research design

Each school/district carried out its study independently. INPP had no involvement in the design of the studies. Therefore, baseline criteria for selection of subjects, presentation of the figures and data available for each school varies.

In the cases of Mellor, Prince Albert, Swanwick Schools and the NEELB Study, statistical analysis of the results was carried out independently.

Research Questions

1. Is Neurological Dysfunction (a cluster of abnormal reflexes > 25%) a significant factor in children who are under-achieving?

2. Does Neurological Dysfunction respond to a specific programme of developmental exercises carried out in school every day for a minimum of one academic year?

3. Is there a cross-over from change in neurological status to improved performance in educational measures such as reading, spelling and drawing?

Neurological Tests

Balance and Coordination	Tandem and Fog Walks
Abnormal Reflexes:	ATNR (Ayres)
	ATNR (Hoff Schilder)
	STNR
	TLR Erect test
Visual Tracking & Integration	Valett
Visual Discrimination	Tansley and Bender Visual
Visual Motor Integration	Gestalt Tests
Spatial	

Scoring for Neurological Tests

0 = no abnormality detected (NAD)

1 = reflex present to 25% or 25% impairment

2 = reflex present to 50% or 50% impairment

3 = reflex present to 75% or 75% impairment

4 = reflex present to 100% or unable to carry out the task

Total possible score on neurological tests = 72

Educational Measures

- Reading
- Reading Comprehension (Knowle and Kingsley only)
- Spelling
- Draw a Person

Intervention

A series of developmental movements adapted from the INPP clinical programme. Exercises were based on natural movements made by the infant in the first year of life.

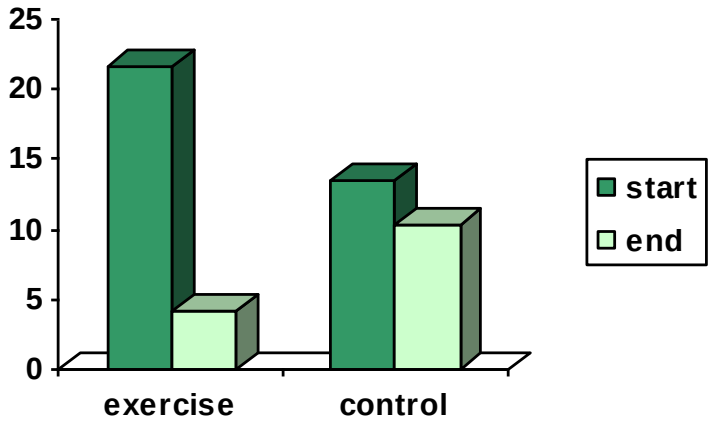
Movements were carried out for 10 minutes per day, every day during the school year under the supervision of a teacher who had followed an INPP day training course in the administration of the programme

Results
Change in Neurological Scores
Mellor Primary School

Participants: Age: 8 – 10 yrs

Total	18
Experimental	11
Control	7
Period between assessments:	9 – 10 months

Total Neurological Score /72

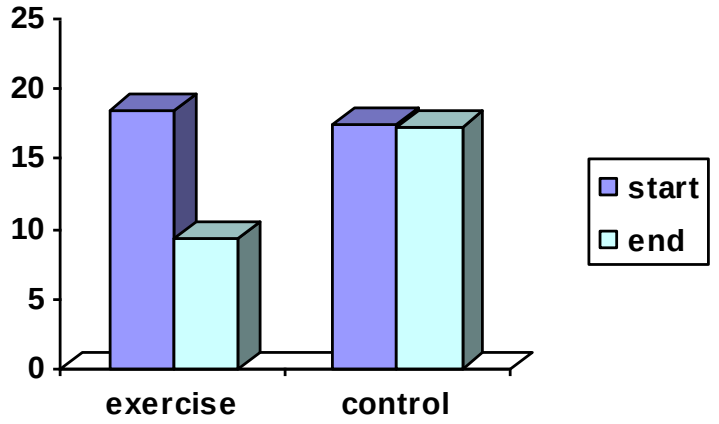


Change in Neurological Scores Prince Albert School

Participants:

