

SRP9: Disabled Children's Travel to School

Focusing on Neurodiverse Experiences



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Contents

Executive Summary	3
Key findings	3
1. Introduction	6
1.1 Background and research aims	6
1.2 Our approach to disability	7
1.3 Methodology overview	9
2. Literature Review.....	11
2.1 Disabled children’s travel	11
2.2 School travel among non-disabled children	16
2.3 Active travel among Disabled adults	17
2.4 Summary	21
3. Findings	23
3.1 Who we heard from	23
3.2 Travel habits	25
3.3 Challenges associated with active school travel	29
3.4 Enablers of active travel	38
4. Discussion and Next Steps.....	43
4.1 Opportunities for future research.....	44
5. Appendix	48
5.1 Methodology	48
6. References	57

Executive Summary

This research was funded by Transport Scotland as part of the Scottish Research Programme and carried out by Sustrans.

This report explores Disabled children's experiences of school travel, with a particular focus on Neurodiverse children. It highlights the challenges associated with active school travel and presents participants recommendations for the design of streets and spaces and behaviour change activities.

Eight families from across Scotland took part in the research, involving interviews with parents and creative activities with children. The experiences of children with autism, ADHD, dyspraxia, hypermobility, asthma, sensory processing issues and incontinence are discussed in this research.

Disabled children's, and specifically Neurodiverse children's travel to school, is not well understood. This emphasises the importance of the findings of this project which provide a starting point to understanding how active travel can be made more accessible to Neurodiverse children. Continued learning in this area is essential and could include activities such as co-designing streets and spaces with Neurodiverse children, piloting inclusive behaviour change programmes and larger-scale research studies.

Key findings

All families wanted their children to be able to travel actively, with many seeing benefits specifically related to children's conditions and impairments, such as building strength and stamina and releasing energy.

However, parents identified a range of challenges associated with travelling actively to school which are less commonly cited in the existing active school travel literature. These include:

- **Differences in children’s awareness and focus:** leading to significant concerns from parents around children’s safety from road traffic and personal safety.
- **Differences in sensory processing:** including sensitivity to bright lights, noise, crowded places, and cold - making some environments challenging to navigate.
- **Differences in children’s balance, motor skills, strength and stamina:** leading to difficulties with learning to cycle, walking on uneven surfaces and tiring more easily than others.
- **Journeys taking longer than they may for others:** due to differences in focus, stamina, mobility and anxiety about attending school. This also makes getting out of the house on time challenging.

Recommendations from participants

Parents and children suggested various changes to the design of streets and spaces that would make it easier and more pleasant for them to travel actively. These include:

- More **controlled crossings** and **lollipop people**.
- **Fewer vehicles on the streets around schools** through measures such as park and stride and modal filters.
- **Wider and less uneven footpaths**.
- **Patterns and signs on footpaths** directing children towards the school.
- **Safer cycling infrastructure** on routes to schools.

These largely indicate that actions already being taken to encourage active school travel, such as school streets, are likely to positively impact upon neurodiverse children.

Participants were also keen for activities and training around active travel and had suggestions for how these should be run to take account of their children’s needs:

- **Small group** or **one-to-one** sessions.
- Sessions done **over time** to build relationships.
- **Providing information** about what will be done in sessions beforehand.

- **Breaking down instructions** into small sequences.
- Training focused on patiently **teaching the motions of cycling and how to balance.**

1. Introduction

1.1 Background and research aims

This report explores Disabled children's experiences of school travel, with a particular focus on Neurodiverse children. In recent years there has been a growing body of research exploring children's active school travel and what can be done to increase this. However, very little of this literature has focused on the specific experiences of Disabled¹ children and even less on Neurodiverse children's experiences (Ross and Buliung 2018). This is a significant omission given that research has shown that Disabled children who attend mainstream schools are more likely to get to and from school by car or taxi than their non-disabled peers (Flavell 2020).

Similarly, among the increasing research interest in the needs of Disabled people in relation to active travel, little of this has considered Disabled children specifically. Disabled people and children are often discussed as two distinct groups, rather than recognising their intersections (e.g. Verlinghieri 2022; Burns et al. 2020). It's also worth noting that Neurodiversity has also had a very limited focus within existing literature on Disability and active travel.

These bodies of literature have also been accompanied by current trends in transport policy and practice. Making spaces more accessible to Disabled people and encouraging active school travel are key priority areas for Transport Scotland (Transport Scotland 2019). However, without more exploration

¹ We are capitalising the words 'Disabled' and Neurodiverse to signify a collective cultural identity and as a 'political description of the shared, disability experience that people with impairments face in society' (Disability Rights UK). This is in line with the Social Model of Disability, discussed in [section 1.2.1](#).

of Disabled children's experiences, including Neurodiverse children, there is a risk that these initiatives may miss the specific needs of this group.

This project fills this gap in research, through exploring how families with Neurodiverse children experience journeys to and from school. In doing so it answers the following research questions:

1. How do families with Neurodiverse children experience journeys to and from school?
2. What are the barriers of active school travel among families with Neurodiverse children?
3. Where families with Neurodiverse children are travelling actively to school, why is this the case?
4. What could be done to support families with Neurodiverse children to travel actively to school?

1.2 Our approach to disability

1.2.1 The Social Model of Disability

This research project is framed and informed by the [Social Model of Disability](#). This model establishes that people are not disabled by their impairment or difference, rather they are disabled by barriers in society. These can include barriers such as disabling and inequitable environments, social attitudes and institutional norms. This model thus moves focus onto the need for societal and systemic action to remove these barriers to enable Disabled people's full inclusion in society.

1.2.2 A focus on neurodiversity

This research took a pan-impairment approach, inviting participation from any families who considered their child to be Disabled or have additional support needs stemming from a long-term physical, mental or sensory impairment or condition. However, the sample we achieved was entirely made up of

Neurodivergent children – shifting the focus of our research to neurodiversity.

Neurodiversity refers to the difference and variation in the ways that people’s brains function and process information. It is generally used as an umbrella term to describe a range of neurological differences including hyperactivity disorder (ADHD), Autism, Dyslexia, Dyspraxia, Tourette Syndrome and others. Individuals with these differences may identify as Neurodivergent.

Research shows that travel behaviour and the challenge and enablers of active travel differ vastly between Disabled people, and particularly between those with different conditions and impairments. Therefore, a more focused approach enables drawing out the specificities of experiences over a pan-impairment approach. The literature review also highlights that neurodiverse children’s travel experiences is a particularly under researched area.

1.2.3 Disabled children in schools in Scotland

In the school system in Scotland, the term ‘Additional Support Needs’ (ASN) is used to describe those who may find it difficult to be able to benefit fully from school education without additional support. Such needs can arise from a variety of circumstances including family circumstances, social and emotional factors, health or disability needs or language barriers.

27.7% of primary school pupils have ASN in Scotland, with the vast majority (93%) spending all their time in mainstream classes (Scottish Government 2023). Around 77% of ASN are a result of learning disabilities or difficulties; physical impairments, physical or mental health problems or neurodiversity such as autism or dyslexia² (Scottish

² The exact categories used included; Learning disability, Dyslexia, Other specific learning difficulty (e.g. numeric), Other moderate learning

Government 2023). Focusing in on neurodiversity, the Scottish Government estimate that around 10% of pupils in Scotland have neurodevelopmental differences (McLeod 2021). These statistics highlight the high prevalence of children with long-term physical, mental, or sensory impairments or conditions in Scotland. It also highlights that the majority of these children attend mainstream school.

1.2.4 Who we involved in our research

This research focused on primary school aged children. This reflects the fact that much active school travel policy and practice has been aimed at this age group. Thus, this research gathers insight into whether the activities and schemes aimed at primary school work for Disabled children.

Furthermore, this research focuses on children that attend mainstream school. This is because there is often specific provisioning for transport in ASN schools, and although understanding transport experiences in these circumstances would provide valuable insight, this would be better suited to a separate research project. Furthermore, Disabled children in mainstream schools may be considered a hidden population since disability may not be at the forefront of thinking when working to encourage active travel within mainstream schools. As section 1.2.3 highlighted, most children with ASN in Scotland attend mainstream schools.

