

"Where's the front door?"
Integrating Quantitative Trends and Qualitative Voices relating to Physical Activity within the Irish Blind and Vision Impaired Population

A thesis submitted for the award of Doctor of Philosophy (PhD)

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Author Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work. I hereby certify that no Generative Artificial Intelligence (Gen AI) tools have been used in the creation of the thesis.

Signed: 

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Date: 23/08/2026

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List of Abbreviations

BMI = Body Mass Index

BVI = Blind and Vision Impaired

CI = Confidence Interval

CSPPA = Children Sports Participation and Physical Activity report

DCU = Dublin City University

FMS = Fundamental Movement Skills

HRF = Health-Related Fitness

ISM = Irish Sports Monitor report

MVPA = Moderate to Vigorous Physical Activity

N = Sample Size

NCBI = National Council of the Blind of Ireland

NCD = Non-communicable Disease

NHANES = National Health and Nutrition Examination Study

P = p-value

PA = Physical Activity

PE = Physical Education

PL = Physical Literacy

RTA = Reflexive Thematic Analysis

SD = Standard Deviation

SEM = Social Ecological Model

SES = Socioeconomic Status

VI = Vision Impairment

VSI = Vision Sports Ireland (formerly NCBI)

WHO = World Health Organization

Chapter 1: Introduction

1.1 Abstract: "Where's the front door?" Integrating Quantitative Trends and Qualitative Voices relating to Physical Activity within the Irish Blind and Vision Impaired Population – Lisa Flynn Candidate 21270724

Physical Activity (PA) is widely recognised as essential for health and wellbeing, yet for individuals who are blind or vision impaired (BVI), participation remains consistently low. While previous research has documented these disparities, it has largely done so within discrete age groups, offering limited understanding of how participation is shaped over time. This thesis adopts a life course perspective to examine PA participation among individuals who are BVI in Ireland.

Using a mixed-methods approach, quantitative studies established the extent of low PA participation across children, adolescents and adults, while qualitative studies explored the lived experiences underlying these patterns across adolescence, working-age adulthood and older adulthood. Across the age groups studied, PA participation was low, indicating that reduced engagement was not confined to one specific life stage. Although the cross-sectional design cannot establish individual trajectories across time, the convergence of findings across successive cohorts supports a life course informed interpretation.

Qualitative findings provide insight into the factors shaping this pattern. Structural barriers, including transport limitations, inaccessible environments and a lack of inclusive opportunities, were identified as key determinants of participation. Qualitative accounts suggested that early experiences, particularly within physical education, have a lasting influence, shaping confidence, identity and long-term engagement. Across the life course, participants described navigating environments that were not designed to accommodate their needs, often placing responsibility for inclusion on the individual.

This thesis demonstrates that low PA participation among individuals who are BVI reflects a systemic issue shaped over time, rather than isolated barriers. By adopting a life course perspective, this research provides a more comprehensive understanding of participation and highlights the need for inclusive, coordinated and stage-specific approaches to support sustained engagement in PA.

1.2 Publications

Published:

Investigating Physical Activity levels in adults who are Blind and Vision Impaired
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Adapted Physical Activity Quarterly
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Authors; Lisa Flynn, Sarahjane Belton, Noel O'Connor, Kristina Millar, Hannah Goss, Sarah Meegan, Úna Britton, Stephen Behan

"You can come to the practice, but you can't be on the team": Physical activity experiences of Irish working-age adults who are Blind or Vision Impaired
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Oral Presentations:

Vision Sports: Physical activity in a Blind/Vision Impaired Cohort of Adolescents and Adults
International Symposium on Adapted Physical Activity, Parma, Italy – June 2023

Vision Sports: Physical Activity in a Blind/vision Impaired Cohort of Adolescents and Adults
Vision 2023, Denver, Colorado, USA - July 2023

Evaluation of Physical Activity, Screentime and Wellbeing for the Vision Impaired
Irish Paediatric Association meeting, Galway, Ireland - December 2023

Physical Activity in a Blind/Vision Impaired Cohort of Adolescents and Adults
Health Enhancing Physical Activity Conference, RCSI, Dublin, Ireland - August 2024 (Presented by co-author due to illness)

Vision Sports: Physical activity in a blind/vision impaired cohort of adolescents and adults.

The CRC Empowering Change Conference, Clontarf Castle Hotel - October 2024

Working together to increase physical activity opportunities for children experiencing blindness/vision impairment in Ireland
International Symposium of Adapted Physical Activity and the International Symposium on Physical Activity and Visual Impairment or Deafblindness, Munster Technological University, Tralee, Co. Kery, Ireland - May 2025

Experiences of Teens who are Blind or Visually Impaired accessing sports
38th Annual Congress of the European Academy of Childhood-onset Disability (EACD)
NUI Galway – *To be presented June 2026*

Poster Presentations:

Vision Sports: Physical Activity in a Blind/Vision Impaired Cohort of Adolescents and Adults
Insight Showcase Event, The Helix, Dublin City University, Dublin - October 2022

Evaluation of Physical Activity, Sport Participation and Wellbeing for the Vision Impaired
Child Vision Research Society Meeting, Great Ormond St. Hospital, London, UK - July 2023

Evaluation of Physical Activity, Sport Participation and Wellbeing for the Vision Impaired
Insight Scientific Plenary, University of Galway - October 2023

Quantifying Physical Activity, Physical Education and Active Travel in Children and Adolescents with Visual Impairments
The National Consortium for Physical Education for Individuals with Disabilities, Virtual conference - July 2024

Bridging the Gap: Using Quantitative Physical Activity Data to Guide Qualitative Inquiry in Blind and Visually Impaired Populations
University College Cork, Insight Scientific Plenary - January 2026

1.3 Introduction

There are some questions in clinical practice that should have straightforward answers. For those working in paediatrics, few should be simpler than how can a child who is blind or vision impaired (BVI) meaningfully participate in sport. Yet, after several years working in paediatrics, I have found this difficult to answer, and this uncertainty sits at the heart of this research. Physical activity (PA) is widely recognised as a key determinant of health and wellbeing (1,2), a fact reinforced through my medical education and early years training as a paediatric doctor. Substantial evidence from large scale systematic reviews and global guidelines demonstrates that regular participation in PA is associated with reduced risk of cardiovascular disease, improved all-cause mortality, improved metabolic and musculoskeletal health and enhanced wellbeing across the life course (3,4). Importantly, PA is increasingly recognised not merely as a lifestyle choice, but as a fundamental component of disease prevention and health promotion (4,5). However, as I transitioned into clinical practice, it became increasingly evident that opportunities to engage in PA are not experienced equally across populations, a disparity consistently highlighted in the literature (6). Individuals living with disabilities report lower levels of participation compared to the general population, reflecting persistent inequalities in access and engagement (6–10).

In my work with children and young people with disabilities, including those who are BVI, I have repeatedly encountered families who are motivated to support participation in PA, yet face significant challenges in accessing appropriate, safe and inclusive opportunities. Over time, it became clear that these challenges were not solely the result of individual barriers, but rather reflected inconsistency and fragmentation in the availability of suitable opportunities. While some families were able to access local PA programmes, others had no comparable services or means of engagement. Importantly, these difficulties were rarely related to a lack of motivation or awareness among children or their families, but instead reflected broader environmental, social and structural constraints within systems largely designed for the general population (6). This prompted a shift in focus towards understanding how opportunities for PA are structured, accessed and sustained for individuals who are BVI.

These issues became particularly apparent during a clinical encounter with an inquisitive 12 year old girl diagnosed with vision impairment (VI) who was highly motivated to engage in PA. Her family asked for guidance on how to access appropriate opportunities. Despite

recognising the importance of participation, I was unable to provide a clear or consistent pathway to support this. In that moment, I was struck by the professional dissonance of being a doctor who understood the "why" of physical health, but was powerless to facilitate the "how" for a patient in need. This realisation, that my clinical training had left me unequipped to answer a fundamental health question, provided the primary impetus for this research. In attempting to identify suitable options, I became aware of organisations such as Vision Sports Ireland (VSI), highlighting both the presence of community based initiatives and glaring lack of integration between these and healthcare services (11). Notably, despite years of clinical experience, these pathways had not been highlighted within my medical training.

While such challenges were clearly visible in clinical practice, they could not be fully understood within the constraints of individual 15-minute consultations; the amount of time allocated for me to meet with individual patients. These encounters offered only a snapshot in time, limiting insight into how participation develops, changes, or is lost over time. Within paediatrics, this is further constrained by a focus on early life stages, with limited visibility of how experiences evolve into adolescence and adulthood. This raised critical questions regarding how PA participation is shaped across the life course, and how early opportunities, or their absence, influence longer-term engagement. This PhD serves as a bridge from the exam room to reality, seeking to examine participation beyond individual encounters and across broader systems and timeframes.

Within the Irish context, national data indicate lower levels of PA participation among individuals with disabilities compared to the general population (9,10), despite increasing policy emphasis on inclusion and engagement in sport and PA (12). Adolescents with disabilities had lower levels of community sports participation when compared to those with no disabilities (63% vs 78%), and recorded significantly lower levels of daily PA than those without disability (15% vs 24%) (10). For adults, meanwhile, just 28% of adult population with a long-term illness or disability played sport, compared to 45% of those without a disability (13). These figures are clinically concerning, as PA is not merely a lifestyle choice, but a fundamental health intervention (14). For the BVI community, PA is a primary modifier for long-term cardiovascular and metabolic health, which are often compromised in more sedentary populations (15). Furthermore, the psychosocial benefits of PA provide a vital buffer against the disproportionately high rates of social isolation and depression reported among children and adults who are BVI (16,17). These participation gaps represent more than missed hobbies, but instead widening health deficits that begin in childhood.

These disparities raise important questions regarding equity of access, particularly given the established role of PA in supporting health, wellbeing and social participation (15), and highlight a clear disconnect between policy commitments and the lived realities of individuals and families attempting to access meaningful opportunities.

One of the most striking aspects of this issue in clinical practice is the cumulative impact of reduced participation in PA across the life course (6,18). While not always immediately visible within a single consultation, this becomes apparent over time, particularly when working longitudinally with patients. What emerges is not only reduced PA, but a widening gap in confidence, independence and social engagement between those who are able to participate and those who are not (8,19–21). This has significant implications for long-term health and wellbeing (15).

Conversely, among those who are able to engage in PA, the benefits of PA represent a cumulative developmental asset. Participation in childhood, alongside the clear enjoyment observed in clinical practice, is associated with improvements in balance, coordination and fundamental movement skills (22). In the life course framework, these are the building blocks of PA supporting continued engagement into adolescence and young adulthood (23). In later life, physical inactivity is linked to poorer health outcomes (24), while regular participation contributes to improved strength, balance and reduced falls risk (25). Individuals who are BVI are also at increased risk of social isolation and poorer mental health (17), with PA providing important opportunities for social interaction and community engagement (26).

Despite this, the existing evidence base remains limited and fragmented. Research in this area is often characterised by small sample sizes (27), a focus on specific age groups (28) or settings (29), and inconsistency in how VI is defined (30). Critically, there is limited understanding of how participation in PA is developed, sustained or disrupted over time. From both a clinical and research perspective, this limits understanding of when and how best to support engagement in PA across the life course.

The research presented in this thesis was developed in collaboration with VSI, key partners who played a central role in shaping the research focus, and ensuring its relevance to the BVI community. This partnership emerged from efforts to identify accessible PA opportunities for patients within clinical practice, highlighting both the value of existing

initiatives and the gaps that remained. Their involvement ensured that the research remained grounded in the priorities and lived experiences of the BVI community, rather than being driven solely by academic concerns. This approach reflects both my clinical practice, where family perspectives inform care, and the principle of "nothing about us without us," which emphasises the inclusion of individuals with lived experience in shaping research (31). Accordingly, individuals with VI and other stakeholders were involved in the design of the study and development of the survey instrument.

A life course perspective, similar to that applied in the general population (10,13), offers a way to move beyond isolated descriptions of participation towards a more comprehensive understanding of how PA behaviours are shaped over time. Rather than viewing participation as a static outcome measured at a single point, this approach recognises that engagement in PA is dynamic, influenced by experiences, opportunities and constraints that accumulate across different stages of life. Early experiences of inclusion or exclusion may shape confidence, skill development and attitudes towards PA, with implications that extend into adolescence and adulthood (18,32). Conversely, missed opportunities at key developmental stages may contribute to sustained disengagement over time (33) with downstream consequences including increased risk of chronic disease, reduced physical function, and poorer mental health outcomes (1,3,5).

Adopting a life course perspective therefore enables identification of critical transition points, such as entry into school, adolescence, or transitions out of structured education; where participation may be particularly vulnerable to disruption. It also highlights the potential for targeted interventions to support sustained engagement at key life stages. In this way, a life course framework provides a more nuanced and clinically relevant understanding of PA participation, which is essential for informing effective, equitable and sustainable approaches to supporting individuals who are BVI. This life course perspective underpins the overall design of this thesis, which seeks to examine how participation in PA is developed, sustained and disrupted across the life course for individuals who are BVI.

1.4 Philosophical Position

When considering the methods and findings of the studies presented in this thesis, it is important to situate them within my own philosophical position. This positioning refers to the underlying set of beliefs that shape how research is conceptualised, conducted and

interpreted (34). It encompasses both ontology, assumptions about the nature of reality, and epistemology, assumptions about how knowledge is generated and applied (35). These philosophical commitments influence the questions that are asked, the methods that are selected, and the way findings are understood (36). Methodology is therefore not neutral, but reflects the researcher's interpretation of reality and their assumptions about how knowledge can most appropriately be produced (35).

I trained as a medical doctor in Ireland from 2010-2016 and have since worked clinically across a range of hospital and community settings, with a particular focus on paediatric disability. Over this time, I have worked with children and young people with a range of disabilities, including those who are blind or vision impaired (BVI). My medical training has been grounded in a scientific approach to knowledge, with a strong emphasis on objective observation, measurement and generalisable findings. However, through clinical experience, I became increasingly aware of the limitations of relying solely on this approach. As I encountered a wider range of patients' experiences, it became clear that there is no single, uniform experience of physical activity (PA) among individuals who are BVI. While quantitative methods are essential for identifying patterns and establishing the scale of the issue, they are insufficient for understanding how participation is experienced and interpreted in context. This necessitated the incorporation of an interpretivist perspective to explore the meanings individuals attach to their experiences of PA.

This thesis therefore adopts an overall pragmatic approach, reflecting a commitment to using the most appropriate methods available to address the applied research questions and generate meaningful real-world impact (36). Within this, a multi-level philosophical structure is employed at the level of individual studies (37). The quantitative components (Chapters 3-4) are aligned with a post-positivist perspective, focusing on measurement and patterns of PA (37), recognising that while objective measurement of PA is possible, it is inherently imperfect, shaped by assumptions, and subject to uncertainty and contextual limitation. The qualitative components (Chapters 5-7), meanwhile, are underpinned by an interpretivist perspective, seeking to understand how individuals construct and make sense of their experiences (37). These components are intentionally integrated, with qualitative inquiry building on earlier quantitative findings in a sequential and complementary design.

My clinical work with individuals who are BVI, as well as those with other disabilities, has enabled me to develop rapport with families, and a grounded understanding of the challenges

surrounding PA and sport participation. However, I do not share the lived experience of being BVI, positioning me as an outsider in relation to participants' embodied experiences (34,38). At the same time, I occupy an insider position within the healthcare system that shapes many aspects of participants' lives, including how support is accessed, interpreted and delivered. This dual positioning situates me neither fully inside nor outside, but within a relational space that carries both epistemic opportunity and constraint (38,39). While outsider status may support critical engagement with taken-for-granted assumptions, my role as a clinician also brings a degree of institutional authority that influences how knowledge is produced and interpreted within this research. My medical training and professional identity confer a particular form of credibility within interview interactions, which may shape how participants engage with me. Participants may view me as a figure of expertise or authority, potentially influencing what they feel comfortable disclosing, how they frame their experiences, or the extent to which they challenge existing systems. Recognising this, I remained attentive to how these dynamics may have shaped the data, and sought to create a space in which participants could speak openly about their experiences, including those that may sit in tension with healthcare structures.

Given the central role of interpretation in the qualitative components, Reflexive Thematic Analysis (RTA) was selected as the methodological approach (40,41). RTA explicitly positions the researcher as an active agent in the development of themes, rather than a neutral observer. Within this multi-level design, RTA sits within the interpretivist component, aligning with its focus on meaning-making and the co-construction of knowledge. This allows for an approach that is both theoretically coherent and methodologically flexible, consistent with the broader pragmatic orientation of the thesis.

To support rigour, I engaged in structured reflexive practices throughout the analytic process, including maintaining analytic memos and working with critical friends who challenged codes and interpretations (41). Beyond these procedural strategies, reflexivity required ongoing attention to how my clinical positioning shaped what I noticed in the data and how I interpreted participants' accounts. For example, in early stages of coding I was drawn more readily to accounts relating to healthcare access, service provision and functional limitations, reflecting my familiarity with clinical systems and frameworks. In doing so, I risked emphasising system or clinical barriers over more experiential aspects of participation. Through iterative engagement with the data and discussion with critical friends, I became more attentive to elements such as enjoyment, identity and social

belonging, which were often less explicitly articulated but equally central to participants' experiences. This required actively revisiting earlier coding decisions and broadening the analytic lens beyond a primarily clinical framing.

The aim of this research was to explore the lived experiences of children and adults in Ireland who are BVI, with a particular focus on the barriers and motivators to PA participation. Ensuring that participants' perspectives inform future interventions was a key priority. RTA was particularly suited to this aim, as it supports the development of themes that reflect lived experiences within broader social contexts (41). This is especially relevant given existing research has highlighted environmental and societal influences, such as coach attitudes, transport and access to inclusive opportunities, as key barriers to PA (6,42).

1.5 Mixed-methods Design and Integration

In view of my previously highlighted pragmatic approach, finding answers to the research questions detailed in section 1.8 required different approaches. A literature review detailed low PA levels in the BVI population across multiple different countries (30,43) consistent with both my own clinical practice and the experience of stakeholders and collaborators in Vision Sports Ireland. This thesis therefore employed a pragmatic, multiphase mixed-methods design with an explanatory sequential logic, in which quantitative investigation was followed by qualitative exploration. Mixed methods were selected because the research questions required both measurement of PA participation and an understanding of how this participation was experienced. Quantitative methods were necessary to establish the extent and distribution of PA participation, including differences according to age, gender and degree of vision impairment. However, these methods could not adequately explain how individual, social and environmental factors shaped the patterns identified. Qualitative methods were therefore required to explore the meanings participants attached to PA and the contexts in which participation was either enabled or restricted.

The two components served complementary purposes. Chapters 3 and 4 established patterns of PA, PE, AT, barriers and motivators among children, adolescents and adults who are BVI. Chapters 5-7 then explored how these patterns were experienced and negotiated across different life stages. The qualitative phase was not intended to reproduce the quantitative measures but to explain, extend and qualify their findings. Integration

occurred at multiple stages. At the design stage, findings and areas of uncertainty arising from the quantitative studies informed the focus of the qualitative phase, including the exploration of language used by coaches. At the interpretation stage, findings were examined for convergence and divergence. At the synthesis stage, quantitative patterns and qualitative accounts were considered together across life stages within the Social Ecological Model. Integration was therefore undertaken primarily at the level of study design and interpretation, rather than through the statistical merging of datasets.

This integrated approach strengthened the life course perspective by demonstrating not only that low PA participation was evident across different age groups, but also how the factors underlying participation persisted or changed over time. Quantitative findings established the presence of inequalities at successive stages, while qualitative accounts identified the mechanisms through which early exclusion, changing dependence, structural barriers and previous experiences could influence participation in later life. Neither component could have provided this understanding in isolation.

1.6 Theoretical framework — Social Ecological Model and life course perspective

Physical activity (PA) participation reflects the interplay of influences across multiple levels, rather than being driven by individual choice alone. Previous work has shown that participation reflects the interaction of individual characteristics, social relationships, organisational settings, community environments and wider policy contexts (44). For populations who face additional constraints, including those who are blind or vision impaired (BVI), these influences tend to be more layered and, at times, more impactful (6,45). Understanding these patterns requires a framework that can account for how factors interact at a given point in time, and how participation changes across the life course. This thesis adopts an integrated framework, combining the Social Ecological Model (SEM) with a life course perspective. Each is outlined below, before their integration is described.

The Social Ecological Model

The SEM is grounded in Bronfenbrenner's ecology of human development, which positioned behaviour within a set of nested systems, from immediate settings such as family and peers to broader cultural and policy contexts (46). McLeroy and colleagues later adapted this into a framework for health behaviour, outlining five levels: intrapersonal, interpersonal, organisational, community and policy (47). While Bronfenbrenner's theory provides the conceptual foundation for ecological thinking, McLeroy's SEM was selected because it is more directly aligned with health behaviour, PA and intervention-focused research (47). This five-level structure is used in the present thesis. The SEM aligns well with the focus of this thesis, as PA participation in adapted and disability context often involves factors such as coach behaviour, organisational practices, transport and access to facilities. These map clearly on to SEM levels. The model is also widely used within PA research, making it a useful and recognisable framework (44,48).

The application of the SEM within PA research is well established. Sallis, Owen and Fisher argued that interventions focusing on a single level, such as individual motivation, are generally less effective than those that address multiple levels simultaneously (49). This position has been reinforced by large scale reviews, including the Lancet Physical Activity Series, where Bauman and colleagues identified determinants operating across all SEM levels and emphasised the need for coordinated, system level approaches (44). More recently, the Lancet Disability and Physical Activity Commission applied an explicitly

ecological lens to participation among people with disabilities (6). Within the BVI literature, Lieberman and colleagues have advocated for multi-level approaches within adapted physical education (50), while Haegele and Porretta's review of school age individuals with vision impairment identified barriers across individual, family and school contexts (30). However, much of this work tends to focus on particular levels in isolation, often interpersonal or environmental, without situating findings within a broader ecological structure.

A key aim in this thesis is to apply the SEM as a consistent interpretative and organising framework across all empirical chapters. The SEM is particularly valuable because it moves interpretation beyond the individual, accommodates different types of evidence, and highlights the role of interventions at multiple levels (46). While the SEM informed the interpretation and organisation of the findings, it did not determine the design of the empirical studies, nor did it act as a coding framework. Instead, the quantitative and qualitative studies were designed to explore experiences of PA, PE and sport participation among people who are BVI. In the qualitative studies, themes were generated through Reflexive Thematic Analysis, and the SEM was then used to support interpretation by situating these themes across individual, interpersonal, organisational, community and policy levels. In this way, the SEM provided a coherent structure for presenting and comparing findings across the thesis, while preserving the inductive and reflexive nature of the qualitative analysis.

However, the SEM has several limitations that should be considered. It is primarily a descriptive and organising model, useful for identifying influences across multiple levels, but less specific in explaining the mechanisms through which these influences interact or change over time. In practice, these influences are rarely separate. This is particularly evident for BVI populations, where participation often depends on several levels aligning at once. For example, attending a training session may depend on individual motivation, parental support, inclusive club practices and accessible infrastructure. The model is also limited in how it deals with time. It captures a snapshot of influences at a given moment, but says little about how these influences develop or accumulate. For this reason, in this thesis the model is paired with a life course perspective.



Figure 1.1 Visual Diagram illustrating the Social Ecological Model

The Life course perspective

The life course perspective focuses on how experiences and exposures shape outcomes over time. It is most closely associated with the work of Glen Elder, particularly his studies of cohorts growing up during the Great Depression (51,52). From this work, a number of core principles emerged. These include the idea of linked lives, where individual trajectories are shaped by relationships; timing, where the impact of events depends on when they occur; human agency, where individuals make choices within constraints; and historical time and place, where broader social context shapes life trajectories (51).

Within health research, life course epidemiology has developed a set of models to explain how exposures at different stages influence later outcomes (53). PA has been examined through these lenses. Longitudinal work by Telama (2009) has demonstrated that participation in childhood and adolescence may track into adulthood, suggesting both accumulation and chain risk of processes (18). Hallal and colleagues also identified adolescence as a key period where disengagement is more likely, with implications that extend into later life (54).

Within disability research, the life course perspective has been developed further by Priestly, who emphasised that disability is experienced differently at different stages of life, and that transitions between these stages can either reinforce or reduce disadvantage (55). The concept of cumulative disadvantage is particularly relevant here. As outlined by Dannefer and others, relatively small inequalities early in life can build over time into more substantial

differences, especially where structural conditions remain unchanged (56). Applied to PA among individuals who are BVI, this suggests that early exclusion from contexts such as physical education may have longer term consequences, shaping confidence, opportunity and participation patterns across subsequent stages.

It is important to distinguish between a life course study and a longitudinal study. This thesis does not follow the same individuals prospectively from childhood into later adulthood and therefore does not claim to establish individual trajectories or causal relationships between experiences at one stage and outcomes at another. Instead, it adopts a cross-sectional, multi-cohort life course design, bringing together evidence from children and adolescents, working-age adults and older adults to examine how PA participation is experienced at successive stages of life.

The thesis represents more than three age-specific investigations for several reasons. First, all empirical studies address a common overarching problem – how participation in PA is developed, sustained or disrupted among BVI individuals. Second, the studies were designed as an integrated programme of research. The quantitative chapters establish the extent and distribution of low participation across younger and adult populations, while the qualitative chapters examine the experiences and mechanisms that may help explain these patterns at adolescence, working-age adulthood and older adulthood. The qualitative phase therefore builds on, rather than sits separately from the quantitative findings. The cohorts are additionally interpreted relationally. Findings from one life stage inform the interpretation of findings at another. Adolescents' accounts of exclusion, parental dependence and restricted autonomy provide insight into how disengagement may begin or become reinforced during youth. Working-age adults' retrospective accounts of school physical education provide evidence of the continuing significance of these early experiences for confidence, identity and subsequent adult accounts, in turn, demonstrate how longstanding structural barriers may interact with changes in health, transport access, confidence and social circumstances in later life. This cross-cohort comparison allows the thesis to identify continuities, differences and potential transition points that cannot be seen when each age group is examined in isolation.

The life course perspective directs attention not simply to age differences, but to processes such as timing, human agency and cumulative advantage or disadvantage. The role of parents and teachers in youth, the increasing requirement for self-advocacy in adulthood, and

renewed dependence on others in later life illustrate how participation is shaped through changing relationships and institutional contexts. Accordingly age is not treated solely as a demographic variable. Instead, each cohort represents a distinctive social and developmental context in which opportunities, constraints and responsibilities are unique.

The life course contribution of this thesis therefore lies in its analytical integration of evidence across stages, rather than in prospective observation of individual change. While causal or individual-level continuity cannot be inferred, the convergence of contemporary adolescent accounts, retrospective adult accounts and recurring structural patterns across cohorts provides a basis for identifying plausible processes of accumulation and disruption over time.

Integrating the SEM and the life course perspective

The SEM and life course frameworks address different but complementary aspects of participation. The SEM helps identify and organise influences across multiple levels at a given point in time, and provides a structure for recognising that these levels are interrelated. The life course perspective, in contrast, focuses on how these experiences unfold over time, and how trajectories of participation are shaped by earlier experiences. Bringing the two together allows for an analysis that is both multi-level and temporally informed, examining how influences operate at particular life stages and how patterns identified across cohorts suggest accumulation, continuity and change over the life course.

In this thesis, the integration is applied in a structured way. Within each empirical chapter, the SEM is used to organise the analysis of barriers and facilitators reported by the cohort in question. The life course perspective is then used across chapters to allow for comparison of how these same levels are experienced at different stages, and how patterns of advantage or disadvantage emerge over time. The general discussion in Chapter 8 draws these strands together, arguing that participation among individuals who are blind or vision impaired cannot be understood as the result of isolated factors or single life stages. Rather, it reflects the interaction of influences operating across multiple levels and across time. This combined approach provides the conceptual basis for the empirical work that follows.

1.7 Aims and Objectives of the study

Aim of research:

To examine how participation in physical activity is developed, experienced and shaped across the life course among individuals who are blind or vision impaired in Ireland.

Objectives:

1. To conduct an evaluation of physical activity levels among children and adolescents who are blind and vision impaired (Chapter 3).

2. To conduct an evaluation of physical activity levels among adults who are blind and vision impaired (Chapter 4).

3. To assess age and gender differences in physical activity levels amongst Irish children, adolescents and adults who are blind and vision impaired (Chapter 3-4).

4. To examine the barriers, motivators and facilitators of physical activity in adolescents and adults who are blind and vision impaired (Chapter 5-7)

5. To explore how barriers and facilitators of physical activity evolve across the life course of the BVI population in Ireland (Chapter 5-7).

1.8 Research Questions and Hypotheses

This thesis adopts a mixed-methods approach with a multi-level paradigmatic structure (see Section 1.4). In line with the post-positivist positioning of the quantitative components, directional hypotheses are included where they are supported by existing evidence. The qualitative components are grounded in an interpretivist approach and, rather than advancing hypotheses, are guided by clear inquiry aims that set out what the analysis is intended to explore.

1. What are the physical activity levels of children and adolescents who are blind or vision impaired in Ireland, and how do these compare to the general population?

Hypothesis: A majority of children and adolescents who are blind or vision impaired will not meet minimum physical activity guidelines for health, and will have lower levels of physical activity than the general population.

2. What factors (e.g. severity of vision impairment, gender, participation in PE) influence physical activity participation in this population?

Hypothesis 2a: Within the BVI sample, greater severity of vision impairment will be associated with lower levels of physical activity and reduced participation in physical education.

Hypothesis 2b: Gender differences in physical activity within the BVI sample will be smaller than those observed in the general population of Irish children and adolescents.

3. What are the physical activity levels of adults who are blind or vision impaired in Ireland, and how do these compare to the general population?

Hypothesis: A majority of adults who are blind or vision impaired will not meet minimum physical activity guidelines for health, and will have lower levels of physical activity than the general population.

4. What factors (e.g. severity of vision impairment, gender) influence physical activity participation in this population?

Hypothesis 4a: Within the BVI adult sample, greater severity of vision impairment will be associated with lower levels of physical activity.

Hypothesis 4b: Gender differences in physical activity within the BVI adult sample will be smaller than those observed in the general Irish adult population.

5. How is participation in physical activity experienced and understood by individuals who are blind or vision impaired at different stages of the life course?

Aim: To explore and characterise how physical activity participation is experienced and understood by individuals who are blind or vision impaired across different life stages, and to develop a contextualised account of these experiences over the life course.

6. What barriers, motivators and facilitators shape physical activity participation among individuals who are blind or vision impaired across the life course, and how do these operate across different ecological levels?

Aim: To identify and make sense of the barriers, motivators and facilitators that shape physical activity participation across the life course, with particular attention to how these operate at individual, interpersonal, organisational, community and policy levels, informed by the Social Ecological Model (47).

1.9 Thesis Structure

Chapter 1: Introduction to thesis

This chapter gives a broad overview of the thesis, including the aims and objectives of the study. It introduces the rationale for adopting a life course perspective and the Social Ecological Model as guiding frameworks. The aims, research questions and hypotheses are presented, alongside an outline of the thesis structure.

Chapter 2: Literature review

This chapter gives a critical review of the existing literature relating to physical activity participation among people who are blind or vision impaired. It explores key areas including physical activity levels, health outcomes, barriers and facilitators to participation within both the general and blind or vision impaired population.

Chapter 3: Quantifying physical activity, physical education and active travel in children and adolescents with visual Impairments

This chapter examines physical activity levels among children and adolescents who are blind or vision impaired, with a particular focus on participation in physical education and active travel. It explores differences by gender and severity of vision impairment, contributing to an understanding of early-life physical activity behaviours.

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Heliyon. 2024 Aug;10(15):e34856. doi:10.1016/j.heliyon.2024.e34856

Chapter 4: Investigating physical activity levels in adults who are blind and vision impaired

This chapter presents a quantitative analysis of physical activity levels among adults who are blind or vision impaired in Ireland. It examines associations between physical activity participation, demographic variables and perceived barriers and motivators.

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Chapter 5: "Sometimes they're not even trying to be rude. It's just sometimes they just don't know ": A qualitative exploration of physical activity experiences among Irish adolescents with vision impairment

This chapter presents a qualitative exploration of physical activity experiences among adolescents who are blind or vision impaired. Using Reflexive Thematic Analysis, it examines the barriers and facilitators influencing participation, with particular attention to autonomy, safety and social context.

Chapter 6: "You can come to the practice, but you can't be on the team": Physical activity experiences of Irish working-age adults who are blind or vision impaired

This chapter explores the lived experiences of physical activity participation among working-age adults. It examines the interaction between structural barriers, societal perceptions and adult identity, highlighting the unique challenges faced in this life stage.

Chapter 7: "You just kind of lose heart": A qualitative exploration of barriers and facilitators to physical activity among older adults who are blind or vision impaired

This chapter presents a qualitative analysis of physical activity participation among older adults. It explores how ageing-related factors, health status and environmental conditions influence engagement, and how these interact with vision impairment.

Chapter 8: Discussion, conclusions and future directions

This chapter synthesises findings across all studies, integrating quantitative and qualitative results within a life course and Social Ecological Model framework. It discusses the theoretical, practical and policy implications of the findings, outlines the strengths and limitations of the thesis, and provides recommendations for future research and practice.

Appendix A:
Supplementary chapter consisting of a scoping review of the influence of physical activity and sleep in the blind or vision impaired population.

Published as: Flynn, L., Peltz, J., Perreault, M., Lieberman, L. J., & Beach, P. (2025). The Relationship Between Sleep and Physical Activity for Children With Visual Impairments: A Scoping Review.
Journal of Visual Impairment & Blindness, 119(3), 196-209.

Appendix B:
This questionnaire was used to form basis of Chapter 3, an investigation of physical activity levels of children who are blind or vision impaired.

Appendix C:
This questionnaire was used to form basis of Chapter 4, an investigation of physical activity levels of adults who are blind or vision impaired

Appendix D:
This appendix contains the interview protocol for the adolescent focus groups detailed in Chapter 5.

Appendix E:
This appendix contains the interview protocol for the adult focus groups detailed in Chapters 6 and 7.

1.10 Definition of Terms

The following key terms are defined to ensure clarity and consistency in their use throughout the thesis.

Adolescence: Adolescence is a developmental period typically defined as ages 10–19 years, characterised by rapid physical, psychological and social development (57).

Active Travel: Active travel refers to forms of transport that involve physical activity, such as walking or cycling, undertaken for functional purposes rather than recreation (58).

Blind or Vision Impaired (BVI)/ Vision Impairment: Vision impairment refers to a limitation in visual functioning that cannot be fully corrected by standard glasses, contact lenses, medication or surgery, and which negatively impacts an individual's ability to perform everyday activities. The term encompasses a spectrum ranging from low vision to complete blindness (4,59).

Older Adulthood/Older Adults: Older adulthood is commonly defined as age 65 years and older, often associated with retirement, ageing-related health changes and increased reliance on support systems (24).

Physical Activity: Physical activity refers to any bodily movement produced by the skeletal muscles that results in energy expenditure over resting expenditure (60).

Physical Activity Guidelines: Physical activity guidelines refer to evidence-based recommendations outlining the minimum levels of physical activity required to achieve health benefits. For adults, this typically includes at least 150–300 minutes of moderate-intensity aerobic activity per week, while children and adolescents are advised to engage in an average of 60 minutes of moderate-to-vigorous physical activity daily (1).

Physical Education: A school subject providing children with learning opportunities through the medium of movement and contributing to their overall development by helping them to lead full, active and healthy lives (61).

Social Ecological Model (SEM): The Social Ecological Model conceptualises behaviour as being shaped by dynamic interactions between multiple levels of influence, including individual, interpersonal, organisational, community and policy factors (62).

Working-age Adults: Working-age adulthood refers to the life stage typically spanning ages 18–64 years, characterised by employment, independence and social role responsibilities (63)

Chapter 2: Literature Review

Literature Review

This chapter reviews the literature on physical activity (PA) across the life course, with a particular focus on individuals who are blind or vision impaired (BVI). It begins by outlining what is meant by PA, how it is classified, and why it matters for health. From there, it moves to consider current participation patterns, first in the general population and then within blind and vision impaired groups, highlighting where clear disparities exist. The chapter then turns to how PA is measured, before examining the factors that shape participation across different populations, including those specific to blindness and vision impairment. Throughout, the emphasis is on understanding PA as something shaped by a combination of individual, social and environmental influences, rather than as a simple matter of personal choice. The chapter concludes by identifying the key gaps in the literature, which provide the basis for the empirical work that follows.

2.1 Physical Activity: Definitions, Health Implications and Population Context

Physical Activity – Background and Definitions

Physical activity (PA), physical inactivity and sedentary behaviour are related but distinct constructs. PA is defined as "any bodily movement produced by the skeletal muscles that results in energy expenditure over resting expenditure" (60), while physical inactivity describes not achieving recommended levels of PA (1). In contrast, sedentary behaviour refers to waking activities characterised by low energy expenditure, such as sitting or lying (1,64). Regular participation in PA is associated with a wide range of positive health outcomes, while physical inactivity is recognised as an independent risk factor for all-cause mortality (1,65–67) and non-communicable disease. Despite the known benefits, global estimates suggest the majority of the population does not meet recommended PA levels (10,13,68,69).

While these low levels of PA prevail across age, gender and geographic locations, individuals living with a disability consistently demonstrate significantly lower PA levels compared to the general population (6,10,13,70). Specific to this thesis, which investigates PA and its correlates among the blind or vision impaired (BVI) population, evidence indicates reduced participation in PA and sport, alongside higher levels of sedentary behaviour, in people with BVI across the life course. Consequently, this population may be at disproportionately higher risk of the deleterious health outcomes associated with

insufficient PA (15,65,71).

Physical Activity Classification

Activities are classified according to the energy expenditure associated with the activity; sedentary, light, moderate or vigorous (72,73). Practical definitions of PA intensity have been proposed, with moderate intensity activity defined as activity that causes a notable increase in heart rate and breathing (74). Vigorous activity is defined as an activity that substantially increases heart rate and breathing (74). In order to ensure consistency of results, public health recommendations for PA typically incorporate both duration and intensity to ensure sufficient health benefits. The most widely adopted PA guidelines are those of the WHO (1,14), which recommend that children and adolescents accumulate an average of at least 60 minutes/day of moderate-to-vigorous physical activity (MVPA) across the week. These recommendations apply equally to children and adolescents living with a disability.

Adults are recommended to accumulate a minimum of 150 minutes of moderate intensity activity, or 75 minutes of vigorous intensity activity per week (14). Similarly, these recommendations apply to adults who are living with a disability (14), where possible and appropriate.

In addition to aerobic activity, the WHO guidelines emphasise the importance of muscle strengthening activities. Children and adolescents (aged 5-17) should engage in activities that strengthen muscle and bone at least three days a week (14), while adults are advised to perform muscle strengthening activities involving all major muscle groups on at least two days per week, performed at a minimum of moderate intensity (14).

The importance of Physical Activity for Health

Regular physical activity (PA) is associated with substantial health benefits across the life course, including reduced risk of all-cause mortality, and a range of non-communicable diseases (chronic, non-transmissible conditions such as cardiovascular disease, certain cancers, or diabetes) (67,71,75). In children and adolescents, PA is associated with improved cardiovascular and metabolic health, enhanced musculoskeletal development and reduced risk of obesity (1,76). In adults, higher levels of PA are associated with a reduced risk of cardiovascular disease, type 2 diabetes, certain cancers as well as improved mental health and cognitive function (1,15,66). Large scale meta-analysis and device-based studies have demonstrated consistent dose-response relationships between PA and reduced risk of premature mortality (65). For older adults, PA contributes to the maintenance of functional

independence and is associated with reduced risk of falls, frailty and age-related physical decline (77).

The positive impact of PA can be observed at relatively low levels of PA, with greatest gains observed when individuals who are previously inactive become moderately active (65). Acute bouts of PA are associated with short-term improvements in cardiometabolic health (78). The health benefits of PA are thought to be mediated through multiple physiological mechanisms, including improving body composition, reducing systemic inflammation, augmenting cardiac function and enhancing endothelial function (15,79).

The relationship between PA and mental health has been increasingly recognised, with a growing body of high-quality evidence demonstrating positive associations across the life course (80,81). Systematic reviews and meta-analyses have consistently shown that PA is associated with reduced symptoms of depression and anxiety, as well as improved psychological wellbeing (79–81).
In children and adolescents, PA is associated with improved self-esteem and reduced depressive symptoms, with evidence demonstrating consistent benefits across sex, health status and socioeconomic status (81,82). In the wider adult population, prospective meta-analyses have demonstrated that higher levels of PA are associated with reduced risk of developing depression, while intervention studies indicate that PA can be an effective treatment for mild-to-moderate depressive symptoms (83).

Chekroud et al. (2018)'s cross-sectional study in the Lancet explored the association between exercise and mental health in 1.2 million individuals, and reported 43.2% fewer self-identified days of poor mental health in individuals that exercise (84). Lower mental health burdens were seen across all exercise types compared with those who did not exercise, but were most evident in those who engaged in team sports (22.3% lower mental health burden) and cycling (21.6% lower mental health burden) (84).

Importance of Physical Activity in the Blind or Vision Impaired Population

In addition to the physical and mental health benefits of PA outlined above, PA offers additional benefits specific to the BVI population. Evidence suggests there is a reciprocal relationship between PA and eyesight. For example, a lack of PA has been shown to increase the risk of metabolic syndrome and diseases such as diabetic retinopathy, both of which can lead to blindness (85,86). Other sight-threatening diseases, such as age related macular

degeneration, have been postulated to be connected to low levels of antioxidant enzyme activity associated with low levels of PA (87). Given the emerging research in this area, it is unsurprising that increasing PA levels is now considered a potential treatment modality for certain sight-threatening diseases. In Williams' (2009) cohort study, those with a faster running pace and longer running distance had lower rates of glaucoma (88), even when adjusted for age, hypertension, smoking history, diet and alcohol intake. Results were statistically significant ($p < 0.04$), with a 5% reduction in glaucoma risk per kilometre run per day (88). PA has also been proposed as a strategy to reduce the global burden of diabetic retinopathy (86).

As well as preventing further vision loss, PA has additional benefits for the BVI population. For children who are BVI, higher levels of PA were associated with higher gait stability (a factor associated with a lower risk of falling) and superior navigation performance (22). Physically active adolescents with BVI were also found to have improved hearing, including increased auditory reaction speed, which may support spatial awareness and safe navigation in daily environments (89). Given that BVI individuals rely on vestibular and proprioceptive cues, as opposed to visual inputs, to understand both their environment and their location within it, developing these skills allows people who are BVI to navigate unfamiliar environments with increased confidence (90). Research examining the benefits of PA in adults who are BVI has demonstrated similar findings (89,91). For example, exercise interventions in adults who are BVI have been shown to improve balance and mobility, which may contribute to safer navigation and reduced falls risk in this population (92). A 2021 systematic review of nine articles found that PA and sport for those who are BVI served to improve communities' perceptions of people with disabilities, increase the social importance of people with disabilities in the community and increase social skills of those who are BVI (93). A separate study found that PA improved health related quality of life in adults who were BVI (43).

Physical Activity: Summary

Overall, PA confers substantial physical health, mental health and social benefits in the BVI population, as it does in the non-disabled population. These benefits include a reduced risk of non-communicable diseases, dementia, certain cancers and improved emotional wellbeing (65,67,79–81). For those who are BVI, additional benefits include a reduced risk of future vision loss, reduced risk of falls, increased confidence and improved social participation (22,86,94). These benefits have resulted in a renewed focus on PA guidelines

and targets (as set out by the WHO (1)), among groups at risk of lower levels of PA, including those who are BVI (95).

2.2 Current Trends in Physical Activity Among the General Population

Physical Activity in Children and Adolescents

Physical activity (PA) levels are known to vary across the life course, with childhood and adolescence representing a critical period for the establishment of lifelong health behaviours (96,97). Understanding how PA patterns evolve during childhood and adolescence is particularly important, as PA behaviours established early in life may track into adulthood and influence long-term health outcomes (98,99). Consequently, interventions aimed at increasing PA during this period may have sustained benefits across the lifespan.

In the child and adolescent population, PA levels are widely reported to decline with increasing age (10). Large-scale international surveillance studies have demonstrated that younger children are more likely to meet recommended PA guidelines than older adolescents, with a reduction in moderate-to-vigorous physical activity (MVPA) observed during the transition from primary to post-primary education (68,100,101). However, longitudinal evidence suggests that this decline may begin earlier in childhood than previously assumed. For example, Farooq et al. (2018), using accelerometer-based data, demonstrated that PA declines from as early as age 7, with no clear evidence of an accelerated decline specifically during adolescence (102). These findings suggest that reductions in PA reflect a gradual life course trajectory rather than a change confined to adolescence alone. Despite this, adolescence remains an important period in which PA levels are consistently low. Global estimates suggest that fewer than 30% of adolescents meet recommended PA guidelines (68,69,100), highlighting a critical window for intervention. To facilitate international comparison of PA in children and adolescents, the Report Card on Physical Activity for Children and Youth has been developed. Using data from multiple nationally representative surveys, local committees assign a letter grade to each indicator based on the evidence available. In the United States, the overall grade for PA was a D-, given that 21% of children and youths aged 6-17 met the guidelines of 60 minutes of PA per day (103). This compares to the C- grade awarded in the 2022 Ireland North and South Report Card on Physical Activity for Children and Adolescents, where 40-46% met similar PA guidelines (104), identical to the grade awarded in the UK (105).

In the Irish context, similar trends are observed with regard to age. Younger children are more likely to meet PA guidelines than adolescents (104), although data were limited for children under 8 years of age (104). The CSPPA survey also identified a gap between children and adolescents, with those in primary school (typically less than thirteen years of age) more likely to meet PA guidelines (23% vs 12%), participate in school sport (91% vs 72%), and engage in community sport at least once a week (96% vs 84%) (10). Possible explanations for this discrepancy include that older children are less likely to participate in organised sport or active transport (AT) on their journey to school (10), as well as increased screentime, with fewer secondary school students meeting recommended screentime limits (10,104). Importantly, PA levels in adolescence are positively associated with PA levels in early adulthood (54,68,69). Although the exact mechanisms for this correlation are unclear, understanding and increasing PA levels in children and adolescents is likely to yield major public health benefits (106), given the importance of PA highlighted previously.

Sex and/or gender differences in PA are also well established during childhood and adolescence. Boys consistently demonstrate higher PA levels than girls, particularly at moderate and vigorous intensities, with these differences emerging early and often widening with age (54,106). This difference is particularly evident for moderate-intensity physical activity (MVPA), with boys accumulating substantially more MVPA than girls across childhood and adolescence (107). These results are consistent across countries with differing geography, culture, socioeconomic status and climate (54,69). Similar results have been reported in longitudinal and systematic review evidence, which consistently show that boys are more active than girls and that activity declines with age (101,108,109). The reasons for these differences are likely multifactorial, including lower participation by girls in organised sport, less perceived enjoyment of physical education and lower levels of social support for participation in PA (109–113).

Physical Activity in Adults

Statistics regarding Physical Activity (PA) in the adult population are similarly stark to those reported for children and adolescents. The World Health Organization (WHO) estimates that approximately 27.5% of adults globally do not meet recommended levels of PA, with consistently higher levels of inactivity observed among women than men (1,69). This has become a growing area of concern with the WHO recently highlighting physical inactivity as one of the top five risk factors for mortality (71). The Lancet's Physical Activity Series Working Group has additionally described physical inactivity as a global pandemic and a

major cause of death worldwide (114). At a regional level, surveillance data indicate that approximately 60-65% of adults in high income countries meet recommended PA guidelines. For example, the European Social Survey reports that approximately 61% of adults across 29 European countries meet WHO guidelines, with comparable estimates reported in Australia, the United States and England (95,115–117).