Total	34
Experimental	24
Control	10

Prince Albert School in situated in an Education Action Zone where over 80% of the children come from schools where English is spoken as a second language. Literacy assessments were not therefore appropriate independent measures of progress in this sample

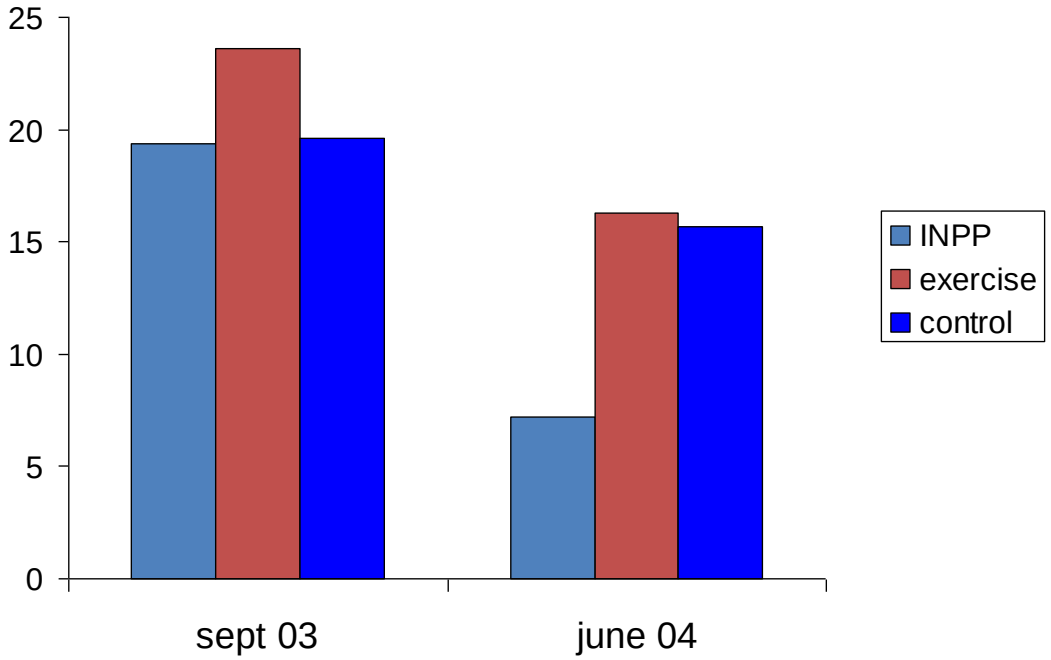


Swanwick School

- All children: 93
  - 32 INPP exercise
  - 31 general exercise
  - 30 control
- Year 3
  - 13 INPP exercise
  - 15 general exercise
  - 12 control
- Year 4
  - 19 INPP exercise
  - 16 general exercise
  - 18 control

Change in Neurological Scores: Swanwick School

Neurological scores decreased significantly for all children. This decrease was significantly larger in the INPP group.



Change in reading and spelling Mellor Primary School

Criteria for Selection:

