

Proof Points for Active School Travel



This document provides a series of ‘proof points’ using national and international evidence on children’s active school travel (i.e., getting to or from school using active travel modes such as walking, biking, scooting, or wheeling using other modes). These proof points do not provide an exhaustive list of literature – rather, key studies, international literature reviews, and evidence from Aotearoa New Zealand have been highlighted. Further proof points may be added at a later date.

The following proof points are provided:

- ✓ Active school travel leads to healthier kids
- ✓ Active school travel supports mental health
- ✓ Getting to school actively helps kids learn
- ✓ Walking school buses have multiple co-benefits
- ✓ Getting around independently benefits children
- ✓ Supporting whānau is important
- ✓ The ‘secret recipe’ for active school travel



Where a map of Aotearoa New Zealand is present, this indicates a study was conducted primarily or solely in Aotearoa.

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Active school travel leads to healthier kids

SUMMARY: Physical activity is essential for children's physical and mental health and wellbeing. Accumulating an average of 60 minutes per day of moderate-to-vigorous physical activity (activities that make you huff and puff) is recommended for children's cardiovascular, metabolic, mental, and bone health. Active school travel makes a significant contribution to children's daily moderate-to-vigorous physical activity and children who get to school actively are more likely to meet the recommended levels of physical activity. Evidence suggests there is no compensation effect (i.e., active school travel does not reduce participation in other forms of physical activity).

Proof points	Literature	Detail
Getting to school actively increases overall physical activity levels	<p>Associations between active school transport and physical activity, body composition, and cardiovascular fitness: A systematic review of 68 studies. Larouche R et al. <i>Journal of Physical Activity & Health</i>, 2014, 11(1): 206-227</p> <p>Systematic review of active commuting to school and children's physical activity and weight. Lee M C et al. <i>Journal of Physical Activity & Health</i>, 2008, 5(6): 930-949</p> <p>Active school transport and weekday physical activity in 9-11-year-old children from 12 countries. Denstel K D et al. <i>International Journal of Obesity Supplements</i>, 2015, 5: S100-S106</p>	<p>A review of 68 studies including data for over 108,000 children and youth showed active school travellers were more active overall than passive transport users, for example:</p> <ul style="list-style-type: none"> Average differences in time spent in moderate-to-vigorous physical activity were as much as 45 minutes per day The greatest differences were found for active travellers who lived further away from school – these children did the most physical activity overall Most studies showed active travellers were more active across the full day <p>In a review of 34 studies (25 that looked at active travel and physical activity):</p> <ul style="list-style-type: none"> Two thirds of studies found that children who got to school actively had higher overall physical activity than passive travellers On average, active travellers had 28 minutes more of moderate-to-vigorous physical activity per day than passive travellers <p>A large multi-country study of 6224 children showed that on average (across countries), active travellers had 6 minutes more of moderate-to-vigorous physical activity per day than passive travellers, with differences between countries ranging from 5-10 minutes per day.</p>
Active travellers are more likely to meet activity guidelines	<p>Association between the school physical activity environment, measured and self-reported student physical activity and active transport behaviours in Victoria, Australia. Crooks N et al. <i>International Journal of Behavioural Nutrition and Physical Activity</i>, 2021, 18: 79</p> <p>The associations of active travel to school with physical activity and screen time in children and adolescents: Do individual and parental characteristics matter? Huang C et al. <i>Frontiers in Public Health</i>, 2021, 9: 719742</p>	<p>A study of 3360 students aged 7-12 years from 54 schools in Victoria, Australia, showed that students who got to school actively were 1.56 (girls) to 1.59 (boys) times more likely to meet the recommended levels of physical activity than passive travellers.</p> <p>Research with 5898 students aged 10-18 years from 39 schools in Hubei province, China, showed that active school travellers were 1.26 times more likely to meet physical activity guidelines than passive travellers.</p>
Biking to/from school increases fitness	<p>Associations between active school transport and physical activity, body composition, and cardiovascular fitness: A systematic review of 68 studies. Larouche R et al. <i>Journal of Physical Activity & Health</i>, 2014, 11(1): 206-227</p> <p>The relationship between active travel to school and health-related fitness in children and adolescents: A systematic review. Lubans D R et al. <i>International Journal of Behavioural Nutrition and Physical Activity</i>, 2011, 8(1): 5</p>	<p>In this systematic literature review, all studies that separated cycling out from walking and looked at cardiovascular fitness found that cyclists had better cardiovascular fitness than passive travellers.</p> <p>In this systematic review, cardiovascular fitness was associated with active school travel, for example:</p> <ul style="list-style-type: none"> Children who started cycling to school in one study had 9% greater cardiovascular fitness at follow-up Cycling to school explained 3.1-9.7% of the variance in cardiovascular fitness A study with adolescents showed cyclists had higher maximal aerobic power and other fitness measures
Active school transport doesn't take away from other forms of physical activity	<p>Associations between active school transport and physical activity, body composition, and cardiovascular fitness: A systematic review of 68 studies. Larouche, R et al. <i>Journal of Physical Activity & Health</i>, 2014, 11(1): 206-227</p>	<p>Evidence suggests that getting to school actively doesn't reduce participation in other physical activities (i.e., there is not a compensation effect – increasing activity through active transport, while reducing physical activity in other domains), and that active travellers can even participate in even more physical activity. For example, for studies in this review, the difference in physical activity between active and passive travellers was often greater than the amount associated with the journey to and from school.</p>
Active school travel can be a key contributor to physical activity	<p>Systematic review of active commuting to school and children's physical activity and weight. Lee M C et al. <i>Journal of Physical Activity & Health</i>, 2008, 5(6): 930-949</p>	<p>Four studies in this review looked at what proportion active school travel contributed to total daily physical activity. The study methods and results varied – two were negligible, and two reported contributions of 28-50%:</p> <ul style="list-style-type: none"> A nationally representative survey in Russia reported that active school travel accounted for 40-50% of total daily physical activity A German study of students who lived <1.5km from school showed 28% of daily activity was from active school travel



