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The journey to learn: Perspectives on active school travel from exemplar schools in New Zealand

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ABSTRACT

Introduction: In New Zealand, as elsewhere, active school travel has declined over recent decades. The emergence of physical inactivity as a global health concern has heightened the need for strategies to reverse this decline. In this paper we question whether 'exemplar schools' - those with comparatively high active school travel rates – offer lessons for other schools. We report on a qualitative investigation in these schools to understand school-level enablers and interactions across socio-ecological domains.
Method: Nine schools (three primary, four middle, and two secondary) were identified through local government contacts across New Zealand – reported estimates of active school travel rates were between 43% and 61%, compared to the New Zealand national rate of 31%. Semi-structured interviews with school representatives explored: school values, policies, and practices; local culture and norms; and perceptions of the street environment. Interviews were transcribed verbatim, coded, and analysed thematically.
Results: Interview data suggest an interaction between: local community culture and values; school culture and practices; and the physical environment, whereby these elements positively reinforce each other to contribute to active school travel rates above the norm. This interaction was common across all schools; however, context-specific variation in active school travel enablers was evident. Schools supported active travel because physical activity is believed to aid student learning, and this support was conditional on a traffic safety threshold being met.
Conclusion: This qualitative inquiry complements other quantitative research by providing narrative around the complex socio-ecological interactions underpinning active school travel. Findings suggest that a thorough understanding of school values and priorities, and community culture are needed to design a context-specific mix of interventions to increase active school travel. Several other implications for research, policy, and practice are discussed.

1. Introduction

Physical inactivity in children and youth is a prevalent global health problem (Aubert et al., 2018), contributing to greater risk of non-communicable diseases and poor mental health status (Poitras et al., 2016; World Health Organization, 2013). For optimal

health, it is recommended that children accumulate at least 60 min of moderate to vigorous physical activity per day (Poitras et al., 2016; World Health Organization, 2015). Active travel to/from school (e.g., walking or cycling) can make a meaningful contribution to reaching this recommended level (Faulkner et al., 2009; Larouche et al., 2014b), and may also positively influence cognitive performance (Martínez-Gómez et al., 2011) and social development, particularly when travel is independent of adults (Marzi and Reimers, 2018; Pooley et al., 2010). Wider population benefits of increasing active school travel (AST) include reductions in air pollution and climate change mitigation (de Nazelle et al., 2011). Normalising AST in the current generation of children will have future health and environmental benefits.

In New Zealand (NZ), as in many industrialised countries, AST has declined in the last 25 years, coupled with concomitant increases in children being driven to school (Larouche et al., 2015; Ministry of Transport, 2015). NZ Household Travel data estimates that only 31% of journeys to NZ schools are 'active' for both children (5–12 years) and youth (13–17 years) (Ministry of Transport, 2015). Cycling journeys have decreased markedly since 1989 - from 12% to 2% in children, and 19%–3% in youth (Ministry of Transport, 2015). In NZ, males and children aged 10–14 years are more likely to travel actively to school than females, younger children, and older adolescents (Smith et al., in press). Some evidence suggests children in deprived neighbourhoods achieve higher AST rates than less deprived groups (Ikeda et al., 2018b). Low rates of AST are concerning as NZ children have low levels of physical activity (Smith et al., in press) with a third overweight or obese (Ministry of Health, 2017). Although some NZ cities have shown interest in the 'Child Friendly City' approach (UNICEF, 2019), NZ towns and cities are still largely characterised by low-density housing and automobile-dominated transport systems (Ministry of Transport, 2015), which are considered toxic for children's health and wellbeing (Gleeson and Sipe, 2006).

A large body of research has sought to explain AST decline and test interventions to reverse downward trends. Socio-ecological models – both theoretical and methodological - have been used to identify social (socio-demographic and socio-cultural) and environmental (built and natural) influences on AST at individual, interpersonal, organisational, community, and policy levels (Giles-Corti et al., 2005; Mitra, 2013; Panter et al., 2008; Sallis et al., 2006; Sirard and Slater, 2008).

At the individual level, AST commonly varies across gender, age, socio-economic status (SES), and ethnicity (Rothman et al., 2018). Distance to school is the strongest and most consistently demonstrated associate of AST both internationally (Curtis et al., 2015; Rothman et al., 2018) and in NZ (Ikeda et al., 2018c). Other objective built environment AST associates include street connectivity (Ikeda et al., 2018c), dwelling or population density (Curtis et al., 2015; Rothman et al., 2018) and walkability (Rothman et al., 2018).

The social environment has been explored at varying scales – home, school, and neighbourhood. At the family level, more favourable parent perceptions of traffic safety, personal safety, and walkability are positively associated with AST (Ikeda et al., 2018a; Rothman et al., 2018). Parent perceptions may also interact with other social and environmental factors to result in decisions to support or inhibit AST (Ahern et al., 2017; Ikeda et al., 2018b; Ross et al., 2017; Trapp et al., 2011). Negative associates of AST include parent education level and car access (Ikeda et al., 2018a; Rothman et al., 2018).

At the school level, quantitative studies have typically examined the presence or absence of AST policies and programmes (termed school practices) and findings are inconsistent (Ikeda et al., 2018a). Some studies have found that crossing guards (i.e. adults guiding safe crossing) (Everett Jones and Sliwa, 2016; Larouche et al., 2014a), bike racks (Everett Jones and Sliwa, 2016) and school encouragement (Everett Jones and Sliwa, 2016; Hollein et al., 2017; Lee et al., 2017; Trapp et al., 2012) are significantly associated with AST, whereas others have shown insignificant results (Panter et al., 2013; Salmon et al., 2007; Trapp et al., 2011). Larouche et al. (2014a) found that the combination of *identifying safe routes for children* and traffic calming meant Canadian children were eight times more likely to travel actively – highlighting possible interactions between school factors and the environment. The 'quality' and specificity of school practices and the nuances of school culture are likely to be important (Eyler et al., 2007; Fesperman et al., 2008), but may be difficult to quantify (Crawford and Garrard, 2013).

