



MUSIC AND MOVEMENT

ARE THESE THE LOST KEYS TO EARLY LEARNING?

By

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MUSIC AND MOVEMENT – ARE THESE THE LOST KEYS TO EARLY LEARNING?

My task in this introduction for the next 15-20 minutes is to bring together the different aspects of specific learning difficulties which are going to be discussed over the next 2½ days, and to look at how and where the theories behind them can be recognised and applied at the cutting edge of education – in the classroom.

First of all, it is important to recognise that no one system develops in isolation – each system, whether it be sensory, motor or metabolic is affected by its interaction with many others. For example, let us take a look at just the basic connections between the sensory systems and the reflex system in the first years of life.

Reflex Connections to the Sensory Systems (See Figure 1)

It also important to remember that the sensory categories listed here are but the beginning; the sense of touch also involves, pressure, pain, reaction to temperature and kinesthesia. Balance is involved in posture, motor control, proprioception, spatial awareness and certain visual skills. Hearing and balance are mutually exclusive in the execution of certain tasks, one taking a back seat to support the other are one time and vice-versa. Location of the source of a sound is carried out as a result of the time difference between sound reaching the two ears – but the vestibular mechanism is also involved in timing – thus balance and hearing affect each other.

Last, but not least, is the chemical system – the system through which all experiences are mediated or transmitted.