Active school travel supports mental health

SUMMARY: Being physically active on the trip to school brings numerous benefits to mental wellbeing through hormonal and endocrine activity which supports positive emotions, stress reduction, and helping kids to feel calm. Active school travel also supports children's mental health through facilitating time spent with friends and family, allowing time for reflection and contemplation, providing opportunities for imaginative and physically active play, and enabling children to interact with animals and nature along the school journey. Collectively, these activities bring joy to children and support their mental health.

Proof points

Being active makes us feel good

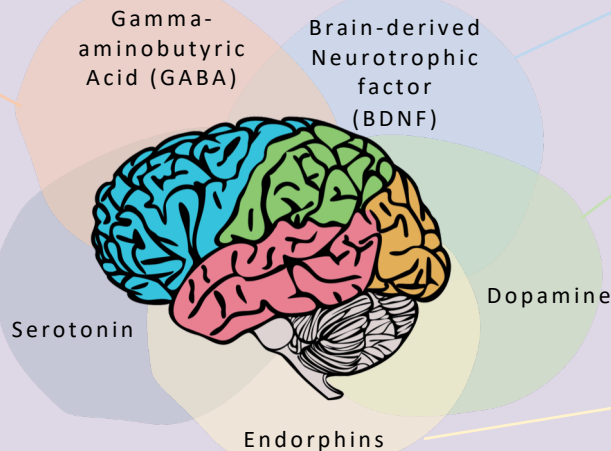
Exercise research on children and adolescents. Field T. Complementary Therapies in Clinical Practice, 2012, 18(1):54-59

Justifying Physical Education Based on Neuroscience Evidence. Berg K. Journal of Physical Education, Recreation & Dance, 2010, 81(3):24-46

Physical activity and brain health. Di Liegro, C M et al. 2019. Genes, 10(9):720

Facilitates sleep
Reduces stress & anxiety
Calming

Regulates mood, sleep, appetite, digestion
Impacts learning & memory



Neuron survival & growth
Learning & memory

Feel-good hormone
Impacts learning, memory, movement, mood, attention

Natural pain reliever
Contribute to positive feelings

Active school travel gives time for reflection and connection with nature and others

Social relationships, nature and traffic: Findings from a child-centred approach to measuring active school travel route perceptions. Egli, V et al. Children's Geographies, 18(6):667-683

'I'd paint rainbows and unicorns on it': Understanding children's school travel behaviours and the impact of a new shared path. Donnellan, N et al. Journal of Transport & Health, 2020, 17, 100838

Health Benefits of walking school buses in Auckland, New Zealand: Perceptions of children and adults. Neuwelt, P M et al. Children, Youth and Environments, 2006, 16(1), 104-120

Neighbourhoods for Active Kids was an online mapping study with over 1100 children in Tāmaki Makaurau. Children were asked what they liked about their trip to school - comments from children who walked were more reflective about the school day or their surrounds than those from children who were driven, e.g.: "i like thinking about my day" and "[I like] looking around to see what is coming and discover something." Children also reported enjoying connecting with their friends and family members on the trip to school.

