Overview

The Built Environment and Active Transport to School (BEATS) Research Programme is based on contemporary ecological models for active transport (walking or cycling) that identify individual, social, environmental and policy influences on behaviour. This research is designed to advance scientific knowledge and provide service to the government, local community and schools.

BEATS Research Outputs to Date

• **BEATS Rural Study** (2018-2019): This study examines individual, social, environmental and policy factors influencing active transport to school in adolescents living in rural areas of the Otago region of New Zealand. The study uses the published BEATS Study methodology and conceptual framework. This study will generate valuable rural-specific data to inform future interventions for built environment change, educational campaigns and policy development in rural areas.

• **BEATS Cultural Study** (2018-2019): This study examines what Māori and Pacific adolescents think about their transport to school. Data will be collected in Dunedin and the wider Bay of Plenty. Understanding the local context, including the cultural factors, is essential for identifying and designing effective interventions to promote active transport to school.

Funding

The links to publications are available on the BEATS Study website: [www.otago.ac.nz/beats/publications](http://www.otago.ac.nz/beats/publications)
BEATS Study Spin-Off Projects to Date

**BEATS Study Symposia (2014, 2016, 2018):**

These symposia were designed to showcase the latest BEATS Study findings to academics, research students, schools, health professionals, policy makers and the general public. These symposia were open to the public and registration was free.


**The Active Living and Environment Symposium (TALES) (2017, 2019):**

The goal of these symposia is to facilitate and grow an international, multidisciplinary and multi-sector dialogue related to Active Living and Environment. These symposia bring together researchers, policy makers, health promoters, urban designers, transport experts and interested members of the public to network and exchange ideas. Symposium themes include Health, Transportation, Environment and Sustainability.

- Symposium website 2019: www.otago.ac.nz/active-living-2019

**Evaluation of Cycle Skills Training Programme (2015-2017):**

South Dunedin Cycling Project provided a cycle skills training programme, a series of activities and events, as well as access to bikes, helmets and safety equipment in Dunedin, New Zealand. This research project examined the effects of the cycle skills training programme on increasing knowledge of road safety, practical cycling skills and rates of cycling for recreation, transport and sport in children and young people.

Investigators: Associate Professor Sandra Mandic (PI), Charlotte Flaherty.
Funding: Dunedin City Council and Sport New Zealand.

**Examining Cycle Skills Training Content and Delivery (2017-2018):**

This study examined key factors for improving the quality of the content and delivery of cycle skills training in primary and intermediate schools in Dunedin, New Zealand. Data were collected from children, teachers, cycle skills trainers, cycling experts and parents of children who took part in the training. Focus groups, photos and videos were used to elicit information. Children also built 3D models of their ideal cycle skills training course.

Investigators: Dr Christina Ergler (PI), Associate Professor Sandra Mandic.
Funding: University of Otago Research Grant 2017

**The Catalyst Project (2020):**

This project has been designed to inspire, empower and support adolescents in rural areas of the Otago region to engage with science using BEATS Rural Study data from their own school. As a part of this project, rural adolescents would develop innovative ways to encourage healthy lifestyle behaviours in their schools and communities.

Investigators: Associate Professor Sandra Mandic, Mrs Kimberley King, Mr Andrew King
Project subject to funding.

**Active Living Laboratory Newsletter (since 2016):**

We publish a quarterly newsletter to provide regular updates about our work and the BEATS Study publications. Previous issues are available online: www.otago.ac.nz/active-living/research/publications
Sign up for this newsletter at www.goo.gl/jtqdAo .
Next Step: BEATS Natural Experiment (2020-2022)

Several Dunedin neighbourhoods have been undergoing on-road and off-road cycling infrastructure construction since 2014 and pedestrian-related infrastructure changes in 2018, affecting 6 out of 12 Dunedin secondary schools.

The BEATS Natural Experiment study will examine the effects of these built environment changes on active transport to school and physical activity levels in Dunedin adolescents, as well as adolescents’ perceptions of the school neighbourhood built environment. Data will be collected in schools using published research methods. Analysis will include 2014/2015 BEATS Study data and contemporary ecological models for active transport that account for individual, social, environmental and policy factors. Findings will inform planning of future built environment and active transport interventions. Project subject to funding.

