

THE IMPORTANCE OF SCHOLAR AND CHILD TRAVEL IN SOUTH AFRICAN CITIES AND A REVIEW OF IMPROVEMENT MEASURES

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ABSTRACT

In recent years a number of travel surveys have suggested, perhaps unexpectedly, that as many education trips are made in South Africa's metropolitan cities as work trips. However, much past analysis of travel behaviour and many travel demand models exclude education trip-making. This paper argues that this practice is problematic, and investigates secondary and primary data sources to establish the nature, extent and importance of scholar and child travel. The primary data source takes the form of an activity-based household travel survey administered in 2000 and 2001 in Cape Town. The paper discusses the significance of the available data for understanding the urban passenger transport problem in South Africa in general, and for understanding morning peak congestion and pedestrian safety problems in particular. Considerable attention is being given at present to improving conditions of scholar or child travel in other parts of the world. The paper reviews international measures implemented to alleviate many of the problems associated with child and scholar trip-making, and identifies opportunities for improved practices in South African cities.

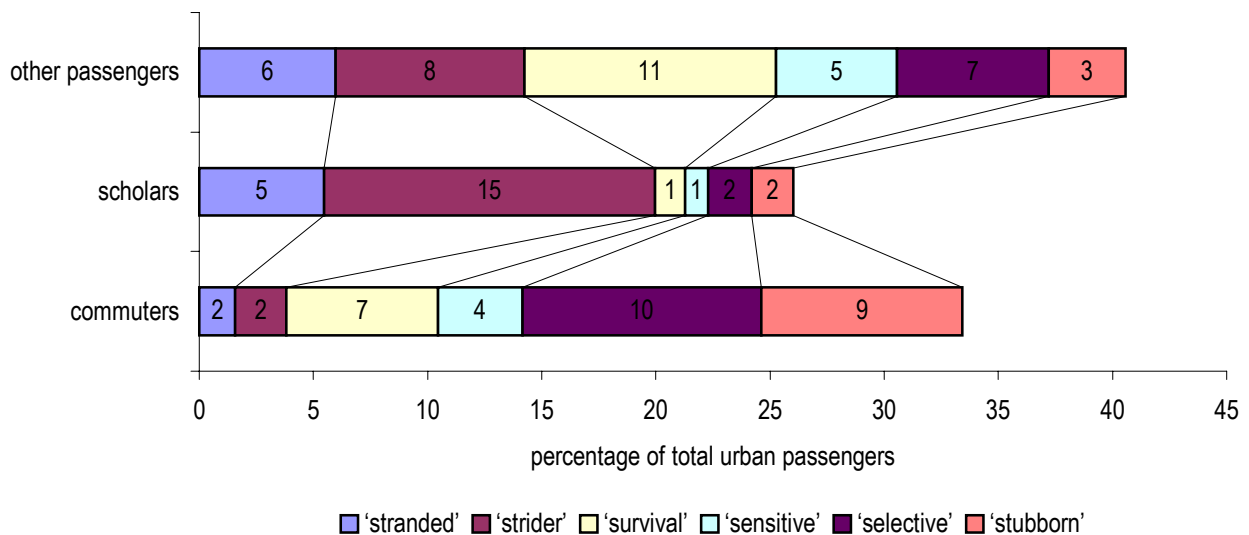
1. INTRODUCTION

This paper explores a hitherto largely neglected arena of South African research into travel behaviour, namely scholar and child travel. It begins with an investigation of available sources of data on scholar and child trip-making in order establish patterns of travel behaviour (section 2). It then reviews international precedent for measures implemented to alleviate problems associated with child and scholar trip-making (section 3). It concludes with suggestions for improved practices in South African cities (section 4).

2. THE IMPORTANCE OF SCHOLAR AND CHILD TRAVEL IN SOUTH AFRICAN CITIES

The segmentation of 'urban passenger customers' undertaken by the *Moving South Africa* project team in the late 1990s suggests that some 26% of South Africa's (\pm 21,5 million) urban population are scholars (see Figure 1) It was found that proportionately far more scholars fall into the largely pedestrian 'stranded' and 'strider' categories, than adult groups.

The travel behaviour of this relatively substantial group of passengers – who are largely dependent on cheap non-motorised means of transportation – is discussed briefly below, in terms of trip generation, mode use, trip purposes, independent mobility, and road accident casualties.