FIGURE 1: REFLEX CONNECTIONS TO THE SENSORY SYSTEMS

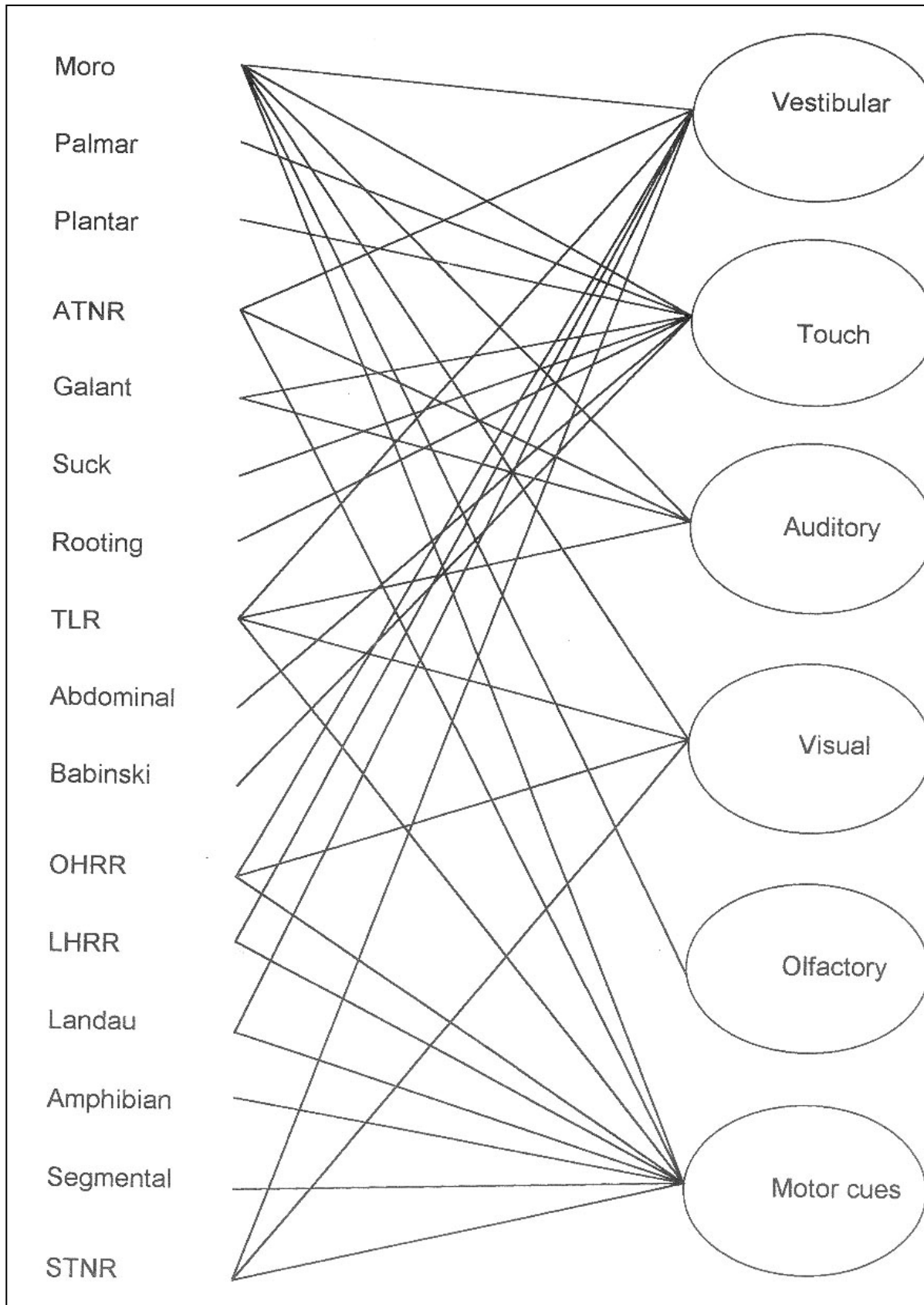


FIGURE 2: SENSORY CONNECTIONS TO PRIMITIVE & POSTURAL REFLEXES

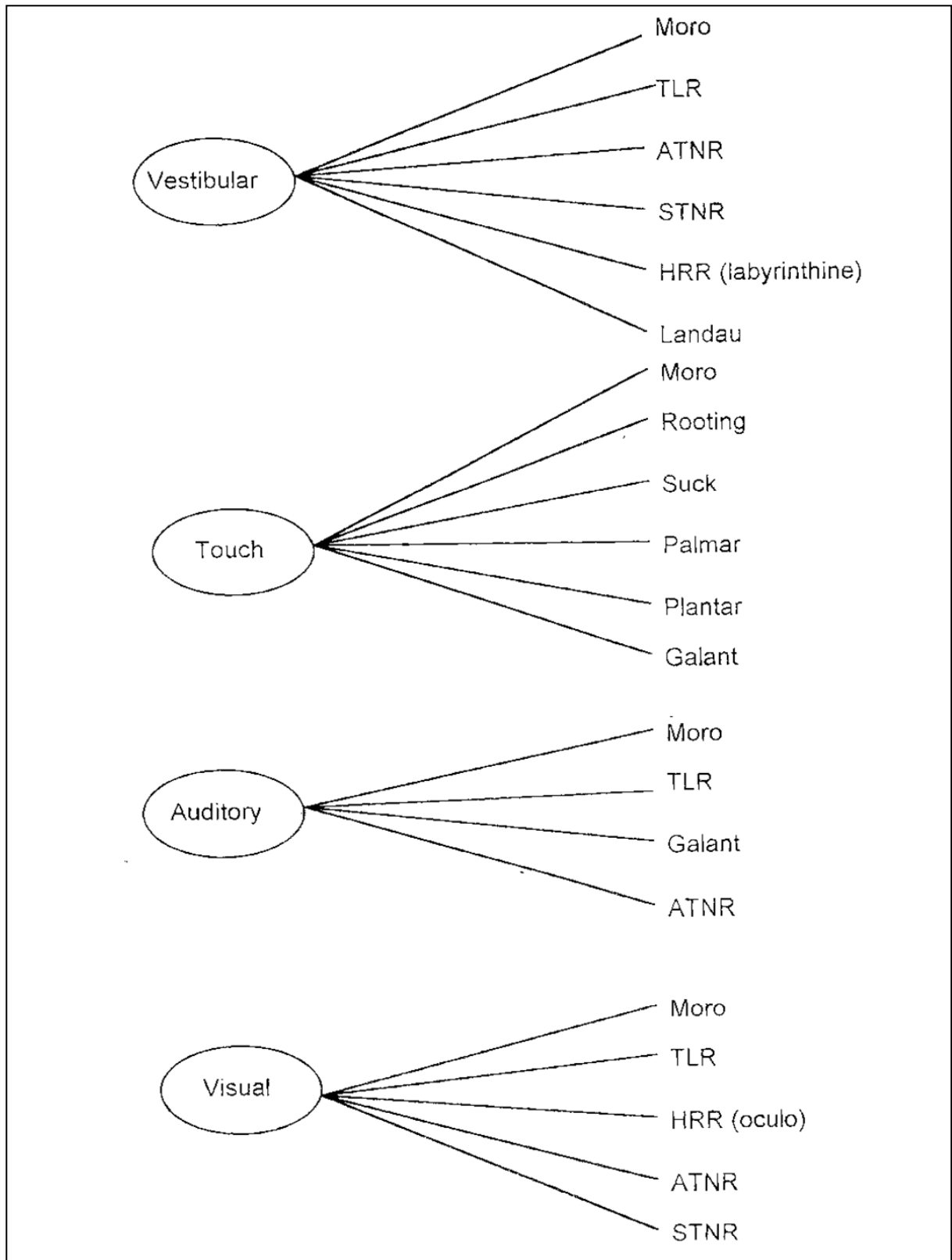
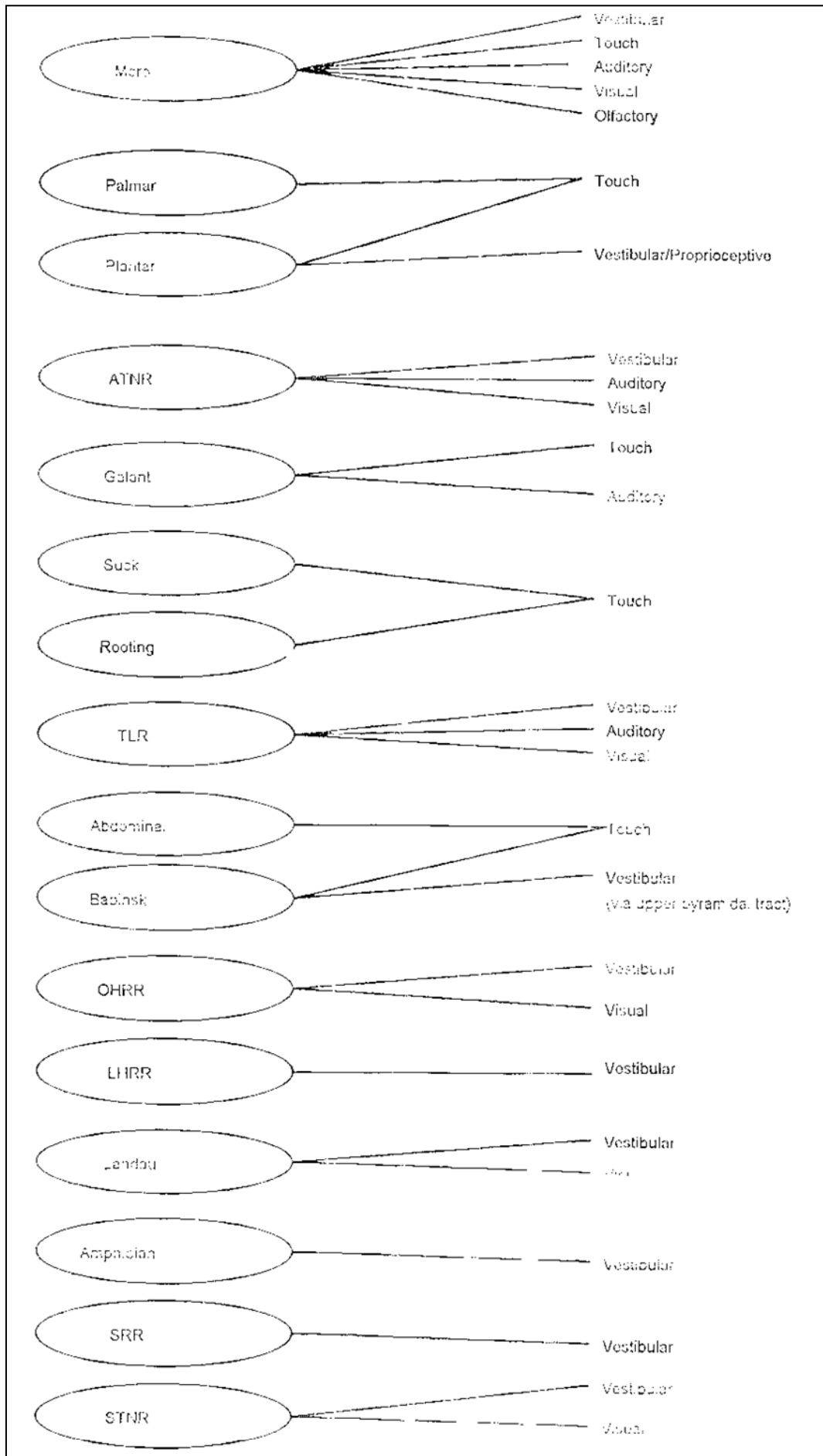


FIGURE 3: INDIVIDUAL REFLEX CONNECTIONS TO THE SENSORY SYSTEMS



Moro

Auditory
Visual
Olfactory

Palmar

Touch

Plantar

Vestibular/Proprioceptive

ATNR

Vestibular
Auditory
Visual

Galant

Touch

Suck

Auditory

Rooting

TLR

Abdominal

Babinski

OHRR

LHRR

Landau

Amphibian

SRR

STNR

Imbalance in the chemical system will have an impact on all others.