Neighbourhood social interaction was identified as a positive and consistent associate of AST in children in a recent systematic review (Ikeda et al., 2018a). Neighbourhood social cohesion has also been positively associated with NZ children travelling independently (Lin et al., 2017). Inconsistent findings are evident for associations between neighbourhood level SES and AST (Ikeda et al., 2018a).

School Travel Planning (STP) and Safe Routes to School (SRTS), are common multi-faceted programmes that aim to increase AST (Larouche et al., 2018; Pang et al., 2017). While positive intervention effects have been evident for STP in NZ (Hinckson et al., 2011) and SRTS in North America (McDonald et al., 2014), systematic reviews have shown trivial to small effect sizes, inconsistent results across studies, and a lack of evidence for sustained change (Larouche et al., 2018; Villa-González et al., 2018). Varied programme implementation and school type, location, SES and motivation may moderate intervention effectiveness (Buttazzoni et al., 2018a; Crawford and Garrard, 2013; Hinckson et al., 2011; Larouche et al., 2018; Mammen et al., 2014, 2015). Similarly, less is known about effective AST interventions for youth (> 13 years) (Larouche et al., 2018; Mitra and Buliung, 2015).

This observational and experimental research demonstrates that AST behaviour is complex, with multiple factors interacting at different levels and variation in determinants across contexts (Ikeda et al., 2018b; Larouche et al., 2018, 2015; Rothman et al., 2018). To unravel this complexity, a better understanding of context-specific influences across socio-ecological domains is needed (Larouche et al., 2018; Rothman et al., 2018). Moreover, a gap remains in understanding the influence of school-level factors and in explaining the inconsistency seen in quantitative research (Ikeda et al., 2018a).

Qualitative inquiry enables in-depth examination of school culture and practices, how they manifest in different contexts, and how they may affect AST behaviour (Ahern et al., 2017). Previous qualitative studies have provided useful insight into AST experiences in children and youth (Hinckson, 2016; Hopkins and Mandic, 2017; Wilson et al., 2018) and the complexity of school travel decision-making for parents (Ahern et al., 2017; Faulkner et al., 2010). Other qualitative studies with STP coordinators (Mammen

et al., 2015) and school representatives (Atteberry et al., 2016; Buttazzoni et al., 2018a; Crawford and Garrard, 2013; Eyler et al., 2007) have described the factors that impact AST intervention implementation, such as school readiness, collaboration, funding and time. This literature is informative; however, there is also value in exploring the perspective of schools, without being constrained by a specific intervention framework. Focusing on schools with AST rates that positively deviate from typical levels may build knowledge of 'what works for whom in what context' (Larouche et al., 2018) to inform future policy and practice.

This paper reports on a qualitative study, which explored the culture, practices, and context of exemplar schools in NZ – those with comparatively high AST rates. School representatives were interviewed about their experiences and reflections. The inquiry was informed by a socio-ecological framework and aimed to answer the following questions.

- *What were school representatives' understandings of the factors underpinning high AST rates at their schools?*
- *Were there commonalities and differences between schools in values, policies, and practices relating to AST?*
- *How do school values, policies, and practices manifest in different school contexts, and interact with other socio-ecological factors to support AST?*

2. Materials and method

2.1. Design

This study draws on interviews conducted with representatives from nine NZ schools (across six regions), with comparatively high rates of AST, between September 2016 and May 2018. The study was approved by the Massey University Ethics Committee.

2.2. School selection and recruitment

A purposive sampling method was used to identify schools with AST rates that positively deviated from the national rate of 31% (Ministry of Transport, 2015). Local government (LG) staff, who oversee school travel programmes throughout NZ, were contacted and asked to identify the schools with the highest rates of AST in their area. This was defined as the schools with the highest combined proportion of students who walk, bike, scoot or skate, as well as schools with a 'stand-out' rate for a specific active travel mode (e.g. cycling or scooting). LG staff were asked to provide suggestions for schools regardless of whether they were working with the school on STP or road safety programmes, and regardless of whether AST rates were historically high or had recently increased. There is no comprehensive national data set of school travel mode share at the school level; therefore, researchers relied on this knowledge of LG staff (and in some cases locally collected travel data) to identify exemplar schools. Drawing on reported AST rates, schools were selected from the pool of suggestions based on achieving variation across the following characteristics: school type[1] (primary, middle, and secondary school), SES (indicated by the school's decile[2]), geographical spread across NZ, and the presence of infrastructure to support AST.

School principals were contacted and invited to participate in a research interview. In some cases, the principal referred the researcher to another staff member who had greater availability or more topic knowledge.

2.3. Study sample

A total of 13 schools were approached - four declined to participate or failed to respond. Table 1 summarises the characteristics of the nine participating schools and other contextual information. Pseudonyms for the school name have been used to preserve the anonymity of schools.

The sample represents a group of exemplar schools, with AST rates that were considerably higher than those seen both nationally (31%) (Ministry of Transport, 2015) and in main urban areas (35%) (Ministry of Transport, Personal Communication, August 10, 2018). Webb and Tātahi Schools had total active mode shares of 44% and 43% respectively but were most notable for their regionally high rates of cycling, scooting, and skating.

Walk Score is an open access tool that rates the walkability of a given address, based on distance to nearby destinations and metrics such as population density, block length, and intersection density (Walk Score, 2019). The address of each school was used to generate a Walk Score and categories based on these scores are reported in Table 1, as an indicative proxy for neighbourhood walkability.