Note: 'stranded' = cannot use public transport due to cost and access (13%); 'strider' = does not require motorised transport – walking or cycling is adequate for trip distance (25%); 'survival' = captive to a mode within public transport and cost-sensitive (19%); 'sensitive' = captive to public transport but quality sensitive (i.e. choice is made not only based on affordability) (10%); 'selective' = can afford to own a car but willing to give it up, or owns one but willing to use public transport (19%); 'stubborn' = unwilling to use any mode other than private car (14%)

Figure 1. Moving South Africa 'customer segments' by urban passenger type. (1995 n = 30 000h, 1997 n = 500h)

Data is drawn from a variety of published secondary sources, as well as from primary research in the form of a household travel survey undertaken during school terms in October-November 2000 and January-February 2001 in Cape Town.¹

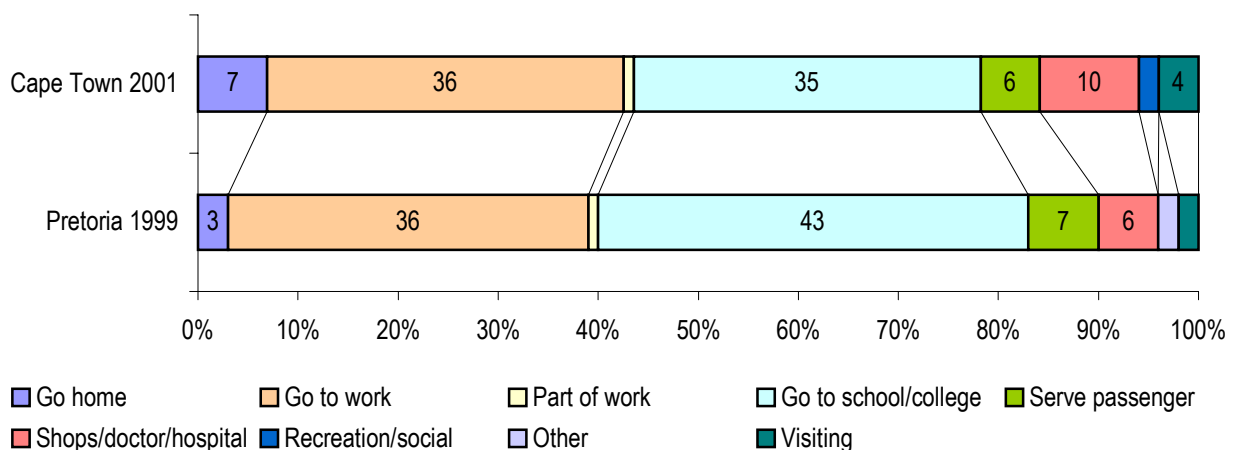


Figure 2. Morning peak period trip purpose in Cape Town (2000/01 n = 204h) and Pretoria (1999 n = 7883h) Source: Behrens 2002a, TRC Africa 1999

¹ For a discussion on the analytical framework and survey method of this primary research, as well as its limitations with regard to sample size and statistical levels of confidence, see Behrens (2001), (2002a) and (2002b). Suffice to say here that a CAPI-based activity diary survey instrument was used to collect 24-hour activity-travel schedules from 678 members of 204 households living within 6 sampling areas. Of the 678 persons surveyed, 194 were children aged between 0 and 18 years. In strict statistical terms the best that can be claimed is that one can be 95% confident that the actual mean of a simple dichotomous variable falls within 15.2% to 17.6% on either side of the sample mean, depending on the sampling area.

2.1 Child trip generation

The significance of scholar travel emerged clearly in the previous decade in travel surveys conducted in Pretoria and Durban (TRC Africa 1999, VKE 1999). These surveys revealed – perhaps somewhat unexpectedly despite the often visibly different congestion patterns over school holidays and school terms in many urban areas – broadly equal amounts of work and education trips during the morning peak period. The above-mentioned primary research in Cape Town found a similar pattern over the morning peak period (see Figure 2), as well as equal proportions of work and education trips across the entire day (see Figure 3).