In focus groups, children reported many calming benefits about their active trip to school including spending time with parents, talking with friends and playing with siblings. Those who travelled actively enjoyed the quietness of a new shared path which was absent of traffic and in nature, e.g.: "There's no loud noise. It's just sort of really calm and enjoyable", and "If you walk out there [next to the main road], you can hear the cars go past, but if you're walking on the path it's nice and quiet sometimes. And it's out in nature. It's just nice. You can enjoy it".

Interviews with parents about their children's participation in a walking school bus showed walking home from school allowed their child to better "process" their day, arriving home in a better frame of mind, having "let off steam" and "burned off energy." Parents also noted this led to an improvement in the quality of their time after school together.

Children get joy from being active on the school journey

Social relationships, nature and traffic: Findings from a child-centred approach to measuring active school travel route perceptions. Egli, V et al. Children's Geographies, 18(6):667-683

Evaluation of a multicomponent infrastructural and app-based intervention to increase children's active school travel: A multiple methods study in Tāmaki Makaurau/Auckland, Aotearoa/New Zealand. Smith, M et al. Social Sciences and Humanities Open, in press.

Children who used active school travel modes reported having fun and playing on their school journey - for example, doing jumps on their bikes or scooters, pretending they are running on powerlines, jumping over zebra crossings with sharks underneath.

Children enjoyed activities along the school route such as having breaks at a special tree and saying riddles. They enjoyed going fast on their bikes, and biking in the rain was fun: "You get wet, and all the splashes go on your helmet....And it makes kind of cool sounds". Children also reported enjoying connecting with nature and animals, and connecting with each other on their active school trip.



Getting to school actively helps kids learn

SUMMARY: Getting to school using active travel modes means kids are getting to school refreshed, energized, and ready to learn. Physical activity before school activates children's brains so they are primed for learning. Brain scans show increased neural activity after just a short bout of walking, and numerous studies show improved performance on tests and other academic outcomes after being physically active. Teachers report that after being active, children are more able to remain on-task, requiring less behaviour management. Teachers and school principals also recognise the opportunities to link active school travel initiatives with the New Zealand Curriculum, enhancing learning and bringing school values to life

Proof points

Literature

Detail

Getting to school actively helps develop positive learners

The journey to learn: Perspectives on active school travel from exemplar schools in New Zealand. Hawley, G et al. Journal of Transport & Health, 14, 100600

Health Benefits of walking school buses in Auckland, New Zealand: Perceptions of children and adults. Neuwelt, P M et al. Children, Youth and Environments, 2006, 16(1), 104-120

Interviews with principals of schools with higher-than-average rates of active school travel showed a key reason for supporting active school travel was that being active supported student learning:

"We have a very symbiotic partnership where we work with the community centre to support our families in as much as we can in order that the kids will be achieving better at school it all comes back to how do our kids learn in the classroom."

Interviews with school principals and parent walking school bus drivers showed how participating in walking school buses and getting to school actively helped develop positive learners and prepared them for learning:

"For me as a principal, I want the kids coming to school ready for school and ready for their learning, and I think that walking to school does that exceptionally well...Keying children into their school day by walking with their friends to school, talking about what they did yesterday, talking about what they're going to be doing today, I think is very, very beneficial to kids and their learning."

Single sessions of physical activity can enhance attention and memory

The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. Hillman, C H et al. Neuroscience. 2009;159(3):1044-1054

Single episodes of walking resulted in greater improvement in academic tests, better response accuracy, and greater brain activity compared with a resting session. The study shows how moderate-intensity activity (such as walking to school) can help increase attention and academic performance.

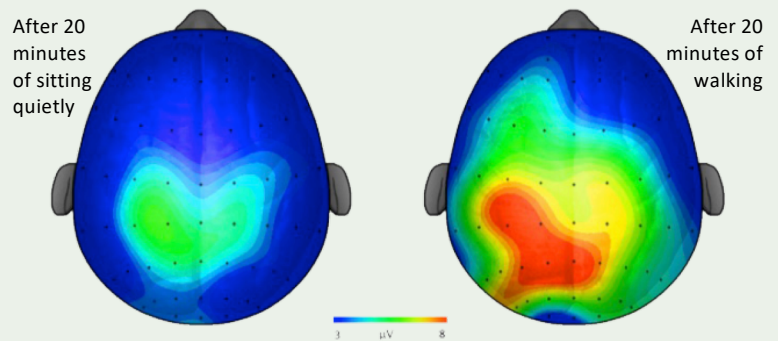


Image showing students' neural activity during a test after sitting or walking for 20 minutes. Blue represents lower neural activity; red represents higher activity*

