



# Motor Competence in Children & Young People With Visual Impairment

Interim Report



# Executive Summary

The exploration of motor competence in children and young people with visual impairment was an independent study that utilised multiple methods, including quantitative and qualitative data in the form of motor competence testing, questionnaires, and interviews. Participants included children and young people with visual impairments, their parents/carers, and a range of key stakeholders. 61 children and young people and 28 parents participated in an online survey; Due to the Covid-19 pandemic, motor competence testing has been suspended until it is safe to resume face-to-face research contact; five families participated in a family-based interview; and six industry professionals from key stakeholder organisations participated in one-to-one interviews. Data were gathered from a geographically diverse sample across England.

Data collected offer a unique insight into the scale and complexity of understanding how to best develop motor competence amongst CYP-VI aged 4-8 years old in order to support their engagement in sport and physical activity across the lifespan. As an interim report, we offer findings with a caveat that our analyses might alter as additional data are collected and enable us to undertake further analyses and report additional, potentially more meaningful, findings and results in due course.

## *Headline findings*

- Physical activity energy expenditure (*i.e.* time spent engaging in physical activity) was found to be a significant predictor of wellbeing and social desirability subscales of psycho-social wellbeing.
- CYP-VI reported spending 91% of their free-time involved in sedentary activity.
- Quantitative data indicated that physical education lessons are where most (n=48) CYP-VI reported being most physically active.

- Qualitative data suggest that education settings offer the best environment for engaging and supporting CYP-VI to become more physically active through meaningful participation in physical education lessons.
- Qualitative data suggested schools as the most critical sites for motor competence development.
  - Key Stage 1 appeared to be less of a concern for engagement in PE lessons amongst families and industry professionals.
  - Families and industry professionals indicated that Key Stages 2, 3 and 4 were where engagement in PE lessons was more concerning for CYP-VI.
- Indices of Multiple Deprivation were not found to be a significant predictor of psychosocial wellbeing or physical activity energy expenditure amongst 4-8-year-old CYP-VI.
- Qualitative data showed that parents exhibit positive attitudes toward CYP-VI participating in sport and physical activity.

## *Recommendations*

- British Blind Sport should support and advocate for the development of an inclusive PE curriculum for Key Stages 1 and 2 that ensures all children are able to access PE and develop the necessary motor competence skills.
- British Blind Sport should position itself as an industry leader in the development of motor development in CYP-VI, building on the First Steps programme and this body of research.
- British Blind Sport should purposefully engage with a national sports body to develop CYP-VI specific training and development opportunities for sports coaches and PE teachers.
- Working with sports education partners, e.g. Youth Sport Trust, British Blind Sport should lead the way in understanding the issues and opportunities associated with PE from Key Stage 2 onwards.

- British Blind Sport should be seen as the industry leader for educational support and resources to inform parents and practitioners around the importance of sport and physical activity participation amongst CYP-VI and across the lifespan.
- Future research in this area should seek to adopt longitudinal designs using repeat measures with the same samples. There are not currently enough high-quality studies of this nature to support evidence-based decision making or fully understand the complex relationship between engagement in sport and physical activity, motor competence development, and psycho-social wellbeing.
- That any future interventions are not only evidence-based but have other key-stakeholder involvement (i.e., parents, family, and CYP-VI) that enables a collaborative, co-created process that empowers CYP-VI and the families to advocate for accessible sport and physical activity across multiple contexts.
- Any possible interventions concerned with motor development in CYP-VI should happen as early as possible (i.e., nursery, reception).
- Additional research and evidence is required to understand what families and industry professionals consider to be 'good' or 'best' practice in physical education for CYP-VI and how this can be developed into intervention programmes or resources.
- Awareness of opportunities - up-to-date details of local, accessible and inclusive sports clubs with details about age-specific provision (both mainstream and VI-specific).
- Research underpinned by a social relational understanding of disability which acknowledges the potential for restrictions of activity to result from a complex combination of impairment effects and socially imposed barriers.
- That government should be petitioned to maintain investment in sport and physical activity through school transitions (i.e., primary school key stages; primary to secondary transition; secondary to further; further to higher/work; independent living) to fully support CYP-VI engagement in sport & physical activity.