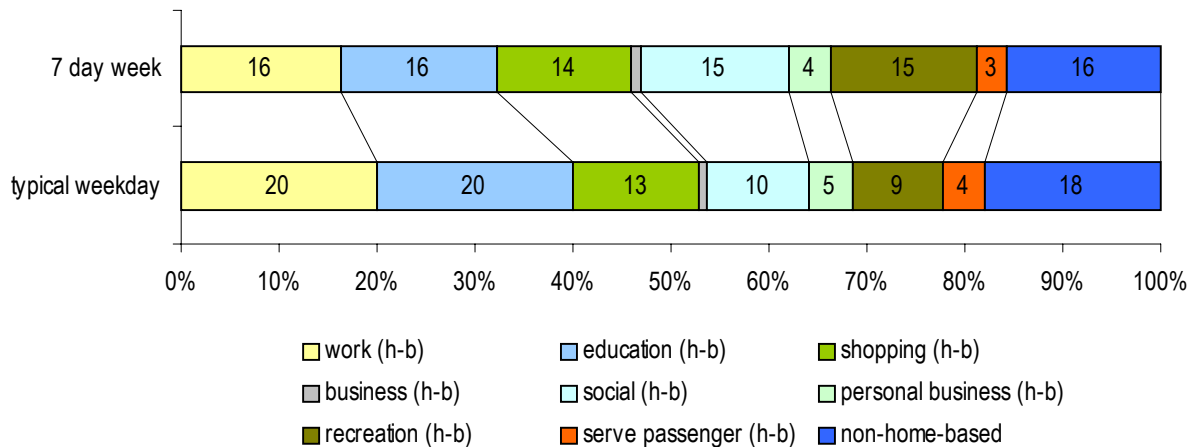


Figure 3. Day and weekday home-based trip purpose distribution in Cape Town (2000/01 n = 204h). Source: Behrens 2002a.

The amount of education trips found in recent South African surveys points to the significant amount of trips that children generate. Figure 4 illustrates child trip generation (for all trip purposes) in Cape Town. The figure suggests, as is the case for all age groups combined, that child trip generation declines with household income. Amongst middle- and low-income households older children (of 6-18 years) generate more trips than younger children (of 0-5 years). The inverse however appears to be the case amongst high-income households where young children undertake more trips – this is probably because of the greater coupling of infants to parents as will be discussed later in section 2.4.

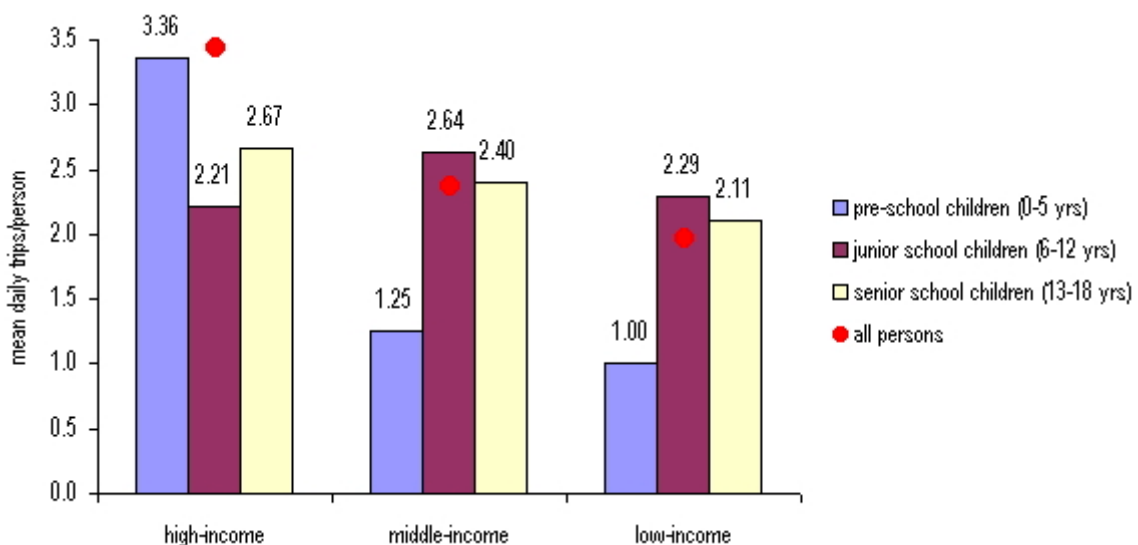


Figure 4. Child trip generation by age and household income in Cape Town (2000/01 n = 194p) Source: Behrens 2002a.

2.2 Child mode use

Table 1 illustrates main mode use amongst children of different age groups within different household income bands in Cape Town. Two clear patterns can be observed from these data. The first is that walking increases as the main mode of travel, across all age groups, with declining household income. The second is that, amongst children in middle- and low-income household bands, the use of public transport modes increases with age. The former is clearly the result of lower household private mobility, while the latter presumably reflects greater independent child mobility. The data also indicate that child members of low- and middle- income households are heavily dependent on walking as their primary means of transportation.

Table 1. Percentage child main mode use by age and household income in Cape Town (2000/01 n = 194p)

		WALK	PUBLIC TRANSPORT	CAR PASSENGER	OTHER
pre-school children (0-5 yrs)	high-income	0	0	97	3
	middle-income	35	0	65	0
	low-income	88	12	0	0
junior school children (6-12 yrs)	high-income	10	0	90	0
	middle-income	75	6	19	0
	low-income	69	31	0	0
senior school children (13-18 yrs)	high-income	9	3	88	0
	middle-income	60	16	24	0
	low-income	67	28	5	0

Source: Behrens 2002a

2.3 Child trip purposes

Table 2 illustrates trip purposes amongst children of different age groups within different household income bands in Cape Town.