Six schools were in the North Island of NZ and three were in the South Island. Five were located in cities (population > 100,000) and four in provincial towns (population < 100,000). School rolls ranged from 400 to 1500 students. All schools were in urban environments (population > 30,000) (Stats NZ, 2013), and predominantly in residential areas, where the default speed limit is

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[1] Typical school types in NZ are: Primary School, Year 1–6 (ages 5–10); Intermediate School, Year 7 and 8 (ages 11–12); Junior High School, Year 7–10 (ages 11–14); and, Secondary School, Year 9–13 (ages 13–17) (Ministry of Education, 2018b). Intermediate and Junior High Schools are referred to as 'Middle-schools' for the purpose of this paper.

[2] School decile is a socio-economic indicator of the school's student community - decile 1 is the 10% of schools with the highest proportion of students from low socio-economic communities, decile 10 is the 10% of schools with the lowest proportion of these students (Ministry of Education, 2018a).

Table 1
Characteristics of the sample of schools.

Pseudonym	School Type	School decile[a]	Estimate of AST mode share[b]	School Travel History[c]	Physical Environment Features[d]
Morton	Primary	High	**54%** 45% walk 1% bike 3% scoot/skate 5% walking school bus	- Involved in STP for 10 + years, reported as a very active school for AST promotion (AST mode shift since 2004 of ~24% reported).	- Walk Score[e] – Somewhat Walkable. - Pedestrian facilities at school entrances; speed reduction measures near the school. - No specific cycling infrastructure near the school. - Residential area, near small town centre and the coast.
Blackburn	Primary	High	**56%** 48% walk 2% bike 6% scoot/skate	- Involved in STP for 8 + years (AST mode shift since 2004 of ~22% reported). - Infrastructure improvements made as part of STP.	- Walk Score – Car-Dependent. - Pedestrian facilities on main roads near school entrances; speed reduction measures near the school; one school entrance located on a main highway. - Community walking and cycling paths in the vicinity of the school. - Residential area, adjacent to rural area.
Baker	Primary	Low	**53%** 48% walk (including scooter) 5% bike	- Historically involved in STP. - Infrastructure improvements made as part of STP.	- Walk Score – Somewhat Walkable. - Pedestrian facility and speed reduction measures near school entrance. - Community walking and cycling path close to school entrance. - Residential area, near recreational facilities and town centre.
Webb	Middle	High	**44%** 25% walk 12% bike 7% scoot/skate	- Involved in STP for many years. - High rates of cycling compared to other schools in the area.	- Walk Score – Somewhat Walkable. - Pedestrian facilities and speed reduction measures near school entrance. - Cycle lane on main road near school entrance. - Residential area, near small commercial area and the coast.
Wilcox	Middle	Medium	Reported as consistently high (i.e. > 60%)	- Historically involved in STP. - High rates of walking, cycling, and scootering for many years.	- Walk Score – Somewhat Walkable. - Pedestrian facility and speed reduction measures near school entrance. - Community walking and cycling paths close to school entrance. - Residential area.
Tātahi	Middle	Medium	**43%** 10% walk 9% bike 24% scoot/skate	- Involved in STP for many years. - High rates of cycling, skateboarding, and scooting compared to other schools in the area.	- Walk Score – Car-Dependent. - Some pedestrian facilities on main roads near the school; speed reduction measures at school entrance. - Walking and cycling path close to school entrance. - Residential area, near an industrial area, small town centre, and the coast.
Ti kōuka	Middle	High	**up to 60%** 33% bike 10% scoot/skate % walk unknown	- Some involvement with LG on school travel initiatives. - Very high rates of cycling.	- Walk Score – Car-Dependent. - Pedestrian facilities at school entrance. - Community walking and cycling paths close to school entrance. - Residential area, suburban fringe.
Brook	Secondary	Medium	**55%** 24% walk 29% bike 2% scoot/skate	- No formal partnership with LG on school travel initiatives. - Very high rates of cycling.	- Walk Score – Somewhat Walkable. - Pedestrian facility at school entrance; speed reduction measures near school entrance. - Cycle lane on main road near the school. - Residential area, near main town centre.
Vine	Secondary	High	**61%** 53% walk 8% bike	- Involved in STP for many years. - High rates of cycling compared to other schools in the area.	- Walk Score – Somewhat Walkable. - Pedestrian facilities and speed reduction measures near school entrance. - Community walking and cycling paths in the vicinity of the school. - Residential area, adjacent to recreational facilities.

[a] School decile is a socio-economic indicator of the school's student community. Schools are grouped into socio-economic categories based on the following; low (decile 1–3), medium (decile 4–7) or high socio-economic (decile 8–10) (Ministry of Education, 2018a).

[b] Estimates are based on information provided by local government staff or the school.

[c] Information provided by local government staff.

[d] Physical environment descriptions are based on images from Google Maps (Google, 2019), using the most recent images prior to data collection, and Walk Scores are from http://www.walkscore.com (Walk Score, 2019).

[e] Walk Score categories: **90–100 Walker's Paradise** (Daily errands do not require a car); **70–89 Very Walkable** (Most errands can be accomplished on foot); **50–69 Somewhat Walkable** (Some errands can be accomplished on foot); **25–49 Car-Dependent** (Most errands require a car); **0–24 Car-Dependent** (Almost all errands require a car) (Walk Score, 2019). Actual Walk Scores have not been reported for each school to maintain school anonymity.

50 km/h (NZ Transport Agency, 2017). All schools had Walk Scores in the 'Somewhat Walkable' or 'Car-Dependent' categories, indicating suboptimal walkability overall, but also variation across schools (Walk Score, 2019). There was also variation in the presence and proximity of other physical environment features, which may support or discourage AST, for example: community walking and cycling paths; speed reduction measures; and main roads near school entrances (Table 1).