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# Introduction

There are over 25,000 children age 0-16 years old with sight loss in the United Kingdom (RNIB, 2018). This includes children who are severely sight impaired, and sight impaired. However, visual impairment does not affect the ability of children to be physically active (Lieberman, 2011; Lieberman & Runyan, 2016), yet recent studies suggest that children and young people with visual impairments (CYP-VI) do not meet recommended daily physical activity thresholds and are less likely to be as physically active as their sighted peers (Augestad & Jiang, 2015; Hagele & Porretta, 2015). Due to low levels of physical activity participation, CYP-VI are also exhibit poorer health-related fitness and are at increased risk of developing mental ill-health (Brunes Flanders & Augestad, 2015; Lieberman et al., 2010). Although CYP-VI often report experiencing physical activity as being 'fun' and 'enjoyable' coupled with building confidence in their abilities to be active (Ward et al., 2011), a number of barriers inhibit their physical activity engagement including a lack of physical activity opportunities, lack of encouragement from parents and trained individuals (i.e., PE teachers, coaches) (Stuart, Lieberman & Hand, 2006). There are, however, additional factors that must be taken into consideration including the roles that motor competence and perceived motor competence play in CYP-VI being physically active (Stodden et al., 2008).

Both motor competence and perceived motor competence are suggested to contribute to an individual's ability to perform tasks associated with physical activity (Haegle, 2019). Motor competence can be thought of as the proficiency of fundamental motor skills – the building blocks to more complex movements that are classified as being either 'object control' (e.g., throwing and kicking) or 'locomotor' (e.g., running and jumping). Studies suggest that motor competence has a symbiotic and dynamic relationship with physical activity engagement and is important in promoting physical activity across the lifespan, particularly amongst individuals with visual impairments (Houwen et al., 2015; Wagner, Haibach & Lieberman, 2013). Perceived motor competence is an individual's perception of their physical strength, movement capability, capacity for sport, and fitness level (Fox & Corbin 1989). Young children have been shown to demonstrate limited capacity to accurately

perceive their motor competence and tend to overestimate their abilities. Thus, they remain willing to continue engaging in activities because their perception is that they are being successful (Brian, Haegele & Bostick, 2016). However, as children grow older their perceived motor competence becomes more closely related to the likelihood of them being physically active. Thus, poor perception of motor competence, or a belief that they are less motor competent than their peers, might lead to withdrawal from physical activities (Stodden et al., 2008). Recent studies have suggested that visually impaired youths demonstrate poor to very poor levels of motor competence (Brian, Haegele & Bostick, 2016; Brian, Haegele & Bostick, 2018), which might also impact their desire to be physically active.

## *Aims & Objectives*

- To understand the possible gaps in physical development and motor competence in children with visual impairment.
- To understand the sport, physical activity, and active play choices and habits of children with visual impairment.
- To consider how participation in sport and physical activity affects the mental and social wellbeing of CYP-VI.

## **Methods**

This project adopted a multiple method approach. This meant that the project team utilised a range of quantitative and qualitative data collection tools to try to best understand the complex and dynamic relationship between motor competence, physical activity engagement, and general wellbeing. All the sample targets outlined in the Tender were surpassed. The objectives of the project were translated into methods as outlined in the table below.

Table 1: Translating project objectives into research methods

<b>Objective</b>	<b>Method</b>
To identify and demonstrate the gaps in physical development and motor competence in children with visual impairment.	Desk-based research Motor competence testing CYP-VI questionnaire Parent/carer questionnaire
To understand the sport, physical activity, and active play choices and habits of children with visual impairment.	Desk-based research CYP-VI Questionnaire Family-based interviews Industry professional interviews
To consider how participation in sport and physical activity affects the mental and social wellbeing of CYP-VI.	Desk-based research CYP-VI questionnaire Family-based interviews Industry professional interviews

## Participants

The breadth of the objectives and scope of this project required the engagement of a range of participant groups, including CYP-VI; parents/carers and immediate family of CYP-VI; industry professionals with responsibility for CYP-VI services in their organisation. The desired sample sizes and actual recruitment numbers for the project are presented below in Table 2.

Table 2: Desired and actual number of participants recruited

<b>Data collection method</b>	<b>Sample population</b>	<b>Desired sample</b>	<b>Actual sample</b>
Motor competence testing	CYPP-VI	30	TBC



CYP-VI Questionnaire	CYP-VI	45	61
Parent/Carer Questionnaire	Parents/carers	15	28
Family-based interviews	CYP-VI	5	5
	Parents/carers Immediate family		
Industry professional interviews	Industry professionals	5	6

## *Data collection and analysis*

Data collection incorporated four methods: 1) rapid evidence synthesis; 2) motor competence testing; 3) questionnaires; 4) interviews with three stakeholder groups. The methods were chosen to best answer the research objectives outlined above and to do so in a way that caused minimal inconvenience to study participants. Several work strands were identified that became the main foci of the research activity:

- Rapid evidence synthesis;
- CYP-VI motor competence testing;
  - Partially sighted group;
  - Severely sight impaired group;
- Family-based interviews;
- Industry professional interviews;
- CYP-VI questionnaire;
- Parent/carers questionnaire.

