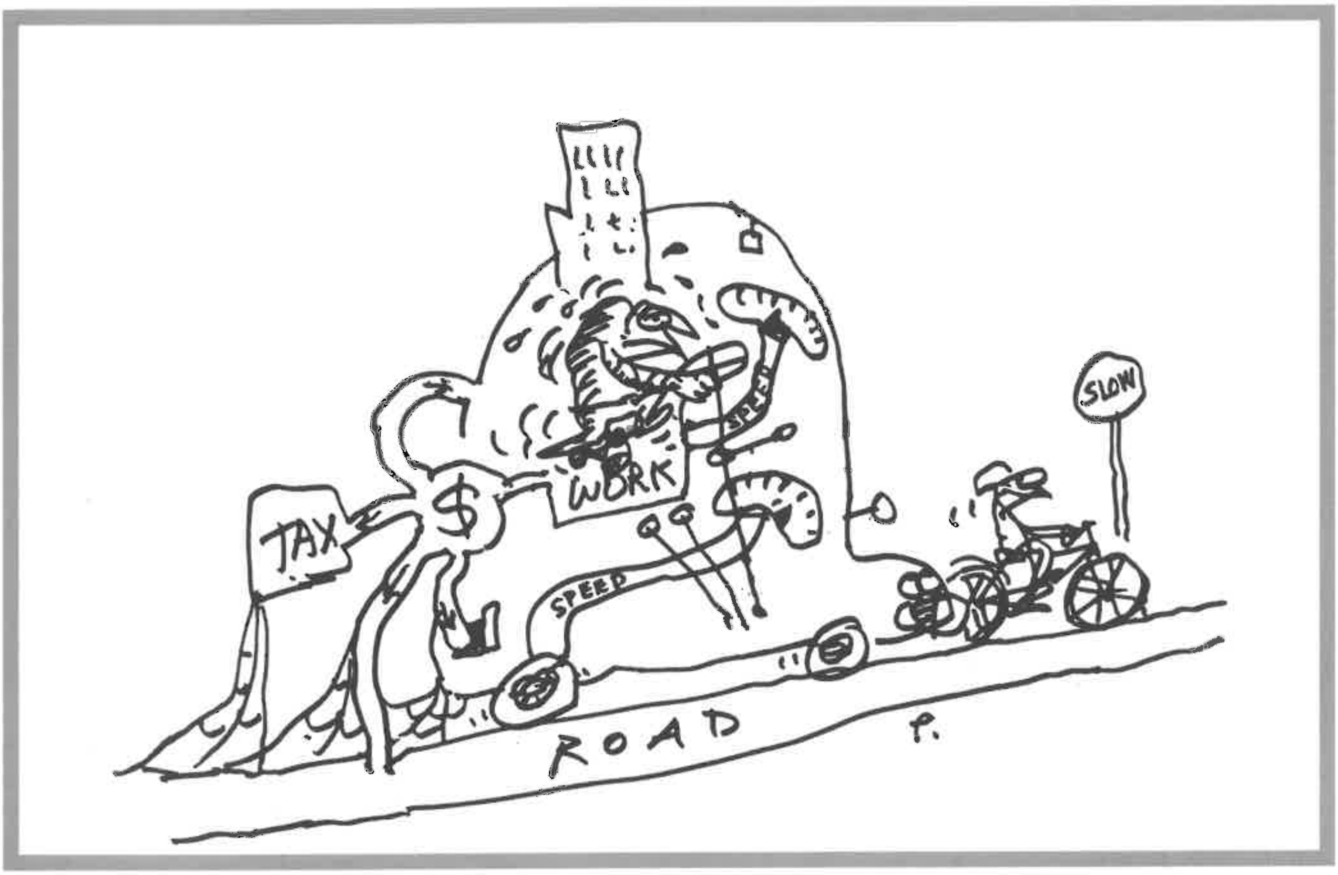


TRANSPORT

The urban speed paradox: time pressure, cars and health

PAUL TRANTER analyses the concept of 'effective speed' and its relevance to urban transport planning.