2.4. Data collection

Semi structured interviews were conducted by the first author using an interview guide developed by the research team. Question domains covered: school values and priorities; school travel culture, policies, and practices; partnerships; local neighbourhood culture and norms; and perceptions of the surrounding street environment. Participants were given time to offer additional insights on factors that supported AST.

One school had a particular focus on student voice (encouraging students to actively participate in school decision-making) and felt their student council would offer some useful insights on AST. Therefore, in addition to an interview with the principal, one focus group was conducted with seven students from this school – three boys and four girls in Years 7 and 8 (ages 11–13).

Six interviews and the focus group were conducted face-to-face, and three interviews were completed via telephone. The interviews and focus group lasted an average of 48 min (range = 35–77 min) and were voice recorded.

2.5. Analysis

Interviews with school representatives and the focus group with students were transcribed verbatim and the data analysed thematically (Braun and Clarke, 2006). Transcripts were first read several times by the second author to identify patterns of meaning across the data. These patterns were discussed with the first author, who conducted the interviews, and an initial coding frame was developed. Data were organised by code and subsequently analysed and interpreted thematically (second author). Commonalities and differences between schools in policies, practices, and behaviours relating to active travel and school representatives' understanding of what enabled or constrained these practices were of particular interest in the analysis.

Parentheses - […] – indicate where quotations have been altered to protect school anonymity. We have indicated after each quote whether the school is a primary, middle or secondary school, and low (decile 1–3), medium (decile 4–7) or high (decile 8–10) socio-economic.

3. Results

Interview data suggest a recursivity between 1) local community culture and values; 2) school policies, practices, and culture; and 3) the physical environment. Recursivity, or the quality of being recursive, is defined as something that reoccurs over and over again, indefinitely, to produce a particular result or effect (Oxford University Press, 2019). Key themes are described, illustrated with excerpts from interviews with school representatives.

3.1. Local community culture and values

A local culture supportive of AST had common elements but varying hues in the different localities. An outdoorsy, active and/or sporty community culture was seen to support AST. At Webb and Tātahi these attributes were linked to proximity to the coast and at Brook, Wilcox, and Baker to benign weather.

The coastal influence is captured in this Tātahi student's comment:

I skateboard 'cause I live really close and I want to learn how to surf so skateboarding actually is a good way to help you learn how to surf. (Tātahi, middle school, medium SES)

The active community theme was also emphasised by the Principal:

Yeah I think [Coasties], affectionately we call them, are really mobile people, the kids here are incredibly active so having taught in urban primary schools and intermediates in [nearby city], where we used to schedule daily fitness and daily exercise, we don't have to do that here, the kids are phenomenally active … like it is just a really active community so that whole notion of kids you know skating and getting themselves to and from school … (Tātahi, middle school, medium SES)

Families were portrayed as spending leisure time in active pursuits, particularly at Webb, Tī kōuka, Wilcox, and Tātahi and kids walking/biking/scootering/skateboarding to school was seen as an extension of family recreational practices.

You know probably family, you know maybe cycling holidays, go up to [mountain bike park], there's a lot of that you know. So that idea of cycling, being a bit more outdoorsy. It's quite a Pākehā [NZ European] area. (Webb, middle school, high SES)

I think as a whole it's quite an active region. Sport is well promoted here. You had that lifestyle culture of fine weather, great outdoors, lots of good facilities. (Wilcox, middle school, medium SES)

3.2. Collaboration to support active transport

Successful AST schools appeared to be well networked with other schools in their area and with local council transport planners and police. The follow quote described collaboration around travel safety at Tī kōuka School:

… we got together with […] who's the principal there [Primary school] and just talked about a traffic plan with whoever was in charge of the traffic at the council and just said okay … what are we gonna do to manage that and how are we gonna keep the kids safe? So I think there was a lot of lobbying for lights. It has to be safe. It's those lights … … our start time is 15 minutes before [primary school], so a staggered start time so that we can think about the traffic management. (Tī kōuka, middle school, high SES)

At Wilcox, children from contributing primary schools attended a cycling training session at their prospective new school prior to enrolling and staff at Tātahi (middle school) recognised a continuity of support for active travel from the local primary school to the middle school.

When AST was promoted at primary school and uptake had been high it was expected that AST would continue at middle-school, especially if doing so was congruent with wider community values around living active lives. Notwithstanding provisos around safety, getting children cycling early was supported by a number of interviewees.

3.3. School policies, practices, and culture

Policies around biking, scootering and skateboarding varied across schools and ranged from blanket encouragement and support to an acceptance that if it's going to happen students should be assisted to be as safe as possible. High rates of AST appeared to be taken for granted, normalised behaviour in several schools. It was notable that at Tī kōuka, Tātahi, and Wilcox the interviewees didn't think the school did anything in particular to support AST.

We didn't do anything, we just work here and we've got this amazing community. It's so well structured to allow safe travel and it's pretty. (Tī kōuka, middle school, high SES)

In fact, Tī kōuka had several AST supportive practices that were so much a part of the everyday school life they were not identified as such. For example, encouraging the use of scooters and skateboards at break times by having an area with ramps and skilled, inspiring skaters on staff. Elective programmes included geocaching by bike and endurance rides. Racks for skateboards were provided in classrooms. The school and local culture was such that biking/scootering/skateboarding had become self-reinforcing – it was fun, gave the children independence and opportunities to socialise with peers.