# Results and findings

## *Rapid review empirical findings*

One systematic review was identified that addressed physical activity interventions for children and youth with VI (Furtado et al., 2015). The authors reported generally low-quality

studies in this area, including the absence of quite basic content, such as information about participant characteristics and details of the interventions, themselves). An additional challenge is the paucity of valid and reliable outcome measures for CYP-VI. With these caveats in mind, the review found positive effects of both structured exercise training and leisure-time physical activity interventions in terms of enhanced levels of physical activity. For example, programmes found to be effective in promoting improved motor competence and physical fitness included basic movements like balance exercises (Jazi et al., 2012), and body coordination, visual motor control, finger dexterity (Aki et al., 2007), to more complex activities such as rope jumping (Chen & Lin, 2011), gymnastics (Hashemi, Khameneh & Salehian, 2015), traditional dance and Pilates (Mavrovouniotis et al., 2013). None of these studies led to the achievement of the 60-minute recommended target for daily physical activity, but they could, of course, contribute to the accumulation of that figure when combined with other forms of physical activity.

The review found several studies focusing on instructional strategies. Two studies reported that peer-tutoring programmes can increase activity levels during physical education classes (Wiskochil et al., 2007), although they involved very small samples (3 and 4 students, respectively). Other research examined the use of 'exergames' to promote the physical activity of children with VI (Boffoli et al., 2011; Gasperetti et al., 2018). These studies found that video game-based technology has demonstrable benefits for CYP-VI, and are viewed by these children as enjoyable contexts for being physically active.

The theoretical perspectives from Henderson, Sugden, & Barnett's (2007) and Black (2011) are consistent with empirical findings on the promotion of motor competence. For example, research strongly shows that with sighted populations, children find outdoor environments stimulating and motivating (Niemistö et al., 2019), and value large spaces as settings to play and run (Harten et al., 2008). Such free movement and play are important experiences in the development of locomotor skills, such as walking, running, climbing, galloping and jumping (Donnelly, Mueller, & Gallahue, 2016), and object control skills, such as holding, projecting, and receiving balls (Iivonen & Säakslahti, 2014). The improvement of locomotor motor skills, in particular, seem to be important for young children's overall

development, as it provides increasing and more varied opportunities for social interactions and cognitively challenging experiences (Campos et al., 2000). Locomotor skills continue to play a pivotal role in development by facilitating new contexts for maintaining and updating existing skills. Such development is possible when children have the necessary social support and freedom to move in an environment with interesting opportunities. Object control skills open up new opportunities for visual, manual, and oral exploration, which are foundational of coordination. The first form of FMS, stability skills, have tended to be over-looked by researchers, but there is little doubt that they play a key role in the development of motor competence by helping the learner to sense a shift in the relationship of the body parts that alter one's balance, as well as the ability to adjust rapidly and accurately to these changes with the appropriate compensating movements (Rudd et al., 2015). All of these skills support children's motor competence, in a variety of settings, and effective interventions are likely to be those that facilitate their development.

So, it is cause for concern that empirical research has generally reported delayed development in the motor skills of children with VI (Brian, 2020). There is some evidence that appropriately designed interventions can positively affect the locomotor skills of children with VI (Brian et al., 2020). Another study examined the influence of a 7-day sports camp on the perceived motor competence of children and adolescents with VI (Brian et al., 2018), with participants making significant improvements in perceived motor competence.

### CYP-VI questionnaire results

A total of 61 CYP-VI completed their respective questionnaire. There were slightly more female (n=33) participants than male (n=28). CYP-VI ages ranged from five to seven years old (M=6.13,  $\pm$ 0.9 years). The majority (95.1%) of participants had a certificate of visual impairment and a small percentage (4.9%) were unsure. There were more sight impaired (55.7%) than severely sight impaired (44.3%) participants; with almost three-quarters of participants (73.3%) having a congenital condition and other participants (27.9%) reporting that their condition was acquired. Most participants (52.5%) reported that they had no additional health-related impairments or needs, though 31.1% reported having additional

health-related impairments or needs, and a small number (16.4%) reported being unsure whether they had any additional health-related impairments or needs. Of those participants that reported additional health-related impairments or needs, Autism spectrum disorder (ASD) was most reported (36.8%), followed by attention deficit hyperactivity disorder (ADHD) (26.3%), then diabetes mellitus (15.8%) and Asperger's syndrome (15.8%) whilst a single participant indicated an additional health-related impairment not listed (5.8%), that was reported to be asthma.

