

A rapid desk-top review of interventions which increase the number of people cycling

Introduction

Context: The successful bid to Cycling England outlined three strands to increase cycle numbers: Infrastructure, Smarter Choices (behaviour change) and Bikeability (cycle training). A fourth element has since been identified as community engagement.

At first glance the question ‘What works in terms of increasing the number of people cycling?’ is one to which a set of interventions may be readily drawn up. There is a plethora of English language policy and practice guidance focused publications from countries where cycling has a significantly higher modal share than in the UK. However, a more reflective analysis of the ‘evidence’ has to be contextualised within a broader understanding of the history of transport policy within the wider public policy developments of each country ie how their respective economies have been developed post World War II and whether cycle use was supported and valued as a normal means of transport.¹

The context and effect of historical UK transport policy choices and how to proceed with Cycling Demonstration City Bristol

Unlike in many European countries with higher levels of cycling than in the UK there is a generation of current UK adults who have never cycled or else stopped cycling in their early teenage years for whom cycling is not a perceived travel choice and who also may perceive cycle use negatively.² Consequently their understanding of what it is like to cycle and how to drive considerately in their presence is largely lacking. This is not a result of chance but of clear public policies made decades ago, largely retained, and consequent infrastructure, marketing, law, and normative cultural values favouring car use.³ In contrast, cycling was given little consideration and virtually no resources, essentially by default viewed as an outmoded form of transport. In the following decades this also resulted in almost no research focus on interventions to promote cycling but rather cycling almost only being framed as a consideration within casualty reduction studies. The outcome has been a combination of speed and volume of motor traffic, and a lack of designated space for cycling that has then acted as a significant barrier to cycling.⁴ Consequently, the funding from Cycling England will enable Bristol to lay the foundations for sustained effort in the following decades to bring the city up towards continental cycling levels. It is important to note that high levels of car ownership in itself is not a barrier to high levels of cycle use, at least for commuting, despite higher car ownership levels among affluent population groups. Evidence from Census data suggests that wards with higher proportions of ‘higher professionals’ display higher levels of cycling to work, but wards that have higher income deprivation display lower levels.⁵

The purpose of the following sections is to:

- highlight the range of interventions shown to work
- provide expert opinion where there is a limited evidence base
- identify what may be the most effective interventions given very limited infrastructure to date and cultural climate.

What works (WW)

Important caveats – What may work (WMW)

Readers seeking high quality studies and appraisals (eg meta-analysis and randomised controlled trials) of transport interventions to increase cycling will largely be disappointed. There is a lack of well-conducted interventions to increase rates of cycling among the population as a whole, or among identified population groups (such as young people). In addition, in some areas there is limited or no evaluated evidence although there may be strong anecdotal evidence. Absence of evidence is not necessarily evidence of absence.⁶ Thus, just because there is no evidence it does not necessarily mean that certain interventions don't work.

Policy level Interventions

There is clear evidence that municipal policies do have an influence on individual's mode choice when considering short journeys. Short journeys by bicycle generally means up to 5 miles (8km).^{7 8} In England, where additional funding has been forthcoming from Government for integral policy approaches cycling has risen by 30%, albeit from low levels of <5% of commute trips.⁹ There are essentially two ways of encouraging bicycle use using a combination of push and pull policies:

- Improving the attractiveness of a mode by reducing its generalise costs (including time through direct routes and few stops) and improving infrastructure, continuity, and safety¹⁰
- Making competing modes more expensive (eg increasing car parking costs).¹¹

Previous European national cycling demonstration towns have established traffic planning models which re-prioritise cycling within traffic policy. This includes a recognition of the amount of short trips by bicycle, not reflected in traffic counts.¹² Best practice case studies highlight the degree to which cyclists can participate in general traffic safely and without obstructions. This is epitomised in the phrase 'continuous and integral'. Of the top ten cycling cities in Europe 6 have separate cycle facilities as standard and 7 have bicycle parking as an important cycling policy theme.¹³