Developing Research Capacity on the BEATS Research Programme

A number of research students and research staff received training as a part of this research programme:

- 3 recent PhD graduates
- 1 PhD student
- 4 Master’s students
- 4 Honours students
- 11 Summer research student scholarships
- 3 International internship students
- 11 Research assistants in 2017-2018

BEATS Research Team 2018

The BEATS Research Programme is a collaboration between Dunedin Secondary Schools’ Partnership, Dunedin City Council, New Zealand Transport Agency and University of Otago.

[Diagram of research team members]

Acknowledgments

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For more information, visit our website: www.otago.ac.nz/beats
**Appendix: Summary of BEATS Study Findings Published to Date**

### BEATS Study Protocol Article

This article describes research methodology for the entire BEATS Study.


### BEATS Study Planning and Implementation

This article provides “a look behind the scenes” from vision to implementation of the BEATS Study: study design, the establishment of research and community collaborations, planning and preparation for data collection, study implementation and knowledge dissemination.


### Clustering of (Un)Healthy Behaviors in Adolescents from Dunedin, New Zealand

The findings from the BEATS Study show that few Dunedin adolescents met recommended health behaviour guidelines, yet two-thirds had a healthy weight. This study identified six clusters based on health behaviours and weight status. Clusters had distinct sociodemographic and lifestyle characteristics. These findings suggest that future public health strategies for adolescents should be comprehensive and consider socioeconomic structural factors.


### Adolescents Perceptions of Walking versus Cycling to School

The BEATS Study findings show that low rates of cycling to school in New Zealand adolescents may be context-specific. This article shows that compared to walking, cycling to school among Dunedin adolescents was less common and perceived as less safe. Cycling also received less social and infrastructure support. Therefore, more supportive physical and social environments are required for promoting cycling to school among Dunedin adolescents.


This article presents findings from BEATS Study focus groups with adolescents and parents. Key findings relate to perceived safety, implicit messages and social norms. A complex range of factors contributed to perceived safety of cycling, including features and perceptions of the built environment, traffic safety, previous cycling experiences and adolescents' cycling skills. Overcoming concerns through behavioural and cultural interventions coupled with up-skilling and infrastructure changes may present a pathway to increasing rates of cycling.


Attitudes Towards Cycle Skills Training in New Zealand Adolescents

Little is known about adolescents’ attitudes towards cycle skills training. In this study, over one third of adolescents perceived that cycle skills training could make them safer in traffic. Enjoyment, usefulness and desire to cycle were associated with a positive attitude towards the training. Parental cycling behaviour and school’s encouragement were also important. Schools may be an appropriate setting for provision of cycle skills training for adolescents.


Parental Perceptions of Cycle Skills Training

This article presents findings from the BEATS Parental Survey. Parents perceived cycle skills training would make adolescents safer in traffic. Having fewer vehicles at home and parental perceptions that cycling to school is important but unsafe were also associated with favourable perceptions of cycling skills training. Parents thought adolescents would benefit from such training at their school. Therefore, interventions should capitalize on parental interest in cycle skills training.


A Tale of Two New Zealand Cities: Cycling to School among Adolescents in Christchurch and Dunedin

This article examined intrapersonal factors related to adolescents' cycling to school in Dunedin versus Christchurch. Despite higher rates of cycling to school in Christchurch, attitudes towards cycling to school were similar in both cities. Norms, capability, autonomy and intention to cycle were lower in Dunedin. Norms were the dominant influence for cycling to school in Christchurch and attitude was dominant in Dunedin. Therefore, norms, social needs and capability are relevant for adolescents' cycling initiatives.

School Bag Weight as a Barrier to Active Transport to School

This article shows that school bag weight was perceived by both adolescents and their parents as a barrier for active transport to school. Heavy school bags were seen as a greater barrier for cycling versus walking. Active transport users were less likely to perceive their school bag as too heavy. On average, adolescents' school bags weighed 5.6 kg. Actual school bag weights did not differ by mode of transport to school. School bag weights should be considered in future active transport to school interventions.


