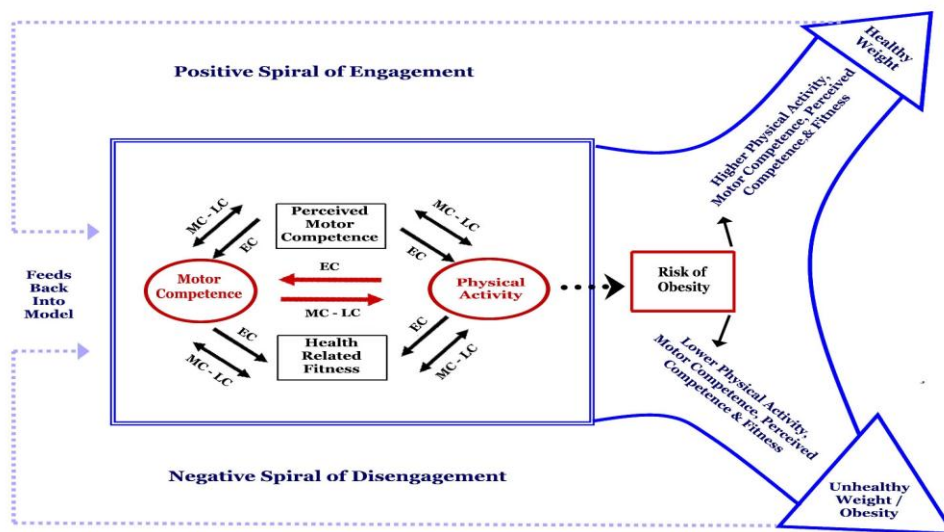




Key Messages

- Developing competent and confident movers in early childhood is critical to a positive developmental trajectory and lifelong physical activity.
- The interaction between physical activity, motor competence, fitness and perceived competence in relation to lifelong physical activity and health is highly complex.
- Children in Wales are entering the education system without the physical competence required to support appropriate levels of physical activity and are likely to be delayed in their physical development.
- High quality developmentally appropriate movement experiences are essential for developing positive attitudes for lifelong physical activity and these require highly trained teachers.
- A structured programme of professional development and training in pre-school settings and the Foundation Phase in Wales has a significant impact on pupils' physical competence
- Incorporating Successful Kinesthetic Instruction for Pre-schoolers into the Foundation Phase through a whole school and community approach is a cost effective sustainable approach for developing physical competence and key factors relating to physical activity levels in children and adolescents.

1. Over 30 years of global research in motor development shows us that developing competent and confident movers in early childhood is critical to a positive developmental trajectory and lifelong physical activity^{1,2,3,4,5,6,7}. In very early childhood and infancy motor competence is affected by biological maturation, however as children become more mobile the quality of the environment and movement experiences they are exposed to is crucial to the development of core stability, co-ordination and motor competence^{7,8,9}. During early childhood children must develop key foundational skills called fundamental motor skills (FMS) and knowledge of movement concepts^{8,9}. Fundamental motor skills consist of object control skills like throwing and catching and locomotor skills such as running and jumping⁷. These movement concepts and FMS are equivalent to the movement alphabet and form the foundation of sports, games and lifetime activities^{5,6,10,11}.
2. Multiple models of motor development highlight the importance of FMS for children to be physically active across the lifespan^{12,3}. Drawing on the fields of motor development, psychology and health, Stodden et al.'s³ model shows the complex relationship between physical activity, competence and perceived competence and fitness in relation to lifelong physical activity, obesity and health (Fig 1)
Fig 1. Motor developmental model showing the resulting health trajectories



Stodden, D., Goodway, J., Langendorfer, S., Robertson, M., Rudisill, M., Garcia, C. and Garcia, L. (2008)

This model shows us that very young children need movement to develop the prerequisites for motor competence, such as core stability, balance and co-ordination. Developing motor competence enables them to be more physically active and gain fitness. The more they are active the more competent they become and so on resulting in them entering a positive spiral of engagement in physical activity and healthy weight.

This is further complicated by a child's perception of their ability, their perceived physical competence, which drives motivation for physical activity (if I think I am good I will take part, if I think I am rubbish I won't). In early childhood before the age of seven, children are not able to make an accurate judgement of their ability and think if they try hard they are great. Hence this gives us a window of opportunity to develop children's competence to a level that they will perceive as good^{3,5,7}. It is crucial to progress children along a motor developmental pathway as pupils that have a slow rate of progress are several times more prone to become overweight or obese at the end of primary school¹². A seven year longitudinal study to test Stodden et al.'s model found that physical activity, motor competence and fitness collectively have a longitudinal impact on body fatness. Motor competence and fitness have the greater influence and as such the study highlights that physical activity interventions focusing on the development of motor competence and fitness in early childhood can have a sustainable impact on maintaining a healthy weight status, or even reducing fatness across childhood and adolescence¹³.