Learning takes place as a result of input, inhibition and action. Input is relayed to the brain through the different sensory systems, but sensation by itself is meaningless unless it is integrated in some way into existing systems. Action or motor activity allows sensory experience to be explored, practiced, trained and refined.

When a child is born it has no understanding of a separate sense of sight or hearing. He experiences the world as a conglomerate of feelings and needs which he must quickly learn to respond to if he is going to survive. The mechanism which enables him to do this operates through the primitive survival reflexes – automatic stereotyped responses which are directed from the brain stem (the most primitive part of the brain), and carried out without conscious thought or control.

Individual Reflex Connections to the Sensory Systems (See Figure 2)

Certain reflexes react to tactile cues such as the palmar, plantar and spinal galant reflexes, others to the cues of hunger and touch such as the rooting and suck reflexes. The Moro reflex, which provides a primitive reaction to shock *is the only primitive reflex to be connected in some way to all the sensory systems.*

Sensory Connections to Primitive and Postural Reflexes (See Figure 3)

By the time a child is identified as having a specific learning difficulty, the weakness may manifest itself predominantly in one area of functioning. If this area is recognised and treated, frequently the child will show significant progress.

However, as we know, working with children on an individual basis takes time, and certainly in the UK with financial resources stretched, only the children with the most severe problems or the most persistent parents receive the help they need. One of the main tasks for the future would seem to be that of early identification and of early intervention. If recognised early enough, the type and amount of intervention may be quite different from what would be required some years later.

A few years ago, a child was eligible for statementing for special needs if he was two years behind its chronological age in reading or other literacy skills. In some areas it is now 4 years. This means that some children reach the age of 12 with a functional reading age of 8 years or less – the chances of these children succeeding at secondary level are minimal. This has implications far beyond the immediate problems of education – frustration and loss of self-esteem are inevitable consequences – factors which all too easily translate into emotional and behavioural problems. Unless these children can find something at which they can succeed, failure to recognise and tackle these problems at their roots, later becomes a social problem.

The evaluation of the screening questionnaire which I presented at this conference last year is due to be published in the British Journal of Occupational Therapy later this year. This, it is hoped will make initial screening more widely available to teachers, occupational therapists, educational psychologists and other professionals so that children with NDD will be picked up earlier.

We have also compiled a series of developmental exercises which can be used either with a whole class of children or with small groups who have particular problems, and we are looking at how music can be adapted and used in the classroom to develop and enhance other skills – yet another area of primary education currently under threat.

The concept of neurological readiness in education is not a new one (Cruickshank 1981). A growing body of research now demonstrates that teaching methods which were successful in the past, were successful because whether by luck or design they utilised the developmental stages at which a child is neurologically most receptive to specific modes of learning.

Neurological Stages of Development (See Figure 4)

If a child is to learn to read, to write, to spell and to understand numeracy, he must develop three basic skills: a visual memory, an auditory memory and short-term memory. The foundations for these skills are laid down in the first 3 years of life, but can also be boosted and trained in the first 7 years – the same years that Piaget described as the sensory-motor stage of development.

The Neuro-Psychology of Reading

Those of you who are familiar with Bakker's work will remember that he identified 3 types of reader.

The first child learns to read using the right hemisphere of the cortex, perceiving whole words and learning to scan-read pictograms. This child learns to read fast, but if he continues to use this method *alone*, his reading may be inaccurate, he will experience difficulty when progressing to an increasingly sophisticated vocabulary. He may also fail to grasp the fundamentals of spelling.

The second child learns to read using primarily the left hemisphere. This enables him to separate out individual characters and syllables, and to word build by putting sounds together. This method takes longer in its initial stages so that reading may remain slow and laborious. The child who uses this method only may become frustrated and start to avoid reading tasks.

The third child starts to read using the right hemisphere, the whole word method, but then increasingly combined it with the left hemisphere once the ground work is established at 6½-7½ years of age – the same time that the nervous system undergoes a major spurt of myelination which strengthens connections between the balance mechanism, cerebellum and the corpus callosum. Fluent, accurate readers use a combination of both methods, scan reading easily material, and slowing down for more complex material. In this way, both fluency, accuracy, memory for spelling and memory for content can be achieved (see Figure 4).