[two staff members] … they're amazing on their skateboards and scooters and they'll go out with the kids and they'll do tricks and then the kids see that and then they'll learn how to do it … It just part of the culture here. (Tī kōuka, middle school, high SES)

Likewise, the Wilcox representative said the school did nothing to encourage AST - it wasn't a part of school plans or priorities and with respect to cycling his personal view was cycling was too dangerous to encourage. Despite this view it was estimated that 95% of students came to school by active mode and it was apparent the school enabled safe AST in several ways. These included: students from contributing schools being taught safe routes to the middle-school; encouraging parents to practice biking the route to school with the students; a school policy sent home to parents on safe and legal bikes; and, lock up storage for bikes and scooters.

While Tī kōuka's policies were framed positively to encourage fun and freedom Wilcox's had a more rule-based safety focus (e.g. asking parents to collect bikes that were not road legal).

Tātahi also had a raft of AST supportive practices, justified in terms of student learning and 'coastal values'. Baker School interviewees talked of a routine school policy to 'actively walk kids' for school trips:

It's just an established norm which is great 'cause it is very doable from here to the museum or the library. (Baker, primary school, low SES)

Morton Primary had age-related policies and ran a bike licensing system:

Yeah you have to get a licence to ride to school and then we have got the bike shed that we raised the money for … so their bikes are locked in there all day …. They are supplied with hi-viz vests, the same thing with our scooters, I think scooters can be ridden from Year 3 up, juniors can ride the scooters but only with a parent. (Morton, primary school, high SES)

At Brook School an estimated 20% increase in cycling to school was attributed to the synergistic effects of building a bike storage facility to reduce fears of bikes being stolen and new off-road routes that were encouraging recreational cycling in the area.

Several schools nested AST promotion within a bigger picture of health and environmental sustainability:

In our car parks there are certain car parks that are reserved for carpooling and there are certain car parks reserved for [fuel efficient] cars … it's all part of a bigger picture. It's not perfect yet but at least it's a value that we're trying to promote. (Tī kōuka, middle school, high SES)

Awareness of the health and environmental impacts of transport practices and the more immediate frustrations of traffic congestion were seen to influence the transport choices of Vine Secondary School students, encouraged by a school culture that supported student leadership programmes. Linking daily travel to sustainability imperatives is implicit in the following comment:

We all have to go through traffic jams every day, even people living 5kms away from school, they experience it and they see their parents experience it, and all the kids they know this is a problem … so we're hoping to create young adults that can eventually solve the problem that we created. (Vine, secondary school, high SES)

Tātahi and Baker School described strong advocacy to get supportive infrastructure in the school's vicinity to make AST safer. At Baker School, staff positioned their actions around infrastructure changes as political and their opposition to roads being motivated by health and environmental concerns. Baker School was involved in other school health and environmental programmes and staff spoke of the importance placed on connecting parents to bigger picture environmental thinking in school communications:

… just so that actually parents get a sense this is how it's happening in the world, this is the trends, this is Europe. Rather than it's a bunch of nutty greens. (Baker, primary school, low SES)

3.4. Recursivity between community culture, school culture, and the physical environment

Two fundamental factors that underpinned AST support were safety and student learning goals. The built environment features that were viewed as supporting student safety were safe crossing facilities, off-road walking and cycling paths, quieter routes that avoided main roads, and lower traffic speeds. Table 1 summarises key physical environment features at each school.

As long as a perceived safety threshold was met the rationale for supporting AST was that being active supported student learning. The notion of 'coastal values' espoused at Tātahi School was an interesting example of assumed area wide values that were put to work within the school context to support student learning. The school representative emphasised that everything the school did was directed at student learning; 'coastal values' were used to promote student behaviours (within school and in the community). Respecting others (a coastal value which could be applied in numerous ways including cycling etiquette) was embraced because it could support student learning. Similarly, there was alignment between the school's AST policies and practices, the notion of coastal values, and encouraging 'positive behaviour' to support learning:

… so every single staff member is out supporting kids with positive choices in terms of how they exit the school and navigate the surrounding and that is all part of the coastal values and the positive behaviour for learning but it has got that safety lens on it too. (Tātahi, middle school, medium SES)

'Coasties' imagery of active outdoor living, blended with the notion of coastal values, was used to try to normalise certain cultural expectations by encouraging and reinforcing a range of behaviours from students:

… it is because it is embedded with our coastal values, just you know a day to day part of what we do. So it is not like we do a one-off unit on how to exit school grounds, we actually teach the kids how to do it and then we reinforce it and we re-explore it and we monitor and we reward it when they do it right, so it is kind of just part of how we do it every day. (Tātahi, middle school, medium SES)

Working alongside community and adopting AST strategies based on a rationale of supporting student learning was also evident elsewhere:

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. (Baker, primary school, low SES)

Whereas some schools appeared to tune into existing community values that supported AST (Tī kōuka, Webb, Tātahi) other school staff talked about actively cultivating community engagement and support (Baker, Morton, Blackburn). Blackburn School had an active philosophy of community collaboration which included raising awareness of AST matters - for example, neighbourhood letter box drops to raise awareness of students walking and scootering on routes to the school.

