

FINDINGS OF LEARNER TRAVEL SURVEYS IN CAPE TOWN, AND THE PROSPECTS OF ESTABLISHING A LONGITUDINAL LEARNER TRAVEL DATABASE

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ABSTRACT

Available data with which to adequately understand learner travel behaviour, and its significance for developing effective plans and strategies to address road safety and traffic congestion problems, is insufficient. This paper reviews the findings of recent learner travel surveys in parts of Cape Town which extend the available data, and enable an improvement of current knowledge of learner travel behaviour and of the prospects of intervening effectively in this segment of the passenger market. These studies take the form of a learner travel survey conducted amongst 14 secondary schools in Mitchells Plain and two other similar, but less extensive, surveys undertaken in Khayelitsha and Blaauwberg, which enable insights into the relationship between socio-economic grouping and travel behaviour. The paper presents a summary of the findings of these surveys, and reflects upon the need for, and prospects of, establishing a longitudinal learner travel database. The paper illustrates a clear relationship between household socio-economic grouping and learner mode use, with walking the dominant mode amongst lower income learners and car travel the dominant mode amongst higher income learners. The most common travel difficulties identified by the learners surveyed include personal safety, travel time and road safety. It is argued that there are benefits to be derived from learners who currently walk long distances switching to cycling, and that the available data suggests that greater potential for switching to cycling exists amongst learners in secondary schools. The benefits of establishing a longitudinal learner travel database, drawn from a variety of sources including census data and past and future *ad hoc* learner travel surveys, are argued to be improved data quality and validation to better inform the formulation of plans and strategies directed at addressing the travel problems experienced by learners, and an ability to monitor behavioural changes in response to the implementation of these plans and strategies over time.

1. INTRODUCTION

A paper presented by one of the co-authors at the previous South African Transport Conference argued that while learner travel is of great significance from a road safety and traffic congestion point of view, available data with which to adequately understand child and learner travel behaviour, in Cape Town at least, is insufficient (Behrens 2003). Since the presentation of this paper, a number of travel surveys have been conducted amongst learners in Cape Town schools which extend the available data, and enable the improvement of current knowledge of learner travel behaviour and of the prospects of changing it. These surveys include two research dissertations undertaken by civil engineering students at the University of Cape Town which explored innovative methods of learner travel data collection and the feasibility of implementing 'walking school buses' (Adams 2003, Fredericks 2003), and an extensive survey of secondary schools in Mitchells Plain undertaken by one of the co-authors (Phillips 2004). More learner travel data collection in Cape Town will follow when a school travel planning demonstration project is commissioned by the City

of Cape Town later in 2004. This paper focuses on the school survey undertaken in Mitchells Plain, and for comparison, draws where possible from two earlier school surveys undertaken in Khayelitsha and Blaauwberg which followed a similar survey format and thus enable some insight to be gained on how learner travel behaviour changes according to socio-economic grouping.

The aim of this paper is to present a summary of the mode choice findings of these surveys, with particular reference to cycling which was their focus, and to reflect upon the prospects of establishing a longitudinal, consolidated or meta- database on learner travel behaviour upon which effective strategies to deal with the problems associated with learner travel can be formulated and their impacts monitored. The paper is divided into 4 sections. The following section describes the learner travel surveys reported upon. Section 3 then summarises the key findings of the surveys with respect to mode use, time spent walking to school, and mode switching. Section 4 concludes with a discussion on the prospects of establishing a longitudinal meta-database of learner travel in Cape Town, and on the form it should take.

2. LEARNER TRAVEL SURVEYS

The objective of the learner travel surveys was to stimulate learners to reconsider the choices they, or their parents or guardians, make in travelling to and from school. The surveys are used to establish current travel trends amongst learners and to encourage a shift towards more sustainable transportation choices and travel behaviour in the future. The surveys cover a wide range of transportation issues that form a basis for understanding child travel patterns and learner mobility issues. In completing survey questionnaires, learners engage with concepts of mobility, mode choice, origin and destination, route choice, and travel time and distance. The survey instruments took the form of printed questionnaires which were distributed to the school governing body with the cooperation of the Principal, for completion during school hours and returned to the planners and engineers conducting the study.

The surveys administered in Blaauwberg, Khayelitsha and Mitchells Plain are described briefly below.