TIME PRESSURE IS AN ALMOST universal experience for residents of modern cities. The feeling of constantly having to rush is a serious health issue, affecting not only adults, but also children, who are increasingly hurried from one extra-curricular activity to another. The hurry virus taking over our lives is linked to increased stress and depression, poor diets, and a lack of physical activity. In a recent book titled *The Seven Deadly Sins of Obesity*, time pressure is identified as the second of these sins: people experiencing time pressure eat fast food to save time, but still have not got enough time for regular exercise.

We rarely have enough time to do the things we want to do, and we feel unable to get to places quickly enough. Building faster roads or buying a 'fast' car or a second car may be an appealing solution to time pressure. However, our obsession with speed, and in particular our reliance on cars as a supposedly fast mode of transport, may be an underlying cause of our lack of time.

It might be expected that cities with higher traffic speeds would have lower daily Travel Time Budgets (TTBs: time spent on travel each day). In fact, the opposite is true. As the French transport researcher Iragaël Joly explains, Western European cities have TTBs of about 43 minutes and distance travelled of about 21 km. In contrast, North American cities have TTBs of around 55 minutes with 40 km distances. The increased speed is not used to save time but to cover more distance. Consequently, as the city expands (or as shops, jobs and services become more dispersed), even more speed is needed to overcome the increased distances. However, the increases in speed do not fully compensate for the increasing distances, and hence low density cities pay for their dispersion with longer travel times.

Higher motor vehicle speeds are not saving us time. Indeed, our attempt to increase the speeds at which we travel in cars may be stealing our time, our money, and our health. To resolve this paradox, it is necessary to understand the hidden time costs of speed.

MOTORISTS TYPICALLY underestimate the costs and overestimate the speeds of their travel. Public transport users typically do the reverse. Not only do car drivers underestimate the time they spend in their cars, they also rarely consider the total time devoted to these machines. The irrationality of this is illustrated in the following anecdote.

Imagine that you live in a village in the 1800s, and that your role each day is to collect water from a nearby stream. This takes you an hour each day. To save time, you construct a machine to collect the water for you, based on a system of pulleys, cables, levers and springs. With this machine, simply by pulling a lever you can send your bucket to the stream, and have it returned full of water. You appear to have saved yourself an hour each day. However, to get the machine to work, you need to spend an hour each day winding up the spring that powers the machine. The question you need to ask is whether you should consider this time in any decision about the effectiveness of the machine.

For motorists in modern cities, the equivalent of the time winding up the spring is the time spent at work to earn the money to pay for the various costs of their cars. The car will only save time if the time saved in travelling is greater than the work time required to earn the money to pay for the car. Many motorists, as well as many city governments, ignore this time spent by motorists to earn the money to pay for transport costs. The concept of effective speed allows this time to be considered.

The ideas behind the concept of effective speed appear in the literature as early as the 1850s.

The car will only save time if the time saved in travelling is greater than the work time required to earn the money to pay for the car.

In his famous book *Walden*, first published in 1854, Henry David Thoreau argues that 'the swiftest traveller is he that goes afoot'. He compares his own speed as a pedestrian with the speed of a fellow traveller who plans to go by train to a nearby town:

> *I start now on foot, and get there before the night. You will in the meanwhile have earned your fare, and arrive there some time tomorrow, or possibly this evening, if you are lucky enough to get a job in season. Instead of going to Fitchburg, you will be working here the greater part of the day. And so, if the railroad reached around the world, I think that I should keep ahead of you.*

In 1974 Ivan Illich, in *Energy and Equity*, brought Thoreau's ideas into the twentieth century, explaining that:

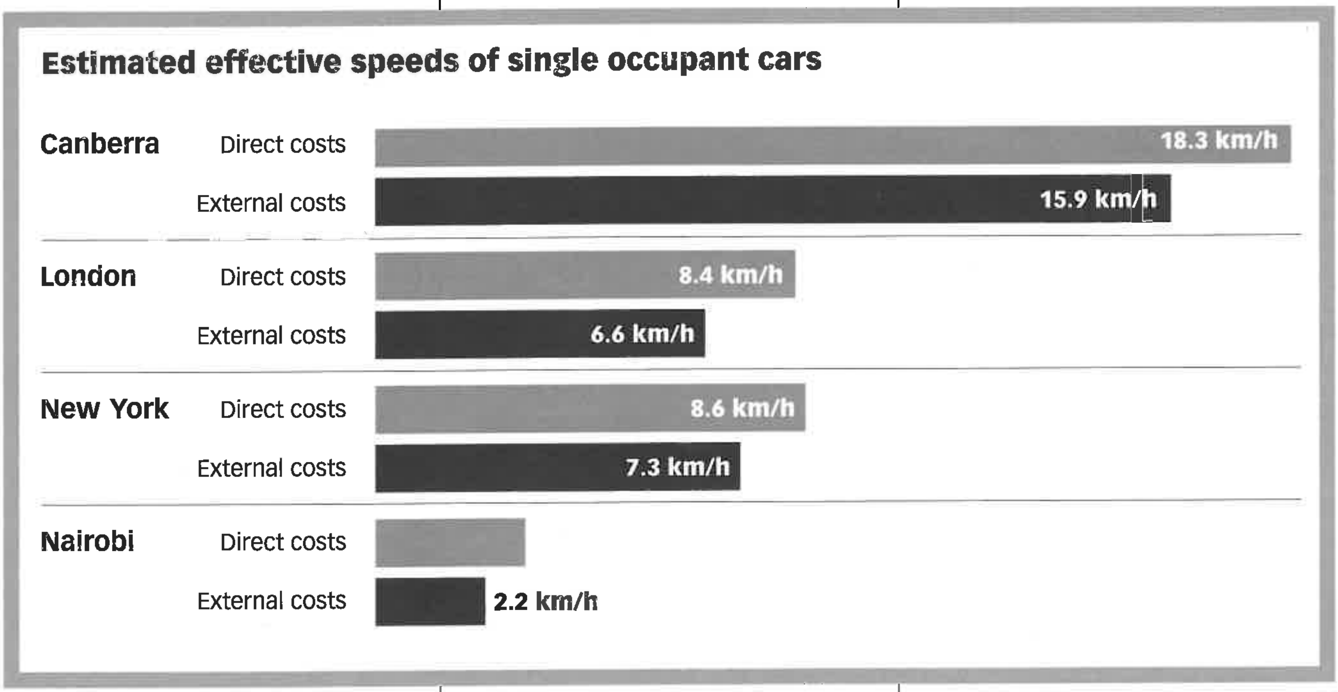
> *...the typical American male devotes more than 1,600 hours a year to his car. He sits in it while it goes and while it stands idling. He parks it and searches for it. He earns the money to put down on it and to meet the monthly installments. He works to pay for petrol, tolls, insurance, taxes and tickets ... The model American puts in 1,600 hours to get 7,500 miles: less than five miles per hour.*

The concept 'effective speed', examined in several papers by the writer and co-authors, allows all the time costs to be summarised in a single calculation. Effective speed uses the standard formula: speed equals distance divided by time. However, unlike the usual consideration of speed of travel, it considers all the time costs of any mode of transport, not simply the time spent moving. For pedestrians, the only time cost involved is the time spent walking. For cyclists the time required to pay for the purchase and operating costs of the bicycles is minimal (at least in cities in developed nations). In contrast, for car drivers the major time commitment is not the time spent driving, but the time spent at work earning the money to pay for costs associated with the car.