As with the children and adolescents, similar factors influence PA amongst adults. However, sex differences in PA appear to differ from those observed in younger populations. While boys consistently demonstrate higher levels of PA than girls in childhood and adolescence, this disparity is less consistent in adulthood, and may even may vary depending on how PA is measured. The European Social Survey reported that women were more likely to meet PA guidelines than men (62.05% vs 60.77%), and were significantly more active than men in general (95). This is consistent with findings from a Portuguese population study, which reported a similar proportion of women and men meeting PA recommendations (33.1% vs 32.8%) (118).

In contrast, the Health Survey for England reports higher levels of inactivity among women compared with men (23% vs 18%), alongside lower adherence to aerobic PA guidelines (59% vs 70%) (115). A similar disparity is observed for muscle-strengthening activity, with 27% of women and 34% of men meeting recommendations (115). These differences may partly reflect variation in the types of activities undertaken, with men reporting greater participation in sports and structured exercise (7.8 days/4 weeks vs 6.0 days/4 weeks), as well as higher involvement in heavy manual work (3.5 days/4 weeks vs 2.8 days/4 weeks), gardening and DIY (1.4 days in the last 4 weeks vs 0.6 days for women), while women report greater engagement in house work (3.5 days/4 weeks vs 2.8 days/4 weeks) (115). Possible explanations for discrepancies, and changes in these populations, include a focus on PA undertaken in leisure time. Recent systematic reviews have noted that occupational PA is often of low intensity and long duration both below the threshold for health benefits but sufficient to lead to chronic fatigue (119).

Large scale prospective cohort studies, such as the UK Biobank Study, have attempted to objectively quantify PA levels using accelerometers, providing data regarding the impact of age on PA levels. In their 2017 study of over 100,000 UK residents aged over 45 years, Doherty et al. reported that older residents had levels of PA that were on average 7.5% lower for each 10 year increase in age (120). Returning to the Health Survey for England, a similar

drop off in PA levels was observed, most notably at the age of 75 years. Minutes per week of nonoccupational moderately intensive PA dropped from 454.5 minutes/week amongst those aged 65-74 to 252 minutes/week for those aged over 75 (115). The European Social Survey mirrors these results with the number of times that males and females engage in PA for 30 minutes decreasing amongst those over the age of 65 years (95).

The Irish Sports Monitor (ISM) provides valuable information on PA levels in the Irish context. The percentage of the population classified as highly active (i.e. those who met PA guidelines as per the WHO (14)) was low at 40% (9,13). Similar to international findings, the ISM also highlights a gender gap, with women more likely to be classified as highly active compared to men (42% vs 39%) – a gap which has persisted through previous iterations of the ISM (9,13). Interestingly, however, men were more likely to participate in sports (50% vs 47%) (13). With regard to age, PA declined across the life course (13). For example, 51% of under 24 year-olds and 34% of those aged 65 and over were classified as highly active (13). Previous studies have noted that the drop off in PA by age may also vary by sex. For example, men tend to reduce participation in leisure time PA with age while the same situation was not observed in women (121). Other factors that may be responsible for reduced PA in age included lack of interest, lack of access to a car and medical reasons such as shortness of breath, joint pain and a lack of energy (122).

2.3 Physical activity in the Blind or Vision Impaired Population

Physical Activity in Blind or Vision Impaired Children and Adolescents

Movement, physical activity (PA) and sport have increasingly been recognised as important areas within childhood visual impairment research, reflecting their relevance to health, independence and participation (123). Much of the early data on PA levels in those who are BVI comes from large international studies examining populations with a range of disabilities. In the child and adolescent population, Longmuir et al. (2000) reanalysed data from 987 participants aged between 6 and 20 years with physical and sensory disabilities, 77 of whom had a vision impairment (124). This same research group also examined the effects of age and sex on PA in adults and children with sensory impairments, including those who are BVI, as part of the Canadian Fitness Survey using pedometer-based measures (125). Across these studies, a greater proportion of participants with disabilities were classified as sedentary compared to their peers without disabilities (29% vs 10%), with particularly low PA levels observed among those with vision impairments (124,125).

Importantly, these studies allow for comparisons across disability types, providing insight into the relative impact of vision impairment on PA. While similar proportions of youths across disability categories (including those with chronic medical conditions, hearing impairments, and vision impairments) were classified as "moderately active" (29–35%), significant differences emerged in sedentary behaviour (124). Youths with vision impairments were more likely to be classified as sedentary compared to those with chronic medical conditions or hearing impairments, and demonstrated activity patterns more closely aligned with those observed in individuals with physical disabilities such as cerebral palsy or spina bifida (124). Consistent with these findings, children with vision impairments reported greater limitations to PA participation and lower perceived fitness than their peers (124).

While these studies offer useful early insights, several methodological limitations must be acknowledged. For example, the 1994 study analysed those with hearing and vision impairment jointly in a group labelled "sensory impairment", when it seems clear that these populations will experience different barriers to PA (126). Although initially the sample size seems large at 987, groups become much smaller when divided into the different disability types, resulting in a smaller group of 77 having a vision impairment. Although over 30 years old, it is the most recent to compare the impact of various different disabilities

on PA levels, and highlights that vision impairments can have as much of an impact on PA as a physical disability. Longmuir et al additionally do not quantify the level of vision impairment experienced by the child; more recent evidence suggests that those who have a more severe vision impairment, or are completely blind, may have more sedentary behaviours than those with a milder vision impairment (28,127). Additionally, as these participants were primarily recruited though organisations providing services to those with additional needs, those with "milder" levels of disability may not have been recruited – a factor noted by the authors (124,125). Nevertheless, these studies highlight the high levels of sedentary behaviour youths with disabilities and, in the context of this thesis, emphasise the low levels of PA specifically in children who are BVI, representing an important public health issue. Higher levels of sedentary behaviour and lower levels of PA have been consistently reported across both Irish and international populations with disabilities (6,9,10,13).

Of the limited studies available which specifically measured PA in populations who are BVI, these are primarily focused on children and adolescents. Given that promoting PA in the adolescent population is a priority for future health (96,97), this population clearly merits such focus from the research community. Haegele and Porretta were the most recent to review the literature regarding PA in school-aged individuals with vision impairments (30). Previous reviews identified no published articles on this topic prior to 1981 (128), and so criteria for this 2015 review (Haegele & Porretta) included articles published between 1981 and July 2013 on participants aged less than 22 years. Articles regarding mixed disabilities were excluded, likely due to the variability and uniqueness of barriers experienced by these different groups (126,129). Eighteen articles were identified, though it should be noted that each used either convenience or purposeful sampling (i.e. no research examined a random sample of BVI school-aged children). Major findings from this review indicate that students with vision impairments had significantly lower levels of PA than their sighted peers (30). The authors noted that individual studies included in this article were small (though the largest included study consisted of 177 participants (130), 16 of the 18 studies included less than 30 participants). In some studies included in this review, significant differences between BVI children and their sighted peers were observed for moderate-to-vigorous PA, whereas differences were less evident for lower-intensity activities such as walking (27). While any PA is better than none, ensuring that PA is at a level sufficient to obtain health benefits is something that is paramount to PA promotion initiatives if positive health outcomes are to be realised (14). The authors noted differences in classification of the level of vision

impairment, lack of randomised control trials and small sample sizes as weaknesses in the study (30).

In one of the larger studies into PA in BVI childhood population, Houwen et al. (2009) looked at PA levels in a sample of 48 BVI children aged 6-12 years, comparing results to sighted age-matched peers (n = 48, recruited from the same class as the 48 participants with BV (127) I). Sports participation was measured via self-report while PA was measured via ActiGraph accelerometer. Children spent <1% of the daytime in the vigorous intensity level therefore moderate and vigorous intensity were combined into one single variable. Children with a vision impairment were found to be statistically less active than their sighted peers ($p < 0.001$). Children with vision impairment additionally spent a great percentage of time in sedentary activity (81.4% (78.4-85.5) vs 78.1% (73.2-81.2), $p < 0.001$), and a smaller percentage of time in light activity when compared to their peers with no vision impairment (15.9% (12.7-18.5) vs 18.6% (16.3-22.3), $p<0.001$). Finally the percentage of time spent in moderate to vigorous PA was significantly lower for those with a vision impairment (2.3% of time (approximately 18.4 mins/day) vs 3.6% of time (approximately 28.8 mins/day), $p < 0.015$. The relationship between degree of vision impairment and PA will be explored later in this chapter.

As part of the National Health and Nutrition Examination Study (NHANES), a nationally representative stratified, multistage, clustered sample of approximately 5000 participants conducted annually across the United States (131), Smith et al. recruited a cohort of adolescents, including those with vision impairment. In this study, vision impairment was defined as reduced visual acuity not attributable to uncorrected refractive error, while uncorrected refractive error refers to reduced vision due to conditions such as myopia or hyperopia that can be corrected with appropriate lenses. Participants with uncorrected refractive error were identified as having distance visual acuity of 20/30 or worse in the better-seeing eye that improved with correction (91). Vision examinations were conducted locally for each participant. A total of 78 adolescents aged between 12 and 19 years with non-refractive vision impairment were included, alongside 689 with an uncorrected refractive error. Adolescents with uncorrected refractive errors and those with non-refractive vision impairment did not demonstrate higher levels of sedentary behaviour or lower levels of moderate-to-vigorous PA compared with those with normal vision. The authors suggested that these findings may be explained by generally low levels of PA within the sighted population, reducing the contrast between groups (132). Additionally, participation in

school-based physical education may have ensured a minimum level of activity across all groups (132). Although this study was limited by relatively small subgroup sample sizes, it is a strength that visual acuity was measured objectively rather than self-reported. However, the sample size was insufficient to explore the impact of severity of vision impairment on PA levels.

Kozub et al were one of the first group to use activity monitors to study PA in individuals with vision impairments in 2004 and were included in Haegele & Porretta's review (27,30). As part of their study, 19 children and adolescents aged between 6 and 18 years were recruited from a school for the blind. Over four days participants accumulated a mean of 7.31 bouts of MVPA per day, lasting an average of 3.77 minutes (SD = 2.26) – significantly lower than levels reported in peers without disabilities participating in similar studies (12.20 bouts/day vs 7.31) (133). No difference was found in bouts of MVPA in those who were day students at the school or attending the school in a full time residential capacity. Researchers have postulated that the lack of a discrepancy between PA levels in day students vs boarding students (with access to appropriate leisure programmes on an accessible campus) suggests this cohort of vision impaired adolescents self-select activities that are sedentary (27,134). Although the study had a small sample size and used imprecise measurements of vision obtained through school records, they point to a low level of PA in this at risk population – even when provided with additional supports such as an accessible campus.

Research is ongoing into the impact of co-existing disabilities with vision impairment on PA. Haegele et al. (2018) studied the relationship between weekday PA levels in youth with vision impairments (n = 6), and those with vision impairments and comorbid Autism Spectrum Disorder (ASD)(n = 6)(134). Activity levels of twelve students in a school for students with vision impairments were measured using a tri-axial accelerometer for four week days, some of whom had a co-existing diagnosis of ASD. Vision impairment levels varied, with eight participants having vision graded B1 via the Paralympic classification system for blind sport (i.e. "no vision"), three labelled B2 ("low vision") and one labelled B3 ("useful vision") (59). Accelerometer data was classified as either sedentary, light, moderate or vigorous. Sedentary behaviour accounted by 74.66% of average wearing time and moderate-to-vigorous PA accounting for just 3.51% of wear time. Perhaps most concerningly, no participants reached the recommendations of 60 minutes of moderate-to-vigorous PA a day (14). Those with ASD and vision impairments spent significantly less time engaged in weekday PA than their peers with vision impairments alone (13.28 mins per

day vs 27.58 minutes per day). This is one of the first studies which attempts to include the level of vision impairment as an important metric in their outcomes. While this is a small study, Haegele et al. noted that the low incidence of the conditions studied, both individually and concurrently, likely contributed to the low sample size (134). Participants were also recruited from a school for students with vision impairments, which previous research has shown are likely being offered sports and PA opportunities that are modified to support their needs (135). It is possible therefore that those in a public school setting would have less opportunities for PA, and lower results in terms of time spent engaging in PA and proportion of students achieving criteria on fitness testing (134).

Similar to the general population, age and sex are two key factors associated with PA levels in the child and adolescent BVI community. Aslan et al (2012) specifically sought to investigate the effect of gender on PA levels of 30 children with vision impairments (136). Overall PA levels were low, with little to no participation in moderate to vigorous PA (136). Unlike the sighted population, there was no significant difference in PA levels between boys and girls identified as blind ($p = 0.32$) (136). Those with milder vision impairments, thus classified as "low vision" however demonstrated different results, whereby boys with low vision were more likely to participate in moderate activity compared to girls with low vision (12/16 +/- 2.56 hours per week vs 8.48 +/- 2.42 hours per week, $p = 0.01$). This study highlights low levels of participation in moderate and vigorous PA in the group of blind children as a potential explanation for this discrepancy between boys and girls (136). Factors such as biased expectations of physical educators, as well as females feeling "more self-conscious" have subsequently been identified by BVI girls as factors that limited their participation in physical education (137). Longmuir and Bar-Or (2000) also explored the impact of gender on PA levels of children and adolescents who are BVI. They noted that PA levels did not differ between genders in their small sample size of 77 (124). Here the authors acknowledge that the presence of a disability may limit PA levels to a lower level *"one that is more commonly associated with "female" levels of participation"* (124)

With regard to age, this concept is not as well studied amongst the BVI population as it is in the general population. Longmuir's study, however, noted that participants with vision impairments did not exhibit the age effect noted both in the general population and amongst those with a physical disability (124). Possible explanation for this include the relatively small sample size ($n = 77$) and low levels of PA limiting the ability to detect a decline with age (124). Contrasting results were obtained by Kozub and Oh (27), with total bouts of

moderate to vigorous PA decreasing with age. Larger studies are required to understand both the extent of this age related decline in PA and the reasons for it.

In the Irish context, there is limited data available regarding PA levels in the BVI population – one of the primary motivating factors for completing this PhD study. Available data comes from large nationally conducted studies of PA in the general population. The Childhood Sports Participation and Physical Activity (CSPPA), for example, provides some information on the impact of disability in general on PA. Disability status was assessed using the Child Functioning Module questionnaire, a screening tool often used in censuses to capture levels of disability (138). At primary school level, children with disabilities were less likely to meet WHO PA guidelines (16% vs 23% of the population), highlighting a clear disparity in overall activity levels. They also participated in fewer minutes of physical education per week (81 vs 86 minutes) and were more likely to be categorised as non-swimmers (14% vs 7%).

Those without a disability were more likely to participate in community sports on a weekly basis (94% vs 84%) when compared to those with at least one functional difficulty, though it should be noted that this disability gap is improving year on year (10,139). Disability status also significantly impacted school sport participation at both primary and post primary level (10). 66% of the general post primary school population participated in weekly school sports, for example, vs 74% of those without a disability (10). It was also noted that disability status did not influence the likelihood of meeting PA guidelines at post primary school level (10) These results are consistent with the PA report card issued to Ireland North and South, which reported grades both for the general population and those with a disability (104). With regard to organised PA, the general population achieved a C- grade, suggesting 40-46% met overall PA guidelines, while those experiencing a disability received an F grade (indicating less than 20% overall met the PA guidelines) (104). Although the results were less stark for other indicators, discrepancies remain. For example, 27-33% of those with a disability met guidelines regarding organised PA and sport, vs 47-53% of the overall population (a D grade vs a C grade) (104).

Physical Activity in Blind or Vision Impaired Adults

Similar to the child population, low PA levels in adults with BVI are frequently reported across the adults life course, including among working-age and older adults. While the implications of low PA may differ across adulthood, the issue is particularly relevant in later

life given that rates of vision impairment increase with age, both in Ireland and internationally (4,140). Increasing PA among adults with BVI is therefore an important public health concern. Interpretation of adult findings is complicated by variation in how age groups are defined across studies. Terms such as “working-age”, “middle-aged” and “older adults” are often applied using different chronological cut-offs, making direct comparison between studies difficult (24,141–143).

Although much of the available literature focuses on older adults with age-related vision loss, these findings provide important context for understanding PA across adulthood, including among working-age adults with BVI. A scoping review by Griffin et. al (2016) reviewed 30 articles published between 1999 and 2015 that reported PA data on those over 55 years of age with evolving vision deterioration (i.e. not those who have stable vision loss, or vision loss since childhood) (143). This review noted age related vision loss was highly detrimental to mobility. The majority of studies included in this review also demonstrated reduced levels of PA when adjusted for age and health related confounders (143). Similar results were noted incidentally through the English Longitudinal Study of Ageing. Here Smith et al. demonstrated that those over 50 with self-rated fair/poor eyesight were twice as likely to be inactive as those with self-reported excellent eyesight (24). These findings remain robust even after accounting for important confounders including cardiovascular disease, diabetes and depressive symptoms.

The impact of this in the older population is also profound. Griffin et al.’s review (143) noted that age related vision loss had a significant impact on the pursuit of vision dependent leisure activities. Subsequent qualitative research on twenty-six individuals who are BVI noted that vision loss caused a number of participants to give up activities which they previously would have enjoyed the most (144). Additionally vision loss caused a shift in relationships. For example some participants noted that they withdrew from relationships which no longer felt “equal” (144). Given the mental health benefits of PA (83), prioritising PA in this older age group experiencing BVI could have significant health benefits.

Maintaining PA in the older population with low vision is also of importance for future health care planning. The Beaver Dam Eye Study of middle to older age adults age 40-60 demonstrated associations between current binocular vision level and nursing home residence ($p < 0.0001$), though confounders by other illnesses and self-rated health should be taken into account when reviewing papers focusing on older cohorts (145).

With regard to the Irish adult population aged over 16, the ISM survey provides some data on the impact of disabilities in general on sports participation. In the most recent 2024 report, individuals with a disability were far less likely to participate in sport than those without a disability (32% vs 54%) and were less likely to walk for recreation (63% vs 73%) (13). The 2024 Sports Monitor included a particular disability focus and provided additional data (9). For example, although the proportion of people with a disability leading a sedentary lifestyle has declined from to 19% in 2019, it had increased in the most recent iteration to 29% - almost double that of those without a disability (15%) (9,146). Further exploration of the barriers to PA for those with a disability in this survey will be detailed later in this review.

2.4 Assessing Physical Activity Levels in the Blind or Vision Impaired Population

There has been considerable debate in the literature regarding the optimal methods of assessing PA levels in any given population (147–149). Assessment approaches are broadly divided into device-based (i.e. objective) and self-reported (i.e. subjective) measures (147–149). Device-based methods, such as accelerometers, are widely regarded as the gold standard in the general population due to their capacity to capture large volumes of data, quantify activity intensity, and demonstrate high levels of validity (147–149). Pedometers are considered a more accessible alternative, offering greater convenience and lower cost when compared to accelerometers (147–149). However they are generally less accurate than accelerometers, particularly in capturing activity intensity (147).

Regardless of the device chosen, device-based measures are not without limitation. These include participant noncompliance resulting in missing or incomplete data (150), device removal for safety or during water sports participation (150) and variability of results with device placement (151,152). Cost remains a significant barrier, particularly for large-scale studies, with accelerometers representing a substantial financial investment (147–149). Taken together, these limitations highlight important practical and methodological challenges associated with relying solely on device-based measures of PA.

Self-reported measures, such as those provided by surveys and activity diaries, are commonly used as a practical and low cost alternative to devices which measure PA (147,153). They can also provide additional context about the type and domain of PA undertaken (147). However, as indirect measures, they are subject to several well-recognised biases. Recall bias may result in underestimation of habitual activities and overestimation of

vigorous-intensity exercise (153–155), while social desirability bias may lead participants to report behaviours perceived as favourable (147,155). Furthermore, certain groups – including individuals with low literacy (153), limited internet access for online surveys, or the elderly, may be under-represented in self-reported data (147,153,156). Despite these limitations, large-scale studies utilising self-reported data have provided valuable insights into population-level PA patterns (10,13), supporting their continued use where device-based methods are not feasible.

Measuring PA in BVI populations presents additional and unique challenges. In device-based assessment, differences in gait compared to sighted populations have been consistently reported, including shorter stride length, slower gait velocity and limited plantar flexion (22). These gait changes likely reflect a more cautious walking strategy, with fear of falling being particularly common amongst the older population who are BVI (157). Such altered gait patterns may reduce the magnitude and regularity of movement signals captured by accelerometers, leading to potential underestimation or miscalculation of PA intensity (25,158).

The use of assistive devices further complicates measurement. Cane-assisted ambulation, used by approximately 2-8% of this population (159,160), alters gait mechanics and introduces upper limb movement that may not be adequately captured by standard hip- or wrist-worn monitors (161). As a result, conventional device placement may fail to fully reflect activity patterns in this group. Although research is ongoing to address these challenges, including how to appropriately account for cane use in activity measurement, such approaches have yet to be fully validated (159,160). Alternative devices, such as talking pedometers, have also been explored; however, these have demonstrated poor reliability, with error rates exceeding acceptable thresholds (>5%) across common activities such as walking and stair negotiation (162).

Evidence examining the validity of accelerometry in the BVI population remains limited. Kozub et al (2004) examined the accuracy of the ActiGraph RT3 accelerometer in individuals with vision impairments (158), reporting acceptable inter-instrument reliability in a small sample of children and adolescents. However, variability in movement patterns, including rocking and other non-ambulatory movements, may influence measurement accuracy. Subsequent research has supported the use of accelerometers in this population (127), although findings are based on relatively small samples and short-term measurement

periods, limiting generalisability. Taken together, the current evidence base highlights both the potential and the limitations of device-based PA measurement in BVI populations.
Given these challenges, alongside the financial and logistical constraints associated with device use in large samples, alternative approaches to measuring PA must be considered. Self-reported methods have been widely used in studies involving BVI populations (136,163). Advances in assistive technologies, including screen readers (164), have improved accessibility, enabling individuals to complete surveys independently while maintaining privacy. Much of the available data on PA levels in BVI adults is derived from larger population-based studies, such as the English Longitudinal Ageing Study (24), the Beaver Dam Study (145) and the Canada Fitness Study (125), which utilise a combination of computer-assisted interviews and questionnaire-based methods. In the Irish context, the national CSPPA (child/adolescent population) and ISM (adult population) studies employ similarly survey-based tools (10,13). The widespread use of these methods has firmly established questionnaires and activity diaries as practical approaches to measuring PA levels in this population.

While both device-based and self-reported approaches provide valuable information on the frequency, intensity and duration of PA, they offer limited insight into the contextual, social and psychological factors that influence behaviour. This limitation is particularly important in BVI populations, where participation in PA is shaped by complex and often interrelated barriers, including environmental accessibility, social support, perceived safety and prior experiences of inclusion or exclusion. Qualitative research has demonstrated that individuals who are BVI experience barriers such as transport difficulties, limited access to PA opportunities and negative past experiences (165), many of which are not readily captured through quantitative measures (147,166). Similarly, studies involving individuals with VI highlight the role of social and environmental factors, including interpersonal dynamics and structural barriers, in shaping participation (167–169). Across disability populations more broadly, qualitative research has consistently identified multifactorial influences on PA behaviour, encompassing social, environmental and psychological domains (6,45).

As a result, qualitative approaches are essential in providing a deeper understanding the "how" and "why" underpinning PA behaviour, complementing quantitative measures. Despite a growing body of research, there remains a limited understanding of how these factors interact to influence PA behaviour in specific contexts, particularly within defined BVI populations. Much of the existing literature is based on small or heterogeneous samples

(24, 27). Furthermore, there is a paucity of research integrating both quantitative and qualitative approaches to provide a comprehensive understanding of PA behaviour in this group. As such, further research is required to explore these experiences in greater depth and within clearly defined populations.

2.5 Physical Activity and Degree of Vision Impairment;

Association between Physical Activity and Degree of Vision Impairment

While there is a body of research exploring the relationship between degree of VI and PA, interpretation of this association is complicated by a lack of uniformity in how VI is defined and measured. Augestad and Jiang (2015) highlight a limited number of studies specifically exploring this relationship, with conflicting findings reported (28). Some evidence suggests that individuals with more severe levels of VI may engage in lower levels of PA. Within the studies identified by Augestad and Jiang (28), both Aslan (2012) and Hopkins et al. (1987) reported difference in PA participation between individuals with low vision and those who are blind (136,170). Houwen et al. (2009) further identified that decreasing levels of PA were associated with increasing severity of VI, particularly in relation to time spent in sedentary and light activity (127). These findings suggest a potential gradient effect, whereby increasing severity of VI may be associated with reduced engagement in PA.

In contrast, Kozub and Oh (2004), also identified within Augestad and Jiang's review, found no statistically significant association between degree of VI and participation in PA (27). This study was limited by a small sample size (n=19) and imprecise measurement of visual acuity, reducing the reliability of its findings (27). Similarly, Aslan et al. (2012), despite identifying differences between groups, reported no statistically significant relationship between vision level and time spent in light, moderate or vigorous activity ($p > 0.05$) (136). It was observed, however, that blind participants demonstrated a preference for lower intensity activity, and both groups showed minimal participation in vigorous exercise. These findings suggest that environmental and contextual factors, in addition to methodological limitations, may obscure potential relationships between vision level and PA.

More recent studies further contribute to this evidence base. Demiturk et al. (2015) reported that blind children had significantly lower total PA levels, as measured by the International Physical Activity Questionnaire, compared to children with low vision ($p < 0.05$) (171). Similarly Maciej identified differences in motor skill performance between children with low vision and those who were totally or near blind, including disparities in running, balance

and coordination (172). These findings may provide a possible explanation for reduced participation in moderate to vigorous PA among children with more severe VI.

While a broader body of literature exists examining PA among individuals with VI, relatively few studies explicitly analyse the impact of degree of vision loss on PA outcomes. Overall, the evidence remains inconsistent. This is likely driven by methodological heterogeneity, particularly in how VI is quantified. Across studies, variation in classification systems, small sample sizes, and differences in PA measurement limit comparability. As a result, drawing firm conclusions regarding the relationship between degree of VI and PA remains challenging. While there is a suggestion that individuals who are blind may benefit from different PA interventions compared to those with low or useful vision, there is currently insufficient evidence on which to base these recommendations.

Quantifying Vision Impairment

High quality, multicentre data on the PA levels among adolescents and adults who are BVI remains limited. Augestad and Jiang (2015) highlighted conflicting evidence regarding whether individuals who are blind differ in their PA levels compared to those with milder VI (28). This inconsistency is likely influenced by a lack of uniformity in how VI is defined and classified across the literature.

Much of the available data is derived from larger studies examining populations with mixed disabilities, where vision-specific terminology is not consistently included in search strategies. Terms such as “blind”, “visually/vision impaired”, and “low vision” are often absent from MESH headings, requiring identification of relevant studies through citation tracking rather than systematic search alone. Furthermore, studies vary considerably in how VI is measured. Some rely on self-reported categories (e.g. fair, poor, good) (24,91,173), while others use arbitrary visual acuity cut-offs, such as those applied in the NHANES survey (131). While these approaches provide some level of standardisation, they may fail to account for functional aspects of vision, such as visual fields or light sensitivity (30,174).

More formal classification systems include those used by the Irish and International Paralympic Committees (IPC), ICD-10 criteria, and the Berkeley Rudimentary vision Test (59,174–177). These systems involve objective assessment by an ophthalmologist or optician and require a degree of health literacy. Of these, the classification system used by the Paralympic organisations is among the most widely recognised by patients and the

public, and it is outlined below in Table 2.1 (59,175). This thesis adopted the IPC classification as it was most appropriate for studies focused on PA, PE and sports participation. This classification is widely used in blind/VI sport and therefore aligns with the context and stakeholder language of the research. It additionally features plain language descriptors, for example "light perception and ability to perceive some movement in front of the eye but inability to recognise shapes" (59). Previous position statements from the IPC have described how this system should reflect the extent of activity limitation impairments cause and should thus be objective and reliable (178). While it is broadly based on medical classifications such as the ICD, these medical classifications are more appropriate for diagnosis, epidemiology and health-service reporting (177,179).

Table 2.1 Paralympic Classification of Vision Impairment.

B1	-Having no light perception in either eye -light perception and ability to perceive some movement in front of the eye but inability to recognise shapes
B2	-Limited vision in both eyes either in how far or how wide they can see. - Includes being able to count fingers at 15 centimetres to a visual acuity of up to and including 2/60. - B2 also includes someone with a visual field of under 10 degrees even if their acuity is better than 2/60
B3	-Includes those with a level of vision better than 2/60 and up to and including 6/60. -It also includes those with a visual field of less than 40 degrees who may have acuity better than 6/60
B4	-Includes those with better vision than 6/60, and up to and including 6/24.
B5	-Includes those with a visual acuity of better than 6/24 but no better than 6/18.

While this system provides clear, standardised categories with associated functional descriptors, it is not routinely used in research. The lack of consistent terminology has been highlighted previously; Haegele and Porretta (2015) reported that 44% of studies in their review used non-standardised descriptors such as “low vision” or “blind” without reference to a defined classification system (30). In some cases, insufficient detail was provided to determine how VI was categorised (30). Greater consistency in classification would facilitate comparison between studies and strengthen the evidence base regarding the relationship between VI and PA.

2.6 Determinants of Physical Activity;

Determinants of Physical Activity in the General Population: Facilitators

A substantial body of literature has examined the factors that facilitate participation in PA in the general population, with evidence consistently demonstrating that these determinants are multifactorial and operate across personal, social and environmental domains (47,62). Rather than acting in isolation, factors interact to influence behaviour, as conceptualised within ecological models of health behaviour (44,47).

At an individual level, psychological factors such as motivation, enjoyment and self-efficacy are consistently identified as key facilitators of PA (109,113,180). Self-efficacy, defined as confidence in one's ability to engage in PA under varying circumstances, has been shown to be a strong and consistent predictor of PA participation across the life course (44). In children and adolescents, perceived competence and enjoyment are particularly important, with opportunities for choice and autonomy further enhancing engagement (57,112,181). Image based factors have additionally been found to influence PA, though the exact nature of these factors vary by gender (180,182,183). Females are more likely to report appearance-related motivations such as staying in shape and weight management, and males more likely to endorse strength-based motivations ($p < .001$). However, the absence of reported effect sizes limits the ability to determine the practical significance of these findings (180). More recently, social-media may have influenced these findings, with boys increasingly referencing image based outcomes as exercise aims (184). With regard to the adult population, additional factors such as avoiding or managing health conditions (cited by 17.8% of participants in a large Australian study), improving athletic performance/strength (11.5%), improving mood (7.9%) and improving appearance (12.8%) were other motivating factors, though for these factors no significant difference was found between genders (185).

Social influences also play a critical role. Support from family and peers is a widely identified as a facilitator of PA, particularly among younger populations. Parental encouragement, role modelling and logistical support (such as transport to activities) are key contributors to participation (109,180,186,187). Having parents who encourage PA ($p=0.02$) and having parents who exercise themselves ($p<0.001$) were particularly influential, highlighting the potential benefit of involving parents in any interventions trialled to promote PA. Additionally, having a peer to exercise with was influential for males and females ($p <$

0.001). Many of the studies in this area however did not include significance tests or measure effect size, making it difficult to judge the magnitude of these relationships (181).

Environmental factors further shape PA behaviour. Access to safe, appropriate and affordable facilities, availability of recreational spaces and supportive infrastructure such as active transport routes are all positively associated with PA participation (44). More recent evidence has reinforced the importance of the built environment, demonstrating that walkability, neighbourhood safety and access to green space are key determinants of PA across populations (188).

Determinants of Physical Activity in the General Population: Barriers

In an attempt to understand the low levels of PA in the general population, much research has been directed towards the barriers to PA and how best they can be overcome. Understanding what hinders PA provides an opportunity to modify and improve these factors (44). These barriers are similarly multifactorial and can be broadly categorised into personal, social and environmental domains.

At an individual level, lack of time, competing priorities and low motivation are consistently reported as the most common barriers to PA (185,189). These barriers are evident across age groups but are particularly pronounced during adolescence, where competing academic and social demands increase (180). Psychological barriers, including low confidence and body image concerns, have also been identified, particularly among female adolescents [$p < 0.009$] (190).

Social factors may further limit participation. A lack of social support, particularly from family and peers, has been associated with reduced PA engagement (191). Socioeconomic status also plays a significant role, influencing access to facilities, opportunities for organised sport and engagement in active transport (10,139).

Environmental barriers include limited access to appropriate facilities, poor infrastructure and safety concerns. While these factors vary across geographic and socioeconomic contexts, they remain important determinants of PA behaviour. Notably, more recent research has highlighted the importance of the built environment, with poor infrastructure, lack of safe walking routes and limited access to recreational spaces acting as barriers to participation (188). In the Irish context, access to safe places to cross the road, distance

between home and school being too far and the weight of school bags were barriers to active transport to school (e.g. walking or biking) (139). These obstacles to active transport were similar to those reported by parents in other countries (192,193). These determinants may be further influenced by the presence of disability, which introduces additional personal, social and environmental barriers to participation.

Determinants of Physical Activity in the Population with Disabilities;

While many determinants of PA in the general population are also relevant to individuals with disabilities, these factors often operate differently and are compounded by additional, disability-specific barriers. Evidence suggests that determinants of PA in this population are complex and interrelated, spanning personal, social and environmental domains (6,45).

Determinants of Physical Activity in the Population with Disabilities: Facilitators

Facilitators of PA in individuals with disabilities span individual, social and environmental domains, and often reflect the presence of supportive structures that enable participation . At an individual level, motivation, enjoyment and perceived competence are important facilitators of participation, consistent with findings in the general population. However, for individuals with disabilities, these factors are strongly influenced by prior experiences of inclusion and success in PA. Positive early experiences, particularly during childhood, may enhance self-efficacy and promote sustained engagement in PA across the life course (45). Social support is consistently identified as one of the most important facilitators of PA in this population. Support from family members, particularly parents, plays a central role in enabling participation by providing encouragement, transport and opportunities for engagement (19,45). Peer support is also influential, with inclusive social environments and opportunities to engage in PA with others acting as key motivators. The presence of supportive relationships may mitigate some of the psychological and practical barriers associated with disability, reinforcing participation through social reinforcement and shared experiences (45).

Environmental and organisational factors are critical facilitators of PA. Access to appropriate and inclusive facilities, availability of adapted programmes and the presence of trained staff have all been associated with increased participation (6). Inclusive programme design, including the adaptation of activities to meet individual needs, has been shown to enhance engagement and improve outcomes (194). More recent research emphasises the importance of inclusive community environments, highlighting that accessibility, affordability and availability of programmes are key determinants of participation (19).

At a broader level, policy and structural supports also influence participation. The implementation of inclusive policies, provision of funding and development of community-based programmes have been identified as important facilitators, underscoring the need for system-level approaches to promoting PA in individuals with disabilities (6).

Determinants of Physical Activity in the Population with Disabilities: Barriers

Despite the presence of facilitators, individuals with disabilities experience a range of barriers that limit participation in PA. These barriers are multifactorial and often interrelated, spanning personal, social and environmental domains.

At an individual level, reduced physical competence, fatigue, pain and functional limitations are commonly reported barriers to participation (195,196). These factors may reflect both intrinsic limitations and reduced opportunities for skill development (197). Previous negative experiences of PA, including exclusion or failure, may further reinforce avoidance behaviours (198). Additionally, practical challenges such as fatigue, pain, toileting requirements and the increased time needed for preparation may further limit engagement in PA among individuals with disabilities (199).

Social barriers also play a significant role. Parental attitudes may restrict participation, particularly where concerns exist regarding safety or injury risk, or simply prioritising other activities or therapies over PA (200). Peer-related factors, including stigma, fear of bullying, social exclusion and lack of inclusive opportunities, may further limit engagement (201). The absence of supportive social networks can exacerbate feelings of isolation and reduce motivation to participate in PA.

Environmental barriers are consistently identified as significant determinants of PA in individuals with disabilities. While access to facilities and opportunities influences participation in the general population (44), these challenges are often amplified in disability populations. Transport difficulties and financial constraints further restrict access to opportunities (202,203). Importantly, these barriers are often systemic, reflecting broader issues related to accessibility and inclusion within the built environment and recreational infrastructure.

More recent literature has highlighted the persistent nature of these barriers, with limited progress observed in improving accessibility and inclusion despite increased awareness. In

particular, structural barriers within community and recreational settings continue to limit opportunities for participation, emphasising the need for coordinated, multi-level interventions (6,19,204). It is important to note that much of the foundational research in this area was conducted in the early 2000s. While these studies remain relevant, the relative lack of contemporary, large-scale research examining determinants across diverse disability groups represents an ongoing limitation within the evidence base.

Determinants of Physical Activity in the Blind or Vision Impaired Population

While there is overlap between the determinants to PA observed in the general population and those with disabilities, individuals with blindness or vision impairment (BVI) experience additional, unique barriers that further limit participation. These unique barriers may explain the discrepancies between PA levels across these groups. Existing literature suggests that these barriers are multifactorial, encompassing personal, social and environmental influences, and are often shaped by the interaction between visual impairment and the surrounding environment.

At an individual level, factors such as motivation, confidence and prior experiences influence participation. Qualitative research has demonstrated that while individuals with BVI recognise the physical and mental health benefits of PA, participation may be limited by reduced confidence, fear of injury and previous negative experiences, particularly in educational settings (167). Early exposure to adapted sports and positive experiences of inclusion have been identified as important facilitators, highlighting the long-term impact of childhood experiences on adult behaviour. The presence of additional disabilities and health conditions is therefore an important consideration when interpreting PA levels within the BVI population. Co-existing physical, developmental or health related conditions may independently restrict participation through factors such as pain, functional limitation of additional support needs, while also interacting with barriers associated with VI. Consequently, reduced PA within a BVI cohort cannot necessarily be attributed to VI alone where participants have additional disabilities or health conditions. This heterogeneity should be considered when comparing PA levels both within BVI populations and with sighted populations (6,70,199,200).

Similar to the general population, improving physical fitness served as the primary motivation for regular PA, and a decline in fitness served as a prompt to return to exercise.

Consistent with research on the general population, those with BVI have noted the positive impact of exercise on mental health (205).

Social factors also play a critical role. Family support, including encouragement and practical assistance, has been identified as a key facilitator of PA in this population (167,169). Conversely, and unique to the BVI population, stigma and societal attitudes towards VI may act as barriers. For example, reluctance to use assistive devices such as canes due to perceived stigma may limit opportunities for participation (167). Peer relationships are similarly important, with lack of companionship and fear of social exclusion reducing engagement in PA (168).

Environmental barriers are particularly prominent in individuals with BVI. Difficulties navigating the built environment, including poor infrastructure, uneven surfaces and obstacles, may significantly limit opportunities for PA. These challenges are compounded by issues related to transport, accessibility and safety, with many individuals relying on others to access facilities (42,206). Issues with public transport included inconsistent bus design (making it difficult to find seats), difficulty managing steps up to a bus, lack of accessible time table information in rural areas and absence of audible cues naming bus stops were highlighted as barriers to the use of public transports (42). Importantly, the quality of the built environment, including road and pavement conditions, may directly influence mobility, confidence and willingness to engage in outdoor PA. Variability in pavement condition, often assessed through measures such as surface roughness, has been shown to impact usability and safety of walking environments, particularly for vulnerable populations (207,208).

In addition to physical barriers, structural factors such as lack of accessible programmes, limited availability of adapted equipment and insufficient training among staff further restrict participation (126,169). These barriers often persist across the life course, reflecting broader issues related to inclusion and accessibility within PA provision. Despite these challenges, participation in PA has been associated with significant physical, psychological and social benefits in this population. Engagement in adapted sports has been shown to improve mental health, social participation and overall wellbeing, reinforcing the importance of addressing barriers and promoting inclusive opportunities (209).

2.7 Physical Education for Children who are Vision Impaired

Given the previously mentioned low levels of PA amongst children and adolescents with vision impairment, and the proportion of a child's day spent in school, this represents a critical opportunity for intervention (210). Physical Education (PE) provides an important opportunity to develop fundamental movement skills, physical competence and confidence, all of which are essential for lifelong engagement in PA (211,212).

For children with BVI, PE may offer additional benefits, including improved spatial awareness, social integration and exposure to adapted forms of PA (167,212). This aligns with McLinden et al.'s distinction between "access to learning" and "learning to access", whereby inclusive education should not only enable children who are BVI to access curriculum content, but also support the development of skills needed to navigate future environments and participation opportunities. The most recent guidelines for PE in Ireland recommend 60 minutes of PE per week at primary school, and 80 minutes per week for the first three years of post-primary school (213). In the most recent CSPPA iteration (10), Irish primary school students reported receiving an average of 85 minutes of PE/week, with 75% meeting the recommended guideline of 60 minutes/week. Second level school students received an average of 77 minutes of PE/week, with 72% meeting the recommend 80 minutes/week (10,139). Participation in PE is often limited by a range of barriers, including lack of teacher training, safety concerns and insufficient adaptation of activities (126,214). Improving teacher education, increasing awareness of inclusive practices and providing appropriate resources are essential to maximise participation in PE. Low-cost adaptations, such as the use of auditory equipment, peer support and modified instructional strategies, have been shown to improve inclusion and engagement (126). Given the importance of early experiences in shaping lifelong behaviour, addressing barriers within the school environment represents a key opportunity to promote PA in this population.

2.8 Summary of Literature Review;

This chapter has reviewed the literature on Physical Activity (PA) participation across the life course, with a particular focus on individuals who are Blind or Vision Impaired (BVI). A number of consistent patterns emerge. Physical activity is associated with clear physical, mental and social benefits, and for those who are blind or vision impaired there are some

additional gains, including reduced risk of falls, better spatial awareness and, in some cases, a slowing of further vision loss. Despite this, participation levels remain lower than in the general population, and this gap is evident across all stages of the life course. Participation is also shaped by factors operating at multiple levels, from individual motivation through to wider policy, and these influences shift over time rather than remaining fixed.

While the literature does a reasonable job of establishing these broad patterns, there are still some fairly clear gaps. These gaps underpin the empirical work that follows in the thesis. To start with, there is limited evidence on participation among individuals who are BVI within the Irish context. Large scale surveys give a good overview of the general population but tend not to provide meaningful detail for this group, and it is difficult to rely on international work given how much context can vary across countries. Chapters 3 and 4 address this by providing a clearer picture of participation in Ireland, focusing on children and adolescents in Chapter 3 and adults in Chapter 4.

A second issue is the imbalance across life stages in the existing literature. Much of the work focuses on either younger people or older adults, with relatively little attention given to those of working age. This is a sizeable group, and one that faces its own set of challenges, particularly around work and family commitments, and the lack of structured supports that tend to exist earlier or later in life. Chapter 6 focuses on this group specifically, exploring their experiences in more depth.

A third limitation is that most studies look at participation at a single point in time. There is less consideration of how experiences change across the life course, how early engagement shapes later behaviour, or how barriers build over time. The design of this thesis, which looks across multiple cohorts and applies a consistent framework throughout, is intended to address this. The comparative element of this work is brought together in Chapter 8.

Finally, there is a tendency in the literature to separate quantitative and qualitative approaches. Quantitative work tells us that participation is lower, but does not always explain why. Qualitative work provides insight into lived experience, but often without the broader context. This thesis takes a more connected approach, with the qualitative work in Chapters 5, 6 and 7 building directly on the findings from the quantitative analyses in Chapters 3 and 4.

Overall, these gaps point towards the need for a more joined up approach, one that is grounded in the Irish context, takes a life course perspective, uses a mix of methods and gives proper attention to working age adults. The chapters that follow are structured around addressing each of these areas.

Chapter 3: Quantifying physical activity, physical education and active travel in children and adolescents with visual impairments

3.1 Abstract

Background

Meeting the physical activity (PA) guidelines for children, as set out by the World Health Organisation (WHO), has a range of physical and mental health benefits. For children who are blind or vision impaired (BVI), additional benefits include social inclusion and reduced falls risk. While previous research has demonstrated low PA levels across most demographics, little research has been done in the Irish context to quantify PA in children who are BVI. Two potential methods of increasing PA levels, active travel (AT) and physical education (PE), have additionally never been assessed in this group.

Methods

Consenting parents of children who are BVI (n=53, 55% boys, mean age of children 12.92 ± 2.76 years) completed a questionnaire regarding PA levels, and participation in AT and PE.

Results

PA levels were low, with 9.6% achieving WHO guidelines (60 minutes MVPA/day). There was no statistically significant differences between genders completing either no PA in the last week (p=0.157) or MVPA on each of the last 7 days (p=1.00). 15.4% used AT to get to school. Mean PE times in minutes/week were lower than the general population (58.63 mins), with a low proportion of respondents meeting PE guidelines (32.1%). Regarding barriers to PA, 17.0% of respondents stated they were very likely to be "too tired after school to be active". 13.5% stated they were very likely to feel "my day is so busy now I just do not think I can make time to include PA in my regular schedule".

Conclusion

This study provides a valuable insight into the low levels of PA that prevail amongst BVI children. Increasing PA levels would provide individual benefits (including physical and mental health benefits) as well as population benefits (including reduced health expenditure). Future qualitative research should seek to gain a deeper understanding of the PA barriers, motivators and facilitators in this cohort.

3.2 Background

Physical activity (PA) is essential in the prevention of non-communicable diseases such as diabetes, dementia and certain forms of cancer (15). Furthermore, strong positive correlations between PA levels and mental health have also been demonstrated in youths (205). It therefore seems logical that all factors that increase PA participation in children and young people should be explored in an effort to positively impact their health. Physical education (PE) and active travel ((AT; defined as walking or cycling for the purpose of functional rather than leisure travel) have been recognised as key areas where children and young people can increase their level of PA (215–217)

The World Health Organisation (WHO) recommends an average of 60 minutes of moderate to vigorous physical activity (MVPA) per day for children and adolescents aged 5-17 years, with an additional emphasis on muscle strengthening at least three times per week (14). In the paediatric population, both national and international data suggests that the majority of children are not sufficiently physically active to elicit the positive health benefits associated with PA (54,139). Research suggests that those with a disability have even lower levels of PA, with Longmuir & Bar-Or (1994) identifying a statistically significant increase in sedentary lifestyle amongst the population with a disability (125). Specifically, those with a vision impairment (VI) were at even higher risk of low PA than those with other impairments such as a physical disability or a hearing impairment (125).

The relationship between engagement in PA and VI is complex, and recent research has sought to shed light on the interplay between the two. While the health risks for low activity levels are well documented (15) in the population with VI, a lack of PA and the resulting higher BMI increases the incidence of sight threatening metabolic diseases, including diabetic retinopathy, glaucoma and macular degeneration (85,87,218), the consequences of which would be greater for those who already experience poor vision. Given the strong correlation between PA levels in childhood and adulthood, improving PA levels in childhood and adolescence offers a unique opportunity to provide long term benefits to this group (18,96,219). This is particularly important when considered within a life course framework, as early experiences of PA are likely to shape future participation, confidence and engagement across later life stages (55,56).

While information regarding PA levels in children and adolescents who are blind or vision impaired (BVI) can be accessed either through filtering the results of large population based surveys (91,139) or studies conducted on those with multiple different types of disability (124,125), limited studies have attempted to quantify levels of PA specifically for young people who are BVI. Haegele and Poretta's review (2015), for example, identified 18 studies published over a 32 year period on the topic, providing evidence of lower PA levels in children who are BVI while also identifying the need for further research regarding the variables that influence PA (30). The barriers to PA in this population are known to be unique and difficult to overcome (30,220). Linsenbigler's 2018 review, spanning over 30 years of research from 1984 – 2015, highlighted the persistence of social barriers such as attitudes about visual impairments, and lack of professional training (126). Additional environmental barriers such as access to appropriate equipment and suitable transport have been highlighted in both Linsengbigler's (2018) review (126) and similar research (19).