1.2 Methodology overview

The research took a qualitative approach to exploring families' experiences, involving both parents/carers and children in the research. Research methods and participants included:

difficulty, Visual impairment, Hearing impairment, Deafblind, Physical or motor impairment, Language or speech disorder, Autistic spectrum disorder, Physical health problem, Mental health problem.

- Nine parents, from eight families across Scotland. Eight took part in a semi-structured interviews and one responded to questions in writing.
- Four children, from three of these families. All four completed a research activity booklet and three also took part in a short interview about their booklet.

More information about the methods used in this research can be found in the [methodology](#) section of this report.

2. Literature Review

In order to understand the context of the research, a review of the existing literature on the topic was undertaken. The review initially explores Disabled children's travel, followed by a focus on school travel for non-disabled children. It then reviews some of the key literature surrounding active travel among Disabled adults. For a full description of the approach to reviewing the literature, see the Appendix.

2.1 Disabled children's travel

2.1.1 Active school travel

Over the past two decades there has been increasing research interest in the topic of children's active and independent school travel (e.g. Carver et al. 2013; Pang et al. 2017; Wangzom et al. 2023). However, as Ross and Bulliug's (2018) systematic review of this literature highlights, very little of this research has focused on the specific experiences of Disabled children. This is despite an increased research interest in how other forms of social difference, such as gender or socio-economic status, shape travel to and from school (e.g. Brown et al. 2008; Fulkner et al. 2010). For example, the Scottish Government (2016) research report 'Tackling the School Run', expands upon gender, however, makes no reference to disability or additional support needs.

The research that exists on Disabled children's school travel has tended to focus on experiences of accessible school bus provision, rather than thinking about more active modes of travel (e.g. Ross et al. 2022; Chan, Senserrick and Saggars 2022; Buliung et al. 2021). This is a key gap in the research, considering that a 2020 survey of Disabled children's participation in sport and physical activity in England showed that Disabled children are more likely to get to and from school

by car or taxi than their non-Disabled peers (Flavell 2020)³. This finding was mirrored in Easton and Ferrari’s (2015) study of school travel in Sheffield, England, which found that ‘the flag for SEN-statement or “school action plus”⁴ status was significantly inversely associated with walking or cycling to school.

2.1.2 Everyday travel

Research examining Disabled children’s experiences of walking, wheeling, cycling and taking public transport for everyday travel may give some insight into potential experiences of active school travel. However, this body of research is also small, and a few studies are focused specifically on a UK context.

Much of the existing research has focused on children with mobility impairments. This includes Strafford et al. 2019’s study of Australian 10–12-year-olds. They reported that children wanted to move about their neighbourhoods, but there were various issues with the design of streets which limited their ability to do so – particularly without their parents. This included absent footpaths, poor maintenance of footpaths, fear of traffic danger, high vehicle speeds, poor crossings and lack of dropped kerbs. They emphasised the compounding effects of being a child and being disabled, arguing that street design privileges both ‘able’ and ‘adult’ bodies.

Similar issues with inaccessible environments were identified by Stephen et al. (2017). Their study also highlighted “the impact of seemingly small missing links in the chain of accessibility, as it only takes one stairs or one narrow door to

³ The study found that 39% of Disabled children travelled to school by car or taxi compared to 24% of non-disabled peers. 32% of Disabled children walk or wheel to school compared to 52% of non-disabled peers. They are also less likely to use public transport (10% compared to 13%), whilst a similar percentage cycle (4% compared to 5%).

⁴ This was a term used to describe stages of extra support for students in schools in England. Since 2015 this has been replaced with the term SEN.

render an entire place or activity inaccessible to a disabled child” (Stephen et al. 2017: 595).

Landy’s (2019) and Pyer and Tucker’s (2017) studies both similarly look at the everyday travel of children and young people in wheelchairs but focus on public transport. They also reported multiple issues with the accessibility of services including the presence of steps, frequent occupation of wheelchair priority spaces by pushchairs or luggage, and adaptations to public transport that catered to the size of adult’s wheelchairs rather than children’s. Even when journeys were labelled as accessible, they remained inaccessible to Disabled children, both through physical barriers and the anxiety about becoming stuck and not being able to reach destinations. Children also often had to transport additional equipment like walking aids or medical devices.

These issues meant that children were only able to overcome barriers to travel if there were multiple adults to aid them. Accessible taxi services could be made use of, but there was a significant monetary and time-cost involved in doing so. Thus, most children in both studies tended to travel with parents in specially adapted vehicles – even when families previous had commitment to not owning cars or travelling on public transport.

There have also been several studies focusing on the experiences of visually impaired young people (Worth 2013; Middleton and Byles 2019). Young people in these studies highlighted numerous barriers to moving around by themselves including the presence of street furniture and clutter, crowds of people moving at unpredictable speeds, unfamiliarity with the area, speed and rhythms of bus/train doors, poor transport assistance, parking on pavements and the high cost of cab fares. Significantly, they found these barriers changed in different spaces and at different times. For example, travel became more difficult when in a rush, at busy times and in locations with low levels of light. Both papers looked at strategies young people use to navigate these issues. This included travelling with trusted friends, asking for assistance from the public, using navigation apps and technology, use of guide dogs.

Smith et al.'s (2021) research expands from these studies to look at the mobility barriers and enablers for Disabled children and young people in Aotearoa, New Zealand, including participants who are mobility impaired, blind or low vision, and D/deaf or hearing impaired. They found substantial variability in the mobility enablers and barriers between participants with mobility, vision or hearing impairments, but also within these group - highlighting the need to not homogenise the experiences of Disabled children.

However, what united these groups was that mobility practices are often 'fragile', meaning that arrangements that worked one day might not the next. This was due to a range of factors including weather, variability in physical condition, financial cost, the availability of trusted people to support and psychological readiness to handle 'everyday ableism' - including staring, questioning and the need to 'prove' disability to access services. Another common thread was the considerable mental load of trip planning. Making a trip includes having to think through each part of the journey in detail and problem solve for multiple potential issues along the way. This meant that trips were often not taken.

While Smith et al.'s (2021) research highlights many differences in the enablers to mobility between different disability types, they could broadly be ordered into six different categories:

- **Relationships and social support** (e.g. friends considering accessibility when planning social events, bus drivers helping children onto buses, support from members of the public when crossing the road)
- **Education and health systems/services** (e.g. formal orientation and mobility training; access to sign language interpreters, occupational therapists; disability services in the community)
- **Technological, informational, aids** (e.g. hearing aids; mobility equipment; smartphones; guide dogs; voiceovers on trains)
- **Physical environment** (e.g. ramps; smooth services; places to rest; obstacle free paths; good weather)

- **Transport systems** (e.g. ramps to board trains; taxis; circular bus routes)
- **Policy** (e.g. transport subsidies: regulation around where guide dogs are allowed).

Similarly to Worth (2013) and Middleton and Byles's (2019) papers, this research highlights that there are multiple different layers affecting travel for Disabled children.

2.1.3 Neurodiverse children's travel

What has been missing from this discussion thus far is a focus on the experience of children with 'non-visible' disabilities, including Neurodiverse children. Indeed, very little research has been conducted in this area.

One exception is Tootle et al.'s (2022) study into the facilitators and barriers to road safety education, among children, aged 7-13, with autism, ADHD and learning disabilities. This study found multiple barriers to navigating the street environment on foot, not identified in the research described above. These included difficulties related to children's awareness of their own surroundings, with some being distracted by their own interests. Impulsivity and impatience could also cause some children to run ahead or cross streets before it was safe to do so. Some children also experienced challenges relating to sensory processing, including finding environmental noise overwhelming. The anxiety about unexpected events such as encountering dogs or large groups of young people could also be overwhelming for some.

Caregivers also expressed concern that some children were unaware of danger and had limited understanding of personal boundaries and personal safety that they worried may put them in dangerous situations. Challenges with coordination could also mean children were prone to tripping and falling whilst some also found navigation of routes difficult.

