Invisible Bicycle

Parallel Histories and Different Timelines

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CHAPTER 3

Entrenched Habit or Fringe Mode: Comparing National Bicycle Policies, Cultures and Histories

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1 Introduction

From the First World War until the 1960s, the bicycle was a popular means of personal transport all over Europe. After the volume of pedalling traffic peaked in the 1950s, it was rapidly outstripped by motoring. In many countries, the share of the car in the total number of traffic movements (modal share or modal split) would surpass that of the bicycle by around 1960—a development that came about earlier in North America. Cycling seemed out-dated and headed for an all-time low. However, since the 1970s, when countercultural criticism of technocratic car-geared systems and bicycle activism arose,[1] it has regained support among the general public as well as from governments. Worries about energy depletion, environmental and noise pollution, traffic congestion and safety, ill health and obesity, social exclusion and insecure streets, have entailed a re-evaluation of the two-wheeler as a clean, silent, sustainable, healthy, flexible, inexpensive, democratic and humane vehicle. Its modal share increased again, in some countries and cities more sharply than in others, but nowhere did it reach the 1950s level. Over the last two or three decades, national governments and cities throughout the western world, have launched ambitious policy statements and programs aimed at promoting cycling. Apart from students in university towns, the bicycle's popularity increased in particular among young and well-educated residents of cosmopolitan cities. Also, it won a prominent position in the marketing of popular tourist destinations such as Paris, Amsterdam and Barcelona, and even of traditionally bicycle-unfriendly cities such as London and New York.

1 See, e.g., E.C. Claxton, "The Future of the Bicycle in Modern Society", *Journal of Royal Society of Arts* 116, no. 5138 (1968); Ivan Illich, *Tools for Conviviality* (New York: Harper and Row, 1973); Ivan Illich, "Energy & Equity", in Illich, *Toward a History of Needs* (Berkeley: Heyday Books, 1978); André Gorz, "L'idéologie sociale de la bagnole", *Le Sauvage* (September–October 1973); Paul Rosen, "Up the Vélorution: Appropriating the Bicycle and the Politics of Technology", in *Appropriating Technology: Vernacular Science and Social Power*, ed. Ron Eglash et al. (Minneapolis: University of Minnesota Press, 2004).

All of this has nourished the belief that the western world is witnessing a "bicycle renaissance" and "a veritable bicycle boom".[2] Policymakers, policy-oriented bicycle researchers and cycling activists seem quite optimistic about the possibilities to increase the bicycle's modal share in daily transport for short-distance trips (up to 5 or 7.5 kilometres) by means of infrastructural engineering and programs for bicycle promotion. Bicycle policies have been introduced not only in countries with relatively high cycling levels (Netherlands, Denmark, the Flemish part of Belgium, Germany and Finland, and, to a lesser extent, Sweden, Norway, Ireland, Austria and Switzerland), but also in countries with low volumes of cycling (Great Britain, the United States, Canada, Australia, France, and Italy). By way of contrast, in the eastern part of Europe, where recent trends point to declining levels of pedalling as a consequence of economic growth and fast growing motorized traffic, and also in Spain, Portugal and Greece, bicycle policies, if in place at all, are still in their infancy.

The arguments reinforcing cycling policies are basically similar everywhere, but their implementation as well as actual wheeling levels reveal significant and persistent differences between countries. Around 2000, the bicycle's modal share in passenger transport amounted to 27 per cent in the Netherlands and 20 per cent in Denmark. It varied between 7 and 12 per cent in Germany, Belgium, Austria, Switzerland, Sweden and Finland; between 4 and 5 per cent in Italy, France and Norway; and between 2 and 3 per cent in Great Britain, Canada, Ireland and the Czech Republic. And it stagnated at around 1 per cent in the United States, Australia, New Zealand, Spain, Portugal and Greece. The annual pedalling distance per capita in kilometres fluctuated between 850 and 1,020 in the Netherlands and Denmark; between 250 and 330 in Belgium, Germany, Sweden and Finland; between 140 and 230 in Ireland,

2 John Pucher, Charles Komanoff, and Paul Schimeck, "Bicycling Renaissance in North America? Recent Trends and Alternative Policies to Promote Bicycling", *Transportation Research Part A: Policy and Practice* 33, nos. 7–8 (1999); John Pucher, Ralph Buehler, and Mark Seinen, "Bicycle Renaissance in North America? An Update and Re-appraisal of Cycling Trends and Policies", *Transportation Research Part A: Policy and Practice* 45, no. 6 (2011); John Pucher and Ralph Buehler, eds., *City Cycling* (Cambridge, MA: MIT Press, 2012); Trine Agervig Carstensen and Anne-Katrin Ebert, "Cycling Cultures in Northern Europe: From 'Golden Age' to 'Renaissance'", in *Cycling and Sustainability*, Transport and Sustainability, Vol. 1, ed. John Parkin (Bingley: Emerald, 2012); Tim Birkholz, "Die stille Revolution—das Fahrrad kommt zurück", in *Das Fahrrad. Kultur/Technik/Mobilität*, ed. Mario Bäumer and Hamburg Museum der Arbeit (Hamburg: Junius, 2014); Paul Smethurst, *The Bicycle: Towards a Global History* (New York: Palgrave Macmillan, 2015), 3–4, 143. For a tempering of this belief, see, however, Manuel Stoffers and Anne-Katrin Ebert, "New Directions in Cycling Research: A Report on the Cycling History Roundtable at T2M Madrid", *Mobility in History* 5, no. 1 (2014); Smethurst, *The Bicycle*, 144–48.

Italy and Austria, between 70 and 100 in France, Great Britain and Greece; while it did not reach 50 in Portugal and Spain. Whereas all residents of the Netherlands and Denmark, on average, own a bicycle, the same goes for 3 out of 4 Germans; 2 out of 3 Swedes and Finns; about 1 out of 2 Belgians, Italians and Austrians; 1 out of 3 Frenchmen and British; 1 out of 4 Portuguese; and 1 out of 5 Spaniards.[3] Also, the reasons for, and the appreciation of, pedalling show considerable variation. Whereas in countries with high volumes of bicycle traffic, a positive image and utilitarian purposes (commuting to work, school, shops and other activities and destinations) prevail, in countries with low cycling levels, more negative views abound on daily use of the bicycle and pedalling as a leisure time, sportive or childhood activity comes first.[4]

These substantial differences between nations raise several questions. For one thing, what does the so-called "bicycle renaissance" imply, and what is its impact? Is it possible to explain variations in the frequency, purpose and appreciation of bicycle-use on the basis of geographical and climatological conditions, environmental and infrastructural planning, demographic characteristics, habits in mobility, and the image of the bicycle? What is the impact of cycling policies in various countries? Are they effective at all?