AT, traditionally defined as walking and cycling for the purpose of functional rather than leisure travel, is a recent area of Irish government policy focus, forming part of the government's National Sustainable Mobility Policy (217,221). If implemented successfully, policies such as this should lead to increased PA for the entire population. AT has long been recognised as positively contributing to overall PA, through the provision of mobility and activity that is easily accessible and affordable (216,222). According to Götschi (2015), adoption of high levels of AT could prevent up to 4% of all cause deaths (216). AT, however, presents unique difficulties to the BVI population. While the Royal National Institute for Blind People (RNIB) in the UK highlighted the importance that 90% of respondents who are BVI placed on the ability to make walking journeys independently (223), obstructions such as cluttered pavements, lack of accessible pedestrian crossings and difficulty detecting quiet/silent electric vehicles have been identified as barriers to AT for this population. Additionally, in a survey of Irish people experiencing BVI, up to 63% of respondents to a recent survey had been injured while walking in their local area (224), resulting in the need for campaigns such as the Vision Ireland's recent 'Clear Our Paths' (208). Assessment of the current levels of AT within the BVI population in Ireland is needed, not only to raise further awareness of the importance of AT but also to provide a baseline from which the impact of future interventions can be judged.

While it is clear that AT is a key determinant for increasing PA levels, children and adolescents spend the majority of their waking hours in school, and education settings

provide another opportunity to increase PA levels and sports specific skills (215). The Department of Education in Ireland recommends that all primary school students in Ireland receive at least 60 minutes of PE weekly, and all post-primary schools receive either a double class or 80 minutes/week (10,213). PE guidelines in Ireland do not make any specific accommodations for those with a disability, including those who are BVI. As a result, additional effort should be made to ensure these students meet these guidelines. For the BVI, PE additionally offers opportunities to develop self-determination skills (the ability of individuals to make choices and have control over their lives) and sensory efficiency skills (use of residual vision, hearing and other sense to enhance access to the environment) – key skills that will likely serve as building blocks for future PA (212). Evidence shows, however, that the inclusion of children who are BVI can be challenging for teachers, leaving these children at risk of reduced access to PE (128,225,226).

Given that PA levels have not been quantified in the Irish BVI population to date, assessing current PA levels is vital to understanding whether interventions to increase PA in youths with BVI in Ireland are needed. In addition, information on barriers/enablers of PA, use of AT and participation in PE amongst this cohort, particularly in the Irish context, will provide essential information that is required to direct any necessary changes in policy. This is particularly relevant given the potential for these early patterns to influence participation across later stages of life (51,56).

Study Aim

The aim of this study was to further investigate PA levels of children and adolescents who are BVI in Ireland, as well as the barriers and motivators to PA this group experience, an area which is yet to be studied in the Irish context. To further understand PA levels in this group, this research also aimed to quantify AT and engagement in PE class – unique insights which have not been obtained in an Irish or international context.

The impact of gender on PA levels is unique in the BVI population, with Kozub et Oh (2004), for example identified no difference in PA levels between genders (27), unlike the general population (18). To explore this aspect in the Irish context, analysis will be conducted to investigate the impact of gender on PA levels within this population.

3.3 Study Design and Methods

Study Design

A cross sectional survey design investigating PA levels and related variables was selected as an appropriate method of investigation. Quantitative online surveys were selected as the most effective data collection tool given the practicality, cost effectiveness and ease of collection and distribution across the country (147). They are useful when classifying activity levels (sufficient/insufficient, low/moderate/high), providing information regarding different types of PA and showing changes between groups, given their accuracy on a population level (147,227). Based on previous research with this cohort, and in consultation with research partners Vision Sports Ireland (VSI) (the national governing body for sport and leisure opportunities for people who are BVI in Ireland)(228), MS Forms was selected as the most user-friendly and accessible online platform from which to collect questionnaire-based data in this sample (229).

The majority of questions included in the questionnaire were based on the Children Sports Participation and Physical Activity Questionnaire (CSPPA) 2022 (10). CSPPA is a 170+ item questionnaire conducted at 4-5 yearly intervals following first iteration in 2005. This all-island research study of children age 10-18 includes topics relating to PE, PA and AT. Validity has previously been established through previous CSPPA iterations (10). The instruments selected for CSPPA 2022 were based on developmentally appropriate and psychometrically valid self-report instruments, which are provided in Table One (10,74,230,231). Gender was determined by self-report, consistent with CSPPA (10). Modifications were made where required to ensure the survey was appropriate for the cohort. One modification was required, specifically adding "with the use of a mobility aid" when assessing mobility challenges. An additional demographic question was added to capture the parent-reported level of VI using simplified functional descriptors derived from the Paralympics Ireland and the International Paralympic Committee (IPC) (59,175). These categories were used as pragmatic descriptors within the survey and did not constitute formal IPC classification, meeting stakeholders needs and agreed by consensus with the research team. A pilot version of the survey was trialled with volunteers who were BVI and feedback was sought to ensure the highest levels of accessibility and acceptability. No adjustments were required at this point.

Barriers to PA identified by the children who completed the survey were identified as responses to six questions, with respondents being asked to rate their likelihood of agreeing with that sentence on a four point scale from very likely to very unlikely. This was consistent with methods used in the CSPPA study (10). Data regarding PE and AT was also obtained through questions previously validated in the CSPPA study (10). The evidence base for specific survey questions can be found in Table 3.1.

Table 3.1 Evidence Base for Questionnaire.

Subject of Interest	Question asked	Reliability	Source
Level of Vision Impairment	What level of vision does your child have? -no vision (B1 – no perception of light) -low vision (B2 – can you see hand movements, counting fingers) -useful vision (B3-B5 – better than 6/60 with a visual field constriction of less than 40 degrees).	n/a	(59)
PA levels	Mean of ; i) Over the past 7 days on how many days were you physically active for a total of 60 minutes per day? ii) Over a typical or usual week, on how many days are you physically active for a total for a total of 60 minutes per day?	Intraclass correlation, 0.77; Correlation with accelerometer data (r = 0.40, P<.001)	(74)
Participation in muscle	During the last 7 days, on how many days did you do exercise that may strengthen	n/a	(10)

strengthening exercises	your muscles, such as push-ups, sit-ups, weight lifting or heavy yard work?		
Rates of active travel	How do you usually travel i) to school, ii) from school?	n/a	(10)
Walkability of local area	Overall, how would you rate your neighbourhood as a place to walk? Walkable means pedestrian friendly.	n/a	(10)
Barriers to PA	6 item screening tool with responses very unlikely, somewhat unlikely , somewhat likely and very likely to respond to suggestions such as; My day is so busy now I just do not think I can make the time to include physical activity in my regular schedule	n/a	(Woods et al., 2022)

Participants

Participants were recruited through an extensive social media campaign and events run by VSI, Vision Ireland, and other community organisations, to ensure participants were not solely those who are in contact with VSI and regularly participate in sports. Inclusion criteria consisted of individuals aged 18 and under with a VI. Level of VI was parent-reported using the IPC derived functional descriptors described above (59,175). No independent ophthalmic assessment was conducted. Exclusion criteria included those over 18, or those whose parent/guardian was unable to complete the survey with them. Parents provided demographic information as well as background details regarding level of VI, school level, school type and additional supports required, before the children completed questions regarding PA levels, PE class, AT, PA barriers and PA motivators.

Consent and Ethical Approval

Ethical approval was obtained from the institutional Research Ethics Committee (DCU/REC/2022/053). Consent was obtained from parents/guardians prior to beginning the survey, with detailed information regarding the processes involved available through an accessible digital document. Plain language videos with audio descriptions explaining the nature of the research were also recorded by the research team to maximise accessibility to participants. Parents were advised to complete an initial portion of the survey before sharing the device with their child, ensuring that both the parent and child data were submitted simultaneously and as a single response. Assent was provided by the children completing the survey through tick box on survey initiation and again prior to the final third of the survey, after the information deemed most essential was identified. Only those who returned completed consent forms were eligible for inclusion in the study. Each parent/child pair was assigned a unique numerical code to ensure anonymity.

Data Processing

Data regarding PA levels were obtained through the average of two questions, where participants were asked about the number of days in which they achieved 60 minutes of MVPA in the last week and over a typical or usual week, as per Prochaska et al. (2001) protocol (74).

Adherence to PE guidelines was assessed through ascertaining the number of minutes of PE class each respondent participated in over the last week, as well as the class/year the respondents were in, and comparing this information to national curriculum guidelines based on school stage (10,213).

AT data was obtained through two questions regarding journeys to school and from school, with children asked to select the most regularly used transport method for the longest portion of their journey. This method was previously validated through the CSPPA study (10). As per the 2022 iteration of the CSPPA study, AT data was reported as children either walking or cycling to or from school (10). Data regarding barriers and enablers for PA was provided through multiple-response questions, also as per CSPPA 2022 (10).

Data Analysis and Statistical Methods

Data analyses were performed using SPSS software version 28. Descriptive statistics and frequency tables were produced to determine demographic data, mechanism of transport to school (i.e. use of active transport) and the number of days in the last week during which

children completed 60 minutes of MVPA. Descriptive statistics were also used to report frequency of barrier data identified.

Data are presented as mean ± standard deviation unless otherwise stated. An independent-samples t-test was run to determine if there were differences in PA levels (days/week where 60 mins MVPA was achieved) between boys and girls. The number of active days per week was a bounded discrete variable ranging from 0 to 7. Before conducting the independent-samples t-test, the distribution within each sex group was examined using histograms and Q–Q plots, and homogeneity of variance was assessed using Levene's test. Although the outcome was bounded and discrete, inspection of the distributions supported use of the t-test for this exploratory comparison. Where Levene's test did not indicate unequal variances, the equal-variances result was used. The mean difference is reported with a 95% confidence interval and Cohen's d with a 95% confidence interval to indicate the magnitude and precision of the observed difference.

Associations between sex and binary outcomes were assessed using Pearson's chi-square test where its expected-frequency assumptions were satisfied. Fisher's exact test was used where more than 20% of expected cell frequencies were below five (i.e. associations between gender and meeting PE guidelines). For each principal comparison, an appropriate effect estimate and 95% confidence interval were reported alongside the p-value. Specifically, Fisher's exact test was used for comparisons in which expected cell counts were small, while Pearson's chi-square test was used to examine the association between sex and meeting the WHO muscle-strengthening recommendation, for which the expected-frequency assumptions were satisfied. Information regarding PE was obtained as per CSPPA, and compared to local guidelines available at time of publication (232).

No formal sample size calculation was used as recruitment was constrained by the size and accessibility of the eligible population. The achieved sample of 53 parent–child pairs was sufficient to provide descriptive estimates but offered limited precision and limited power for subgroup comparisons. Inferential analyses were therefore treated as exploratory. Non-significant findings were not interpreted as demonstrating equivalence or the absence of an association; effect estimates and confidence intervals were used to assess the magnitude and precision of the observed differences.

3.4 Results

Fifty-three parent/guardian and child pairs completed the survey (55% boys, mean age of children 12.92 ± 2.76 years, range 9-18). Distribution in terms of area of residence, type and level of school and level of VI are described in Table 3.2.

Table 3.2 Demographic data.

	Subcategory	N	%
Sex	Male	29	54.70%
	Female	23	43.40%
Area of residence	Village/Rural area (<3,000 inhabitants)	26	49.10%
	Town (<20,000 inhabitants)	6	11.30%
	Suburbs/large town/Outskirts of city (<70,000 inhabitants)	15	28.30%
	A big city (>70,000 inhabitants)	6	11.30%
Type of school	Mainstream school	45	84.90%
	Special school	2	3.80%
	School tailored for students with VI	4	7.50%
	Other	2	3.80%
Level of schooling	Primary/Junior school (approx.. age < 12 years)	16	30.20%
	Secondary school (approx.. age > 12 years)	37	69.80%
Level of VI	No Vision (B1)	6	11.30%
	Low Vision (B2)	12	22.60%
	Useful Vision (B3-B5)	35	66.0%

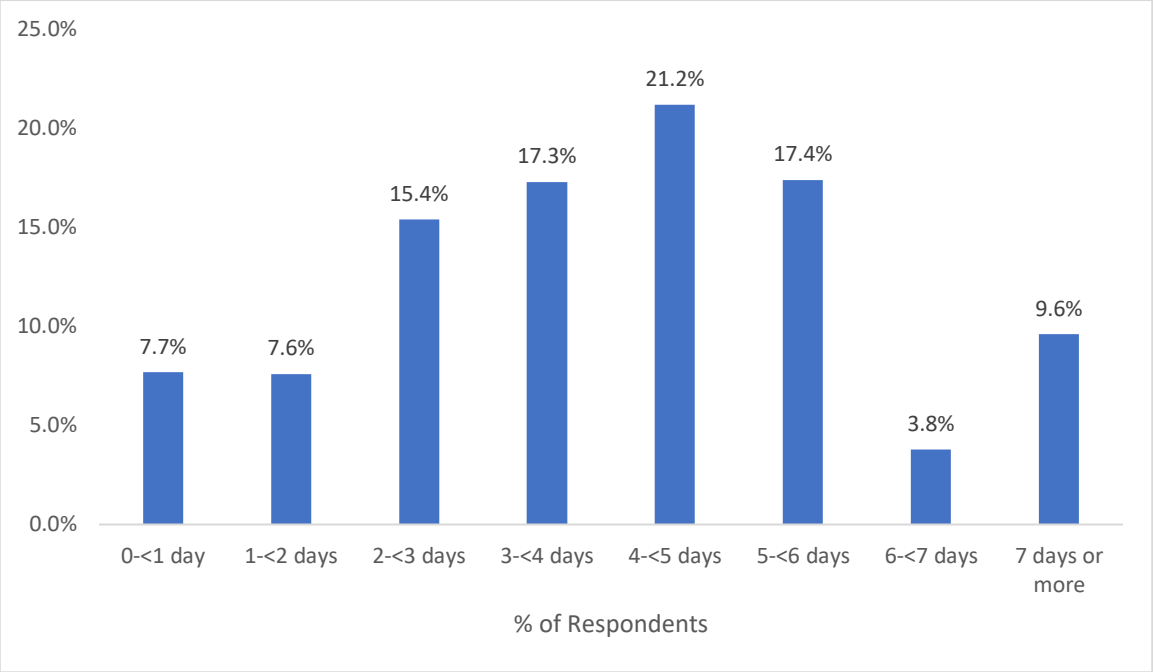


Figure 3.1 Days per week with 60 minutes of Moderate to Vigorous Physical Activity completed by children who are Blind or Vision Impaired.

Alt text: Bar chart of respondent percentages by duration, peaking at 4–<5 days (21.2%), with lower proportions at shorter durations (around 7–8%) and the lowest at 6–<7 days (3.8%).

Additional functional difficulties were reported within the cohort. Of the 53 participants, 34.0% (18/53), had some or a lot of difficulty walking 500 metres on level ground despite appropriate equipment or assistance, 18.9% (10/53) had some or a lot of difficulty being understood by people outside the home, and 9.4% (5/53) had some difficulty hearing sounds despite appropriate hearing devices.

Data regarding number of days of MVPA per respondent is presented in Figure 3.1. 9.6% of respondents completed 60 minutes of MVPA on each of the last seven days (5/52, 95% CI [4.2%, 20.6%]). 7.7% had not completed 60 minutes of MVPA on any day (4/52, 95% CI [3.0%, 18.2%]), with 30.8% completing 60 minutes MVPA less than 3 days a week (16/52 95% CI [19.9%, 44.3%]).

Boys completed 60 minutes of MVPA on a mean of 3.98(SD 1.73) days/week compared with 3.30 (SD 2.14) days/week among girls. Levene's test did not indicate unequal

variances (F=1.813, p=.184), and the equal-variances independent-samples t-test was therefore used. The mean difference was 0.68 days/week (95% CI [−0.40, 1.75]), t(50)=1.266, p=.211. The standardised mean difference was small (Cohen's d=0.35, 95% CI [−0.20, 0.90]). The confidence interval was wide and included both little or no difference and a potentially meaningful difference favouring boys.

With regard to gender, 10.3% (3/29) of boys and 8.7% (2/23) of girls achieved 60 minutes of MVPA on each of the last seven days. This represented an absolute difference of 1.6 percentage points, 95% CI [−17.7, 18.9], and a risk ratio of 1.19, 95% CI [0.25, 5.73]. Fisher's exact test provided little evidence of an association (p = 1.00). However, only five participants met the criterion, resulting in a very wide confidence interval; potentially meaningful differences in either direction cannot therefore be excluded.

1/29 boys (3.4%) and 4/23 (17.4%) girls had no PA in the previous seven days. The observed prevalence was 13.9 percentage points higher among girls, 95% CI [−3.3, 33.9], corresponding to a risk ratio of 5.04, 95% CI [0.81, 32.88]. Although Fisher's exact test did not reach the conventional threshold for statistical significance (p = .157), the point estimate suggests a potentially meaningful difference. However, the small event count and very wide confidence interval preclude a firm conclusion about the direction or magnitude of the association.

Additionally, with regard to muscle strengthening exercises, 14/29 boys (48.3%) and 6/23 girls (26.1%) met the WHO muscle strengthening guidelines of incorporating muscle and bone strengthening activity at least 3 days a week (14). This represented an absolute difference of 22.2 percentage points, 95% CI [−4.3, 44.2], and a risk ratio of 1.85, 95% CI [0.89, 4.17]. A chi square test for association showed no statistically significant association between gender and meeting the muscle strengthening guidelines ($\chi 2$ (1) = 2.668, p= 0.102).

Barriers to PA are reported in Figure 3.2. When asked about the barriers to PA, 17.0% of respondents stated they were very likely to be "too tired after school/work to be active", while 13.5% stated they were very likely to feel "my day is so busy now I just do not think I can make time to include PA in my regular schedule". Concern regarding injury was relatively low with 51.9% citing this as very unlikely to be a barrier to PA.

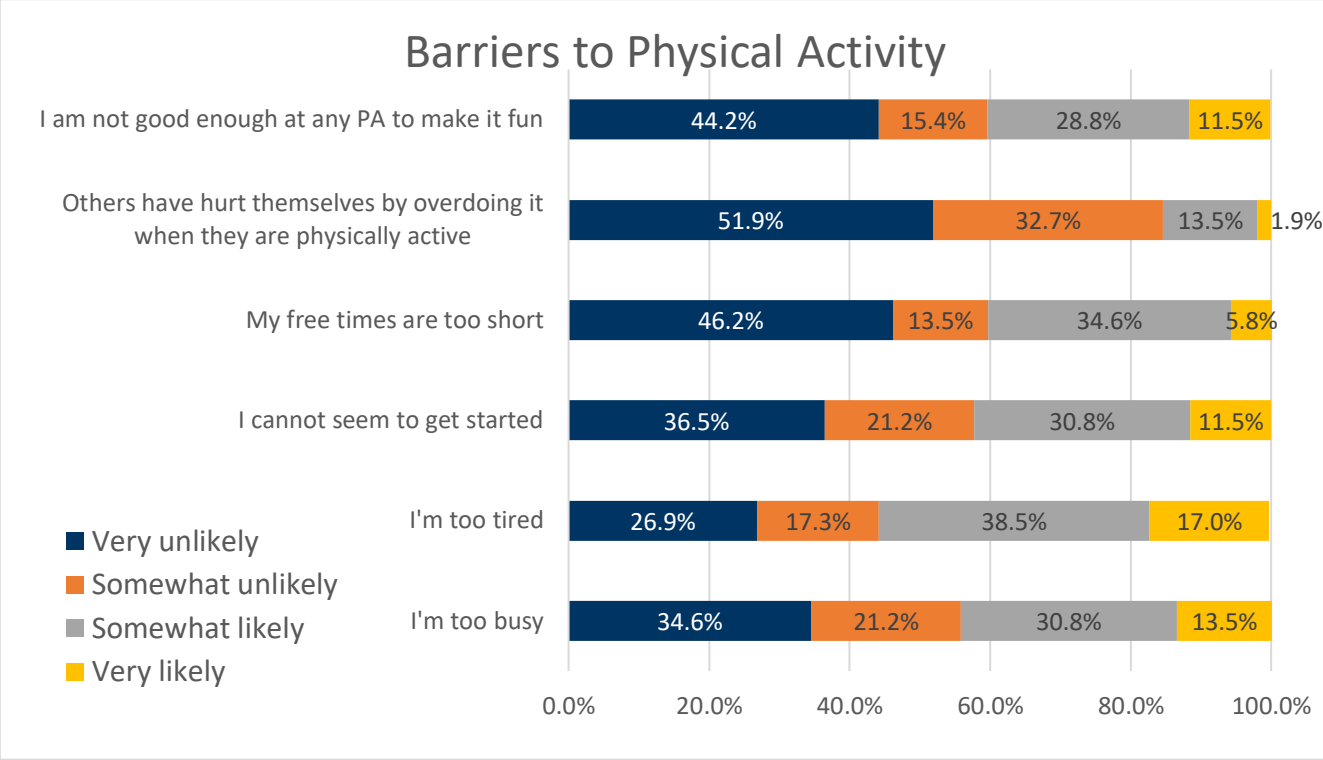


Figure 3.2 Barriers to Physical Activity reported by children who are Blind and Visually Impaired

Alt text: Stacked bar chart of barriers to physical activity among blind and visually impaired children. Across all items, most responses fall under 'unlikely'. 'Too tired' and 'too busy' show higher 'likely' responses compared to other barriers, while concern about others being hurt is least endorsed.

The use of AT (i.e. walking or cycling to school) (232) is reported in Table 3.3, where 15.4% used active transport on their route to school (8/52, 95% CI [7.9%, 28.0%])

Table 3.3 Chosen mechanism of transport to school.

Mechanism of Transport	**Activity Status;**	**Frequency (n=52)**	**%**
Car	Inactive	21	30.4%
Bus	Inactive	23	44.2%
Bicycle	Active	1	1.9%
By Foot	Active	7	12.5%

Regarding PE, mean time in PE class was 58.6 mins/week, lower than mean of 85 mins/week and 73 mins/week in the general population at primary and secondary school respectively (10). Additionally, the proportion of children who are BVI meeting Department of Health PE Guidelines (60 mins/week at primary school level and 120 mins/week at secondary school level) was lower than the general population. 53.1% of BVI respondents at primary level met PE Guidelines (8/15, 95% CI [30.1%, 75.2%]) , vs 72% of the general population studied at CSPPA (10). Results were more stark at secondary school level, with 11.1% vs 72% of the general population (4/36 CI [4.4%, 25.3%]) (10).

3.5 Discussion

This is the first study of its kind to quantify PA levels of children and adolescents who are BVI, and as such provides unique insights into the motivators and barriers to PA. Perhaps the most stark result emerged in the area of PA levels, with just 9.6% achieving the target of 60 minutes MVPA/day (vs 15.4% in the sighted population) (10) and half the BVI cohort engaging in 60 minutes MVPA less than four days a week. Possible explanations for this include the low proportion engaging in AT to school (15.4% vs 35-45% of the general population) and meeting national PE guidelines (32.1%. vs 72-75% of the general population, depending on school level). Barriers to PA were varied with tiredness proving to be quite regularly cited as very likely to prevent PA (17.0%) and fear of injury, by comparison, cited as a very likely barrier less frequently (1.9%). Given the long term impact of low levels of PA on physical and mental health, and the noted environmental benefits of AT, this is not a sustainable situation at an individual or population level (15,233,234). When considered from a life course perspective, these findings are particularly concerning, as low levels of PA during childhood and adolescence may represent the beginning of a trajectory of reduced participation rather than a short-term behaviour pattern

Of particular concern was the low level of children achieving 60 minutes of MVPA seven days a week, with just 9.6% reaching this target. While the WHO states that this can be achieved as an average over seven days, given the comparatively low numbers achieving 6 or more days a week (13.4%) and the high proportion completing 60 minutes MVPA on four days a week or less (50.0%), it seems very likely that the vast proportion of our participants are not meeting WHO guidelines (14). The discrepancy between PA levels and the general population is perhaps not as stark as expected. In CSPPA's most recent 2022 results report, similar to the cohort in this study, only 15% achieved 60 minutes of MVPA per day (10).

Those with a disability who completed CSPPA were also less likely to complete 60 minutes of MVPA a day (12% vs 16% with no disability), though the definition of disability used in CSPPA originated in the UNICEF Child Functioning tool, and includes physical, sensory and functional disabilities including VI (235). In addition to MVPA, the WHO has recently recommended the inclusion of muscle strengthening exercises which should occur three times a week (14). Almost two thirds of respondents to this questionnaire were not adhering to these guidelines – similar to the general population assessed in CSPPA (57%) (10). Whilst certainly not as low as overall PA levels, conditioning and muscle strengthening exercises should be an additional target for future interventions.

While overall levels of PA were low, the lack of discrepancy between genders was interesting to note, given that this appears to be a feature unique to the BVI population. Large multinational research studies have demonstrated statistically significant differences between genders in the general population, with boys being more physically active than girls (54). These differences become even more pronounced with age, with the gap between boys' and girls' activity levels increasing in the mid to late teenage years (10,54). Similar discrepancies exist with regard to muscle strengthening activities, with men being more likely than women to participate in muscle strengthening activities in sixteen studies across six countries (236). In our BVI cohort, there was no statistically significant difference between girls and boys meeting PA guidelines (daily 60 mins MVPA). Additionally, there was no statistically significant difference between the genders of those who participated in muscle strengthening exercise. One possible explanation for this may be the low numbers of participants engaging in muscle strengthening exercises to begin with (42.3% of respondents do not participate in any muscle strengthening exercises at all). Previous studies, though smaller in participant number, demonstrated similar findings with regard to PA levels in the population who are BVI, with no significant difference between PA levels found (27,237). The findings regarding muscle strengthening activities in our cohort were, to the best of our knowledge, unique. Together, this pattern is compatible with Marmeleira et al.'s postulation that the lower level of PA in this groups attenuates the impact of differences between the genders (25). Given these low PA levels all factors that could positively impact PA participation rates should be explored. Considering the proportion of time children spend in school, AT (193,217,234) and PE class (238) have previously been identified as possible opportunities for intervention.

Given its low cost and accessibility to different age groups, AT is a potentially easy target for increasing PA levels (193,234). The use of AT to school is disappointingly low in our survey, with 14.4% of respondents commuting to school either by bike or foot (vs 37% of the general population (10)). Taking into account the environmental as well as health benefits of AT, and the fact that 56.9% of respondents rated their local area as either somewhat or very walkable, this represents a significant opportunity for intervention and a target for public health intervention. It was interesting to note additionally that 50% of respondents lived within 5km of their school. It would also align with the current National Sustainable Mobility Policy in Ireland (221), and similar policies in other countries such as the European Union's Sustainable Urban Mobility plan (239), and the UK's "Gear Change" policy (58). Campaigns such as 'Clear our Paths' run by Vision Ireland are an illustration of some of the infrastructure changes that may be required to increase this number (208).

Increasing the offering of PE in schools may prove to be an area which can elicit the most benefit in targeting increased PA amongst BVI children. PE provides an opportunity for children who are BVI not only to participate in PA, but additionally provides them with the skills necessary to adapt any sports/PA they may have an opportunity to participate in the future (128,240). Unsurprisingly there are unique barriers to including children who are BVI in PE lessons (128,226), particularly given that the majority of children who are BVI in Ireland attend mainstream school. Unfortunately the proportion of children meeting PE guidelines in this study was quite low at 32.1%, with a mean time of 58.63 minutes/week – significantly lower than their sighted counterparts where 72-75% of children meet the PE guidelines (10). In an attempt to understand the reasons for this discrepancy, participants were asked to select reasons as to why they did not participate. The most common reasons cited were due to "participation in other activities" (33.3%), being "unable" to participate (33.3%), and worryingly, "parents or teachers prefer I sit out PE" (16.7%). Given the majority of these children are attending main stream school, it is difficult to ascertain what other activities are being prioritised over PE though possibilities include access to resource hours. While further research is required to understand these barriers in greater detail, these results demonstrate a need to prioritise PE class in school and adapt PE activities to meet the needs of the child such that they are able to participate fully (128,226).

Strengths and Limitations

Strengths of this study include its use of previously well validated tools including Prochask's PACE+ questionnaire (74) and CSPPA (10). The short term recall nature of the questionnaire

(241) was used in an attempt to reduce recall bias. The limitations of this study include the use of questionnaires to collect data. Questionnaires are at risk of social desirability bias, whereby participants seek to provide the perceived "correct" responses. (147,242). The modest sample size resulted in wide confidence intervals around prevalence estimates and limited power for subgroup comparisons. Consequently, non-significant results should be interpreted with caution. The use of VSI's social media pages may also be seen as a potential weakness, given that they are more likely to be accessed by families already seeking opportunities to engage in PA. This weakness however was balanced through the use of Vision Ireland's social media – a support service for people who are BVI which has a broader focus than specifically sport. Despite this the levels of PA remain worryingly low, suggesting that levels of PA in the BVI cohort may be even lower than demonstrated in this study.

3.6 Conclusion

Establishing healthy, lifelong habits is particularly important in childhood and adolescence, with studies suggesting that adolescents who participate in PA are more likely to become physically active adults (18,219). The low PA levels in the cohort captured by this research should now serve as a benchmark to assess the effectiveness of any future interventions. PE classes and AT are two mechanisms through which improvements in PA levels can be made and represent areas that should be targeted in future interventions. Further studies, however, are required to better understand the causes of perceived barriers to and motivators for PA in this group. Qualitative studies may enable a deeper understanding of the experiences behind these low PA levels.

Chapter 4: Investigating physical activity levels in adults who are blind and vision impaired

4.1 Abstract

Background

It is well established that meeting physical activity (PA) guidelines has a range of physical and mental health benefits. For people who are blind and vision impaired (BVI) there may be additional benefits in terms of social inclusion and the prevention of sight deterioration.

Objective

This study aimed to quantify PA levels, barriers to and motivators for PA in adults who are BVI.

Methods

PA levels, perceived barriers to, and motivators for PA were measured via questionnaire of 310 self-identifying BVI adults (n=345 mean age = 29.77 ± 11.37, 55.8% male).

Results

PA levels were low, with 21.7% meeting PA guidelines. Median PA levels were not statistically significantly different between different age groups. Males completed 0.382 fewer days of PA per week than females (95% CI [−0.749, −0.015], p = .041), a difference of small magnitude (Cohen's d = −0.24).

There was a significant difference between PA levels between the "no vision" (B1) and "useful vision" (B3) groups (p = .027), and the "no vision" (B1) and the "low vision" (B2) groups (p = .003). Transport (54.8%) and lack of access to enjoyable activities (47.0%) were the most commonly cited barriers, while "to relax" (36.4%) and "to have fun" (35.6%) were most commonly cited as very important motivators.

Conclusion

This study provides a valuable insight into the low levels of PA that persist amongst adults with BVI. Future research should seek to gain a deeper understanding of the PA barriers, motivators and facilitators in this cohort.

4.2 Background

Physical activity (PA) has been proven to improve cardiorespiratory fitness, maintain a healthy body mass index (BMI), enhance bone health and reduce falls risk (15). In addition to improvements in general health, PA is now known to be essential in the prevention of non-communicable diseases, such as diabetes, certain cancers, and dementia (15). While a substantial proportion of the research in this domain is within the general population, there is also a significant focus on the benefits of PA to those living with a disability (243,244). Individuals who are blind and vision impaired (BVI), for example, demonstrate persistently low PA levels (24,27,143). For those who are BVI, additional benefits of PA include improved psychological wellbeing and decreased susceptibility to injury following a fall (209,245).Given this strong evidence base it is unsurprising that "Advancing the Global PA Agenda"(2020) has become a priority for the World Health Organisation (WHO), with PA levels of those living with a disability or chronic illness being a particular priority (246).

Aside from the well-established benefits of PA, a complex relationship has been established between being BVI and PA, whereby both impact each other. A lack of PA can increase the risk of metabolic syndromes and diseases such as diabetic retinopathy (86). Sight-threatening diseases (e.g. Age-Related Macular Degeneration) have been postulated to be connected to low levels of antioxidant enzyme activity, secondary to low levels of PA (87). Additional research has suggested that those who are BVI are at risk of inactivity Click or tap here to enter text., likely due to issues such as a lack of confidence (24) or societal stigma (126,167). Ensuring adequate PA amongst this cohort would undoubtedly have positive effects in the prevention of further sight loss. For example, increasing PA has recently been cited as a strategy to tackle the global burden of diabetic retinopathy (86).

PA guidelines set out by the Department of Health in the Republic of Ireland recommend at least 30 minutes of PA every day for adults age 18-64, or an average of 150 minutes a week, similar to WHO recommendations (14,232). Evidence suggests that insufficient levels of PA persist across most population cohorts over the past 20 years, including both the general population and those who are BVI. The WHO states that more than a quarter of the world's adult population are insufficiently active, with the proportion of the population insufficiently active increasing to 36.8% in high income countries (14). In Canada, the prevalence of physical inactivity (77.8%) is higher than all other modifiable risk factors for cardiovascular

disease including alcohol use and smoking (247) These low PA levels are also demonstrated in the Irish context, with just 41% meeting the national PA guidelines (13).

Sedentary behaviour and reduced PA levels have been noted in multiple studies of adults living with a disability (124,248). In comparison to adults without a disability, a larger proportion of adults with a disability were physically inactive (25.6% vs 12.8%), and a smaller proportion met PA guidelines (37.7% vs 49.2%) (248). Specifically in Ireland, the Irish Sports Monitor (ISM) survey described a "disability gap", where almost three quarters of people with a disability were not participating regularly in sport (13) compared to 55% without a disability.

There is additional evidence that those who are BVI experience unique challenges to meeting the PA guidelines. Lower levels of PA have been identified across all age ranges in the BVI population compared to the general population including in children, adolescents and older adults (24,30,143). These discrepancies persist whether PA is measured by PA monitors (e.g. accelerometers, pedometers), diaries or surveys (30,143,173). A scoping review conducted by Griffin et al. (2015) revealed that age-related vision loss was highly detrimental to mobility and the ability to engage in vision-dependent leisure activities (143)

In an effort to further understand these results, research has been conducted to evaluate the additional barriers to PA this cohort face. Linsenbigler's (2018) literature review examined the evolution of barriers identified by young people with VI over three time periods: 1984-1989, 2000-2006, and 2011-2015 (126). Low expectations set by others and feeling stigmatised by peers and adults were identified as persistent barriers across all three time spans. This study also revealed that four out of six barriers identified in papers from the 1980s were also observed in papers from 2015, including attitudes regarding BVI, overprotective parents, lack of accommodations/modifications, and fear of injury (126). More recently, Armstrong et al (2020) have developed the Physical Activity Barrier Questionnaire for Youth with Visual Impairments, which has been validated in school age children in pilot studies in several different countries (129,249). Barriers remained consistent with other research and included community barriers, personal barriers and social barriers. However, the extent to which these barriers manifest within an Irish adult population with BVI remains unexplored. Given that physical activity trajectories are shaped by experiences accumulating across the life course (56), understanding how barriers develop and are sustained over time is particularly pertinent in this context.

Study Aim

Given the dearth of literature around this topic in the Irish specific context, this study seeks to explore the PA levels of BVI adults in Ireland. Additionally, to further understand the reason for these PA levels, a secondary objective is to review the motivators to and barriers towards PA.

4.3 Study Design and Methods

Study Design

A cross-sectional survey design investigating PA levels and related variables was selected as an appropriate method of investigation. Quantitative surveys were utilised as an effective data collection method due to their low cost, practicality and ease of distribution (147,242). MS Forms was selected in consultation with the research partners, Vision Sports Ireland (VSI), for digital accessibility. MS Forms was selected due to its accessibility features, including an inbuilt screen reader, assistive technology that converts text, buttons and images into speech or braille. This allowed participants to complete the survey independently, ensuring confidentiality (250). The online component also maximised opportunities for participants to take part in their own time.

The survey design was based on the ISM – a population based quantitative study undertaken biennially to provide trends in participation in sport and PA in Ireland (13). The ISM is designed to assess PA broadly, measuring all forms of activity including PA, sport, exercise, walking/cycling for recreation or function (13). The ISM was validated through the use of calibration, whereby sample distribution is compared to external population figures derived from the Quarterly National Household Survey and the Irish National Census (140). The ISM additionally includes a separately validated single item screening tool to accurately assess PA, where the subject is asked the number of days in the last week where they engaged in 30 minutes of MVPA, consistent with both WHO Guidelines and previously validated by Milton et al as a single item PA measure (14,231).

Some alterations were required to ensure the survey was appropriate for the BVI population, and these were achieved through consensus with data scientists nominated by VSI. Two alterations were made in total, including “with the use of a mobility aid” when clarifying mobility difficulties, an additional demographic question capturing self-reported level of

vision impairment using simplified descriptors derived from the International Paralympic Committee (IPC) classification system (59). A pilot version of the survey was trialled with volunteers who were BVI, and adjustments were made following feedback to ensure the highest levels of accessibility and acceptability.

Participants

345 adults (174 males, 137 females, 35 other gender, mean age = 29.77 ± 11.37 years, age range: 16 – 78 years) completed the survey between August 2022 and January 2023. Links to the surveys were advertised through the VSI social media platforms. VSI is the national governing body for sport and leisure for people who are BVI in Ireland. To avoid participants only coming from sporting backgrounds, the survey was also advertised on the social media platforms of BVI hospital and community based support services.

To maximise participation and ensure a broad range of responses, staff from Vision Ireland (a national sight loss agency) also offered assistance to prospective participants in completing the survey over the phone. This method of recruitment was previously validated via the Irish Sports Monitor questionnaire, where phone is the primary method of recruitment (13). Inclusion criteria included individuals aged 16 and over with a BVI. Level of VI was self-reported using simplified functional descriptors derived from the IPC classification system (59). These categories were used as pragmatic descriptors within the survey and did not constitute formal IPC sports classification or independent ophthalmic assessment. Descriptors were provided as follows; "No vision (B1 – No perception of light)", "Low vision (B2 – Can see hand movements, count fingers)" and "Useful vision (B3-B5, visual acuity of greater than 6/60 with a visual field constriction of less than 40 degrees)". Exclusion criteria included those under 16, who were given the opportunity to participate in a separately designed children and young people's survey, and those who did not identify as BVI.

Descriptive statistics and participant demographics are presented in Table 4.1. The demographic data was broken up into subcategories (Age 16-19, Age 20-24, Age 25-34, Age 35-44, Age 45-54, Age 55-64, Age 65+) as per the ISM for comparison purposes. 345 participants were recruited (50.1% male, 39.7% female and 10.1% non-binary/other/prefer not to say). Level of vision impairment was reported as follows; 15.4% "No vision (B1)", 59.1% "Low vision (B2)" and 25.5% "Useful vision (B3)".

Table 4.1 Demographic Data of Age Range, Gender, VI Impairment.

Category	Sub category	N	% of Respondents
Age range	16-19	16	4.60%
	20-24	121	35.10%
	25-34	97	28.10%
	35-44	57	16.50%
	45-54	16	4.60%
	55-64	6	1.70%
	65+	9	2.60%
	Age not specified	23	6.70%
Gender	Male	173	50.10%
	Female	137	39.70%
	Non binary/Other/Prefer not to say	35	10.10%
Vision Impairment	No vision – B1	53	15.40%
	Low vision – B2	204	59.10%
	Useful Vision – B3	88	25.50%

Consent and Ethical Approval

Ethical approval was obtained from the institutional Research Ethics Committee (DCUREC/2022/053). Participants were provided with detailed information regarding the process through a digital plain language statement. Further plain language videos explaining the research were produced by the research team prior to dissemination. Only those consenting were eligible for inclusion in the study. The survey was anonymous with no identifiable information collected.

Data Processing

PA levels were categorised into a hierarchy of sedentary (no PA in last seven days), fairly/just active (30 minutes MVPA in the last one to four days) and highly active (active on at least five of the last seven days), consistent with those used in the ISM (13). Age groups were also classified in order to be consistent with the ISM (i.e. “Age 16-19”, “Age 20-24”, “Age 25-34”, “Age 35-44”, “Age 45-54”, “Age 55-64”, “Age 65+”) (13).

Data Analysis and Statistical Methods

Data analyses were performed using the statistical analysis programme licensed to the institution, SPSS version 28. Descriptive statistics and frequency tables were produced to describe demographic data, including the PA levels and perceived barriers to PA identified by respondents. Additional descriptive statistics were conducted to identify factors which influence motivation for PA, such as age, gender, level of VI. Days of PA were recorded as a bounded discrete outcome ranging from 0 to 7. Key prevalence estimates are presented with 95% confidence intervals.

The comparison of PA between male and female respondents included participants identifying as male or female (n=310). Distributions within each group were examined using histograms and Q–Q plots. An independent-samples t-test was selected to compare mean days of PA between the two independent groups. Homogeneity of variance was assessed using Levene's test. As Levene's test indicated unequal variances, the unequal-variances (Welch) t-test was used together with Cohen's d and its 95% confidence interval as a measure of effect magnitude.

A Kruskal-Wallis H test was used to determine differences in PA between age groups. This non-parametric approach was selected given the bounded outcome, unequal subgroup sizes and small numbers within some age categories. A Kruskal-Wallis H test was also conducted to explore differences in PA according to self-reported IPC-derived VI category (59). Where an overall Kruskal–Wallis test was statistically significant, Dunn's pairwise comparisons with Bonferroni adjustment were undertaken.

No formal sample size calculation was undertaken, as recruitment sought to maximise participation within the available BVI population rather than recruit to a predetermined hypothesis-testing sample. The overall sample provided useful descriptive estimates; however, subgroup analyses were limited by unequal group sizes, particularly within the older age categories. Inferential subgroup analyses were therefore interpreted cautiously, with effect sizes and confidence intervals considered alongside p-values. Non-significant findings were not interpreted as demonstrating equivalence or absence of an association.

4.4 Results

Mean days/week of 30 minutes MVPA are reported in Table 4.2. Females completed PA on a mean of 3.31 (SD 1.76) days/week compared with 2.92 (SD 1.45) days/week among males. Females age 23-34 were the least active. Other gender participants and those who did not specify their age were the most active. Levene's test indicated that the assumption of equal variances was not met (F=10.379, p=.001). The unequal-variances (Welch) t-test is therefore reported. Males completed a mean of 0.382 fewer days of PA per week than females (95% CI [−0.749, −0.015]), Welch's t(261.36)=−2.049, p=.041. The standardised mean difference was small (Cohen's d=−0.24, 95% bootstrap CI [−0.47, −0.01]).

PA levels did not differ significantly between age groups, H(6)=11.363, p=.078. The estimated magnitude of the age-group effect was small (η^2H=.017, 95% bootstrap CI [.000, .099]), with the wide confidence interval reflecting limited precision across the unequal age subgroups. Seventy-five of 345 respondents met the study criterion for being highly active (21.7%, 95% CI [17.7%, 26.4%]).

Results regarding classification of PA levels are presented in Figure 4.1, with results for those selecting non-binary/other/prefer not to say as their gender noted in Table 4.2 for ease of comparison to ISM figures (13).

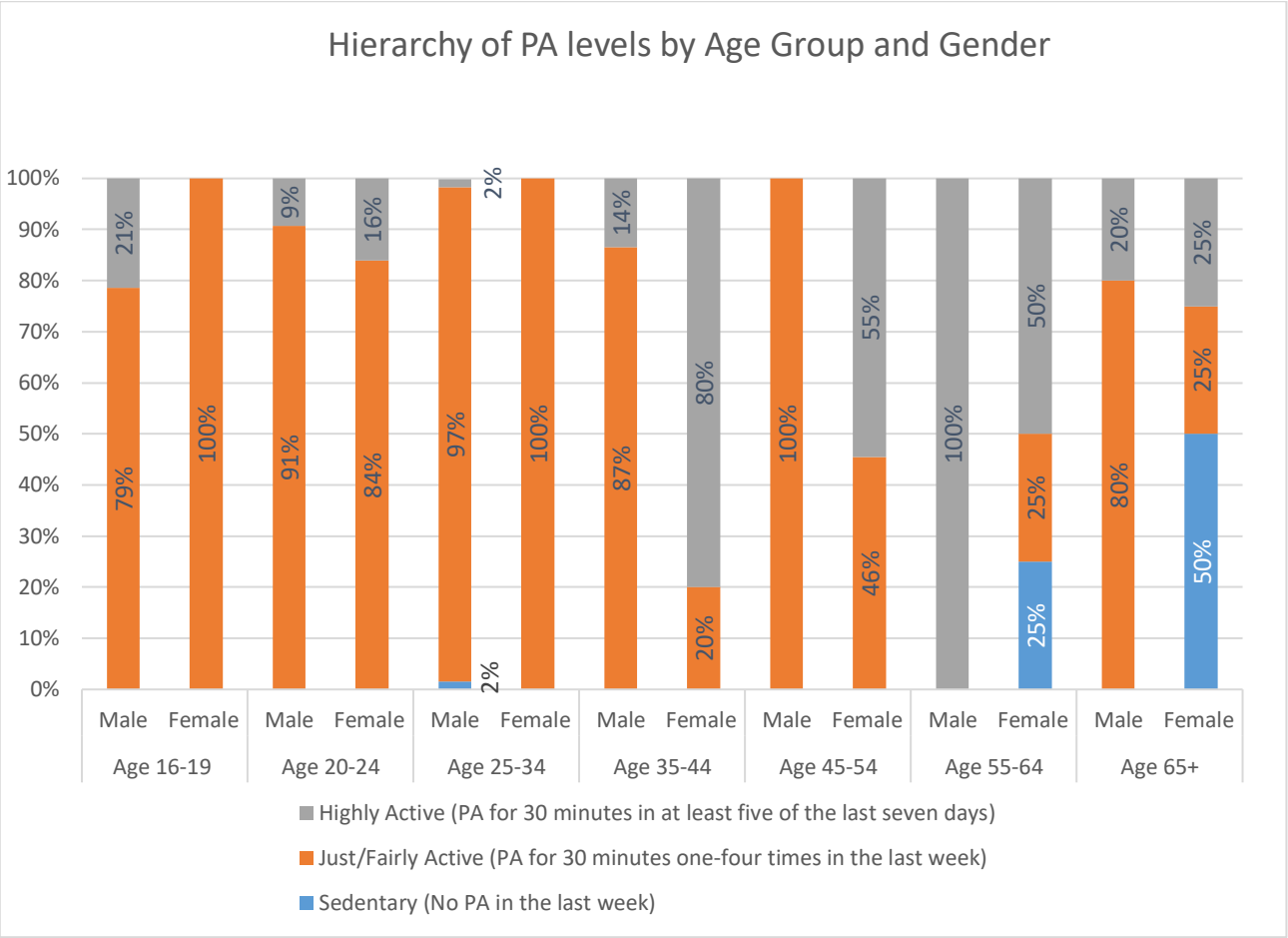


Figure 4.1 Hierarchy of PA levels by Age Group and Gender.

Alt text; Bar graph depicting levels of physical activity divided by gender and age. Activity tended to increase with age with a peak age 55-64. Sedentary behaviour was low overall but increased with age to a high of 50%. The most active groups were men age 55-64 and the most sedentary groups were women age 65+.

Table 4.2 Mean (±SD) number of days in the last 7 days where 30 minutes of physical activity was completed, across age and gender.