Table 2. Percentage child trip destination activity purpose by age and household income in Cape Town (2000/01 n = 194p)

		WORK	EDUC.	SHOP.	BUS.	SOC.	P. BUS.	REC.	SERVE	HOME
pre-school children (0-5 yrs)	high-income	0	22	3	0	16	3	5	14	38
	middle-income	0	20	0	0	25	0	10	0	45
	low-income	0	25	0	0	0	6	19	0	50
junior school children (6-12 yrs)	high-income	3	26	3	0	10	6	13	0	39
	middle-income	1	24	3	0	6	0	18	2	46
	low-income	2	29	0	0	11	2	11	0	45
senior school children (13-18 yrs)	high-income	0	38	9	0	6	0	3	0	44
	middle-income	1	17	4	0	19	0	13	1	45
	low-income	0	33	3	0	15	3	0	0	48

Source: Behrens 2002a

The data indicate that, other than trips to home (from all out-of-home activities), the most common trip purpose amongst children from all household income bands and age group categories is education, followed by trips to social and recreational activities. While there are some variations in this pattern across age and income categories, there would appear to a general consistency in the distribution of child trip purposes. The most notable differences perhaps being the greater proportion of shopping trips amongst high-income children, and the amount of serve passenger trips amongst high-income pre-school children (again presumably the result of greater trip coupling² with parents responsible for transporting older siblings).

2.4 Independent child mobility

Table 3 illustrates trip coupling amongst children of different age groups within different household income bands in Cape Town. The data indicate an inverse relationship between increasing household income and decreasing independent child mobility. Children aged between 0 and 5 years, across all income bands, seldom if ever travel alone – high-income 0-5 year olds however appear more likely to be accompanied by an adult household member than by other household children or non-household adults. Amongst 6 to 12 year olds independent travel, or travel with other children, increases significantly amongst middle and low-income households. High-income 13 to 18 year olds continue to be accompanied by an adult household or non-household member on most trips they make.

Table 3. Percentage child trip coupling by age and household income in Cape Town (2000/01 n = 194p)

		HOUSEHOLD ADULT (and all others)	NON-HOUSEHOLD ADULT (and other children)	HOUSEHOLD CHILD (and other children)	NON-HOUSEHOLD CHILD(REN)	TRAVELLED ALONE
pre-school children (0-5 yrs)	high-income	92	8	0	0	0
	middle-income	45	23	18	0	14
	low-income	73	15	0	12	0
junior school children (6-12 yrs)	high-income	65	6	23	0	6
	middle-income	31	11	34	9	15
	low-income	18	20	0	26	36
senior school children (13-18 yrs)	high-income	70	20	5	0	5
	middle-income	22	30	4	13	31
	low-income	0	35	5	12	48

Source: Behrens 2002a

Given the available data on scholar mode use from past surveys in Cape Town, and assuming a strong correlation between racial and income stratification, it is likely that higher income households have followed a pattern of declining independent child mobility over past decades

² The term ‘trip coupling’ is derived from time geography and refers to the need for different individuals to undertake trips together. An obvious example of trip coupling is the need for parents to drive or escort their younger children to various activities.

similar to that reported in parts of the developed world (see for instance the seminal study undertaken by Hillman *et al* 1990). A household interview survey undertaken in 1976 in Cape Town amongst 'white' households indicated that some 38% of education trips were undertaken by car (Moolman 1976). A later survey in Cape Town in 1992 indicated that the amount of education trips undertaken by car amongst this group had increased to 52% (Market and Opinion Surveys 1992), and as indicated earlier (see table 1) in 2001 in the region of 91% of high-income education trips were undertaken by car.

2.5 Child pedestrian road accident casualties

Figure 5 illustrates that of the between 9 000 to 11 000 people killed annually on South Africa's roads between 1985 and 1995, an alarming 40-48% are pedestrians. Data from 1997 to 1999 in the Cape Metropolitan Area (CMA) indicate a larger proportion (around 54-56%) of road accident fatalities are pedestrians (CMC 2000).

Even more alarming perhaps is the proportion of child pedestrian fatalities and injuries. National data for the period October to December in 1997 indicate that some 25% of pedestrian fatalities are children aged 16 years or less (NDoT *Arrive Alive* website), a proportion fairly consistent with 1998 data for the urban areas of the Western Cape which indicate that around 21% of pedestrian fatalities are children aged 14 years or less (de Beer 2000). Data from 1997 and 1999 in the CMA indicate around 19-33% of pedestrian fatalities and 31-38% of pedestrian injuries are children aged 12 years or less (and 24-43% and 41%-52% of pedestrian fatalities and injuries respectively, are children aged 17 years or less) (see figures 6 and 7). These figures are disproportionate with the total CMA population age distribution – 1996 census data indicate that 25% of the population are 12 years old or less, and 34% are 17 years old or less.