2.2 School travel among non-disabled children

Given the limited research conducted about school travel among Disabled children, it is worth briefly reviewing the literature about children's active school travel more generally as these may overlap with the experiences of Disabled children. As Ross and Builiug (2018) point out, much as been written in recent years about children's active school travel. This has generally highlighted a decline in active travel to and from school over the past 30 years, including within Scotland (Scottish Executive 2002; Living Streets 2017).

This literature has found a variety of influences on children's school travel including:

- **Distance from school** (Transport Scotland 2021; Panter et al. 2008)
- **Parental perceptions and attitudes** towards active travel, personal safety, safety from road traffic, time constraints and convenience and their child's capabilities (Panter et al. 2008; Lee et al. 2013)
- **Children's perceptions** of safety, image and comfort (Line et al. 2012; Vasey et al. 2022)
- **The built environment**, including safety of crossings, presence of safe cycle infrastructure and land use (D'Haese et al. 2015; Steinbach et al. 2012; Pather et al. 2008)
- **Social factors**, including having friends to travel with and neighbourhood trust (Vasey et al. 2022; Kirby and Inchley 2009; Bishop et al. 2024)

It is important to acknowledge that these factors are not experienced uniformly. Gender, socio-economic status, age, location, and ethnicity have all been found to have influences on how children travel. For example, research has consistently found that as socio-economic status decreases, rates of active travel increase (Medeiros et al. 2021). However, this has been largely attributed to disadvantages in circumstances such as

the prohibitive cost of cars or public transport. Thus, active travel is not necessarily something chosen but rather done because other options are not available. This highlights the importance of making active travel safe and accessible for those who have no alternative. Studies have also found walking levels to be relatively similar across genders, however, girls use cycles far less than boys (Department for Transport 2023; Line et al. 2012)

Examining the intersecting factors affecting school travel is important as Ross and Builiug (2018: 365) highlight “children’s experiences of disability during school travel are not divorced from gender and age; rather, disability is experienced alongside them and affected by their associated mobility and mode choice norms”.

2.3 Active travel among Disabled adults

Whilst the body of work exploring Disabled adult’s experiences of travel is too vast to discuss in detail, key insights related to active travel are summarised below.

A repeated finding is that Disabled people overall make fewer trips than non-disabled people (Sustrans 2023; Motability 2022; Park et al. 2023; Department for Transport 2017; Transport for All 2023). Research also shows that Disabled people cycle much less than non-disabled people (NTA 2023; Sustrans 2021). Although these averages mask large variety in the behaviour and attitudes of those with different types of impairments – again pointing to the need to not homogenise this group (Department for Transport 2017). For example, for some Disabled people cycling can be more accessible and easier than walking and wheeling, with some considering

cycles as mobility aids⁵ (Transport for All 2023; Wheels for Wellbeing 2017).

A recent survey by Transport for All (2023) found the main reason Disabled people do not make as many journeys as they would like is down to access barriers – barriers which exist at each stage of a journey. Common barriers to walking, wheeling and cycling can be summarised under several broad categories⁶:

- **Inaccessible environments** (e.g. poor pavement quality, street clutter, pavement parking, crowded pavements, cycle infrastructure unsuitable for adapted/non-standard cycles)
- **Personal and social factors** (e.g. facing discrimination and stigma, fear of losing benefits; constraints on stamina and strength; fear of falling; cost of transport)
- **Technology, equipment and information** (e.g. lack of accessibility information; difficulty obtaining mobility aids; lack of accesses to carers or personal assistants, lack of safe storage, cost of adapted/non-standard cycles)⁷

Commonly discussed enablers to making it easier for Disabled people to walk, wheel and cycle can also be broken down into similar categories:

- **Creating more accessible environments** (e.g. improving pavement quality, stopping pavement parking, improving crossing points, improving integration of walking/wheeling with public transport)
- **Improve access to technology, equipment and information** (e.g. making wayfinding and journey

⁵ Although it should be noted that cycles are not formally recognised as mobility aids and are not available from NHS wheelchair services and not available on the Motability Scheme. This makes it challenging for some Disabled people to use public infrastructure, take cycles on public transport and risks benefit penalties.

⁶ These categories were adapted from across multiple studies including (TfA 2023; Sustrans 2023; Park et al. 2023; Motability 2022; WfW 2017; Shen et al. 2023; Zaluska et a. 2022; Clery et al. 2017).

⁷ These categories were adapted from across multiple studies including (TfA 2023; Sustrans 2023; Park et al. 2023; Motability 2022; WfW 2017).

- planning tools work for Disabled people; improve access to mobility aids, subsidies for non-standard cycles)
- **Policy and public changes** (e.g. official recognition of cycles as mobility aids; re-education of road users; transport designs, guidance and legislation co-designed with Disabled people).

This shows many of the same barriers and enablers as identified in Disabled children’s literature review – whilst also identifying others not previously discussed. This may be a consequence of the lack of research about Disabled children but may also point to where experiences differ. Thus, investigating the experiences of Disabled children specifically could help uncover previously unobserved issues and bring forth new solutions to increasing active travel.

2.3.1 Active travel and neurodiversity

Neurodiversity has had a limited focus in the broader literature about Disabled adults travel – mirroring its treatment in Disabled children’s mobility research. The literature has highlighted a variety of challenges Neurodiverse people face when navigating travel and public spaces.

Many of these relate to the sensory environment, as differences with sensory processing are a key element of neurodivergence. Encountering crowds, smells, noise, pollution, heat or cold, overly bright light or frequent shifts between light and dark are more challenging for this population to navigate (Pau, et al. 2023; McAllister et al. 2022; Toronyi 2019). Sensory overload can cause people to lose focus, have a harder time processing information, cause anxiety and emotional overwhelm, creating the need to reset and recalibrate. However, this differs from person to person as “for every sensory stimulation that some participants find overwhelming there will be others who find the stimulation important to say focused” (Pau et al. 2023: 32). For example, sensory stimulation may help some people with ADHD to keep present and focussed.

Wayfinding can also be a challenge for neurodiverse people – relating to difficulties with orientation, comprehending signs and directions, and remembering routes (Pau et al. 2023; McAllister et al. 2022). Furthermore, unexpected occurrences, such as road works or public transport delays can cause difficulties for some neurodiverse people. Such events take up significant energy to deal with. Some people report anxiety around not knowing how they will react to them and the possibility of showing behaviour that are seen as unacceptable (Pau et al. 2023).

Research has also described multiple strategies used to avoid or overcome these barriers. A lot of time is spent planning and preparing journeys, including planning routes to avoid crowded places or unpleasant sensory environments, packing items necessary to create sensory comfort, memorising routes and creating backup plans to account for fluctuating energy levels (Pau et al. 2023). Green and blue spaces were particularly sought out – with individuals finding them calming and replenishing. Opportunities to sit, preferably in quiet places, were also described as important for grounding, replenishing energy, and distracting from intrusive thoughts.

There is limited data on mode choice among Disabled people. Pau et al. (2023) research indicated that for many neurodiverse participants in their study, walking was their preferred mode of choice because of the opportunity to be in less sensorily stimulating environments than public transport. Taxis were used to avoid getting lost and to manage physical and mental exhaustion. Bicycles were described by a few participants as giving them a sense of autonomy as they could largely cycle by themselves to where they wanted. However, no other research specifically explores the experiences of Neurodiverse people cycling.

In their participatory research project, Pau et al. highlighted several design choices that their participants desired from streets, including:

- Quiet places which provided opportunities to pause, recalibrate and breathe

- Sensory stations with interactive elements such as calming water features, textured walls and fidget objects
- Seating and comfortable furniture
- Public toilets and rest rooms
- More greenery on streets
- Safer streets, with well-marked pedestrian crossings and segregation between modes
- More tools to aid navigation, including incorporating sensory information on navigation apps.

Several of these ideas overlap with design features identified in the wider literature on inclusive design, such as crossings, public toilets and seating. However, others are more novel ideas, highlighting the specific needs and desires of Neurodiverse people in public space.

2.4 Summary

This literature review has summarised the existing research around Disabled children's school and everyday travel, non-disabled children's school travel and Disabled adult's travel. In doing so, this review suggests that Disabled children are likely to face a variety of barriers when travelling actively to school which stem from multiple spheres. These include, inaccessible street environments, the impact of others' perceptions and attitudes on travel behaviour and difficulty accessing information and technology.