Age Range	Gender	N	Mean Days/Week
16-19	All	16	3.31 (± 1.250)
	Male	14	3.36 (± 1.34)
	Female	2	3.00 (± .00)
	Other	0	n/a
20-24	All	121	2.97 (± 1.402)
	Male	43	3.00 (± 1.291)
	Female	62	3.10 (± 1.399)
	Other	16	2.37 (± 1.628)
25-34	All	97	3.05 (± 1.349)
	Male	61	2.79 (± 1.213)
	Female	23	2.74 (± 1.251)
	Other	13	4.85 (±- 0.555)
35-44	All	57	3.63 (± 1.942)
	Male	37	2.76 (± 1.657)
	Female	20	5.25 (± 1.293)
	Other	0	n/a
45-54	All	16	4.06 (± 1.806)
	Male	5	3.00 (± 0.707)
	Female	11	4.55 (± 1.968)
	Other	0	n/a
55-64	All	6	3.83 (± 2.639)
	Male	2	5.50 (± 0.707)
	Female	4	3.00 (± 2.944)
	Other	0	n/a
65+	All	9	2.33 (± 2.345)
	Male	5	2.80 (± 2.049)
	Female	4	1.75 (± 2.872)
	Other	0	n/a
Age not specified	All	23	3.39 (± 2.675)
	Male	6	3.00 (± 2.898)
	Female	11	1.64 (± 0.505)
	Other	6	7.00 (± 0.000)

Seventy-five of 345 respondents met the study's criterion for the adult PA guideline (21.7%, 95% CI [17.7%, 26.4%]). In contrast, five of 345 respondents were classified as sedentary under the Irish Sports Monitor definition (1.4%, 95% CI [0.6%, 3.3%]). The low prevalence of complete inactivity should not be interpreted as indicating adequate PA, as most respondents did not achieve the recommended activity criterion. Sedentary behaviour increased with age, with this effect being most pronounced in females. No females under 55 were classed as sedentary, while 25% of females age 55-64 and 50% of females age 65+ were. Males age 55-64 were the most active, with 100% classed as highly active. Young females (age 16-19 and 25-34) had no highly active respondents, nor had males age 45-54. Additional long-standing conditions and functional difficulties were common in the adult cohort. These included difficulties with basic physical activities such as walking, climbing stairs, reaching, lifting or carrying (33.3%, 115/345), psychological or emotional/mental health difficulties (31.6%, 109/345), learning, memory or concentration difficulties (28.1%, 97/345), and hearing impairment (21.4%, 74/345).

Distributions of PA scores between the three self-reported IPC-derived VI categories were compared using a Kruskal-Wallis H test. PA differed significantly between categories, $H(2) = 11.024$, $p = .004$. The overall effect was small ($\eta^2H = .026$, 95% CI [.003, .071]). Pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted p-values are presented. Values are mean ranks unless otherwise stated. This post hoc analysis revealed statistically significant differences in PA levels between the "no vision" (B1) group (132.25) and "useful vision" group (B3) (176.73) ($p = .027$), and between the "no vision" (B1) group (132.25) and the "low vision" (B2) group (181.98) ($p = .003$). There was no significant difference between the "low vision" (B2) group (181.98) and the "useful vision" (B3) group (176.73) ($p=.080$)

The Likert scale responses to the motivating factors offered to respondents are presented in Figure 4.2. Here participants were asked to classify a number of PA motivators on a five point Likert scale ranging from not at all important to very important. "To relax" (36.4%) and "to have fun" (35.6%) were the factors most commonly cited as very important. "To improve how I look" was the factor most commonly cited as unimportant (12.5%).

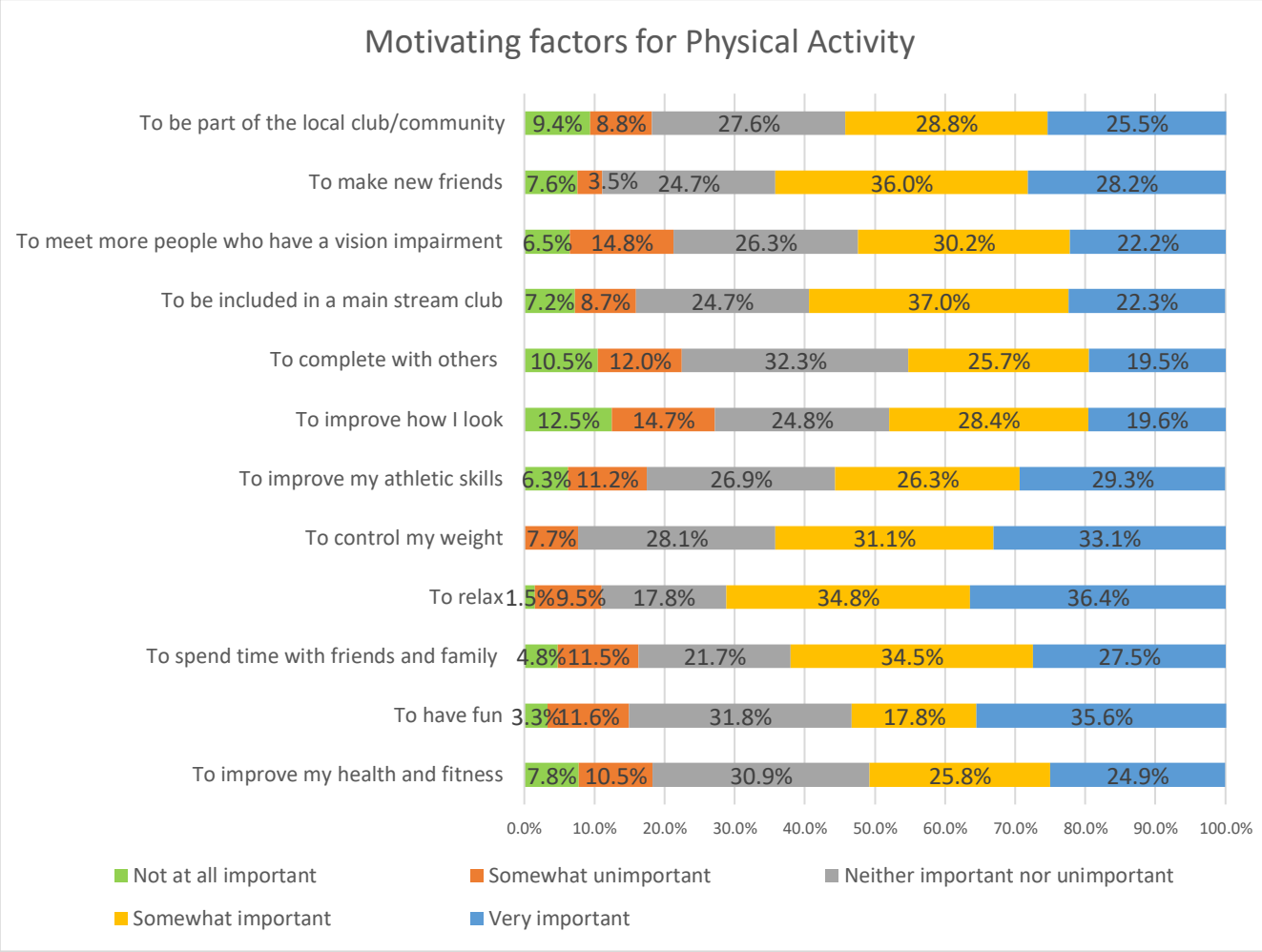


Figure 4.2 Motivating Factors for Physical Activity

Alt text; Figure two depicting factors to engage in PA on a five point Likert scale (not at all important, somewhat unimportant, neither important nor unimportant, somewhat important or very important). "To improve how I look" was selected as not at all important by the largest number of respondents (12.5%). "To relax" was selected as very important by the largest number of respondents (36.4%).

Barriers to PA are presented in bar chart form in Figure 4.3. Transport (54.8%) and a lack of access to activities (47.0%) were the most commonly identified barriers, while a lack of understanding of BVI amongst coaches/volunteers (15.9%) was less frequently identified.

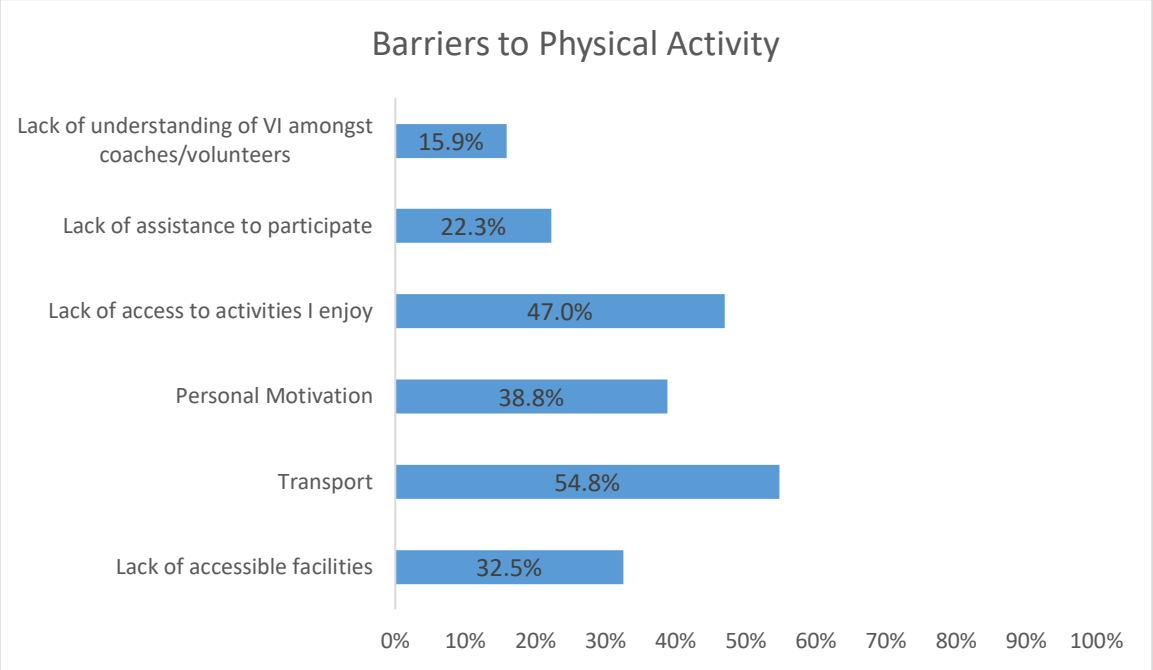


Figure 4.3 Barriers to Physical Activity

Alt text Figure 4.3: Figure 4.3 highlights barriers to PA selected by respondents. Responses were as follows; 15.9% lack of understanding of VI amongst coaches/volunteers (15.9%), lack or assistance to participate (22.3%), lack of accessible facilities (32.5%), personal motivation (38.8%), lack of access to activities I enjoy (47.0%) and transport (54.8%).

4.5 Discussion

This study sought to examine PA levels of Irish participants who are BVI, employing population data from the ISM for comparison purposes. This study, the first of its kind in Ireland, highlighted low PA levels of Irish adults who are BVI, along with a discrepancy between the proportion of Irish BVI adults meeting the PA guidelines compared to the general population. With regard to the secondary aims of the study (exploring the barriers and motivating factors towards PA experienced by this group), enjoyment and relaxation were reported as important motivators by over a third of respondents. Accessibility factors such as lack of access to activities and transport were identified as key barriers of PA participation.

Perhaps the most notable result of the study is the small proportion of participants meeting the recommended PA guidelines of 30 minutes of MVPA five (or more) days a week

(21.7%). This compares with 41% of the general population as reported in the ISM (13). It is also important to note the effort exerted during PA, with aerobic exercise appearing to be less common, with 36.2% of the BVI cohort reports that the exercise was not sufficient to leave them out of breath or sweating, while 27.7% reported that the exercise did not raise their breathing rate. While PA of all forms is to be encouraged given its well established benefits (15), moderate PA sufficient to raise heart/breathing rate is a core feature of the WHO PA recommendations (14). This raises the possibility that even those meeting the guidelines are not engaging in PA of sufficient intensity necessary to obtain maximum health benefits.

Given the low percentage of BVI respondents achieving PA guidelines (21.7%), it was somewhat surprising to find that lower proportions of the BVI population were classified as sedentary when compared to the ISM results (13). This was particularly evidence in the male age 45-54 category, where there was a 13% difference between groups (with 13% of the ISM cohort engaging in no PA in the last week vs 0% of the BVI population).The total proportion of the BVI population classified as sedentary was 1.4% vs 11% in the ISM (13). Though the same definition of sedentary was used in both the ISM and this paper for ease of comparison, it is important to note that this definition of sedentary is not without criticism. The ISM defines sedentary as no PA, including walks for transport or recreation, in the past seven days. As such, the low level of sedentary behaviour observed in the current BVI cohort does not provide reassurance that this population is avoiding the detrimental health effects of insufficient PA.

In the international context, the current study findings regarding PA levels are consistent with previous research. Lower levels of PA, reduced step count and increased sedentary behaviour are common among most cohorts with a disability, and particularly among the BVI population (25,143,173). Given the physical and mental health benefits of exercise and PA, quantifying and monitoring the levels of PA in this cohort is essential to assess the effectiveness of any future interventions (15,205,209). This project is unique in its use of a short recall period (seven days) (147), a method to reduce the impact of recall bias, to provide objective data regarding the impact of BVI level, gender and age on PA levels in the BVI group.

The significant difference in PA between those with no, low and useful vision is of particular interest, as this remains a contentious issue in the literature. Within the self-reported IPC-

derived categories used in this study, participants selecting the lowest vision levels (the “no vision” (B1) group) had significantly lower PA levels than those selecting the “low vision” (B2), or “useful vision” (B3). These findings should be interpreted cautiously, as VI category was self-reported rather than formally assessed, and misclassification between categories may have occurred. This is consistent with other studies that have found that those with more profound levels of VI had lower levels of PA (127,136). Further research is warranted however before any definitive statements in this regard can be made. Smaller studies such as those by Kozub and Oh (2004) of 19 participants demonstrated no significant difference in PA levels in those with varying levels of vision impairment (27). Armstrong et al, in a study of 41 participants, found varying results with those with “useful vision” (B3) more active that those with “low vision” (B2), while those with “no functional vision” (B1) were more active than those with low vision (B2) (129,206). The use of categories derived from the established IPC classification system provided a consistent and functionally relevant framework for describing VI within a study focused on PA and sport, and facilitated comparison with research using similar categories (59,175). Click or tap here to enter text.However, as classification in the present study was self-reported rather than formally assessed, the findings should not be interpreted as comparisons between formally classified IPC groups. Taken together, these findings suggest that individuals with more profound VI may be at greater risk of lower PA levels and may experience unique barriers compared to those with some or limited vision. However further research using formally assessed measures of VI is required.

Clarifying this discrepancy between VI levels is an important factor in assessing which subgroups are most at risk of low PA levels – however those with the lowest levels of vision are certainly not the only sub group to be aware of. Research in the general population suggests that age and gender have a significant impact on PA levels (13). PA levels did not differ significantly across age groups in this study, although a small difference by sex was detected. Research in the general population suggests a “gender gap” in PA. The ISM, for example, noted that women were more likely to be “highly active” (i.e. complete 30 minutes of MVPA in five of the last seven days) than men (42% vs 39%), with this gap particularly notable in older cohorts. The present study identified a difference in the same direction, with females completing 0.382 more days of PA per week than males (95% CI [−0.749, −0.015], $p = .041$). The magnitude of this difference was small ($d = −0.24$) and the confidence interval extended almost to zero, so it is better read as a modest tendency than as a substantial

separation between the sexes. By contrast, this study did not identify a statistically significant difference between males and females with BVI.

In studies involving people who are BVI, results are mixed with regard to the impact of gender on PA. Through the use of accelerometers, Marmeleira et al (2014) found no significant difference in PA levels between males and females (25). The small magnitude of the difference observed here is consistent with the suggestion by Marmeleira et al. (2014) (25) that uniformly low levels of PA in this population attenuate differences between the sexes. Uniformly low participation is not in itself a positive finding, and the modest sex difference should not distract from the fact that the majority of respondents of both sexes did not meet the guidelines.

Although statistical differences were identified for gender and VI category, the associated effect sizes were small. The mean gender difference was approximately 0.4 active days per week, while VI category accounted for a relatively small proportion of variation in ranked PA levels. These findings therefore suggest modest subgroup differences rather than large separation between groups, and should be interpreted alongside the uncertainty reflected in their CI.

While trends and differences in PA levels across age groups were observed in this study, these differences were not statistically significant. In the ISM survey of the general population, significant declines in activity occur with age (13). Consistent with the sighted population, PA decreased with age, and those age 65+ were the least active age group in both studies (2.33 ± 2.345). Unlike the ISM however, the younger groups in our BVI sample (age 16-19 and 20-24) were active less often. Previous international studies have found similar results in their younger BVI cohort, such as fewer bouts of MVPA in BVI adolescents (27), or spending a lower proportion of their day engaging in MVPA (127). Given that PA levels in adolescence/early adulthood correlate with PA levels in adulthood, it seems that interventions targeted at this group would be particularly beneficial (219). For the older population, international data has demonstrated associations between age related vision loss, and a loss of mobility and access to leisure activities (143). To date, previous research has focused on sub-groups within these cohorts, such as young adults, or those experiencing age related vision loss (143,145). The use of various age anchors in this study has provided more information regarding the PA levels of people who are BVI across gender as they age, and allows us to take a nuanced view of factors related to their activity habits.

When we consider the results of this study with respect to motivators and barriers, variation by age and gender are evident. For example, spending time with family and friends was the primary motivator in younger males (78.6% cited this as being very important), while making new friends was of the highest priority for younger females (very important to 100% of respondents in this subgroup). As age increased however, focus shifted to improving health and fitness for males over 65, with 80.0% of that cohort reporting this as being very important. For the female cohort in the 65+ category, on the other hand, having fun and improving athletic skills were equally mentioned as "very important" by 75% of respondents. Competition, by comparison, consistently scored poorly across several age and gender categories, with no males or females over the age of 45 identifying it as an important factor. This move from interpersonal motivators to psychological/health motivations with age is born out in studies conducted on the general population (251), but had not been captured in the BVI population to date. While the ISM does not offer comparable age specific results regarding motivating factors in a general population Irish cohort, similar trends do emerge from that data set, with improving health and fitness being highlighted as an important or very important motivating factor by the majority of men and women. The current results provide valuable information which may be used to support exercise adherence and retention strategies (251), however it is critical that consideration also be given to the unique barriers identified by this group.

The barriers identified in this survey form an interesting basis for future research. It was positive to note how infrequently "lack of understating … amongst coaches and volunteers" was identified (15.9%) in this study – particularly as this has been identified as a significant barrier in previous research of both adults and children who are BVI (126,167). It was interesting to note that this barrier was more frequently cited by young females (in all categories under 55 years), often by quite a considerable margin (e.g. 6.4% of male respondents age 25-34 reported lack of understanding as a barrier vs 37.5% of woman of the same age. The frequency with which transport was identified as a barrier (54.8%) is unsurprising, and aligns with past studies (42). It seems logical that interventions improving transport independence for those who are BVI, be that through traffic calming measures (252) or campaigns such as the "Clear Our Paths" campaign (208) could positively impact PA participation. It is possible however that these transport concerns are specific to the Irish context, given that previous campaigns on this issue have been conducted here.. The issue of personal motivation was an interesting barrier, highlighted by 38.8% of respondents. This

is in contrast to Cain et al (2023) study of Australian students who are BVI (249). In that study, 82% of respondents felt motivated to engage in PA (249), though it should be noted this study was conducted on a younger cohort (mean age 13.27). In the blind/VI cohort in our study, personal motivation as a barrier increased with age from a low of 11.1% at age 16-19 to a max of 54.4% age 35-44, before returning to 12.5% age 65+. Further qualitative research may help determine whether these finding is unique to the Irish population or, in fact, related to the cohort included in this study having reached adulthood. The motivating factors cited in this study will be relevant to the fields of health and education, offering opportunities to target intervention strategies. A focus on appearance is unlikely to encourage exercise, having been cited by participants as somewhat or very unimportant, or neutral by 52% of respondents. The identified goals of 'to relax' (very or somewhat important to 71.2%) and to make new friends (very or somewhat important to 64.2%) may prove more effective – and provide a positive framework for professionals to initiate discussions encouraging PA. The variation in both barriers and motivators across age groups also reinforces the need to consider PA participation as dynamic, rather than fixed, with different supports likely required at different stages of adulthood (56).

As previously mentioned, qualitative research by India et. al (2021) has explored some of the PA barriers and motivators to PA experienced by the BVI population (167). Certain motivators, such as improving physical fitness, seem to be consistent between the general (220) and the BVI population (167), and were a positive finding of this study. These authors highlight however that additional barriers, including stigma perpetuated by society, may be unique to the BVI group (167). Future research, through the use of qualitative or mixed methods, would likely provide a deeper understanding of the challenges experienced by this group.

This study is not without limitations, notably the limited responses from certain age categories and genders. Limited survey and questionnaire responses in older populations have been described previously, with online surveys found to be feasible in most circumstances but limited by issues such as internet access (253). Deliberate attempts to contact this group through phone calls were marginally successful in increasing engagement, but further research may be required to gain more accurate information on this cohort. This study additionally relied on questionnaire information which can be at risk of social desirability biases (147). Despite this, it uses previously well validated tools and studies including the ISM and Milton's single item questionnaire (13,231). The consistent use of

these surveys allows for effective and accurate comparison between the typical population and the BVI population, which has not been attempted previously (13).

4.6 Conclusion

These insights are an opportunity to inform effective positive change to PA levels in this group, and are unique in the Irish context. The barriers and motivators identified will provide useful information to those offering sport and leisure opportunities, ensuring they are both of interest and accessible. Though conducted in the Irish context, results regarding PA levels are broadly consistent with previously conducted research regarding PA in adults with disabilities (143,173). Motivators (such as to relax, to have fun and make new friends) for and barriers (such as transport) to PA are similar across multiple different environments and have been identified in other cohorts such as high school students (220) and inactive adults (185). While this study provides a valuable insight to the low levels of PA that prevail amongst the BVI population, future research, including qualitative research involving participants who are BVI across all stages of the life cycle, should seek to gain a deeper understanding of the PA barriers, motivators and facilitators in this cohort.

Link from Chapter 3 and 4 to Chapter 5 - 7

Chapters 3 and 4 addressed a significant gap in the literature, particularly within the Irish context, by quantifying physical activity (PA) levels among children and adults who are blind or vision impaired (BVI). This formed the quantitative phase of the mixed-methods design. While international research has examined PA participation in these populations (25,136,254), such studies are often limited by small, localised samples, narrow age ranges, and inconsistencies in how vision impairment is defined, classified and measured (24,27,30). Within Ireland, large-scale surveillance studies have documented PA participation across the general population (9,10,13), however these datasets do not meaningfully represent individuals who are BVI. Consequently, prior to this thesis, there had been no comprehensive attempt to quantify PA participation across the life course within the Irish BVI population.

Aligned with the post-positivist strand of this thesis (37), Chapters 3 and 4 took a measurement-focused approach to examining patterns of PA participation at a population level. The findings point quite clearly to consistently low levels of PA, with particularly reduced engagement in active travel and physical education among children and adolescents compared to their sighted peers. This suggested a pattern of early disengagement, which was concerning given the established link between participation in childhood and continued involvement across the life course (96). A similar pattern was evident among adults, where low levels of PA raised concerns in relation to long-term health, independence, and functional capacity, particularly in the context of ageing (255,256). For individuals who are BVI, these issues were further heightened by the additional role PA can play in supporting navigation, balance, and reducing falls risk (22,257).

While these findings helped to establish the scale of the PA disparity, they did not explain how these patterns are experienced, or why they persisted. The statistical analyses highlighted trends and relationships, but they could not capture the more contextual aspects of participation, or the meanings people attached to their experiences. This reflected a broader limitation of relying on measurement alone to understand behaviours that are shaped by everyday context and lived experience, as is the case with PA participation among individuals who are BVI.

The move into the qualitative phase of the thesis (Chapters 5 – 7) therefore represents both a methodological and philosophical step. As outlined in Chapter 1, the overall approach taken here is pragmatic, with methods chosen based on their ability to address the research questions and contribute to a more complete understanding of the issue. The quantitative work provided an important starting point by establishing the scale and pattern of participation, but it was not sufficient on its own. To move beyond this, it is necessary to engage with how individuals experience and make sense of participation in their own lives.

For this reason, Chapters 5, 6 and 7 take an interpretivist approach, focusing on the lived experiences of individuals who are BVI across different stages of the life course (37). Reflexive Thematic Analysis (RTA) is used to analyse the data, recognising that themes are developed through an active process of interpretation rather than simply identified within the dataset (41). This aligns with the broader philosophical position of the thesis, where knowledge was understood as situated and shaped through interaction between the researcher and the data (37).

Importantly, this does not represent a departure from the quantitative findings, but rather builds directly on them. The qualitative work aims to unpack and make sense of the patterns identified in earlier chapters, offering a more detailed and grounded understanding of how participation is shaped in practice. Life course integration occurred at the level of interpretation and synthesis. Following analysis of each cohort, findings were compared across life stages to identify: i) barriers and facilitators that persisted across cohorts ii) influences that changed in form or significance with age iii) experiences at earlier stages that were retrospectively described as shaping later participation and iv) transition points at which existing support, opportunity or identity appeared particularly vulnerable to disruption. This comparative process did not assume that the cohorts represented a single longitudinal trajectory. Rather, it used convergence and contrast across datasets to develop a temporally informed account of PA participation across the life course.

Chapter 5: “Sometimes they’re not even trying to be rude. It’s just sometimes they just don’t know ”: A qualitative exploration of physical activity experiences among Irish adolescents with vision impairment

5.1 Abstract

Background

Vision Impairment (VI) is a growing public health concern. Adolescents who are blind or vision impaired (BVI) engage in significantly less physical activity (PA) than their sighted peers. In Ireland, only 9.6% of this population meet recommended World Health Organization guidelines. Although PA is crucial for physical and social well-being, research has historically overlooked the voices of the adolescents themselves. This study explores the barriers and facilitators to PA through the lived experiences of Irish adolescents who are BVI.

Method

Guided by the Social Ecological Model, this qualitative study utilised 4 focus groups (n=18) stratified by age (12-18) and gender. The data were analysed using Reflexive Thematic Analysis to identify recurring patterns and themes in participants' experiences.

Findings

Five themes were identified; (i) Personal factors influencing physical activity, (ii) Structural barriers to physical activity, (iii) The importance of the coach, (iv) Experiences of physical education and (v) Sport specific considerations. Results highlighted a persistent tension between high intrinsic motivation and safety concern, such as fear of injury. Furthermore, heavy reliance on parental transport was identified as a constraint on adolescent autonomy and agency.

Conclusion

Physical safety acts as an essential prerequisite for enjoyment and participation among adolescents who are BVI. Future initiatives must move beyond simple barrier identification to focus on creating safe, adaptive environments that foster independence and agency to support lifelong PA engagement.

5.2 Background

Vision impairment (VI) represents a significant and growing public health challenge among children and adolescents both nationally and internationally (141,258,259). The global prevalence of VI in those under 20 was estimated at 1.67% (260). Within the Irish context, this figure represents approximately 3% of the school-age population, with over 32,000 children aged 5-18 identified as blind or vision impaired (BVI) on the most recent census (261). The Lancet commission on adolescent health and wellbeing identified adolescence as a time of creating a foundation for later life health, with investments in adolescent health and well-being bringing a triple dividend of benefits now, into adult life, and for the next generation (262). VI interacts with physical activity (PA) in ways that expose and amplify existing health vulnerabilities. Multiple studies demonstrate that children and adolescents who are blind or visually impaired (BVI) engage in significantly lower levels of PA compared to their sighted counterparts, even after controlling for factors such as residential school attendance or health status (27,226,263).

Houwen et al. reported that children with a VI were statistically less active than their sighted peers, and spent a greater percentage of their time in sedentary activity (127), whilst Haegele and Porretta's more recent literature review yielded similar results (30). Irish studies mirror these international trends, with a recent study finding that only 9.6% of adolescents who are BVI met the PA guidelines set out by the World Health Organisation (263). Given this low rate of participation, it appears that current inclusion models are struggling to meet the needs of this generation of adolescents who are BVI. With improved survival rates among children born prematurely (a recognised risk factor for VI (264)), and improved recognition of other forms of VI (e.g. Cerebral Visual Impairment (265–267)), this prevalence is set to increase in the coming years. The combination of rising incidence and low PA levels at this critical life stage represents a growing public health concern.

These relationships are particularly concerning because PA offers unique benefits for adolescents who are BVI, including the development of fundamental motor skills (FMS) which are crucial to living an active and independent life (32,268). Furthermore, PA can support social engagement and enjoyment, benefits often underappreciated in the literature (212,269). In the longer term, PA is also associated with a reduced risk of future sight and health threatening conditions such as diabetic retinopathy and glaucoma, which may cause further deterioration in visual acuity as children and adolescents age. Given the positive

correlation between childhood and adulthood PA levels, the examination of the barriers to PA is an important step towards supporting this population's lifelong engagement in PA. It is only through understanding these adolescent barriers that we can explore the entrenched sedentary behaviours observed in older cohorts (24,145,270).

The Social Ecological Model (SEM) provides a useful framework for understanding PA behaviour as shaped by interacting influences across individual, interpersonal and environmental levels (271). This perspective is particularly relevant during adolescence, where participation is influenced by family support, school environments and broader social contexts (187). Existing research examining barriers to PA participation among children and adolescents who are BVI has predominantly employed quantitative methodologies, focusing on identifying and ranking obstacles and barriers to PA participation. Personal, social and environmental barriers have been documented, suggesting that challenges exist across multiple levels of the SEM (129,206,249). Within the Irish context, fatigue and feeling too busy have additionally been identified as key barriers (263). However, despite this growing body of evidence, a recent review suggests limited progress over the past four decades, indicating that documenting barriers has not yet translated into meaningful change (126).

This highlights the need to move beyond barrier identification towards a deeper understanding of how adolescents who are BVI experience, interpret and navigate PA in their everyday lives. Historically, qualitative research on this topic has largely prioritised the perspectives of parents and teachers of BVI adolescents (214,226,272–274), rather than the adolescents themselves, leaving a critical gap in understanding adolescents' lived experiences during this formative period. Given the heterogeneity of VI and the specific considerations of the Irish setting, research that centres adolescents' own voices is needed to provide nuanced, contextually grounded insight into PA participation among this population.

5.3 Aims and Research Questions

Grounded in the SEM framework (275,276), this study aims to explore the barriers and facilitators to PA participation among Irish adolescents who are BVI. The study seeks to understand how individual, interpersonal, and environmental factors interact within participants' broader life contexts (41,275,276). This approach allows not only the categorisation of barriers, but also the opportunity to explore the interpersonal tensions

unique to adolescence such as the conflict between a desire for autonomy and the continued reliance on parental support for access to movement (57,106,110).

Specifically this study addresses the following research questions;

i) What are the experiences of adolescents who are BVI participating in PA and sport?
ii) What do adolescents who are BVI identify as the facilitators of PA and sport?
iii) What do adolescents who are BVI identify as the barriers to PA and sport?

5.4 Methods

Study Design

This study was undertaken as part of a larger mixed-method study, examining PA levels amongst Irish people who are BVI. A qualitative design was selected as the best method to achieve the aforementioned aims. Given previous research in the area on the impact of age and gender on PA in the general population (10,13), and the BVI population (263,270), groups were stratified by age and gender; males and females aged 12-15 and 16-18. This is consistent with work by Kennedy et al recommending a narrow spread of ages given that differences in ability and level of comprehension vary substantially by age in childhood and adolescence (57,277). These specific age and gender criteria directly informed the subsequent sampling strategy.

Ethics

Ethical approval was granted by the University Ethics Committee DCUREC/2022/053. Written informed consent was obtained from the parents or guardians of participants under 18. In cases where consent was provided on behalf of the participant, verbal assent was sought prior to the commencement of the focus group. In conjunction with Vision Sports Ireland, an organisation with particular expertise in conducting research on those who are BVI, plain language explainer videos and accessible screen based copies of the form were available. In any situation where a participant had difficulty providing their signature (e.g. due to severe VI), verbal informed consent was obtained witnessed by a member of the research team. Verbal assent was additionally audio-recorded. Participants were informed of their right to withdraw at any time without consequence. No financial incentive was offered to participants as participants were motivated to attend by stressing the value of their contribution to both the project and future service planning. Anonymised electronic data

(audio files, transcripts and analytic files) will be retained for 5 years in accordance with institutional policy and then securely destroyed.

Participants and Recruitment

Inclusion criteria consisted of those with a self-reported vision impairment aged 12-18 who were living in Ireland at the time of data collection. Exclusion criteria included those over 18 (who were invited to participate in alternative focus groups stratified by age), those under 12, and those who did not identify as BVI. Participants were initially recruited through purposeful sampling, via advertising on Vision Sports Ireland's social media platforms, as well as being shared on Vision Ireland and other hospital-based groups' social media. Participants were invited to make direct contact with the research team. Those who had participated in previous research studies conducted by the research team and consented to being contacted for future research were also invited to participate. A snowball strategy was also used, whereby those who participated in focus groups were encouraged to share details of the research with others who may be interested in participating.

Finally, when recruitment of participants became challenging, convenience sampling was employed at specific Vision Sports Ireland events – events where a large number of people who are BVI would be attending. Participants were offered the opportunity to attend either in person or online via a password protected meeting on Zoom.

Data Collection

Focus group interviews were deemed the most appropriate method of gathering the necessary insights into this group. Focus groups provide the unique benefit of generating discussion, and rapidly producing important thoughts that may not emerge from questionnaires or one-to-one interviewing (33,35). In order to balance the need for sufficient time for participant discussion while ensuring a range of viewpoints were explored, a group size of between 4 and 8 people was selected (277–279), with interviews lasting 45-60 minutes. Long-standing guidelines and suggestions by researchers such as Krueger (35,36) and Morgan provided the initial framework for conducting the focus groups.(48)(7,8,49)

Building on this general framework, and cognisant of the fact that this group may have their own unique challenges, additional considerations included designing short, simple questions, moving from general to specific questions, and keeping discussion duration short. The question schedule was designed via the Interview Protocol Refinement Framework (37)

– a four phase process designed to develop the most appropriate research instrument (37). The question schedule was designed in consultation between research team members and Vision Sports Ireland. The question schedule was then piloted with adults who are BVI and sighted adolescents to test question clarity, acceptability and flow for the target groups, with some questions edited for clarity and brevity. The use of the Reflexive Thematic Analysis (RTA) framework allowed for groups to be conducted in a flexible manner, where the moderator could respond to participants' accounts in real time (41).

For in-person focus groups (n=3), participants were met at the venue entrance (an accessible Vision Ireland facility with conference room facilities) and greeted by the moderator (LF). For focus groups conducted virtually (n=1) participants were greeted together as the meeting started, with instructions provided in advance. To ensure the autonomy of the adolescent participants, and minimise parental influence on the data, parents or guardians who provided consent were invited to attend the focus group site solely for logistical support (e.g., transportation/wait time), but were not encouraged to remain in the interview space during the focus group or interview sessions. This boundary was clearly communicated during the informed consent and assent process, while ensuring they remained on-hand at a nearby waiting area in the unlikely event of an adverse outcome during the session. Table 5.1 provides an overview of the data collection methods and participant numbers.

Table 5.1 Focus Group Composition

Age	Gender	Number of Participants	Location
12-15	Male	4	In -Person
12-15	Female	5	In-Person
16-18	Male	5	In-Person
16-18	Female	4	Zoom

Data Analysis

Focus groups were recorded to ensure accurate documentation of findings. Interviews were then transcribed verbatim by the lead author (LF) and anonymised. The six-phase RTA analytical process set out by Braun and Clarke was employed as the method of analysis for this paper (40,41). A flexible approach was maintained throughout, with researchers moving back through phases as necessary. For steps 1-3 of the RTA framework, a single coder was used in this study (LF). As such, the analysis reflects the first author's interpretation of the data, informed and refined through critical dialogue with the wider research team. Data

familiarisation involved listening to and transcribing audio recorded files for focus groups. Data were subsequently examined for initial recurring messages and areas of interest. This information was then uploaded to NVivo qualitative data analysis software (NVivo 12, QSR International), and led to the creation of initial codes and potential themes. Through the use of three critical friends (SM, HG, SjB, SB) experienced with qualitative research and RTA in particular, themes were refined with constant reference to the original data to maintain clarity.

Rigor and Trustworthiness

The first author had completed a literature review of the barriers and motivators towards PA in the BVI population, and quantitative research looking at these issues in the Irish context specifically (263,270). As a result they brought a level of familiarity with the topics being discussed. Confirmability was strengthened through reflexive journaling and acknowledgment of the researcher's positionality. These reflexive practices were informed by the broader clinician-researcher positionality described in Section 1.4. Critical friend dialogue was used to challenge assumptions and explore alternative interpretations rather than to establish coding consensus. Data analysis was primarily conducted by the first author, with additional authors monitoring the reflexive analytical process by sense checking analysis and exploring alternative interpretations of data. Clarity was sought throughout the focus group to ensure comments were being accurately represented.

5.5 Findings and Discussion

Five main themes (and a number of subthemes) were identified in the data. An overview of these themes, along with illustrative participant quotes, is provided in **Table 5.2**. The following sections provide a detailed discussion of these findings in relation to existing literature and the SEM framework. These themes included (i) Personal factors influencing Physical Activity, (ii) Structural barriers to Physical Activity, (iii) The importance of the coach, (iv) Experiences of physical education and (v) Sport specific considerations. Importantly, these themes were not interpreted as discrete barriers or facilitators; rather, participants' accounts demonstrated how individual experiences of confidence and safety interacted with coaching, educational and structural contexts to shape participation.

Table 5.2 Illustrative participant quotations supporting identified themes

Theme	Subtheme	Illustrative Quotations
Theme i) Personal Factors Influencing PA	Intrinsic personal factors	"To keep fit and get bigger" A, Male age 16 "It makes you look stronger" R, Male age 14
	Extrinsic personal factors	"Making friends. Keeping connected." A, Female age 17 "I think it's [PA] good for your well-being. It's good for health, so it's good for your mind." C, Female age 17 "I exercise… for the physical health and the mental health. And also building ties between people... Making friends. Keeping connected." L, Female, 15
	Safety	"For every sport I've to be careful… that stops me [participating]. J, Male age 16 "It can be annoying because I can't do any of it. Even boxing I'm at risk of getting punched in the face" D, Male age 15 I'm not taking any chances. I'm doing sports that a ball either has a sound in it or it stays on the ground." B, Male age 16 "There'd be certain times I go into a room and I'd be just like 'I'm not doing this" R, Male age 14 "I'd be very nervous walking down certain stairs that don't have markers... I'd be worried, literally, that I'd fall on my face." A, Female age 16
	Transport & Autonomy	"It hasn't stopped me, but if my mother worked or something, I'd be in big trouble. I think not being able to drive is a big problem...

Theme ii) Structural Barriers to PA		I'm grateful my mother take me places, but if she didn't, I wouldn't do nearly any of the stuff that I do." A, Female age 17 "When I get to the swimming pool it's 45 minutes away by bus, and I have to take two buses to get there." R, Male age 14 (Transport) is not a problem yet. But it will be later on in life. A, Female age 16
	Lack of accessible facilities	"The gym I went to had a lot of really bright lights in winter. So I found it hard to see..." B, Male age 13 "They never make the writing really big... it's always small." C, Female age 17 "My depth perception is very bad so like stairs look like a ramp to me. When places don't have markers on the end of each step, it just means that getting down steps is that bit more stressful." D, Male age 15
	Lack of local inclusive opportunities	"I think clubs and gyms that tend to be a bit more rural, they tend to not know what to do as much." A, Female age 16 "I think that's a big thing that, like, a lot of things would primarily be in Dublin or Cork and stuff." F, Male age 17
Theme iii) Importance of the Coach	Competence & Empathy	"They check I'm okay. They understand it completely... I think definitely a lot more people are able to cater for it now." A, Female age 16 "They wouldn't be up to the needs of what you need when you have a vision impairment." A, Female age 17 "They basically get all of the leaders to do the activities blindfolded... putting the coach into our position, I think that really does help." A, Female age 17 "I know a good coach by the way they explain things to me."

		D, Male age 15
	Negative experiences	"It just wasn't working. I was too scared to swim, because I couldn't see the instructor because I was scared I would drown, and the instructor didn't understand why I was scared, because she thought I could see her. They were confused. They didn't know how to do it." A, Female age 16
Theme iv) Experiences of PE	Exclusion & 'Liability'	"Even if they're doing exercises or just running... I'm just kind of out of PE... We have a dog in our school so I just walk him." D, Male age 15 "They were afraid of liability, so I just get a free class to do homework." L, Female age 14 "Sitting on the bench at the side and watching everybody else have fun... is always really tough." A, Female age 16 "In secondary school I did it [PE] for a bit, but they wouldn't let me do ball sports. I got to second year and they just said no. They were afraid, because I'm the only one. They were afraid of a liability if I were to get hit." D, Male age 15
	Positive experiences with teachers	"My teachers are great. The school are good." D, Male age 15 "It depends on the teacher. I had a really good PE teacher. He was really nice. If we were playing a game with a ball, he'd bring them out, and he'd be like "which one do you want to plan with? Can you see this? Can you do that? And if we were playing badminton, because, like, I don't think a lot of visually impaired people can play badminton, he'd set up, like, a volleyball pitch, so I could stay on the volleyball and, like, people could play whichever one they wanted. A, Female age 17
	Negative Inclusion & Teacher Efficacy	"He [teacher] tries to include me in sports which are not safe for me to be doing… And I try to tell him and he does not listen to me." A, Male age 13 " They're all the same"

		L, Female age 14 "PE teachers are just the dumbest. My PE teacher always tried to do stuff that invariably I can't do... I'm like 'Ms I cannot see that'... playing hockey—that's a bit stupid. And she goes 'Oh, would you try it for me?' And I'm tempted to look at her and go 'Honey I have 5% vision.'" L, Female age 14 "I had this one instant actually, in second year where I went up to my teacher, and we were outside playing rugby, and I went up to her and told her, I can't see. She's like, Okay, go drink some water." A, Female age 16 "I think the really difficult thing from, I think the visually impaired person's point of view is that they'll say, oh, but you can run around a hockey pitch. And I say, Yeah, I guess I can. And then suddenly, the entire class will be running around a hockey pitch, and I don't get any thanks for that. So it's not like I guess there is no good proportionate response." A, Female age 17
5. Sport-Specific Considerations	Feasibility & Adaptations	"I do swimming... there's not much of a difference when you add in the visual impairment. You might be a bit more mindful, with lanes... but there's not much of a difference." L, Female age 14 "I can't play GAA and I couldn't do like soccer... I've tried badminton, I just can't see the shuttlecock. They tried to use the yellow one but it just wasn't going to work." D, Male age 15

Theme I; Personal Factors Influencing Physical Activity

Participants' engagement in PA was driven by a combination of *intrinsic motivators*, *extrinsic influences*, and explicit concerns for individual *safety*. Across focus groups,

participants consistently expressed an awareness of the holistic benefits of PA for both physical and mental health, framing it as important to their well-being.

I think it's [physical activity] good for your well-being. It's good for your health so it's good for your mind.
A, Female age 17

This awareness aligns with prior research showing that individuals who are BVI recognise both the physical and mental health benefits of PA (1, 2). A unique finding among the male focus groups was the emphasis on extrinsic factors such as perceived strength and appearances.

Moderator: Why do you exercise?
Male 1: To keep fit and get bigger.
T, Male age 16
Male 2: Yeah it [exercise] makes you look stronger.
P, Male age 17

By contrast, body image was not raised as a salient influence on PA among adolescent females in the study. This apparent shift of greater male concern with extrinsic appearance related factors may reflect broader trends (184,236). Adolescent males, for example, have been shown to understand engaging with health and fitness online as a matter of "striving for being ripped" (A, male age 16) (184). It is possible that increased use of social media has influenced this trend – an extrinsic influence rooted at the individual layer of the SEM but increasingly shaped by the media environment at the macrosystem layer (276). Given that social media usage decreases with age, males at this specific stage of the life course are more impacted by digital trends than adults who are BVI (280).

Personal safety emerged as a critical barrier to participation. Participants described avoiding sports perceived as risky, sometimes due to conditions that increase vulnerability to retinal detachment (4), with contact sports and ball sports often cited as particularly dangerous.

For every sport I've [got] to be careful. That stops me [from participating]…. I'm not taking any chance[s]. I'm doing sports that a ball either has a sound in it or it stays on the ground.
J, Male age 16

Sports modified specifically for those who are BVI were consistently perceived as safer and more enjoyable than mainstream sports, highlighting how environmental adaptations interact with individual risk perceptions to facilitate engagement.

It is really good to do sports that are for [the] visually impaired, that are completely altered and with visually impaired people, because it's just so much easier and you really feel safe there.
A, Female age 17

Participants in adapted ball sports, such as VI tennis, felt safer due to specific measures (e.g., a soft ball) used to mitigate risk.

I definitely feel safer. I mean the only VI sport I really play is tennis, but the ball is soft - so like, I do get hit with the ball every now and then ... it doesn't matter. Whereas if you're playing, you know, regular non-VI sports, you get hit with the ball, it hurts, and that's never pleasant.
R, Female age 16

These experiences echo results from Camp Abilities, a summer camp for students who are blind or vision impaired, underlining the importance of environmental adaptation and community support within the SEM (276). While participants exhibited high levels of intrinsic motivation, valuing PA for its health benefits and, in the case of males, its impact on physical appearance, within this sample, this motivation exists in a state of constant tension with a prevalent fear for personal safety. For adolescents who are BVI, the findings of this study suggest that physical safety functions as the obligatory gateway to enjoyment. Without environmental adaptations that reduce the risk of injury (specifically legitimate concerns such as retinal detachment), the psychological cost of hyper-vigilance may override the desire for participation within this sample. This creates a unique adolescent tension whereby participants appear motivated to engage in the world of PA yet sometimes feel constrained by an environment they perceive as a potential site of harm rather, than well-being.

Theme II; Structural Barriers

Findings show that structural and environmental constraints consistently shaped participants' opportunities for PA, reinforcing barriers long documented in research on

adolescents who are BVI (249). Participants also described challenges related to public transport and variable path quality, previously identified in the Irish context (208,263,270). While some participants in the current study highlighted their reliance on public transport, others acknowledged that their age and circumstances of residing at home shielded them from some of the major transportation barriers identified by adults in previous quantitative studies (270).

However, this protection functions as a double-edged sword. While residing at home eased the immediate logistical burden, it appeared to generate new conflict regarding developmental autonomy. Where adults face systemic failures, such as a lack of buses, adolescents in this group were conscious that their ability to take part in sports and PA was almost entirely dependent on parental availability. Older adolescents expressed a keen awareness of this vulnerability within the interpersonal layer of the SEM, where PA was conditionally granted by parental availability and schedules, rather than being an independent choice.

It hasn't stopped me, but if my mother ... worked or something, I would be in big trouble. I think not being able to drive is a big problem. I'm grateful my mother does take me places, but I think if she didn't, I wouldn't do any of the stuff that I do.
A, Female age 17

This finding adds practical nuance to existing literature, which often observes that parental activity level is positively associated with the PA levels of their children who are BVI (7). While that association holds, the age stratification used in this study captured how, for the adolescent, the barrier is not merely transportation in a logistical sense. They also experience a restriction of agency. Unlike adults who navigate systemic failures (such as bus routes) the adolescent is tethered to the family microsystem. Autonomy is a known predictor of PA engagement (57), with autonomy support positively associated with autonomous motivation that in turn predicts intention and participation in PA (281,282). Reduced opportunities for independent engagement may therefore undermine motivation, and potentially contribute to disengagement from PA. Failure to develop this autonomy at a critical life stage may have long term implications. Adolescents may not learn how to navigate the world as an active adult who is BVI, instead learning to view PA as something that requires external facilitation rather than internal drive (212).

Travel dependence was closely linked to the subtheme of *lack of locally available opportunities*. Under this subtheme, participants mentioned that specific opportunities for those who are BVI were typically based in larger cities and highlighted a lack of local organisation and knowledge to enable them to participate in mainstream sporting opportunities.

