

BICYCLES : THE MYTH AND REALITY

ALAN DAVIES
Urban Transport Study Group
of N.S.W.

ABSTRACT: *This paper examines roles for bicycles in the transport task and concludes that the case for policies to encourage bicycle use which are premised on energy, pollution and roadworks savings cannot be demonstrated. Evidence is offered to support the contention that bicycles have limited potential to compete with, or complement, existing modes. A residual, though narrow, role for bicycles is identified, based on the justification of greater mobility and safety for young persons.*

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The once humble bicycle is experiencing a wave of popularity in Australia and enjoying new status as a potential contributor to the solution of contemporary urban ills.

Evidence of its popularity is an increase in annual sales from 130,000 units in 1970/71 to 320,000 in 1976/77, although the extent of actual use is not really known (ABS). Its new status is based on its low energy, non polluting operation and the pleasurable means of 'getting fit' which it provides.

With the resurgence of interest in cycling have come calls on government to provide bike route systems, lock up facilities at rail stations, amendments to legislation restricting cycling and a host of other measures designed to promote cyclists interests. The major rationales which have been put forward for government expenditure and policy initiatives to promote cycling are recreation, safety and transport.

The most contentious of these rationales is the latter, which I will argue has no substance as a justification for the allocation of scarce public resources to cycling. It contends that the bicycle has the ability to reduce energy demand, pollution and the area of cities devoted to road-works. It is based on the view that cycling could replace a significant number of car trips, and hence reduce the adverse effects of private vehicle travel, if governments were to provide the appropriate facilities to make cycling both safer and more attractive.

This is a particularly important claim given current concern about pollution levels, availability of portable energy sources and the social effects of major road construction. It is also worthy of detailed consideration because of the massive costs involved in providing bicycle facilities, which run to \$20,000 per kilometre for bikeways, and involve the possibility of increased traffic congestion and reduced public transport revenues.

It also hardly need be said that further competition for scarce public funds requires close examination in the current climate of belt tightening. However, there are other important, though narrow, grounds for encouraging wider bicycle use and I will also discuss these.

There can be no argument that a single bicycle is a great deal more energy efficient, less polluting and requires less roadspace than a single car. The bicycle in fact is about 40 times more energy efficient and is a considerably cheaper means of travel than the \$3,000 annual average cost involved in operating a car. The trouble however is that bicycles have extremely limited potential to replace car trips on a scale sufficient to realise the claimed benefits.

The hill too steep for bicycles to climb is the dispersed land use pattern of cities in developed nations such as Australia. Unlike Amsterdam, where historical development produced a dense urban form which enables trips to be made easily by walking let alone cycling, Australian cities are relatively recent in origin. The major population area of Sydney, which I will use as an example in this discussion, developed since the advent of motorised transport. This created a sprawled land use pattern where the distance between activities is largely determined by the travel times of motorised vehicles, particularly cars.

In fact the centre of gravity of population in Sydney is no longer the city centre which is so well served by public transport, but in the vicinity of Silverwater 13 kilometres west. At the 1976 Census, cars were used for 59% of journeys to work and public transport for 29.9%. Bicycles were used for only 0.35% of work trips on average and usage was highest in the Eastern Suburbs, as the map shows.

The necessity to travel by car is now further consolidated by trends such as declining population in the dense inner city, outer suburban residential growth, relocation of manufacturing industry from inner city to peripheral locations, and the emergence of decentralised business and shopping centres where the necessity to travel by car is proclaimed by giant parking lots.

According to a Sydney Area Transportation Study survey (SATS, 1974) undertaken in 1971, the median length of all car journeys in Sydney was 5.8 kms. and that of journeys by car between work and home was over 9.8 kms. The average non-manufacturing work trip length in Sydney was estimated to be 13.8 kms. in 1976 (UTSG, 1978). Available data on bicycle journeys in Australia is limited, but it is clear they are considerably shorter. Even in Holland where bicycle use is high, a study of one city found the median length of bicycle journey is 1.5 kms. (Brummelaar, 1978).

Such long trip distances militate against the use of bicycles. There is little hope they can be reduced significantly by developing new residential areas at higher densities, as the existing urban fabric will still accommodate over 80% of Sydney's projected population at year 2000. (PEC, 1976) That is, the effects of higher densities can only be obtained at the margin unless the socially traumatic and inefficient redevelopment of existing housing stock is contemplated.

Another stick in the spoke for bicycles is the fact that 57% of week day journeys in 1971 were for work, personal business and non home based purposes (SATS, 1974) for which travellers place a high value on travel time.