This chapter considers these issues on the basis of a meta-analysis of social-scientific and historical bicycle studies as well as policy documents. First, I discuss policy-oriented research into the factors that advance or impede bicycling. Next, I argue that this research and the associated policy plans leave several of the questions unanswered, and that some of their basic assumptions

3 For these and other quantitative data, see J. Dekoster and U. Schollaert, *Cycling: The Way ahead for Towns and Cities* (Luxemburg: Office for Official Publications of the European Commission, 1999), 19; Ulrike Huwer, "Let's Bike: The 10 Point Pedalling Action Programme to Support Cycling", *World Transport Policy & Practice* 6, no. 2 (2000), 41, 43; European Conference of the Ministers of Transport, *Implementing Sustainable Urban Travel Policies: National Policies to Promote Cycling* (Paris: Organisation for Economic Co-operation and Development, 2004), 19–20, 24; Piet Rietveld and Vanessa Daniel, "Determinants of Bicycle Use: Do Municipal Policies Matter?" *Transportation Research Part A: Policy and Practice* 38, no. 7 (2004), 534; Kurt van Hout, *Literature Search Bicycle Use and Influencing Factors in Europe* (Hasselt: Hasselt University/Transportation Research Institute, 2008), 8, 14–18; John Pucher and Ralph Buehler, "Making Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany", *Transport Reviews* 28, no. 4 (2008), 498–99; David R. Bassett et al., "Walking, Cycling, and Obesity Rates in Europe, North America, and Australia", *Journal Physical Activity and Health* 5, no. 6 (2008), 799; Directorate-General for Internal Policies, Policy Department B, Structural and Cohesion Policies, Transport and Tourism, *The Promotion of Cycling* (Brussels: European Union, 2010), 28; "Bicycle Statistics: Usage, Production, Sales, Import, Export", International Bicycle Fund, accessed 28 December 2017, http://www.ibike.org/library/statistics-data.htm.

4 Huwer, "Let's Bike", 43.

should be brought up for discussion. As I will show, policymakers and bicycle researchers largely ignore the historical and national-cultural dimension of cycling. My claim is that this overlooked aspect is highly relevant for explaining international differences in both cycling levels and the effectiveness of policies.[5] This will be demonstrated by comparing diverging cycling patterns among Western countries, and explaining how they are rooted in the past. In this way, my argument seeks to bridge the gap between bicycle policies and the interrelated social scientific research on the one hand and cultural-historical studies of pedalling on the other.

2 Determinants of Bicycling

The growing concern for bicycling in the transport policies of many western governments in the last three decades has boosted social-scientific bicycle research in the field of mobility, traffic engineering and urban planning. Quantitative and statistical methods—in particular, measurements of traffic movements and surveys—have been predominant in this research. Central concerns pertain to why people either use or do not use the bicycle (in particular for utilitarian purposes) and how cycling can be facilitated and promoted. Strikingly, most of these studies have appeared in the United States, the United Kingdom and Australia, where bicycle levels are fairly low, while Dutch, German, Belgian, Danish and other Scandinavian scholars also figure prominently. My argument is based on an analysis of more than two hundred published and unpublished research papers[6] and several policy documents, mostly produced in the last two decades.[7]

5 The considerable variations in cycling volumes between regions or cities within countries are beyond the scope of this chapter. See, however, Stoffers and Ebers, "New Directions".

6 Within the confines of this chapter, I can only refer to a selection of these studies.

7 Ministry of Transport, Public Works and Water Management, The Netherlands, *Nota Fietsverkeer 1983. Een volledig beeld* (The Hague: Ministry of Transport, Public Works and Water Management, 1983); European Commission, *Policy and Provision for Cyclists in Europe* (Brussels: Commission of the European Community, Directorate General for Transport, 1989); Ministry of Transport, Public Works and Water Management, The Netherlands, *Beleidsnotitie Masterplan Fiets* (The Hague: Ministry of Transport, Public Works and Water Management, 1991); Federal Highway Administration, the United States, *The FHWA National Bicycling and Walking Study Case Study No. 3: What Needs to Be Done to Promote Bicycling and Walking?* (Washington, DC: Federal Highway Administration, 1992); Federal Highway Administration, the United States, *The* FHWA *National Bicycling and Walking Study Case Study No. 4: Measures to Overcome Impediments to Bicycling and Walking* (Washington, DC: Federal Highway Administration, 1993); Ministry of Transports and Communications, Finland, *Finland Moving*

on Two Wheels (Helsinki: Ministry of Transports and Communications, 1993); Department of Transportation, Federal Highway Administration, the United States, *The National Bicycling and Walking Study: Transportation Choices for a Changing America* (Washington, DC: Federal Highway Administration, 1994); Department of Transport, the United Kingdom, *National Cycling Strategy* (London: Department of Transport, 1996); Federal Ministry of Transport, Building and Urban Development, Germany, *Erster Bericht der Bundesregierung über die Situation des Fahrradverkehrs in der Bundesrepublik Deutschland* (Bonn: Federal Ministry of Transport, Building and Urban Development, 1998); Ministry of Transport, Public Works and Water Management, Directorate-General for Passenger Transport, The Netherlands, *Eindrapport Masterplan Fiets. Samenvatting, evaluatie en overzicht van de projecten in het kader van het Masterplan Fiets, 1990–1997* (The Hague: Ministry of Transport, Public Works and Water Management, 1998); Federal Highway Administration, the United States, *The National Bicycling and Walking Study: Five-Year Status Report by the US Department of Transportation* (Washington, DC: Federal Highway Administration, 1999); Ministry of Transport, Public Works and Water Management, Directorate-General for Passenger Transport, The Netherlands, *The Dutch Bicycle Master Plan: Description and Evaluation in an Historical Context* (The Hague: Ministry of Transport, Public Works and Water Management, 1999); Ministry of Transport, Denmark, *Promoting Safer Cycling: A Strategy* (Copenhagen: Ministry of Transport, 2000); Department of Transport, the United Kingdom, *Ten Year Transport Plan* (London: Department of Transport, 2000); *The Swedish National Strategy for More and Safer Cycle Traffic* (Stockholm: N/A, 2000); European Commission, *Promotion of Measures for Vulnerable Road Users: Measures to Promote Cyclist Safety and Mobility* (Brussels: European Commission, 2001); Federal Ministry of Transport, Building and Urban Development, Germany, *Nationaler Radverkehrsplan 2002–2012: FahrRad! Massnahmen zur Förderung des Radverkehrs in Deutschland* (Berlin: Federal Ministry of Transport, Building and Urban Development, 2002); Ministry of the Flemish Community, Department of Environment and Infrastructure, Belgium, *Ontwerp Vlaams Totaalplan Fiets* (Brussels: Ministry of the Flemish Community, 2002); Ministry of Transport and Communications, Finland, *Towards Healthy, Sustainable Transportation: Implementation of the* WHO *London Charter in Finland* (Helsinki: Ministry of Transport and Communications, 2002); Geneviève Laferrere, *Comparison of National Cycling Policy in European Countries* (Brussels: Association for European Transport, 2002); Norwegian Public Roads Administration, *National Cycling Strategy: Making Cycling Safe and Attractive: National Transport Plan 2006–2015* (Oslo: Norwegian Public Roads Administration, 2003); Department for Transport, the United Kingdom, *Walking and Cycling: An Action Plan* (London: Department for Transport, 2004); European Conference of the Ministers of Transport, *Implementing*; Department of Transportation, the United States, *The National Bicycling and Walking Study: A Ten-Year Status Report* (Washington, DC: Department of Transportation, 2004); Austroads Incorporated, *The Australian National Cycling Strategy 2005–2010* (Sydney: Austroads Incorporated, 2005); Federal Ministry of Agriculture and Forestry, the Environment and Water Resources, Austria, *Masterplan Radfahren—Strategie zur Förderung des Radverkehrs in Österreich* (Vienna: Federal Ministry of Agriculture and Forestry, the Environment and Water Resources, 2006); Interministerial Co-ordinator for Bicycle Policy, *Plan pluriannuel d'actions de l'État en faveur du vélo proposé en 2007* (Paris: Ministry of Ecology, Sustainable Development and Energy, France, 2007); Federal Ministry of Transport, Building and Urban Development, Germany, *Zweiter Bericht der Bundesregierung über die Situation des Fahrradverkehrs in der Bundesrepublik Deutschland 2007* (Berlin: Federal Ministry of Transport, Building and Urban Development, 2007); Department of Transport, the United Kingdom, *A Sustainable Future for Cycling* (London: Department of Transport,