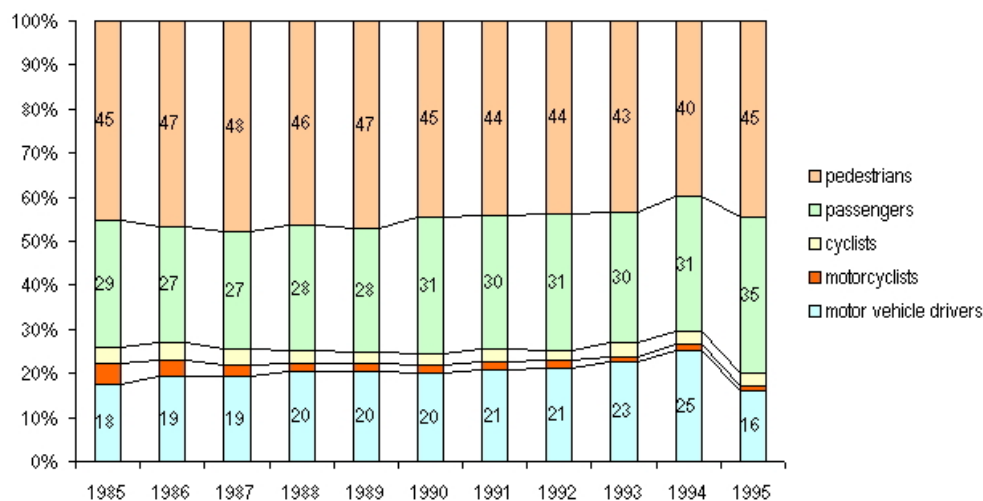


Figure 5. National road accident fatalities by user group: 1985-1995.
Source: Shepperson and Matjila 1997:48

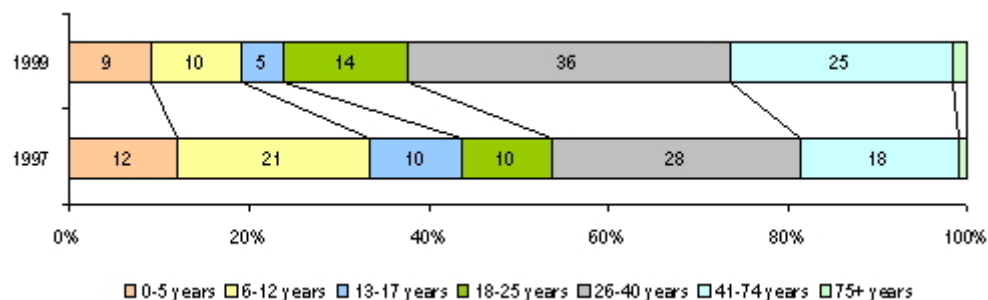


Figure 6. CMA pedestrian road accident fatalities by known age: 1997-1999.

Source: CMC 1999:table 7, 2000:34

Note: A fatal injury is defined as an injury that causes death, either immediately or subsequently, but not later than six days after the accident. (CMC 2000:5)

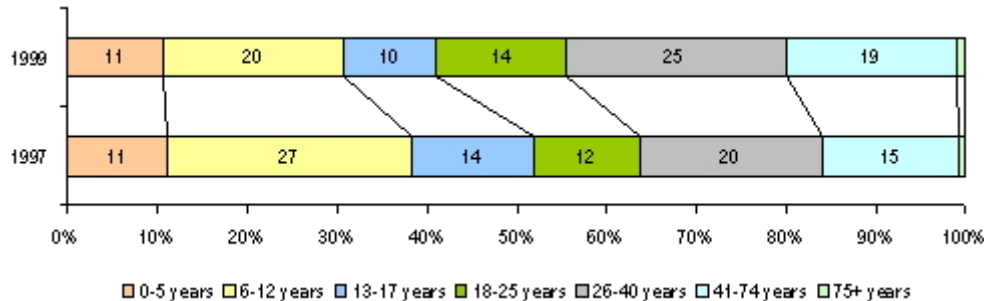


Figure 7. CMA pedestrian road accident injuries by known age: 1997-1999.