Table 1: Comparison of ten cities based on 'integral policy'¹⁴

	Analogy	Exceptions
Integral cycling policy: Also attention to innovations, services and promotion?	Limited: 6 out of 10 cities still have a nearly complete focus on infrastructural measures	To some extent Groningen and Copenhagen: stronger: Odense and Ghent
Firm, systematic and enthusiastic cycling policy: From political commitment to assessment?	Limited: 6 out of 10 show clear 'holes' in political support or in thoroughly planned conduct of policy	Clearly systematic: Amsterdam and Copenhagen; more embedded in politics and with political 'drive': Odense and Ghent
Integral traffic policy: Restrictions to car traffic in and near city centre (parking, circulation of car traffic?)	Yes, all cities show some kind of restrictions to car\ traffic near the city centres	Possibly less restrictions in Zwolle and especially Veenedaal; clearly more restrictions in Copenhagen and Amsterdam

Environmental interventions

WW: There is *unequivocal* evidence that infrastructure measures both to directly improve conditions for cyclists on and off-road, including designing for safe intersection crossing, while placing restrictions on car use, is critical. Complete and integral systems of bicycle routes in all successful cycling cities permit cyclists to cover almost any trip either on completely separate paths and lanes or on lightly travelled, traffic calmed residential streets (maximum speed 30 kph/18.6 mph). Bike lane connectivity has been identified as a likely key determinant of cycling as a means of transport in urban areas.¹⁵ Extensive car-free zones in city centres generally permit cycling during the off-peak. In total these measures are designed to feel safe, comfortable, and convenient for both young and old, for women as well as men, and for all levels of cycling ability.¹⁶

WW: Segregated off-highway routes are often popular, perhaps best exemplified in the UK by the Bristol-Bath Railway Path. Research evidence suggests that such paths may be an invaluable means for many people in urban areas to make cycle utility trips which would be perceived to be too dangerous because of mixing with motorised traffic and consequently particularly valuable for children, and older people who are less confident or able. Off-highway routes also attract more female cyclists and black and ethnic minority groups.¹⁷ The introduction of traffic-free paths can lead to increases in levels of cycling in both the short and long term.^{18 19 20} A current proposal for a Cycle Expressway between Whiteladies Road and Temple Meads station alongside part of the Sevenbeach line may provide a suitable candidate.

WW: An Evidence Review for the National Institute for Health and Clinical Excellence (NICE) identified five environmental interventions for which there was a minimum of before and after data relating to increasing cycling or walking: traffic calming; multi-use trails; closing or restricting use of roads; cycle infrastructure; safe routes to schools. These are summarised below from NICE Guidance²¹ with further details in the Appendix drawn from the Review.

- re-allocate road space to support physically active modes of transport (as an example, this could be achieved by widening pavements and introducing cycle lanes)
- restrict motor vehicle access (for example, by closing or narrowing roads to reduce capacity)
- introduce road-user charging schemes
- introduce traffic-calming schemes to restrict vehicle speeds (using signage and changes to highway design)
- create safe routes to schools (for example, by using traffic-calming measures near schools and by creating or improving walking and cycle routes to schools).

WW: A funding programme of Links to schools by DfT has also reported significant increases in cycling among children and adults.²² This is supported by international evidence as to the impact of safe routes to schools projects including the critical importance of traffic calming.²³ A principle utilised by Cycle Exeter is 'appropriate infrastructure' so that for the most vulnerable the emphasis is on traffic free routes to school wherever possible. This would not necessarily be so for cycle commuters.