Based on my reading of the research reports, the following six factors that advance or impede cycling can be distinguished: (1) natural conditions; (2) land use patterns and built environment; (3) demography; (4) traffic infrastructure; (5) individual motivation and (6) ingrained and taken for granted collective habits (*habitus*) with respect to mobility. Four of these determinants cannot be changed through direct and purposive human intervention, at least not in the short term: they largely depend on the forces of nature (1) or they have taken on a more or less fixed shape in long-term historical developments (2, 3 and 6). In principle, it is possible for traffic infrastructure and individual motivation to be influenced more or less directly in the shorter term through goal-oriented policy measures. Policy as such—the choices and priorities made and the way it is implemented—can be considered a possible immediate influence on pedalling levels in its own right.

The basic assumption of cycling policy is the more or less optimistic idea that riding bicycles can be stimulated by technical and social design. Policymakers, planning experts, and policy-oriented bicycle researchers feel themselves challenged by two main problems. The first one is that people who do not use a bicycle for personal transport are hampered by material and environmental barriers, such as the dominance of motorized traffic and the lack of appropriate infrastructural facilities or other provisions. The second issue is that such people are not aware of the two-wheeler's benefits because they lack experience with it and have the wrong ideas about it. The engineering and planning approach implies the belief that these problems can be tackled by implementing the appropriate measures based on scientific (in particular quantitative) knowledge and expertise. This way of reasoning also presupposes to a large extent that people's decisions as to whether or not to pedal is mainly based on an individual and rational-instrumental consideration of costs and benefits, and that such a choice can be influenced by adapting the

2008); Swiss Federal Council, *Stratégie pour le développement durable: Lignes directrices et plan d'action (2008–2011)—Guide* (Bern: Federal Office for Spatial Development [ARE], 2008); Department of Transport, Ireland, *Ireland's First National Cycle Policy Framework* (Dublin: Department of Transport, 2009); Australian Bicycle Council and Austroads, *Gearing up for Active and Sustainable Communities: The Australian National Cycling Strategy 2011–2016* (Sydney: Austroads, 2010); Directorate-General for Internal Policies, *The Promotion of Cycling*; Department of Transportation, the United States, *The National Bicycling and Walking Study: 15-Year Status Report* (Washington, DC: Department of Transportation, 2010); Department of Transportation, the United States, *Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations* (Washington, DC: Department of Transportation, 2010); National Association of City Transportation Officials, *Cities for Cycling* (Washington, DC: National Association of City Transportation Officials, 2010).

physical environment, by promoting a positive image of cycling and by educating them about its advantages.

After a brief discussion of the main results of bicycle research with respect to natural conditions, land use and built environment, and demography, my argument centres on infrastructure, motivation and *habitus* in relation to policies. Finally, I turn to what is generally lacking in bicycle studies and planning: a consideration of the influence of history and (national) culture on pedalling.

3 Natural Conditions, Built Environment and Demography

Although considerable differences in altitude and extreme climates (hot as well as cold) seem to be major barriers for cycling, research shows that such natural conditions are not always a decisive factor and perhaps even play a subordinate role. The two-wheeler's modal split is largest in Denmark and the Netherlands, more or less flat countries with a temperate (though also rainy) climate. Despite the cold winters, cycling levels are generally higher in Scandinavia than in several countries with a warmer climate. And even with their icy winters, Canadians on average pedal more often than Americans. Moreover, both the climate and the topography in Ireland, Eastern England as well as the North of France, Germany and Italy are not very different from those in the Netherlands and Denmark, but cycling levels vary substantially among these regions. Swiss and Austrian pedalling volumes are larger than those in several less mountainous areas.[8]

8 Mark J. Koetse and Piet Rietveld, "The Impact of Climate Change and Weather on Transport: An Overview of Empirical Findings", *Transportation Research Part D: Transport and Environment* 14, no. 3 (2009); Paul Emmerson, Tim Ryley, and D.G. Davies, "The Impact of Weather on Cycle Flows", *Traffic Engineering & Control* 39, no. 4 (1998); Max Nankervis, "The Effect of Weather and Climate on Bicycle Commuting", *Transportation Research Part A: Policy and Practice* 33, no. 6 (1999); A.J. Richardson, *Seasonal and Weather Impacts on Urban Cycling Trips*, TUTI Report 1–2000 (Victoria, Australia: The Urban Transport Institute, 2000); Christiane Brandenburg, Andreas Matzakaris, and Arne Arnberger, "The Effects of Weather on Frequencies of Use by Commuting and Recreation Bicyclists", in *Advances in Tourism Climatology*, ed. Andreas Matzarakis, C.R. de Freitas, and Daniel Scott (Freiburg: Berichte des Meteorologischen Instituts der Universität Freiburg, 2004); John Pucher and Ralph Buehler, "Why Canadians Cycle More than Americans: A Comparative Analysis of Bicycling Trends and Policies", *Transport Policy* 13, no. 3 (2006); Meghan Winters et al., "Utilitarian Bicycling: A Multilevel Analysis of Climate and Personal Influences", *American Journal of Preventive Medicine* 32, no. 1 (2007); Christiane Brandenburg, Andreas Matzakaris, and Arne Arnberger, "Weather and Cycling—A First Approach to the Effects of Weather Conditions on Cycling", *Meteorological Applications* 14, no. 1 (2007); Muhammad Sabir, Mark J. Koetse, and Piet