Source: CMC 1999:table 7, 2000:34

Note: These data include both serious and slight injuries. Serious injuries are defined as including fractures, crushings, concussion, internal injuries, severe cuts and lacerations, severe shock requiring medical treatment, and any other injuries which necessitate hospitalisation or confinement to bed. Slight injuries include cuts and bruises, sprains and light shock not requiring hospitalisation. (CMC 2000:5)

The link between child road accident casualties and education trips is perhaps illustrated tentatively in figures 8 and 9. Figure 8 illustrates the timing of national urban pedestrian casualties by age group, while figure 9 illustrates weekday trip timing in Cape Town by motorised and non-motorised modes. As might be expected, a 14h00-14h59 peak in non-motorised trip departures is reflected in the timing of child pedestrian road accident casualties. While not corresponding exactly with the non-motorised trip timing profile indicated in figure 9, and clearly illustrating that pedestrian casualties are greatest in the evening when visibility is poor, these data do indicate that national urban pedestrian casualties amongst children occur earlier in the day than other age groups, and this is probably associated with school to home trips amongst middle- and low-income scholars.

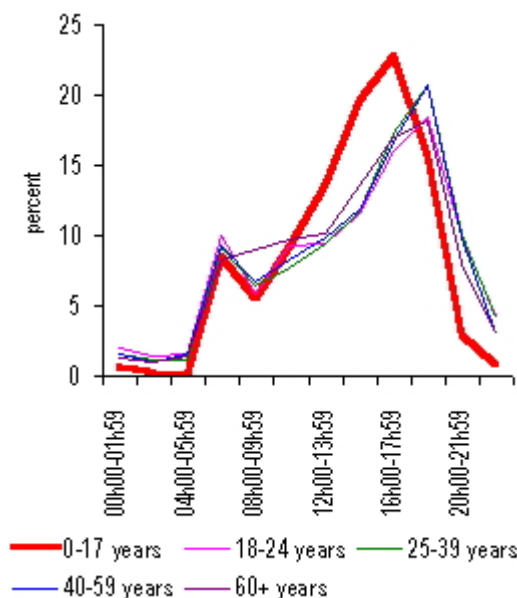


Figure 8. National urban pedestrian casualties by age and known time of day (1997).

Source: Makhanya *et al* 1998:3

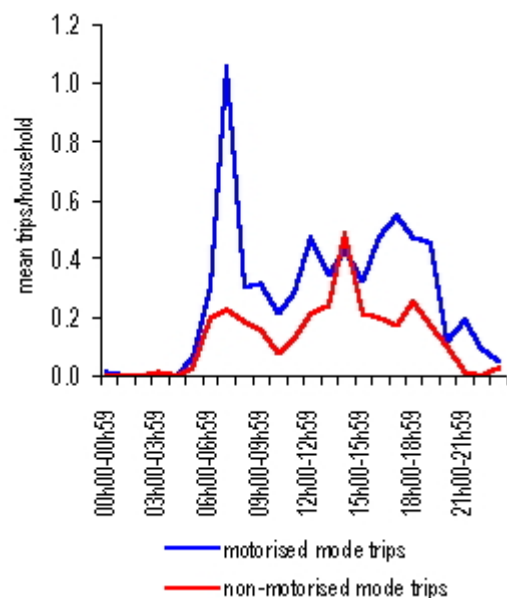


Figure 9. Weekday hourly trip timing by motorised and non-motorised modes in Cape Town (2000/01 n = 84 h).

Source: Behrens 2002a

The foregoing discussion highlights the importance of scholar and child travel in South Africa in terms of both contributing to peak period traffic congestion, as well as to the ongoing national road accident casualty crisis. Much past analysis of travel behaviour and many travel demand models have however excluded education trip-making and often non-motorised travel as well (Behrens 2000a). This practice is clearly problematic if congestion and road safety problems are to be properly analysed and addressed.

3. A REVIEW OF SCHOLAR AND CHILD TRAVEL IMPROVEMENT MEASURES

Having established the importance of scholar and child travel in South African cities and the need for more careful analysis of scholar and child trip-making, this paper now turns to the improvement of scholar and child travel conditions. A review of recent travel planning practices indicates that considerable attention is being given to improving the conditions of travel for scholars and children in other parts of the world. The range of measures implemented, many of which incur very low costs and can be initiated independently of larger scale organisational support, are discussed briefly and uncritically below.

3.1 'Walk to school' and 'cycle to school' days

A virtually no-cost measure designed to encourage scholars (and their parents) to switch to non-motorised modes and to lobby for improved pedestrian and bicycle infrastructure are 'walk to school' and 'cycle to school' days (see figures 10 and 11). In South Africa there is an initiative to join the *International Walk to School Day* (or 'iwalk') for the first time in 2003 – initially with participating Johannesburg schools, and eventually across the entire country (David Flax pers comm 2003). The origins of the 'iwalk' date back to 1994 when the Hertfordshire County Council (United Kingdom) piloted a 'walk to school week' with a few of its schools. The initiative gradually grew to an international event in 2000. In October 2002 more than 3 million scholars from 28 developed and developing world countries around the globe participated in the most recent 'iwalk'.