I think clubs and gyms that tend to be a bit more rural; they tend to not know what to do. M, Female age 16

Finally, a *lack of accessible facilities* also proved a common subtheme for this group. Specifically issues with lighting (being either too dark or too bright for those experiencing light sensitivity), the size of text used on written instructions, and markings on stairs to aid recognition (8), were frequently highlighted by participants. These findings mirror previous research on structural barriers among adolescents in other countries (9) and Irish adults who are BVI (6). This theme highlights that access is not simply binary (accessible vs inaccessible) but can depend on many environmental features (e.g. lighting and contrast) at the community-level of the SEM. Experiencing these facility challenges from a young age, may contribute to frustration and fatigue, potentially increasing risk of future disengagement.

Moreover, these findings demonstrate the need for interventions at the exosystem-level, including programmes to build confidence and skills for navigating public transport, alongside increasing accessible transport opportunities to address these structural barriers more broadly. Collectively, these findings underscore how community and policy-level adaptations are essential for enabling individual agency.

Theme III; The importance of the coach

The influence of the coach was identified as a theme, revealing a critical paradox; while coaches were seen as an impactful motivator for PA in this BVI group, a lack of education and training was seen to limit how much support they could provide. Despite the central role coaches play, there remains a shortage of disability trained coaches, with disabled athletes and players primarily coaching themselves (10,11). Disability coaches have previously highlighted a dual challenge of understanding both the athletes' sport, and their disability (10,11). All participants agreed that formal training on coaching individuals with a VI is an important method of improving PA participation in this cohort. They emphasised a coach's competence is most often defined by their ability to communicate sporting

requirements in accessible language. Particular areas for coach development highlighted by adolescents in this study included increased awareness of varying sight abilities and clearer accessible descriptions of PA activities .

Sometimes they're not even trying to be rude. It's just sometimes they just don't know… I know a good coach by the way they explain things to me.
D, Male age 15

This confirms that the barrier is sometimes a systemic knowledge deficit, positioned at the exosystem-level of the SEM, rather than solely at the level of the individual. This has been shown to be the case amongst others living with a disability (1,12). Greater collaboration between disability organisations and local mainstream sport providers could help address this gap.

Unique to the adolescent group, in contrast to the focus groups conducted with working age and older adults as part of the larger study, was a voiced ethical expectation that providers of PA opportunities should be competent to do so in an inclusive manner. Unlike previous generations, who maybe have internalised their VI as a deficit to be managed or hidden, these adolescents have been socialised in a culture of disability rights (283), leading to an internalised expectation of inclusion rather than a passive hope for it. For this group the "burden" of accommodation was rarely described as resting with the adolescent. Participants' comments suggest that they expect providers to demonstrate competence and inclusivity. While it is not possible to generalise beyond this sample, these findings may reflect a generational shift toward viewing inclusion as a provider responsibility and right rather than an individual obligation.

I think it's not being educated… I feel like if you ever want to be working with people, you should know how to be inclusive. Because there's loads of courses out there. It's not like there's nothing to teach you.
K, Female age 14

On an interpersonal-level, a coach's attitude was seen to greatly influence a participant's experience of PA. Participants, however, detailed a recurring pattern of support waning over time.

Some of them care at the start, and then they get sick of you. It's not the best.
P, Male age 13

This sentiment is a crucial finding. It demonstrates that without formal training, inclusion occurs as an act of interpersonal charity. As it is fuelled by individual willpower rather than policy, it requires high individual effort which becomes prone to fatigue. Consequently, when the coach's initial enthusiasm and capacity wane, the sustained effort needed for these adaptations eventually shifts back to the adolescent, leading to eventual disengagement.

By contrast, PA opportunities where the coaches were sufficiently trained were highlighted as positive experiences where the coach emerged as a supportive and motivating figure. Camp Abilities, an educational summer camp for children and youth with visual impairment (5,12), perfectly demonstrates this. Participants in the current study repeatedly mentioned Camp Abilities as a PA experience they particularly enjoyed - to such an extent that participants questioned coaches on what training they had experienced.

They check I'm okay. They understand it completely…I think definitely a lot more people are better able to cater for it [her vision impairment] now .
M, Female age 16

They have all the leaders [coaches] to do the activities blindfolded so they understand more what it's like and how hard it actually is. I think it helps them to understand.
A, Female age 17

These findings highlight the essential need for coach training that prioritises understanding, practical adaptations and empathy, ensuring inclusive and sustainable PA experiences for adolescents who are BVI.

Theme IV; Experiences of Physical Education

Experiences within Physical Education (PE) in school were characterised by a persistent pattern of limited or non-meaningful participation, reflecting challenges that have remained largely unchanged in the literature over several decades (14). Many participants spoke of exclusion that echoed long-standing findings in research on children and adolescents with VI, where barriers to participation have shown little improvement over time (14, 15,16, 17). In this study, young people commonly felt positioned as a liability, a finding that suggests

deeply embedded assumptions about risk and capability within PE settings. The systematic positioning of the adolescent as a "liability" within physical education fosters an enduring identity of disengagement, generating pervasive attitudes to PA that could persist into adulthood (24,270). However, such perceptions may be less a reflection of individual teacher attitudes and more a result of systemic pressures, where a single coach or teacher is often responsible for the safe engagement of a large, diverse class without additional support.

Even if they're [the class are] doing exercise or just running, it's not even with a ball – I'm just kind of out of PE.
L, Male age 15

The emotional impact of this exclusion was evident, with participants describing sadness, frustration and a pervasive sense of being sidelined. These accounts closely mirror work by Haegele et al. (13), specifically regarding the transition from total exclusion to negative inclusion. While such experiences are often attributed to a lack of teacher understanding, they also highlight a critical lack of system-level support, such as classroom assistants or adapted equipment, which leaves teachers overstretched and ill-equipped to facilitate meaningful inclusion. The persistence of this marginalisation is consistent with previous quantitative work noting that barriers to PA for children with VI have remained stagnant for over four decades (126). Crucially, participants in this study felt viewed as a "liability", which helps explain (though not justify) their exclusion.

Sitting on the bench at the side and watching everybody else have fun is always really tough.
R, Female age 16

Unlike older adults in previous cohorts who may choose non-disclosure to avoid shame (284), the adolescent in PE has no such choice. Being "out of PE" or "sitting on the bench" serves as a visible, recurring marker of "otherness" in front of their sighted peers (A, Female, age 17; R female age 17). This enforced visibility of their impairment as a liability is likely the origin point for the internalised shame seen in later life stages (284,285).

Conversely, several participants also reported forms of "negative inclusion" - being pressured to participate in activities they felt were unsafe (L, Male age 15). This reflects a mismatch between students' assessment of risk and teachers' assumptions.

He tries to include me in sports which are not safe for me.. .and I try to tell him and he does not listen to me.
J, Male age 13

Such situations not only reinforce the safety concerns raised earlier in the findings, but they also represent real physical risks, highlighting the consequences of inadequate adaptation and consultation with students. For this group, equating inclusion with danger immediately justifies a level of fear and desire to avoid PA, which can easily continue across the life course (285). This pattern aligns with evidence that PE teachers often report low self-efficacy when teaching students who are BVI and receive limited mandatory training (15,16). This lack of efficacy is frequently compounded by a lack of mandatory training and the absence of specialised personnel to aid in real-time modifications. Students themselves identified this knowledge gap directly.

PE teachers are just the dumbest.
K, Female age 12

While expressed forcefully, this comment clearly reflects a student's frustration rather than a literal assessment of teachers' intelligence, and captures the disconnect between teachers' perceived competence in their inclusive practice and the lived experiences of students with VI. This mirrors discussion in the broader literature, where there is an emphasis on stakeholders *believing* they teach inclusively, rather than spotlighting the voice of visually impaired students to ensure they feel included (94,273). These findings demonstrate an urgent need for more consistent, meaningful inclusion practices in PE. Targeted training and system-level policies that centre the experiences of young people with VI should form the basis for this. Qualitative work such as the present study provides a greater depth of evidence into how exclusion and inappropriate inclusion continues to be enacted in everyday school environments, and highlights the importance of aligning teacher practice with the lived realities of visually impaired students within a properly supported educational framework.

Theme V; Sport Specific considerations

Adolescents who are BVI also identified a range of sport-specific considerations that influenced their PA engagement. Consistent with broader evidence that individual preferences strongly influence participation,(17) participants expressed strong affinities for

particular sports, reflecting personal values and motivational priorities in PA behaviour among people who are BVI documented in prior work (93).

I just like rugby.
A, Male age 13

Such preferences, while often overlooked in programme design, represent a critical component of inclusive provision and should be explicitly integrated into policy-level decision-making within the SEM. Swimming was repeatedly highlighted as a sport that was attractive given the minimal adaptations required, such as clearer spatial awareness or modified lane allocation, consistent with research suggesting that activities with lower reliance on rapid object tracking or complex visual tasks are perceived as more accessible to individuals who are BVI (93).

I do swimming. There's not much of a difference when you add in the visual impairment. You might be a bit more mindful, with lanes, and they might be a bit more generous in the space they give you. But there's not much of a difference.
M, Female age 14

In contrast, ball and team sports were frequently considered difficult or impossible by this cohort, largely due to the perceptual and cognitive demands inherent in fast-paced, object-tracking activities. These perceptions mirror previous findings that visually demanding, rapidly changing sports and environments can present significant barriers to participation for youth with VI (206,249), and align with broader evidence on how mismatch between skill level and environmental demands can limit adolescent participation across contexts (93).

I can't play GAA [traditional Irish field sport] and I couldn't do soccer.
A, Female age 17

Some participants described attempts to adapt certain sports, often unsuccessfully, reinforcing the importance of realistic sport selection and tailored modifications. Sport specific adaptations have been highlighted as crucial enablers of inclusion in previous research, where lack of appropriate adaptations or awareness restricted meaningful engagement (286).

I've tried badminton, I just can't see the shuttlecock. They tried to use the yellow one but it just wasn't going to work.
N, Male age 15

Together, these accounts underline that sport preference, perceived feasibility, and the nature of required adaptations all interact within the SEM to shape adolescents' participation opportunities. This echoes literature on sport participation in people with VI, which emphasises that personal values, accessibility, and familiar, enjoyable activities are central to sustained engagement (286)

Crucially, these findings also highlight the inherent complexity of inclusive practice. Participants' labelling of certain sports as "impossible" (N, male age 15), suggests that inclusion is not a binary outcome of teacher or coach effort, but a nuanced interaction between the sport's demands and the environmental supports and modifications provided. These findings emphasise the inherent complexity of inclusive practice, and reinforced that meaningful inclusion cannot be achieved through isolated interpersonal efforts alone.

It is important to acknowledge that these findings also illustrate that inclusion is not a simple function of teacher effort, or willingness. Certain sports present intrinsic visual demands that require substantial environments and personnel adaptations. Teachers or coaches cannot reasonably be expected to facilitate PA in every situation without appropriate support (93,284,285). This highlights the need for system-led interventions that operate across all levels of the SEM, from targeted teacher training and student centred adaptations, to school-level resourcing and policy initiatives. Acknowledging this complexity allows for a balanced and more nuanced interpretation - educators are constrained by systemic factors, but meaningful improvements are achievable through coordinated action.

5.6 Discussion summary

This study explored the barriers and facilitators to PA among Irish adolescents who are BVI, providing insight into their lived experiences within multiple layers of influence and viewed through the SEM, at a time of critical physical development and identity formation. Five interconnected themes were cocreated; personal factors influencing PA, structural barriers to PA, the importance of the coach, experiences of PE and sport-specific considerations.

Across these themes, adolescents consistently demonstrated strong motivation for PA despite multi-level barriers (20,21)

A primary contribution of this work is the identification of the adolescent specific tension between a desire for agency and transport dependency. While parents provide essential access to PA, the continued reliance on the family simultaneously may restrict the development of independent skills required for lifelong activity. This can lead to a long-term belief that PA is something to be facilitated by others rather than an independent right.

School-based experiences, particularly within PE, highlight the consequences of exclusion and negative inclusion , where adolescents are positioned as a "liability" and safety concerns are not consistently addressed. Structural barriers such as limited transport inaccessible facilities and points of vulnerability; where training and competence were sufficient, adolescents experiences inclusion and motivation, whereas limited knowledge and waning support contributed to disengagement. Sport-specific considerations further shaped participation opportunities and highlight the complexity of designing inclusive programmes.

Importantly, within this participant cohort, significant barriers coexisted with consistently high levels of interest in PA and a clear desire for greater inclusion among participants. Despite repeated experiences of inclusion, or unsafe inclusion, adolescents did not express disengagement from PA itself. In fact, many remained motivated despite the multi-level barriers identified. However this motivation can be expected to wane over time should these remain unaddressed. This finding challenges deficit-based assumptions about PA engagement, and underscores the urgency of system-level reform, as the willingness to participate exists but is persistently being unsupported.

Strengths and Limitations

A key strength of this study is the authentic insight it provides into the challenges and motivations of adolescents who are BVI in engaging in PA. By centring their voices the study provides evidence that can inform future interventions. RTA, including the use of coding, verbatim transcription, critical friends and constant reference to original transcripts additionally strengthens this studies credibility and transparency of findings.

Several limitations should also be acknowledged within this study. Firstly, participants were recruited primarily through their existing engagement with Vision Sports Ireland. As such,

it is possible that these participants may be more positively disposed towards PA than the general BVI population. Previous research involving a similar cohort (7), demonstrated insufficient PA levels amongst this group. This work, therefore, provides crucial, actionable insights that reflect significant barriers, even among the most actively engaged subset of the BVI adolescent population. Additionally, this study did not stratify participants by cause, age of onset or degree of visual impairment. Given the low prevalence nationally (261), such research would benefit from international collaborations to achieve necessary numbers.

An additional limitation included the use of focus groups themselves, particularly in this adolescent group (21,22). Focus groups can encourage a phenomenon known as "groupthink" whereby participants converge on more dominant or socially acceptable opinions, potentially silencing sensitive or individual experiences (277–279). Strategies employed by the moderators aimed to mitigate these risks; however it is likely impossible to completely eliminate this phenomenon amongst this cohort.

Future Directions

The findings of this study carry immediate and crucial implications for practice and policy. These recommendations are organised according to levels of the SEM in Table 5.3, reflecting the multi-level nature of the change required to support lifelong PA for adolescents who are BVI.

First and foremost, there is an urgent need for evidence-based training for PE teachers and sports coaches that transcends basic disability awareness to focus specifically on practical adaptations and non-visual communication strategies. Such training should facilitate a shift toward meaningful inclusion, whereby teachers move away from assuming "liability" and instead engage in a collaborative process that centres the student's own assessment of their visual function and risk. This will allow for the development of the fundamental movement skills essential for future PA participation into adulthood.

At the community level, local authorities should prioritise low-cost environmental adaptations, such as high-contrast stair markings and tactile indicators, to foster independent navigation within sports facilities. These steps would primarily aim to foster independence among adolescents who are BVI which will not only reduce parental burden to facilitate participation, but arm this important group with the skills needed for lifelong PA participation.

Furthermore, addressing the challenge of transport and consequent deficit in adolescent autonomy requires community providers to consider flexible scheduling or peer-based transport solutions that reduce reliance on parental availability. Finally, while promotion efforts should highlight sports with naturally high accessibility, such as swimming, dedicated sound-based adaptations must be provided for traditionally "impossible" ball sports to ensure that sport-specific preferences and the genuine interests of adolescents are meaningfully met.

Table 5.3 Recommendations for Practice and Policy

SEM Level	Key Finding	Targeted Recommendation
Intrapersonal	Fear of injury (retinal detachment) and focus on appearance.	Provide sport-specific safety education and FMS training to build physical competence and reduce the "psychological cost" of participation.
Interpersonal	"Inclusion as charity" and reliance on parental transport.	Implement "Autonomy Support" training for parents and coaches to transition the adolescent from being "facilitated" to being an independent agent.
Organisational (School/Club)	Adolescents positioned as a "liability" in PE and mainstream clubs.	Mandate practical, non-visual communication training for PE teachers and coaches. Provide system-level support (e.g., assistants) to reduce teacher "inclusion fatigue."
Community / Physical Env.	Inaccessible facilities (lighting/contrast) and transport barriers.	Prioritize low-cost environmental universal design: high-contrast tactile stair markings, adjustable lighting, and peer-based or flexible transport solutions.
Policy / Macrosystem	Ethical expectation of inclusion vs. systemic knowledge deficit.	Shift policy from "disability awareness" to "instructional competence." Ensure national governing bodies (NGBs) integrate VI-specific adaptations into standard coaching certifications.

5.7 Conclusion

This study demonstrates that barriers to PA for adolescents who are BVI are not simply age-adjusted versions of adult obstacles. They are developmentally specific and deeply embedded within multiple levels of the SEM. While positive engagement occurs when programmes are well-adapted and coaches are competent and supported, these instances remain the exception rather than the rule. Ultimately, achieving equitable participation requires a shift from inclusion as interpersonal charity to a synchronised, system-level responsibility. By acknowledging the difficulty of the task and providing necessary structural support, we can ensure these adolescents are no longer positioned as liabilities, but as active participants in their own well-being.

Chapter 6: “You can come to the practice, but you can’t be on the team”: Physical activity experiences of Irish working-age adults who are blind or vision impaired

6.1 Abstract

Background

Physical activity (PA) is a critical determinant of health, yet individuals who are blind or vision impaired (BVI) consistently report lower participation levels than their sighted peers. In Ireland, only 21.7% of adults who are BVI meet recommended PA guidelines, compared to 41% of the general population. While research often focuses on children or older adults, working-age adults (18–65) represent a "missing middle" who must navigate participation alongside employment and caregiving without structured youth or geriatric supports. This study explored the multi-level barriers and facilitators to PA for this cohort.

Methods

Guided by the Social Ecological Model, this qualitative study involved four focus groups with 20 Irish working-age adults (11 female, 9 male). Data were analysed using Reflexive Thematic Analysis to identify recurring patterns within the participants' lived experiences.

Findings

Four themes emerged: (i) structural barriers, (ii) societal perceptions, (iii) the influence of the coach, and (iv) personal factors. Transport was identified as the dominant structural constraint, with unreliable infrastructure creating an "opportunity cost" that forced a reliance on others. Participants described a "pre-emptive withdrawal" from activities due to anticipated environmental inaccessibility. Furthermore, past negative experiences in school physical education (PE) continued to shape current participation identities.

Conclusion

For working-age adults, structural barriers function not only as logistical constraints but as challenges to adult identity and autonomy. Access to PA should be treated as a fundamental determinant of wellbeing rather than an optional health choice. Future policy must prioritize universal design and reliable transport to support independent participation throughout adulthood.

6.2 Background

Physical activity is a fundamental determinant of health across the life course, providing critical health benefits and protection against a range of chronic conditions (15). For individuals who are blind or vision impaired (BVI), engagement in PA assumes particular importance, as vision impairment is associated with reduced PA, increased barriers to PA, and elevated risks of secondary health conditions linked to a sedentary lifestyle (43,249,270). Beyond metabolic health, physical inactivity during early and mid-adulthood carries profound long-term implications. For adults who are BVI, weight-bearing PA is critical at this life stage for the development and maintenance of bone mineral density (287), a key protective factor given their elevated falls and hip fracture risk compared with sighted peers (157,257,288). Furthermore, PA during adulthood plays a central role in psychological resilience, social participation and identity formation (60,186,289), areas frequently disrupted by VI through restricted independent mobility (42,270) and increased social isolation (140). Failure to address inequitable access to PA therefore represents not only a personal health risk, but a broader public health concern. Given the higher prevalence of depression and social isolation reported among adults who are BVI (261), access to PA should be understood as a fundamental determinant of wellbeing rather than an optional health choice.

The interaction between VI and PA exposes a stark health inequality. Across populations, individuals who are BVI consistently report lower levels of PA than their sighted peers. Irish data confirms this disparity, with only 21.7% of adults who are BVI meeting the World Health Organisation's recommendations for PA (14,270), nearly half the rate of the general adult population (41%) (13). This disparity is particularly concerning for working-age adults, a period in which health behaviours strongly influence long-term morbidity trajectories and future independence (290,291). The participation gap creates a double burden of health risk, whereby primary sensory impairment is compounded by secondary chronic conditions associated with physical inactivity (85,86).

VI represents a sizeable and growing public health challenge both nationally and internationally. Current data, including the Lancet Global Commission on Global Eye Health (4) and the most recent Irish Census (261), indicate that nearly 300,000 Irish citizens report as blind or vision impaired (BVI). While substantial and novel research has focused on the developmental needs of children (27,263), or the age-related pathologies of older adults

(24,145), the experiences of working-age adults remain comparatively unexplored, despite constituting a substantial portion of the BVI population (4,141). Typically defined as adults aged 18-65 (4), this cohort occupies a distinct life stage characterised by expectations of autonomy, productivity, caregiving responsibility and self-reliance (63,291,292). Working-age adults who are BVI often navigate participation within community environments without the structured educational supports available in youth (212) or the targeted health services more commonly oriented towards older age (288). Consequently, this group represents a 'missing middle' in Irish and international health research, representing a population navigating significant participation demands while receiving comparatively limited structural support for engagement in health-promoting behaviours (290–292).

Existing literature identifying barriers to PA has relied predominantly on adolescent samples (27,30) or subgroup analyses of older cohorts (24,145). While certain barriers such as fear, transport and falls-risk are common across the life course within a BVI population (30,42,263,270), the barrier landscape for working-age adults is fundamentally distinct. This 'missing middle' must frequently negotiate PA participation alongside employment, caregiving responsibilities, and evolving health identities following vision loss, factors that may uniquely shape both perceived and actual participation barriers (63,290). The Irish context presents additional challenges, characterised by dispersed settlement patterns (293), variable public transport infrastructure (42,270), and specific health and social service configurations (11); factors which may disproportionately disrupt PA participation during a life stage characterised by expectations of autonomy, productivity and self-reliance (291,292). Understanding how working-age adults who are BVI experience and negotiate PA participation within this context is therefore essential to informing equitable adapted PA policy, programming, and support. The Social Ecological Model (SEM) provides a useful framework for understanding PA behaviours as shaped by interacting influences across individual, social and environmental levels. This perspective is particularly relevant for working-age adults, whose participation may be influenced by competing demands of employment, caregiving responsibilities and expectations of autonomy (63,271).

6.3 Aims and Research Questions

Aligned with the SEM framework (62), this study aims to explore the multi-level barriers and facilitators to PA participation among Irish working-age adults (aged 18-65) who are BVI. By capturing the qualitative depth of participants' lived experiences, this study moves beyond documenting barriers to examine how this 'middle' cohort negotiates their right to participate in an environment that frequently defaults to their exclusion (167,294). Specifically, this study addresses the following research questions:

i. What are the experiences of adults who are BVI participating in PA and sport?
ii. What do adults who are BVI identify as the facilitators of PA and sport?
iii. What do adults who are BVI identify as the barriers to PA and sport?

6.4 Methods

Study design

This study was undertaken as part of a larger mixed-method study examining PA participation across the life course among Irish people who are BVI. A qualitative design was selected to enable an in-depth exploration of how working-age adults (aged 18-65 years) experience and navigate PA within the context of VI and the broader demands of adulthood, including employment, caregiving responsibilities and expectations of independence. This age range reflects commonly used definitions of working-age adulthood within public health research (13,141,295). This study was informed by the Social Ecological Model (SEM), which conceptualises behaviour as shaped by interacting influences across individual, interpersonal, organisational, community and policy levels, providing a framework for understanding the multi-level factors influencing PA participation within this group.

Ethics

Ethical approval was granted by the University Ethics Committee DCUREC/2022/053. Plain language explainer videos and screen-based copies of forms were also employed, consistent with recommendations from Vision Sports Ireland. Where possible, written informed consent was obtained from all participants. Where a participant was unable to provide a written signature (e.g. due to their VI), verbal informed consent was obtained, with a member of the research team acting as witness. Verbal assent was additionally audio-recorded.

Participation was voluntary, and individuals were free to withdraw at any time without consequence.

Participants and Recruitment

Inclusion criteria comprised adults aged 18-65 with a self-reported VI who were living in Ireland at the time of data collection. Individuals who did not identify as BVI or who did not meet the age criteria were excluded and invited to participate in alternative focus groups relevant to their peer group. Participants were initially recruited using criterion-based sampling. Invitations were disseminated via hospital-based support groups and social media platforms run by Vision Sports Ireland, the governing body for sports and recreation opportunities for those who are BVI (228). Individuals who had previously participated in related research and consented to future contact were also invited. A chain referral strategy was employed, whereby participants were encouraged to share study information within their networks.

Finally, convenience sampling was employed at selected Vision Sports Ireland events, where a large number of adults who are BVI would be in attendance. Focus groups were offered either virtually or in person according to participant preference.

Data collection

Focus groups were utilised as the primary data collection tool in order to capture the lived experiences of this group. This method facilitated dialogue among peers and enabled exploration of collective barriers and facilitators that may be less accessible through surveys or individual interviews (296–298). Moderation followed established focus group guidelines (278,296,297), with sessions lasting approximately 60 minutes to balance participant engagement and depth of discussion

The question schedule was developed using the Interview Protocol Refinement Framework, a process designed to develop an appropriate research instrument (299). Questions were informed by collaboration between the research team and Vision Sports Ireland. Following pilot testing with adults who are BVI to assess acceptability, flow, and clarity, minor refinements were made to enhance clarity and brevity. Reflexive Thematic Analysis (RTA) (40,41,299) facilitated a flexible and responsive approach, allowing moderators to follow participants' priorities as discussions unfolded.

Although virtual participation was offered, all participants elected to attend in person. Participants were met at the venue entrance (a Vision Ireland facility with accessible meeting rooms) and greeted by the moderators (LF, SB). Guide assistance was available where desired. An overview of focus group composition is provided in Table 6.1.

Table 6.1 Focus Group Composition

Age	Gender	Number of Participants	Location
18-35	F	5	In Person
18-35	M	4	In Person
35-65	M	5	In Person
35-65	F	6	In Person

Data Analysis

Audio recordings of each session were transcribed verbatim by the first author (LF). RTA was agreed as the most appropriate method of analysis by the research team in order to maintain a flexible yet rigorous analytical approach. Analysis followed the six phase process outlined by Braun and Clarke (41). Consistent with reflexive principles, primary coding and theme development were conducted by a single coder (LF), with findings representing an interpretive engagement with the data rather than an objective consensus (40,41).

Data familiarisation consisted of repeated reading of transcripts and audio recordings. Transcripts were then imported into qualitative data analysis software (NVivo12, QSR International). All transcripts were pseudonymised, and data were stored on secure, password-protected drives in accordance with University policy and GDPR requirements. From there, initial codes and potential themes were identified. Four critical friends (HG, SB, SM, SjB), experienced in the use of RTA, reviewed and refined themes through engagement with the original data to support analytic depth and coherence.

Rigour and Trustworthiness

The first author had completed a comprehensive review of the literature on PA among people who are BVI. Several members of the research team had also conducted prior research in this area, providing contextual familiarity with the field. Transparency was enhanced

through the acknowledgement of the researcher's positionality and the use of reflexive journaling. As outlined in Section 1.4, particular attention was paid to the potential influence of the first author's clinical and prior research experience on interpretation. Critical-friend dialogue was used to challenge and deepen interpretation rather than to seek objective coding consensus. While primary analysis was conducted by the first author, co-authors provided sense-checking analysis and joined in offering alternative readings of the data. Clarification was sought during focus groups where necessary to ensure accurate representation of participants' accounts.

6.5 Findings and Discussion

Four main themes, each comprising several subthemes, were identified from the data; (i) Structural barriers to physical activity, (ii) Societal perceptions of people who are blind or vision impaired, (iii) Influence of coach on participation, and (iv) Personal factors influencing physical activity. Illustrative quotations supporting the identified themes are presented in Table 6.2. By integrating these findings with the SEM, it becomes evident that the 'missing middle' navigates a unique tension between a high desire for adult autonomy and a lack of systemic enabling infrastructure.

Findings are presented thematically and interpreted in relation to existing adapted PA and disability participation literature, using the SEM as an organising framework.

Table 6.2 Illustrative participant quotations supporting identified themes

Theme	Subtheme	Illustrative Quotation
Theme i) Structural barriers to PA	**Lack of local inclusive opportunities**	"I know there is tandem cycling in [city] …but there wouldn't be much up our way for visually impaired sports." M, male age 43 "The tandem cycling is the only thing I've explored... It's only 30 miles, but it takes an hour on the bus." L, Female age 37 "There is really nothing down there. You'd see different stuff advertised in Cork, Athlone but there's never anything down say in the north east." R, Female age 38

		"There probably is stuff in [local community centre] but because it's too hard to get in there I just don't even look it up." M, Male age 57
	Transport	"My biggest issue is getting to things. Cause I live in the countryside. Any kind of sport…I couldn't participate in any kind of sport because it would still be too far away." M, Male, age 43 "I couldn't keep it up because it was just too far away from me. Do you know what I mean?" L, Female age 37 "I know myself I'm relying on my mom or dad or a friend a friend to come. Because public transport isn't great where I am. …you have to fit it around their schedule as well. ..And it's not fair on them." J, Male age 27 "I think transport is one of the biggest things I really do." P, Male age 49
Theme ii) Societal perceptions of people who are blind or vision impaired	**Lack of understanding**	"Sometimes people underestimate your ability as well you know that they think you can't do stuff." R, Female age 38 "Well there is that yeah the under estimation and the over estimation. Either people are coming grabbing you by the shoulders, they're pushing you every way… or they think you're better and they go "it's over there" and you're just going "what's there?" B, Female age 49 "I think there is that lack of understanding about vision impairment. Compared to like, other additional needs." L, Female age 37
	Heterogeneity of the BVI population	"It's very hard when you work especially with people with visual impairments because you don't have just one complaint or one complication" J, Male age 53

		"Some people don't look visually impaired and so the person wouldn't know straight away unless they say something" P, Male age 49 "It's not one size fits all. Because even in a group of us, someone's able to do something probably a bit better than the other because you've got a little bit more vision, or a certain type of vision." J, Male age 27 "Every single person is different (regarding different needs)." C, Male age 34
Theme iii) The Influence of the Coach	**Use of language**	"A big thing is the instructor because if you join a regular class outside, they're not used to having to give instructions that everybody is watching them and they're following what they're doing." J, Male age 27 If you have one specifically organised by say, [sight loss organisation] and it's online, they're obviously going to… give you an actual specific steps." "And I thought No, she wasn't she wasn't giving the right descriptions or maybe giving enough time in between each activity or describing the activity before she started." J, Male age 53
	Coaches as a support	"There's several running clubs. They're very positive, like, what can we do to help you type of things? It's never, it's never "You can't"" P, Male age 49 "They're absolutely instrumental." J, Male age 27 "She's a good instructor. She'd come over quietly and say, you know, try it this way. She's discrete like." C, Male age 34 "I think the coaches make or break it." M, Male age 43
	Exclusion	"I used to do the swimming, and I had a row or two with the coaches about it, because she would draw what to do on a

		board and you'd be like, Sorry, what are we doing next? And she'd get short with you . I can't see the board, okay. I could do it. If you just bloody told me. That's just that." E, Female age 52 "You kind of get the impression it's too much hassle for them or something…They don't want to deal with you" L, Female age 37
Theme iv) Personal Factors influencing PA	**Advocacy for myself and for others**	"The other thing is you could have, we'll say, the likes of any of us going into a gym and saying well this is what a blind person needs." J, Male age 27 "So if you had somebody who was blind or vision impaired going in and said look at this is what you need to guide." B, Female age 31 "I mean we can sit here and say oh, we can't have this and we can't have that. But we can all sit here and say well you know what I wouldn't mind going in and giving a talk on what to do and what not to do …with somebody who's visually impaired, you know?" E, Male age 47 "I had to fight for the hours to go swimming, on medical grounds. But it shouldn't have to be a fight." K, Female age 58
	Recognising the benefits of PA	"For everything! Mental health, everyday physical health. Getting out and getting involved." B, Female age 31 "Physical benefits as well, you know, for me anyway, just trying to keep my muscles you know, not seizing up at our age! Just keep yourself moving and out and active." O, Male age 47 "You can't even put words on the benefits of physical exercise." L, Female age 33 "I'm not exercising as much as I should, I know that."

		J, Male age 27
	Previous experience of PA	"I was always left aside in PE, so it didn't really give me an introduction into sports. So that's why I'll just….what I know is what I know." C, Male age 34 "I was more of a spectator than anything else." O, Female age 43 "I started off on a bad foot because of school." J, Male age 53 "Yeah, it leaves a mark on you like. Just don't like anything to do with it (sport)." R, Female age 48

Theme I; Structural Barriers to Physical Activity

While structural barriers are long-documented across the life course, their impact on working-age adults who are BVI is uniquely shaped by the tension between societal expectations of adult autonomy and the absence of enabling infrastructure. Consistent with research demonstrating that environmental constraints remain one of the most persistent barriers to PA participation among people with disabilities (6,19,42,249,270), participants in this study described structural barriers not simply as logistical challenges, but as factors that fundamentally determined whether participation was possible at all. Within the Social Ecological Model (SEM) (62,111), these barriers operated primarily at the environmental level, where the personal demands conflicted with fragmented transport systems, inaccessible facilities, and rising costs.

Transport was described as the dominant structural barrier for this cohort, with a distinct opportunity cost. Unlike adolescents, whose participation is often mediated by parental transport and school structures (168), or older adults with greater access to leisure time (300), working-age adults must negotiate PA within the rigid constraints of employment and domestic responsibilities (63). This finding aligns with broader disability participation research demonstrating that transport accessibility is a critical determinant of community participation for adults with disabilities (301). In this context, transport failure frequently determined whether PA was feasible at all.

"My biggest issue is getting to things"
M, Male, age 43

"I just couldn't keep it [physical activity] up because it was too far away from me."
L, Female, age 37

Unreliable public transport and incompatible service schedules often clashed with other commitments, forcing participants to abandon structured PA opportunities. Even when activities were geographically close, the effort required to navigate transport systems rendered participation unsustainable:

"It's not too far but transport isn't always the best or most reliable."
F, Female age 36

As a result, participants described a process of **pre-emptive withdrawal**, whereby activities were not even considered due to anticipated access difficulties:

"There probably is stuff in [local community centre] but because it's too hard to get there. I just don't even look it up."
M, Male age 57

This anticipatory disengagement has been described in disability participation literature as a form of self-restriction, whereby individuals avoid opportunities based on prior experiences of environmental inaccessibility (302). In the present study, such decisions were not framed as personal preference but as a rational consequence of structural barriers.

Critically, when transport failed, participants described a loss that extended beyond the cancelled activity itself. The breakdown of the door-to-pitch link forced individuals back into reliance on others, undermining the independence expected of working-age adulthood and reinforcing a sense of exclusion. This finding highlights an important life stage dimension: whereas transport dependence may be socially expected during childhood or more accepted in older age, reliance on others during working adulthood conflicts with normative expectations of autonomy and self-sufficiency. In this way, structural barriers function not only as access constraints but as challenges to adult identity.

When participants were able to access PA opportunities, inaccessible facilities presented further barriers to independent participation. Swimming pools were frequently cited as particularly challenging environments, due to the lack of universal design, high background noise, and difficulties navigating changing areas.

"Pools are a nightmare…To even find your way into the pools or back into the showers. You actually can't do it on your own."
M, Female age 49

Similar challenges were described in gyms, where inadequate contrast, poor print size, and inconsistent equipment placement created both usability and safety concerns:

"The challenge I had was reading the weight on the weights. Some of them would have a bright colour but most of them didn't. The writing was the same colour as the weights. So I didn't know what weight to use."
R, Female age 38

"A lot of things could be thrown on the floor. It's not a very easy place to walk around."
J, Male age 52

These findings are consistent with previous research highlighting how sport and recreation facilities are frequently designed around visual norms, thereby creating unintended barriers for individuals who are BVI (303). The present findings extend this work by demonstrating how such design issues intersect with the responsibilities of adulthood, where the time and energy required to overcome these barriers may be limited.

Participants often viewed these barriers as theoretically modifiable but outside their individual control, instead locating responsibility for change within organisations, service providers, and wider community systems, consistent with similar findings in the literature (6). Within the SEM, these accounts position the primary locus of change at the organisational and community levels rather than the interpersonal level (111).

Financial constraints also shaped PA participation, particularly in the context of rising living costs and the additional expenses associated with being BVI (203,304). Policies such as free admission for carers were universally valued by this group, not only for reducing financial burden but for legitimising assistance and reducing guilt and discomfort associated with requesting support.

"I used to swim three times a week and my carer gets to come with me free of charge. So that's a big plus. My carer wouldn't come swimming with me out of choice, do you know what I mean?"

R, Female age 47

The value placed on such policies suggests that financial supports may function not only as economic facilitators but also as mechanisms that normalise assistance within recreational environments. Previous work has similarly demonstrated that inclusive policies and subsidy schemes can significantly influence participation among adults with disabilities (305,306).

Importantly, these barriers function not merely as isolated access issues but as systemic constraints that shape whether PA can realistically be integrated into adult life. Consistent with disability participation research highlighting the central role of environmental accessibility in shaping community participation (6,305)**,** participants described how transport, facility design, and financial cost collectively determined whether PA opportunities were viable. Unlike other life stages, working-age adults must independently negotiate environmental barriers within already demanding social roles (57,63). This dynamic reinforces the concept of the 'missing middle', highlighting how structural conditions can render PA participation conditional rather than expected during this important life phase.

Theme II; Societal Perceptions of People who are Blind or Vision Impaired

Societal perceptions of blindness and VI were discussed as an influential factor shaping PA participation among working-age adults. Unlike structural barriers, which restrict access through tangible constraints, societal perceptions operated as a pervasive and often unspoken force, shaping how participants felt they were interpreted by others, and whether their participation in PA was perceived as legitimate. Participants described how widespread misunderstandings of VI influenced the type, quality, and sustainability of their engagement in PA. Consistent with research demonstrating that social attitudes can function as powerful participation barriers alongside physical accessibility (6,167), both in the BVI community

and across other disabilities, these perceptions frequently constrained access to appropriate activity.

Participants consistently described a dynamic of simultaneous underestimation and overestimation of their abilities. When underestimated, individuals experienced a loss of autonomy and were restricted to activities they perceived as insufficiently challenging to support physical or psychological benefit.

"People underestimate your ability. They think you can't do stuff."
R, Female age 38

Conversely, participants also described being overestimated, where assumptions of competence resulted in inadequate instruction or inappropriate physical guidance.

"Well there is that under estimation and the over estimation. Either people are coming grabbing you by the shoulders, pushing you every way. Or they think you're better and they go "oh it's over there", and you're just thinking "what's there?"
B, Female age 49

This misreading of ability created a unique barrier for working-age adults who are BVI. Underestimation palpably limited autonomy, with participants being physically led when not necessary, and restricted to activities lacking appropriate challenge. Overestimation, in contrast, introduced safety concerns and frustration when instructions assumed visual capacity that was not present. Similar tensions between paternalistic support and unrealistic expectations have been documented in disability participation literature, where individuals with disabilities have reported navigating conflicting assumptions about competence and independence (303). Together, these opposing assumptions constrained access to PA that was both accessible and sufficiently graded to individual ability.

Participants emphasised the **heterogeneous nature of the BVI population**, highlighting wide variation in diagnosis, functional vision, and day-to-day experience. This diversity was frequently overlooked in PA contexts, where disability was treated as a uniform category.

"It's not one size fits all. Someone's able to do something a bit better than the other because they've got a little bit more vision, or a certain type of vision."
R, Male age 58

For some participants, variability within their own condition further complicated how they were perceived and supported.

"I have really bad days or really good days, and get infections or whatever… Sometimes one day they're fine and the next day it's a bit worse."
O, Female age 43

Failure to recognise this heterogeneity contributed to inappropriate assumptions about capacity and need, reinforcing both under- and overestimation. Participants suggested that such misunderstandings limited opportunities for tailored support and reduced access to PA experiences that aligned with individual preferences and abilities. This finding echoes calls within BVI research to move beyond categorical understandings of disability towards a more nuanced recognition of diversity and fluctuating capacity (6,307).

Participants equally described VI as being less well understood than other disabilities, particularly those that are more visible.

"I think there is that lack of understanding about vision impairment, compared to like, other additional needs."
R, Female age 32

One participant who also used a wheelchair noted that while he could successfully locate facilities that met his physical disability, these adaptations failed to account for his visual needs.

"The only [gym] I've attempted to go to… is suitable for wheelchairs. So all I have to deal with is my visual impairment. If you go to another gym I have a couple more things to worry about."
J, Male age 26

The relative invisibility of VI further complicated how participants' needs were recognised and responded to. Several participants noted that unless they disclosed their impairment, it frequently went unnoticed.

"Some people don't look visually impaired and so the person wouldn't know straight away unless they say something."
R, Male age 58

This invisibility placed responsibility on participants to continually explain, justify, and legitimise their impairment in PA settings. A similar burden has been widely discussed in the literature, whereby individuals must repeatedly disclose and defend their impairment to access appropriate support (307,308). In some cases, participants described having their impairment questioned or minimised, particularly when they demonstrated competence in certain skills.

"I nearly got kicked out of [a VI based activity] a couple of weeks ago. I potted the snooker balls and someone said 'Oh he's not visually impaired'."
J, Male age 27

Even when framed as humour or banter, such interactions reinforced the notion that visible difficulty was required to validate VI. This reflects broader stigma processes described in disability studies, where individuals whose impairments are not immediately visible may face suspicion or disbelief when requesting accommodations (308,309). This positioned participation as conditional, requiring ongoing negotiation and self-advocacy.

These findings demonstrate how societal perceptions function as a powerful barrier to PA participation among working-age adults who are BVI. The interaction between heterogeneity, under- and overestimation, and the invisibility of VI created a persistent burden of legitimisation, shaping not only access to PA but the quality and sustainability of engagement. Within the SEM, these dynamics operate primarily at the interpersonal and community levels, where social attitudes and knowledge of disability shape the inclusivity of recreational environments. These findings therefore highlight the need for broader public and organisational education regarding the diversity and variability of VI, to support participation that is safe, autonomous, and appropriately challenging.

Theme III; Influence of the Coach on Participation

Coaches played a central role in shaping whether PA was experienced as accessible, enjoyable, and sustainable for working-age adults who are BVI. Unlike adolescents in school PE, adults often exercise agency in choosing which coach or activity to engage with, shifting the power dynamic (57,310). For this group, participation becomes a negotiation rather than a mandatory experience. This consumer-oriented relationship with sport participation has been recognised in adult participation research of the general population, where continued engagement is strongly influenced by perceived quality of instruction and interpersonal climate (311,312). For the BVI cohort, this consumer perspective amplified the impact of coaching style, competence, and adaptability on engagement.

"I think the coaches make or break it. If the coaches are good and welcoming, and they're willing to kind of change things or move things around. That makes the world of difference. You don't feel like you're a burden to them. You don't feel awkward. You feel included."
O, Female age 43

Participants in the present study emphasised that effective coaches combine technical competence with subtle, individualised support. Support was most valued when it was delivered willingly and discreetly, allowing participants to maintain a sense of independence while receiving the necessary assistance.

"She's a good instructor. She'd come over quietly and say 'try it this way'. She's discreet."
R, Female age 42

"There's several running clubs. They're very positive. It's never 'You can't', it's 'what can we do to help you'."
P, Male age 49

In contrast, coaches perceived as dismissive, rigid, or unwilling to adapt created feelings of inconvenience and self-silencing, reducing motivation to engage.

"You kind of get the impression it's too much hassle for them or something… They don't want to deal with you."
M, Female age 52

"I felt like I was bothering them all the time."
O, Male age 47

Such experiences reflect broader findings within adapted PA literature, suggesting that perceived instructor competence and willingness to adapt activities are key determinants of whether individuals with disabilities feel welcome in mainstream sport environments (6,43).

Instructional language and teaching style were also critical. Participants valued accessible, inclusive instructions delivered at a pace that allowed comprehension and action. Visual-default teaching, such as writing on boards without verbal explanation, often caused more frustration than the use of specific words.

"I used to do the swimming, and I had a row or two with the coaches about it, because she would draw what to do on a board and you'd be like 'Sorry, what are we doing next?' She'd get short with you. I can't see the board. I could do it, if you just bloody told me."
E, Female age 52

This reliance on visually dominant instructional methods has been widely identified as a barrier to participation for individuals with VI, where standard coaching practices often assume visual learning and observation as the primary mode of instruction, as early as school level (43,50). For participants in this study, accessible instruction did not necessarily require complex adaptation but rather simple adjustments such as clear verbal explanation, spatial orientation cues, and pacing that allowed time to interpret instructions. Activities organised specifically for adults who are BVI were consistently praised by participants for the clear, adaptive instruction they provide.

"If you join a regular class, they're not used to having to give instructions…whereas if you have one specifically organised by say, [sight loss organisation]…they're going to give you actual specific steps."
M, Female age 52

This important distinction suggests that the accessibility of PA is sometimes shaped less by the activity itself ("I could do it") and more by the preparedness of the instructors to adopt an inclusive teaching strategy ("If you just bloody told me."). Previous research has similarly

emphasised the importance of coach education and disability-specific training in supporting inclusive sport participation (6).

Overall, participants' accounts highlight that coaching practices can either enable or constrain PA participation. At the interpersonal SEM level, interactions with coaches shaped immediate experiences of inclusion, confidence, and enjoyment among participants. At the organisational level, adaptive instruction determines whether an activity is genuinely accessible. Importantly, the adult context of participation introduced an additional dynamic: because working-age adults can choose whether to return to an activity, coaching practices had a direct influence on the sustainability of engagement (311,312). From a consumer perspective, adults' choice of coach introduces a negotiating power that can reinforce autonomy and self-determination (313). It also places responsibility on organisations to ensure inclusive opportunities exist (283). Consequently, expanding coach education and resources focused on non-visual pedagogy and accessible communication may represent an important mechanism for improving PA levels for working-age adults who are BVI.

Theme IV; Personal Factors influencing Physical Activity

Multiple individual-level factors influenced PA participation for this cohort. Participants were aware of the physical and mental health benefits of PA, including maintaining function, supporting wellbeing, and managing weight.

"Physical benefits as well, for me anyway, just trying to keep my muscles …not seizing up at our age!"
O, Male age 47

"You could get in a rut in the house... so if you only move for a walk... it just helps mental health. Sort of leads to a better home environment? And then obviously for weight management".
M, Female age 52

This awareness reflects findings in PA research among people with disabilities, where knowledge of health benefits is generally high but does not necessarily translate into sustained participation (6,43). Despite this awareness, participants often experienced guilt or self-criticism when they felt they were not meeting their own expectations regarding PA levels.

"I'm not exercising as much as I should, I know that."
J, Male age 27

"I've got very lazy. I played a lot of tennis….but I've got trouble with my hips. I'm with my guide dog and I go for walks with him, and I walk most places… I wouldn't be exercising as such".
R, Female age 32

Consistent with prior research (60,186,289), knowledge of recommended activity levels alone was insufficient to motivate sustained engagement; for some, it acted more as a source of self-criticism. The accounts in this study illustrate how individual motivation cannot be understood in isolation from the structural and social barriers described in earlier themes, reinforcing sociological perspectives that position behaviour as emerging from interactions across multiple levels of the SEM (6).

A distinctive feature of this cohort was the emergence of self-advocacy as a personal and social mechanism to support PA. Unlike adolescents, who often lack social capital (57,310), or older adults who described more resignation (285,309), working-age adults in this study actively challenged barriers and promoted inclusion.

"We can sit here and say we can't have this and we can't have that. But we can also sit here and say I wouldn't mind going in and giving a talk on what to do and what not to with somebody who is visually impaired."
E, Female age 47

"You could have the likes of any of us going into a gym and saying this is what a blind person needs."
J, Male age 27

These accounts reflect a growing form of collective self-determination and agency, in which individuals proactively addressed inaccessible environments and educated others about VI. Similar dynamics have been described in disability literature as forms of "everyday advocacy", where individuals develop strategies to negotiate environments that were not originally designed with accessibility in mind (309). For working-age adults in this study,

such advocacy emerged as a practical strategy for navigating participation barriers rather than as formal activism.