There is evidence that spatial and urban characteristics (building and population density, the degree of (sub)urbanization and the dispersion or mixing of functions such as living, working, shopping and leisure, which determine commuting distances, have a greater impact on bicycle use than climate and topography. In general, trips of up to a maximum of 5 to 7.5 kilometres seem to be feasible for utilitarian cycling. The contrast between compact towns and inner cities in Europe and pervasive urban sprawl in North America and Australia partly explains the large differences in bicycle use. Some researchers point out that urban design and land use patterns are not independent variables because self-selection may play a role as well: areas with greater building density and lesser functional dispersion attract people who may choose the bicycle over the car in daily transport. Also, various degrees of urban compactness or sprawl may not only be a cause, but also an effect of higher and lower levels of pedalling and motoring respectively. In general, the influence of existing bicycle volumes and patterns on the built environment and people's willingness to use the bicycle in daily transport tends to be underrated. The increase of automobility has advanced urban sprawl (most obviously in North America and Australia), while high numbers of cyclists (such as in Dutch and Danish and also other European towns) may stimulate higher building densities and the intermixing of economic and social functions. Moreover, there is evidence that the correlation between sizeable cycling volumes and high building density holds truer for smaller towns than for larger cities (over 100,000 residents), which usually have more elaborate public transport networks. There appears to be an inverse correlation, in other words, between the modal share of public transport and that of the two-wheeler in daily mobility.[9]

Rietveld, *The Impact of Weather Conditions on Mode Choice Decisions: Empirical Evidence for the Netherlands*, Tinbergen Institute Discussion Paper (Amsterdam: Vrije Universiteit, 2008).

9 Kevan Shafizadeh and Debbie Niemeier, "Bicycle Journey-to-Work: Travel Behavior Characteristics and Spatial Analysis", *Transportation Research Record* 1578 (1997); Tim Schwanen, "Urban Form and Commuting Behavior: A Cross European Comparison", *Tijdschrift voor Economische en Sociale Geografie* 93, no. 3 (2002); Brian E. Saelens, James F. Sallis, and Lawrence D. Frank, "Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design, and Planning Literatures", *Annals of Behavioral Medicine* 25, no. 2 (2003); Robert Cervero, "The Built Environment and Travel: Evidence from the United States", *European Journal of Transport and Infrastructure Research* 3, no. 2 (2003); Robert Cervero and Michael Duncan, "Walking, Bicycling, and Urban Landscapes: Evidence From the San Francisco Bay Area", *American Journal of Public Health* 93, no. 9 (2003); Anne Vernez Moudon et al., "Cycling and the Built Environment, a US Perspective", *Transportation Research Part D: Transport and Environment* 10, no. 3 (2005); John Douglas Hunt and J.E. Abraham, "Influences on Bicycle Use", *Transportation* 34, no. 4 (2007); Jessica Y. Guo, Chandra R. Bhat, and Rachel B. Copperman, "Effect of the Built Environment on Motorized and Non-Motorized Trip Making: Substitutive, Complementary, or Synergistic?",

In some countries, there is a significant correlation between the bicycle's modal split and particular demographic characteristics of the population (age, gender, income, education, religion, family composition, lifestyle, ethnicity and political affiliation), but in other countries such a correlation is weak or almost non-existent. If in countries with low cycling levels—such as the United States, Canada, Great Britain and Australia—men, youngsters and students are strongly overrepresented among wheelers, while also in France and Belgium more men than women pedal, countries with large (Netherlands and Denmark) or moderate (the rest of Scandinavia, Germany, Austria and Switzerland) cycling volumes show a stronger correspondence between the demographic traits of bicyclists and those of the general population. In some countries, young metropolitan professionals are overrepresented among wheelers, while in general ethnic groups with non-Western roots seem underrepresented. Researchers have found no straightforward correlations between bicycle use and such demographic variables as education, wealth, income, family composition, religion, and car ownership; such correlations are usually weak and vary between countries.[10] However, there are indications that

Transportation Research Record 2010 (2007); Sammy Zahran et al., "Cycling and Walking: Explaining the Spatial Distribution of Healthy Modes of Transportation in the United States", *Transportation Research Part D: Transport and Environment* 13, no. 7 (2008); Xinyu (Jason) Cao, Patricia L. Mokhtarian, and Susan L. Handy, "Examining the Impacts of Residential Self-Selection on Travel Behaviour: A Focus on Empirical Findings", *Transport Reviews* 29, no. 3 (2009); Reid Ewing and Robert Cervero, "Travel and the Built Environment: A Meta-Analysis", *Journal of the American Planning Association* 76, no. 3 (2010); Meghan Winters et al., "Built Environment Influences on Healthy Transportation Choices: Bicycling versus Driving", *Journal of Urban Health* 87, no. 6 (2010); Joachim Scheiner, "Interrelations between Travel Mode Choice and Trip Distance: Trends in Germany 1976–2002", *Journal of Transport Geography* 18, no. 1 (2010); Grégory Vandenbulcke et al., "Cycle Commuting in Belgium: Spatial Determinants and 'Re-Cycling' Strategies", *Transportation Research Part A: Policy and Practice* 45, no. 2 (2011); Kevin J. Krizek, "Cycling, Urban Form and Cities: What Do We Know and How Should We Respond?" in *Cycling and Sustainability*, ed. Parkin; Maria Börjesson and Jonas Eliasson, "The Benefits of Cycling: Viewing Cyclists as Travellers Rather than Non-Motorists", in *Cycling and Sustainability*, ed. Parkin, 254, 256, 264, 266.

10 Ipek N. Sener, Naveen Eluru, and Chandra R. Bhat, "An Analysis of Bicyclists and Bicycling Characteristics: Who, Why, and How Much Are They Bicycling", *Transportation Research Record* 2134 (2009); Gregory B. Rodgers, "The Characteristics and Use Patterns of Bicyclists in the United States", *Journal of Safety Research* 25, no. 2 (1994), 86–88; Michael R. Baltes, "Factors Influencing Nondiscretionary Work Trips by Bicycle Determined from 1990 U.S. Census Metropolitan Statistical Area Data", *Transportation Research Record* 1538 (1996): 96–101; William E. Moritz, "A Survey of North American Bicycle Commuters: Design and Aggregate Results", *Transport Research Record* 1578 (1997): 98; Ministry of Transport, Public Works and Water Management, *Eindrapport*, 45; Colin G. Pooley and Jean Turnbull, "Modal

lifestyle, social environment, and status sensitivity or egalitarianism are relevant. The difference between the Netherlands and Belgium in this respect is striking indeed. In Belgium, people with lower education and lower income levels are overrepresented among bicyclists. For Belgians, it seems, pedalling in daily commuting is much more strongly linked to social status than for the