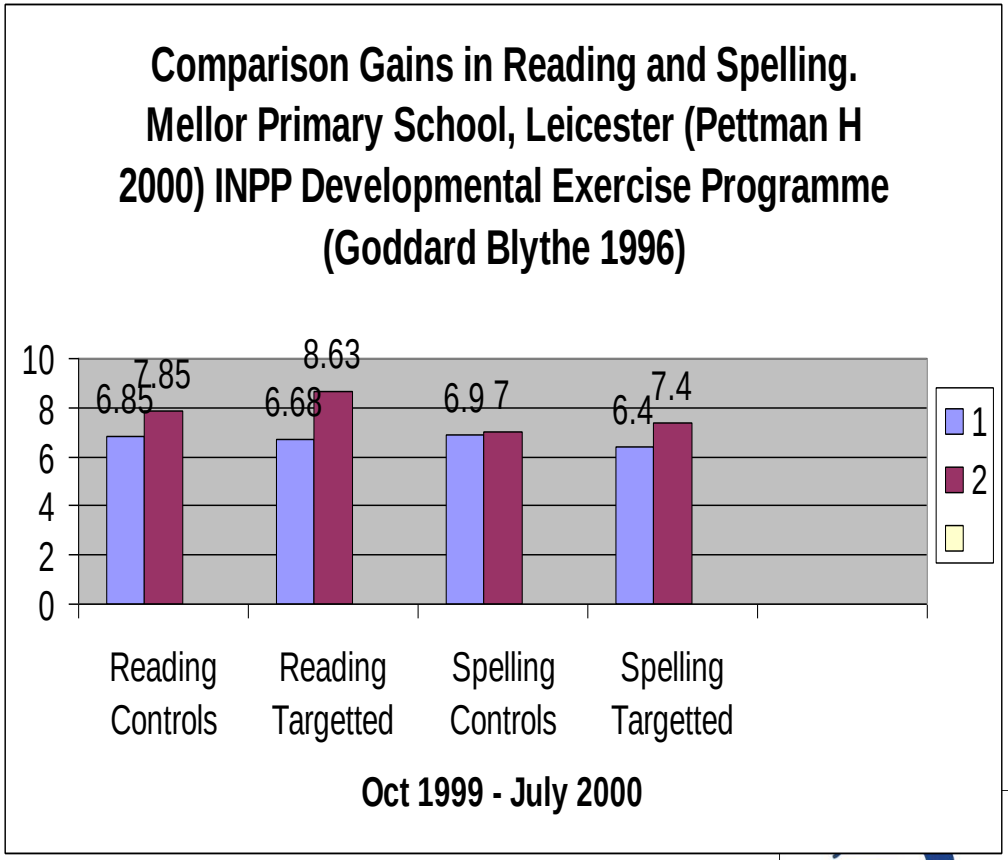
Reading age of >1 year below chronological age

Reading scores:

Experimental	+1.95
Control	+1.00

Spelling Scores:(in months)