Importantly, while this agency enabled participation for some individuals, it also reflected an uneven distribution of responsibility, whereby individuals were required to compensate for systemic shortcomings. This dynamic echoes broader debates within BVI and disability research regarding the difficulties with over-reliance on individual resilience or advocacy in the absence of structural change (6).

Early experiences in school PE were described as formative, with exclusion and marginalisation shaping lifelong attitudes towards PA:

"I started off on a bad foot because of school."
J, Male age 53

"I'm kind of just remembering school where I'd be the last person to be picked."
R, Female age 48

"I was more of a spectator than anything else."
O, Female age 43

Participants reflected that these early experiences influenced confidence, perceived competence, and willingness to engage in PA in adulthood.

"[PE] didn't really give me an introduction into sports. So that's why [I don't know much about sport]. What I know is what I know."
J, Male age 54

"I went to a vision impaired school. Sports wasn't offered to us at all… That probably sets the seed, 'Oh well I just don't do sports'."
H, Male age 60

These reflections provide a compelling longitudinal link with the adolescent cohort investigated in the broader research of which this study forms a part, where exclusion in PE continues to affect engagement, reinforcing the importance of early interventions. Previous

research has similarly documented how negative school-based experiences influence lifelong attitudes towards sport and PA among individuals with VI (314). These accounts suggest a potential life course trajectory in which early exclusion accumulates across time unless actively addressed through inclusive practice.

Finally, participants contrasted the isolation, token inclusion and limited support associated with negative experiences with the social and practical benefits of group-based PA.

"I mean you get your fitness... but it's the community stuff as well. It's probably tougher if you're not in an area where there are people to help if you need it. I run in a group so there is always someone if I needed a bit of guiding."
M, Female age 49

"You can come to the practice, but you can't be on the team. Or go to the next level in ballet or whatever. If I'm swimming by myself I can do what I want. And because you're in a pool nobody knows that you can't see and you just go in your own lane. It's not like I need anything to make that possible for me to do."
L, Female, age 37

These contrasting experiences highlight how social environments can either reinforce exclusion or support participation by providing both practical assistance and a sense of belonging. Within the SEM, such dynamics operate at the interpersonal level, where peer relationships and social support can mitigate environmental barriers to PA (26).

Collectively, these findings highlight how individual-level factors such as health beliefs, identity, prior experiences, and self-advocacy interact with broader social and community environments to shape PA participation. For working-age adults who are BVI, self-advocacy is both a response to structural barriers and a distinctive mechanism supporting engagement within the 'missing middle' life stage, differentiating this cohort from adolescents and older adults.

6.6 Discussion Summary

This study provides novel insight into the lived experiences of working-age adults who are BVI, a cohort that has received comparatively little focused attention within the PA

literature. By examining this 'missing middle' life stage, the findings extend existing research on adolescents and older adults who are BVI and highlight how participation during adulthood is shaped by a distinct configuration of responsibilities, expectations and environments.

Across four interconnected themes, the findings illustrate how PA participation in working-age adulthood is negotiated through the interaction of previous personal experience, interpersonal relationships, organisational practices, and wider societal perceptions. Although participants demonstrated strong awareness of the benefits of PA, engagement was frequently constrained by structural barriers, limited access to appropriately trained coaches, and pervasive misconceptions of VI. Crucially, these barriers were not experienced by participants as isolated or individual challenges, but as consequences of systemic conditions operating across multiple levels of the SEM.

A particularly notable contribution of this paper is the identification of the lasting impact of school-based PE experiences. Participants described early exclusion and marginalisation in PE as formative experiences that shaped enduring identities in relation to PA, influencing confidence, perceived competence, and willingness to engage well into adulthood. When considered alongside findings from the adolescent cohort, these accounts suggest a life course trajectory in which exclusion in youth is not transient, but can accumulate into adulthood, reinforcing disengagement unless actively countered. This highlights school PE as a critical intervention point with implications extending far beyond adolescence.

In contrast to adolescents, who may lack the social capital to challenge exclusion, and older adults, who in previous work described greater resignation, working-age adults in this study frequently described self-advocacy as a key mechanism supporting participation. Participants reported educating others, challenging inaccessible practices, and advocating for themselves and their peers. While this agency enabled access to PA for some, it also reflected an uneven distribution of responsibility, whereby individuals were sometimes required to compensate for systemic shortcomings. This was particularly evident in relation to the legitimisation burden associated with the invisibility and heterogeneity of vision impairment. Participants were often required to explain, justify, or even defend their impairment in order to access appropriate support, adding an additional cognitive and emotional load to participation.

Taken together, these findings demonstrate that creating inclusive PA environments for working-age adults who are BVI requires more than individual motivation or isolated adaptations. Meaningful and sustained engagement depends on coordinated action across the SEM, including organisational competence, societal understanding of vision impairment, and opportunities that acknowledge the cumulative effects of earlier exclusion. Practical implications arising from these findings are summarised in Table 6.3, which outlines recommended actions to support equitable PA participation for working-age adults who are BVI.

By centring the experiences of this under-researched cohort, this study highlights how PA participation in adulthood is shaped not only by present-day conditions, but by the legacy of earlier experiences and structures. Addressing these factors is essential if working-age adults who are BVI are to be supported to participate fully in PA.

Strengths and Limitations

This research prioritises an in-depth qualitative exploration of an underrepresented life stage, capturing the rich, multifaceted accounts of how PA is experienced and negotiated by working-age adults who are BVI. By foregrounding participant perspectives and interpreting findings through the lens of the SEM, this study moves beyond individual-level explanations to offer a more systemic understanding of participation. In addition, by engaging a heterogeneous cohort, encompassing a wide range of eye conditions and ages of onset, these findings reflect shared realities of adulthood rather than being limited to a specific clinical subgroup.

Several limitations should be considered when interpreting the findings. Participants were primarily recruited through organisations that provide sport and leisure opportunities for people who are BVI. This likely introduced a service-user bias, where the perspectives of individuals already engaged in or open to PA are over-represented compared to those who are fully disengaged. Nevertheless, the persistence of substantial barriers even within this relatively engaged group underscores the depth and pervasiveness of the challenges identified. Additionally, as this study was situated within a specific national and service context, the reported barriers and supports are inevitably shaped by local infrastructure and policy frameworks (11). Finally, while the focus group format facilitated a rich dialogue, it remains susceptible to groupthink and social desirability bias. To mitigate this, moderators

employed reflexive probing and explicitly sought divergent opinions to ensure that the diverse realities of navigating PA as a working-age adult with BVI were captured.

Future Directions

The findings of this study point to several priorities for future research, practice, and policy. Given the distinctive position of working-age adults within the life course, targeted PA interventions are needed that explicitly address the legacy of earlier exclusion, particularly experiences of marginalisation within school PE. Such interventions should aim not only to provide accessible opportunities for PA, but also to support adults to (re)engage with PA and reimagine identities shaped by past experiences.

Future work should also examine how self-advocacy develops across the life course, including the circumstances under which it supports participation and when it becomes an additional burden for individuals navigating inaccessible environments. Peer-led and advocacy-based approaches identified in this study may represent potential opportunities to foster belonging and empowerment among adults who are BVI. However, reliance solely on individual advocacy risks reinforcing inequities and exhausting individuals if it is not accompanied by systemic-level change.

At an organisational and community level, further research is needed to develop and evaluate scalable, structured models of coach education. Training should prioritise non-visual pedagogy, accessible communication, and collaborative approaches to risk and autonomy and move beyond general disability awareness. Importantly, public health and sport policy must engage more explicitly with the invisible and heterogeneous nature of VI. Improving societal understanding of fluctuating and diverse visual experiences may reduce the ongoing burden placed on individuals to legitimise their needs, shifting responsibility from justification to inclusion.

Finally, longitudinal research tracking experiences from adolescence into adulthood would provide valuable insight into how early exclusion shapes later engagement in PA, and how timely intervention might disrupt this trajectory. Understanding how and when interventions can disrupt trajectories of exclusion will be critical for promoting equitable and sustained PA participation among individuals who are BVI.

Table 6.3 Targeted recommendations to support physical activity participation among working-age adults who are blind or vision impaired

SEM Level	Key Finding	Targeted Recommendation
Intrapersonal	Self-advocacy emerged as a key strategy enabling participation, with participants frequently educating others about their needs.	Support peer-led and advocacy-informed initiatives that empower adults who are BVI while ensuring responsibility for accessibility remains with organisations rather than individuals.
Interpersonal / Community	Societal misunderstandings of vision impairment led to simultaneous underestimation and overestimation of ability, limiting access to appropriately challenging activity.	Provide targeted disability awareness training for coaches, staff, and community organisations to improve understanding of the diversity and variability of vision impairment.
Interpersonal / Community	The invisible and heterogeneous nature of VI created an ongoing legitimisation burden, requiring participants to repeatedly explain and justify their needs.	Promote inclusive organisational cultures in which accessibility needs are anticipated and accommodated without requiring individuals to repeatedly disclose or defend their impairment.
Environmental / Structural	Sport and recreation facilities were often designed around visual norms, creating navigation and safety challenges in environments such as gyms and swimming pools.	Implement universal design principles in sport and recreation facilities, including high-contrast signage, consistent equipment placement, improved lighting, and accessible wayfinding supports.
Organisational	Coach competence and willingness to adapt activities strongly influenced whether participants felt included and confident to engage.	Expand coach education programmes to include non-visual pedagogy, accessible communication strategies, and practical guidance on adapting instruction for individuals who are BVI.

Organisational	Instructional practices frequently relied on visual demonstration, limiting accessibility even when activities themselves were feasible.	Encourage inclusive coaching practices that prioritise clear verbal instruction, spatial orientation cues, and pacing that allows participants time to interpret instructions.
Organisational/ Policy	Early exclusion from school physical education shaped lifelong attitudes toward PA and influenced adult engagement.	Strengthen inclusive PE practice and teacher training to ensure meaningful participation for students with vision impairment and reduce long-term disengagement from physical activity.
Policy	Participation barriers reflected broader systemic gaps rather than isolated individual challenges.	Develop coordinated policy approaches across sport, health, and disability sectors to embed accessibility within mainstream physical activity programming.

6.7 Conclusion

PA participation among working-age adults who are BVI is shaped by interacting influences including personal circumstances, social support and access to environments and services. This study highlights the unique position of this 'missing middle', a group navigating competing demands of employment, caregiving and independence, while often lacking the structured supports available in earlier and later life. Consistent with the SEM, barriers to participation extend beyond the individual to include environmental, organisational and societal constraints that limit opportunity and access.

Addressing these challenges requires a shift away from individual-level approaches towards coordinated, system-level responses that prioritise accessibility, inclusivity and flexibility within community-based PA provision. Recognising and responding to the specific needs of working-age adults who are BVI is essential to reducing health inequalities and supporting sustained engagement in PA across the life course.

Chapter 7: “You just kind of lose heart”: A qualitative exploration of barriers and facilitators to physical activity among older adults who are blind or vision impaired

7.1 Abstract

Background

Older adults who are blind or vision impaired (BVI) are less likely than the general population to meet physical activity (PA) recommendations, despite the importance of PA for maintaining health, mobility and independence in later life. Limited qualitative research has explored how older adults who are BVI experience barriers and facilitators to PA participation. This study examined these experiences among older Irish adults who are BVI.

Methods

Using a qualitative design informed by the Social Ecological Model (SEM), two focus groups were conducted (one in-person, n=5; one online, n=4). Data were analysed using Reflexive Thematic Analysis (RTA) to identify patterns of meaning regarding the lived experience of PA.

Findings

Five interconnected themes were identified: (i) structural barriers to physical activity, (ii) the role of the coach, (iii) heterogeneity of the blind and vision impaired population, (iv) personal perceptions towards PA participation, and (v) societal perceptions of people who are BVI. Participants described transport dependence, inaccessible environments and limited local opportunities as major barriers that reduced autonomy and restricted participation. Coaches could either support or hinder engagement depending on their communication style, willingness to adapt and inclusive training. Participants also highlighted diversity within the BVI population, including differences in functional vision, comorbidities, support preferences and attitudes towards disclosure. Fear of injury, low confidence and societal misconceptions further shaped participation.

Conclusion

PA participation among older adults who are BVI is shaped by interacting barriers and facilitators across multiple levels. Person-centred, co-designed approaches are needed to improve accessibility, inclusion and sustained engagement.

7.2 Background

Blindness and vision impairment (BVI) are disproportionately prevalent in older adulthood. Globally, the majority (77.7%) of people living with BVI are aged over 50, and prevalence increases with age (4), affecting approximately 13% of adults aged over 65 and up to 25% of those aged 85 years and older (140,142). In Ireland, where the population over 65 is projected to increase substantially in the coming decades (315), BVI in later life represents an important and growing public health concern. Although BVI occurs across the life course, its implications in older adulthood are shaped by the broader context of ageing, including changes in mobility, health status and reliance on social or environmental supports (316–318).

Physical activity (PA) is widely recognised as a key determinant of health and is associated with reduced risk of cardiovascular disease, diabetes, depression and premature mortality across the life course (15). For older adults who are BVI, PA may be particularly important in supporting balance, mobility and functional independence (22,319,320). Participation in PA may also contribute to the prevention or management of secondary conditions that are more common among people with BVI, including obesity and diabetes (86,218). Despite these benefits, PA participation among people who are BVI remains consistently lower than in the general population. In Ireland, only 20–25% of adults aged over 65 who are BVI meet World Health Organization PA recommendations, compared with 32% of the general population (13,14,270). Similar disparities in PA participation between individuals with BVI and sighted populations have been reported internationally (24,145).

Large-scale epidemiological studies provide important population-level evidence linking BVI and lower PA participation (24,145,270). However, these studies offer limited insight into how barriers to participation are experienced and negotiated in everyday life. Qualitative research has begun to address this issue, identifying environmental barriers, transport difficulties and lack of accessible information as key influences on engagement (173). While this work provides valuable insight, relatively little qualitative research has examined how older adults who are BVI experience PA participation in contemporary social and service contexts.

Participation in PA for older adults who are BVI is likely to be shaped by a range of interacting influences. The Social Ecological Model (SEM) provides a useful framework for

understanding PA behaviour as shaped by interacting influences across individual, interpersonal and environmental levels (271). This perspective is particularly relevant in older adulthood, where participation may be influenced by health status, mobility, social support and accessibility of local environments (321). Previous research has identified structural barriers such as transport access, accessibility of facilities and availability of inclusive programmes (206,270). In addition, older adults who are BVI may navigate the broader personal and social consequences of VI, including adapting to later-life sight loss or managing long-term disability within social contexts where attitudes towards disability have changed substantially over time (204,283,322). Understanding how these influences intersect in everyday life is important, as barriers to participation may arise from the interaction of individual, social and environmental conditions rather than from BVI alone.

The broader context in which PA occurs has also evolved in recent years. Developments in assistive technologies (164,323), changes in service provision (11) and the social consequences of the COVID-19 pandemic (324–326) may have altered the opportunities and constraints surrounding participation for older adults who are BVI. Contemporary qualitative research is needed to examine how structural, interpersonal and individual factors interact to shape PA participation among older adults who are BVI. These insights are therefore important for informing effective and equitable PA initiatives.

7.3 Aims and Research Questions

This study aimed to explore the barriers and facilitators to PA participation among older Irish adults who are BVI, with particular attention on how ageing-related factors shape participation later in life. A qualitative methodology was selected due to the exploratory nature of the research questions and the need to understand complex interactions between individual, social and environmental factors while capturing participants' perspectives. This approach allows for the development of contextually grounded insights that can inform both theoretical frameworks and practical intervention design. Specifically, this research sought to address the following questions:

i. What are the experiences of older adults who are BVI when participating in PA and sport?
ii. What do older adults who are BVI identify as the facilitators of PA and sport?
iii. What do older adults who are BVI identify as the barriers to PA and sport?

7.4 Methods

Study Design

This study was undertaken as part of a larger mixed-method study examining PA levels across the life course among Irish people who are BVI. A qualitative design was selected to allow an in-depth exploration of how older adults aged 65 years and older understand and navigate PA within the context of ageing and VI (327). This age threshold was selected to align with commonly used definitions of older adulthood within public health research and national surveillance systems, including the Sports Monitor study, which tracks PA participation within the Irish population (13,270). This study is informed by the SEM, which conceptualises behaviour as shaped by interacting influences across multiple levels, including individual, interpersonal, organisational, community and policy environments (62).

Ethics

Ethical approval was granted by the University Ethics Committee DCUREC/2022/053. Given the accessibility needs of the participant group, particular attention was paid to ensuring that study materials and procedures were accessible to individuals who are BVI. Accessible materials, including plain-language explainer videos and screen-reader compatible versions of participant information sheets and consent forms, were developed in collaboration with Vision Sports Ireland.

Informed consent was obtained from all participants prior to participation. Where participants were unable to provide a written signature due to the nature of their VI, verbal informed consent was obtained and witnessed by a member of the research team, and additionally audio-recorded. Participants were informed that their involvement was voluntary and that they could withdraw from the study at any time without consequence. For participants attending in-person focus groups, individuals were permitted to attend the venue accompanied by a guide or companion if required for transport or navigation. However, companions did not participate in the discussions themselves. All recordings and transcripts were pseudonymised to protect participant confidentiality, and data were stored securely in accordance with university and regional data protection policies.

Participants and Recruitment

Inclusion criteria consisted of individuals aged 65 years or older with a self-reported BVI, who were living in Ireland at the time of data collection. Exclusion criteria included individuals under 65 (who were invited to participate in alternate focus groups stratified by age) and individuals who did not identify as BVI. Participants were initially recruited through purposive sampling. Study advertisements were distributed through Vision Sports Ireland's social media platforms and shared by Vision Ireland. Interested individuals were invited to make direct contact with the research team. Individuals who had previously participated in research conducted by the team and had consented to future contact were also invited to participate. A snowball recruitment strategy was also utilised, whereby participants were encouraged to share details of the research with others who may be interested in participating. Finally, convenience sampling was conducted at Vision Sports Ireland events, where a large number of people who are BVI would be present.

Data collection

Focus groups were selected as the primary data collection method to facilitate discussion and shared reflection among participants with similar lived experiences of ageing and VI. This approach allowed participants to build on one another's accounts, generating insights into common barriers, facilitators and social dynamics influencing PA participation (296–298). Each group lasted approximately 45–60 minutes, allowing sufficient time for discussion while maintaining participant comfort. Established guidelines informed the structure of the focus groups, including the use of open-ended questions and facilitated discussion to encourage participant interaction (296,328).

In designing the focus group schedule, particular consideration was given to clarity and accessibility of questioning, recognising that participants may have diverse visual abilities and communication preferences. Questions were therefore structured to progress from broader experiences of PA participation to more specific barriers and facilitators, supporting natural conversation flow. The question schedule was designed via the Interview Protocol Refinement Framework, a four–phase process designed to improve the clarity and effectiveness of qualitative research instruments (299). The guide was developed collaboratively between members of the research team and Vision Sports Ireland and was subsequently piloted with adults who are BVI to assess clarity, relevance and flow. Minor revisions were made following pilot testing to improve question clarity. Focus groups were

conducted in a flexible manner consistent with Reflexive Thematic Analysis (RTA) principles, allowing the moderator to explore emerging topics and respond to participants' experiences in real time (41).

For in-person focus groups (n=1), participants were met at the venue entrance (a Vision Ireland facility with conference room facilities) and greeted by the moderator (LF). Participants were oriented to the physical environment before the session commenced to ensure they were comfortable navigating the space. To maximise participant autonomy, companions or guides who accompanied participants to the venue remained in a nearby waiting area rather than within the focus group room itself. This boundary was clearly communicated during the informed consent process, while ensuring companions remained nearby in the unlikely event of an adverse outcome during the session.

Two focus groups were conducted: one in-person (n = 5) and one online (n = 4).

Table 7.1 Focus Group Composition

Age	Gender	Number of Participants	Location
65+	Male	4	Zoom
65+	Female	5	In Person

Data analysis

Focus groups were audio recorded to ensure accurate documentation of participants' accounts. Recordings were subsequently transcribed verbatim and anonymised by the first author (LF) prior to analysis.

Reflexive Thematic Analysis (RTA), as described by Braun and Clarke, was selected as the most appropriate analytical approach. This method provides a flexible yet rigorous framework for exploring patterns of meaning within qualitative data while recognising the active role of the researcher in the analytic process. The six phases of RTA were followed throughout the analysis process. Consistent with Braun and Clarke's recommendations for reflexive analysis (41), a single primary coder (LF) conducted the initial stages of analysis,

including familiarisation with the data and generation of initial codes. Data familiarisation involved repeated listening to the audio recordings alongside transcript review.

Transcripts were subsequently imported into NVivo qualitative data analysis software (NVivo 12, QSR International) to facilitate coding and organisation of emerging patterns within the data. Initial codes were then developed into candidate themes through iterative comparison and refinement. To enhance analytic depth and reflexivity, emerging themes were discussed with a group of critical friends (SM, HG, SB, SjB) who had expertise in qualitative research and Reflexive Thematic Analysis. These discussions involved revisiting original transcripts to ensure themes remained grounded in the data and accurately reflected participants' accounts.

Rigour and Trustworthiness

The first author had previously conducted a literature review examining barriers and motivators to PA among people who are BVI, alongside quantitative research in the Irish context specifically. This prior familiarity with the research topic informed the analytical process while also requiring ongoing reflexive awareness of potential assumptions. This was considered in relation to the broader clinician–researcher positionality described in Section 1.4, with critical-friend discussion used to challenge assumptions and develop alternative readings rather than to establish coding consensus.

Confirmability was strengthened through the use of reflexive journaling, allowing the researcher to document analytic decisions and reflect on how their positionality may influence interpretation of the data. Data analysis was primarily conducted by the first author, with additional authors providing ongoing sense-checking of emerging themes and exploring alternative interpretations of the data. Throughout the focus groups, the moderator actively sought clarification where necessary to ensure participants' perspectives were accurately understood and represented.

7.5 Findings and Discussion

Five overarching themes (and a number of subthemes) were identified in the data obtained, as detailed in Table 7.2; (i) structural barriers to physical activity, (ii) the role of the coach,

(iii) heterogeneity of the blind and vision impaired population (iv) personal perceptions towards PA participation (v) societal perceptions of people who are BVI.

Findings are presented thematically below, with integrated discussion offering interpretation in relation to existing adapted PA and disability participation literature, using the SEM as an organising framework. This approach is consistent with Reflexive Thematic Analysis, which emphasises the active role of interpretation and supports the integration of analysis and discussion within qualitative reporting (41). Across these themes, participants' accounts illustrated that PA participation in later life was shaped by the interaction of VI with health status, previous experiences, support preferences and wider structural and societal conditions, rather than by any single barrier in isolation.

Table 7.2 Illustrative participant quotations supporting identified themes

Theme	Subtheme	Illustrative Quotation
Theme i) Structural barriers to PA	Lack of accessible facilities	"You'd have to have a safe place to do it [tandem cycling] as well" S, Male age 65 "The sign posts and things are very visual" L, Female age 72 "Just more contrast in things would help" D, Male age 68
	Coach Training	"I don't think the understanding is there in the sports bodies to actually know everything about that vision loss. That if I hit a golf ball, once I hit it, it's gone. It's out of my field of vision. I cannot find it. I'm looking through a keyhole. I'm not going to find a golf ball looking through a keyhole." J, Male age 71 "A lot of people who wouldn't have that training. You turn up and they're just like, oh my god, what am I going to do?" E, Female age 68 "They don't know where to start and you can't blame them."

		D, Male age 68 "I wonder how many coaches would be interested in getting involved. You know, they don't have to. A lot of coaches get involved in the sport because they like sport, but I think an awful lot of coaches would like to be involved in in people who are able bodied or certainly not people with visual impairments." J, Male age 71 "Whether it's insurance or it's the fact that the coaches aren't trained, (they) maybe manoeuvre somebody to the side without really saying it'd be too difficult for me to actually show you…It's down to training" S, Male age 65
	Transport	"To get to the place was … two hours on busses to get there and back…So sometimes we got a lift, but it was just your whole day was gone.. You kind of lose heart." I, Female age 68 "Some of the bus drivers don't listen. ..Now, I said it three times for the bus driver, will you please tell me where the stop is … if there's no one else getting off that stop, just please tell me. He drove past it." D, Male age 68 "I'm dependent on my wife to drive me anywhere." J, Male age 72 "It's very difficult to participate in a sport, although you would like to, if you don't have the ability to get there, so that for me is the issue is that I have to be self-contained." D, Male age 68 "You've got to rely on other people to get you to these events. And are they free? Are they available? " E, Female age 68
	Lack of Inclusive local opportunities	"There's nothing (i.e. no sport or PA opportunities) to share in Clare." S, Male age 65 "Well, no, there isn't an awful lot going on . I'm living in West Tipperary and there isn't a lot going on. "

		J, Male age 72 "There is no visually impaired basketball team in Ireland." D, Male age 68
Theme ii) Influence of the Coach	Coaches Fear	"Personally, I think that the likes of gyms are going to activities that I normally wouldn't do. I feel I'm viewed on as an insurance risk." K, Female age 74 "For a lot of them, I'd say it could be the fear factor. They don't know, and don't know how to deal with it, and they haven't got the tools to deal with it." S, Male age 65
	Use of language	"They do tend to talk down sometimes. They don't tend to accommodate in a neutral fashion. You have to have neutral language." K, Female age 74 "Like when we were doing the dancing. I enjoyed it. But there was one thing that she said – walk like a penguin or something – somebody that couldn't see wouldn't know what she was talking about. And there's just little things like that. It's very simple. " L, Female age 72 "I: Not pointing and saying "it's over there!". I, Female age 68 E; I HATE that. It's irritating." E, Female age 68
	Coaches as a support	"The gym that I used go to … is fabulous. They just got it." E, Female age 68 "There's some of them that will say I can't help you but would you tell me how I can help you." J, Male age 71 "The first time I went under [the water] was very first night - twice I went on and that was scary, and I got out of the pool. My legs just went out from under me. And

		one of the lifeguards, he come over with a chair, sat me down. God love him, he talked me right through it." L, Female age 72
Theme iii) Heterogeneity of the Blind and Vision Impaired Population	Complex health needs	"I don't exercise much because my bones, and they are at me. Like my hip is in an awful state." E, Female age 68 "I have the blindness which is bad enough, but I've the Parkinsons as well. So I don't really get around that much like, you know." S, Male age 65
	Use of language	"I: I thought that was fabulous. I meant to say it to him… I, Female age 68 E: But then some people may find it offensive – what do you mean what can I see?" E, Female age 68 "So there's a lot of training and a lot of coaching that's required for each person to be able to understand where they are with their vision impairment, because each one is different." J, Male age 71 "Everybody is different" L, Female age 72
	Disclosure preferences	"The thing is once you disclose it there is no going back. It depends who you're talking to you know, because some people say, Ah, sorry about that. Are you blind? Are you this? Are you that? And you don't want pity, you know." K, Female age 74 "A lot of people are ignorant to visually impaired people, and they're not sensitive to it. So it is very important to be aware of your audience. Who you're going to disclose it to. Even friends." K, Female age 74 "Well you don't want to disclose it all the time – when you disclose it you want someone to bring you into the fold."

		E, Female age 68 "You then have to go through a litany of explanation, and it becomes very difficult and embarrassing… And so a little bit of an identity document would help." L, Female age 72
	Need for a companion or individual participation	No I just say can I take someone with me. I always do… I know [E] didn't take anyone, but she probably could have if she wanted to. I, Female age 68 "I'd probably be very independent." E, Female age 68
Theme iv) Personal Perceptions towards PA participation	Attitudes towards competition	"There is blind tennis now, but that's very competitive, I believe. And I wouldn't be into that now. I'd be just doing for the for the leisure thing, really." J, Male age 72 "I don't like sports that go into some kind of competition." S, Male age 65 "It got very competitive, didn't it? … And I was not good. I was not a good player. I never was. I did it for exercise." I, Female age 68
	Need for courage	"It's important that people realise how frightening it is for the person with the visual impairment. You know, it takes a lot of courage to get involved in sport or to get out there and to do stuff." J, Male age 72 "It takes an amount of courage to get involved in sport or to do anything, you know, from the back of a tandem for Christ's sake." D, Male age 68
	Safety concerns	"I can't go outside the back door – I'd be afraid I'd fall down or something." J, Male age 71 "I'd be careful of rugby you know, a contact sport." D, Male age 68

		"VI basketball, is that not very dangerous though? As in, you get hit in the face all the time with the ball? "
Theme v) Societal Perceptions of People who are Blind or Vision Impaired	Public lack of understanding of people who are BVI	"If you go to the pool, that creates chaos sometimes. Obviously, there's a risk involved and you get to… the life guards, You can almost smell the panic of them. What's he going to do next?" J, Male age 71 "To be honest, I really don't care. I can't see them, so I don't know if they're making faces. So let them do whatever they want." E, Female age 72 "Sometimes you're patronised a bit as well, by people. You're a child of a Lesser God at times. You're not the same as the rest. You know you have a deficit, a deficiency, and people try not to mention the fact, but it's very obvious. Other people, they tend to be a bit patronising, if nothing else, sometimes, and you can't blame them. Sometimes they just feel happy that they don't have it themselves. And sometimes they feel I'm a bit better than him." S, Male age 65
	Media Perception of people who are BVI	"You know, that guy … walking to the North Pole or doing stuff like that, and everybody feels happy that he's doing all this great stuff. So it must be brilliant. You know, he's a brilliant guy… But the other thing is… they don't have to take any responsibility for anybody else who's not as courageous as he is." J, Male age 71 "You'll hear these wonderful stories about some woman running a marathon and she's blind, or somebody else doing something magnificent, and they're blind, and then people are thinking, wonderful but… they're not completely representing blind people. It's not dealing with the day to day. It's a feel good story… J, Male age 72 … But it's just to make other people feel good!" D, Male age 68

		"They don't want show us warts and all" L, Female age 72

Theme I; Structural Barriers to Physical Activity

Within each focus group, discussion frequently centred on structural barriers that limited opportunities for PA. Consistent with the SEM, these barriers can be understood as operating primarily at the environmental and organisational levels (62,111). Participants described transport difficulties, limited accessible facilities and a lack of local inclusive PA opportunities as key factors constraining participation. While similar barriers have been documented in previous research examining PA participation among people who are BVI (42,270), participants in the present study emphasised the ways in which these structural constraints were experienced as a loss of independence in later life.

Transport was consistently described by participants as the most immediate barrier to participation. Several participants reported relying on family members or friends for travel to activities, which limited both the frequency and spontaneity of their engagement in PA. One participant explained that they were "*dependent on my wife to drive me anywhere." (J, male, 72),* highlighting the reliance many participants placed on informal support networks to access opportunities for exercise. Similar reliance on family members for transport has been identified in previous research examining PA participation among individuals who are BVI, particularly in contexts where accessible transport infrastructure is limited (42,206). Participants described how this reliance constrained engagement by making participation contingent upon the availability and willingness of others. As one participant explained, *"You've got to rely on other people to get you to these events. Are they free? Are they available?"* (*E, female, 68).* For individuals who had previously travelled independently, this transition represented a significant loss of autonomy, transforming participation in PA from a personal choice into an activity dependent on external support.

Participants also described the practical challenges associated with navigating public transport systems. Journeys to activities were often characterised as lengthy and exhausting, with one participant explaining that travelling to an activity could involve *"Two hours on buses to get there and back… it was just your whole day was gone."* (*I, female, 68)*.

Difficulties navigating public transport systems have been widely documented among individuals with VI, particularly where transport environments rely heavily on visual cues or inconsistent driver assistance (42). Participants in this study described situations in which assistance from transport staff was unreliable, further increasing the uncertainty associated with travel. For example, one participant recalled repeatedly requesting help from a bus driver to identify their stop, only for the driver to pass it entirely:

> *"I said it three times to the bus driver, "Will you please tell me where the stop is?" He drove past it." (D, male, 68)*

These accounts illustrate how transport barriers extend beyond logistical inconvenience, and may generate frustration and uncertainty that discourage participation in PA.

The results of this study also suggest that persistent transport challenges may gradually undermine motivation to remain physically active. Participants described how the cumulative effort required to organise transport, navigate unfamiliar environments and manage uncertainty surrounding assistance frequently outweighed the perceived benefits of attending activities. One participant reflected that repeated challenges associated with travel could eventually lead individuals to disengage from participation altogether: "*You just kind of lose heart." (I, female, 68)*. Similar processes of disengagement have been described in research examining PA participation among people with disabilities, where repeated environmental barriers can gradually erode motivation to participate in organised activities (305).

Beyond transport, participants also emphasised the importance of accessible and safe environments in enabling participation in PA. Even where specialised training opportunities for BVI specific sports were available, participants reported that appropriate environments for participation were often lacking. For example, one participant notes that although tandem cycling training opportunities existed, participation remained difficult without safe and accessible spaces in which to practise, explaining that *"You'd have to have a safe place to do [tandem cycling] as well" (S, male, 65)*. Previous research has similarly identified limited access to appropriate facilities as a barrier to participation in adapted sports among individuals with disabilities (19,305). Without accessible environments, opportunities for engagement in these activities remain restricted even where training programmes are technically available.

Participants living in rural areas described particularly limited opportunities to engage in inclusive PA, with many activities concentrated in larger urban centres. As one participant explained, *"There's nothing [i.e. no sport or PA opportunities] to share where I'm based anyway"(S, male, 65).* Geographic disparities in access to inclusive sport opportunities have also been reported internationally, with individuals living in rural areas often facing additional barriers related to transport infrastructure and limited local provision (165,249,329). These accounts highlight how geographical inequalities intersect with disability and ageing, leaving those living outside urban centres with particularly limited access to inclusive PA opportunities.

Together, the findings of this present study highlight how structural barriers shape opportunities for PA among older adults who are BVI. Addressing these barriers may require flexible approaches to PA delivery that reduce reliance on transport and increase the accessibility of participation opportunities. One approach discussed within the literature involves the development of digital or home-based PA interventions. Such programmes have shown promise in supporting exercise adherence among older adults by providing structured guidance, remote support, and the autonomy of a programme that can be undertaken at an individual's own pace in a safe and familiar environment (323). However, the effectiveness of such approaches for individuals who are BVI depends heavily on the accessibility of digital platforms. Older adults who are BVI may encounter additional barriers when engaging with digital technologies, including difficulties navigating visual interfaces and reduced compatibility with screen readers (90). Consequently, while digital interventions may reduce the transport barriers, poorly designed technologies risk creating new accessibility challenges. Co-designed initiatives developed in collaboration with individuals who are BVI, such as the "I Can" programme developed by Vision Sports Ireland (330), may therefore represent a more appropriate model for supporting participation in PA.

Importantly, the accounts presented here also suggest that structural barriers may accumulate across the life course. While younger individuals who are BVI may encounter similar environmental challenges (263), participants in the present study described the compounded effects of ageing, reduced mobility, and long-standing infrastructural limitations. Addressing these barriers therefore requires coordinated action across multiple levels of the SEM (62). Although these findings are situated within the Irish context, similar transport and accessibility barriers have been documented internationally among individuals who are BVI (19,165,249). This suggests that the structural challenges identified here reflect broader

patterns in the organisation of inclusive PA opportunities rather than context-specific anomalies.

Theme II; Role of the coach

The coach-participant relationship was identified by participants as a central influence on PA engagement, acting as both a significant barrier and powerful facilitator for older adults who are BVI. Participants described a consistent mismatch between how coaches delivered instruction and how participants could access it. In particular, instruction was often communicated using visual metaphors and gestures, creating barriers for those unable to access visual cues. Communication style has been identified as a critical component of effective inclusive coaching, with previous research emphasising the importance of adapting instructional approaches to meet the needs of participants with disabilities (19,311). The findings in this study suggest that when such adaptations are absent, communication itself can become a primary barrier to participation.

Participants described how commonly used phrases such as "over here", "there", or "that way" were of limited practical value. The use of pointing was highlighted as a particularly ineffective and, at times, frustrating, with one participant stating *"No pointing and saying it's over there!" (I, female 68),* while another added *"I HATE that. It's so irritating" (E, female 68).* These accounts illustrate how communication strategies that are intuitive within sighted contexts may exclude individuals who are BVI. Similar challenges have been identified in research examining coaching practices in disability sport, where reliance on visual instruction can limit access and reduce participant confidence (331). Participants in the present study emphasised that these barriers were not necessarily intentional but reflected a lack of awareness of how instruction is experienced by individuals who cannot rely on visual information.

Participants also provided examples of instructional approaches that relied on visual or metaphorical language that could not be easily interpreted without sight. One participant described being instructed to "walk like a penguin", noting that "*somebody that couldn't see wouldn't know what she was talking about"* (*L, female, 72).* This example highlights how visual metaphors, while often used to simplify movement for sighted participants, may become inaccessible when the references point itself is visually based. Previous research has emphasised that instruction for individuals with VI must be conveyed without reliance on

visual cues, requiring clear and descriptive verbal communication when teaching movement tasks (19). More broadly, research examining motor skill development among individuals who are BVI highlights the importance of adapted instructional strategies to support skill acquisition and participation (332). The findings of the present study suggest that the ability to translate movement into accessible non-visual instruction may represent a key component of inclusive coaching practice.

Beyond the specific language used, participants also described the tone of communication as influential in shaping their experiences. Some participants reported that coaches adopted a tone they perceived as patronising, with one participant stating that " *They do tend to talk down to you sometimes" (K, female, 74).* Such experiences may reflect broader societal attitudes towards disability, which have been shown to influence interactions between instructors and participants in sport and exercise settings (204). Within the context of PA, these interactions may affect not only participants' immediate experiences but also their longer-term willingness to engage.

A further issue raised by participants was the often invisible burden placed on them to educate coaches about how to adapt activities. While many coaches expressed goodwill and a willingness to support participants, the responsibility for explaining adaptations frequently fell on the participant themselves. As one participant described, *"There's some [coaches] that say 'I can't help you but would you tell me how I can help you?' (J, male, 71)*. Other participants reflected that coaches often lacked the knowledge or confidence to adapt activities, with one noting that "*You turn up and they're just like, oh my god, what am I going to do with them?" (E, female, 68)* while another explained that "*they don't know where to start and you can't blame them" (D, male, 68).* These accounts suggest that, while this willingness from coaches was viewed positively, explaining their needs may become tiring and discouraging over time. This finding also highlights how the labour of making sport inclusive may be shifted onto individuals with disabilities rather than being supported through formal training or organisational structures. While coach-focused research has highlighted the acquisition of disability sport-specific skills "on the job" as a positive learning experience (331,333) the findings of the present study suggest that this perspective may overlook the cumulative burden placed on participants during this process.

Participants also attributed these challenges to a lack of formal training and structural support for coaches. One participant reflected that barriers to inclusion were not solely individual

but systemic, noting that *"whether it's insurance or it's the fact that the coaches aren't trained… it's down to training" (S, male, 65).* This reinforces the need for organisational approaches to coach education rather than reliance on informal or participant-led learning.

In contrast, participants also described positive experiences in which coaches acted as facilitators of participation. Supportive coaches were characterised not only by their knowledge but by their willingness to listen, adapt and respond to individual needs. One participant described a positive gym environment, noting that "*they just got it"* (*E, female, 68).* Previous research has demonstrated positive associations between instructor expertise and PA participation (311); however, participants in the present study emphasised that a coach's willingness to learn and adapt was equally, if not more, important. This finding aligns with literature highlighting the importance of relational and adaptive coaching practices in inclusive sport settings (331,334). Some participants also questioned the extent to which coaches were willing to engage with inclusive practice, suggesting that interest in working with individuals with visual impairment may vary: *"I wonder how many coaches would be interested… I think an awful lot of coaches would like to be involved in people who are able bodied" (J, male, 71).* While not universally expressed, such views highlight potential attitudinal barriers that may further limit opportunities for participation.

Taken together, these findings highlight the central role of coaches in shaping PA participation among older adults who are BVI. While supportive coaching practices can facilitate participation and confidence, a lack of training in non-visual communication strategies and inclusive pedagogical practices may unintentionally create barriers to participation. Addressing these gaps requires organisational investment in coach education that moves beyond disability awareness toward practical instructional competence.

Theme III; Heterogeneity of the Blind and Vision Impaired Population

Participants in this study explicitly rejected the idea of VI as a uniform experience, instead emphasising the substantial diversity that exists within the BVI community. Rather than describing VI as a single shared experience, participants emphasised the wide variation in visual function, health status and support needs across individuals. These differences influenced how participants approached PA and the types of support they required to participate.

"So there's a lot of training required for each person to be able to understand where they are with their vision impairment, because each one is different." (J, Male, 70)

Previous work by Haymes et al has highlighted the variability in functional ability associated with differing levels of VI, with those with more severe VI reporting greater difficulty with activities of daily living (258). Participants in the present study echoed these findings and extended them by emphasising the implications of this variability for how PA support is designed and delivered, highlighting that effective support requires an understanding of each individual's specific capabilities rather than a one-size-fits-all approach.

In addition to variations in VI, participants described the impact of additional health conditions on their ability to engage in PA. For this older cohort, comorbid health conditions were a common feature of daily life and often compounded the challenges associated with VI.

"I don't exercise much because my hip is in an awful state." (E, female, 68)

"I have the blindness which is bad enough, but I've the Parkinson's as well. So I don't really get around that much ." (F, male, 74)

These accounts illustrate how participation in PA for this group is often shaped by the combined impact of VI and other age-related health conditions. Previous research has similarly documented declines in PA participation with age among both sighted and BVI populations (13,143,270). More broadly, multimorbidity has been shown to significantly influence functional capacity and engagement in PA among older adults (335). The findings of the present study suggest that when these conditions intersect with VI, they may create additional and compounding barriers to participation.

Beyond health-related differences, participants also described differing preferences regarding the presence of support when engaging in PA. For some, having a guide or companion was viewed as essential, particularly when navigating unfamiliar environments or activities. In these cases, the presence of a support person was perceived as enabling the participation that would otherwise feel inaccessible.

"I take someone with me. I always do. I know [E] doesn't take anyone, but she probably could have if she wanted to." (I, female, 68)

By contrast, other participants expressed a strong preference to participate independently, with one participant stating *"I'd be very independent." (E, female, 68)*

These differing perspectives suggest that preferences for support are not solely determined by functional ability, but are also shaped by personal values such as autonomy and independence. While some individuals value the security provided by a guide or support person, others view independence as a key component of meaningful participation. Similar variability in support preferences has been reported in research examining PA and disability, which emphasises the importance of autonomy and choice of facilitating engagement (6,19). Programmes that assume a single model of support may therefore fail to accommodate the diverse needs and preferences within the BVI population.

Participants also expressed varied perspectives regarding whether, when, and how they wished to discuss their VI in PA settings. For some, disclosure was viewed as a permanent and potentially limiting step.

"The thing is, once you disclose it [a vision impairment] there is no going back." (K, female, 72)

Others suggested that disclosure should be purposeful, and linked to meaningful inclusion, rather than occurring routinely.

"You don't want to disclose it [a vision impairment] all the time – when you disclose it you want someone to bring you into the fold." (E, female, 68)

Some participants were more open to discussing their VI, but highlighted the effort involved in explaining their needs in these situations.

"You have to go through a litany of explanations and it becomes very difficult and embarrassing… an identity document would help." (V, female, 66)

Collectively, these accounts suggest that disclosure is not a fixed decision but a dynamic and context-dependent process that is actively managed by individuals. Previous work has found

that individuals with disabilities often perceive the term "disclosure" negatively, particularly where it is associated with stigma (284,336). More broadly, research has highlighted how decisions around disclosure are shaped by social and cultural contexts, as well as individual concerns regarding identity and autonomy (204). In this context, it is interesting to note that neither the concept nor the language of disclosure was evident in focus groups conducted on younger adults and adolescents as part of the wider study. The prominence of disclosure within participants' accounts suggests that, for older adults, this process is not straightforward or uniform, but requires ongoing negotiation depending on the context.

Overall, these findings highlight the substantial heterogeneity within the BVI population. Differences in visual function, comorbid health conditions, support preferences and attitudes toward disclosure mean that PA interventions must remain flexible and responsive to individual circumstances rather than assuming a uniform experience of VI potentially resulting in interventions that fail to engage those whose needs and preferences fall outside standardised models. Similar calls for person-centred and adaptable approaches have been made within the disability and PA literature, which emphasises the importance of tailoring interventions to individual needs and contexts (6).

Theme IV; Personal Perceptions towards PA Participation

Participants described a range of individual perceptions that shaped both their willingness to participate in PA and the types of activity they chose to engage in, highlighting the role of perceived risk, confidence and personal preference in PA decisions. While these factors operate primarily at the individual level of the SEM, participants' accounts suggest they are shaped by previous experiences, perceived risks, and interactions with broader social and environmental contexts.

Attitudes toward competition emerged as an important influence on participation, particularly among female participants, who expressed a clear preference for recreational rather than overly competitive forms of sport. For many, the perception that an activity was highly competitive was sufficient to discourage engagement.

"There is blind tennis now, but that's very competitive, I believe. And I wouldn't be into that. I'd just be doing it for the leisure." (J, female, 72)

Participants who had previously engaged in sport described how competitive environments could prioritise performance over enjoyment, reducing their motivation to continue participation.

"It got very competitive, and I was not good. I was not a good player. I never was. I did it for exercise". (I, female, 68)

These accounts suggest that for some older participants, competitive sporting environments may act as a deterrent rather than a facilitator of participation. While competition has been identified as a motivator in some physically active older populations (337), this finding appears to be context-dependent and may not translate to individuals who are less experienced, less confident, or navigating additional accessibility challenges. The findings of this present study suggest that, for this group, participation is oriented more toward enjoyment and accessibility than performance-based outcomes.

Participants also spoke of the emotional effort and courage required to initiate participation in PA. Many emphasised the need for courage when engaging in new or unfamiliar activities, particularly those that required reliance on others or navigating uncertain environments.

"It's important that people realise how frightening it is for the person with the vision impairment. It takes a lot of courage to get involved in sport or to get out there and to do stuff." (J, male, 71)

This sense of vulnerability was particularly evident when participants described situations involving reduced control, such as acting as a stoker in tandem cycling.

"It takes an amount of courage to get involved in sport or to do anything, you know, from the back of a tandem, for Christ's sake." (P, male, 72)

These accounts highlight the emotional dimension of participation, suggesting that engagement in PA may involve overcoming psychological barriers related to uncertainty, trust and perceived loss of control, which may delay or prevent initial engagement in new activities. Previous research has identified fear and lack of confidence as key barriers to PA among individuals with VI (143,173), supporting the importance of considering emotional and psychological factors alongside physical access.

Concerns regarding personal safety were also prominent within participants' accounts. These ranged from general fears of falling to activity-specific concerns related to injury.

"I can't go outside the back door – I'd be afraid I'd fall down." (J, male, 69)
"I'd be careful of rugby – a contact sport." (P, male, 72)

These concerns are consistent with evidence showing that individuals with VI are at increased risk of falls and fall-related injuries compared to sighted population (257). However, research also suggests that appropriately designed exercise programmes can substantially reduce fall risk among older adults. For example, Day et al. found that a structured exercise programme targeting strength and balance significantly reduced falls among community-dwelling older adults (288). While this study was conducted in a general older population rather than a VI-specific cohort, it highlights the potential protective role of structured and supported PA when delivered safely.

Taken together, the findings of this present study suggest that perceived vulnerability and fear of injury appear to act as important barriers to participation among older adults who are BVI. While similar concerns have been identified in research involving children with VI and their parents, (168,338), the accounts presented here indicate that these emotional and safety-related considerations may persist into later adulthood.