Ten years of TAKE 10!: integrating physical activity with academic concepts in elementary school classrooms. Kibbe, D I et al. Preventive Medicine. 2011;52(Suppl 1):S43-S50

A review of studies that included short episodes of physical activity into the day showed improvements in academic achievement, such as a 20-point gain on the Florida Comprehensive Achievement Test and increased percentile ranks on the Texas Assessment of Knowledge and Skills.

Physical activity and academic achievement: An umbrella review. Whiting, B A et al. International Journal of Environmental Research and Public Health, 2020, 17(16):5972

A review of literature showed that physical activity was linked with improved academic outcomes across language, geography, mathematics, reading, and spelling. The World Health Organization has used this review to develop [implications for practice](#) including creating safe environments for active travel.

Active travel can help students stay on task in the class

Ten years of TAKE 10!: integrating physical activity with academic concepts in elementary school classrooms. Kibbe, D I et al. Preventive Medicine. 2011;52(Suppl 1):S43-S50

Lessons that included physical activity breaks resulted in a 20.5% reduction in time spent on off-task behaviour, fidgeting, and teacher classroom management.

Effects of classroom-based program on physical activity and on-task behavior. Mahar, M T et al. Medicine & Science in Sports & Exercise. 2006;38(12):2086-94

Short bursts of physical activity improved on-task behaviour (e.g., staying focused on the task in class) in by 8%. The least on-task students improved their on-task behaviour by 20% after the physical activities.

Active school travel programmes link with the Curriculum

The journey to learn: Perspectives on active school travel from exemplar schools in New Zealand. Hawley, G et al. Journal of Transport & Health, 14, 100600

School representatives emphasised the links between active school travel initiatives and school values and curriculum, integrating concepts from the values and the curriculum into active school travel communications and initiatives (e.g., promoting student behaviours when leaving the school gate, cycling etiquette and respecting others).



Walking school buses have multiple co-benefits

SUMMARY: National and international evidence shows a range of benefits from walking school buses, including benefits to children's health and wellbeing through increased physical activity and active travel, increased connection with the outdoors, benefits to mental health and learning, improved social cohesion, the development of road safety skills, improved traffic safety and reduced congestion. Challenges moving forward are overcoming time and resource barriers, and supporting schools and their communities to ensure equitable delivery of walking school buses. Improving safety in the wider transport environment through infrastructural and social approaches is essential to support walking school bus uptake and efficacy.