Participants were asked about their sport and physical activity engagement using questions from the C-PAQ (Corder et al., 2009). CYP-VI reported participating in 23 of the 49 activities (46.9%): are categorised as: 1) sports activities; 2) leisure activities; 3) Activities at school; and 4) other activities (including sedentary). Of those 23 activities, eight were sport activities, five were leisure activities, one was an activity at school, and nine were 'other' (often sedentary) activities.

- There were no gender differences in PAEE ( $F(1, 61) = 0.49, P > 0.05, \eta^2 = 0.01$ ).
- There were no differences in PAEE between year groups ( $F(1, 61) = 1.25, P > 0.05, \eta^2 = 0.06$ ).
- There were no differences in PAEE between impairment groups ( $F(1, 61) = 1.25, P > 0.05, \eta^2 = 0.06$ ).
- There were no gender differences in either the wellbeing ( $F(1, 61) = 0.41, P > 0.05, \eta^2 = 0.01$ ) or social desirability ( $F(1, 61) = 0.01, P > 0.05, \eta^2 = 0.00$ ) components of wellbeing.
- There were no differences between impairment groups for either the wellbeing ( $F(1, 61) = 0.03, P > 0.05, \eta^2 = 0.00$ ) or social desirability ( $F(1, 61) = 1.60, P > 0.05, \eta^2 = 0.03$ ) components of wellbeing.
- There were no differences between year groups for either the wellbeing ( $F(1, 61) = 0.91, P > 0.05, \eta^2 = 0.05$ ) or social desirability ( $F(1, 61) = 0.46, P > 0.05, \eta^2 = 0.02$ ) components of wellbeing.
- PAEE was found to be a significant predictor of both the wellbeing ( $R^2 = 0.08, p < 0.05$ ) and social desirability ( $R^2 = 0.07, p < 0.05$ ) sub-components of wellbeing.

- IMD was not found to be a significant predictor of either the wellbeing ( $R^2 = 0.00$ ,  $p > 0.05$ ) or social desirability ( $R^2 = 0.01$ ,  $p > 0.05$ ) sub-components of wellbeing.
- IMD was not found to be a significant predictor of PAEE ( $R^2 = 0.00$ ,  $p > 0.05$ ).
- PAEE was not shown to be a significant predictor ( $p > 0.05$ ) of perceived motor competence.

### Parent/carer questionnaire results

A total of 28 parents/carers completed questionnaires for this study. There was a larger number of responses from females ( $n=20$ ) than males ( $n=8$ ). Parents ages ranged from 30-49 years old (avg. 38.78 years old;  $\pm 5.71$  years). Most parents ( $n=23$ ) reported not having a certificate of visual impairment, though several did ( $n=5$ ); those with a certificate of visual impairment reported being sight impaired ( $n=4$ ) or severely sight impaired ( $n=1$ ). Parents were asked questions to determine their level of physical activity over a seven-day period, and they were also asked to report their engagement in activities included in the C-PAQ.

Parents reported participating in 21 of 49 activities across the C-PAQ. Of those 21 activities, seven were sport activities, five were leisure activities, and nine were 'other (often sedentary) activities. A full breakdown of these activities, the number of parent/carer participants.

Data demonstrated that the parents/carers of CYP-VI participated in one more sport and physical activities than sedentary (11 physical activities, 10 sedentary activities). The number of times parents/carers participated in sedentary activities ( $n=134$ ) was higher than the number of times they participated in sport and physical activities ( $n=59$ ). Accordingly, the total number of minutes spent in sedentary activities (46,170 minutes) was over three times more than the total number of minutes spent engaged in sport and physical activities (10,925 minutes). This means that parents/carers of CYP-VI spend 80.87% of their week engaged in sedentary activities and only 19.13% engaged in sport and physical activities.

- There were no gender differences in PAEE ( $F(1, 28) = 1.37$ ,  $P > 0.05$ ,  $\eta^2 = 0.05$ ).

- There was a significant main effect for PAEE ( $F(1, 28) = 5.17, P < 0.05, \eta^2 = 0.29$ ) in impairment groups. Post-hoc pairwise comparisons showed that PAEE was significantly larger in the not sight impaired group in relation to the partially sighted group.
- IMD was not found to be a significant predictor of PAEE ( $R^2 = 0.02, p > 0.05$ ).