Blackburn staff also described the school's role in changing community culture around the use of active modes by teaching children who would in turn teach their parents:

… a key one [strategy] is getting students excited and buying in because children educate the parents. So, really involving the children in active travel thinking and that tends to flow on through the families. (Blackburn, primary school, high SES)

Morton staff appeared to work hard to engage their community in AST but doing so was depicted as a battleground in comparison to the views of some of the other schools:

Because we get road rage out there and the teachers cop it, we get abuse left right and centre, it has got worse over the years so the more we can keep it away the better. (Morton, primary school, high SES)

The importance of an enabling built environment in addition to a supportive local culture is highlighted in the following quote:

… it feels family-focused, it feels like if you're out on a sunny day everybody and their dog is out walking and running, it's very active, friendly. And the infrastructure is there, and we've got the bike paths or the footpaths to do it safely. (Tī kōuka, middle school, high SES)

The theme of a recursivity between the school, community, and environment elements is visually represented in Fig. 1. In
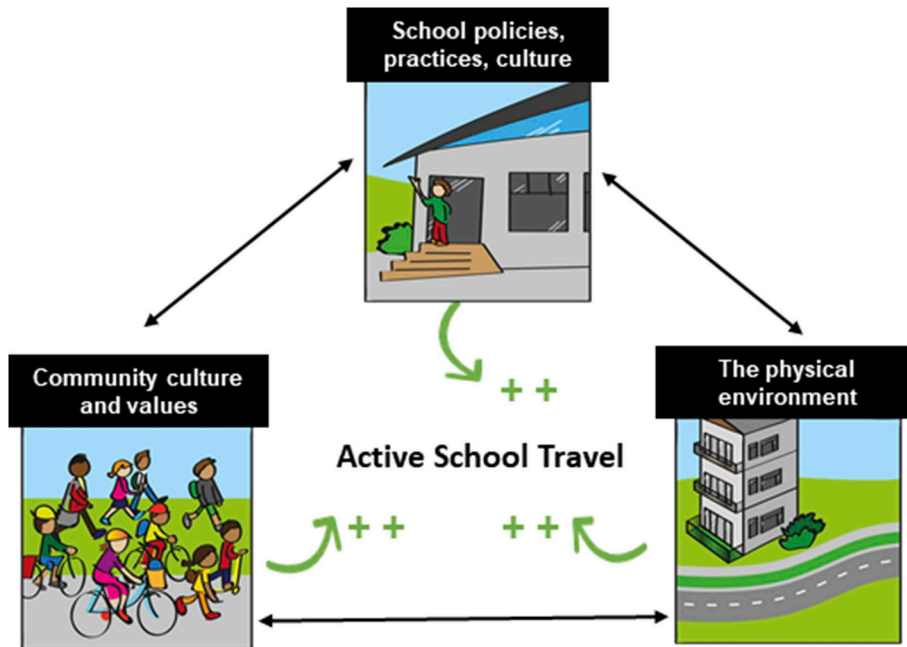
Fig. 1. A recursive relationship of active school travel enablers in a community, based on insights from exemplar schools in New Zealand.
Fig. 1 Description: Black arrows indicate an on-going two-way interaction. Green arrows and accompanying 'plus signs' indicate a positive influence on AST behaviour as a result of this interaction.

addition, the level of 'effort' and the role of the school appeared to change depending on the strength of the other elements - i.e. a continuum from the school as a 'driver' of AST behaviour to a 'reinforcer'. In instances where a perceived local culture of physical activity and enabling physical environment features were described, school practices were depicted as 'reinforcing' and implicit cues fostered an AST culture (Fig. 1a) (Webb, Wilcox, Tī kōuka, Brook). In instances where some supportive community and physical environment elements were described, but with some residual barriers remaining, more 'effort' from the school was portrayed, with school practices seeking to drive AST uptake and foster community support (Fig. 1b) (Blackburn, Morton).
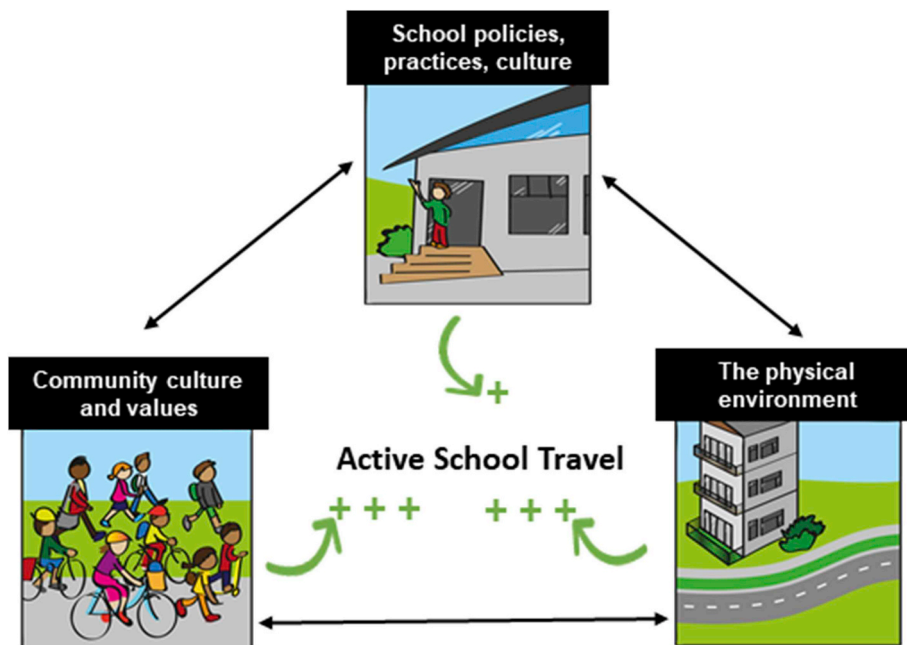