Would New Zealand Adolescents Cycle to School More if Allowed to Cycle without a Helmet?

This article shows that 22% of Dunedin youth stated they would cycle to school more often if helmet use was not mandatory. Greater distance to school and school route being perceived as boring were identified as significant factors. Ethnicity, social norms and cycling often with friends also emerged as significant factors. These findings can be used to design educational interventions among adolescents to raise awareness that wearing a bicycle helmet provides protection from head injuries.


Built Environment Associates of Active School Travel in New Zealand Children and Youth: A Systematic Meta-Analysis using Individual Participant Data

This article analysed data from five New Zealand-based studies (including the BEATS Study) with a total sample of 2844 children and youth aged 6-19 years. The results show that distance to school was the strongest predictor of active travel to school. Increased street connectivity around schools was related to active travel to school. Dwelling density and school socioeconomic status were negatively associated with active travel to school. Distance to school is a key consideration for school zoning and catchment policies.


Transport to School Habits and Objectively Measured Physical Activity in Adolescents

Nearly half of adolescents using active transport to school (alone or in combination with motorised modes) met physical activity recommendations compared to only one third of motorised transport users. Physical activity differences by transport modes were observed in girls, on school days and during school commute times. Therefore, combined active and motorised transport to school is also a plausible way to increase adolescent girls’ physical activity when active transport only is not feasible.


Assessment of School Neighbourhood Built Environments for Active Transport to School

An optimal distance for walking to school in Dunedin adolescents is ≤2.25 km. Adolescents’ perceived walking safety was the strongest correlate of active transport to school, whereas the near-school built environment was not correlated with active transport to school. Therefore, adolescents’ perceptions of walking safety should be considered as part of comprehensive efforts to encourage active transport.


Adolescents’ Perspectives on School Choice

The most common reasons for school choice in Dunedin included: preference for a co-educational school, school’s facilities, positive comments from parents/students and friends’ enrolment. Reasons for school choice differed by who was making the decision (student, parent, or student and parent together). These findings suggest that social factors and school programmes/facilities rather than proximity to home influence school choice decisions in Dunedin.


Implications of School Choice Decisions on Active Transport to School

Without school zoning, half of Dunedin adolescents enrolled in the closest school. Distance to school and importance of school’s proximity influenced school choice. Co-educational school status and peer feedback were also important. Adolescents attending their closest school had five times higher rates of active transport. These findings suggest that school choice has implications for education, health, transport and environment.


Evaluation of Cycle Skills Training Programme

Cycling is a less common mode of transport to school compared to walking among children and adolescents in most developed countries. Cycle skills training improves children’s cycling knowledge and skills. Cycle skills training in a traffic-free and light traffic environment is a promising approach to improve children’s cycling-related skills and knowledge. Although adolescents and their parents have positive attitudes toward cycle skills training, the effects of such training in adolescents remains unknown. This research examined and compared the effects of cycle skills training with or without on-road training on cycling-related knowledge, confidence and behaviours in children and adolescent girls.

Cycle Skills Training in Children

This article shows that cycling dominated as children’s preferred mode of transport to school. Cycle skills training improved children’s cycling-related knowledge. Training also improved confidence to cycle in parks and on the road but not to school. The on-road cycle training had small positive effects on increasing cycling to school. Additional interventions targeting parents, schools and built environment changes may be necessary to achieve long-term behavioural change.


Cycle Skills Training in Adolescent Girls

This is the first article to examine the effects of cycle skills training in adolescents. In this study, cycle skills training improved cycling-related knowledge in adolescent girls. The on-road cycle training improved confidence to cycle on the road but not to school. The training did not change cycling habits in adolescent girls. Future cycle skills training should be tailored to adolescents’ needs. To achieve behavioural change, additional interventions may be necessary.


The links to publications are also available on our websites:
The BEATS Research Programme: www.otago.ac.nz/beats/publications
Active Living Laboratory: www.otago.ac.nz/active-living/research/publications