### Family-based interviews

Data from the family interviews has indicated that all parents in these families exhibit positive attitudes towards, and appreciate the value of, sport and PA in their children's lives. It should be noted that, as recruitment for interviews was dependent upon voluntary respondent participation, the sample is vulnerable to bias. The families' interest in sport and PA may have been a factor in their willingness to participate in the research and this needs to be acknowledged. It may also explain why these families do not necessarily exhibit the more negative perceptions of parents held by industry professionals that are discussed in the next section. However, these interviews offer a rich qualitative insight into these families' attitudes towards and experiences of sport and physical activity. Furthermore, the in-depth discussions have highlighted the decision-making that is involved in trying to involve their CYP-VI in sport and PA experiences that are inclusive and empowering, in pursuit of lifelong participation. In their review of family-based sport and PA for CYP-VI, Meera et al (2020: 72) recognise that "even though research has been conducted and we have learned that parents of children with VI deem PA important for their children, we still need to learn and explore motives and barriers to PA that these families are facing". These family-based interviews are a valuable first attempt to address a significant gap in the current literature. Key issues raised within these interviews included:

- The nature and impact of visual impairment
- Informal sport and physical activity in the family setting
- Formal/structured sport and physical activity provision
- Experiences of mainstream sport and physical activity provision
- Experiences of sport and physical activity in different settings

- Experiences of school-based sport and physical education
- Attitudes towards sport and physical activity (children and parents)

### Industry professional interviews

Data from the industry professionals provided unique insight into the facilitation of motor development and engagement in sport and physical activity amongst CYP-VI. Due to the breadth of their roles, participants were able to discuss a broad range of topics and issues, though these did not always have meaning for the population that this project is concerned with (i.e., CYP-VI aged 4-8 years old). Key issues raised within these interviews included:

- The influence of parents/carers
- The role and importance of schools and physical education
- Prioritising sport and physical activity
- Provision of opportunities

## Conclusion

This project offers a unique insight into sport and physical activity engagement amongst CYP-VI. Firstly, this is one of a small number of research projects that have sought to explore the impact of motor competence amongst CYP-VI using multiple methods, focussing on the youngest individuals within that category (i.e. 4-8 years old). Much of the previous research has been conducted amongst children and youth aged 9-18 years old (Brian, 2021). As such, this project as a whole occupies a unique position to help inform future applied practice, research, and evaluation work.

The report is not able to offer any further concluding thoughts as the data collection process continues and analyses is incomplete. However, BBS are confident in the current recommendations for future practice and research activity, though it is expected that findings will be added to as additional data and results transpire.

## *Recommendations & future research*

- British Blind Sport should lead the development of an inclusive PE curriculum for Key Stages 1 and 2 to ensure all children have access PE and develop the necessary motor competence skills.
- British Blind Sport should position itself as an industry leader in the development of motor development in CYP-VI, building on the First Steps programme and this body of research.
- British Blind Sport should purposefully engage a national sports body to develop CYP-VI specific training and development opportunities for sports coaches and PE teachers.
- British Blind Sport should lead the way in understanding the issues and opportunities associated with PE from Key Stage 2 onwards.
- British Blind Sport should be seen as the industry leader for educational support and resources to inform parents and practitioners around the importance of sport and physical activity participation amongst CYP-VI and across the lifespan.
- Future research in this area should seek to adopt longitudinal designs using repeat measures with the same samples. There are not currently enough high-quality studies of this nature to support evidence-based decision making or fully understand the complex relationship between engagement in sport and physical activity, motor competence development, and psycho-social wellbeing.
- That any future interventions are not only evidence-based but have other key-stakeholder involvement (i.e., parents, family, and CYP-VI) that enables a collaborative, co-created process that empowers CYP-VI and the families to advocate for accessible sport and physical activity across multiple contexts.
- Additional research and evidence is required to understand what families and industry professionals consider to be 'good' or 'best' practice in physical education for CYP-VI and how this can be developed into intervention programmes or resources.



- Awareness of opportunities - up-to-date details of local, accessible and inclusive sports clubs with details about age-specific provision (both mainstream and VI-specific).
- Research underpinned by a social relational understanding of disability which acknowledges the potential for restrictions of activity to result from a complex combination of impairment effects and socially imposed barriers.
- That government should be petitioned to maintain investment in sport and physical activity through school transitions (i.e., primary school key stages; primary to secondary transition; secondary to further; further to higher/work; independent living) to fully support CYP-VI engagement in sport & physical activity.

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