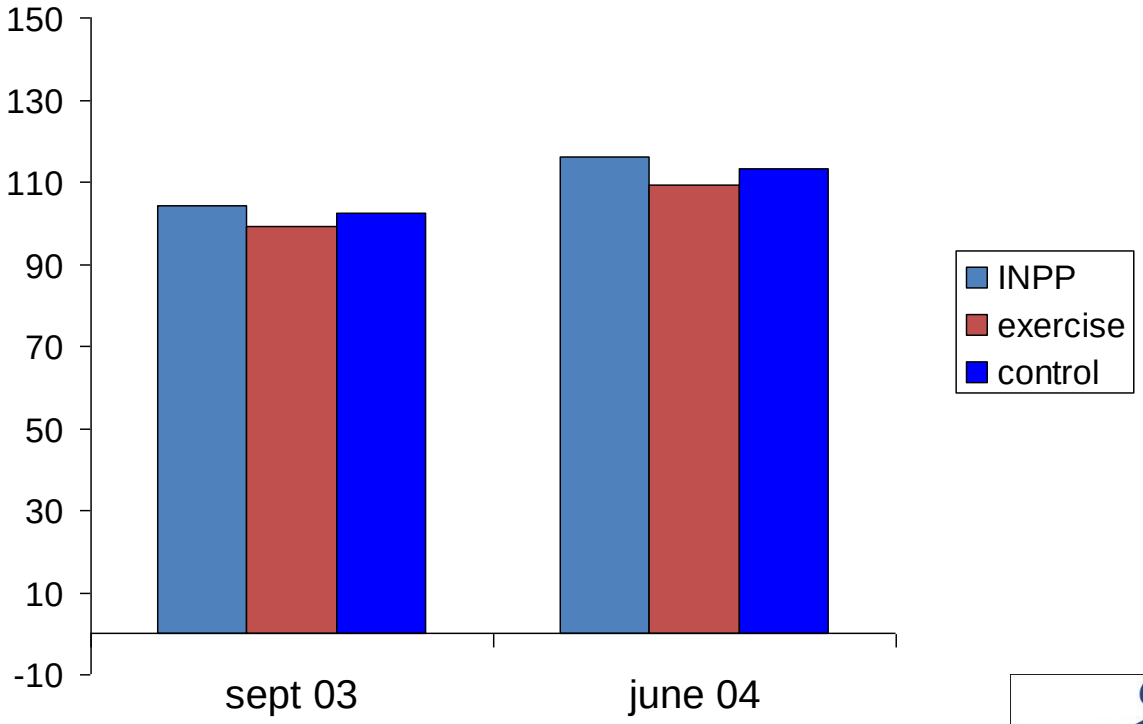
Experimental	+ 10
Control	+1



Change in Reading Scores: Swanwick School

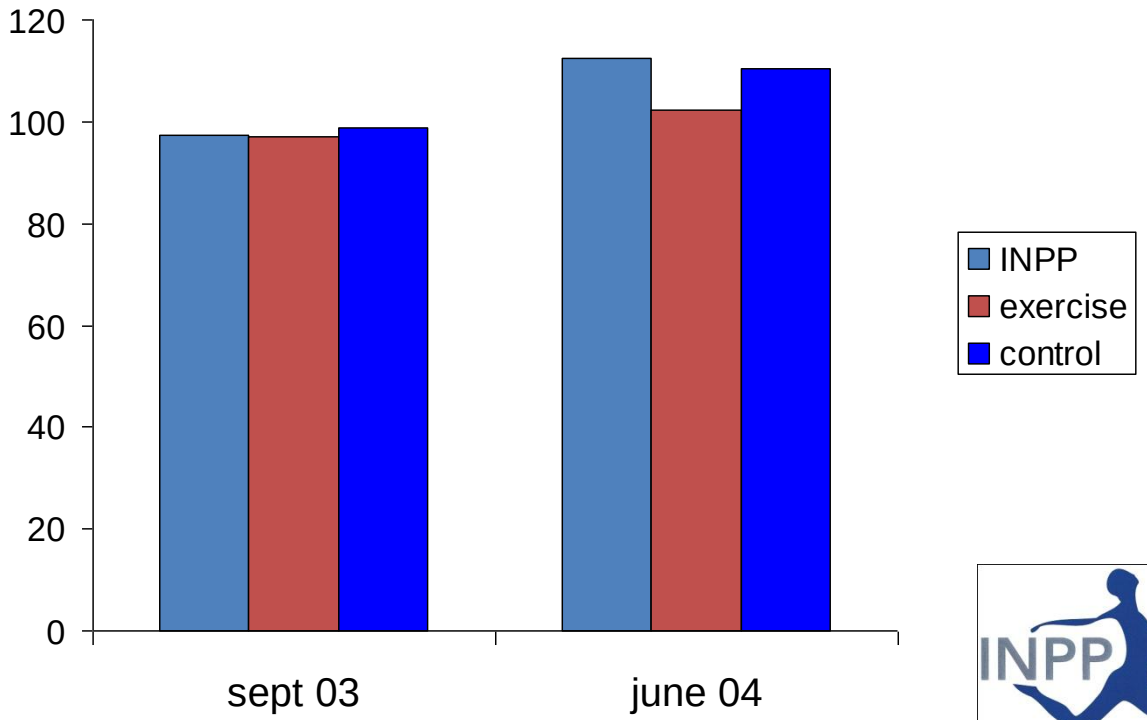
All Children – no pre-selection on the basis of reading ability.

Reading scores increased for all children. The increase was larger for children in the INPP group but this did not reach statistical significance.