Proof points	Literature	Detail
Walking school buses increase rates of active school travel	<p>Walking School Buses as a Form of Active Transportation for Children-A Review of the Evidence. Smith, L et al. The Journal of school health, 2015-03, Vol.85 (3), 197-210</p> <p>Pilot evaluation of a walking school bus program in a low-income, urban community. Mendoza, J et al. BMC Public Health, 2009, 9(1), 122-122</p> <p>Encouraging active transportation to school: Lessons learned from implementing a walking school bus program in Northeastern Ontario. Scharoun Benson, S M et al. Journal of Transport and Health, 2020, 19, 100914</p> <p> Evaluation of a multicomponent infrastructural and app-based intervention to increase children's active school travel: A multiple methods study in Tāmaki Makaurau/Auckland, Aotearoa/New Zealand. Smith, M et al. Social Sciences and Humanities Open, in press.</p>	<p>A review of international literature including 12 walking school bus studies and 9169 children showed walking school buses were generally associated with increased prevalence of walking to school and increased physical activity levels.</p> <p>A walking school bus program resulted in more students walking to school at the 12 month follow-up (the walking school bus was still running), compared to the control schools which had a decline in walking to school at 12 months.</p> <p>An increase in active travel and physical activity, socialising and community participation, being outdoors, benefits to mental health, knowledge of road safety, and perceptions of environmental influences were revealed as positive outcomes in a walking school bus evaluation.</p> <p>An increase in active school travel was observed during an active school travel intervention that included setting up walking school buses and cycle trains, hosting street closures, and other activities. Increases in rates of active school travel were the largest for older aged children.</p>
Child self-efficacy for active school travel and road safety skills are increased	<p>Impact of walking school bus programs on self-efficacy and outcome expectations. Cramer, N et al. Journal of physical activity & health, 2021, 18(7), 858-862</p> <p> Health Benefits of walking school buses in Auckland, New Zealand: Perceptions of children and adults. Neuwelt, P M et al. Children, Youth and Environments, 2006, 16(1), 104-120</p>	<p>A walking school bus intervention among 22 elementary schools serving racially diverse, low-income populations in the United States showed increases in child self efficacy (self confidence for active school travel) in the intervention group compared to the control group.</p> <p>School principals and parent bus drivers highlighted the role of walking school buses in developing road safety capabilities in children.</p>
Children enjoy participating in walking school buses	<p> Health Benefits of walking school buses in Auckland, New Zealand: Perceptions of children and adults. Neuwelt, P M et al. Children, Youth and Environments, 2006, 16(1), 104-120</p> <p>Walking School Buses as a Form of Active Transportation for Children-A Review of the Evidence. Smith, L et al. The Journal of school health, 2015, 85(3), 197-210</p>	<p>Forty five children offered pragmatic views of participating in walking school buses. They preferred walking to school and enjoyed developing new friendships, the fun of walking, fitness gains, overcoming fear and becoming safer while getting around, and the "naturalness" of walking.</p> <p>Children enjoyed socialising and interacting with the environment on their walking school bus.</p>
Involvement encourages walking in later life	<p> The legacy of an intervention : exploring the mobilities of teenage walking school bus 'graduates' in Auckland. Kearns R A et al. Sites, 2012, 9(1), p.83-106</p>	<p>In this study, interviews with adolescents showed that being part of a walking school bus previously in childhood seems to encourage a positive view of (and enthusiasm for) walking in later life.</p>
Walking school buses can reduce traffic congestion and improve traffic safety	<p> The Walking School Bus: Extending Children's Geographies? Kearns R A et al. (2003). Area, 35(3), 285-292.</p> <p> Walking school buses in the Auckland region: A longitudinal assessment Collins, D et al. Transport policy, 2010, Vol.17 (1), p.1-8</p>	<p>A case study in Tāmaki Makaurau showed that setting up a walking school bus contributed to a noticeable reduction in cars at the school gate.</p> <p>Parent coordinators identified that walking school buses led to reduction in car use and local congestion, and reduced injury risk for child pedestrians.</p>
Social cohesion is supported through walking school buses	<p> Health Benefits of walking school buses in Auckland, New Zealand: Perceptions of children and adults. Neuwelt, P M et al. Children, Youth and Environments, 16 (1), 104-120</p> <p> Walking school buses in the Auckland region: A longitudinal assessment Collins, D et al. Transport policy, 2010, Vol.17 (1), p.1-8</p>	<p>Parent drivers of walking school buses and school principals noted participating in walking school buses supported the development of new relationships and encouraged people to care for children in the neighbourhood.</p> <p>Parent walking school bus coordinators reported that walking school buses encouraged a sense of community.</p>



Getting around independently benefits children

SUMMARY: Independent mobility (children's freedom to get around their neighbourhood without adult supervision) is beneficial to children in a number of ways. When children are able to be active in their neighbourhood independently, they interact with their environments in different ways, taking time to play and socialise. These independent interactions help children develop skills and confidence in social relationships, environmental awareness and navigation, and risk assessment. Independent mobility also supports child wellbeing through physical activity, social interaction, and a sense of belonging.