Increasing congestion on roads approaching the inner city may well make cycling as fast as driving on these roads, but only 18% of Sydney's jobs were located in the CBD in 1971 and 78% of trips to these were in any case made by public transport (SATS, 1974). Talking governments into building bikeways to attract patronage away from public transport would be a particularly difficult task.

As well as the drawbacks of journey length and time, the potential role of bicycles in the journey to work is limited by the requirements of formal working attire, absence of showers at work places (particularly white collar employment) and simple things like the custom of after-work drinks. Actually, these are probably more significant constraints than trip length!

The other 43% of trips in Sydney in 1971 were for school, shopping and social/recreational purposes (SATS, 1974). While these are shorter than work trips, the latter two journey purposes nevertheless had lengthy median trip distances by car of 3.2 kms. and 5.3 kms. respectively. Further, the potential for shopping by bicycles is limited by the difficulties of carrying large packages and supervising children.

Nearly a sixth of all school journeys were made by car, but these amounted to only 3% (SATS, 1974) of all weekday journeys made in Sydney. A total of 47% of school journeys were made on foot and 35% by public transport. The wisdom of spending public money to replace these school trips by bicycles is questionable.

The foregoing drawbacks work against the wider use of bicycles even before other constraints such as topography, the difficulty of making trips at night and the expectation of cold, rainy or excessively hot weather are weighed up in the mind of the prospective cyclist.

The critical factor is not so much the number of people who have access to a bicycle, but rather the extent to which they use it. There are significant exceptions to each of the drawbacks identified, but taken together they indicate that the potential of the bicycle to replace car trips, or more correctly kilometres of travel by car, is extremely limited.

The scale of replacement necessary to effect significant energy and pollution savings would have to be large indeed. For example, to maintain car emissions at their current levels in Sydney would require replacing about half a million car trips each day with bicycles by the end of the next decade. A 16% reduction in the total Australian consumption of oil would require a 50% decrease in the use of oil by the nations cars (IEA, 1977). Put another way, half the cars in Australia would have to be taken off the road.

The gain to be had from replacing half the nations urban car trips (or half the kilometres they travel) with bicycles would be a 36% reduction in the nations total energy consumption. The explanation of these rather disappointing facts is that oil makes up about 50% of total energy consumption in Australia and cars in turn burn up only 32% (and urban car trips only 15%) of oil consumption (IEA, 1977).

Short of draconian pricing policies, increases in the price of petrol offer little hope for the bicycle either. Usage of cars is highly resistant to increases in operating costs due to the sheer convenience cars provide compared to other transport modes. For instance, a reduction in vehicle miles of travel of only 15% has been forecast for a doubling of petrol prices in London (Hooper and Mullen).

Preliminary findings of U.S. Federal Energy Administration research (Pratt, 1977) indicate a value of -0.1 for petrol price elasticity, i.e. a pump price increase of 1% would result in a 0.1% reduction in car usage. A study of the 40% increase in the pump price of petrol in the U.S. during the 1973-74 shortage (Peskin, 1975) found it had little impact on car usage. A study of the impact of petrol price changes on demand in Australia (Schou and Johnson, 1978) over the period 1955-1976 found that a 1% rise in pump price would decrease demand by only 0.08%.

Indeed, the preference for car travel persists despite its high real cost, largely because of the convenience and comfort it provides. Significant shifts to other forms of transport appear to occur mainly in a limited number of situations where driving is infeasible, such as in the city centre of Sydney where parking is restricted. As noted above, 78% of workers travelling to Sydney's CBD used public transport in 1971, making an argument for a shift to bicycles difficult to justify on the grounds of savings in energy, pollution or roadworks.

Even if serious oil shortages were to occur, it is a great deal more likely that a shift to cars powered by electricity or some other energy source would occur rather than a wholesale shift to cycling (or public transport for that matter). Alternatively, smaller and more efficient cars could reduce oil consumption while still allowing the mobility travellers have come to expect. In fact it is by no means certain that shortages will occur. As one writer has pointed out (Peterson, 1978) it would be in Saudi Arabia's long term interest to continue acting as a moderating influence on OPEC pricing decisions rather than have the value of its extensive oil reserves depreciated by stimulating development of alternative energy sources.

Thus the prospects for ameliorating the identified problems of energy, pollution and roadworks by replacing car travel with cycling look far from promising. In fact, greater bicycle use may pose additional problems.