Fig. 1a. The school as a 'reinforcer' of AST culture when interacting with strong community and physical environment factors.
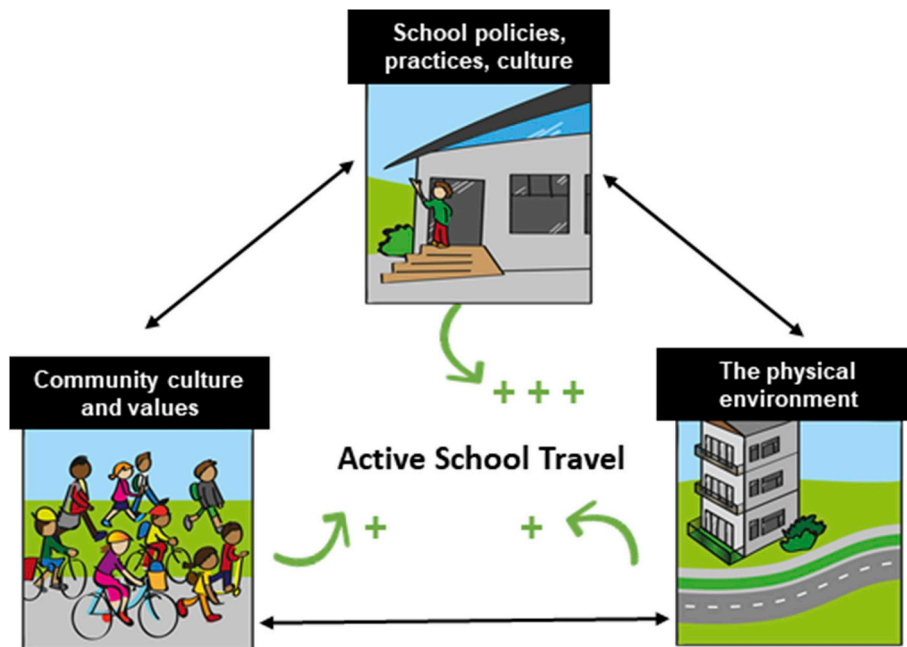
Fig. 1b. The school as an AST 'driver' when interacting with weaker community and physical environment factors.

3.5. Other social characteristics

Several interviewees linked an area's demographic composition to community support for active travel, but the explanation differed by school decile rating. Higher decile schools attributed high AST variously to Pākehā households, working parents and time stress that necessitated children getting themselves to school (Webb and Tī kōuka). Conversely time stress and congestion were seen as contributing to drive and drop and road rage behaviours at Morton School. Baker School, a low decile school, identified higher rates of AST in former refugee families and non-car households.

4. Discussion

The aim of this study was to explore, through the lens of school representatives, the practices, culture, and context of NZ schools with comparatively high AST rates, in order to elucidate factors underpinning AST. This information can stimulate new ways to conceptualise the complexity of AST, help explain inconsistent evidence from quantitative research, and offers lessons for schools and AST practitioners. Our analysis of school representatives' dialogue indicated a recursive relationship between the school culture, community culture, and the physical environment. This provides an authentic example of socio-ecological theory in practice – in particular, illuminating how organisational and community level factors can interact to influence AST behaviour (Sallis et al., 2006).

AST practices varied across schools, not only in type and number, but also in how they were implemented and framed – from overt encouragement, to value-based approaches, rule-based policies, and fun, social activities. The influence of school factors on AST may be more affected by the nature of these practices and specificity to student and community needs and norms – rather than simply their presence or absence (Crawford and Garrard, 2013; Fesperman et al., 2008). This could partly explain the inconsistency seen in quantitative studies (Everett Jones and Sliwa, 2016; Ikeda et al., 2018a). Future studies should consider the quality of school AST practices, and the extent they are voiced and embedded within school, family, and community culture, not solely the quantifiable elements. Schools supported AST based on an understanding that being physically active improved student learning and strengthened broader school or community values; findings that echo those of Buttazzoni et al. (2018a) in a Canadian setting. In NZ, AST interventions are primarily framed in terms of student safety, student health, and at times environmental sustainability (Auckland Transport, 2018; NZ Transport Agency, 2011). Thus, overtly making the link between AST and student learning could create another policy 'driver' which directly aligns with the core business of education. Our findings also support the notion that AST practitioners should focus on working in partnership with schools to integrate AST supports, rather than place too much emphasis on pre-determined activities or 'one-off' actions (Buttazzoni et al., 2018a; Mammen et al., 2015).

In several schools, AST supports were so embedded in school life interviewees found them difficult to identify (i.e. lunchtime scooter use, staff doing 'tricks' on their wheels, and walking to destinations for school trips). These practices align with the 'observational learning' construct of Social Cognitive Theory, which is characterised by peer modelling and role modelling (McAlister et al., 2008). In accordance with Ginja et al.'s (2018) conceptualisation of AST using the Behavioural Ecological Model, these elements in the school social environment may be acting as regular positive reinforcers of AST behaviour. In addition, these enablers of AST, while evident at most schools, were more apparent at middle and secondary schools and more evident for cycling. The

importance of socialising and social norms on AST behaviour in adolescents has been suggested in other NZ (Frater et al., 2017; Mandic et al., 2015) and international research (Mitra and Buliung, 2015) and may be particularly salient for cycling (Frater et al., 2017; Hopkins and Mandic, 2017). Previous quantitative studies have also highlighted the differing correlates of walking versus cycling to school and the limitations of combining these modes as one AST dependent variable (Mandic et al., 2017; Trapp et al., 2011). Taken together, these observations suggest further research should focus on investigating the role of implicit social cues in changing and sustaining AST behaviour in adolescents, especially for 'wheels'. Increasing the uptake of cycling and other 'wheels' is important because it could reduce the profound effect of distance to school (Ikeda et al., 2018b). However, schools with exemplar rates of 'wheeling' were all middle-high SES schools – more research examining the barriers and enablers in low SES schools is needed if equitable increases in 'wheeling' are to occur.

Secure storage facilities for bikes, skateboards, and scooters were common in exemplar schools, and alleviated concerns about theft. While storage facilities are unlikely to have a significant effect in isolation (Crawford and Garrard, 2013; Panter et al., 2013; Smith et al., 2017; Trapp et al., 2011) they may be an important visual cue in the social environment that signify these modes are normal and accepted (Hopkins and Mandic, 2017). Visible, lockable, and user-friendly storage facilities could be a low-cost and low-burden AST support (Crawford and Garrard, 2013; Mandic et al., 2017).