Choice and Modal Change: The Journey to Work in Britain since 1890", *Journal of Transport Geography* 8, no. 1 (2000): 14–15, 19; City of Copenhagen, Denmark, *Cycle Policy 2002–2012* (Copenhagen: The City of Copenhagen, Roads & Parks Department, 2002); Rietveld and Daniel, "Determinants"; Ruud Ververs and Arnold Ziegelaar, *Verklaringsmodel voor fietsgebruik gemeenten. Eindrapport* (Leiden: Research voor Beleid, 2006); John Parkin, Tim Ryley, and Tim Jones, "Barriers to Cycling: An Exploration of Quantitative Analyses", in *Cycling and Society*, ed. Dave Horton, Paul Rosen, and Peter Cox (Aldershot: Ashgate, 2007); Winters et al., "Utilitarian Bicycling"; Joachim Scheiner and Christian Holz-Rau, "Travel Mode Choice: Affected by Objective or Subjective Determinants?" *Transportation* 34, no. 4 (2007): 487–511; Joachim Scheiner, "Mobility Biographies: Elements of a Biographical Theory of Travel Demand", *Erdkunde* 61, no. 2 (2007); Bas de Geus et al., "Psychosocial and Environmental Factors Associated with Cycling for Transport among a Working Population", *Health Education Research* 23, no. 4 (2007); Van Hout, *Literature Search*; John Parkin, Mark Wardman, and Matthew Page, "Estimation of the Determinants of Bicycle Mode Share for the Journey to Work Using Census Data", *Transportation* 35, no. 1 (2008); Transport for London, *Cycling in London: Final Report* (London: Transport for London, 2008) 1, 8–11, 41, 45; Michael Smart, "US Immigrants and Bicycling: Two-Wheeled in Autopia", *Transport Policy* 17, no. 3 (2010); Catherine Emond, Wei Tang, and Susan Handy, "Explaining Gender Difference in Bicycling Behavior", *Transportation Research Record* 2125 (2009); Sener, Eluru, and Bhat, "An Analysis"; Eva Heinen, Bert van Wee, and Kees Maat, "Commuting by Bicycle: An Overview of the Literature", *Transport Reviews* 30, no. 1 (2010); Rik Verhoeven and Pieter M. Schrijnen, "Allochtonen onderweg: fietsgebruik onder immigranten" (presentation, Colloquium Vervoersplanologisch Speurwerk, Roermond, The Netherlands, 25–26 November 2010); Peter Pelzer, "Fietsmulticulturalisme", AGORA—*Magazine voor sociaalruimtelijke vraagstukken* 26, no. 4 (2010); Yan Xing, Susan L. Handy, and Patricia L. Mokhtarian, "Factors Associated with Proportions and Miles of Bicycling for Transportation and Recreation in Six Small US Cities", *Transportation Research Part D: Transport and Environment* 15, no. 2 (2010); Frank Goetzke and Tilmann Rave, "Bicycle Use in Germany: Explaining Differences between Municipalities with Social Network Effects", *Urban Studies* 48, no. 2 (2011); Pucher, Buehler, and Seinen, "Bicycle Renaissance in North America?", 454–58; John Pucher et al., "Walking and Cycling in the United States: Evidence from the National Household Travel Surveys", *American Journal of Public Health* 101, no. 1 (2011): 312–13; Shannon L. Sahlqvist and Kristiann C. Heesch, "Characteristics of Utility Cyclists in Queensland, Australia: An Examination of the Associations between Individual, Social and Environmental Factors and Utility Cycling", *Journal of Physical Activity and Health* 9, no. 6 (2011); Vandenbulcke et al., "Cycle Commuting"; Jennifer Bonham and Anne Wilson, "Women Cycling through the Life Course: An Australian Case Study", in *Cycling and Sustainability*, ed. Parkin.

Dutch. At the same time, some researchers have noted that the education levels of American, British, Australian and Danish bicyclists are above average.[11]

Generally speaking over the last decade, bicycling has gained more status as part of the trendy lifestyle choices ("cycle chic") of a metropolitan and well-educated "creative class" in many parts of the Western world. The notion of a recent bicycle-renaissance appears to be related to gentrification and neoliberal consumer capitalism as well as to a privileged middle-class perspective on pedalling. The increasing popularity of riding expensive, stylish and technically advanced bicycles among "yuppies" in some large European and American cities and the associated middle-class cycling activism may be at odds with the interests and attitudes of lower class citizens. Whereas the first group can afford to live close to their jobs in expensive uptown neighbourhoods and does not view driving as relevant for their social status, the lower class (including deprived ethnic groups), which is increasingly shunted to the cheaper peripheries, cannot and probably does not want to reduce its dependence on motorized traffic—at least if they do not cycle out of sheer necessity because they cannot afford motorized transport.[12]

Against this background, in the United States the construction of new urban cycling facilities sometimes evokes aversion among lower class, black urban residents who feel that they are elbowed out of their neighbourhoods. Therefore it is questionable whether bicycle policies always serve the interests

11 De Geus et al., "Psychosocial and Environmental Factors"; Peter Pelzer, "Bicycling as a Way of Life: A Comparative Case Study of Bicycle Culture in Portland and Amsterdam" (master's thesis, University of Amsterdam, 2010), 31, 61, 91; Giselinde Kuipers, "De fiets van Hare Majesteit: Over nationale habitus en sociologische vergelijking", *Sociologie* 6, no. 3 (2011); Vandenbulcke et al., "Cycle Commuting", 121; Rodgers, "The Characteristics", 86; Shafizadeh and Niemeier, "Bicycle Journey-to-Work", 84; William Moritz, "Adult Bicyclists in the United States: Characteristics and Riding Experience in 1996", *Transportation Research Record* 1636 (1998); Pucher, Komanoff, and Schimeck, "Bicycling Renaissance in North America?", 629; Winters et al., "Utilitarian Bicycling"; Sener, Eluru, and Bhat, "An Analysis"; Pucher, Buehler, and Seinen, "Bicycle Renaissance", 455; City of Copenhagen, *Cycle Policy*, 9; Sahlqvist and Heesch, "Characteristics of Utility Cyclists".

12 Richard Florida, *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community, and Everyday Life* (New York: Basic Books, 2002); Carstensen and Ebert, "Cycling Cultures", 47–50; Börjesson and Eliasson, "The Benefits of Cycling", 258; Dave Horton and John Parkin, "Conclusion: Towards a Revolution in Cycling", in *Cycling and Sustainability*, ed. Parkin; Giselinde Kuipers, "The Rise and Decline of National Habitus: Dutch Cycling Culture and the Shaping of National Similarity", *European Journal of Social Theory* 16, no. 1 (2012); Carlton Reid, *Roads Were Not Built for Cars: How Cyclists Were the First to Push for Good Roads & Became the Pioneers of Motoring* (Washington: Island Press, 2015), 259–60; Peter Cox, "Ideas in Motion: Cycling: Image and Imagery in the Cultural Turn: Review Essay", *Transfers: Interdisciplinary Journal of Mobility Studies* 2, no. 1 (2012); Smethurst, *The Bicycle*, 57–65, 145–46, 153–55.

of the financially weak who are pushed back to the outskirts of cities without such facilities and without adequate public transport. Anyway, this reversal of the post-war image of the two-wheeler as a poor man's vehicle qualifies the idea that it is by definition an egalitarian and emancipatory means of transport.[13] Whereas in the lower class and non-Western ethnic perspective driving still bestows social status and cycling is second-rate, younger parts of the privileged urban middle-class, who experience pedalling as convenient and enjoyable, feel that car-ownership is no longer relevant for their social standing.