Overall motor competence is a key factor influencing children's physical activity levels across childhood. Thus it is not enough to just promote physical activity in children we must ensure that children become motor competent during the early childhood years if they are to access a healthy active lifestyle.

3. Children in areas of socio economic deprivation in Wales are entering the education system without the physical competence required to support appropriate levels of physical activity and are likely to be delayed in their physical development^{15,16}. This mirrors the international evidence that children growing up in poverty are

developmentally delayed in their FMS placing them at greater risk of negative health outcomes, physical inactivity and poorer academic achievement^{7,17}. Children who are delayed in FMS are less likely to be physically active both now and in the future and as a result have few opportunities to change their motor competence status¹⁷. Over time, developmental delay results in low perceived motor competence, which impacts a child's desire and motivation to be active^{5,6,18}. These factors interact together to pull a child into a negative spiral of dis-engagement resulting in a child who will be inactive across time and more likely to be an unhealthy weight. Such children will have greater health risks and greater rates of hypokinetic disease than children who are motor competent and physically active. Societal changes seeing increased use of equipment such as baby seats, bouncers and buggies, coffee shop culture replacing visits to parks, a huge increase in children's screen time, a lack of green space and limited free play has created a 'perfect storm' for inactivity and motor developmental delay so that children from all socio-economic backgrounds now lack necessary movement opportunities^{19,20}.

We need to look to schools as a key element in the development of motor competence and as a hub for building community capacity for supporting and sustaining physical development. However, despite the importance of the role of the teacher in developing motor competence, the majority of early childhood teachers and primary school staff are inadequately prepared with the knowledge and skills to enhance their pupils' motor development^{15,16}.

4. Fundamental Motor Skills (FMS) do not naturally develop as part of childhood⁷. It is a common misconception that proficiency in FMS naturally emerges as a part of the normal activities of childhood⁷. Consistent evidence suggests that like many other academic skills FMS need developmentally appropriate instruction and opportunities to practice skills in enriched learning environments in order to become motor competent. Although high quality play is an important part of the early years experience, this alone has not been found to change FMS development^{17,18,21}. Although research in the Foundation Phase has shown that a high quality play based curriculum can develop locomotor skills, this is still not sufficient for the development of object control skills which are closely aligned to many sports and activities^{14,15,16}. Of particular concern is that the development of object control skills in early childhood is significantly related to later adolescent physical activity⁴.

The lack of specialist knowledge in physical education in Primary Schools and the rise in cheaper curriculum delivery by outside agencies, NGB coaches and private companies means that adults who are not qualified teachers and have little knowledge of child development are coaching skills rather than teaching children²². Foundation Phase and primary school teachers with an in depth understanding of early childhood pedagogy need professional development to apply their pedagogical skills to the physical development aspect of the curriculum. The skill of the teacher is crucial as children progress through school if they are to continue to engage in physical activity^{23,24}. A systematic review of international studies of approaches that promote physical activity in children and adolescents found that the most important factor was an appropriate teaching approach from an expert physical education teacher and that professional development of teachers to achieve this should be founded on an understanding of teacher learning in order to have an impact on student learning²⁴.

5. In light of this and drawing on research which identified a gap in teachers' knowledge, a programme of training and support was implemented in target schools in Wales. An evidence based programme of professional development, Successful Kinaesthetic Instruction for Pre- schoolers (SKIP) has been used to train teachers, teaching assistants and parents about the importance of early movement for child development¹⁰. Teachers learn how children move through developmental stages in their motor competence and how they can alter tasks and the environment to progress pupils to achieve mastery of skills needed for life long physical activity. Target schools have primarily been in areas of socioeconomic deprivation, where engagement with parents has historically been a challenge. The project also involved running parental engagement sessions and parents taking equipment home to play with their children. Parents have been highly engaged and in some cases taken over the running of sessions. SKIP has been adapted to be incorporated into the Foundation Phase play based approach in Wales. Research into the effectiveness of this programme of professional development and support in West Wales found that pupils significantly improved their FMS after as little as 8 weeks whilst there was no significant change in the control group²⁵.
6. With schools and early childhood settings acting as hubs in the community, parents, grandparents and whole communities have worked to support the physical development of pupils in a highly cost effective and sustainable way impacting over 5000 pupils' physical competence in the region²⁵. Importantly whole schools and communities have developed an ethos of valuing physical activity and continued to support this in after school and holiday opportunities. Key to this success is the understanding of the importance of movement in early childhood to lay the foundations for lifelong physical activity and crucial to this is training staff to understand physical development pedagogy.

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