Proof points	Literature	Detail
Children develop awareness of their environment and other skills through independent mobility	<p>The ambivalence of independent mobility: Balancing perceived risks and expected benefits of walking to school in inner-city neighbourhoods. Eisenlohr A et al. <i>Travel Behaviour and Society</i>, 2023, 31: 49-62</p> <p>Freedom of movement and environmental knowledge in elementary school children. Rissotto A et al. <i>Journal of Environmental Psychology</i>, 2002, 22(1-2): 65-77</p> <p>Children's independent mobility: Current knowledge, future directions, and public health implications. Marzi I et al. <i>International Journal of Environmental Research and Public Health</i>, 2018, 15(11): 2441</p>	<p>Surveys, mapping, and interviews with 239 children aged 9–11 years from 10 schools across Los Angeles and San Diego showed that children who walked to school unsupervised were much more observant and aware of their surrounding built environment than children who walked with supervision or who were driven.</p> <p>In this study, 46 children aged 8-11 years from Rome mapped their school routes and neighbourhood landmarks. Children who got to school independent of adult supervision performed better in making a sketch map of the journey, placing landmarks, and on accurately orienting their school route.</p> <p>This international literature review highlighted that independent mobility can contribute to children's psycho-social and cognitive development, social competencies, and psychological wellbeing.</p>
Independent mobility supports other health promoting behaviours	<p>Children's right to the city and their independent mobility: Why it matters for public health. Frohlich K L et al. <i>Journal of Epidemiology & Community Health</i>, 2023, doi: 10.1136/jech-2023-221067</p> <p>Associations between children's independent mobility and physical activity. Schoeppe S et al. <i>BMC Public Health</i>, 2014, 29(14): 91</p> <p>The freedom to explore: Examining the influence of independent mobility on weekday, weekend and after-school physical activity behaviour in children living in urban and inner-suburban neighbourhoods of varying socioeconomic status. Stone M R et al. <i>International Journal of Behavioural Nutrition and Physical Activity</i>, 2014, 22(11): 5</p> <p>Associations of children's independent mobility and active travel with physical activity, sedentary behaviour and weight status: A systematic review. Schoeppe S et al. <i>Journal of Science and Medicine in Sport</i>, 2013, 16(4): 312-319</p>	<p>Drawing on an international literature review, these authors highlight how independent mobility is central to increasing children's active travel and their outdoor free play, both of which are key to physical and mental health. The authors suggest that efforts to increase active travel and outdoor free play are "doomed to fail" if barriers to independent mobility are not addressed.</p> <p>In this study of children aged 8-13 years in Australia, boys who got to school independently by walking or biking to school had higher levels of overall physical activity. Independent outdoor play was linked with higher overall physical activity and light intensity physical activity (e.g., slow walking) for all children.</p> <p>In a Canadian study with 856 children aged 10-12 years, children with more independent mobility had more physical activity overall, and more moderate-to-vigorous physical activity, on weekdays, on weekend days, and especially during the after-school period.</p> <p>A systematic literature review of 52 studies (of which four focused on independent mobility) showed independent mobility was consistently associated with higher levels of physical activity in children.</p>
Social connections and cohesion are increased through independent mobility	<p>Children's incidental social interaction during travel international case studies from Canada, Japan, and Sweden. Waygood E O D et al. <i>Journal of Transport Geography</i>, 2017, 63: 22-29</p> <p>Gender differences in children's pathways to independent mobility. Brown B et al. <i>Children's Geographies</i>, 2008, 6(4): 385-401</p> <p>The influence of psychosocial and environmental factors on children's independent mobility and relationship to peer frequentation. Prezza M et al. <i>Journal of Community & Applied Social Psychology</i>, 2001, 11(6): 435-450</p>	<p>Children who travelled independently saw someone they knew 4.6 times more often than children who were accompanied by an adult.</p> <p>This study involved questionnaires, interviews, and mapping with 1099 children aged 8-11 years and their parents in the United Kingdom. Findings showed that independent mobility provides opportunities for children to foster relationships and to develop the skills to navigate social relations independent of adults.</p> <p>Interviews with 251 mothers in Rome showed that children who have more independent mobility play more often with their peers, both indoors and outdoors.</p>
Independent mobility may benefit mental health	<p>Decline in independent activity as a cause of decline in children's mental well-being: Summary of the evidence. Gray P et al. <i>The Journal of Pediatrics</i>, 2023, 260: https://doi.org/10.1016/j.jpeds.2023.02.004</p>	<p>This commentary draws on international literature to show how declines in independent mobility might be linked to increased mental distress, through: (1) reduced opportunities for satisfaction gained from playing, roaming, and engaging in activities without adult control; and (2) less opportunity to build mental characteristics (resilience, internal locus of control, confidence to deal with risk) that provide a foundation for dealing with the stresses of life.</p>



Supporting whānau is important

SUMMARY: Whānau (especially parents/caregivers) are the gatekeepers to children's active school travel and have an important impact through role modelling. Children prefer to get to school actively, and enjoy spending time with family members on the school trip (see mental health proof point). **Everyone benefits** when whānau accompany children on their active school journey – through increased physical activity and time outdoors, having time to connect with each other, reducing travel costs, and growing children's skills and confidence for getting to school independently and safely. Parents/caregivers understand the benefits of active school travel but face significant barriers and competing priorities.