4 Infrastructural Facilities

Traffic systems, infrastructures and other material provisions have received much attention in policy-oriented bicycle research, in particular because they can be purposively (re)shaped by means of planning and engineering. This category includes traffic rules and speeds for motorized and pedalling traffic; whether cyclists are segregated or not from cars on the one hand and from pedestrians on the other; the availability of (secure) parking space and its cost for cars and/or two-wheelers; the presence of bicycle ways and lanes, car restricted zones, marked routes and networks, separate bridges, viaducts, tunnels, traffic lights, repair shops, changing rooms and showers in the workplace, and storage capacity for bicycles at home. Additional elements in this category are bicycle rental facilities, adjusting public transportation to pedalling, and the costs and taxation of various modes of transport.

Existing traffic systems and infrastructures offer more or less possibilities to add specific modifications and amenities for cyclists. Many policymakers and bicycle researchers assume that the construction of facilities that make cycling efficient, comfortable, pleasant and safe will result in increasing numbers of people opting for the bicycle in daily commuting. Some of them display an unshakable optimism about the possibilities of promoting pedalling through infrastructural and traffic measures. Typically for many American bicycle experts, a leading professor of urban planning, John Pucher, strongly believes that "bicycling can be increased even under quite unfavourable circumstances,

13 Timothy A. Gibson, "The Rise and Fall of Adrian Fenty, Mayor-Triathlete: Cycling, Gentrification and Class Politics in Washington, DC", *Leisure Studies* 34, no. 2 (2015); John Stehlin, "Regulating Inclusion: Spatial Form, Social Process, and the Normalization of Cycling Practices in the USA", *Mobilities* 9, no. 1 (2014); Karel Martens, "Role of the Bicycle in the Limitation of Transport Poverty in the Netherlands", *Transport Research Record* 2387 (2013).

provided the right public policies are implemented".[14] He claims that the high cycling levels in the Netherlands, Denmark and parts of Germany as well as in some cities in other countries, are largely caused by policies and the wide availability and good quality of infrastructural facilities. A similar approach would be the solution for countries with little bicycle traffic.

In order to find out whether infrastructural adjustments and facilities indeed have encouraged (utilitarian) cycling, researchers have investigated to what extent and by whom they are used. Some of them have established a correlation between improved bicycle routes and networks and an increased modal share of the two-wheeler, but only under an array of specific conditions. Cycling paths and lanes should provide direct and continuous connections and they should be part of a larger network, which should be located not too far from a cyclist's point of departure and destination. The road conditions should be good for pedalling and the routes should avoid steep climbs, and the number of traffic lights and busy intersections with car traffic should be kept to a minimum. Furthermore, the stimulating effect of facilities on bicycle levels seems not to be the same among all user groups. It is stronger among relatively inexperienced cyclists, the elderly and women than among experienced and sporty riders, including many younger men. The first group pedals prudently and prioritizes the (assumed) safety of segregated facilities, while the latter group, characterized by a more assertive driving style, prefers to take roads with motorized traffic if that saves them travel time.[15] Also, more as a

14 John Pucher, "Bicycling Boom in Germany: A Revival Engineered by Public Policy", *Transportation Quarterly* 51, no. 4 (1997): 44. See also John Pucher, "Urban Travel Behavior as the Outcome of Public Policy: The Example of Modal-Split in Western Europe and North America", *Journal of the American Planning Association* 54, no. 4 (1988); John Pucher and Lewis Dijkstra, "Making Walking and Cycling Safer: Lessons from Europe", *Transportation Quarterly* 54, no. 3 (2000); John Pucher and Lewis Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany", *American Journal of Public Health* 93, no. 9 (2003); Pucher and Buehler, "Making Cycling Irresistible"; John Pucher and Ralph Buehler, "At the Frontiers of Cycling: Policy Innovations in the Netherlands", *World Transport Policy* 1313 (2008); Pucher, Buehler, and Seinen, "Bicycling Renaissance", 464, 471; Pucher and Buehler, *City Cycling*; cf. Marcia D. Lowe, *The Bicycle: Vehicle for a Small Planet*, Worldwatch Paper 30 (Washington, DC: Worldwatch Institute, 1989), 6, 10, 31, 35, 39–40; John Parkin and Glen Koorey, "Network Planning and Infrastructure Design", in *Cycling and Sustainability*, ed. Parkin; Horton and Parkin, "Conclusion"; Meghan Winters et al., "Motivators and Deterrents of Bicycling: Comparing Influences on Decisions to Ride", *Transportation* 38, no. 1 (2011).

15 Cathy L. Antonakos, "Environmental and Travel Preferences of Cyclists", *Transport Research Record* 1438 (1994); Robert B. Noland and Howard Kunreuther, "Short-Run and Long-Run Policies for Increasing Bicycle Transportation for Daily Commuter Trips", *Transport Policy* 2, no. 1 (1995); Shafizadeh and Niemeier, "Bicycle Journey-to-Work";

general rule, Dutch and Danish findings have revealed that a clear causal link between infrastructural policies and an increase in cycling can only be demonstrated if pull measures such as installing cycling networks are combined with push measures such as constraining traffic regulations for motoring and a substantial rise of parking rates for cars in town centres.[16]

Monique A. Stinson and Chandra R. Bhat, "Commuter Bicyclist Route Choice: Analysis Using a Stated Preference Survey", *Transportation Research Record* 1828 (2003); Terri Pikora et al., "Developing a Framework for Assessment of the Environmental Determinants of Walking and Cycling", *Social Science and Medicine* 56, no. 8 (2003); Janet E. Dickinson et al., "Employer Travel Plans, Cycling and Gender: Will Travel Plan Measures Improve the Outlook for Cycling to Work in the UK?", *Transportation Research Part D: Transport and Environment* 8, no. 1 (2003); Monique A. Stinson and Chandra R. Bhat, "An Analysis of the Frequency of Bicycle Commuting Using an Internet-Based Survey", *Transportation Research Record* 1878 (2004); Kevin J. Krizek, Pamela J. Johnson, and Nebiyou Tilahun, "Gender Differences in Bicycling Behavior and Facility Preferences", in *Research on Women's Issues in Transportation: Report of a Conference, Volume 2: Technical Papers*, Transportation Research Board Conference Proceedings 35 (Chicago: Transportation Research Board of the National Academies, 2004); Rietveld and Daniel, "Determinants"; Hunt and Abraham, "Influences"; Marie-José Olde Kalter, *Vaker op de fiets? Effecten van overheidsmaatregelen* (The Hague: Kennisinstituut voor Mobiliteitsbeleid, 2007); Nebiyou Y. Tilahun, David M. Levinson, and Kevin J. Krizek, "Trails, Lanes, or Traffic: Valuing Bicycle Facilities with an Adaptive Stated Preference Survey", *Transportation Research Part A: Policy and Practice* 41, no. 4 (2007); Deborah Cohen et al., "Impact of New Bicycle Path on Physical Activity", *Preventive Medicine* 46 (2008); Inger Mary Bernhoft and Gitte Carstensen, "Preferences and Behaviour of Pedestrians and Cyclists by Age and Gender", *Transportation Research Part F: Traffic Psychology and Behavior* 11, no. 2 (2008); Jan Garrard, Geoffrey Rose, and Sing Kai Lo, "Promoting Transportation Cycling for Women: The Role of Bicycle Infrastructure", *Preventive Medicine* 46 (2008); Gulsa Akar and Kelly J. Clifton, "The Influence of Individual Perceptions and Bicycle Infrastructure on the Decision to Bike", *Transportation Research Record* 2140 (2009); Emond, Tang, and Handy, "Explaining Gender Difference"; Jennifer Dill, "Bicycling for Transportation and Health: The Role of Infrastructure", *Journal of Public Health Policy* 30, no. 1 (2009); Heinen, Van Wee, and Maat, "Commuting"; John Pucher, Jennifer Dill, and Susan Handy, "Infrastructure, Programs, and Politics to Increase Bicycling: An International Review", *Preventive Medicine* 50 (2010); Gianluca Menghini et al., "Route Choice of Cyclists in Zurich", *Transportation Research Part A: Policy and Practice* 44, no. 9 (2010); Jacob Larsen and Ahmed El-Geneidy, "A Travel Behavior Analysis of Urban Cycling Facilities in Montréal, Canada", *Transportation Research Part D: Transport and Environment* 16, no. 2 (2011); Bonham and Wilson, "Women Cycling"; Krizek, "Cycling".

