

## Facilitating children's sensorimotor\* development in DEIS schools:



## Relevance and recommendations

\*The term *sensorimotor* is used here rather than *motor* to incorporate the influence of the senses. This includes the lesser known vestibular and proprioceptive senses, which identify different types of movement (O'Connor, 2016).

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### INTRODUCTION

Children's sensorimotor development in Ireland is particularly compromised in socio-economically marginalised communities. A striking indicator of this is the fact that children from households with the lowest level of income are more than twice as likely to be obese (Walsh & Cullinan, 2015). Socio-economical marginalisation is strongly associated with children spending more time on sedentary activities (Growing Up in Ireland, 2011). Access to safe outdoor play areas is often reduced, especially in socio-economically marginalised urban communities (particularly where there is a higher level of violent crime). In seeking to promote the physical and mental wellbeing of children in

socio-economically marginalised areas, through addressing sensorimotor development, this paper is in line with the principles of *Better Outcomes, Brighter Futures: The National Policy Framework for Children and Young People 2014-2020* and *Get Ireland Active: National Physical Activity Plan*. Both these documents highlight DEIS schools as a route to improving outcomes for children. As well as the benefits of improved sensorimotor development related to physical health, this paper outlines others which are more directly related to successful school participation. A number of key recommendations are highlighted.

## LEARNING

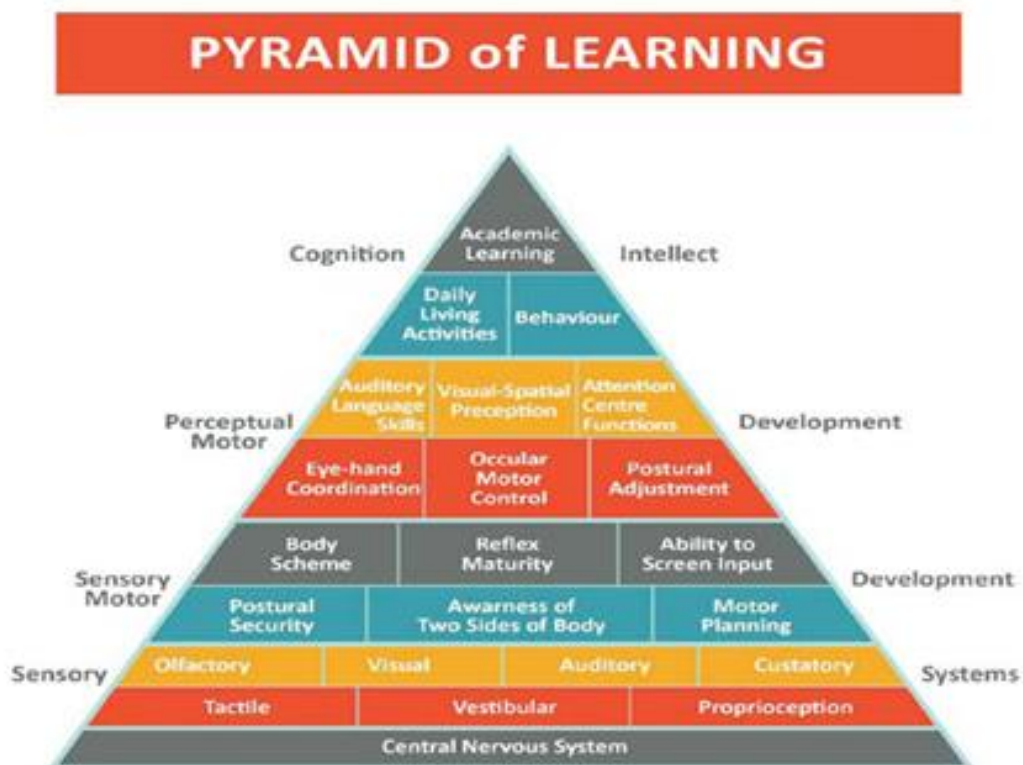


Figure 1. The Pyramid of Learning. Taylor and Trott, 1991, cited in and reprinted from *How does your engine run?* (p. 4) by M.S. Williams & S. Shellenberger 1994, Albuquerque NM USA: Therapy Works. Copyright 1991 by Taylor and Trott. Permission granted for reprinting for educational purposes.

**Brain development** is strongly influenced by the type or lack of childhood physical activity (Schaff & Millar, 2005). As represented in Figure 1, all learning is dependent on the prior development of the necessary sensorimotor skills (Williams & Shellenberger, 1994). Up to relatively recently, children in Ireland automatically played in ways that promote the sensorimotor development on which cognitive skills are based. Problems such as homelessness and cultural changes in the way children play means that such movement opportunities are no longer automatically part of many socio-economically excluded children's experience.

Physical activity can improve children's ability to **pay attention** in class (Ratey & Hagerman, 2008). Self-regulation skills developed through physical activity allow children attend to academic learning (Williams & Shellenberger, 1994) and enable socio-economically excluded children develop

resilience leading to good educational outcomes (Better Outcomes, Brighter Futures, 2014). Increased physical fitness has been shown to improve **academic performance** (Sattelmair & Ratey, 2009).

The precise movements required for **handwriting** depend on the prior development of the muscles of the trunk, shoulder and upper arm (Myers, 1995). These are developed through physical activity, including floor play. Starting to teach handwriting before these foundation skills have been sufficiently developed can cause long-term handwriting difficulties.