Proof points	Literature	Detail
Active travel is good for the whole family	Happiness in Motion: Emotions, Well-Being, and Active School Travel. Ramanathan S et al. Journal of School Health, 2014, 84(8): 516-523	A study of 5423 children (average age 8.7 years) from 76 schools in Canada and their parents explored links between wellbeing and school travel mode. Parents who travelled to school with their child actively reported more positive emotions (relaxed, happy, energized, content, calm, curious) and less negative emotions (rushed, bored, anxious, tired, frustrated, distracted) about the trip than parents who drove their child to school. This pattern was the same for children. The researchers developed the term 'sustainable happiness' to capture the link between their child's active travel and their physical, emotional, community, and environmental well-being. Parents of active travellers reported higher sustainable happiness across all elements but especially emotional wellbeing.
	 Why are cyclists the happiest commuters? Health, pleasure and the e-bike. Wild K et al. Journal of Transport and Health, 2019, 14: 100569	Interviews with 24 adult e-cyclists revealed a number of positive benefits of cycling. Relevant to active school travel, cycling contributed to commute mode satisfaction through enjoyable levels of sensory stimulation; feeling good from doing physical activity, and from opportunities for social interaction that cycling allowed.
Active school travel costs families less	Chapter Ten - Making the economic case for active school travel. McDonald N C et al. Transport and Children's Wellbeing, 2020: 187-197	Authors estimate that in the United States, families drive an extra 1.5 billion miles and spent an extra 50 million hours driving elementary and middle school students to school when the distance is less than one mile – this equates to an economic cost of USD720 million (USD300 million for vehicle costs and USD420 million for time).
Role modelling encourages children's active school travel and reduces barriers to children's active school travel.	Parental Active Transportation Routines (PATRns) as a Moderator of the Association Between Neighborhood Characteristics and Parental Influences and Active School Transportation. Van Kann D H H et al. Environment and Behavior, 2016, 48(7): 946-965 Built environment characteristics and parent active transportation are associated with active travel to school in youth age 12-15. Carlson J A et al. British Journal of Sports Medicine, 2014, 48(22):1634-9 Using parental active travel behavior and beliefs to predict active travel to school among children. Sims D et al. International Journal of Sustainable Transportation, 2020, 14(5): 343-348	In this study with 722 children aged 8-12 years and their parents from the Netherlands, parent use of active travel modes to get to local destinations was linked with a greater likelihood of their children getting to school actively. Children (n=294, aged 12-15 years, residing in the United States) whose parents modelled regular active travel were 3.3 times more likely to get to school actively than children whose parents didn't role model active travel. This study surveyed 344 parents of school-aged children in the United States. Compared with parents who did not use an active travel mode to get to work, children whose parents got to work actively at least once weekly were 1.2 times more likely to actively travel to school.
Making active travel easy, safe, and a social norm is key for parents – their decision-making is complex and challenging	Integrating Parental Attitudes in Research on Children's Active School Commuting: Evidence from Community School Travel Survey. Yang Y et al. Transportation Research Record: Journal of the Transportation Research Board, 2012, 2318(1): https://doi.org/10.3141/2318-14 It's about being the good parent: exploring attitudes and beliefs towards active school transportation. Forsberg H et al. International Journal of Circumpolar Health, 2020, 79(1): 1798113  Children's Transport Built Environments: A Mixed Methods Study of Associations between Perceived and Objective Measures and Relationships with Parent Licence for Independent Mobility in Auckland, New Zealand. Smith M et al. International Journal of Environmental Research and Public Health, 2019, 16(8):1361	A survey of 1,197 parents of school aged children in the United States showed that parental attitudes towards active (e.g., environmental and health benefits) and passive (e.g., comfort, convenience) travel modes to school impacted the likelihood of children getting to school actively. Importantly, these attitudes were associated with active school travel <i>over and above</i> the association with environmental variables (e.g., distance to school, walkability). Interviews with 20 parents in Sweden highlighted the complex decision-making processes parents go through for active school travel. Parents recognised the benefits of active travel (health, physical activity, time outdoors, free play) but struggling with daily life was a fundamental barrier to active school travel. Social norms about parenting practice also impacted parental decision-making. This study asked 940 parents of children aged 8-13 years from 19 schools in Tāmaki Makaurau what would make their neighbourhood a better place for their child to walk, bike, or scooter by themselves. Safer transport environments were most frequently noted by parents – including the need for separated biking infrastructure, safer places to cross, slower traffic, less traffic, safer driver behaviour, etc.