2.1 Blaauwberg Learner Travel Survey

The Blaauwberg learner travel survey was undertaken in 1999 at 38 schools throughout the substructure area representing a total of 23,500 learners. Five primary and three secondary schools were selected for a more detailed survey. A total of 2,247 learners responded to a detailed questionnaire. The survey was commissioned by the former Blaauwberg Administration of the City of Cape Town and administered by Kantey and Templer. (Kantey and Templer, 2000).

The survey instrument included questions on:

- age;
- gender;
- bicycle ownership;
- main mode use to school;
- mapping of bicycle route choice to school;
- impediments to cycling;
- demand for cyclepaths; and
- bicycle use.

Responses were collated and formed a substantial input to the public participation process surrounding the planning of a cyclepath network for the Blaauwberg area. Geographic mapping of collective bicycle route desire lines assisted the Project Management Team in deciding upon an appropriate first phase demonstration project in the Table View Area. The cyclepath network planning exercise culminated in a demonstration project in 2003 funded by the National Department

of Transport's Arrive Alive Campaign.

2.2 Khayelitsha Learner Travel Survey

The Khayelitsha learner travel survey was undertaken in 2002 at three secondary schools in the area. A total of 107 learners were surveyed. The survey were commissioned by the City of Cape Town and administered by Trafficon. (Kevin Garrod pers comm 2004).

The survey instrument included questions on:

- age;
- gender;
- bicycle ownership;
- morning main mode use to school;
- impediments to cycling;
- demand for cyclepaths;
- bicycle use; and
- demand for bicycles for school trips.

2.3 Mitchells Plain Learner Travel Survey

The Mitchells Plain learner travel survey were undertaken in 2003 at 14 secondary schools representing a total of 18,000 learners. A total of 3,957 learners responded to the questionnaire. The survey were commissioned by the City of Cape Town, as a participant in Cities for Climate Protection programme that seeks to reduce Green House Gas (GHG) emissions, and administered by the Bicycling Empowerment Network with assistance from the Institute for Transportation and Development Policy. Sustainable Energy Africa is currently in the process of estimating current and future GHG emissions on the basis of the baseline mode choice data collected in the survey.

The survey instrument is more complex than the earlier instruments used in Blaauwberg and Khayelitsha. The questionnaire includes sections dealing with background information on the respondent, travel to school, specific sections for walk, cycle and public transport mode user groups, and bicycling encouragement.

The section on background information included questions on:

- teacher;
- age;
- grade;
- gender;
- home address; and
- household size.

The section on travel to school included questions on:

- current main mode of travel to school;
- difficulties with current travel mode;
- mapping of route to school by bicycle;
- available alternative modes;
- household bicycle ownership;
- bicycle use; and
- household car ownership.

The section specific to the walking user group included question on:

- travel time;
- general inconvenience and threats;
- threats from vehicle drivers of vehicles;
- injuries while walking to school;
- walking infrastructure and crossing facility use;
- lighting and rain; and
- travel companions.

The section specific to the bicycle user group included question on:

- travel time;
- general inconvenience and threats;
- threats from vehicle drivers of vehicles;
- injuries while cycling to school;
- bicycle infrastructure facility use;
- lighting and rain;
- travel companions; and
- mapping of route choices to school by bicycle.

The section specific to the public transport user group included question on:

- duration of the components of the journey;
- costs associated with public transport;
- general inconvenience and threats; and
- travel companions.

The section on bicycle encouragement included questions on:

- impediments to cycling; and
- the propensity to cycle to school if conditions were more favourable.

3. SURVEY FINDINGS

How then do the surveys described above enable an extension and improvement of current knowledge of learner travel behaviour generally, and of the prospects of encouraging switching to bicycle use more specifically. A summary of the findings of these surveys with respect to main mode use, time spent walking to school, and mode switching with particular attention to impediments to the choice of cycling as an alternative more environmentally sustainable main mode,¹ are discussed below.

3.1 Mode Use

Table 1 assembles the available main mode use findings for individual schools. Schools are categorised by area. The learner travel surveys did not include questions on the combined household income of respondents, so direct correlations between schools and socio-economic grouping can not be drawn. Nevertheless a crude and unsubstantiated proposition of this relationship is that schools in Blaauwberg serve a predominantly white and ‘coloured’ higher- and upper middle- income group, schools in Mitchells Plain serve a predominantly ‘coloured’ middle-and lower middle-income group, and schools in Khayelitsha serve a predominantly black low-income group.