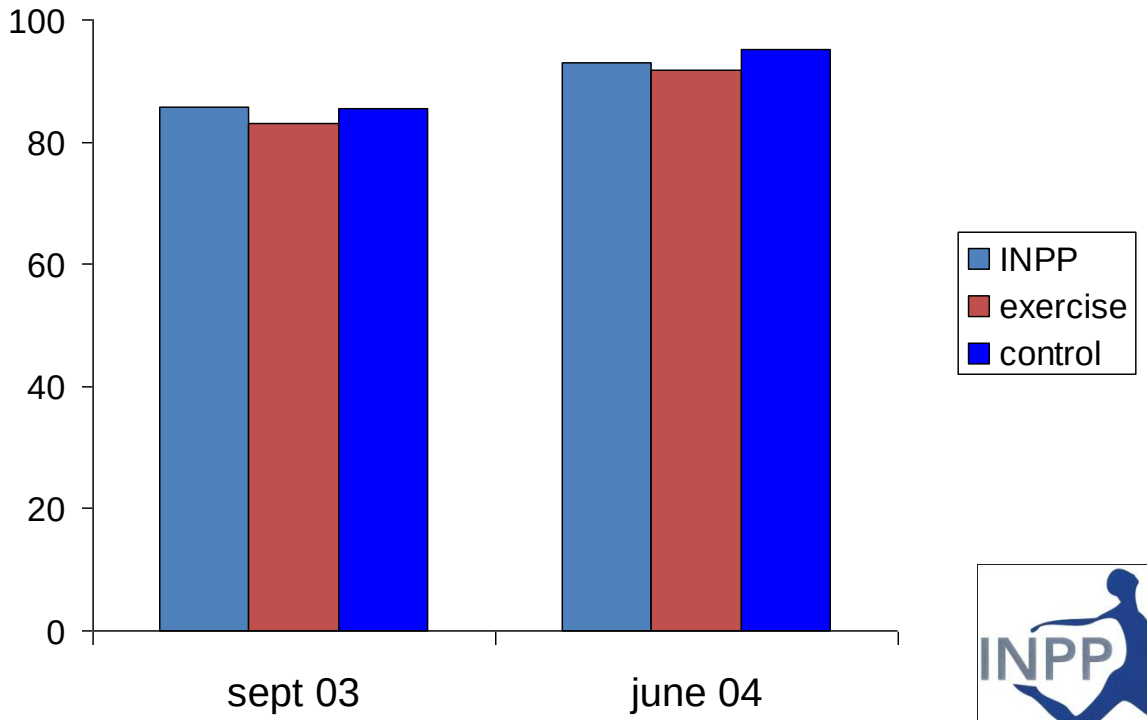
Lower Achieving Children: Reading. Swanwick School

- 14 INPP exercises
- 19 general exercises
- 20 control group
- Significant differences between the groups.



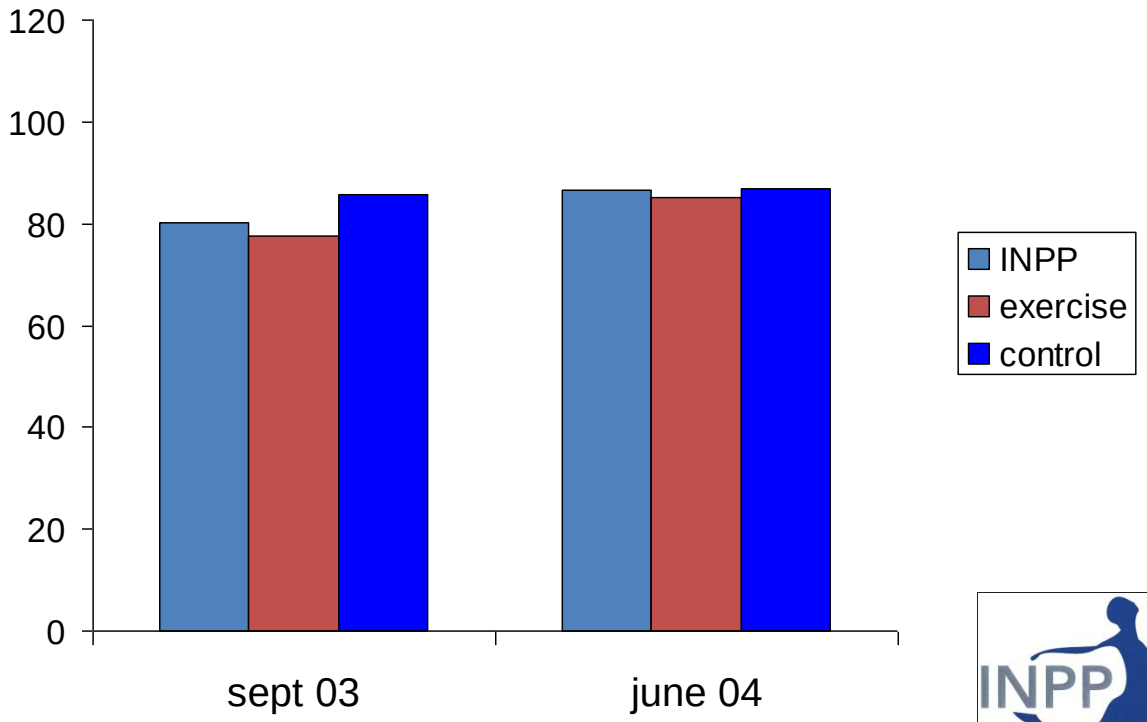
Change in spelling scores: Swanwick School

Spelling scores increased for all the groups: there was no statistically significant difference between the groups.