16 Ministry of Transport, Public Works and Water Management, *Eindrapport*, 34, 40–41; Ververs and Ziegelaar, *Verklaringsmodel*; I.J.M. Hendriksen et al., *Beleidsadvies. Stimuleren van fietsen naar het werk*, TNO-rapport (The Hague: Ministry of Health, Welfare and Sport, 2010); Thomas Krag, "Bicycle Promotion Strategies in Denmark", Polish Seminars on Bicycle Promotion, accessed 28 December 2017, http://www.Friefugle.dk/poland/promotion_tk_en.html; Olde Kalter, *Vaker op de fiets?*; Kevin J. Krizek, Ann Forsyth, and Laura

Other studies have further questioned the assumption that infrastructural policies bring about an increase in bicycle traffic. It is difficult to determine the precise impact of facilities on bicycle use: finding a correlation between the cycling volumes and the presence of cycling routes and other amenities is not the same as proving that the construction of facilities causes an increase of pedalling. There may be a tendency in bicycle research to underestimate or even overlook the impact of existing wheeling levels on other relevant factors. Instead of infrastructure triggering an upsurge of cycling levels, policies aimed at building and improving facilities can also be a result of existing bicycle practices or the preceding rise of the two-wheeler's modal split, which may have been advanced by other factors. A growing number of cyclists may entail an increasing need and demand for adapting the traffic system and built environment and a greater willingness of governments to meet such pressure, in particular if it is articulated by well-informed and vocal bicycle activists and lobbyists. Self-selection should also be taken into account: individuals who are motivated to pedal, may prefer to settle in a bicycle-friendly neighbourhood or area. In this light it is difficult to determine the extent to which bicycle use is influenced by the available infrastructure or the composition of the population, individual preferences, lifestyle, perceptions, attitudes and habits.[17] An American study even concludes that there is no clear evidence for a correlation between infrastructure and cycling levels, and that demographic factors are far more relevant. The authors assert "that people who cycle do so irrespective of a supportive transportation infrastructure. Such commonly accepted

Baum, *Walking and Cycling International Literature Review: Final Report* (Melbourne: Department of Transport, State of Victoria, 2009).

17 Chris Banister, "Planning for Cycling", *Planning Practice & Research* 5, no. 1 (1990); Baltes, "Factors"; Arthur C. Nelson and David Allen, "If You Build Them, Commuters Will Use Them: The Association between Bicycle Facilities and Bicycle Commuting", *Transportation Research Record* 1578 (1997); Chris Gardiner and Rosalie Hill, "Cycling on the Journey to Work: Analysis of Socioeconomic Variables from the UK 1991 Population Census Samples of Anonymised Records", *Planning Practice & Research* 12, no. 3 (1997); Jennifer Dill and Theresa Carr, "Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them—Another Look", *Transportation Research Record* 1828 (2003); Gary Barnes and Kevin J. Krizek, "Estimating Bicycling Demand", *Transportation Research Record* 1939 (2005); Parkin, Wardman, and Page, "Estimation"; Krizek, Forsyth, and Baum, *Walking and Cycling*; Kevin J. Krizek, Susan Handy, and Ann Forsyth, "Explaining Changes in Walking and Bicycling Behavior: Challenges for Transportation Research", *Environment and Planning B: Urban Analytics and City Science* 36, no. 4 (2009); Heinen, Van Wee, and Maat, "Commuting"; Krizek, "Cycling"; Xing, Handy, and Mokhtarian, "Factors"; Simon Fraser and Karen Lock, "Cycling for Transport and Public Health: A Systematic Review of the Effect of the Environment on Cycling", *European Journal of Public Health* 21, no. 6 (2010).

route-related correlates of cycling as bicycle lanes, traffic conditions, and street connectivity … remain insignificant".[18]

Some longitudinal studies, which compare cycling levels before and after installing new bicycle facilities in several American cities, show that their construction did not result in a substantial growth of (utilitarian) cycling. To be true, modest increases (especially of recreational cycling) were sometimes realized, but these seem to have occurred only in neighbourhoods where the bicycle's modal share was above average already before the new facilities were put in. Conversely, in the suburban outskirts, where bicycle levels were lowest to begin with, little change was accomplished, if the number of wheelers did not in fact go down.[19] German and British studies comparing the widely divergent levels of bicycle use among commuters and school children in several cities demonstrate that no direct causal link can be established between, on the one hand, cycling volumes and whether or not pedalling is a matter of course, and, on the other hand, the existing traffic infrastructure and current cycling policies.[20] The results of a British survey-study suggest that the construction and improvement of cycling facilities hardly brought about an increase in pedalling commuters.[21]

Overall, in countries with low average pedalling levels, such as the United States, Canada, Australia and Great Britain, the implementation of bicycle policies—the construction of infrastructural facilities and also the launching of promotion campaigns—have failed to generate substantial increases of utilitarian cycling, apart from a few local exceptions. The number of Brits, Americans, Canadians and Australians who cycle on a daily or regular basis does not exceed 2 per cent of the population, and the past fifteen years have even witnessed a decline in utilitarian two-wheeler traffic, despite the implementation of cycling policies.[22] In these countries such policies do not find

18 Moudon et al. "Cycling and the Built Environment", 259.

19 Kevin J. Krizek, Gary Barnes, and Kristin Thompson, "Analyzing the Effect of Bicycle Facilities on Commute Mode Share over Time", *Journal of Urban Planning and Development* 135 no. 2 (2009); Fay Cleaveland and Frank Douma, "The Impact of Bicycling Facilities on Commute Mode Share" (presentation, Transportation Research Board 88th Annual Meeting, Washington, DC, 11–15 January 2009).