This review also focused in on the existing research about Neurodiverse children and adult's experiences of travel. This brought out several issues not present in more general reviews of disability and travel. These particularly related to challenges with sensory processing, unexpected occurrences, and wayfinding. Many of these findings were shared across the research with adults and children. However additional issues were brought out in the children's study relating to impulse control and traffic danger and perception of personal safety. This suggests that there may be additional or different challenges and needs among neurodiverse adults and children.

The review also highlighted several important gaps in the literature that the present study begins to address. First, this research focuses on the experiences of neurodiverse children which have had very limited attention previously. Second, it focuses on the school travel context, placing the experiences of neurodiverse children in the increasing literature around active school travel. Finally, the study in part focuses on the experience of cycling among neurodiverse children – which has not been looked at previously.

3. Findings

3.1 Who we heard from

Eight families took part in our research. The experiences of 10 children were discussed by parents, as some families had more than one Disabled child or child with additional support needs. Families were spread across different areas of Scotland. Four families lived in the suburbs of cities including Edinburgh, Aberdeen, and Perth. Two families lived within mid-sized towns within the south of Scotland, whilst two lived in villages outside of Edinburgh. The age, gender and information about the children's impairments and conditions are summarised in [Table 1](#) of the methods section. All participant names have been replaced with pseudonyms.

This table shows that the research includes families with children from a range of ages between 7-12 and a relatively even mix of genders (4 male, 6 female). It also shows that a range of forms of neurodiversity and impairments were represented in the research, with children often having multiple and intersecting conditions. This is to be expected as many of these conditions frequently co-occur. Most children discussed in the research are Autistic (8 out of 10). Three children have dyspraxia and three have hypermobility or issues with joints. Two have ADHD, two have sensory processing issues⁸, one has asthma, and one has incontinence.

⁸ This was also discussed more broadly as a presentation of autism by more parents, as will be mentioned in the findings section of the report.

Table 1. Participant characteristics

Parent Pseudonym	Child Pseudonym	Child's age	Child's gender	Area of child's condition, illness or impairment ⁹	Further information
Craig	Charlie	9	Male	-	Autism, ADHD
Richard	Olivia	8	Female	-	Autism
	Willow	8	Female	-	Autism
Meera		8	Female	-	Autism, ADHD
Fiona		12	Male	<ul style="list-style-type: none"> • Mobility and balance • Dexterity • Learning or understanding or concentrating • Stamina or breathing or fatigue 	Dyspraxia
		8	Male	-	Dyspraxia
Louise	Noah	10	Male	<ul style="list-style-type: none"> • Mobility and balance • Learning or understanding or concentrating • Socially or behaviourally 	Autism, hypermobility, sensory processing, incontinence
Donna		7	Male	<ul style="list-style-type: none"> • Learning or understanding or concentrating • Socially or behaviourally 	Autism, asthma, issues with joints
Sarah		10	Male	<ul style="list-style-type: none"> • Socially or behaviourally • Mobility and balance 	Autism
Melissa		8	Female	<ul style="list-style-type: none"> • Mobility and balance • Dexterity • Mental health • Stamina or breathing or fatigue • Socially or behaviourally 	Autism, dyspraxia, hypermobile joints, sensory processing difficulties

⁹ At the point of sign-up parents were asked to select the broad area of their child's condition or illness. This has been supplemented with additional information gathered from open-text comments in the sign-up form and discussion in interviews.

3.2 Travel habits

3.2.1 Current travel to school

Participants in the research travelled to and from school in a range of different ways. Aileen and her child only travel to school by walking. Craig's child either walked, scooted or cycled to school – and was the only child to regularly cycle to school. Both Gary and Fiona largely walk, sometimes with scooters, and very occasionally drive in bad weather or if there are appointments to attend.

Louise either drives her child or they walk depending on the weather and how her child is feeling, occasionally he will cycle. Melissa's most often drives her child to school in the morning and then walks home after school. Sarah largely drives her child to and from school, with him occasionally walking or getting the bus home. Meera and Ajay only drive their child, although this sometimes includes a five-minute walk depending on where they park.

These descriptions show that walking to or from school is a regular part of most participants school travel routines, but cycling is not common and two families largely drive their children to and from school, with active travel occurring rarely. Of those families who travelled actively, only two children did this without their parents. All other children were accompanied by their parents as they travelled.

3.2.2 Aspirations for school travel

Parents were asked how they would like their children to travel to school and how they expected it to change in the future. All parents said they would like their child to continue to, or start, travelling actively. This was due to the range of benefits that they felt travelling actively brings (see [section 3.2.3](#)). Many parents said that they would like their child to be able to cycle to school, or they would like to cycle to school with their child in a cargo bike or similar cycle. Another common aspiration was that children would be able to travel without their parents, either by themselves or with siblings or friends.

“we’re trying to build his independence now, because he’s away to primary seven after summer. So he will be going up to the big school next year and I want him to be able to feel confident that he can cycle to school” *Louise*

We also asked children how they would most like to travel to school. Noah said that he would like to be able to cycle to school more often. Charlie said that although he enjoys cycling to school, he would like to get the bus. Similarly, Olivia and Willow said they would both like to be able to take the train to school.

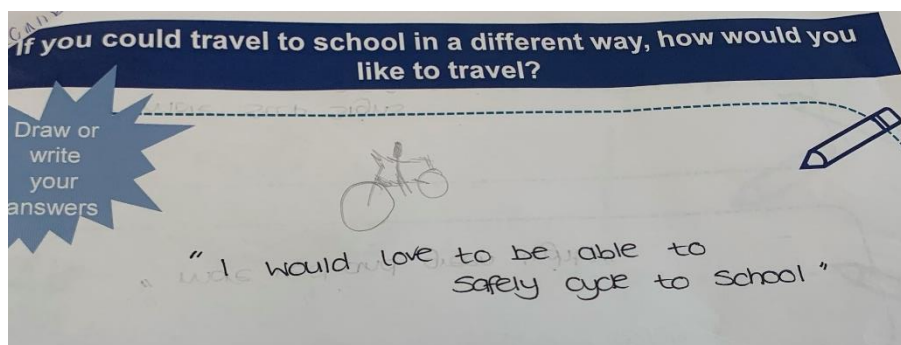


Image 1. Noah Booklet

Whether those aspirations matched their ideas of how their children’s travel might change differed among parents. Some were positive that as their children grew older and as they practiced walking to school with them, they would be able to walk to school without them. A few parents were also optimistic about their children cycling to school as they got older and more confident on their bikes. Some parents also anticipated their children getting buses as they attended high schools further away. See [section 3.4](#). for more information about what would enable children to travel actively.

Others were not so optimistic about their aspirations for travel becoming reality. This was because of a lack of safe cycling infrastructure and pedestrian crossings, alongside concerns about the safety of their children. See [section 3.3](#). more a detailed discussion about the barriers to active travel.

“Right now I can’t imagine not dropping her off to school, even secondary school. However, we have plans to obviously teach her regularly what is happening and stuff like that. So it’s not we’re not thinking positive, we’re just trying to be realistic with what we have, so we are only going with what she has shown us, and she’s shown us that she’s not up to the level yet.” *Ajay*

3.2.3 The benefits of active travel

Parents observed or anticipated a range of benefits associated with travelling actively to school. These most commonly related to health and wellbeing. Such benefits are well established in the literature about active school travel (e.g. Ramanathan et al. 2014; Stark 2018). However, participants’ felt that there were particular benefits that related to their child’s condition or impairment. For example, some felt that walking or cycling to school may improve issues with balance, strength or stamina and enable their children to feel more confident to be active.

“We were told by his consultant at the hospital that cycling and swimming is the best exercise for hypermobility” *Louise*

This was exemplified well by Melissa, who used to walk to school with her child but had to stop for a variety of reasons. Over this time Melissa observed her child’s mobility issues worsen, and wondered whether this may in part be because they stopped walking to school. Melissa commented on the minimal opportunities for physical activity and time outside that her child has – further emphasising the potential health benefits of active school travel. This concern also shared by several other parents.