¹ See Behrens (2003b) for a review of the energy consumption and air quality emissions characteristics of different passenger travel modes, and the relative superiority of non-motorised and public transport modes.

Table 1. Percentage main mode use for trips to school by area and school.

		WALK	BICYCLE	SCHOOL BUS	PUBLIC BUS	MINIBUS-TAXI	TRAIN	CAR	OTHER*
Blaauwberg	Milnerton High	20	2	0	2	2	0	66	8
	Milnerton Primary	10	2	0	0	0	0	79	8
	Seamount Primary	11	1	1	0	0	0	81	6
	Table View High	26	6	10	1	1	0	54	3
	Table View Primary	11	5	1	1	1	0	72	9
Mitchells Plain	Aloe Secondary	70	0	0	3	12	11	5	0
	Beacon Hill Secondary	85	1	0	1	8	1	2	1
	Cedar Secondary	54	0	27	3	12	1	3	0
	Glendale Secondary.	41	0	47	2	5	3	1	1
	Lenteguur Secondary	73	0	0	4	10	7	6	1
	Mondale Secondary.	59	0	0	3	21	0	16	0
	Oval North Secondary	75	1	1	3	8	5	3	3
	Portlands Secondary	71	1	1	3	13	1	11	0
	Princeton Secondary	53	0	2	12	21	0	12	0
	Rocklands Secondary	74	0	1	5	8	0	11	0
	Spine Road Secondary	65	0	0	2	18	0	13	1
	Tafelsig Secondary	87	0	1	3	2	1	4	1
	Westridge Secondary**	0	0	96	1	0	0	1	1
Woodlands Secondary	61	0	0	2	17	15	5	0	
Khayelitsha	Bulumko Secondary	80	0	10	0	8	0	2	0
	Kwamfundo High	94	0	0	0	0	6	0	0
	Luhlaza Senior Secondary	64	0	0	11	21	4	0	0

* Travel modes falling into the 'other' category include car lift schemes, motorcycles, roller blades, etc.

** The sample of 67 learners from this school of 1200 learners is not truly representative and consequently the percentages are counterintuitive.

Figure 1 attempts to draw a pattern of learner main mode use across socio-economic groups and across primary and secondary school divisions. The data in table 1 is supplemented with data from the two primary schools surveyed by Fredericks (2003) in Athlone – with these schools serving a predominantly 'coloured' upper middle- and middle-income group. Three main patterns can be observed in the figure. The first is that as household incomes decline so the proportion of learners walking to school increases and the proportion of learners driven to school declines. In the Khayelitsha secondary schools walking accounts for 79% of main mode use and car travel for just 1%, while in the Blaauwberg secondary schools car travel accounts for 60% and walking for 23% of main mode use. The second pattern is that the proportion of learners walking and driven to school varies according to age. In Blaauwberg, 11% and 77% of primary school learners travelled on foot and by car respectively, compared to 23% and 60% amongst secondary school learners. Similarly in Athlone and Mitchells Plain – representing reasonably similar socio-economic groupings – 30% and 47% of primary school learners travelled on foot and by car respectively, compared to 62% and 7% amongst secondary school learners. The third pattern is that cycling to school is uncommon – not accounting for more than 1% of modal split in any of the schools surveyed on Mitchells Plain and Khayelitsha.