The costs of cars include both direct costs and indirect, or external, costs. Direct costs are costs paid by individual motorists (e.g. depreciation, fuel, insurance, registration, parking, and tolls). External costs are costs that are borne by the whole society, both now and in the future (e.g. congestion, accidents and pollution). When external costs are included in the calculations, the term 'social effective speed' is used.

The question of whether external costs should be included in effective speed calculations is one of morality. The critical issue is whether or not individuals should be responsible for the wider impacts of their behaviour. Morality suggests that they should. Current behaviour in an individualistic society suggests that the majority of citizens ignore these responsibilities. However, as awareness of the impact of transport on climate change increases, motorists may be more likely to consider the collective impacts of their individual transport decisions.

Estimations of the average effective speeds of car drivers can be made for any city, using data on the operating costs of cars (calculated by many motoring organisations), average incomes, and the average trip speeds



of cars within the city. I have estimated effective speeds of single occupant cars for several cities throughout the world, in North America, Europe and in developing nations. If only the direct costs are considered, and using new cars with the lowest operating costs (e.g. the Hyundai Getz in Australia), the effective speed of cars in cities I have examined varies from 18.3 km/h in Canberra to a mere 3 km/h in Nairobi. (For more expensive cars, the effective speed is lower than this.) The higher effective speeds in Canberra are a consequence of the combination of high average incomes, minimal car parking costs, no tolls and minimal traffic congestion. The low effective speeds in Nairobi are due largely to the low average incomes in this city, and therefore the increased time taken by people to earn enough money to pay for their car costs. In cities such as London and New York (8.4 and 8.6 km/h effective speeds respectively), the relatively low speeds are due mainly to low trip speeds and high vehicle operating costs (including parking and tolls). When the external costs are taken into account, the social effective speeds for car drivers range from a high of 15.9 km/h (Canberra) to a low of 2.2 km/h (Nairobi). Other examples of social effective speeds for motorists on average incomes, driving a low-cost car, include: New York—7.3 km/h; Los Angeles—9.3 km/h; Toronto—12.9 km/h; London—6.6 km/h; and Hamburg—8.9 km/h.

Increasing the trip speeds of cars has little impact on effective speeds because the main time component for many car drivers is not the time spent in cars, but the time spent earning the money to pay for all the costs of cars.

These figures can be used to calculate how slowly cyclists could cycle and still be effectively faster than a car. Allowing for the time spent earning the money to pay for bicycle costs, if external costs are ignored, a cyclist in Canberra would need to travel 21.5 km/h to be faster than a car. In Nairobi, a cyclist at 3.1 km/h would be faster than a car. If external costs are considered, cyclists in Canberra would only need to average 18.3 km/h to be faster than a car. In New York, Los Angeles, and Hamburg, cyclists would not need to travel faster than 11 km/h to be 'effectively' faster than a car.

When audiences are introduced to the concept of effective speed, it can generate cognitive dissonance amongst car drivers. Even when motorists understand the concept, they sometimes respond with a range of arguments about why effective speed is not relevant to them. One such argument is 'I'm a skilful driver, so I drive faster than everyone else'. Such drivers will be disappointed to find that driving faster is likely to *reduce* their effective speed.

INCREASING THE TRIP SPEEDS of cars has little impact on effective speeds because the main time component for many car drivers is not the time spent in cars, but the time spent earning the money to pay for all the costs of cars. If nothing is done to reduce the work time component, effective speeds are not likely to fall. In fact, when car drivers try to save time by driving faster, this will likely reduce their effective speed, because of the extra costs involved in more hectic driving (more fuel used, more wear and tear on the vehicle, increased risk of speeding fines and accidents, and greater stress on the drivers).

The time costs of these are likely to far outweigh the few seconds gained by a speeding motorist.