Schools attributed AST rates variously to active local communities, family recreation practices, and local natural and built environment elements (such as cycle paths, recreational facilities, and the proximity to the coast). In keeping with studies internationally, features in the physical environment, were perceived to play a role in fostering the development of an active local culture, which in turn fostered AST (Crawford and Garrard, 2013; Dollman and Lewis, 2007). Similarly, the imagery of students and families being 'out and about' could partially reflect greater neighbourhood social interactions and social cohesion, which are associated with AST and independent mobility (Ikeda et al., 2018a; Lin et al., 2017). School representatives advocated for continuity of safe and supportive environments (social and physical) for AST from primary through to secondary school, as this reinforced AST habits and values. Thus, our findings suggest that sustained neighbourhood-wide interventions, encompassing schools across year levels (with differentiated approaches by age) and over student generations, are likely to be most effective in increasing and maintaining AST behaviour. A neighbourhood-wide approach, which also incorporates the voices and needs of children, aligns well with a 'Child-Friendly City' framework (UNICEF, 2019).

4.1. Interpretation of overall findings

A recursivity and synergy across the socio-ecological domains of school practices and culture; community culture; and the physical environment was common across all schools. Despite this commonality, there was nuanced variation across schools in the nature and apparent extent of influence *within* these socio-ecological domains. Taking a recipe analogy, this can be described as common ingredients across schools, but with varying quantities and flavours resulting in a different mix (Fig. 1–1b). The variation in the physical context of exemplar schools outlined in Table 1 also supports this interpretation. In keeping with the findings of quantitative studies (Ikeda et al., 2018b; Larouche et al., 2018; Rothman et al., 2018) insights from this research suggest that AST is influenced by the interaction of context-specific factors. Locally-based, context-specific interventions that not only remove AST barriers, but also foster repeated positive reinforcement across school, community, and environmental factors should be encouraged. Our findings broadly support the multi-faceted and collaborative intention of current AST intervention models (e.g. STPs) (NZ Transport Agency, 2011; Pang et al., 2017). However, the large variation in success could be a result of 'not having enough' of the right ingredients for the context or relying too heavily on schools as a 'driver' without effectively addressing community culture and physical environment features (Buttazzoni et al., 2018b; Pang et al., 2017). Our findings endorse those of Buttazzonni et al. (2018a), which emphasise the importance of quality collaboration and the need to focus more on understanding the school context in the set-up phase of interventions.

4.2. Study strengths

The sample included a mixture of school types located in different built environments, in city and provincial areas and across geographical regions. The inclusion of secondary schools is a strength as research with older age-groups remains a research gap (Larouche et al., 2018). Considerable AST research has used a socio-ecological framework to quantify AST associates; however, few studies have taken a qualitative approach to help interpret these findings (Ahern at al. 2017) from the perspective of schools. This study is based on the premise that the limited and inconsistent associations between school-level factors and AST seen in quantitative research (Ikeda et al., 2018a) do not necessarily indicate an absence of association, and therefore a study strength is the novelty in choosing to explore this relationship in a different way.

The study methodology is also novel as it identified exemplar schools and worked backwards to holistically understand school perceptions of why. This is complementary to other qualitative research with schools focusing on AST intervention implementation (Buttazzoni et al., 2018a; Mammen et al., 2015).

4.3. Study limitations

Although the variation in school characteristics in the sample is a strength, the nine-school sample is also relatively small. Had additional schools been included, other school and community level factors, which are relevant in other school contexts, may have been identified. Only one low decile school was involved as two low decile schools declined to participate. The transferability of

findings to other low SES schools is potentially limited by this study weakness. Further qualitative research with low SES schools is needed, although eliminating barriers to participation will also need to be considered.

The recruitment of secondary schools was challenging - there was less local knowledge of travel behaviour in secondary schools and two declined to participate. While study findings provide some insight into secondary schools, more research with older adolescents is needed (Larouche et al., 2018).

The school selection approach relied on LG knowledge and local data. Given the absence of a national data set of school-level AST rates, this was deemed appropriate. However, this is a study limitation as the validity of local AST data sets is unknown and the data collection method varied across schools. Examination of AST trends over time in the sample schools was also limited. For one school, no data set was available, despite LG staff and the school reporting that the AST rate was routinely 60%–95%. A routine, nationally consistent approach to collecting AST data at the school level would enable examination of the contextual factors that underpin AST over time. The NZ 2018 Census included a new question on 'main means of travel to education' and addresses of home and education institution. Although this data set was not available at the time of publication, it may prove useful in the future (Stats NZ, 2019).

5. Conclusion

Interviews with NZ schools, who are exemplars in terms of AST rates, show that a complex mix of school, community, and physical environment factors interact and positively reinforce each other to result in AST rates above the norm. This study complements other quantitative research by providing a narrative around this socio-ecological interaction. The nuanced variation in AST enablers across schools, reinforces that locally-based, context-specific, and comprehensive interventions are needed to increase AST.

Several implications for policy, practice and research arise from this study: 1) the role of implicit social cues for facilitating and sustaining AST in adolescents should be further investigated; 2) An in-depth understanding of context-specific AST levers prior to AST interventions is needed to identify strategies that build on the values and strengths of the local school community; 3) Consideration should be given to framing AST policy and interventions in terms of student learning – as well as broader environmental and health values of schools; 4) Neighbourhood-wide interventions, addressing social and physical environments, encompassing schools across year levels and over student generations should be tested; 5) Quantitative research should continue to focus on the interactions of AST influences in different contexts.

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