WW: Various traffic calming programmes have helped to increase cycle use including standard use of 30kph zones eg in the Netherlands the effects of 30 km/h zones piloted at the end of the 1970s had a positive effect on road safety. Speeds were lower, it was safer for cyclists, and there was less through traffic.²⁴ Later programmes elsewhere in Europe also reported positive results eg Buxtehude, Germany (part of the national traffic calming demonstration project, 1981-86), where establishment of 30 kph zones in the town led to increases in cycle traffic of 27% post intervention.²⁵ The evaluation and follow-up research for the national programme found a doubling of bicycle use over a 4-year period.²⁶

Smarter Choices: Behavioural interventions

WW: On average behavioural programmes such as personalised journey planning increase cycle use by around 10%²⁷ and specific interventions such as TravelSmart (home setting) by as much as 17%.²⁸ In continental cities with higher cycling mode share behaviour change programmes have largely developed in the past decade or so in order to further grow cycle use. When people live in settings with adequate bicycle infrastructure, promotion campaigns aimed at increasing cycling for transport should focus on creating social support by encouraging cycling partners, increasing perceptions of the normality of cycling, raising environmental and health awareness and time benefits.²⁹ Young and middle aged people are generally viewed as the key target groups.³⁰

WW Case example: In Odense, designated the Danish Cycle City (1999-2002) campaigns featured strongly alongside infrastructure improvements including attracting more children to cycle. Balloons, candy, free bike accessories and other gifts for children learning to ride were included. There were also new offers to adults to try out different types of bicycle, trailers, company bike and accessories. The campaigns continuously encouraged

people to cycle and provided prizes as rewards, for individuals, workplaces and employers. Fold-up bikes were successfully introduced as an efficient complement for car commuters. Traffic safety was promoted including a new 30 kph speed limit area. Image improvements including the special role of bicycles in police work and as taxis, and the annual election of the cyclist of the year. In addition, the Cycle City was powerfully presented, for example through 80 talks and 856 newspaper articles. Overall, the Cycle City continually asked cyclists what priority they would put upon future initiatives.³¹ The target to increase the number of journeys by bicycle in Odense by 20% by the end of 2002, compared to the years 1996-1997 was achieved.

WW: In Aarhus, an experiment giving a small number of adults free bicycles (returnable deposit) who previously travelled the car to commute to work reported an increase from 8% to 39% in bicycle use. Motivational factors for participants were largely health and the attraction of a free bicycle.³²

WW: Programmes targeted at children are particularly important in increasing cycle use, often linked to infrastructure measures (often part of School Travel Plan work).³³ In Exeter, 'cycle proofing' school 'catchments' areas is an approach to ensuring children can cycle to school through infrastructure improvements around the area of the school while Personalised Journey Planning is offered to pupils in transition from primary to secondary schools who currently cycle in order to help them cycle to their new school. Evidence from Bike It schools in England demonstrates that cycle use can increase by over 400%, albeit from low baselines of 2% or 3% and reflecting the high level of suppressed demand for cycling among this age group.³⁴

WW: awareness campaigns of new cycle routes is seen as critical as evidence exists that perceptions remain if people receive little (or no) information is made widely available. For example, in Lund, Sweden, a new route remained little used until a belated awareness campaign by the municipality.³⁵

WWW: Habit is an important determinant of travel behaviour.³⁶ An approach utilised in Germany and currently being implementation in London is to use 'naturally' occurring breaks in habitual behaviour, such as home moves. Tailored interventions to when car oriented travel behaviour is 'broken' during a variety of lifecourse events offers a targeted approach to behaviour change. Preliminary evidence suggests that it may lead to greater mode change away from car use than less targeted approaches.³⁷

Bikeability: Cycle Training

WWW: There is little peer reviewed evidence as to the effectiveness of cycle training in encouraging cycle use. There is limited evidence from a low quality local case study that advanced cyclist training has resulted in increases in the proportion of children cycling to school.³⁸ A lack of evidence has been noted by the Cycle Training Standards Board.³⁹ Cycle training for adults has through self-report data cited large increases in cycle use – from 0.9 to 2.2 trips per week by those trained.⁴⁰ The Dutch Cyclists' Union runs courses for older cyclists to encourage continuation of cycling.⁴¹