Children with poor sensory motor development may experience **difficulty with a range of academic tasks** (Ayres & Robbins, 2005, Myers, 1995). These difficulties include:

- Poor self-help skills including dressing and feeding
- Poor pencil grip
- Drawing and copying shapes is difficult, poor handwriting
- Immature art work
- Finds it difficult to organise materials and equipment
- Poor gross motor skills: kicking/catching a ball, running, hopping, jumping, avoidance of PE class
- Poor attention, difficulty staying seated for long periods of time
- Anxiety, fear of environment and unpredictability, fear of failure
- Difficulty copying material from blackboard
- Difficulty making and sustaining friendships- low self-esteem

A more recent study in the UK carried out by Carroll, Solity & Shapiro (2015) examined the extent to which difficulties in auditory, visual and motor skills can be used to predict dyslexia in school age children. The results showed that deficits in visual and auditory processing, key perceptual motor skills, were present in a large minority of poor readers.

In addition, further recent research has given positive evidence for including sensory and motor skills in the prediction of dyslexia. Le Jan et al (2011) found that a combination of auditory, visuo-attentional, phonological and morphological measures provided a highly effective screening measure with 94% of children correctly classified (Carroll et al, 2015)

## **SOCIAL, EMOTIONAL AND BEHAVIOURAL NEEDS**

Lower income is also associated with an increased risk of **developmental coordination disorder** (Lingam, Hunt, Golding, Jongmans & Emond, 2009).

Poor sensorimotor functioning negatively affects children's **social and emotional development**, which can lead to unintentional disruption at school for the individual and classmates (Ayres, 1989). Physical activity can positively contribute to the development of skills in this area (Sandford, Duncombe, Mason & Butler, 2015).

Figures from the Department of Children and Youth Affairs (2012, 2014) highlight serious **mental health** issues in relation to children in Ireland. Poverty related risks, substance abuse and parental stress leave children who are socio-economically excluded at a higher risk of developing mental health problems (Costello & Lawler, 2014; Graham & Easterbrooks, 2000). Physical activity has a positive effect on mental health, acting against depression and anxiety (Ratey & Hagerman, 2008).

As well as benefiting children in the short-term, establishing the habits necessary to attain and maintain physical fitness contributes to the prevention of mental health difficulties emerging in adolescence or later.

There is a higher rate of disruptive **behaviour** in DEIS schools, particularly in Urban Band 1 (Quail & Smyth, 2012). Increased physical fitness is associated with improved behaviour, evidenced by decreased levels of violence in schools (Ratey & Hagerman, 2008). Poor sensorimotor functioning can lead to children being overwhelmed by sensory overload in class (Ayres, 1989). This can lead to behaviours which (especially if they are not understood) can be very difficult to manage in a school environment. Strategies involving the use of appropriate movements during class can improve classroom behaviour (Mac Cobb, Fitzgerald, Lanigan-O’Keefe, Irwin & Mellerick, 2014).

## RECOMMENDATIONS

Recommendation	Actions to be taken
Occupational therapists collaborating with teachers in schools	Time needs to be allocated for occupational therapists (OTs) to collaborate with teachers in schools. The OTs require to have a role in working with teachers on a whole-school, preventative level, as well as in supporting teachers in providing for the school-based needs of pupils with specific sensorimotor difficulties. (Children who require clinic-based occupational therapy, perhaps due to the need for access to specialised equipment, need to also receive that service.) A collaborative, school-based approach has been shown to be successful (McWilliams & Scott, 2003; Missuna et al., 2012).
Expansion of SPHE to include sensorimotor strategies for self-regulation	Instruction on the use of sensorimotor strategies for self-regulation needs to be included in the Social, Personal and Health Education (SPHE) curriculum. This requires an increase in the time allocated to SPHE. This subject is a priority in DEIS schools, where there is often a high prevalence of emotional and behavioural difficulties (Quail & Smyth, 2012). The allocation of extra time (necessarily coming from another subject) is considered to be warranted, given that it is impossible for a child to learn while dysregulated. This type of instruction has been shown to have a positive impact (Mac Cobb et al., 2014).
Development of schoolyards into sensorimotor-rich environments	DEIS funding needs to target the development of green playgrounds (based on the natural environment rather than manufactured equipment) in DEIS schoolyards, to allow play in environments rich in sensorimotor opportunities. Strong evidence reveals the superiority of this type of playground to traditional playgrounds for the child’s holistic development (Fjørtoft, 2004; Kerrins, Fahey & Greene, 2011; Barron, 2013; Frost, 2012; Gray, 2011; Coolahan, Mendez, Fantuzzo, and

	<p>McDermott, 2000; Wood, 1988; Brown &amp; Vaughan, 2009; Howard and Alderson, 2011; Sandford, Duncombe, Mason &amp; Butler, 2015; Lindholm, 1995; Taylor, Kuo &amp; Sullivan, 2001; Carr &amp; Luken, 2014). This type of playground meets universal children's needs and would be a powerful resource for children with difficulties such as ADHD (Taylor, Kuo &amp; Sullivan, 2001; Kaplan, 1995). Structural indicators would guide the development of these playgrounds to ensure quality of play provision. As schools are generally within walking distance for many children in areas of socioeconomic exclusion, these playgrounds need to be accessible to the community outside of school hours with correct security systems in place.</p>
Monitoring progress in addressing sensorimotor needs	<p>Physical Education and the general level of physical activity needs to be included as part of the Whole School Evaluation. Handwriting progress needs to be monitored and explicitly linked to Physical Education goals and attainments.</p>
Preschool guidelines on sensorimotor needs	<p>Early years are fundamental in developing the sensorimotor skills needed to succeed in junior primary and all the way through school. Governmental guidelines need to be provided to preschools, to address the sensorimotor needs and progress of children at this critical period of development. These guidelines need to be available to parents, to allow them to make more informed choices regarding preschools.</p>

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