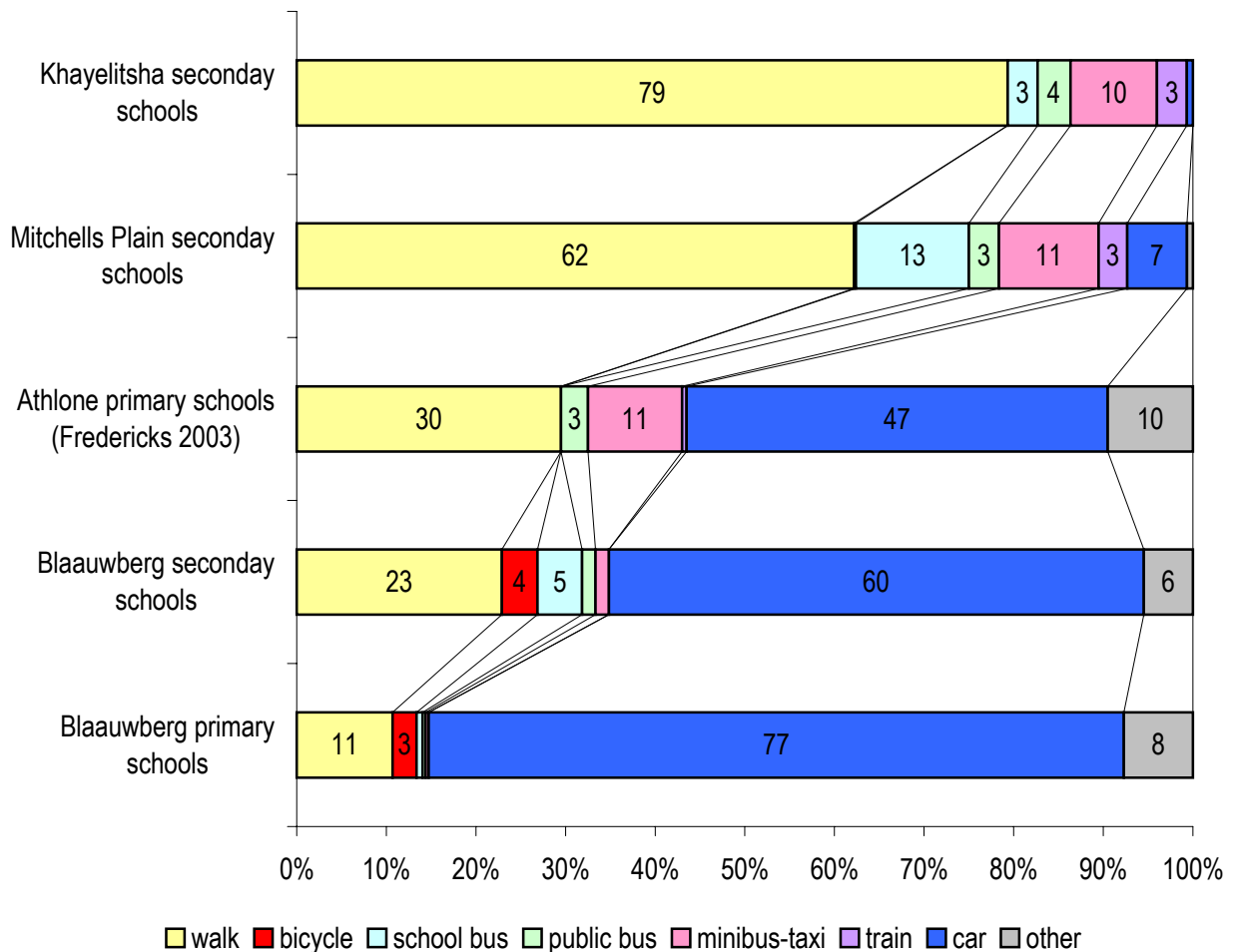


Figure 1. Percentage main mode use for trips to school by area.

Comparisons of these contemporary data with data collected in past surveys reveals some clear, and from the perspective of creating more sustainable passenger transport systems worrying, trends. Comparison of the mean mode use percentages of the Table View schools surveyed in the Blaauwberg learner travel survey of 1999, with an earlier learner travel survey administered in the same area in 1988 (Milnerton Municipality 1988) illustrates a marked decline in non-motorised transportation from 50% to 32% over the 11 year period. Particularly severe has been the decline in cycling to school – from 31% in 1988 to about 3% in 1999. This trend is partly due to the introduction of a school bus service for some schools in the area, but probably more significantly to switching from walking and bicycling to private car travel due to changing perceptions and levels of safety, security and convenience. Comparisons of school trip data collected in household (as opposed to learner) travel surveys suggest that, amongst high-income groups across the city as a whole, private car travel for trips to school has increased from 38% in 1976, to 52% in 1992, to 91% in 2001 (Behrens 2003).