Other considerations

WMW: Safety in numbers as an issue is not new. The critical issue is reaching a level of cycling where it starts to make a perceivable improvement in safety. This is likely to be over 10%. Although peer reviewed evidence is still relatively limited the phenomenon is taken as fact in other countries where cycling holds a significant mode share eg in Dutch and Danish transport policy. There are examples from towns where increases in cycle use have led to increases in the safety to individual cyclists.⁴² Cycling in London has also increased by 83% over the past 6 years, yet the number of serious crashes involving cyclists has fallen proportionately by 28%.⁴³ Policies that increase walking and cycling appear to be effective route to improving road safety. Moreover, drivers who are also cyclists are more supportive of the needs of cyclists.⁴⁴ An analysis of national data from 14 European countries on walking and cycling as well as data for 47 towns in Denmark, and 68 towns in California provides the most robust peer reviewed evidence⁴⁵ that there is a relationship between motor vehicle collisions with pedestrians and or cyclists and numbers of pedestrians and or cyclists. For example, in a community where cycling doubles it can be expected that there will be a 34% increase in cyclist injuries. The relationship between pedestrian or cyclists exposure and casualties is not linear, that is, there is safety in numbers for these mode users. Motorists appear to adjust their behaviour in the presence of people walking and cycling which largely controls the likelihood of collisions. Jacobsen's paper is important not only because of his conclusions but also because it highlights the paucity of attention to this potentially substantial contribution to transport policy.

WMW: Satisfaction with current conditions for cycling is also important and is exemplified in the City of Copenhagen's approach to cycling which, since 2000, includes an annual report on cycle users satisfaction. An important headline objective is that at least 80% of cyclists shall feel safe in traffic. Currently this is 53% which has led to a policy focus on infrastructure and campaign work on road user behaviour (2007-09). Thirty-six per cent of commuters cycle to work in Copenhagen.⁴⁶

WMW: Community level cycling programmes are absent in peer review.⁴⁷ However there are case studies of interventions with claims of successful uptake of cycling, at least in the short term (ie under 1 year).⁴⁸

WMW: The Odense Cycle City noted above included a cycling ambassador programme that sent well trained cyclists to residential neighbourhoods to serve as role models of safe cycling and help with cycling promotion, distributing newsletters and information.

WMW: Social Marketing is linked closely to individualised marketing programmes such as TravelSmart but is more targeted. There is, however, little evidence of application in the UK to cycling specifically, with perhaps the exception of research for the development of the Active Bristol programme.⁴⁹ Many people are not aware that cycling increases life expectancy. There is potential for messages to be promoted through GP surgeries. Health

promotion messages are often better received by women than men, and also by those better educated.

WMW: One target group not to be forgotten is potential new young car users. Information about the costs, casualty risks, and stress of drivers have been shown to reduce or slow uptake of car driving licenses.⁵⁰

WMW: Research on active travel and children in the South West region has identified three Adventure Playgrounds in Bristol which are actively helping children to keep cycling, largely by providing an unofficial and free bicycle repair service, and some organised rides. The Felix Road Adventure Playground in Easton is shortly to launch a cycle hire facility.⁵¹ With a relatively small funding resource there is potential to expand their reach to children from communities with high levels of deprivation.

WMW: In the German Cycle-Demonstration Towns (1980-87) establishing a bicycle office' proved useful as a centre for people to meet and seek advice.⁵²

Dr Adrian Davis, Health and Transport Consultant.

adrian.davis@phonecoop.coop

¹ Tengstrom, E. 1999 Towards environmental sustainability? A comparative study of Dutch, Danish, and Swedish transport policies in a European context. Aldershot: Ashgate.

² Basford, L., Reid, S., Lester, T., Thomson, Toile, A. 2002 Drivers perceptions of cyclists, TRL Report 549.

³ Hamer, M. Wheels within wheels: A study of the road lobby. London: Rutledge and Keegan Paul. The impact of the post war Marshall Plan was a re-building of Britain in which the development of motor manufacturing and an allied automotive industry led to a powerful roads lobby which was successful in lobbying Whitehall for a major roads programme which was almost wholly accepted by successive governments since the 1950s.