Importantly, participants' accounts suggest that these individual perceptions do not occur in isolation. Rather, they appear to be shaped by broader structural and social contexts, including previous experiences of exclusion, environmental barriers, and societal attitudes toward disability. Research examining disability and PA has similarly emphasised the interaction between individual-level perceptions and wider environmental influences in shaping participation behaviours (1,6). As such, perceptions of risk, courage and competence cannot be understood solely at the individual level of the SEM but must be considered within the broader social environments in which PA participation occurs, as interventions that fail to account for these interactions may overlook key barriers to engagement.

Theme V; Societal Perceptions of people who are BVI

Participants described how broader societal perceptions of VI shaped their experiences of physical activity (PA), often influencing how welcome, capable or visible they felt within

sporting environments. Participants described these perceptions not as isolated incidents, but as recurring experiences that participants navigated in everyday life.

Participants frequently described a lack of public understanding of visual impairment, particularly in shared PA environments such as swimming pools or gyms. This was often experienced through uncertainty or discomfort from others, including staff.

"If you go to the pool, that creates chaos sometimes… you can almost smell the panic of them. What's he going to do next?" (J, male, 71)

The above accounts suggest that interactions within PA settings may be shaped by uncertainty or lack of confidence among others when engaging with individuals who are BVI. Similar findings have been reported in research examining disability and public interaction, where a lack of familiarity or knowledge can lead to awkward or exclusionary behaviours, even where no negative intent is present (204). For participants in this study, such interactions contributed to a sense that these environments were not fully inclusive or understanding.

Participants also described how they managed or adapted to the reactions of others in these environments. Rather than directly challenging these behaviours, some described adopting strategies that allowed them to continue participating without engaging with others' responses.

"To be honest, I really don't care. I can't see them [co-participants], so I don't really know if they're making faces. So let them do whatever they want" (E, female, 72)

This account illustrates how participation may involve not only navigating physical barriers, but also managing the social dynamics of being visibly different in public spaces. Such strategies can be understood as forms of emotional adaptation, allowing individuals to maintain engagement despite potentially uncomfortable or uncertain social interactions.

Alongside these experiences, participants described more explicit forms of patronisation and perceived social hierarchy. These interactions were often subtle but persistent, contributing to a broader sense of being viewed as less capable than others.

"You're a child of a lesser God at times. You're not the same as the rest. You know you have a deficit, a deficiency…it's very obvious." (S, male, 65)

This account highlights how societal perceptions of disability may position individuals who are BVI as fundamentally different or less capable. Such experiences align with research on stigma and disability, which suggests that social attitudes can reinforce perceptions of dependency or reduced competence (204,339). For participants in this study, these perceptions were not confined to isolated interactions but formed part of a broader social context in which participation in PA occurred.

A significant point of frustration for this group was the way VI is portrayed in the media, particularly in relation to sport and PA. Many rejected what they perceived as overly positive or inspirational portrayals, arguing that these narratives failed to reflect the realities of every life with VI.

"You'll hear wonderful stories about some woman running a marathon, and she's blind, or somebody else doing something magnificent. People think they're wonderful but they're not completely representing blind people. It's not dealing with the day to day. It's a feel good story…(J, male, 72)

"…But it's just to make other people feel good!" (D, male, 68)

"They don't want to show us warts and all." (L, female, 72)

Participants suggested that these portrayals prioritised exceptional achievements while overlooking the more typical experiences of individuals who are BVI. In doing so, they may create unrealistic expectations of what participation should look like, while obscuring the structural and everyday challenges that shape engagement. This critique aligns with literature examining media representations of disability, which has highlighted how inspirational narratives can reinforce simplified or distorted understandings of disability by focusing on exceptionalism rather than lived experience (340,341).

One participant further reflected that such narratives may also reduce collective responsibility for inclusion, stating *"they don't have to take any responsibility for anybody else who's not as courageous as he is." (J, male, 71).* This suggests that portraying

individuals with disabilities as exceptional may inadvertently shift attention away from the structural changes required to support broader participation. Taken together, these accounts illustrate how societal perceptions operate alongside structural and individual factors to shape PA participation among older adults who are BVI.

The findings of the present study therefore suggest that efforts to increase PA participation among older adults who are BVI must extend beyond improving access or provision alone. Addressing societal attitudes, increasing public understanding of visual impairment, and promoting more realistic and inclusive representations of disability may be equally important in supporting sustained and meaningful engagement.

7.6 Discussion Summary

This study explored the barriers and facilitators to PA among older Irish adults who are BVI, providing insight into their experiences across multiple levels of the SEM. Five interconnected themes were developed from analysis; i) personal perceptions towards PA participation, ii) structural barriers to PA, iii) the role of the coach, iv) heterogeneity of the BVI population and v) societal perceptions of people who are BVI. Participants emphasised the importance of PA for maintaining health, independence and social connection, despite multiple interacting barriers. This aligns with existing research demonstrating the role of PA in supporting physical and psychosocial wellbeing among individuals with visual impairment (43,337,342,343)

A key contribution of this study is the identification of the cumulative and interacting barriers experienced by older adults who are BVI. Structural barriers, particularly transport dependence, were described not only as logistical challenges but as constraints on autonomy and independence. Similar barriers have been reported in previous research examining PA participation among individuals who are BVI (42,206,270). These findings extend this work by illustrating how barriers accumulate across the life course, with reliance on others restricting opportunities for spontaneous engagement and contributing to social isolation. This is particularly relevant given evidence linking VI with increased risk of loneliness and reduced mental wellbeing in older adults (342,344).

The role of the coach emerged as a critical and complex influence on participation. Participants described how coaching practices could both facilitate and hinder engagement,

particularly when instruction relied on visual teaching strategies. Previous research has highlighted the importance of adapted instructional approaches in supporting participation among individuals with disabilities (314,331). The findings of the present study build on this work by demonstrating how gaps in inclusive pedagogical practice may place additional demands on participants, including the need to repeatedly explain their needs, which may affect sustained engagement over time.

Participants also emphasised the heterogeneity that exists within the BVI population, consistent with previous literature highlighting the variability in functional ability and daily living challenges (258). The present study extends this understanding by demonstrating how this heterogeneity operates across multiple domains, including comorbid health conditions, support preferences and attitudes toward disclosure. These findings reinforce the importance of person-centred approaches to PA provision, as recommended within broader disability and physical activity frameworks (6).

Finally, participants highlighted the influence of societal perceptions on their experiences of PA. Media representations that emphasise exceptional or "inspirational" achievements were frequently described as misrepresenting the realities of living with VI, while everyday interactions in PA environments revealed a lack of public understanding. These findings align with research demonstrating how societal attitudes and representations of disability can shape participation opportunities and reinforce perceptions of difference or reduced capability (341). The present study adds to this literature by illustrating how broader narratives intersect with individual and structural factors to influence engagement in PA.

Overall, these findings highlight how participation in PA for older adults who are BVI is shaped by the interaction of individual, structural and societal influences across the life course. This supports existing calls for multi-level approaches to promoting physical activity among individuals with disabilities, which recognise that meaningful change requires coordinated action across policy, community and individual levels (6)

Strengths and Limitations

A key strength of this study is the depth of insight it provides into the lived experiences of older adults who are BVI in relation to PA participation. By centring participants' voices, the study captures nuanced perspectives that are often underrepresented within predominantly quantitative research. The use of Reflexive Thematic Analysis, including verbatim transcription, iterative coding and engagement with experienced qualitative

researchers, enhances the transparency and credibility of the analytical process. The collaborative design and piloting of the interview protocol with individuals who are BVI further strengthens the relevance of the data collected.

Several limitations should also be acknowledged. Participants were recruited primarily through Vision Sports Ireland and associated networks, and may therefore represent individuals who are already engaged with, or positively disposed towards, PA. As such, the experiences of those who are more disengaged or face more substantial barriers to participation may be underrepresented. However, existing evidence suggests that PA levels remain below recommended guidelines even within this population, indicating that significant barriers persist (270).

This study did not stratify participants by cause, age of onset or degree of VI. Given the relatively low prevalence of VI nationally (140), achieving sufficient sample sizes for meaningful stratification would be challenging within a single-country study. Future work may benefit from international collaboration to explore these differences in greater detail.

The use of focus groups may also have influenced the nature of responses. While this method facilitates shared reflection and the development of collective insights, it may also encourage convergence around dominant perspectives or limit the expression of dissenting views. In addition, participants may have been influenced by social desirability when discussing their experiences. Although moderators actively encouraged individual perspectives, these influences cannot be fully eliminated.

Finally, consistent with Reflexive Thematic Analysis, the researcher played an active role in the interpretation of the data. While reflexive practices were employed throughout the research process, including ongoing critical dialogue and reflexive journaling, the influence of the researcher's perspectives on data interpretation cannot be fully eliminated.

Future Directions

The findings of this study carry important implications for future research, policy and practice aimed at supporting PA participation among older adults who are BVI. These recommendations are organised according to levels of the SEM in Table 7.3, reflecting the multi-level nature of the change required to support lifelong PA for older adults who are BVI.

First, interventions aimed at increasing PA participation should prioritise restoring autonomy for this group. Transport barriers were frequently described as limiting participation, particularly for those living in rural areas. Flexible approaches such as home-based or technology-supported exercise programmes may help reduce reliance on external transport while enabling individuals to remain physically active. However, such approaches may also reduce opportunities for social interaction, which participants identified as an important component of participation, and this trade-off should be considered in programme design.

Second, there is a need for improved education and training for coaches working in mainstream sporting environments. Training programmes should move beyond basic disability awareness and instead focus on practical non-visual communication strategies. For example, replacing visual metaphors with directions or clock-face cueing (e.g. move your hand to 3 o'clock) may significantly improve accessibility for participants who are BVI.

Third, public health initiatives should consider how PA opportunities for older adults who are BVI are presented and marketed. Participants expressed a preference for recreational, social and enjoyable forms of PA over highly competitive environments. Programmes that prioritise these elements may therefore be more effective in sustaining engagement.

Finally, future research should investigate interventions designed to address the gap between perceived and actual fall risk among older adults who are BVI. While concerns about injury can act as a barrier to participation, appropriately designed exercise programmes may help build confidence while reducing fall risk.

Table 7.3 Recommendations for Practice and Policy

SEM level	Key finding	Targeted recommendation
Intrapersonal	Fear of injury, falling and perceived vulnerability discouraged participation in PA.	Develop PA programmes for older adults who are BVI that build confidence through gradual progression, clear safety guidance and supportive environments.
Intrapersonal	Many participants preferred recreational and socially oriented PA rather than highly competitive sport.	Promote PA opportunities that emphasise enjoyment, wellbeing and social connection rather than competitive performance.
Interpersonal	Coaches often relied on visual cues, gestures or metaphors that were inaccessible to participants who are BVI.	Provide targeted training for coaches in non-visual communication strategies, including precise verbal instruction and directional cueing.
Interpersonal	Participants frequently had to explain their needs and educate coaches themselves.	Embed disability inclusion training within coach education programmes so responsibility for accessibility does not fall on participants.
Organisational	Inclusive PA opportunities were limited and often concentrated in urban centres.	Expand inclusive PA provision through partnerships with local sport organisations, community groups and leisure facilities.
Community	Participants reported a lack of public understanding of VI in mainstream PA environments.	Deliver disability awareness and inclusion training for staff in gyms, leisure centres and community sport settings.
Policy / Structural	Transport dependence limited autonomy and restricted access to PA opportunities.	Support the development of local, community-based and home-based PA programmes to reduce reliance on transport.

Policy / Structural	Existing PA initiatives may not adequately reflect the lived experiences of older adults who are BVI.	Co-design future PA programmes and interventions with older adults who are BVI to ensure they address real-world barriers and facilitators.

7.7 Conclusion

This study demonstrates that participation in PA for older adults who are BVI is shaped by a complex interaction of individual perceptions, structural constraints and broader societal influences. Although participants expressed strong motivation to remain active, their engagement was frequently limited by transport dependency, inaccessible instructional practices and persistent societal misconceptions surrounding VI.

Importantly, these barriers were not experienced in isolation but as part of a broader life–course trajectory in which structural limitations and societal attitudes accumulate over time. Addressing these challenges requires coordinated action across SEM levels, including improvements in coach education, environmental accessibility and public understanding of VI. By centring the voices of older adults who are BVI, this study provides a foundation for the development of more inclusive and sustainable PA opportunities that support independence, confidence and long-term wellbeing.

Chapter 8: Conclusions and Future Directions

8.1 Overview of Thesis

Physical activity (PA) among individuals who are blind or vision impaired (BVI) is a complex and multifaceted issue, with distinct patterns of participation emerging across the life course. Existing literature demonstrates low PA levels among children, adolescents and adults with BVI (24,25,27,143), with participation rates consistently lower than those observed in the general population (9,10,100,139,146,246). Studies within this field are frequently characterised by small sample sizes (27) and non-random sampling strategies (28). In addition, the BVI population has often been treated as a homogeneous group, with limited consideration of variation in functional vision, comorbidities, or lived experience. While studies have examined specific age groups in isolation, there has been little attempt to understand how PA participation is shaped across different stages of life. Consequently, the cumulative and potentially compounding nature of barriers to PA, particularly within the Irish context, has remained poorly understood. This thesis sought to address these gaps through the development of a programme of research examining PA participation among individuals who are BVI across the life course.

Building on the available evidence, the findings of this thesis confirm the low PA participation rates of individuals with BVI, and demonstrate that these low rates are not confined to a specific developmental or life stage, but instead represent a persistent pattern across the lifespan. A mixed-methods approach was central to developing this understanding. The quantitative components established the extent and distribution of low PA participation, while the qualitative components explored how these patterns were experienced and the individual, social and structural factors through which they were produced. By integrating quantitative assessment of PA levels with qualitative exploration of lived experiences, this research moves beyond documenting disparities towards understanding the mechanisms through which participation is shaped and sustained over time. In doing so, it challenges the tendency within existing literature to conceptualise low PA as age-specific, instead highlighting its cumulative and enduring nature. Specifically, by identifying the ‘missing middle’ (working-age adults) alongside youth and older adult cohorts, this research provides a rare, holistic view of the patterns of PA participation in this group.

Chapters 3 and 4 established persistently low levels of PA participation among individuals who are BVI. For children and adolescents, the findings were particularly stark, with just

9.6% achieving 60 minutes of moderate-to-vigorous physical activity (MVPA) on all seven days of the week. While the World Health Organization (WHO) recommends that this target may be achieved as an average across the week (1), the low proportion achieving six or more days of MVPA (13.4%), alongside the high proportion achieving four days or fewer (50.0%), suggests that the majority of participants are unlikely to meet these guidelines. This disparity is further contextualised when compared to the 15% of the general Irish child and adolescent population meeting these recommendations (10). Notably, this general population figure is low, reflecting broader challenges in adolescent PA engagement (187). However, the further reduction observed among those who are BVI suggests an additional layer of exclusion operating beyond already suboptimal population norms.

This pattern of low PA levels persists into adulthood. As demonstrated in Chapter 4, just 21.7% of adults who are BVI met WHO PA guidelines, compared to 41% in the general adult population. In addition to frequency, the intensity of activity is also a critical consideration, as WHO guidelines specify engagement in MVPA (1). However, only one-third of participants reported engaging in activity of sufficient intensity to result in breathlessness or sweating. This suggests that participation is not only less frequent, but also less likely to reach levels required for meaningful health benefit, reinforcing the extent of the disparity. This finding may also reflect challenges in both recognising and achieving PA at an intensity consistent with MVPA, which is by definition PA that increases heart and breathing rate (345), highlighting potential limitations in both engagement and measurement within this population. Taken together, these findings indicate that low PA participation in individuals who are BVI is not a life-stage-specific issue, but reflects a persistent pattern of reduced engagement across the life course.

Integration of the quantitative and qualitative findings provided further insight into this pattern. Findings largely converged, with low participation occurring alongside recurring barriers relating to transport, accessibility, PE, coach knowledge and the availability of inclusive opportunities. The qualitative findings expanded the quantitative results by demonstrating how these barriers were experienced in everyday life. Transport, for example, was not solely a practical barrier, but shaped dependence and autonomy. Exclusion from PE influenced confidence and identity. Inadequate coach knowledge, meanwhile, determined whether an opportunity was meaningfully accessible. There was little direct divergence between the components. However, qualitative accounts qualified any assumption that low participation reflected low motivation. Across cohorts, participants frequently expressed a

desire to be active but were constrained in their ability to act on this motivation by inaccessible environments and systems.

Beyond the quantification of PA levels, the findings of this thesis highlight the central role of structural barriers in shaping participation across the life course. Consistent with existing disability PA literature, barriers related to transport, accessibility and reliance on others are well-established determinants of participation among individuals with disabilities, including those who are BVI (6,7,42). However, previous research has largely examined these barriers within specific age groups or contexts, with limited attention to how they are experienced or reconfigured over time (24,27). These barriers emerged as the primary determinant of participation across adolescent, working-age adult and older adult groups, and were discussed early and frequently within each focus group. A key contribution of this thesis is the identification of dependency as a dynamic, rather than static, construct across the life course. Adolescents described navigating participation in PA within the constraints of parental availability and competing schedules, at a time when they were developing autonomy and identity as an "active" person (57,187). Working-age adults experienced similar transport barriers, though these were primarily articulated as unreliable transport systems (42), and scheduling conflicts with lift availability and other commitments (63). Older adults, despite potentially greater flexibility in their schedules (300), often reverted to being "dependent" and "reliant" on others for transport to PA, reflecting reduced confidence in public transport systems characterised by limited accessibility and support. This pattern extends existing literature by suggesting a dynamic reconfiguration of dependency across the life course, rather than a linear progression towards independence.

Structural barriers also included inaccessible environments and limited locally available PA opportunities. A consistent theme was an 'unspoken expectation' felt by individuals who are BVI that they must adapt to environments not designed for them (e.g. stairs without adequate markings, poor lighting or contrast). Rather than systems adapting to accommodate diverse needs, responsibility for inclusion was frequently placed on the individual. This manifested as a 'legitimisation burden', particularly among working-age adults, who described the ongoing need to explain and justify their impairment in the context of a condition that is often not immediately visible. This finding aligns with broader disability literature on invisible disability, stigma and disclosure, which highlights the additional labour required of individuals whose impairments are not immediately apparent, including the need to continually negotiate legitimacy and access (308,309,346). However, while this work has

largely focused on employment and social contexts, the present findings extend this concept into the domain of physical activity. In this context, the legitimisation burden represents an additional psychological and social barrier to participation, requiring individuals not only to navigate inaccessible environments, but also to repeatedly justify their presence and right to be included within PA spaces.

Coaches and teachers were identified as key gatekeepers to PA participation. Adolescents characterised a competent coach by their ability to explain things clearly, with poor coaching viewed as a systemic failure rather than an individual limitation. For older adults, experiences were nuanced. They identified challenges with visual metaphors and expressed concerns regarding tone. Participants described feeling "talked down to" and patronised, alongside the emotional burden associated with the "disclosure" of a VI. These findings are consistent with existing literature highlighting the role of coaches and facilitators in either enabling or constraining participation for individuals with disabilities (6,331,334), but further emphasise the importance of communication and interpersonal interactions in shaping inclusive PA experiences.

Important differences emerged in how VI was experienced and negotiated across age groups. Older adults described greater reluctance to disclose their impairment, compared to their younger counterparts. This pattern may reflect, at least in part, broader historical differences in societal attitudes towards disability, with older adults having grown up in contexts where disability was more stigmatised and less openly discussed (204). Earlier disability literature has described tensions arising from well-intentioned but ultimately infantilising behaviours from non-disabled individuals, with resistance to such behaviours often viewed negatively (347). In contrast, more recent work highlights the influence of the disability rights movement in both reducing stigma against people with disabilities and promoting social inclusion (348). This phenomenon is reflected in the findings of this thesis, where working-age adults demonstrated both the ability and willingness to advocate for their needs. Adolescents, meanwhile, appeared to adopt a more explicit social model of disability, expecting environments and providers to be both capable and willing to accommodate their participation (349). These generational differences suggest that experiences of participation are shaped not only by functional ability, but also by evolving cultural understandings of disability.

Early experiences of PA, particularly within Physical Education (PE), appear to play a critical role across the life course. For this population, school PE represents an important opportunity to access elements of the expanded core curriculum as it relates to physical activity and movement, along with the development of independent living, navigation, and social interaction skills (212). However, findings from this thesis indicate that PE was frequently experienced as exclusionary or inaccessible.

One of the most striking findings of this thesis was the enduring influence of PE across the life course, with adult participants discussing their school-based experiences with a frequency and intensity comparable to that of adolescent participants. Older adults described how PE was often not offered within schools for individuals who are BVI, and when it was available, inclusion was frequently experienced as tokenistic. Many could clearly trace these early negative school PE experiences as the genesis of their inactive identities. Disappointingly, similar patterns of exclusion were reported by adolescents, suggesting that these experiences persist despite broader shifts towards inclusive education (204,303). This represents an important point of mixed-methods convergence and extension: the quantitative findings identified low participation in PE, while the qualitative findings explained how the quality of these experiences shaped confidence, perceived competence and later relationships with PA. This continuity highlights PE not as a discrete educational experience, but as a critical determinant of lifelong PA identity and participation. Recent PE initiatives have moved toward a participation model, encouraging sustainable engagement and a lifelong adherence to PA (314,350,351). There is an urgent need for policy and practice to ensure that all children who are BVI are given the tools needed to engage successfully in PA across the life course.

Taken together, the findings of this thesis demonstrate that PA participation among individuals who are BVI is shaped not by isolated barriers at single life stages, but by cumulative interactions between environments, social systems, and lived experience across time. This aligns with established life course theory, which emphasises the importance of trajectories and the accumulation of advantage or disadvantage across the lifespan (352). In particular, the concept of cumulative disadvantage provides a useful framework for interpreting these findings, whereby early experiences of exclusion can initiate pathways of reduced participation that are reinforced over time. Within this thesis, the convergence of contemporary adolescent accounts with retrospective adult experiences suggests that early exclusion may remain meaningful across subsequent life stages, although the cross-sectional

design does not permit causal inference. Mixed-methods integration was important to this interpretation: quantitative findings demonstrated that low participation was evident across age groups, while qualitative findings identified the processes through which barriers were experienced, sustained and reconfigured. This highlights the importance of addressing not only current barriers, but also their potential cumulative effects over time.

8.2 Life course synthesis of physical activity participation

The contribution of this thesis extends beyond demonstrating low PA participation in separate age groups. When considered together, the empirical studies show how opportunities, barriers, relationships and PA identities are shaped and reshaped across successive life stages. The thesis therefore represents a life-course-informed, multi-cohort programme of research rather than three separate age-specific investigations. The studies address a common overarching question, combine complementary quantitative and qualitative evidence, and are interpreted relationally with findings from one life stage informing understanding of participation at other stages. The mixed-methods design strengthened this relational interpretation by combining evidence of the extent of low participation with accounts of how and why participation was enabled, restricted or discontinued.

At study level, Chapters 3 and 4 addressed Research Questions 1–4 by quantifying PA participation and examining demographic and vision-related differences among children, adolescents and adults. Chapters 5–7 addressed Research Questions 5–6 by exploring how PA participation was experienced across adolescence, working-age adulthood and older adulthood, and by identifying the barriers, facilitators and ecological influences shaping participation. Taken together, these studies addressed the overarching doctoral aim by integrating evidence on the extent and distribution of low PA participation with an understanding of how participation is enabled, constrained and reshaped across the life course.

Across cohorts, influences also operated across SEM levels rather than independently. For example, community- and policy-level transport limitations increased interpersonal dependence on parents, family members or others, with consequences for individual autonomy and opportunities to participate. Similarly, organisational practices within PE, sport and coaching influenced individual confidence, competence and active identity.

These cross-level pathways changed in form across life stages, linking structural conditions to individual experiences over time.

This is not a longitudinal study and does not follow the same individuals over time. It cannot establish that an adolescent who experiences exclusion will necessarily become an inactive adult. Its life course contribution instead lies in integrating evidence across successive cohorts to examine continuity, accumulation, change and transition. The convergence between adolescents' current experiences and adults' retrospective accounts suggests that these are not isolated age-specific findings. Instead, they indicate recurring processes through which access, inclusion and exclusion may shape competence, confidence, identity and later willingness to participate. Older adults' accounts further demonstrate how these longstanding influences may interact with later changes in health, mobility, transport and social circumstances. The combination of quantitative patterns and qualitative accounts therefore supports a temporally informed interpretation without implying individual-level causality.

The clearest continuity across the thesis is that low PA participation is evident from childhood and adolescence through adulthood. Many of the conditions underlying this pattern also recur across cohorts. Inaccessible environments, limited inclusive opportunities, transport difficulties, societal misunderstanding and lack of coach education were reported throughout the life course, although their significance and expression changed with age. Quantitative and qualitative findings converged in identifying these barriers, while the qualitative findings demonstrated how their meaning changed across developmental and social contexts. The findings therefore suggest that barriers are not repeatedly created anew at each life stage. Instead similar structural conditions are encountered within changing developmental contexts.

These patterns are consistent with cumulative disadvantage. In childhood and adolescence, exclusion from PE and sport may restrict opportunities to develop movement competence, confidence and a sense of belonging within active settings (32,212,268). Adolescents in this thesis often expressed a desire to participate, but described safety concerns, inappropriate communication, limited autonomy and dependence on parents for access and transport. This finding qualified a possible interpretation of the quantitative results: low PA participation did not necessarily indicate limited interest or motivation. These experiences

affect participation at that time, but may also shape emerging expectations about whether PA environments are welcoming, safe or intended for them.

The working-age findings provide an important connection between early and later experience. Adults frequently described school PE as formative to their current confidence and perceived competence in relation to PA. Their accounts suggest a possible chain of influence. Restricted access limits opportunities for skill development and positive experience (23,353), thus limiting confidence and the development of an active identity. This reduced confidence can make entry into unfamiliar or inaccessible adult settings more difficult. This does not establish a universal or causal pathway, but demonstrates how experiences at one stage may remain meaningful within another. The qualitative accounts therefore extended the quantitative identification of low participation by highlighting a potential mechanism through which early experiences could influence later engagement.

By older adulthood, earlier experiences may interact with additional constraints, including changes in health, mobility and confidence. Some participants' description of having "lost heart" appeared to reflect more than a response to a single inaccessible opportunity. For some, disengagement was situated within a longer history of repeated effort, exclusion or dependence. The older-adult findings therefore illuminate the possible cumulative consequences of barriers identified in the younger cohorts. Conversely, positive early experiences, supportive relationships and inclusive instruction may create cumulative advantage by developing competence, confidence and an active identity that can support participation through later transitions.

Transitions between life stages are important because the contexts in which PA occurs and the supports required for participation, change over time. During adolescence, parental support may remain essential for transport and access, while also limiting opportunities for independence. On leaving school, the structure provided by PE and school sport is lost, and responsibility for identifying opportunities, arranging transport and communicating access needs increasingly shifts to the individual. In older adulthood, changes in health, mobility and social support may further affect participation. Dependence therefore does not simply reduce with age, but changes in form across the life course.

These findings indicate that barriers are not confined to individual life stages. Dependence on parents may be replaced by dependence on transport or others for access, while negative

experiences of PE may influence confidence in adult settings. Repeated difficulties accessing inclusive opportunities may also contribute to disengagement over time (354). Conversely, positive early experiences and supportive relationships may strengthen competence, confidence and continued participation (354). Support should therefore consider continuity across key transitions, particularly from school to community-based activity and during later-life changes in health or social circumstances. The integrated findings suggest that intervention at one life stage may have implications beyond that immediate period and that gains may be lost where support does not continue across transitions.

These findings must, however, be interpreted in light of the cross-sectional design. Older participants experienced different educational, social and policy contexts from contemporary adolescents, and some differences may therefore reflect cohort or historical effects rather than life-stage change alone (204). The study cannot establish individual trajectories or causal relationships across time. Nevertheless, the integration of quantitative findings, contemporary adolescent accounts and retrospective adult experiences supports a coherent life course interpretation. Low PA participation among individuals who are BVI is therefore best understood not as a series of separate age-specific findings, but as a persistent inequality that changes in form across the life course.

8.3 Research Strengths

This thesis has several notable strengths. A primary strength is the adoption of a life course perspective, incorporating the experiences of children, adolescents, working-age adults and older adults who are BVI. This approach addresses a key limitation in the existing literature, which has largely examined PA within isolated age groups, or subgroup analysis of other studies where the primary aim was not to investigate this population. By examining participation across the life course, this thesis provides a more comprehensive understanding of how barriers to PA emerge, persist and evolve over time.

A further strength of this research is the use of a mixed-methods approach, integrating both quantitative and qualitative methodologies. This allowed for the quantification of PA levels alongside in-depth exploration of lived experiences (40,41), providing a more comprehensive understanding than either approach could achieve in isolation. In particular, the qualitative component highlighted the nuanced and age-specific barriers experienced

across the life course, reflecting both the developmental differences and broader societal changes in attitudes towards disability.

The thesis also employed a coherent programme of research, with each component building upon the previous component to provide a deeper understanding of PA in the BVI population. The use of the theoretical framework (the Social Ecological Model), across all qualitative studies facilitated a structured exploration of the multi-level factors influencing PA participation and enabled meaningful comparison across different life stages. Specifically, the Social Ecological Model informed the organisation of findings, which were mapped across individual, interpersonal, and environmental levels. This enabled comparison of barriers and facilitators across age groups. This internal consistency strengthens the conceptual coherence and overall contribution of the thesis and enhances the robustness of the conclusions drawn.

A further strength of this research is the collaborative engagement with Vision Sports Ireland (VSI), which informed aspects of the study design and supported access to participants across the life course. This enhances the ecological validity of the findings and ensures the research is grounded in the lived experiences of the BVI community. However, this approach also reflects a methodological trade-off, as recruitment through VSI may have resulted in a more engaged sample, a limitation which is considered further below.

In addition, this research contributes novel evidence within the Irish context, where data on PA in BVI populations was limited. The inclusion of working-age adults, a group frequently underrepresented in the literature, further strengthens the contribution of this thesis by addressing a recognised gap in research. Collectively, these strengths enhance both the relevance and applicability of the findings for research, policy and practice.

8.4 Research Limitations

The findings of this thesis should be interpreted in light of several limitations. Firstly, while PA levels in children, adolescents and adults were assessed using well-validated questionnaires, including the Irish Sports Monitor and the Children's Sports Participation and Physical Activity Questionnaire (10,13), self-reported measures are inherently subject to recall and social desirability bias (147). While these tools remain widely used in

population-based research, future studies should seek to incorporate objective measures of PA, such as accelerometry, where validation for use in BVI populations has been established (25).

As classification of VI was self-reported by participants or parents, some may not have fully understood the B1-B3 categories. This classification was selected because the thesis focused on physical activity, physical education and sport participation, rather than on the clinical diagnosis, epidemiology or public health burden of visual impairment. Misclassification may therefore have occurred, particularly between adjacent categories such as B2 and B3. This may have diluted differences between classification groups and biased findings towards the null.

Recruitment for both the quantitative and qualitative components of this project was primarily conducted through Vision Sports Ireland (VSI), the main provider of PA opportunities for individuals who are BVI in Ireland. As such, participants may represent a more engaged or motivated subset of the population, potentially underestimating the extent of barriers experienced by those not currently accessing such services. In addition, participation numbers varied across age groups, with older adults underrepresented despite targeted efforts to facilitate their inclusion. Further research focusing specifically on this cohort is warranted, as they may experience distinct and potentially more complex barriers to participation.

Additional disabilities and functional difficulties were captured within the quantitative questionnaires. However, these variables were not incorporated into the primary analyses examining PA participation. As additional physical, developmental and health-related conditions may independently influence PA (6), some of the observed variation in PA levels may reflect these co-existing factors, rather than VI alone. This limits the extent to which differences in PA can be attributed specifically to VI and should be considered when interpreting the findings.

While this thesis sought to adopt a life course perspective on PA participation in the BVI population, the cross-sectional nature of the data limits the ability to examine how participation changes within individuals over time. Longitudinal research tracking individuals across different life stages would provide valuable insight into the cumulative

impact of barriers, as well as the influence of evolving social attitudes, service provision, and environmental accessibility.

Finally, as with all qualitative research, the interpretive nature of the analysis is influenced by the researcher's perspective. While the philosophical position underpinning this work was outlined, the researcher's prior experiences may have shaped the interpretation of findings, particularly in the later chapters of the thesis. For example, drawing on a clinical background, there was a tendency in early stages of coding to focus on issues related to healthcare access, service provision, and functional limitations, potentially prioritising health related barriers over more experiential aspects such as identity, enjoyment and belonging. This was mitigated through regular engagement with supervisory expertise, reflexive practice, and the use of a rigorous analytical framework. However, despite these efforts, it is acknowledged that the researcher's positionality may have continued to influence the interpretation of findings. Taken together, these limitations reflect both the practical challenges of conducting research within this population and the broader gaps within the existing evidence base, further reinforcing the need for continued methodological and conceptual development in this field.

8.5: Recommendations and Future Directions

The findings of this research provide important insights that support change across multiple levels of the Social Ecological Model (SEM). Recommendations are therefore presented across three domains: practice, policy and future research.

8.5.1 Recommendations for practice

Communication: At an individual level, coaches should adopt inclusive communication strategies that do not rely on visually dependent metaphors. Prioritising autonomy-supportive language may help address participants' experiences of being "talked down to" or patronised, concerns that were particularly prominent among older adults. Access to specialist advice or consultation pathways would support coaches and PE teachers in implementing these changes effectively. Given the relatively low prevalence of BVI, training focused on adaptable teaching principles is likely to be more beneficial than condition-specific knowledge alone.

Coaching: Creating psychologically safe environments should also be prioritised by those delivering PA opportunities. A distinctive finding of this study was the strength with which older adults described the emotional burden associated with "disclosure", highlighting the stress involved in repeatedly explaining their vision impairment to others. Across all age groups, participants expressed a preference for coaches who not only adapted instruction using accessible language, but who also communicated in an appropriate and respectful tone. Such approaches may reduce the perceived disclosure burden and foster greater confidence in participation.

8.5.2 Recommendations for Policy

At the organisational and community levels of the SEM, several policy changes may support increased PA participation among individuals who are BVI. These findings are reflected in the newly adopted strategic priorities of Vision Sports Ireland, particularly with the "Beyond Vision 2025-2028" strategy, which also emphasises a life course approach (355). This alignment suggests that the issues identified within this research are informing current practice and policy direction within the Irish context.

Training: Standardised inclusion training for coaches and PE teachers represents a critical step in strengthening coach education pathways. Embedding inclusive PE teaching competencies within teacher training programmes may enhance both competence and confidence among PE teachers in facilitating participation, not only for students who are BVI but also for the broader disability community and individuals engaged in adapted PA.

PE: The findings of this thesis further reinforce the importance of PE experiences, demonstrating their potential lifelong influence on PA participation. Policy recognition of PE as a critical early-life intervention for lifelong PA engagement may therefore represent an important public health strategy.

Transport: Structural barriers emerged as a primary obstacle to PA within the BVI population. Investment in accessible, safe and reliable transport solutions is therefore essential. This may include improvements in public transport infrastructure or, where public transport is limited, incentives supporting community or private transport initiatives.

Environments: Policies ensuring accessibility within environments where PA opportunities are delivered are also required. Practical measures may include providing any written information in accessible formats (e.g. appropriate print sizes and screen-reader compatibility), offering braille labelling where feasible (for example on gym equipment), and ensuring appropriate visual contrast on ramps and stairways. The development of organisational inclusion standards or accreditation systems may help ensure that such adaptations are implemented consistently and maintained over time.

8.5.3 Recommendations for Future Research

This thesis identified significant gaps in the literature relating to the experiences of PA among individuals who are BVI. While the present work has addressed several of these gaps, particularly within the Irish context, it has also generated important directions for future research. Importantly, the findings of this thesis have already contributed to the direction of a successful and prestigious Research Ireland Pathway Programme funding award, supporting an independent postdoctoral researcher and PhD researcher over a four-year period. This demonstrates the longevity and sustainability of the research programme emerging from this thesis, and highlights that the findings extend beyond academic contribution alone. Rather than remaining as evidence "on the shelf", this work has informed a funded programme of research with the potential to generate continued impact across practice, policy and future intervention development.

Having established the extent of low PA participation within the BVI population, the development and evaluation of theory- and evidence-informed intervention programmes represents a critical next step. However, the findings of this thesis indicate that such interventions must move beyond generic approaches and instead respond to the specific structural, social and experiential barriers identified across the life course. In particular, the findings support the development of a targeted inclusive Physical Education (PE) intervention as a key point of early intervention. Across all age groups, participants identified school-based PE as a formative experience, with negative or exclusionary experiences contributing to the development of long-term inactive identities. An inclusive PE intervention should therefore focus on equipping teachers with practical strategies for adapting communication (e.g. reducing reliance on visual metaphors), creating psychologically safe environments, and embedding accessible practices within routine teaching, rather than relying on ad hoc accommodations. Given the clear links identified

between early PE experiences and the development of lifelong PA identities, future research should prioritise the design, implementation and evaluation of inclusive PE models that are responsive to the needs of students who are BVI. Longitudinal evaluation of such interventions would be especially valuable in determining whether early inclusive experiences can alter participation trajectories over time.

The novel life course perspective adopted in this thesis demonstrates that barriers to participation are not static, but vary across developmental stages. Strategies effective for adolescents, for example, may not translate to older adults, whose participation is shaped by distinct social, environmental and health-related influences. These findings reinforce the importance of context and age specific interventions to increase PA at every age, with adolescents requiring support for autonomy and identity formation, working-age adults requiring solutions to structural constraints such as transport and time, and older adults benefiting from interventions that address confidence, accessibility and re-engagement. Continuity of support across transitions is also required. This could include transition planning between primary and secondary PE, signposting from paediatric and adult vision services to accessible local opportunities and programmes supporting re-entry into PA following retirement, acquired sight loss or health changes. This continuity is required to ensure any gains achieved in one setting are not lost as individuals move into another.

Findings relating to communication, coaching practices, and the 'legitimisation burden' reinforce the importance of incorporating co-design approaches involving BVI communities, ensuring that programmes reflect lived experience and address both practical and psychosocial barriers to participation. The collaborative approach adopted in this research, involving engagement with VSI, also highlights the importance of stakeholder-informed design. Future work should build on and extend this collaborative approach to other settings and examine its impact on the development and delivery of inclusive PA opportunities.

While the population-level data presented in this thesis provide valuable insight into PA participation patterns, future research would benefit from increased use of device-based measurement methods. As technological accessibility improves and validation of wearable devices within BVI populations advances, objective measurement of PA is likely to become increasingly feasible. Incorporating such measures may strengthen the evidence base by reducing reliance on more subjective self-report data, and improving the evaluation of intervention effectiveness.

Finally, although the BVI population represents an important and underrepresented group within PA research, similar stark disparities are likely to exist among other disability populations that remain insufficiently studied. Future research should therefore extend inclusive lifespan PA research beyond vision impairment to better understand shared and population-specific barriers, supporting the development of more equitable PA systems.

8.6 Closing Remarks

While the previously existing literature had highlighted low PA levels within the BVI population, this thesis has laid bare the stark reality of low PA levels within the Irish BVI community. Far from occasional, isolated low points, these findings represent a continuous systemic failure that begins in the schoolyard and persists through to retirement.

These findings serve as a challenge to current policy. Low PA levels can no longer be viewed as an inevitable consequence of BVI. They are, instead, a consequence of a society built on exclusionary defaults, systemic barriers and visual metaphors. As it stands, we are effectively 'training' a generation of children who are BVI to be inactive adults by failing to provide an accessible foundation in PE.

Ultimately, this thesis demonstrates that inclusion is not a checklist of accommodations, but a fundamental shift in pedagogical and structural default settings. True equity will only be achieved when we stop asking individuals to adapt to a sighted world, and instead build a world that sees them. Every individual, regardless of visual function or ability, has the right to claim an active life.

Appendix A: Vision Sport Research Project Children's Questionnaire

Formatted questionnaire converted from PDF. Required questions are marked with an asterisk in the source form; asterisks have been removed from the question text for readability.

This study aims to obtain the necessary evidence to enable Vision Sports Ireland and its partners to best support blind and vision impaired children, young people, and adults to participate in the sports and leisure activities of their choice.

This study is being run out of Dublin City University and is a collaboration between Vision Sports Ireland, the National Council for the Blind in Ireland, the School of Health and Human Performance in DCU, and the Insight SFI Research Centre for Data Analytics.

This project aims to carry out research around the physical activity, sports participation, and wellbeing of blind and vision impaired children, adolescents, and adults. A further objective includes trying to find the key barriers or enablers of sport and physical activity among those with a vision impairment. It is hoped that the results from this research study will identify key recommendations for future development and policy in this area.

The data we collect will be kept in the strictest confidence, adhering to all GDPR guidelines as outlined in the plain language statement in the below link. Only aggregated findings will be shared.

If you require support to fill in this form, or if you have any further questions, please contact visionsports@ncbi.ie

A plain language statement outlining the full details of the study, including data and consent details can be found at this link
https://drive.google.com/drive/folders/17XQBMzwmICue8XwRAgzOaJJlV3KP82EC

Thank you for your support in helping us to better understand sport and physical activity opportunities, and current participation levels for people who are blind or vision impaired in Ireland.
This survey is approximately 120 questions long, and may take up to 30 minutes to complete. The survey must be completed in one sitting.
If you wish to be included in a draw to win a €100 Decathalon vouchers please provide your email address when prompted.
Informed Consent - Parents Section

1. I have read the Plain Language Statement (available at the above link), or had it read to me

☐ Yes
☐ No

2. I understand the information provided

☐ Yes
☐ No

3. I understand the information provided in relation to data protection

☐ Yes
☐ No

4. I understand I can ask questions and discuss this study at any time via e-mail. I have received satisfactory answers to any questions I may have had.

☐ Yes
☐ No

5. I am aware that I/my child may withdraw from the Research Study at any point.

☐ Yes
☐ No

6. I have read and understood the information in the form attached. I have explained the information to my child. The researchers have answered any questions and concerns, and I can access the consent form via the link above. I understand that by continuing I am consenting for my child to be included in this study

☐ *
☐ Yes
☐ No

7. Your full name

Answer: _____

8. Your child's full name

Answer: _____

9. This questionnaire is Part 2 of the DCU/ Vision Sports Physical Activity Research. You may have taken part in Part 1: Fundamental Movement Skills Circuits. There may be additional research opportunities to remain involved in the research study over the next 24 months. You may choose to opt out at any time. If you would like to receive direct contact about these opportunities, please indicate below.

☐ Yes
☐ No

10. Please provide your email address

Answer: _____

Parental Section 1 of 2

These questions are for PARENTS to answer.

Please read and answer the following questions.

This section should take approximately 10 minutes, and then the children's section will follow.

11. How old was your child on their last birthday?

Answer: _____

Answer: _____

12. What county do you live in?

Answer: _____

13. Where is the permanent area of residence you live in located?

☐ A big city (more than 70,000 inhabitants)
☐ Surburbs, large town or outskirts of city (less than 70,000 inhabitants)
☐ Town (less than 20,000 inhabitants)
☐ Village/Rural area (less than 3,000 inhabitants)

14. Where is the permanent area of residence you live in located?

☐ A big city (more than 70,000 inhabitants)
☐ Surburbs, large town or outskirts of city (less than 70,000 inhabitants)
☐ Town (less than 20,000 inhabitants)
☐ Village/Rural area (less than 3,000 inhabitants)

15. What type of school does your child attend?

☐ Mainstream school
☐ Special school
☐ School tailored to students with a visual impairment
☐ Other

16. If other please specify

Answer: _____

17. What is the name of the school your child attends?

Answer: _____

18. What is the name of the town & area of the school that your child attends?

Answer: _____

19. What class/year is your child in?

☐ 4th class
☐ 5th class
☐ 6th class
☐ 1st year
☐ 2nd year
☐ 3rd year
☐ 4th year
☐ 5th year
☐ 6th year

20. Does your child attend a paediatrician (children's doctor) on an at least yearly basis?

☐ Yes
☐ No
☐ Don't know

21. Does your child receive support in school, from another teacher/assistant in addition to their classroom teacher?

☐ Yes

☐ No

22. Does your child use a mobility aid? e.g. long cane, guide dog etc.

☐ Yes
☐ No

23. If yes what type?

☐ Long Cane
☐ Symbol Cane
☐ Technology e.g. mobile app for navigation
☐ Guide dog

24. If your child uses a mobility aid, how often do they use it?

☐ Rarely
☐ Sometimes
☐ Regularly
☐ Often
☐ All the time

25. What is your child's diagnosis

☐ Retinitis Pigmentosa
☐ Retinal Dystrophy
☐ Retinopathy of Prematurity
☐ Glaucoma
☐ Cataracts
☐ Albinism
☐ Nystagmus
☐ Optic Nerve Atrophy
☐ Optic Nerve Hypoplasia
☐ CVI/Neurological VI
☐ Retinoblastoma
☐ Hemianopia
☐ Macular Dystophy (e.g. Stargardt disease)
☐ Myopia
☐ Other

26. If other, please describe

Answer: _____

27. What level of vision does your child have?

☐ No vision (B1 - No perception of light)
☐ Low Vision (B2 - Can see hand movements, counting fingers)
☐ Useful Vision - (B3 - B5 Better than 6/60 with a visual field constriction of less than 40 degrees)

28. Do any members of your family have a visual impairment/problems with vision? Please tick which family member(s)

☐ No other family member
☐ Myself

☐ Brother or Sister
☐ Other Parent/Guardian
☐ Aunt/Uncle
☐ Grandparent
☐ Cousin
☐ Other family member

29. How would you rate your knowledge or understanding of your child's eye condition?

☐ Very good
☐ Good
☐ Satisfactory
☐ Poor
☐ Very poor

30. Are you aware of any clubs offering activities specially adapted for children with vision impairments?

☐ Yes
☐ No

31. If yes, does your child participate in any of these activities?

☐ Yes
☐ No

32. If no, is there a particular reason

☐ No activities available in our area
☐ They are not interested in participating in these activities
☐ The activities are not available at convenient times
☐ Other

33. If other please describe

Answer: _____

Parental section 2 of 2 - Functional Difficulties

These questions are for PARENTS to answer.

Please read each of the following statements and pick the most appropriate answer for each statement (no difficulties, some difficulty, a lot of difficulty, & cannot do at all)

34. Does your child have difficulty hearing sounds like people's voices, even if using a hearing aid?

☐ No difficulties
☐ Some difficulty
☐ A lot of difficulties
☐ Cannot do at all

35. Does your child have difficulty walking 500 meters on level ground, even if you use any equipment or receive assistance? (that would be about the length of going around the outside of a rugby or GAA pitch)

☐ No difficulties

☐ Some difficulty
☐ A lot of difficulties
☐ Cannot do at all

36. Does your child have any difficulty with self-care, such as changing clothes by themselves?

☐ No difficulties
☐ Some difficulty
☐ A lot of difficulties
☐ Cannot do at all

37. When your child speaks do they have any difficulty being understood by people outside of your home?

☐ No difficulties
☐ Some difficulty
☐ A lot of difficulties
☐ Cannot do at all

Parents Physical Activity

This is the last section for PARENTS to answer.

We would like to ask you a few questions on recreation, exercise and sport. These questions are being asked on behalf of Vision Sports Ireland, but they relate to a broad range of physical activities as well as traditional sports, including walking, cyc ling, other outdoor pursuits, water sports, and non-competitive or recreational exercise.

38. In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate. This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

39. In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate. This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

40. In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate. This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

Parent Section is now Finished - Children's Section is next

Thank you for completing part one!

Parents, the following questions are for your child to answer about themselves, please provide assistance as needed but please let them answer honestly for themselves, without prompting or commenting on their answers.

The rest of the questionnaire should take approximately 15 to 20 minutes. Please try to ensure all questions are answered. Thank you for your assistance.

Children's and Young Person's Section

We would like you to be part of a research study on physical activity and health.