Source: <http://www.iwalktoschool.org/>



Figure 10. Walk to school day: Colorado, USA



Figure 11. Cycle to school day: Texas, USA

3.2 Walking buses

A 'walking bus' is an organised walking group of usually junior school children led by adults (see figures 12 and 13), also pioneered by the Hertfordshire County Council in 1998. The benefits of the 'bus' include increased safety and reduced traffic congestion on roads leading to schools. Parents wait at a series of 'bus stops' along identified routes for trained parent (or teacher) volunteers to pick-up or drop-off their children on their way to or from school. The 'bus' has a 'conductor' who

supervises the children and a ‘driver’ who wheels a trolley carrying school bags. The recommended ratio of adults to children 1:8. Typically routes are 500-1,500 m long and are assigned a timetable. Initially, the school (with planning assistance from the local authority) identifies each route and approaches parents to act as helpers. ‘Walking buses’ are extremely cost effective – with non-essential requirements taking the form of a trolley, and fluorescent sashes or brightly coloured T-shirts (the costs of which are often borne by local sponsors).³ (O’Fallon 2000)



Figure 12. Walking bus: Cardiff, UK.
Source: <http://www.cardiff.gov.uk/>



Figure 13. Walking bus: Sao Paulo, Brazil.
Source: <http://www.iwalktoschool.org/>

3.3 School travel plans

A school travel plan is a comprehensive strategy on scholar transport for a particular school. While referring essentially to travel planning for schools (as opposed to business corporations), these strategies have been labelled differently in various parts of the world (e.g. ‘safe routes to schools’ in the United Kingdom, ‘travelwise to schools’ in New Zealand, ‘travelsmart to school’ in Australia). A school travel plan is a school-based initiative which assembles a co-ordinated package of measures to improve scholar road safety, ease traffic congestion and encourage scholars and parents to consider walking and cycling to school as an alternative travel mode. Such measures might include the establishment of lift clubs, walking buses, scholar patrols, the provision of cycle parking, pedestrian crossing facilities, etc.

A school travel plan is typically drawn up through a consultative planning process involving teachers, parents, pupils, local authority representatives and local community groups, and its implementation is backed by education, transport planning and law enforcement departments. Various innovative means of facilitating a consultative planning process have been developed, including ‘planning for real’ techniques developed by the Neighbourhood Initiatives Foundation in the United Kingdom (see Figure 14).



³ The less well-documented equivalent of the walking bus for scholar cycling are ‘cycle trains’, which presumably operate on essentially the same principles.

Figure 14. Child involvement in school travel planning using 'Planning for real' techniques. These techniques involve the assembly of a 3-dimensional model of the particular school and its surrounding area which is used to solicit child involvement in the identification of routes to school and travel problem areas. (DOT 2000, Osborne and Pontefract 1999)

3.4 School buses

School buses are passenger transport services that are not available to the general public. They are often provided free-of-charge to scholars provided certain specified criteria are met (e.g. that scholars live within a particular maximum distance from the school they attend). Scholars are transported to and from school under close driver supervision, and in some instances the bus offers a door-to-door service. The services are typically run by private operators under contract to an appropriate government agency. School bus services have been provided in South African cities.

3.5 Scholar travel education programmes

Scholar travel education programmes promote safe walking and cycling, and encourage public transport use and carpooling for school trips. Using a range of classroom and outdoor resource packages, teachers, parents and road safety officials work together to develop and improve young children's walking, cycling and traffic awareness skills. Such education programmes can be a vital factor in persuading parents to form lift clubs or that their children are capable of walking or cycling to school. In situations where there is little money available for engineering measures, training may be the key contribution to improved scholar travel conditions that the local authority can make. De Beer and Davidson (2000) argue that only to a certain extent have schools in South Africa been involved in teaching young children the basics of safe pedestrian behaviour.

3.6 Child safety audits and infrastructure improvement programmes

Child safety audits and infrastructure improvement programmes involve systematic assessments of neighbourhoods or school precincts from the perspective of child pedestrian and cyclist road safety, and the subsequent implementation of infrastructure improvements or retrofits to eliminate unsafe points or links identified within the movement system. Such infrastructure improvements and retrofits might include traffic calming measures, pedestrian crossing facilities, bus embayments, cycleways, wider footways and parking restrictions. Audits are usually undertaken by the relevant local authority.