⁴ Ubiquitous citing eg Cycling: Getting Australia Moving, 2008 Cycling Promotion Fund. <http://www.cyclingpromotion.com.au/content/view/329/9/> accessed 31st August 2008; AA Foundation, 1993 Cycling Motorists: How to encourage them. Basingstoke: AA Foundation.

⁵ Parkins, J., Wardman, M., Page, M. 2008 Estimation of the determinants of bicycle mode share for the journey to work using Census data. Transportation, 35: 93-109.

⁶ Popper, K. 1963 Conjectures and Refutations: The Growth of Scientific Knowledge. London: Routledge.

⁷ Fietsberaad, 2006 Continual and integral: The cycling policies of Groningen and other European cycling cities. Rotterdam: Fietsberaad.

⁸ Ministry of Transport, Public Works and Water Management, 1995 Cities make room for cyclists. Den Haag: MTPWM.

⁹ Wilkinson, J. 2006 Sustainable Travel: the National Perspective. Smarter Travel Choices Conference, London, November. <http://www.london.gov.uk/assembly/scrutiny/docs/transport-seminar-jacqui-wilkinson.pdf> accessed 26th August 2008.

¹⁰ Rietveld, P., Daniel, V. 2004 Determinants of bicycle use: do municipal policies matter? Transportation Research Part A, 38: 531-550.

¹¹ Pucher, J., Buchler, R. 2008 Making cycling irresistible: Lessons from the Netherlands, Denmark, and Germany, Transport Reviews, 18: 495-528.

¹² Monheim, R. 1990 Policy issues in promoting the green modes, 134-158; in Tolley R. (Ed) The Greening of Urban Transport. London: Belhaven.

¹³ Fietsberaad, 2006 op cit

¹⁴ Ibid

¹⁵ Titze, S., Stronegger, W., Janschitz, S., Oja, P. 2008 Association of built-environment, social-environment and personal factors with bicycling as a mode of transportation among Austrian city dwellers, Preventive Medicine, 47: 252-259.

¹⁶ Pucher, J., Buchler, R. 2008 op cit

¹⁷ Moore, C., Cope, A., Bulmer, A. 2006 The role of traffic-free routes in encouraging cycling among excluded groups, World Transport Policy & Practice, 12(3): 21-35.

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- ²⁰ Sustrans 2006 Links to Schools Surveys, Trade Mills, Newhaven. Sustrans.
- ²¹ NICE, 2008 Promoting and creating built or natural environments that encourage and support physical activity, Public Health Guidance 8. London: NICE.
- ²² Department for Transport, 2006 Walking and cycling: 'Links to Schools'. London: DfT.
- ²³ Jensen, S. (2008) How to obtain a healthy school journey. *Transportation Research Part A* , 42: 475-486.
- ²⁴ Janssen, S. 1991 Road safety in urban districts. Final results of accident studies in the Dutch Demonstration Projects of the 1970s, *Traffic Engineering and Control*, June: 292-296.
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Table 2: Environmental interventions reported by NICE

Intervention type	Effect on cycle use	Quality of study
Traffic calming	3UK evidence that 20mph speed limit zones can increase cycle use particularly among children	Included controlled before and after (Medium)
Multi-use trails	3 of 4 studies (2 UK) that segregated routes have lead to above 10% increases in cycling, with one UK case study reporting 110% increase	Controlled before and after (Medium)
Closing or restricting use of roads	1 study addressing cycling (UK) which reported increase in cycle use of 58% from 7,905 to 12,541 on ring road and major roads (seen as components of wider traffic restraint measures)	before and after (Low)
Cycle infrastructure	All 7 studies (1 UK) found reported increases in cycle use, mostly over a year or more, and often over 10% increase. Measures included signage, on road routes, shared paths, recreational paths, cycle bridges, contra-flow, 'green wave' traffic signals, cycle parking	Included case controlled studies (Medium)
Safe routes to school	2 studies (1 UK) both reporting significant increases in cycling. Where a cycle link was built (UK) there was a 191% increase in cycling	Included case controlled studies (Medium)