This study is trying to help children and young people who are blind or have a visual impairment to be active more often, by measuring different things that help young people be active. This means we want to know things like; do you spend much time being physically active? Do you like being active? How well can you do different skills?

You will answer some questions for us through this online questionnaire. You can have your parents help with this, or another adult if you prefer. This should take about 15 to 20 minutes.

Information collected during this study will be kept private and stored separately on computers in DCU. The information will only be seen by the researchers. This basically means that all your information will be kept secret.

You can drop out of the study at any time and no one will be angry at you.

A letter outlining all the details of the study can be found at this link.

https://drive.google.com/drive/folders/17XQBMzwmICue8XwRAgzOaJJlV3KP82EC

41. I know that I am free to decide not to take part in this study if I wish

☐ Yes
☐ No

42. I know that I can change my mind and not take part if I wish

☐ *
☐ Yes
☐ No

43. I have read, or had read to me, the information in this form. Any questions that I may have had have been answered by the researchers, and I have access to a copy of the consent form. Therefore, I consent to taking part of this research project.

☐ Yes
☐ No

44. Are you sure? If you click "No, I would not like to take part" then the survey will end and you will be finished.

☐ Yes, I would like to take part
☐ No, I would not like to take part

45. I identify myself as

☐ Male
☐ Female
☐ Non-binary
☐ Other
☐ I'd rather not say

Young Person Section - Exercise

The following questions are for you to answer about yourself. Feel free to ask for assistance as needed but please answer hon- estly for yourself.

First we will ask some questions about PHYSICAL ACTIVITY

Physical activity is any body movement. It can be done at different levels of effort:

Please try to think carefully and be as accurate as possible with your answers. For these next two questions, add up all the time you spend in physical activity each day. Only include activities of either MODERATE or VIGOROUS effort.

46. Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

47. Over a typical or usual week, on how many days are you physically active for a total of at least 60 minutes per day?

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

48. During the last 7 days, on how many days did you do exercises that may strengthen your muscles, such as push-ups, sit-ups, weight lifting or heavy yard work?

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days

☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

49. On average, how much time do you usually spend on one of those days doing exercises that may strengthen your muscles? Answer to the nearest 5 minutes. If none select 0 minutes If more than 60 select 60 minutes

☐ 0 minutes
☐ 5 minutes
☐ 10 minutes
☐ 15 minutes
☐ 20 minutes
☐ 25 minutes
☐ 30 minutes
☐ 35 minutes
☐ 40 minutes
☐ 45 minutes
☐ 50 minutes
☐ 55 minutes
☐ 60 minutes

50. What distance is your journey to or from school? (answer in km)

☐ 0 km
☐ 1 km
☐ 2 km
☐ 3 km
☐ 4 km
☐ 5 km
☐ 6 km
☐ 7 km
☐ 8 km
☐ 9 km
☐ 10 km or more

51. How do you usually travel to school? Please tick one box only for the longest distance of your usual journey to school.

☐ By foot
☐ Bicycle
☐ Car
☐ Bus
☐ Train
☐ Scoot
☐ E-bike/E-scooter

52. How do you usually travel from school? Please tick one box only for the longest distance of your usual journey from school.

☐ By foot
☐ Bicycle
☐ Car

☐ Bus
☐ Train
☐ Scoot
☐ E-bike/E-scooter

53. Overall, how would you rate your neighbourhood as a place to walk? Walkable means pedestrian friendly.

☐ Not at all walkable
☐ Not very walkable
☐ Neither walkable or unwalkable
☐ Somewhat walkable
☐ Very walkable

PE Class

In this section, we are interested in Physical Education (PE) completed during school time.

When answering these questions, think only of the timetabled PE lessons which you would do with your class.

54. How many minutes of PE did you do in the last week? (1 hour = 60 minutes) If no PE select 0 mins If more than 120min/week select 120

☐ 0 minutes
☐ 10 minutes
☐ 20 minutes
☐ 30 minutes
☐ 40 minutes
☐ 50 minutes
☐ 60 minutes
☐ 70 minutes
☐ 80 minutes
☐ 90 minutes
☐ 100 minutes
☐ 110 minutes
☐ 120 minutes (+)

55. Do you participate in PE with your class every week?

☐ Yes, I participate with support from an adult
☐ Yes, I participate independently
☐ I sometimes participate, sometimes sit out/miss the lesson due my vision impairment
☐ I sometimes sit out/miss the lesson due to other reasons
☐ No, I never participate

56. If you sometimes do not participate in PE, what are the main reasons why? Please tick all that apply.

☐ There is little/no PE in my school
☐ I do not like PE
☐ I don't think I am not good enough at PE
☐ PE is too difficult for me
☐ The teacher doesn't expect me to take part in PE
☐ I have never been asked to take part in PE
☐ I do PE separately from my class
☐ My teacher prefers me to sit out of PE due to my visual impairment

☐ My parents/guardians prefer me sit out of PE due to my visual impairment
☐ I attend learning support class during PE
☐ I get tired and need a break so I sit out
☐ I sit out of PE as I am not able to participate in some activities
☐ I sit out because I think my classmates prefer me not to participate in PE
☐ I do not know/no particular reason
☐ NA/ I do participate
☐ Other

57. If other, please explain

Answer: _____

58. The following questions refer to when you are in PE class… Learning about physical fitness and health is something that I …

☐ Dislike a lot
☐ Dislike
☐ Neither dislike or enjoy
☐ Enjoy
☐ Enjoy a lot

59. Being in a gym or on a playing field is something that I…

☐ Dislike a lot
☐ Dislike
☐ Neither dislike or enjoy
☐ Enjoy
☐ Enjoy a lot

60. Getting some exercise is something that I …

☐ Dislike a lot
☐ Dislike
☐ Neither dislike or enjoy
☐ Enjoy
☐ Enjoy a lot

61. Changing clothes is something that I …

☐ Dislike a lot
☐ Dislike
☐ Neither dislike or enjoy
☐ Enjoy
☐ Enjoy a lot

62. Getting warmed up and breaking a sweat is something that I …

☐ Dislike a lot
☐ Dislike
☐ Neither dislike or enjoy
☐ Enjoy
☐ Enjoy a lot

Lunchtime/After School sport

In this section, we are interested in your participation in school based activities at lunch time or immediately after school.

63. How often do you play sports and physical activities at lunch time or after school?

☐ Never
☐ Less often
☐ One day a week
☐ 2-3 days a week
☐ 4 or more days a week
☐ Every day

64. In your opinion, how adequate are the sport facilities (courts, fields, equipment) for the pupils/students in your school?

☐ Not at all adequate
☐ Fairly adequate
☐ Very adequate
☐ Not sure /I do not know

Sports clubs outside of school

In this section, we are interested in your participation in sports and activities outside of school hours and in the community. Please do NOT include your participation in youth clubs, such as church or scouts, where you may do some physical activities but also other activities too.

65. Outside of school hours: how often do you usually exercise in your free time so much that you get out of breath or sweat?

☐ Never
☐ Less than once a month
☐ Once a month
☐ Once a week
☐ 2 times a week
☐ 3 times a week
☐ 4 to 6 times a week
☐ Every day

66. How often do you take part in sports and physical activities in a sports club, which is not a school club?

☐ Never
☐ Less often
☐ One day a week
☐ 2-3 days a week
☐ 4 or more days a week
☐ Every day

67. How many sports clubs are you a member of in total (exclude school or youth clubs). If not a member select 0 If more than 7 select 7

☐ 0
☐ 1
☐ 2
☐ 3

☐ 4
☐ 5
☐ 6
☐ 7 or more

68. Please tick any sports/physical activities you have played at least once a week with a club, which is not a school club, since the beginning of this school year.

☐ VI Tennis
☐ VI/Blind Football
☐ Parkrun
☐ Cycling
☐ ParaTriathlon
☐ Walking
☐ Adventure activities (e.g. orienteering, canoeing)
☐ Athletics/Track and field
☐ Baseball or Rounders
☐ Basketball
☐ Camogie
☐ Cross country running
☐ Dance (e.g. Irish Dancing, Ballet etc.)
☐ Gaelic football/GAA
☐ Gymnastics
☐ Horse riding
☐ Hurling
☐ Martial arts
☐ Rugby
☐ Soccer
☐ Swimming
☐ Tennis
☐ Other
☐ I do not play any sport/activity in a club

69. If you participate in other sports that are not listed above, please list them here

Answer: _____

Physical Activity Confidence

These questions are about your own level of confidence to be physically active. Please read these statements as carefully as possible, and do not spend too much time thinking about the responses. Enter your first response and move on to the next item on the survey.

70. Thinking about your usual circumstances, how easy or difficult is it to continue with physical activity or sports for at least 1 hour per day?

☐ Extremely difficult
☐ Somewhat difficult
☐ Neither easy nor difficult
☐ Somewhat easy
☐ Extremely easy

71. How would you rate your level of physical activity compared to other people in your class of the same age and gender?

☐ Much less than others
☐ Somewhat less than others
☐ About the same
☐ Somewhat more than others
☐ Much more than others

72. Using the scale provided, indicate how confident you are that you could be physically active in each of the following situations. In the following questions, 0 - "not at all confident", 5 = "somewhat confident", 10 = "very confident" I can participate in regular physical activity when; I am tired

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

73. When I am in a bad mood

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

74. When I do not have the time

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

75. When I am on vacation/holiday

☐ 0

☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

76. When it is raining or snowing

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

77. When I have homework to do

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

78. When my friends call me to go out

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

79. When there is a good TV show on

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

80. When I am on my own

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10

Physical Activity Enjoyment

81. Think about how it feels when you are doing physical activities. Please select one option for each of the following questions; When I am active... ...I feel bored

☐ Disagree a lot
☐ Disagree
☐ Neither Agree or Disagree
☐ Agree
☐ Agree a lot

82. ...I dislike it

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

83. ...it is no fun at all

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

84. ...it makes me depressed

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

85. ...it frustrates me

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

86. ...it is not at all interesting

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

87. ...I feel as though I would rather be doing something else

☐ Disagree a lot
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Agree a lot

Physical Literacy - Knowledge and Understanding

88. Here are some questions about knowledge of physical activity and exercise. Please rate below from strongly agree to strongly disagree how you feel about these statements. I understand why exercise is good for me

☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

89. I know how to get involved in lots of different types of exercise and sports

☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

90. I know how to improve my skills in lots of different types of exercise and sports

☐ Strongly disagree

☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

91. If I do physical activity, it will benefit me in the short term (e.g. burn calories, sleep better etc.)

☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

92. If I do physical activity it will benefit me in the long-term (e.g. live longer, lose weight etc.)

☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

93. I think physical activity will change my life for the better

☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

94. What is the recommended minimum amount of moderate-vigorous physical activity needed for those under 18 for a healthy lifestyle? Please select the answer you think is correct. What is the average number of minutes per day?

☐ 0 minutes
☐ 10 minutes
☐ 20 minutes
☐ 30 minutes
☐ 40 minutes
☐ 50 minutes
☐ 60 minutes
☐ 70 minutes
☐ 80 minutes
☐ 90 minutes
☐ 100 minutes

Barriers

What keeps you from being more active?

Listed below are reasons that people give to describe why they do not get as much physical activity as they think they should. Please read each sentence and tick how likely you are to say each one:

95. My day is so busy now, I just do not think I can make the time to include physical activity in my regular schedule

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

96. I am too tired after school/work to be active

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

97. I have been thinking about becoming more physically active, but I just cannot seem to get started

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

98. My free times during the day are too short to include physical activity

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

99. I know of too many people who have hurt themselves by overdoing it when they are physically active

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

100. I am not good enough at any physical activity to make it fun

☐ Very likely
☐ Somewhat likely
☐ Very unlikely
☐ Somewhat unlikely

Peer support

The following question ask you about the role your FRIENDS have in supporting your physical activities or sports.

101. Here are some statements about the students in your class(es). Please show how much you agree or disagree with each one. The students in my class(es) enjoy being together

☐ Strongly agree
☐ Agree
☐ Neither agree or disagree
☐ Disagree
☐ Strongly disagree

102. Most of the students in my class(es) are kind and helpful

☐ Strongly agree
☐ Agree
☐ Neither agree or disagree
☐ Disagree
☐ Strongly disagree

103. Other students accept me as I am

☐ Strongly agree
☐ Agree
☐ Neither agree or disagree
☐ Disagree
☐ Strongly disagree

Family Support

The following question ask you about the role your HOUSEHOLD/FAMILY have in supporting your physical activities or sports.

During a typical week, how often has a member of your household ...

104. ...encouraged you to do physical activities or play sports?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

105. ...done physical activities or play sports with you?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

106. ...provided transportation to a place where you can do physical activities or play sports?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

107. ...watched you participate in physical activities or sports?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

108. ...told you are doing well in physical activities or sports?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

109. ...encouraged you to spend less time being sedentary (sitting down)?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

110. ...discussed with you how sedentary habits can be unhealthy?

☐ Never
☐ Once
☐ Sometimes
☐ Almost every day
☐ Everyday

Wellbeing and Sleep

This section is about your general health and wellbeing

111. In general, how would you say your health is?

☐ Excellent
☐ Very good
☐ Good
☐ Fair
☐ Poor

112. Here is a picture of a ladder. The top of the ladder "10" is the best possible life for you and the bottom "0" is the worst possible life for you. In general, where on the ladder do you feel you stand at the moment? Tick the box that best describes where you stand

☐ 0
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ Worse possible life
☐ Best possible life

113. In the past 7 days, approximately how much did you sleep each night?

☐ Up to 6 hours

☐ 6 – 8 hours
☐ 8 – 10 hours
☐ 10+ hours

Bonus Questions

Thank you so much for completing the survey so far - you're doing great!

We have a few more questions about sleep, wellbeing and the impact of COVID-19. These questions should take about 10 more minutes.

114. Are you happy to finish the last few questions in the survey?

☐ Yes I want to continue
☐ No I want to finish now

115. The next 10 questions are about how you have felt over last week. Thinking about the last week Have you felt fit and well?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

116. Have you felt full of energy?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

117. Have you felt sad?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

118. Have you felt lonely?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

119. Have you had enough time for yourself?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

120. Have you been able to do the things that you want to do in your free time?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

121. Have your parent(s) treated your fairly?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

122. Have you had fun with your friends?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

123. Have you got on well at school?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

124. Have you been able to pay attention?

☐ Not at all
☐ Slightly
☐ Moderately
☐ Very
☐ Extremely

Sleep

125. When do you usually go to bed on weekends or during holidays?

☐ No later than 21:00 / 9pm
☐ 21:30 / 9:30pm
☐ 22:00 / 10pm
☐ 22:30 / 10:30pm
☐ 23:00 / 11pm
☐ 23:30 / 11:30pm
☐ 00:00 / 12:00pm
☐ 00:30 / 12:30pm
☐ 1:00 / 1am
☐ 1:30 / 1:30am

☐ 2:00 / 2am or later

126. When do you usually go to bed during the school week?

☐ No later than 21:00 / 9pm
☐ 21:30 / 9:30pm
☐ 22:00 / 10pm
☐ 22:30 / 10:30pm
☐ 23:00 / 11pm
☐ 23:30 / 11:30pm
☐ 00:00 / 12 (midnight)
☐ 00:30 / 12:30am
☐ 1:00 / 1am
☐ 1:30 / 1:30am
☐ 2:00 / 2am or later

127. When do you usually wake up on school mornings?

☐ No later than 5:00
☐ 5:30
☐ 6:00
☐ 6:30
☐ 7:00
☐ 7:30
☐ 8:00
☐ 8:30
☐ 9:00
☐ 9:30 or later

128. When do you usually wake up on weekends or during holidays?

☐ No later than 7:00
☐ 7:30
☐ 8:00
☐ 8:30
☐ 9:00
☐ 9:30
☐ 10:00
☐ 10:30
☐ 11:00
☐ 11:30
☐ 12:00
☐ 12:30
☐ 13:00
☐ 13:30
☐ 14:00 or later

COVID-19 Impact

In this section, there are some questions about how COVID-19 may have had an effect on your physical activity behaviour. Please read through these questions carefully, answer as honestly as possible, choosing the first answer that comes to mind. There are no right or wrong answers, and individual responses will not be analysed.

129. Since the start of the COVID-19 pandemic, the lives of many people have been affected (i.e., lockdowns, school closures, distance learning, social distancing, etc). In the last 12 months,

what impact did these measures have on the following aspects of your life? (A negative impact means it made things worse, a positive impact means it made things better).

Aspect: Your overall physical activity (e.g. sports, cycling, walks)

Extremely negative	Somewhat negative	Neither positive nor negative	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

130. In the last 12 months, what impact did these measures have on the following aspects of your life?

Aspect: Your participation in school sport or physical activity (e.g. PE, active classes)

Extremely negative	Somewhat negative	Neither positive nor negative	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

131. In the last 12 months, what impact did these measures have on the following aspects of your life?

Aspect: Your overall health

Extremely negative	Somewhat negative	Neither negative or positive	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

132. In the last 12 months, what impact did these measures have on the following aspects of your life?

Aspect: Your fitness levels

Extremely negative	Somewhat negative	Neither negative nor positive	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

133. In the last 12 months, what impact did these measures have on the following aspects of your life?

Aspect: Your participation in sport or physical activity outside of school (e.g. sport club)

Extremely negative	Somewhat negative	Neither negative nor positive	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

134. In the last 12 months, what impact did these measures have on the following aspects of your life?

Aspect: Your participation in sports or physical activity during lunchtime/after school

Extremely negative	Somewhat negative	Neither positive nor negative	Somewhat positive	Extremely positive
☐	☐	☐	☐	☐

Sedentary Behaviour

For this section sedentary means sitting down activities.

135. How many hours a weekday, in your free time, do you usually spend watching TV, videos (including YouTube or similar services), DVDs, and other entertainment on a screen?

☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

136. How many hours a weekend day, in your free time, do you usually spend watching TV, videos (including YouTube or similar services), DVDs, and other entertainment on a screen?

☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

137. How many hours on a weekday, in your free time, do you usually spend playing games on a computer, games console, tablet (like iPad), smartphone or other electronic device (not including moving or fitness games)?

☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

138. How many hours on a weekend day, in your free time, do you usually spend playing games on a computer, games console, tablet (like iPad), smartphone or other electronic device (not including moving or fitness games)?

☐ None at all
☐ About half an hour a day
☐ About 1 hour a day
☐ About 2 hours a day
☐ About 3 hours a day
☐ About 4 hours a day
☐ About 5 hours a day
☐ About 6 hours a day
☐ About 7 or more hours a day

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☐ Microsoft Forms

End of questionnaire.

Appendix B: Vision Sport Research Project Adult Questionnaire

This study aims to obtain the necessary evidence to enable Vision Sports Ireland and its partners to best support children, young people, and adults who are blind and vision impaired to participate in the sports and leisure activities of their choice.

This study is being run out of Dublin City University and is a collaboration between Vision Sports Ireland, the National Council for the Blind in Ireland, the School of Health and Human Performance in DCU, and the Insight SFI Research Centre for Data Analytics.

This project aims to carry out research around the physical activity, sports participation, and wellbeing of children, adolescents, and adults who are blind and vision impaired. A further objective includes trying to find the key barriers or enablers of sport and physical activity among those with a

vision impairment. It is hoped that the results from this research study will identify key recommendations for future development and policy in this area. Your involvement in the study will be fully anonymous and the data we collect will be kept in the strictest confidence,

adhering to all GDPR guidelines as outlined in the plain language statement in the below link. If you require support to fill in this form, or if you have any further questions, please contact visionsports@ncbi.ie A plain language statement outlining the full details of the study, including data and consent details can be found at this link

Plain language statement:
https://drive.google.com/file/d/1IUiX_HVj_BZMFRf2dAB8QMdMz_ds8S4X/view?usp=sharing

** Required*

In this section we will ask you general questions about yourself, such as your age, the area you live, etc. We will also ask you about your vision impairment. The next section of questions are on your participation in sport and physical activity. This may include a broad range of physical activities as well as traditional sports, including walking, cycling, other outdoor pursuits, water sports and non-competitive or recreational exercise. This section asks questions about any voluntary activity associated with sport and exercise activities that you undertook in the

past 7 days. Voluntary activity means any role you may have fulfilled in support of sport or recreational physical activity, for adults or children. It includes helping to run events, providing or maintaining transport, food, equipment or kit, or acting in any kind of official

capacity in relation to an event, team or organisation that provides opportunities to engage in physical activities for recreation, exercise or sport. The following two sections relate to your wellbeing. Please answer the following questions below to the best of your ability. If

you have been affected by any of the questions asked please visit www.yourmentalhealth.ie or your GP. In the event of a crisis call Samaritans on their Freephone number 116 123. If you have been affected by any of the questions I've just asked please visit www.yourmentalhealth.ie or your GP. In

the event of a crisis call Samaritans on their Freephone number 116 123. The next section is about your motivation to participate in sports and physical activity. The following questions relate to your local club and how they can encourage participation.

Project Overview and Consent

1. I have read the Plain Language Statement (or had it read to me) *

☐ Yes
☐ No

2. I understand the information provided *

☐ Yes
☐ No

3. I understand the information provided in relation to data protection *

☐ Yes
☐ No

4. I am aware that I may withdraw from the Research Study at any point. *

☐ Yes
☐ No

5. I have read and understood the information in this form. My questions and concerns have been answered by the researchers, and I have a copy of this consent form. Therefore, I consent to take part in this research project *

☐ Yes
☐ No

Demographics

6. I identify as *

☐ Male
☐ Female
☐ Non binary
☐ Other
☐ Prefer not to say

7. What is your age? *

[The value must be a number]

8. What if your current level of vision impairment *

☐ No vision (B1 - No perception of light)
☐ Low Vision (B2 - Can see hand movements, Counting Fingers)
☐ Useful Vision - (B3 - B5 VA of greater than 6/60 with a visual field constriction of less than 40 degrees)

9. Is your vision impairment *

☐ Congenital/present from an early age
☐ Onset during childhood
☐ Onset during adult life (18+)
☐ Acquired (e.g. by brain injury, stroke)
☐ Prefer not to say

10. Is your visual impairment *

☐ Improving
☐ Staying the same
☐ Declining/degenerative

☐ I have no vision

11. Please provide details of your diagnosed vision impairment? (Please select all that apply) *

☐ Macular Degeneration (Age Related)
☐ Macular Degeneration (Non-Age related)
☐ Diabetic Retinopathy
☐ Retinitis Pigmentosa (RP)
☐ Glaucoma
☐ Cataracts
☐ Neurological/CVI
☐ Optic Nerve Atrophy
☐ Hemianopia
☐ Detached Retina(s)
☐ Retinoblastoma
☐ I have not received a diagnosis/am awaiting a diagnosis
☐ Other

12. If other please explain

[Enter your answer]

13. Do you have any of the following long-lasting conditions or difficulties? *

☐ Deafness or a hearing impairment
☐ A difficulty with basic physical activities such as walking, climbing stairs, reaching, lifting or carrying
☐ An intellectual disability
☐ Difficulty with learning, remembering or concentrating
☐ Psychological or emotional condition or mental health issue
☐ Difficulty with pain, breathing, including chronic illness
☐ Difficulty in dressing, bathing or getting around inside the home
☐ Difficulty in going outside the home alone to shop or visit a doctor's surgery
☐ Difficulty in working or attending school/college
☐ Difficulty in participating in other activities for example leisure or using transport
☐ Other
☐ No, I do not have any additional disabilities

14. If other please explain

[Enter your answer]

15. Do any of these conditions mentioned in the previous question prevent you from taking part in sport, physical activity or exercise? *

☐ Yes
☐ No

16. Do you use a mobility aid? e.g. long cane, guide dog etc. *

☐ Yes
☐ No

17. If yes, what type *

☐ Long cane
☐ Symbol cane
☐ Guide dog

☐ Technology e.g. mobile app for navigation

18. If you use a mobility aid, how often do you use it *

☐ Never
☐ Sometimes
☐ Regularly
☐ Often
☐ All the time

19. What is the highest level of education that you have completed? *

☐ Primary level or lower
☐ Group, Inter, Junior Certificate
☐ Leaving Certificate
☐ Other Second Level
☐ Third Level
☐ Don't know
☐ Prefer not to say

20. How would you describe your present principal employment status *

☐ Working for payment or profit
☐ Looking for first regular job
☐ Short term unemployed (less than 12 months)
☐ Long tern unemployed (12 months or more)
☐ Student or pupil
☐ Looking after home/family
☐ Retired from employment
☐ Unable to work due to a vision impairment
☐ Unable to work due to additional permanent sickness or disability
☐ Other

21. If other please explain

[Enter your answer]

22. Could I ask about the approximate level of net household income? This means the total income, after tax, PRSI and other statutory deductions, of all members of the household. Amount per week /Amount per month/Amount per year *

☐ under €300 a week/under €1200 a month/under €15500 a year
☐ €300 - €399 a week/€1200 - €1599 a month/€15500 - €19999 a year
☐ €400 - €499 a week/€1600 - €1999 a month/€20000 - €25999 a year
☐ €500 - €749 a week/€2000 - €2999 a month/ €26000 - €38999 a year
☐ €750 - €899 a week/€3000 - €3599 a month/€39000 - €46999 a year
☐ €900 - €1249 a week/ €3600 - €4999 a month /€47000 - €64999 a year
☐ over €1249 a week/over €4999 a month/ over €64999 a year
☐ Prefer not to say

Section 2: Sports Participation

23. In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate. This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job. *

☐ 0 - Zero days
☐ 1 - One day
☐ 2 - Two days
☐ 3 - Three days
☐ 4 - Four days
☐ 5 - Five days
☐ 6 - Six days
☐ 7 - Seven days

24. Do you have difficulty walking 100 meters on level ground, even if you use any equipment or receive assistance, including your mobility aid? (This is around the length of a GAA pitch) *

☐ No difficulties
☐ Some difficulty
☐ A lot of difficulty
☐ Cannot do at all

25. If you do require a mobility aid, equipment or assistance to walk 100 m on level ground, do you have adequate access to this? *

☐ All the time
☐ Sometimes
☐ Often
☐ Never

26. Apart from PE did you play any regular sports at school? *

☐ Yes
☐ No

27. When you attended school yourself, did your parents play any kind of sport regularly? *

☐ Yes, both
☐ Yes, father only
☐ Yes, mother only
☐ No
☐ Don't Know.

28. Do you undertake any regular walks of over 15 (fifteen) minutes for transport, such as walking to work, walking children to school etc.? Regular means at least once a week. *

☐ Yes
☐ No

29. The next question is about any recreational walking you did in the past 7 days. DO NOT include walks for transport, such as walking to work or to the shops, but DO include walks undertaken for exercise, recreation or leisure. In the last 7 days, did you take a recreational walk? *

☐ Yes
☐ No

30. How many walks for exercise, recreation or leisure did you take? *

☐ 1 - one walk
☐ 2 - two walks
☐ 3 - three walks
☐ 4 - four walks
☐ 5 - five walks

☐ 6 - six walks
☐ 7 - seven walks
☐ More than 7 walks

31. For how long did you walk for (minutes)? *

[Enter your answer]

32. How long do you usually walk for (minutes)? *

[Enter your answer]

33. How would you describe your usual walking pace during your walk(s)? *

☐ Slow
☐ Steady, average
☐ Fairly Brisk
☐ Fast
☐ Don't know

34. Where do you usually walk? *

☐ Around local roads
☐ Parks
☐ Forests or other trails
☐ Beach or seafront
☐ Somewhere else
☐ Don't know

35. Please tick any sports/activities you have played at least once a week since the beginning of this year *

☐ Adventure Activities e.g. orienteering, canoeing
☐ Basketball
☐ Blind Golf
☐ Cycling
☐ Dance
☐ Gaelic football
☐ Golf
☐ Gym classes
☐ Gymnastics
☐ Hurling/Camogie
☐ Martial Arts/Judo
☐ Paratriathlon
☐ Parkrun
☐ Rugby
☐ Running with a guide
☐ Running without a guide
☐ Soccer
☐ Swimming
☐ Tandem Cycling
☐ Tennis
☐ Track and field
☐ Triathlon
☐ Vision impaired/ Blind Rugby
☐ Vision impaired/Blind Soccer

☐ Vision impaired/Blind Tennis
☐ Walking/Hiking
☐ Weight Training
☐ Yoga
☐ Other

36. If other, please explain

[Enter your answer]

37. I would now like to ask you about any OTHER physical activities you undertook in the past 7 days for exercise, recreation or sport. Please DO NOT include physical activity for work, transport, or domestic work like gardening or DIY. Please DO include personal exercise, such as swimming, dancing or jogging, as well as all forms of sporting activity, indoor or outdoor, whether undertaken in an organised setting or casually with family or friends. So, in the past 7 days, did you participate in any such activities? *

☐ Yes
☐ No

38. Please list the sport or activity you participated in most *

[Enter your answer]

39. Thinking of the activity you participate in the most, over the past 7 days how many days did you take part? *

[The value must be a number]

40. For how long did you take part (minutes)? Consider a usual session if you took part more than once. *

[The value must be a number]

41. Was the effort enough to raise your breathing rate? *

☐ Yes
☐ No

42. Was the effort enough for you to be out of breath or sweat? *

☐ Yes
☐ No

43. In what context did the activity take place? *

☐ Organised training/coaching/lesson
☐ Organised competition
☐ Casually with family or friends
☐ On own
☐ Other

44. Where did the activity take place? *

☐ Public place (e.g. local park)
☐ Sports club
☐ Community hall
☐ Gym/sports centre
☐ School/college/university
☐ At home
☐ Somewhere else

45. If somewhere else, please specify *

[Enter your answer]

46. If this activity took place through a club, is that club; *

☐ Mainstream club
☐ Mainstream club who have members who are blind or vision impaired
☐ Club specifically for people with vision impairment
☐ I completed this activity alone

47. If using a mainstream club has the club linked with Vision Sports Ireland or similar organisation to maximise your ability to participate? *

☐ Yes
☐ No
☐ Don't know

Section 3: Volunteering and Sports Club Membership

48. Are you a member of any kind of sports club? Please Include clubs for traditional sports, but also walking, cycling or swimming clubs, fitness centres, gyms or other organisations that provide opportunities to engage in physical activity for recreation, exercise or sport? *

☐ Yes
☐ No

49. How many clubs are you a member of? *

[Enter your answer]

50. What are the sports or physical activities concerned (please select up to a maximum of 3 you are most involved in)? *

☐ Adventure activities (e.g. orienteering, canoeing)
☐ Gym classes
☐ Athletics/Running
☐ Badminton
☐ Cycling
☐ Tandem Cycling
☐ Basketball
☐ Hurling/Camogie
☐ Dance
☐ Gaelic football
☐ Gymnastics
☐ Vision Impaired/Blind Soccer
☐ Hockey
☐ Horse riding
☐ Vision Impaired/Blind Tennis
☐ Martial arts/Judo
☐ Rugby
☐ Vision Impaired Rugby
☐ Soccer
☐ Squash
☐ Swimming
☐ Tennis
☐ Weight training

☐ Golf
☐ Blind Golf
☐ Guide Running
☐ Parkrun
☐ Walking/Hiking
☐ Triathlon
☐ Paratriathlon
☐ Yoga
☐ Other

51. If other please elaborate

[Enter your answer]

52. Were these clubs designed specifically for people with vision impairment? *

☐ Yes - all of the clubs were designed specifically for people with vision impairment
☐ Yes - some of the clubs were designed specifically for people with vision impairment
☐ No

53. Do you volunteer with a sports club? *

☐ Yes
☐ No

54. What voluntary involvement did you have? Please select all that apply *

☐ Providing Transport
☐ Coach
☐ Club Official
☐ Activity Organiser
☐ Kit Maintenance
☐ Selector
☐ Mentor
☐ Referee
☐ Administrator
☐ Board member
☐ Other

55. If other please specify

[Enter your answer]

56. How many hours during the past 7 days did you devote to volunteering for this activity? *

[The value must be a number]

57. Which one, if any, of the following types of training do you feel would be most useful for sports clubs to support participants/volunteers who are blind or vision impaired *

☐ How to adapt sport to people with a disability
☐ Communication and the proper use of inclusive language
☐ Increased understanding of different impairments
☐ None of these
☐ Don't know

Wellbeing

58. The following questions are in relation to your well-being, with a focus on how you have been feeling over the PAST FOUR WEEKS. There are six answers which you can choose from.

Please choose the answer which is closest to how you have been feeling over the PAST FOUR WEEKS. Did you feel full of life? *

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

59. Did you feel calm and peaceful? *

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

60. Did you have a lot of energy? *

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

61. Have you been a happy person? *

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

62. The following questions are related to feelings on aspects of your life on a scale of 0 to 10, where 0 is "not at all" and 10 is "completely". There are no right or wrong answers. Overall how satisfied are you with your life nowadays? * Not at all Completely

☐ 0 1 2 3 4 5 6 7 8 9 10

63. Overall to what extent do you feel that the things you do in your life are worthwhile * Not at all Completely

☐ 0 1 2 3 4 5 6 7 8 9 10

64. Overall, how happy did you feel yesterday? * Not at all Completely

☐ 0 1 2 3 4 5 6 7 8 9 10

65. On scale where 0 is "not at all anxious" and 10 is "completely anxious", overall how anxious did you feel yesterday? * Not at all anxious Completely anxious

☐ 0 1 2 3 4 5 6 7 8 9 10

66. To what extent do you agree or disagree with the following statements? I can achieve most of the goals I set for myself *

☐ Strongly agree

☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

67. Most people in my local area can be trusted *

☐ Strongly agree
☐ Agree
☐ Neutral
☐ Disagree
☐ Strongly disagree

68. Please indicate for each of the 5 statements which is closest to how you have been feeling over the past 2 weeks I have felt cheerful and in good spirits *

☐ All of the time
☐ Most of the time
☐ More than half the time
☐ Less than half the time
☐ Some of the time
☐ None of the time

69. I have felt calm and relaxed *

☐ All of the time
☐ Most of the time
☐ More than half the time
☐ Less than half the time
☐ Some of the time
☐ None of the time

70. My daily life has been filled with things that interest me *

☐ All of the time
☐ Most of the time
☐ More than half the time
☐ Less than half the time
☐ Some of the time
☐ None of the time

71. I have felt active and vigorous *

☐ All of the time
☐ Most of the time
☐ More than half the time
☐ Less than half the time
☐ Some of the time
☐ None of the time

72. I woke up feeling fresh and rested *

☐ All of the time
☐ Most of the time
☐ More than half the time
☐ Less than half the time
☐ Some of the time

☐ None of the time

Motivation

73. On a scale of 1 to 5 where 1 is very easy and 5 is very difficult, how easy or difficult is it for you to motivate yourself to participate in sports/ walk for recreational purposes / walk for transport? *

☐ 1 (Very easy)
☐ 2
☐ 3
☐ 4
☐ 5 (Very difficult)
☐ Don't know
☐ Prefer not to say

74. I'd now like you to think about the reasons why you choose to participate in sport or other physical activity. On a scale of 1 to 5, where 1 is not at all important and 5 is very important, how important are the following factors to you in being physically active? To improve my health and fitness *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

75. To relax *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

76. To improve my athletic skills *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

77. To improve how I look *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)

☐ Don't know
☐ Prefer not to say

78. To spend time with friends and family *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

79. To have fun *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

80. To compete with others *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

81. To be included in a main stream club *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

82. To meet more people who are blind or visually impaired *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

83. To make new friends *

☐ 1 (Not at all important)
☐ 2

☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

84. To be part of my local club/community *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

85. To control my weight *

☐ 1 (Not at all important)
☐ 2
☐ 3
☐ 4
☐ 5 (Very important)
☐ Don't know
☐ Prefer not to say

In Relation to Your Local Club

86. From your knowledge, does your local club have any of the following? *

Item	Yes	No	Don't know
Accessible facilities such as accessible car parking, ramps or changing facilities	☐	☐	☐
Inclusion days inviting those with a disability to try out the club activities	☐	☐	☐
A club volunteer or staff member with a disability	☐	☐	☐
Club members with a disability	☐	☐	☐

87. To what extent do you agree or disagree with the following statement - 'my club welcomes all participants, including those with a disability'? *

☐ Strongly disagree
☐ Tend to disagree
☐ Neither agree nor disagree
☐ Tend to agree
☐ Strongly agree

88. To what extent do you agree or disagree with each of the following statements? Most sports clubs would benefit from having more information and support to assist them including people with disabilities *

☐ Strongly disagree
☐ Tend to disagree
☐ Neither agree nor disagree
☐ Tend to agree
☐ Strongly agree
☐ Do not know

89. Most sports clubs should arrange more training for coaches and volunteers around inclusion *

☐ Strongly disagree
☐ Tend to disagree
☐ Neither agree nor disagree
☐ Tend to agree
☐ Strongly agree
☐ Do not know

90. Most sports clubs wouldn't know where to start to actively engage people with disabilities in to their activities *

☐ Strongly disagree
☐ Tend to disagree
☐ Neither agree nor disagree
☐ Tend to agree
☐ Strongly agree
☐ Do not know

91. I would now like to ask you a few questions about your attitudes towards sport and physical activity. To what extent do you agree, or disagree, with the following statements about how you feel generally about sport and physical activity? Please answer on a scale of 1 to 5, where 1 is "Strongly disagree" and 5 is "Strongly agree". My level of fitness prevents me from doing physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

92. I'm not skilful enough to do physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

93. I know exactly where I can go to do physical activity *

☐ 1 (Strongly disagree)
☐ 2

☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

94. My local area is not very attractive and this puts me off doing physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

95. There is nowhere near me to do physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

96. I think people like me do physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

97. I don't have anyone to do physical activity with *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

98. Doing physical activity is helping me achieve a current goal *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

99. I want to do physical activity *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)

☐ Don't know

100. Physical activity is part of my weekly routine *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

101. I don't like doing any physical activities *

☐ 1 (Strongly disagree)
☐ 2
☐ 3
☐ 4
☐ 5 (Strongly agree)
☐ Don't know

102. What do you feel are the greatest barriers to participation? *

☐ Lack of accessible facilities
☐ Transport
☐ Personal motivation
☐ Access to activities I enjoy
☐ Lack of assistance to participant
☐ Lack of understanding about VI with coaches and volunteers
☐ Other

103. If other, please elaborate

[Enter your answer]

104. What would encourage you to be more active? *

☐ More physical activity programmes specifically for people who are blind and VI
☐ Greater education of VI in the community
☐ Community clubs to be more inclusive
☐ Other

105. If other please elaborate

[Enter your answer]

106. Are there sports that you would be interested in participating in locally with the support of volunteers/inclusion officers with experience working with people with vision impairment? *

☐ Yes
☐ No

107. If yes, please elaborate *

Appendix C: Interview Protocol – Adolescent Focus Group

The Interview Protocol Refinement Framework[1]

Phase 1: Ensuring interview questions align with research questions

The first phase focuses on the alignment between interview questions and research questions. To check the alignment of questions, the following matrix maps interview questions onto research questions.

	Question	RQ1 What are the facilitators of PA and sport participation for children with a VI?	RQ2 What are the barriers to sport and PA participation for children with a VI?
Facilitators of PA			
Q1	Is participating in sport and PA important to you? Why?/Why not?	X	
Q2	Do you know what sports clubs and places to practise PA are available near where you live? Can you tell me a little bit about them?	X	
Q3	Have you tried these sports or activities? Why/why not?	X	
Q4	Have you had any particularly good experiences while doing sports or PA? What was it about them that made them so good? If not responses - Was it the facilities? The coaches? What did they do well?	X	
Q5	Have you had any bad experiences while doing sports or PA? What was it about them that made them so bad? If no responses - This might include times when you		

	maybe didn't feel included? Or didn't like the way the coaches ran the activity?		
Q6	Do you tend to prefer PA and sports designed specifically for people with vision problems or do you prefer joining in with activities mainly aimed at sighted people with additional help and changes made as needed?	X	
Q7	Do you prefer doing PA alone or with people? (If with people – is that family? Friends? Volunteers?)	X	
Last Qs	Are there any other factors that help young people with a VI when participating in sport and PA?		
Barriers			
Q1	What are challenges for young people with a VI when participating in sport and PA?		X
Q2	Do you think these challenges are different for older people with a VI?		
Q3	Are these challenges different (either better or worse) since the COVID 19 pandemic?		X
Q4	Do you think sports clubs and facilities like gyms cater for the needs of young people with a VI? Why, why not?	X	X

Q5	Have there been times with in has been harder for you to participate in sports because of the facilities your clubs has e.g. changing rooms, guide rails t etc?		X
Q6	Transport is often mentioned as a big barrier to sport and physical activity for people who have vision problems – is that something you have felt yourself?		X
Q7	Do you feel like sports clubs and PA providers e.g. gyms know how to include young people with a VI into their sport or facility? If not, what can be done to address this?		X
Q8	Do you feel like coaches and other PA providers understand how to include young people with a VI into sport and activities?		
Q9	Some people have difficulties with the language coaches use and whether they are speaking in an inclusive way – is that something you have felt?		
Q10i)	Would training for coaches help you participate in more sports?		
Q10ii)	What do you think that training should include?		
Last Qs	Are there any other challenges you or other young people with a VI can		

	experience when participating in sport and PA?`		
Last Qs	Can you give some suggestions on how to address the barriers to sport and PA participation for people with a VI?		

The Interview Protocol Refinement Framework

Interview Script

Introduction

- I would like to thank you for agreeing to participate in today's roundtable discussion / focus group.
- We have conducted surveys of adults and children with vision impairments late last year, looking at physical activity levels for those with vision impairments.
- We wanted to learn a little bit more about the barriers to physical activity as well as the facilitators – things that make physical activity and exercise easier and more enjoyable.

When starting roundtable discussion:

- The information gathered will be kept anonymous so we ask you to give your honest feedback and opinions.
- I will be recording the audio of this session to allow for full analysis of all the issues raised. This recording will also be kept anonymously, in a password protected file and deleted with analysis has been completed.
- We will use this information (together with Vision Sports Ireland) to help improve physical activity level and sports participation levels for people with vision impairments.
- Does anybody have any questions before we begin?

I will start by asking you a few questions about your experiences of participating in physical activity.

	Question	RQ1 What are the experiences of adults who are blind/vision impaired of participating in PA and sport	RQ2 What do adults who are blind/vision impaired identify as the facilitators for physical activity and sport?	RQ3 What do adults who are blind/vision impaired see as the barriers to physical activity and sports participation?
Q1	Is participating in sport and PA important to you? Why?/Why not?	X	X	
Q2.	What has been your experience of participating in sport and PA? Has it been positive or negative?	X	X	X
Q3i)	If positive experiences in Q2 - Can you tell me a little bit about why that experience was so good?	X	X	

	If more probing required - Was it the facilities? The coaches? What did they do well?			
Q3ii)	If positive experiences with coaches in Q2 - how did the coaches help? If examples needed; Was it how they spoke? The language they used? How they set up the activities?	X	X	
Q3iii)	If positive experiences in Q2 - Is that different to other experiences you have had?	X		X
Alt Q3 if negative experiences in Q2 Q3i)	If negative experiences in Q2; Can you tell me a little bit more about why that experience wasn't good? If more probing required - Was it the facilities? The coaches? The activity itself?	X		X
Alt Q3 if negative experiences in Q2 Q3 ii)	If negative experiences with coaches in Q2 - how did the coaches help? If examples needed; Was it how they spoke? The language they used? How they set up the activities?	X		X
Alt Q3 if negative experiences in Q2 Q3 iii)	If negative experiences in Q2 - Is that different to other experiences you have had?	X	X	
Q4	Do you know what, if any, sporting and PA opportunities/activities are available near where you live? Can you tell me a little bit about them?			
Q5	Have you tried these activities? Why/why not? If not; can you explain why that is?			
Last Qs	Are there any other factors that support you or people with a VI when participating in sport and PA?		X	

Last Qs	What do you think helps you (or people with a VI) participate in PA and sport?		X	
Q1	**What challenges, if any, have you experienced when participating in sport and PA?**	**X**		**X**
Q2	Do you think sports clubs and facilities like gyms cater for the needs of people with a VI? Why, why not?			X
Q3	Transport is often mentioned as a big barrier to sport and physical activity for people who have vision problems – is that something you have experienced?			X
Q4	Have those barriers changed (either for better or worse) since the COVID -19 pandemic?			X
Q5	Do you feel like your local clubs/ sports facility knows what you need to have a good experience?			X
Q6	Do you feel like coaches and other PA providers understand how to include people with a VI into sport and activities?	X		
Q7	Some people have difficulties with the language coaches use and whether they are communicating in an inclusive way – is that something you have experienced?	X		
Q8	Would training for coaches help you participate in more sports?		X	
Q9	What do you think that training should include?			
Last Qs	Are there any other challenges you or people with a VI can experience when participating in sport and PA?			X
Last Qs	Can you give some suggestions on how to address the barriers to			

	sport and PA participation for people with a VI?			

Last Comments

i.Is there anything else that you would like us to know about barriers and facilitators for physical activity?

Conclusion

- We want to thank all of you for participating in today's roundtable discussion. We had a great discussion and have gathered a lot of useful information.
- We will use this information to write up a paper about the best ways to facilitate physical activity for people who are blind and vision impaired. If you are interested in reading this paper, please let me know and I can send it on though this will be in a number of months.
- Vision sports will also use some of this anonymous information to help address some of the problems with physical activity you have highlighted.
- Thank you again

Interview Script

Introduction

● I would like to thank you for agreeing to participate in today's focus group.
● Explain how this information will be used and what the next steps for this work are.
● Does anyone have any questions before we begin?

I will start by asking you a few questions about your experience of participating in physical activity, sport and exercise. We will also cover some of the things that help you participate in these areas.

i) Is participating in sport and PA important to you? Why?/Why not?
ii) What has been your experience of participating in sport and PA? Has it been positive or negative?
iii) Can you tell me a little bit about why that experience was so good/bad?
Was it the facilities? The coaches? The activity itself? What did they do well?
iv) How did the coaches help?
If examples needed; Was it how they spoke? The language they used? How they set up the activities?
v) Is this experience different to other experiences you might have had?
vi) Do you know what, if any, sporting and PA opportunities/activities are available near where you live? Can you tell me a little bit about them?
vii) Have you tried these activities? Why/ why not? Probe further re reasons
viii) Are there any other factors that support you or people with a VI when participating in sport and PA?
ix) What do you think helps you (or people with a VI) participate in PA and sport?

Are there any other factors that support you or people with a VI when participating in sport and PA?

I now have some questions about what prevents you (and other people with a visual impairment) from exercising and participating in physical activity

x) What challenges, if any, have you experienced when participating in sport and PA?
xi) Do you think sports clubs and facilities like gyms cater for the needs of people with a VI? Why, why not?
xii) Transport is often mentioned as a big barrier to sport and physical activity for people who have vision problems – is that something you have experienced?
xiii) Have those barriers changed (either for better or worse) since the COVID -19 pandemic?
xiv) Do you feel like your local clubs/sports facility knows what you need to have a good experience?
xv) Do you feel like coaches and other PA providers understand how to include people with a VI into sport and activities?
xvi) Some people have difficulties with the language coaches use and whether they are communicating in an inclusive way – is that something you have experienced?
xvii) Would training for coaches help you participate in more sports?
xviii) What do you think that training should include?
xix) Are there any other challenges you or people with a VI can experience when participating in sport and PA?
xx) Can you give some suggestions on how to address the barriers to sport and PA participating for people with a VI?

Final questions;

Is there anything else that you would like us to know about barriers and facilitators for physical activity?

Conclusion

- We want to thank all of you for participating in today's chat. We had a great discussion and have gathered a lot of useful information.
- We will use this information to write up a paper about the best ways to facilitate physical activity for people who are blind and vision impaired. If you are interested in reading this paper, please let me know and I can send it on though this will be in a number of months.
- Vision sports will also use some of this anonymous information to help address some of the problems with physical activity you have highlighted.
- Thank you again

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