Lower achieving children: spelling: Swanwick School

- Significant differences between the groups.
- Control group made significantly less progress.



Conclusions – Small Scale Evaluations

1. Improvements in non-verbal performance (Draw a Man Test)
2. Improvements in maths
3. Improvements in behaviour reported by teachers including:

- Ability to: sit still
- Concentration
- Consideration for others
- Sports
- Self-confidence

North Eastern Education Library Board, Northern Ireland (2004)

The aim of the research was to determine whether retained reflexes predicted poor educational progress and to evaluate the effectiveness of the programme by measuring the educational progress associated with undertaking the prescribed exercises.

The programme was evaluated for children who had high levels of retained reflexes and who were underachieving educationally (the criteria for which the programme was designed), and also for all children, regardless of their reflex or educational scores.

NEELB 2004 - Methods

- Total number of participants: 663
- Measures of retained reflexes, balance, educational ability and concentration/coordination were made in a controlled study of P5 (8 – 9 year olds) children in seven Northern Ireland primary schools at the start (September 2003) and end (June 2004) of the school year. In each school one P5 class undertook the exercises and the other did not. (324 children)
- Two P2 (4 – 5 year olds) classes in each school also participated in the research. None of the P2 classes undertook the exercises, and the extent to which the presence of retained reflexes at the start of the school year can predict educational progress at the end of the year was assessed. (339)
- The following conclusions were drawn.

NEELB Results P2's

- Retained reflexes were correlated with poor cognitive development, poor balance and teacher assessment of poor concentration/coordination in P2 children.
- Neurological scores and teacher assessment at baseline predicted poorer reading and literacy scores at the end of the study.

NEELB Results P5'S

- Children who undertook the exercise programme showed a statistically significant greater decrease in retained reflexes than children who did not undertake the exercises
- Children who undertook the exercise programme showed a highly significant improvement in balance and coordination, and a small but statistically significant increase in a measure of non-verbal cognitive development (Draw a Person Test) over children who did not undertake the exercises.
- No difference was found in reading, handwriting or spelling in children who were already achieving at or near their chronological age, but for **children with high levels of retained reflexes and a reading age below their chronological age**, those who undertook the exercise programme made greater progress.

Conclusions

- Neurological Dysfunction was a significant factor in educational under-achievement (reading age below chronological age).

- Neurological Dysfunction did respond to the INPP Developmental Exercise Programme designed to be used in schools with children with special needs. Reflex scores and measures of balance and coordination were significantly lower in children in the experimental groups than control groups after the INPP Programme.

- There was a general trend whereby children who did fit the criteria for using the INPP Programme (reflex scores of greater 25% and reading age below chronological age) showed greater improvement in educational measures after using the INPP Programme than the comparison groups.

Questions raised by results.

- DAP – provides a measure of non-verbal performance. Non-verbal skills support many verbal aspects of learning. Are they a precursor to later academic achievement?
- All schools in England noticed improvements in behaviour, ability to sit still and concentration – do motor skills affect behaviour and concentration?
- Do improvements in educational attainment continue after the programme has finished? Further longitudinal studies are recommended to investigate this.
- Should ND tests be carried out on all children at the time of school entry to assess “readiness” for school and identify children who would benefit from a daily physical programme?

Northumberland 2006 Summary of Findings

- 64 participants (area of social deprivation)
- 88.5% of children age 7–8 years and 40% of children age 4-6 years in the Northumberland sample had residual primitive reflexes.
- Higher scores on tests for retained primitive reflexes correlated with lower performance on the Draw a Person test (non-verbal cognitive performance).
- Children in the INPP group showed a significantly greater decrease in scores for abnormal reflexes than children who participated in a general movement programme.
- 5 children who had been referred to the Behavioral Support Service at the beginning of the year were no longer on the list at the end of he first terms. No specific behavioural work was undertaken with these children.