“This occasional walk home and the occasional times that we get her out on the weekend, that’s the only vitamin D she’s getting, [...] it’s an opportunity for movement that we don’t often get because of her difficulties” *Melissa*

Parents also suggested that they felt travelling actively to school gave children time to adjust between home and school – which one parent said was particularly beneficial for his autistic child. Another parent of children with ADHD said that they appreciated the walk or scoot to school as a space where they could release energy.

“It gives him that five minutes, especially with his autism, going from setting to another setting. So he’s got five minutes to either walk to school, or cycle to school, scooter, and just that five minute clearing his head, doing what he wants to do, no rush, no stress, and I think he benefits mentally from that as well,” *Craig*

Alongside building children’s confidence in active travel, some parents also reflected that walking to school with their children may enable them to grow more confident in their child’s abilities. Some parents saw journeys to school as testing and training grounds for how to build up skills in safely navigating public space.

“What I tend to do now is make her walk by herself while I walk behind her, kind of teaching her self-awareness and taking care of herself while walking in public.” *Ajay*

Another benefit mentioned by several parents was the opportunity to catch up with their children and for children to talk and play with friends who shared the same routes.

This was also expressed by children as all four said they liked walking to school because they got to see their friends. Noah and Charlie also both talked about enjoying cycling to school because they thought it was fun – commenting on liking doing tricks, going fast and ‘*annoying people with my bell*’.

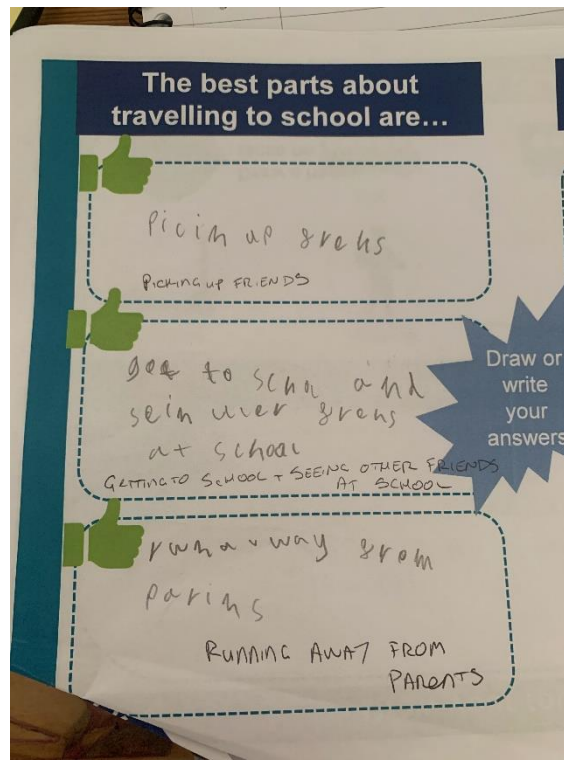


Image 2. Willow's booklet

A few parents were also motivated to travel actively as they did not want to contribute to what they saw as the problem of too many cars on the road and outside of school gates.

3.3 Challenges associated with active school travel

This section discusses the challenges faced by families when travelling actively to school. For some, these consisted of barriers which prevented them from walking, scooting or cycling to school, whilst for others they created challenges which made active school journeys more difficult. Some of these challenges are well established in the wider literature about active school journeys. However, they are more pronounced or present differently for families with neurodiverse children. Other challenges discussed are more unique to the experience of neurodiverse children.

It is also important to note that, following the Social Model of Disability, the challenges discussed in this section are not positioned as issues created and to be overcome on an individual level within families. Rather, the challenges explained here are created and exacerbated by the support that parents receive and the design of streets, spaces and institutions.

3.3.1 Getting out of the house

One of the first barriers parents described encountering is getting out of the house on time in the morning. For example, Meera said that one presentation of her child's ADHD is that she gets distracted by her own interests – meaning she loses focus on getting ready for school. Other parents described the challenges of getting out of the house relating more to the emotional state of their children – particularly how tired, nervous, overwhelmed or excited they are.

For example, Melissa commented that her child struggles at school with “masking¹⁰ in front of her peers, dealing with all the kind of sensory inputs, that is all really exhausting for her”. Thus, her child often has ‘meltdowns’¹¹ in the mornings related to feelings of anxiety and exhaustion about attending school. Melissa also described that when they have chosen to walk to school, these emotional struggles would continue as her child would do a lot of “stopping the street, sitting down and refusing to go”.

Combined with the fact that Melissa also has another two young children, she feels they had no other option but to drive to school, due to the risk of being late. However, Melissa does walk home from school with her child, as the lack of time

¹⁰ Masking refers to suppressing certain behaviours, or mimicking the behaviour of others around, due to social norms to not appear different (Belcher 2022)

¹¹ This was a phrase used by multiple parents. Generally, it's used to describe “an intense response to an overwhelming situation”, where someone may “temporarily lose control of their behaviour. This loss of control can be expressed verbally (e.g. shouting, screaming, crying), physically (e.g. kicking, lashing out, biting) or in both ways” (NAS 2020).

pressure combined with the fact that her child is travelling home, where she feels safe and comfortable, makes this easier.

“It would take so long to get her ready that it would already be five to nine before we even got her out of the house. Some days it was as late at 10.00 we would get her into school. So, you kind of felt you have to just get in the car and go. And it just evolved to the point where we’re driving every day now to school.” *Melissa*

3.3.2 Awareness and focus

One of the most discussed difficulties with travelling actively to school by parents were challenges relating to their perceptions of their child’s awareness and focus. A common phrase among parents was that they felt their children have “no awareness of danger” when it came to crossing roads. Parents described that their children often find it challenging to remember to wait at crossings and to take the time to look to see if it is safe to cross. Some parents also commented that their children find it difficult to judge how quickly vehicles travel or how far away they are – and thus whether they have adequate time to cross.

“Even when we give her clear instructions as to look right and left, she is either not taking her time to do it, or she’s just doing it as a step, one of those things you do by heart, or something like that. Basically she shakes her head, right / left, and then she runs.” *Meera*

“he has ASD and this can have an impact on how he views roads. He loves cars and this can cause him to totally forget his road safety (or the lack of it) and he has been known to jump in the road.” *Sarah*

Parents very much saw these challenges as presentations of their child’s neurodivergence and the ways in which they process and react to information. For example, they described that children could often be focusing on other things in the

environment or struggle processing instructions related to road safety.

These challenges with awareness and focus are affected by children's emotional state – making these difficulties variable. For example, being excited about seeing a friend on the other side of the road could mean that children rush across the road. Being nervous or overwhelmed could also mean that they find it more difficult to process what is happening in their environment.

“when he's... especially if he's angry with someone, say I haven't given proper breakfast, or not done his normal routine, he leaves here in one of his moods, it can be a challenge to ground him, to get him back to his learning state of mind. And when he is in that fixated mindset it can be a challenge, and it can be a risk for him crossing the road as well” *Craig*

This made it challenging to navigate environments which high volumes of traffic or with fast moving traffic, as parents felt their children were more at risk. This was especially the case for roads without pedestrianised crossings, although some also said that their children would often not wait for the green man at signalised crossings. Parents described feeling more comfortable with their children walking or cycling on quiet roads with little traffic. This was also echoed in children's answers as Charlie described that one of the worse parts about travelling to school was the cars. Concerns over awareness, focus and road safety were parents' main reason for not feeling comfortable with their children travelling without them.

“they've got very little awareness of danger, and most of the roads are fine for them to cross but there's one big, main road, it does have a crossing, but we're just not comfortable with them crossing it on their own, so they need a parent with them.” *Richard*

Another aspect of awareness and focus present in parents' narrations were concerns about the fact their children could often get distracted and focus on things that interested them in the environment - losing focus of the fact they were travelling to school. This could make journeys longer, for example, Louise described her journeys take longer as her child likes to stop and touch leaves on the way. This also meant that parents had concerns over their children's personal safety –further contributing to their uncomfortableness about their children travelling without them.