4. CONCLUSION

The general conclusion of this paper is that from a traffic congestion and road safety perspective scholar and child travel is of significance, yet available data with which to analyse the travel behaviour of this group adequately is limited. It is important therefore that greater attention is given to scholar and child trip-making in travel surveys and travel demand models. Further, international precedent suggests that there are a variety of initiatives, with the aim of improving conditions of travel for scholars and children, which can be implemented at low cost and independently of larger scale organisational support. Opportunities exist for the appropriateness of these initiatives in the South African context to be evaluated critically,⁴ and implemented in suitable forms.

⁴ A important contextual difference between the countries in which these initiatives have been developed and South Africa, may well be the aggressive and sometimes violent attitude of South African drivers towards child pedestrians. In a special feature on scholar transport, *Open Road*, the newsletter of the Western Cape branch of the South African Road Federation, cites incidents in Cape Town where motorists verbally abuse, spit upon and squirt water at child pedestrians. In one incident in Belhar a taxi-driver shot a passer-by who objected to the taxi-driver's abuse of a scholar patrol.

5. REFERENCES

- [1] Behrens R 2001: “*Looking beyond commuter travel in Cape Town: methodological lessons from the application of an activity-based travel survey*”, International Conference on Transport Survey Quality and Innovation, How to Recognise It and How to Achieve It, Bergen-Dal.
- [2] Behrens R, 2002a: “*Matching networks to needs: Travel needs and the configuration and management of local movement networks in South African cities*”, Thesis presented for the Degree of Doctor of Philosophy, University of Cape Town.
- [3] Behrens R, 2002b: “*Findings of an activity-based household travel survey in Cape Town, with particular reference to walking as a travel mode*”, South African Transport Conference, “Towards building capacity and accelerating delivery”, Pretoria.
- [4] CMC, 2000: “*Cape Metropolitan Area: Traffic accident statistics 1999*” Directorate, Transportation and Traffic, Cape Metropolitan Council.
- [5] de Beer E, 2000: “*Western Cape pedestrian plan: Feedback from workshops held 6 to 10 March 2000*”, Council for Scientific and Industrial Research, Provincial Administration of the Western Cape, Cape Town.
- [6] de Beer E and Davidson J, 2000: “*Western Cape pedestrian plan: Phase 1 Audit report*”, CR-2000/44, Provincial Administration of the Western Cape, Cape Town.
- [7] DOT, 2000: “*Travelsmart to school, years 5-7: Activities and teacher Notes*”, Department of Transport, Government of Western Australia, Perth.
- [8] Hillman M, Adams J and Whitelegg J, 1990: “*One false move: A study of children’s independent mobility*”, Policy Studies Institute, London.
- [9] Makhanya G, Ribbens H and de Beer E, 1998: “*Pedestrian management plans: The role of provinces and local authorities to reduce pedestrian casualties in South Africa*”, Vol 2C Road Traffic Safety, South African Transport Conference, Pretoria.
- [10] Market and Opinion Surveys 1992: “*Survey of the transport problems experienced by residents in the Cape Town metropolitan area: Summary of the tabulated results*”, Public Transport Study for Cape Town Metropolitan Transport Area, Phase 1 Problem Definition, Report T 15B/92, Liebenberg and Stander Consulting Engineers, Cape Town.
- [11] Moolman B 1976: “*Transportation study Cape Town and vicinity: Home interview report on whites and coloureds*”, Bureau of Market Research, University of South Africa, Pretoria.
- [12] O’Fallon C, 2000: “*The walking school bus: A guide for parents and teachers*”, Pinnacle Research, Energy Efficiency and Conservation Authority, Christchurch City Council, Auckland City Council.
- [13] Osborne P and Pontefract D, 1999: “*School travel strategies and plans: A best practice guide for local authorities*”, Sustrans, Oscar Faber, Department of the Environment, Transport and the Regions, London. <http://www.local-transport.dft.gov.uk/schooltravel/bpgla/index.htm>
- [14] TRC Africa, 1999: “*Greater Pretoria household travel survey*”, Transportation Research Consultants Africa, Greater Pretoria Metropolitan Council, Pretoria.
- [15] VKE, 1999: “*Quality of life survey 1999: Transport results*”, Draft Report, Van Niekerk Kleyn and Edwards Consulting Engineers, Urban Strategy Department, Durban Metropolitan Council, Durban.

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Biography

Roger Behrens is a Senior Lecturer in UCT's postgraduate Transport Studies Programme. He graduated with a with a Master Degree in City and Regional Planning in 1991, and with a PhD degree in 2002. His current research interests include: activity-based travel analysis; local movement network configuration and management; non-motorised transportation; and policy analysis in the fields of urban passenger transport and land use-transport interaction.