The 'secret recipe' for active school travel

SUMMARY: A number of essential 'ingredients' for supporting sustained shifts to active school travel exist. The amount required of each ingredient required depends on the geographical (e.g., presence/absence of safe infrastructure for active modes, topography, traffic and street design) and socio-cultural context (e.g., a legacy of supporting active modes vs. no previous dedicated support) of the schools. These ingredients also interact with each other, enhancing their effectiveness – that is, the sum is greater than its parts. For optimal success, active travel interventions need to be multi-faceted, appropriately resourced, collaborative and cross-sectoral, and sustained over time.

Proof points

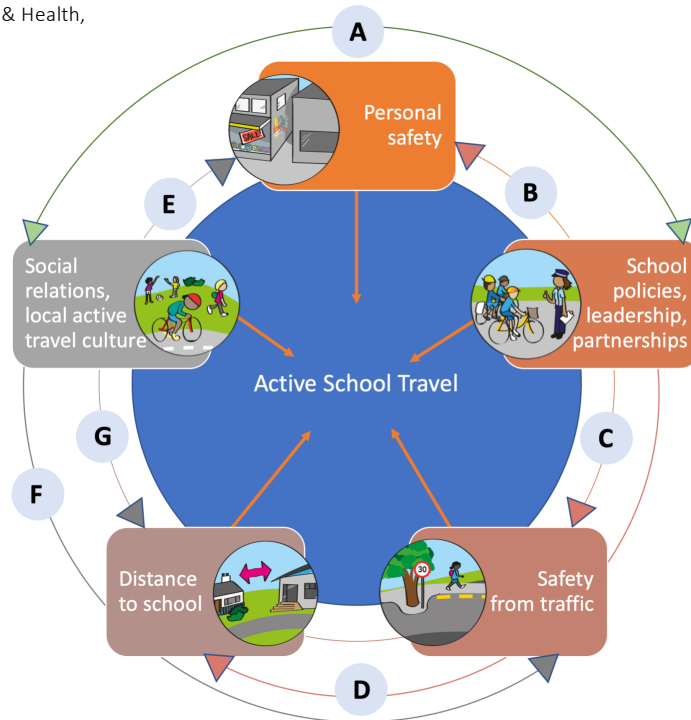
Active school travel initiatives need to consider multiple factors for the greatest likelihood of success

An integrated conceptual model of environmental needs for New Zealand children's active travel to school. Smith M et al. Journal of Transport & Health, 2020, 16: 100814

Literature

Detail

This research takes findings from a range of studies to identify what matters for supporting active school travel in Aotearoa. A model for the 'secret recipe' is provided below.



Personal safety factors focused on safety from others, including older children, bullies, criminal and gang activity, roaming dogs, and general antisocial behaviour. Potential strategies include Crime Prevention Through Environmental Design. **Traffic safety** included concerns about safety crossing roads, traffic speeds and volume, and the need for safe places/infrastructure that supported active modes. Potential strategies include legislating for slower speeds; and fiscal and practical prioritisation of infrastructure that provides children safe places to cross roads, traffic calming infrastructure, separated cycleways, and complete, wide, and connected footpaths that allow for multiple users to walk safely. **Distance to school** has a pervasive role in discouraging active school travel. Potential strategies include increasing safe cycling infrastructure (connected cycleways that are separated from traffic), improving access to and availability of public transport, schools implementing zoning strategies, and maintaining and advocating for local schools nested within communities. **School factors** included policies, programmes, partnerships, and school and individual leadership, and **social factors** included an active community culture, social cohesion and connectivity, and supporting relationships between children, whānau, schools, and the wider community. Potential strategies are suggested, with **arrows** in the figure depicting where opportunities for change/intervention may occur, and examples provided below:

A = Recreational facilities proximal to schools (e.g., mountain bike parks), spaces and events for community connection, use of school grounds/facilities for active community events, school travel initiatives that reflect community culture
B = Supporting active school travel programmes (walking school buses, cycle trains partnering with Police for safety skills development
C = Crossing guards, integrated curriculum – safety, cycle skills training, leadership programmes, walking school buses and cycle trains, traffic management policies, lobbying and collaboration, partnering with community providers for school travel programmes and infrastructural works interventions
D = Zoning regulations, park and walk, bikes in schools, cycle skills training, bike/scooter/skateboard parking, wheels during breaks, bike trains, integrated curriculum – health & sustainability
E = People being active in the community contributing to surveillance
F = People being active in the community contributing to a critical mass of pedestrians and cyclists for improved safety from traffic; community culture of valuing active school travel and taking responsibility for improved driver behaviour
G = Community culture of supporting and participating in walking school buses, cycle trains, community groups supporting school park and walk/ride initiatives