“She can just follow people, pets or something that is of her interest, she hyper focusses and then she can just walk behind that and then just kind of forget, even kind of forget us.” *Meera*

“I would love to be able to just let him get out that front door and cycle to school and know that he's safe, but he won't, he'll do a detour, or this road looks good, I'll go down this road. He will, he'll go for a wander and he'll never make it to school.” *Louise*

Parental concerns relating to road safety and personal safety have both been identified as key determinants of how children get to and from school in the wider literature (Panther et al. 2008). This section shows these determinants are particularly pronounced and have different dynamics when concerning neurodiverse children.

3.3.3 Sensory challenges

Around half of the parents in the research described differences in the ways their children process and react to sensory inputs, because of their neurodivergence. This manifested and affected the school journey in different ways.

For example, Meera and Ajay described that their child was very sensitive to light. This made it difficult for her to fully take in her surroundings - exacerbating challenges with awareness and focus.

“Light is a big thing, she’s extremely sensitive to light, and that causes her to squint and then just stop and she just can’t concentrate, and she just cannot keep her mind on what she’s doing. Then she won’t walk, or she lacks awareness of what’s going on around her, she’s not taking it in because of the light.” *Meera*

Melissa’s child’s sensory differences were more focused on noises. She described that loud noises, such as sirens or vehicles revving, could be distressing for her child and cause her to “scream and shout”. These events would make her child reluctant to walk to school, at least for a few days whilst the memory was recent. Melissa attempts to reduce the risk of this by taking a longer walking route avoiding main roads. However, this is not possible when Melissa has to bring her younger children, as a bridge on the route is not accessible for buggies..

Melissa also described that her child finds walking on narrow, busy footpaths overwhelming. This was a particular problem on the footpaths outside of school. Melissa described that her child’s abilities to cope with these sensory environments is very dependent on whether “she’s feeling burnt out, having a bad day”. This added to the unpredictability of how walks to and from school would be.

“Yeah, and the crowded issue as well, like if you’ve got a narrow pavement and it’s a lot of children trying to filter out of school, that sensory overload of being penned in by people and all the shouting and squealing from the kids. You’re never going to totally escape that but it’s definitely worse when you feel that you’re in a little narrow, uneven pavement and there’s cars whizzing by at 30mph as well.” *Melissa*

Another sensory factor mentioned by several parents was the weather. They described their children finding it difficult to be outside in the rain, or the cold, or in bright sunlight. Whilst the weather is often cited as a reason behind families’ decisions about how to travel, these comments highlight that weather

conditions may be particularly impactful on how neurodiverse children travel.

“he doesn’t like being cold or getting wet, so if the weather is bad we will usually take the car else he gets stressed and doesn’t want to walk” *Louise*

3.3.4 Balance, strength and stamina

Another common theme affecting how families experienced walking, scooting and cycling were differences in children’s balance, strength and stamina. This related to aspects of children’s impairments and conditions, particularly dyspraxia, hypermobility and autism.

This impacted walking in a number of ways. First, several parents described that difficulties with balance, coordination and motor skills made navigating stairs or pavements with uneven surfaces challenging. This meant children walked at a slower pace than others and felt less confident when walking. Second, and relatedly, several parents observed that their child tired more easily than others when walking.

“I find it hard to get him walking, because even walking he finds it difficult, he’s always tripping over, falling over, on the way and back from school. So it takes us longer than the average person to get back home from school, and it’s quite a short distance, it’s only like a five / ten minute walk, which turns out to be 25. It’s just the pace he goes at, he’s very slow at walking, he’s not very confident on his feet or his legs.” *Alieen*

These issues made cycling and scooting particularly difficult for several children. Some found it difficult to get the hang of the motion of propelling the pedals or scooter and lacked the strength needed to do so. Balance was also a difficulty when cycling and made controlling the bike difficult. One parent said they had considered trying an adapted cycle which may be

easier for her child, but worried that she would be too aware of seeming different from her peers.

“getting him to do the actual motions and cycle confidently. He finds it very hard to push on the pedals and make himself go forward. I think it’s the lack of strength to actually do that push and then getting his head around the motion [...] the issue is he struggles with is he tends to back pedal an awful lot and thinks he can go forward, really quickly” *Alieen*

For some this meant that their children didn’t cycle at all, whereas for others it impacted children’s confidence, and parents’ confidence in allowing children to cycle in certain places, such as roads.

“If he was more confident on his bike I would feel differently about [letting him cycle to school], but certainly the balance is just a real concern, that he doesn’t really have amazing control of the bike all the time.” *Fiona*

However, these challenges were not seen as reasons why their children would never be able to cycle, and all parents aspired for their children to be able to. Rather they described needing additional support to be able to teach their children to cycle confidently – as discussed in [section 3.4.2](#). However, many parents did not know where to get or how to access such training.

3.3.5 Additional challenges

There were several additional challenges mentioned that shaped how children travelled to school. These are more well established in the literature and are less directly impacted upon by children’s impairments and conditions.

Parents own health conditions impacted upon how they were able to travel with their children. For example, Melissa experienced health difficulties after the birth of her third child which meant that she could not walk as easily as previously.

This had contributed to decisions to begin driving to school more often.

Meera and Ajay felt the distance to school prevented them from considering walking. Furthermore, the need to trip chain and the lack of safe cycling infrastructure in their area also stopped them from feeling able to cycle.

“An ideal world, the journey would be me going on my bike, she’s going on her bike, I drop her off to school, I then go to work on my bike, that’s the ideal world. However I can’t because my work is in the city, I work actually outside the city, and her school is outside the city, so it just doesn’t work in that way” *Ajay*

The lack of safe cycling along routes to school was commented upon by several other parents as a reason why they did not feel comfortable with their children cycling to school. This was especially as children got older and parents felt it was less appropriate for them to be cycling on the pavements. This was also noted by Noah, Louises’s child – who said that he did not like the lack of cycle lanes.

“He can ride his bike but I feel he’s at an age now where he’s kind of too old to be on the pavement, he should really be on the road, and I don’t really feel that confident with him being on the road without me.” *Fiona*

Several children also described not liking encountering dog poo on the way to school, with both Olivia and Willow talking about a street they particularly disliked called ‘poo street’ – termed for the abundance of dog poo there.

3.4 Recommendations from Participants

This section describes parents and children's views about what would support them to travel actively more often and have easier journeys when doing so. The first set of suggestions describes changes to the design of streets and public spaces. The second section describes what training and activities parents feel would be helpful and how the delivery of these could more inclusive.

3.4.1 Changes to the built environment

The most commonly suggested change to the built environment was more controlled crossings – particularly on main roads and outside of schools. Several parents also wanted more lollipop people. Some children also described wanting more zebra crossing and lollipop people, so they felt safer and did not have to wait to cross the road.

“I’ve said to the school already, I think there needs to be a lollypop person there, because the traffic just doesn’t stop, it’s just constantly moving, albeit at a slow speed, but there’s so many kids around that we’re lucky there hasn’t been an accident yet” *Richard*

Multiple parents also wanted there to be less vehicles on the streets around schools, to make walking and cycling here feel safer. Park and stride locations and road closures were described as helpful in moving cars away from the school entrance.

“just outside of the end of the street, there was like an old bridge over a Metro line that used to open to traffic and they closed that to more vehicles, which made the approach to school a lot safer because it just meant that the bridge was all for pedestrians and people with bikes and scooters. So that was really good.” *Melissa*

Several parents also said wider footways would make walking more pleasant. Less uneven footways were also mentioned to prevent tripping due to issues with balance and coordination. Noah, Louises's child, also said he would appreciate smoother footpaths to cycle on, as they currently felt 'bouncy'. He also wanted streets to be cleaner and free of glass.

"It's a hard one, because with autism you like to have space, you don't want to be bunched up, so having the wider streets is a big help." *Craig*

Meera and Louise both said that they thought patterns and signs on the footpaths that directed children towards the school may help their children stay focused and engaged in walking.