What can we do in the early years to optimise physical development?

Enable children to have:

- Ample time for free movement, play and exploration
- Tummy time (when awake) in the first year of life
- Conversation and social interaction; parental **time** to be actively engaged with their children
- Singing games
- **Read** to your child

Importance of rough and tumble play

Rough and tumble play exercises circuits involved in physical exploration, creativity, adaptation, self-regulation (control), social boundaries, social bonds, and control of temper.

Space for free play and imagination

Song, dance and story telling

Source: The Genius of Natural Childhood. Hawthorn Press.

What needs to be done?

1. Developmental testing (physical) of all children at the time of school entry and at key stages through education.
2. Implementation of effective (researched) daily physical programmes into schools.
3. Flexibility within education systems to allow young children an extended period of time to develop physical skills either before entering formal school or in the first year(s) at school if required.
4. Improved awareness and education of parents, and *training* to teachers, trainee teachers and teenagers (parents of the future) of the importance of physical development to support learning.
5. Improved inter-disciplinary communication and cooperation (Medicine and Education) from birth through the school years.
6. Improved education of the general public in **what children need** in the early years to develop the physical skills that are necessary to support cognitive learning and social integration.
7. Value the role of Motherhood as a society

Published Findings

- An evaluation of the pilot INPP movement programme in primary schools in the North Eastern Education and Library Board, Northern Ireland. *Final Report* compiled by Brainbox Research. 2004
- Goddard Blythe SA, 2005. Releasing educational potential through movement. *Child Care in Practice*. 11/4:415-432

Acknowledgements

To staff, parents and children of all participating schools:

Pettman H, Mellor Primary School, Leicester
Bertram S, Prince Albert School, Birmingham
Preedy P, O'Donovon C, Knowle C of E Primary School Solihull
Scott J, Wolinski R, Kingsley Prep School
Micklethwaite J, Swanwick Primary School, Derbyshire

Dr Fiona Fylan, Brainbox Research, Leeds for statistical analysis and advice
Joan-Ann Wilson Head of Literacy for the North Eastern Education Library Board (NEELB).
DfES Best Practice Research Scholarship for funding of studies in England.
DfES Northern Ireland for funding of the NEELB Study
St Margaret Mary RC School, Carlisle for permission to use children's drawings.

Acknowledgements:Northumberland Study 2006 Participating Schools:

Northumberland

- Ashington Central First School
- Group NDD programme, one groups Activate – mixed ability in each group
- Choppington First School - All Year 1,2,3 and 4 pupils
- Red Row First School – (58 pupils) All Reception, Year 1,2 and 3 pupilsThe Grove Special School – 28 pupils aged 5 -17
- Ruth Marlee

Behaviour Support Service

Schools and Family Support Division, Children's Services Directorate

Northumberland County Council, Hepscott Park, Morpeth, Northumberland, NE61 6NF

North Tyneside Reception Project

- Charlton P, and Hoare. A. Early Years Consultants for North Tyneside. North Tyneside. Battle Hill School. North Tyneside.
- Report published by C4EO. www.c4eo.org.uk/narrowingthegap

Acknowledgements Hungary Results received May 2011

- Magdalena Zweegman-Kocsis, INPP trainer in Hungary and Nyiregyházi Dobrovits Ágnes supervisor in Hungary

- Vikukel Zsuzsa. Csík Ferenc Általános Iskola, II. District in Budapest, Hungary
- Kotormánné Erdei E. Bakáts Téri Általános Iskola, IX. District in Budapest, Hungary.
- Hajdu K. Four schools in Northern Hungary
- Reiszné Szőts E. PETŐFI SÁNDOR EVANGÉLIKUS GIMNÁZIUM Bonyhád, Southern Hungary -special program

Acknowledgements Germany and Australia

Germany

- Giffhorn M, 2011 and participating schools: Grundschule Bad Harzburg, Grundschule Immenrode, Grundschule Goslar Unteroker, Grundschule Lutter, Grundschule Vienenburg Niedersachsen.
- Findeis H, 2010. Waldorf School, Wiesbaden, Germany.