When city governments attempt to save time by building faster roads, this is also futile, as it will make virtually no difference to effective speed, even assuming there is no cost involved. The cost of road building is immense, and if this cost were converted to a time measure (based on average time spent at work to earn the money to pay for it), then building new roads will result in 'more' time spent on transport rather than less. Taking London as an example, if average trip speeds could be increased by 10 km/h, this would result in an increase of effective speed for car drivers of a mere 0.7 km/h, assuming that this increase in trip speeds could be achieved at zero cost. However, to increase the trip speed of motorised traffic, it would require a huge investment in road widening and new motorways, including the cost of the demolition of large areas of buildings and valuable urban green spaces. In addition to road building costs, there would also be the extra costs of increased pollution from induced traffic, reduced levels of physical activity through active transport (due to increased traffic danger with higher vehicle speeds), increased levels of overweight, obesity and heart disease, and the loss of social networks as road widening leads to the closure of local shops, schools and services.

When a city is dominated by cars, more space is required for transport, and hence greater distances must be travelled to reach destinations. Cars require more space for parking than other modes. They also require vastly more space than pedestrians, cyclists and public transport users when moving. The faster cars travel, the more space is required around them. Cars moving 'safely' at 100 km/h (allowing a three second gap between cars) require more than 100 times as much space as cyclists at 15-20 km/h. Thus, not only do cars have lower effective speeds than bicycles, the widespread use of cars means that greater distances have to be travelled, requiring even more time to be devoted to transport. The car steals our time both in terms of the time required to pay for the costs and the extra time created by increased distances.

Increasing trip speeds for cars in cities does not save the time we may think it does. In contrast, increasing trip speeds for cyclists, pedestrians and public transport users can save time. Increases in trip speeds for these active transport modes could be achieved with minimal cost, for example, by transferring road space to pedestrians and cyclists, as has been successfully achieved in recent years in New York. Using the London example, if the average trip speed for cyclists increased by 10 km/h, this would increase the effective speed by 8.7 km/h. This large increase in effective speed is achieved because the main time component involved for cyclists is the time spent cycling. In Copenhagen, the 'Green Wave' (a series of lights timed so that if cyclists keep pace with the changing lights they get all the green traffic light signals) is used to increase the average trip speed of cyclists, and the return on this investment is far greater than any return on increasing the trip speeds of motorists.

A switch to more active modes of transport will not only encourage a celebration of slowness, it will save time, reduce the negative health impacts of transport and increase the positive health impacts of transport

IN EVERY CITY IN THE WORLD, it is likely that the effective speed of cars will decline in coming years as a result of two factors. The first is an increase in congestion—already manifest in Chinese cities with regular gridlock in inner areas. The second will be a decline in the ability of motorists (and cities) to afford the cost of cars: a consequence of the aftermath of the peaking of global oil supplies. These two factors mean that any city that prioritises active transport will be at a considerable advantage over cities that continue with the futile objective of increasing (or even maintaining) the speeds of motorised traffic.

To address the issue of time (and money) devoted to transport requires a reassessment of the design and the priorities of urban transport systems in car-dominated cities. Rather than a focus on speed, a focus on slowness can provide benefits for the liveability and resilience of cities. Slowness is not only about slowing down the speed of cars, but also includes a change in mind-set to a slower way of living: less focus on materialist consumption driven by globalisation, and more focus on enjoying connections with people and with local cultures. When people travel more slowly, the trip itself can be savoured, rather than seeing the next task as being more important than the present.

In order to make ourselves and our cities healthier and wealthier, we should rethink our obsession with speed. A switch to more active modes of transport will not only encourage a celebration of slowness, it will save time, reduce the negative health impacts of transport and increase the positive health impacts of transport (e.g. physical activity and social cohesion). Because time is saved, time pressures will be less likely to provide a barrier to healthy lifestyles. Improving levels of urban health might be as simple as valuing the time of pedestrians, public transport users and cyclists more than the time of motorists.

Dr Paul Tranter is Associate Professor in Geography at the University of New South Wales, Australian Defence Force Academy, Canberra, Australia. His research focuses on holistic strategies to make our cities more child-friendly, liveable and resilient. He is the co-author of Children and their Urban Environment: Changing Worlds.