3.2 Walking Trip Time

The more elaborate survey instrument used in the Mitchells Plain learner travel survey enables an investigation into the time spent walking to school. Figure 2 illustrates the percentage distribution of walking trip times for selected secondary schools in Mitchells Plain. Some 58% of walking trip times were found to be greater than 10 minutes in duration, and some 25% greater than 20 minutes duration. Assuming a mean walking speed of 4 km/hour (or 67 m/min) these findings suggest that 58% of learners walk further than 670 metres to school, and that 25% walk further than 1,340 metres. The mean walk trip time was found to be 25 minutes (1,675 metres walking trip distance at 4 km/hour).

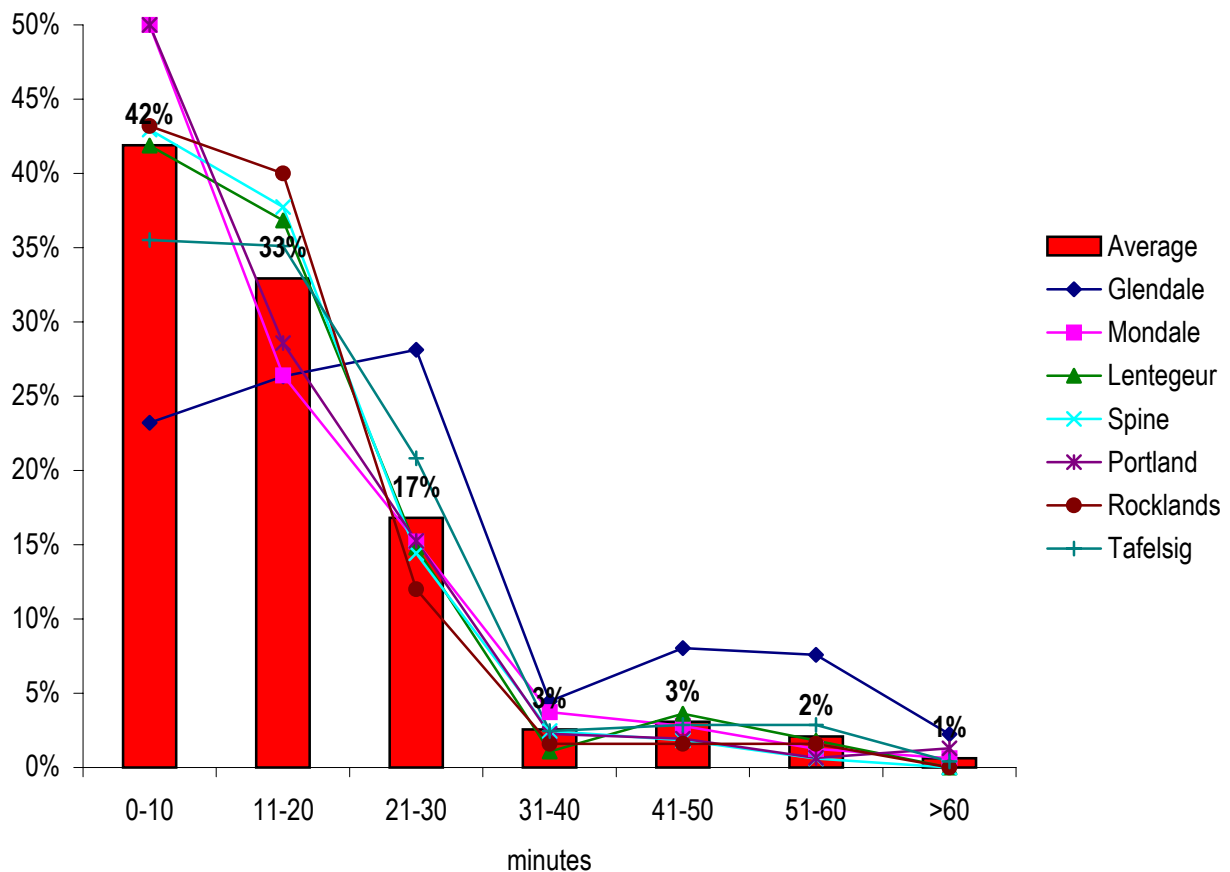


Figure 2. Percentage distribution of walking trip times by selected Mitchells Plain secondary schools.

For learners walking farther distances and for longer times there would appear to be considerable potential benefits – in terms of reduced travel time and associated impacts on physical exhaustion and attention at school – to be derived from switching to cycling as their mode of travel. Assuming a mean cycling speed of 16 km/hour (or 267 m/min), learners taking 25 minutes to walk the mean walking trip length of 1,675 metres would save approximately 19 minutes.