"I think, in my opinion, clear, bright kind of arrows, or something quite obvious like, 'follow this' or arrows leading you to this. Because her thing is if she hyper focusses on something and if it's something new, and it's something that leads you somewhere to a reward, it will be good." *Meera*

Additional suggestions not as commonly made included more street lighting, benches for resting, metal railings alongside footways to prevent cars parking on kerbs and to stop children from walking into the road. Suggestions from children also included better places to lock their bikes at school, more plants and colour outside of school and more lights on the way.

Multiple parents also expressed desires for safer cycling infrastructure – mostly in the form of cycle lanes. When asked about where they currently felt comfortable cycling with their children, most parents described off-road cycle paths which were wide enough for children to swerve and wobble without issue.

3.4.2 Training and activities

Most parents had ideas for training and activities that would enable them to travel actively more often. This was largely

discussed in relation to cycling, but a few described activities involving walking. One parent said he would appreciate more training around road safety. Another parent thought walks in nature may be helpful to get their child more used to walking in uneven environments.

The need for cycle training activities was a common ask among parents. Some children had taken part in, and enjoyed, training such as Bikeability. For those that could already cycle, parents wanted more training on how to cycle safely on roads.

“I think it’s a shame as well that at school they don’t really do cycling proficiency or anything anymore. I think a lot of additional needs kids would benefit from that, knowing that when you come to this part of the road, you need to stop, you need to assess what’s going on, you need to see there’s cars, etc. He doesn’t realise that and just goes straight, and will keep going, and there will be cars coming, or there will be dangers on the road and he doesn’t understand.” *Louise*

Other parents felt they needed support teaching their children how to cycle, as they had struggled to do this themselves. This tended to be the parents of children with more pronounced difficulties with balance, strength and motor skills. Cycle training which focused on patiently teaching on the motions of cycling and how to balance would be useful to them.

“I’ve tried a few times to get him to cycle and I’m like, I’m maybe going to need a little bit more support here with the cycling, as in how a bike works and stuff. But the issue is he struggles with is he tends to back pedal an awful lot and thinks he can go forward, really quickly. Maybe someone taking it step-by-step, explaining to him, to go forward, this is the motion we need to do, with our feet.” *Alien*

Parents also had suggestions for how training or activities could be run in a way that took account of their children's additional needs. These included:

- Having small group sessions or even one to ones to make children feel less overwhelmed.
- Giving information about what they would be doing in the sessions beforehand to reduce anxiety and provide reassurances.
- Focusing activities on fun, reducing the pressure on getting it right.
- Not giving instructions all at once, instead breaking them down into small sequences.

The need for the inclusive delivery of training was highlighted by previous experience of Melissa's. She had signed her child up to a five week, learn to ride your bike course, specifically for autistic children. However, her child only attended one session because she found it overwhelming. Whilst there were only two other children there, Melissa said her child would have benefited from the session being one-on-one, especially as she often found adults much easier to interact with. Furthermore, the activity took place in a large, noisy, sports hall, where other people were also doing separate activities. This contributed to her child feeling sensorially overwhelmed.

“there was only two other children at that one that we went to, but I think that was actually a massive barrier for her because when she went in and saw them, and one of them was quite a bit older and I think that was intimidating for her. You can't just have one to one for every child with needs but I feel like, if she was going to have any chance of learning, it probably would need to be a one to one situation, at least until she got to know the adult because it's a lot for her to walk into a new environment, to meet a new person and then to also see other people there.” *Melissa*

Several parents also mentioned that they really liked the idea of bike buses and felt like they would feel much more

comfortable with their children cycling to school among other people.

“I’ve seen this thing in America, and I think it’s great, it’s like a big cycle thing and they all cycle to school together on the road. They’re all in like a big line and all the traffic stops for them and they cycle to school and I think that’s a brilliant idea, but Aberdeen is just too dangerous.”

Louise

4. Discussion and Next Steps

This report has provided an insight into Neurodiverse children's experiences of travelling to school, with a particular focus on the challenges and enablers of active school travel among this group. The findings showed that most families involved in the research already regularly made school journeys using active travel – although this was mostly in the form of walking rather than cycling. The research also highlighted that all parents wanted their children to be able to travel actively to school as they observed or anticipated a range of benefits for them. Importantly parents felt it would have particular benefits related to their children's impairments and conditions, such as building strength and stamina and releasing energy.

The discussion of the challenges faced by families with Neurodiverse children highlighted that these challenges both overlap and diverge from those identified in the wider literature about active school travel. For example, differences in the ways that Neurodiverse children process and react to different sensory inputs present difficulties for the families in this research that others would likely not experience.

Conversely, parents talked at length about concerns over their children's safety from road traffic and personal safety. These are issues also highlighted in the wider literature about active school travel. However, due to differences in children's awareness and focus, the research showed these concerns can be pronounced among families with Neurodiverse children.

The final section described parents and children's suggestions for what could support them to travel actively to school more often and make these journeys easier. This highlighted that many actions and activities already being taken to encourage active school travel are likely to positively impact upon Neurodiverse children. For example, parents and children

wanted less cars and more space to walk around the school gates, which is a key aim of school streets programmes. Improving road crossings points was also a key ask among families – and is a common inclusion in re-designed streets.

The findings also suggested that activities and training aimed at walking, scooting and cycling are likely to be popular among families with Neurodiverse children. However, the research highlight differences in the ways these should be run to take account of the needs of Neurodiverse children. This included choices such as small group sizes or one to one sessions and sessions focusing on the very basics of cycling.

4.1 Opportunities for future research and learning

This research was a small-scale exploratory project, aiming to provide initial insights into an understudied topic which could provide the basis for further research. This section highlights multiple avenues for future research that have been identified throughout the course of this project. A key learning from this research that would want to be considered in all the projects below is the length of time and resource needed for participant recruitment – as explored in the [methodology section](#).

4.1.1 Co-designing with neurodiverse children

It is the case that whilst this project included some research activities with children, most of the findings are coming from parent's perspectives. Thus, we feel there is value in further research which centres children's voices. Such a project could focus more fully on designing and delivering engaging, child focused methodologies which enable their full participation in the project. Although all children opted for online interviews, we felt that it was challenging to engage children in this format and one of the key lessons from the research was the need to build

rapport and familiarity with children – which has additional challenges for Neurodiverse children.

Therefore, we feel there would be merit in a project which engaged with children, in-person, over time – giving researchers time to develop rapport with children. This form of research may also lend itself well to a project that had more of a focus on the co-design of streets and spaces with children. This would provide insight into children ideas for how routes to school could be designed in ways that made them feel safe and comfortable.

4.1.2 Surveying parents of neurodiverse children

We also feel that there would be value in following up this research with a survey aimed at the parents of neurodiverse children for several reasons. Firstly, it would enable more parents to take part in the research due to the shorter time commitment of filling out a survey – a key concern for frequently time strapped parents. Secondly, conducting a survey would enable exploration into whether the findings of this research resonate with a wider range of families, and support insight gathering into other challenges, issues or enablers we may have missed. Thirdly, we could analyse data to see if there are any patterns emerging among different demographics and support more detailed analysis of the similarities and differences between different conditions and impairments.

4.1.3 Piloting inclusive behaviour change activities

Inclusive behaviour change activities could be piloted which build upon the recommendations included in this report. This would include work to evaluate these pilots to understand the impact of these activities are and lessons learned for delivering inclusive behaviour change activities going forward.

4.1.4 Focusing outside of the school run

Another idea for future research is to broaden the scope beyond school travel to look at the broader ways in which Neurodiverse children habitually travel. This is important as research has shown that school journeys only make up around 30% of children's overall active travel (Department for Transport 2023). School journeys are also a very specific form of travel, they are time bound, repeated and bound up with the emotions associated with school. Thus, there is value in understanding the ways in which children's travel changes outside of these journeys and how active travel is/can be incorporated within them. Much of the focus of policy and practice has been on active travel on the school run. Thus, research which expands beyond this journey could develop important insights to guide programmes of potential work.

There are multiple potential methodological ways in which such a project could be taken. It could be a similar qualitative approach taken in this study, it could be a project as seeking to foreground the voices of children as described previously, or a survey-based study as also explored previously.