Australia

- Holley PA, 2010 MEd Thesis submitted to The University of Melbourne. Australia

Due to be published Autumn 2011

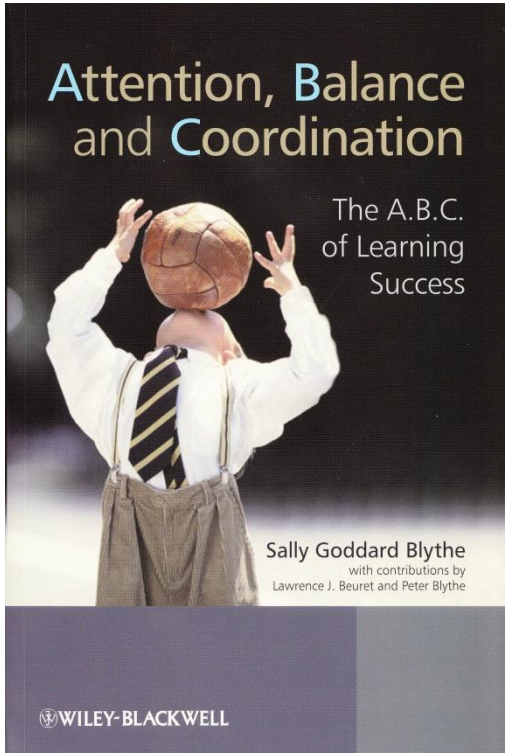
Assessing Neuro-Motor Readiness for Learning.

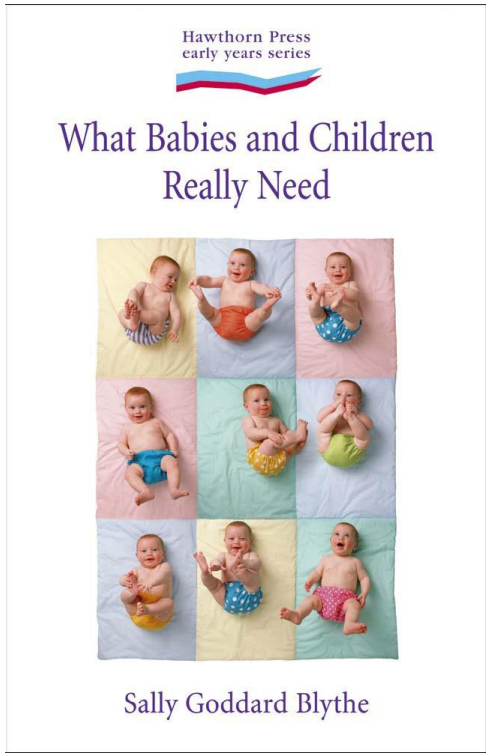
The INPP Developmental Screening Test and School Intervention Programme.

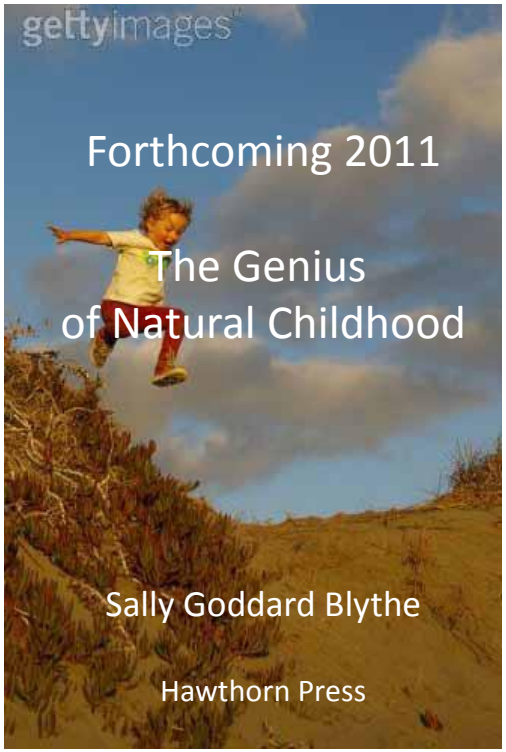
Compiled by Sally Goddard Blythe

Publisher: Wiley-Blackwell. Chichester

Book Titles







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