3.3 Mode Switching

The more elaborate survey instrument used in the Mitchells Plain learner travel survey also enables an investigation into the problems learners experience in travelling to school. Table 3 presents difficulties experienced with the current mode of travel to school. Unfortunately, in its current form, the database does not enable a cross-tabulation of current mode use against travel difficulties experienced. However, the earlier section on main mode use illustrates that in Mitchells Plain some 62% of learners travel to school on foot, so it can be surmised that the relative importance of difficulties indicated in the table relate more to walking than to other travel modes. The table indicates the most cited difficulties as personal safety (around 27%), road safety (around 23%), and travel time (around 21%). Expense, reliability and frequency rank lowest. These findings reflect the vulnerability of learners walking to school to crime and violence in the context of an area with high levels of gang activity. They also reflect a road environment characterised by wide roadways and inadequate crossing facilities which is hostile to pedestrians.

Table 2. Percentage difficulties identified with current travel mode for school trips in Mitchells Plain.

	EXPENSE	RELIABILITY	TRAVEL TIME	FREQUENCY	COMFORT	PERSONAL SAFETY	ROAD SAFETY	OTHER
Aloe Secondary	5	7	20	4	6	36	18	5
Beacon Hill Secondary	3	3	18	0	11	32	32	1
Cedar Secondary	7	6	18	4	13	22	27	2
Glendale Secondary.	4	7	28	4	19	20	14	3
Lentegeur Secondary	7	4	21	1	11	23	26	6
Mondale Secondary.	6	8	22	1	11	26	22	3
Oval North Secondary	5	4	19	4	14	27	26	2
Portlands Secondary	8	4	18	2	11	28	26	3
Princeton Secondary	14	5	31	3	10	14	14	9
Rocklands Secondary	9	3	17	1	7	35	27	1
Spine Road Secondary	6	5	22	1	11	27	24	4
Tafelsig Secondary	7	4	18	10	7	34	19	2
Westridge Secondary	2	19	39	0	18	8	6	7
Woodlands Secondary	5	10	19	3	7	34	20	2

Each of the three surveys included a question relating to impediments to cycling to school if the respondent had a bicycle available for his or her use. Table 3 illustrates responses to this question in selected Blaauwberg and Khayelitsha schools, and table 4 illustrates responses in selected Mitchells Plain schools. In the case of the Blaauwberg schools, the impediment to cycling amongst secondary school learners was predominantly one of choice, with 90% of respondents electing not to cycle for reasons of distance (28%) and stated preference (62%). Amongst primary school learners, however, peer pressure is revealed as less important, and safety (35% and 45%) and parental permission (27% and 38%) as more important impediments. Interestingly, excessive travel distance is considered an impediment equally across the age ranges. In the case of the Khayelitsha, the main impediment to cycling in two of the schools was the perceived danger (40% and 43%), and in one school a preference not to cycle (81%).

Table 3. Percentage impediments to cycling if a bicycle were available in Blaauwberg and Khayelitsha by school.

	TOO DANGEROUS	PARENTAL AUTHORITY	DISTANCE TOO GREAT	PREFER NOT TO CYCLE
Table View High, Blaauwberg	7	3	28	62
Seamount Primary, Blaauwberg	45	27	26	2
Milnerton Primary, Blaauwberg	35	38	26	11
Bulumko Secondary, Khayelitsha	40	22	4	34
Kwamfundo High, Khayelitsha	6	6	6	81
Luhlaza Senior Secondary, Khayelitsha	43	4	14	39

In the case of the Mitchells Plain schools, theft at school (47%) is the major concern amongst learners, followed by the peer pressure (36%) implied by a “none of my friends cycle” response. The peer pressure response is probably associated with the ‘few cyclists’ (26%) impediment, which ranks third. These impediments are all socio-economic problems. The next set of impediments that rank as medium concerns are traffic speed (24%), traffic density (23%), reckless driving (21%), all

of which are road traffic related problems that need to be addressed by road traffic systems management strategies and improved law enforcement. The final set of significant impediments are travel time (16%), road surface condition (14%) and distance (13%).

Table 4. Percentage impediments to cycling if a bicycle were available in Mitchells Plain by (secondary) school.