It could, for instance, adversely affect public transport revenues, particularly in the case of outer suburban private bus operators, who in many cases claim they are dependent on school fare subsidies. It has been argued that this tendency could be offset to some extent by the use of bicycles in lieu of cars for the home leg of 'park and ride' journeys to railway stations, but such car-train journeys are estimated to have accounted for only about 3% of all daily trips made in Sydney in 1971, and the car component tends to be short (SATS, 1974).

Further, increased bicycle use could have adverse ramifications for traffic conditions, as by far the greater part of any system of bicycle routes would need to use existing roads. Some of these could be lightly trafficked local streets, but cyclists themselves prefer to use main roads (GRC, 1977), and in many localities, such as the inner suburbs of Sydney, there are very few lightly trafficked streets. Traffic may be slowed by cyclists or the capacity of roads reduced by devoting a strip to a bicycle lane.

The result could be the imposition of higher operating and travel costs on all road users, including those lower income drivers and passengers least able to afford them. Traffic congestion might also be exacerbated at a time when governments are seeking to use traffic management measures in lieu of freeway construction policies. Further, it is hard to see bicycles per se giving rise to savings in roadworks. On rainy days, cyclists are likely to take their cars out of mothballs and recreate the old peak demand.

It should not be concluded from the foregoing discussion that there is no role for the bicycle to play. While its potential for energy, pollution and roadworks savings does not provide a rationale for government policies directed toward encouraging greater bicycle use, there are compelling arguments for limited government action on other grounds.

Where bicycles offer the greatest potential is in the provision of mobility to those without access to a car or the resources to use public transport. This applies particularly to city children, not so much for urban school trips where walking and public transport can be used, but for the purpose of social and recreational trips. Children in provincial towns and rural areas where public transport service is poor would also have much to gain from bicycles in overcoming long distances. What may seem a long journey to a city child may on the other hand be a pleasant 20 km. ride to an otherwise isolated rural child whose perception of distance is substantially different.

Conventional transportation planning which relies almost exclusively on car and public transport travel tends to ignore the needs of young people. Yet the travel of youth for social and recreational purposes is as legitimate as that of adults and they certainly display a keen interest in extending their interests beyond the home. There were more than 2.4 million Australians aged 7-16 years at the 1976 census, none of whom could drive a car.

Young people presently make up the majority of bicycle users and it seems likely they would ride more extensively if conditions were safer. Indeed, the safety of existing child riders is perhaps the most compelling justification for the provision of cycle facilities.

In Australia 81 cyclists were killed in 1975 and 2,390 injuries were reported, though it is estimated only one tenth of bicycle casualty accidents are officially recorded (Pattinson, 1977). The Geelong Bike Plan (1977) found that 90% of bicycle use in that city is by riders under 18 years of age and states that cyclists under 18 years of age account for 72% of all reported accidents. A U.K. study recorded reported bicycle accidents at the rate of 572 per hundred million kilometres travelled, compared to 127 for cars and taxis (Margason and Corcoran, 1977).

Clearly there is a strong case for allocating government expenditure to the provision of safer cycling. Perhaps some would maintain there is an equally strong case for banning child cyclists on roads, however this would defeat the objective of providing mobility to youth. Special bikeways are expensive to construct and hence a satisfactory bicycle route system must be substantially made up of existing roads.

There are also adults who do not have access to a car or live in outer locations where public transport service is limited and consequently are handicapped in their ability to travel. They include university students, housewives and families on low incomes. Of these, only the former group has displayed a significant interest in cycling.

Though the bicycle would provide them with an alternative means of transport, it is difficult to determine if members of these groups would cycle were safer conditions to be provided. Housewives may continue to co-ordinate their trips with the availability of the family car and low income households may continue to devote an unduly high proportion of their family budget to the purchase of a car. In short, public expenditure on bicycles to assist the mobility of these groups may be better devoted to other solutions, such as improving public transport service.

Bicycles also have a role to play in adult recreation, although there seems little justification for government expenditure on the hard, smooth tracks cyclists require. The cost of access to this activity for the individual is particularly high (around \$150 for a safe bicycle) compared to other government funded leisure activities such as swimming or picnics in national parks. Rather than subsidise higher income groups, as much public expenditure for leisure tends to do, a more equitable government strategy would be to encourage cyclists to raise the necessary funds themselves.

To conclude, it is obvious that appropriate government policy and expenditure on bicycling should be matched to the benefits provided. It is my view that the major issue is constraints on the mobility of youth, which warrant public action to promote safer cycling for this group. However policies premised on energy, pollution and roadworks savings are informed by a mythology which would be more fitting to justifying Ben Hur's chariots. The case for facilities such as bicycle routes serving workplaces cannot be demonstrated on these premises.

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