4.1.5 Exploring other impairments

Although the initial aim of this research was to take a pan-impairment approach to disability, the unintended focus on neurodiversity highlighted the value in considering the specific needs of different types of impairments. Given that there has been little research understanding Disabled children's school journeys, there would be value in exploring experiences of school travel among children with other types of impairment. These may include children with mental health issues, mobility impairments, visual impairments or chronic conditions. Similarly, as for the previous research idea, there are multiple potential ways in which this could be done methodologically.

4.1.6 Exploring the experiences of children at non-mainstream schools

A further idea for research would be to focus on the experience of Disabled children attending non-mainstream schools. As discussed in the introduction of this report, many children attending such schools may be eligible for statutory school transport provision¹². However, this does not mean that such children could not, and would not want to, incorporate active travel into their routines. Thus, there would be value in examining what active school travel currently and could look like in this context.

¹² For more details see [here](#).

5. Appendix

5.1 Methodology

This project was conducted as part of the Scottish Research Programme for 23-24 (SRP9) and funded by Transport Scotland. The fieldwork for the project was undertaken between October 2023 - March 2024. The research took a qualitative approach to investigating the experiences of Disabled children's school travel, beginning with a literature review before moving onto interviews with parents and research activities with children.

5.1.1 Literature review

A literature review was conducted to establish current understanding of Disabled children's school travel. This initially focused on school travel exclusively and then broadened to Disabled children's experiences of walking, wheeling, cycling and using public transport for everyday travel.

The initial keywords for the literature search included 'Disabled children', 'School Travel', 'Walk*', 'Wheel*', 'Cycl*', 'Travel', 'Public transport', this was subsequently expanded to gather broader range of specific impairments. Citation searching was also used to identify further studies missed in the search terms. Due to the small number of studies found no geographical or publish year criteria were added.

Each piece of literature found was screened to assess its relevance to the project by reading the abstract. Next, the literature was read in full, and evaluated, before highlighting key findings.

Following this review of the literature around Disabled children's travel the decision was taken to supplement this with a brief review of the wider literature around active school travel and Disabled people's active travel.

For the active school travel section, citations and key information was taken from a recently completed internal Sustrans review of the evidence around children's active travel. This review had already undergone checks and we were confident it reflected current state of the literature.

For the Disabled people's active travel section, a full literature review of this vast topic was not done due to time constraints. Instead, recent UK-based research reports known to author were included and this was supplemented by a brief review of the literature using terms 'Disabled people', 'active travel', 'walk*', 'wheel*', '*cycl*'. Only meta reviews or cross sectional survey studies were chosen for inclusion due to need to gain broad view across studies and across disabilities.

5.1.2 Research methods

This research took a qualitative approach to exploring families' journeys, working with parents/carers and children – but using different methods with these two groups. Using a qualitative approach enabled an in-depth exploration of their experiences of school travel – supporting nuanced examinations of how families currently perform school travel, why they travel in this way and what more could be done to support families to travel actively.

5.1.2.1 Interviews with parents

Parents/carers were invited to take part in a semi-structured interview conducted online. These took between 25 minutes to one hour. Often these shorter interviews were because parents had limited time to commit to the project. Participants were provided with a £25 supermarket voucher of their choice for taking part in the research.

These interviews were conducted prior to the research with children, giving the researcher an understanding of children's journeys which aided later research activities. It also provided an opportunity to build trust with parents and gave the researcher and parent/carers a chance to talk through children's interests to guide the choice of research methods completed with them.

Seven interviews were conducted with eight parents (two parents took part in a dual interview). One parent responded to the interview questions in writing due to the challenges finding time to participate in an interview.

5.1.2.2 Activities with children

A range of activities were designed to facilitate children's participation in the research. Ensuring flexible ways for children to participate will be essential to ensuring the research is inclusive of the potentially different capabilities and needs of the children that may be involved. Before beginning the research consideration was given to how these activities would work for children with different impairments and the adaptations that could be made to ensure they were inclusive to all.

These activities included:

- Activity booklets (explained below)
- Go-alongs, where a researcher would accompany the family on their journey to or from school
- Photo-elicitation activity, where the child would take photographs of their journeys to and from school and then take part in an interview to discuss the photos.

All children chose to complete the activity booklet over the other activities. This activity included:

- Completing a booklet that involved responding to a series of visual and written prompts. This could be responded to in multiple ways. A copy of the booklet is included in [section 5.1.6](#)
- Children were given the option of either completing them in their own time or in an interview with the researcher. All chose to complete them in their own time, and then three took part in a short 10-15 minute follow-up interview to talk through their booklet.
- The idea was that this gave children the ability to respond to questions in multiple ways that were comfortable for them – including the ability to participate without having a conversation with a researcher. They also helped to

disrupt the potential awkwardness of a traditional interview format.

5.1.3 Analysis

All interviews were recorded and transcribed. Interview transcripts were coded using a mixture of an inductive and deductive approach. High-level codes were derived from the interview guide, whilst second order codes were developed from the transcripts. All coding was reviewed by a second member of Sustrans Research and Monitoring Unit.

5.1.4 Recruitment

Several methods were used to recruit families to take part in the research.

The first of these was to utilise existing Sustrans research activities targeted at parents in Scotland. To do so, an additional question was added to the IBike parent/carers survey¹³, which gave an intro to the project and asked people to leave their contact details if they were interested in taking part in the research.

The second of these was to target organisations supporting families with Disabled children and ask them to distribute details of our research among the families they work with. 20 organisations were contacted, six of which shared details of the research.

Three families heard about the research through an organisation, five heard about it through the IBike survey. All of those who heard about it through an organisation, came through the same organisation. This was one specifically supporting Neurodiverse children. Furthermore, this organisation had a specific list for parents interested in taking part in research – likely explaining the success of recruiting through this means.

¹³ IBike is a behaviour change programmed delivered by Sustrans in schools across Scotland. The survey was intended to gather parents/carers feedback on the impact of IBike for their children.

The specific language used in the research recruitment materials was:

“We are interested in speaking to families with a child, aged 7-12, who attend a mainstream primary school in Scotland are Disabled or have additional support needs stemming from a long-term physical, mental or sensory impairment or condition.

This may include but is not limited to:

- *Conditions or impairments affecting mobility or balance*
- *Hearing impairments*
- *Blindness or visual impairments*
- *Autism, ADHD or dyspraxia*
- *Conditions affecting stamina, breathing or fatigue*
- *Chronic health conditions such as diabetes, Crohn’s disease or epilepsy*
- *Conditions or impairments affecting learning, understanding or concentrating”*

This represents the project’s initial focus on a pan-impairment approach. The details of the sample recruited are in [section 2.1](#).

5.1.5 Limitations

One significant limitation of this research is that it centres the voices and perspectives of parents, rather than children. Whilst children were involved in the research, the main body of the findings is comprised of comments from parents.

Understanding parents’ perspectives is important, given that they have such a large impact on how children travel to school. However, children have their own perspectives, ideas and experiences separate to their parents which it is important to voice. Parents understandings of how their children may be feeling or their preferences may not always be the same as their children’s. As already highlighted, future research should work to include the voices of children more fully.

It is also true that the sample for this project was self-selecting. This may have led to the inclusion of families who have a more positive view of active travel than others, as they wanted to contribute to a project working to support more active travel. However, it may also be that these are the families most likely to be supported by initiatives to travel actively and therefore their perspectives are important to hear.

We also received limited interest in taking part in the research, this meant that we did not select participants on the basis of creating a diverse sample – instead all who wanted to take part were involved. This may have limited the diversity of who was involved in the research.

5.1.6 Copy of activity booklet



I travel to school by...



Car



Bus



Train



Bike



Scooter



Walking



Wheelchair

Other

I travel to school with...

Draw or
write your
answer









Draw your route to school



Draw a happy
faces on places
you like

Draw a unhappy
faces on places
you don't like




The best parts about travelling to school are...	The worst parts about travelling to school are...
	
	
	

Draw or write your answers

If you could travel to school in a different way, how would you like to travel?

Draw or write your answers



What three things would you change to make it easier and more enjoyable to travel to school?

Draw or write your answers

[Dashed-line box for answer 1]



[Dashed-line box for answer 2]



[Dashed-line box for answer 3]



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