	GLENDALE	MONDALE	LENTEGEUR	SPINE	PORTLAND	ROCKLANDS	TAFELSIG	WESTRIDGE	AVERAGE
theft at school	35	62	45	63	71	66	30	7	47
peer pressure	24	55	31	51	54	40	26	4	36
few cyclists	18	40	26	34	47	33	11	2	26
traffic speed	10	37	30	31	41	22	15	4	24
traffic density	11	33	33	21	43	25	10	5	23
reckless driving	17	37	20	31	26	26	9	4	21
travel time	17	22	20	17	23	11	10	4	16
road condition	10	20	18	23	21	8	10	3	14
distance to far	17	19	18	23	13	6	3	5	13
other	5	18	5	13	15	10	4	2	9
narrow roads	4	4	8	14	26	5	5	0	8
parental preference	5	12	6	12	9	9	5	2	8
maintenance	6	8	10	12	8	4	6	0	7

The more elaborate survey instrument used in the Mitchells Plain learner travel survey further enables an investigation into the alternative modes learners would be prepared to use (see table 5). The table suggests that as many as 40% of learners would consider cycling to school. This is potentially a significant number of new cyclists. Storage facilities would obviously be required at schools in order to address the major impediment of theft at school mentioned earlier.

Table 5. Percentage willingness to cycle to school if a bicycle were available in Mitchells Plain by (secondary) school.

		GLENDALE	MONDALE	LENTEGEUR	SPINE	PORTLAND	ROCKLANDS	TAFELSIG	WESTRIDGE	AVERAGE
Would you ever consider cycling to school?	Yes	67	26	32	30	39	34	57	42	40
	No	33	74	68	70	61	66	43	58	60

Figure 3 illustrates that 17% of learners travelling by other modes already have a bicycle available for use on their trip to school, suggesting that, with the necessary encouragement, modest switching from walking to cycling would be possible before initiatives to increase bicycle supply are fully implemented.

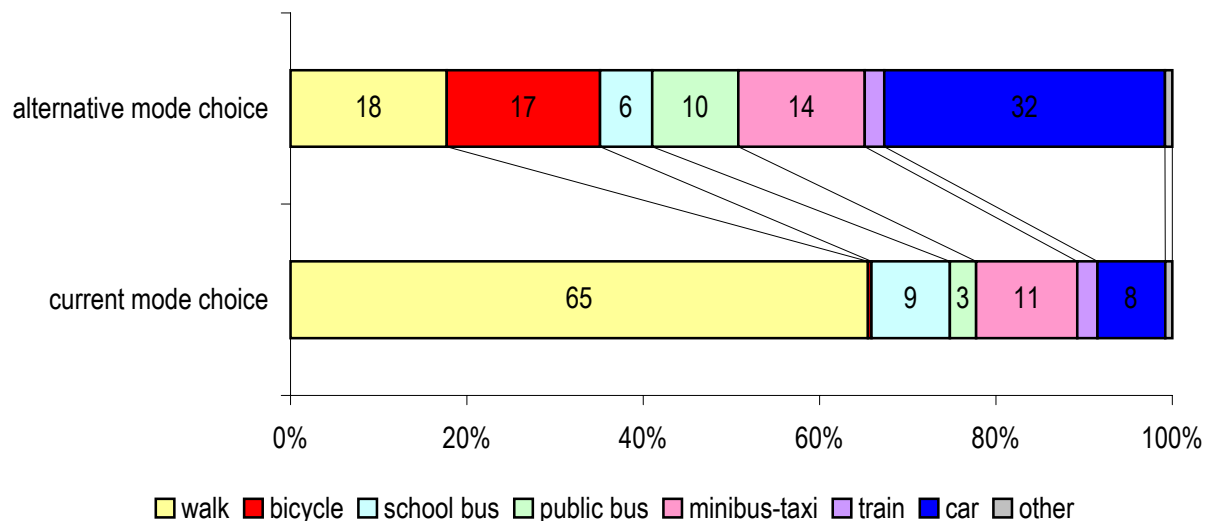


Figure 3. Percentage actual and alternative mode choice for trips to school in Mitchells Plain.