Right hemisphere reading methods rely upon a child's ability to perceive whole words which can be recalled as images which convey meaning. This is a visio-spatial skill which grows out of a child's knowledge of bodily sense of self in space. A child learns through his body, through balance, movement and manoeuvring through space. Children who have poor balance, co-ordination and proprioceptive awareness also frequently have poorly developed visio-spatial skills.

Left hemisphere readers break words down into individual letters, syllables and sounds, and then ‘word build’ from individual characters. In this way phonetic skills can help to bypass deficits in visuo-spatial ability. Auditory skills which form the foundation for phonetic awareness begin in utero and pass through a major stage of training in the first three years of life - practice through games which use music and movement can then help to build on these, not only improving auditory discrimination but also by programming the cerebellum. It is the cerebellum which enables certain functions to become automatic.

A child’s first expressive language is through his body – through movement, posture and gesture – once again the province of the cerebellum and the motor system. He will also spend many months experimenting with sounds, building up a sound bank playing with intonation before he can string words together to produce fluent speech.

Short term memory develops as a result of repetition. Studies have shown that children who have good short term memory have developed an internal system of self-rehearsal for new material, ie they link new material to a familiar image, repeat it verbally or use some other method of repetition to transfer it from raw perception to short term memory, then to working memory, and if appropriate, then to long term memory.

Music for Language

The academic success of children who have received a cathedral chorister’s education is legendary. It is often assumed that this is because children who are selected as choristers are naturally bright. Whilst this is often the case, it ignores the part played by a chorister’s *training* in the enhancement of other skills.

A chorister may spend 20 hours per week singing. While he is singing, he is also listening, vocalising, scanning and memorising reading material, much of which is far in advance of his actual reading level. He may also sing in Latin, French and German – languages which he has not yet met in school.

The process of vocalising sounds to music builds up a storehouse of vocabulary, or lexicon, which may be called upon at any time. The process of putting words to music, and of pointing, naturally breaks words down into separate syllables by giving one or several notes for each unit of sound within a word, placing emphasis on key consonants and slowing down the sounds of speech, so that every phoneme within a word is articulated. In this way, not only is the voice trained, but also the ear, the eye and memory.

Singing is potentially one of the most powerful instruments we have to give children a basic reference library of sounds.

Singing also develops sequencing ability, for melody and musical phrases naturally contain a beginning, middle and end which follow one upon another until a resting place of conclusion is reached. The results of one study published in 1996 from the University of California showed that pre-schoolers who were given either piano or singing lessons daily had become expert puzzle masters 8 months later, a measure of spatial intelligence, scoring 80% higher than their peers who had not received any musical training. Spatial intelligence later translates into maths ability.

Children can learn to put words to music, long before they can actually read the words. Both words and music share features in common – both give order or structure and meaning to sound. Musical meaning is achieved without words and tends to create visual images in the mind of the listener – a right brain function – illustrated by the fact that certain styles of orchestration are actually known as ‘mood painting’.

Language, as we have seen, is predominantly a left-brain function, but the articulate brain is the product of earlier stages of motor, sensory and emotional language. These are all stepping stones on the road to verbal fluency. Forty years ago, no one thought it odd to learn the alphabet to a tune, days of the week and months of the year to a rhyme, and multiplication tables or Latin verbs to a chant. The education revolution in the 60s threw some of these ideas out, arguing that children need to learn concepts first – knowledge of tables, it was said, without understanding the principles of multiplication did not produce mathematicians later on. Nevertheless, it would appear that children are most receptive to just the type of rote learning between the ages of 4

and 7. Many tedious batteries of information can be stored in this way with relative ease, ready to be accessed when concepts are developed later. Music and chant appear to assist the cerebellum in the automisation of certain skills, oral repetition facilitates transfer to memory.

Children who only start to learn their tables at 8 years and above seem to find it enormously difficult to do. Is this because they have passed the 'window' of neurological readiness for this type of learning? If not primed by the age of 7½ year it may be much more difficult to learn thereafter, when the left hemisphere increasingly becomes involved in problem solving.

We know that the optimum time for laying the foundations for speech are the first three years of life; 4-7 years of age covers Piaget's sensory-motor stage of development when children learn through relating physically and emotionally to material. Music has its greatest time of early opportunity between 3 and 10 years of age, and Wisbey says that the optimum time for the development of pitch discrimination is the first 6 years. One system supports, overlaps and integrates with the next. Music and movement it would seem may be the lost keys to early learning.