4. CONCLUSION: TOWARDS A LONGITUDINAL DATABASE ON LEARNER TRAVEL

Having discussed findings of the learner travel surveys in Blaauwberg, Mitchells Plain and Khayelitsha, and having demonstrated that value can be derived from comparing the findings of different surveys, what then are the prospects of establishing a longitudinal, consolidated database on learner travel behaviour? More specifically, what would be the benefits of such a meta-database be, from what sources would it be compiled, and what data fields should it contain?

The obvious benefits of establishing a longitudinal meta-database include improved data quality and validation to better inform the formulation of plans and strategies directed at addressing the travel problems experienced by learners on the one hand, and on the other, an ability to monitor behavioural changes in response to the implementation of these plans and strategies over time as well as monitor trends in learner travel behaviour more generally.

A longitudinal learner travel database could be drawn from a variety of sources including census data, and past and future *ad hoc* learner travel surveys like those mentioned in the introduction of this paper. The National Census of 2001, for the first time, included a question relating to most frequent main mode use for trips to school. Unfortunately the question posed includes both trips to school and place of work – “How does (the person) usually travel to school or to his/her place of work?” – making analysis of school trip mode use impossible. A disaggregation of the question into two parts focussing on work and school trips separately would improve the utility of this data considerably. If this were to occur, the Census would constitute an important longitudinal source of mode use data. Failing changes to the Census mode use question, the *CensusAtSchool* project offers an alternative source of learner travel data. The Royal Statistical Society (RSS), Centre for Statistical Education, first launched the *CensusAtSchool* project in the United Kingdom in 1999. In South Africa, *CensusAtSchool* was initiated by Statistics South Africa in collaboration with the Department of Education in 2001. The main aim of the project is to familiarise learners with the purpose of, and processes and statistical concepts involved in the national censuses. A pilot study was conducted in July of that year, using a sample of 277 schools drawn from the Department of Education’s database of registered schools. A report with an analysis of the sample data was released in 2002 (Stats SA 2002). Some of the key findings related to how children travel to school. The next phase of the project focuses on the development of curriculum material for both learners and teachers using the South African *CensusAtSchool* data. The results of *CensusAtSchool* will be formatted in a way that is applicable to Curriculum 2005. A resource pack will be delivered to all schools across the country.

The data fields of a longitudinal meta-database would clearly be restricted by the degree of similarity between source survey instruments. Building upon the survey instruments already administered in Cape Town, and recognising that different surveys will have different purposes and therefore different content requirements, it is suggested that, at minimum, the following items are included in future learner travel surveys:

- age;
- gender;
- grade;
- current mode of travel to school;
- alternative available modes;
- difficulties with current travel mode;
- household bicycle ownership/availability; and
- household car ownership/availability.

It is recommended that these core survey questions, and perhaps specified response codes, are adopted in future learner travel surveys in Cape Town to facilitate the creation of a longitudinal database.

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BIOGRAPHY

Bertie Phillips

Born 10 March 1964 (South African)

Education

Masters in Transportation Planning & Engineering - Polytechnic University, Brooklyn, New York 1993

Bachelor of Architectural Studies - UCT 1991

Diploma in Civil Engineering - Cape Technikon 1978

Certificate in Business Communication - UNISA 1998

Kantey and Templer

In April 2000, Bertie was appointed to the position of Senior Transportation Planner and Traffic Engineer with Kantey and Templer (Pty) Ltd in their Cape Town office, where he is responsible for a range of projects and training of staff and interns both foreign and local.

Bicycling Empowerment Network

In April 2002, Bertie was elected to the Board of Directors of the Bicycling Empowerment Network (BEN), a Section 21 not for profit organisation, which promotes the use of the bicycle as a low cost form of transport to improve health. His responsibilities include infrastructure planning for the Velo Mondial 2006, marketing and fund raising, cyclepath network planning.

Low Cost Mobility Initiatives

Bertie is the local expert on low cost mobility initiatives (Locomotives) with civil society organizations in Africa, Asia and Latin America. Partners in the developing countries deliver ongoing projects and promote facilities for cycling on roads and streets in urbanizing areas, providing the underprivileged with non-motorised transport.

Committees and Affiliations

Bertie serves on numerous committees including the Keerom Street Area Improvement Committee, Camps Bay Residents and Ratepayers Association Planning Committee, Jewish Maritime League and is currently enrolled in the Partnership 2000 (P2K) international community leadership development programme.