20 Marcus Jones, "Promoting Cycling in the UK: Problems Experienced by the Practitioners", *World Transport Policy & Practice* 7, no. 3 (2001); Goetzke and Rave, "Bicycle Use".

21 Simon Kingham, Janet Dickinson, and Scott Copsey, "Travelling to Work: Will People Move Out of Their Cars?" *Transport Policy* 8, no. 2 (2001).

22 Karel Martens, "The Bicycle as a Feedering Mode: Experiences from Three European Countries", *Transportation Research Part D: Transport and Environment* 9, no. 4 (2004), 284; Parkin, Wardman, and Page, "Estimation", 2; Malcolm J. Wardlaw, "Assessing the Actual Risks Faced by Cyclists", *Tec* December (2002): 352; Transport for London, *Cycling*,

fertile ground in an established and widespread daily practice, and they tend to be at odds with the wider environmental and infrastructural planning, as well as with comprehensive transport policies. Inasmuch as cycling facilities have been put in, these are patchy and mainly geared to recreation and sports; for practical commuting purposes they hardly prove effective. Continuous cycle routes and networks for everyday utilitarian mobility are few and far between, whereby many people still view and experience cycling as stressful and dangerous.[23] Thus cycling remains limited to the minority of the extraordinarily motivated.

Bicycle policies seem to be more fruitful in countries where cycling levels are high already and riding a bicycle is a well-established and time-honoured practice, but their results have to be put in perspective. German studies suggest that bicycle traffic saw its largest growth before city governments, in the 1980s, and the Federal Government, from 2002 on, introduced policies to promote cycling. Other developments appear to have advanced pedalling: greater environmental awareness, increasing traffic congestion, rising fuel prices, citizens' initiatives, local activism and urban expansion, which entailed that the distances covered in daily traffic increased and people who used to walk changed to pedalling.[24] Similarly, the relation between, on the one hand, the internationally renowned Dutch policies and, on the other, the increasing cycling volumes since the mid-1970s, followed by a slight decline between the mid-1980s and mid-1990s and the stabilization of the modal split at around 27 per cent, is far from unambiguous. After some cities had started to build bicycle routes and networks and to ban cars from town-centres, and the central government began to subsidize the building of bicycle ways next to main

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46–47; John Pucher and Ralph Buehler, "Cycling Trends and Policies in Canadian Cities", *World Transport Policy and Practice* 11, no. 1 (2005): 43, 45; Pucher and Buehler, "Why Canadians Cycle", 278; Austroads Incorporated, *The Australian National*, 8–9; Australian Bicycle Council and Austroads, *Gearing up*, 14; Pucher, Komanoff, and Schimeck, "Bicycling Renaissance", 3; Cleaveland and Douma, "The Impact", 2; Krizek, Handy, and Forsyth, "Explaining", 735–36; Pucher, Buehler, and Seinen, "Bicycle Renaissance", 452; Pucher et al., "Walking", 310–12; John Pucher and Ralph Buehler, "Walking and Cycling for Healthy Cities", *Built Environment* 36, no. 4 (2010); Rachel Aldred, "Governing Transport from Welfare State to Hollow State: The Case of Cycling in the UK", *Transport Policy* 23 (2012); Anna Goodman, "Walking, Cycling and Driving to Work in the English and Welsh 2011 Census: Trends, Socio-Economic Patterning and Relevance to Travel Behaviour in General". *PLoS* ONE 8, no. 8: e7190 (2013), accessed 28 December 2017, http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0071790.

23 Krizek, Forsyth, and Baum, *Walking and Cycling*, 37, 40; cf. Horton and Parkin, "Conclusion".

24 Heath Maddox, "Another Look at Germany's Bicycle Boom: Implications for Local Transportation Policy & Planning Strategy in the USA", *World Transport Policy & Practice* 7, no. 3 (2001).

roads, in the second half of the 1970s and early 1980s the total number of pedalled kilometres by the Dutch rose by 35 per cent. However, the introduction of bicycle policies on a national scale in 1990, when the *Bicycle Master Plan* was launched in order to expand and improve the existing cycling infrastructure, was not followed by a further substantial increase in bicycle use. Whereas over the past decade bicycle traffic has increased considerably in Dutch inner cities, partly as a consequence of measures to discourage car use there, at the same time the two-wheeler lost ground to the car and public transport in rural and suburban areas. In the 1980s and 1990s, the number of kilometres travelled by car continued to grow sharply and its modal share rose from almost 46 to 49 per cent between 1980 and the mid-1990s. The net result of Dutch cycling policy during the last two decades is that the bicycle's modal split has remained at a similar level. Without cycling policy and car-restricted urban zones it would probably have decreased.[25]

The same is true of Denmark where the bicycle's modal share has dropped slightly since the late 1980s, while that of car and public transport continued to rise.[26] Apparently it is difficult to achieve a further growth of cycling even

25 Anthony G. Welleman, "Why a Bicycle Policy in the Netherlands?" In *The Bicycle: Global Perspectives: Papers Presented at the Conference vélo mondiale Pro Bike–Velo-city, Montreal, Canada, 13–17 September 1992*, ed. R. Boivin and J.-F. Pronovost (Québec: Vélo Québec, 1992); Peter F. Peters, *De haast van Albertine. Reizen in de technologische cultuur. Naar een theorie van passages* (Amsterdam: Uitgeverij De Balie, 2003), 198–209; Ministry of Transport, Public Works and Water Management, *Eindrapport*, 42–44; Ministry of Transport, Public Works and Water Management, *The Dutch Bicycle Master Plan*, 38, 83–84, 87–88; Joop Atsma, *Fietsen in Nederland … een tandje erbij. Initiatiefnota met voorstellen voor actief fietsbeleid in Nederland* (The Hague: CDA Tweede Kamerfractie, 2008), 9–10; cf. Pucher and Buehler, "Walking and Cycling"; Ministry of Transport, Public Works and Water Management, *Eindrapport*, 47, 49; Jeroen Buis and Roefof Wittink, *The Economic Significance of Cycling: A Study to Illustrate the Costs and Benefits of Cycling Policy* (The Hague: VNG uitgeverij, 2000), 13; Kees van Goeverden and Tom Godefrooij, "Ontwikkeling van het fietsbeleid en—gebruik in Nederland", Bijdrage aan het Colloquium Vervoersplanologisch Speurwerk 25 en 26 november 2010, accessed 28 December 2017, https://www.cvs-congres.nl/cvspdfdocs/cvs10_062.pdf; Advisory Council for Transport, Public Works and Water Management, The Netherlands, *Wie ik ben en waar ik ga. Advies over de effecten van veranderingen in demografie en leefstijlen op mobiliteit* (The Hague: Advisory Council for Transport, Public Works and Water Management, 2010); Goeverden and Godefrooij, "Ontwikkeling", 2; Yusak Susilo and Kees Maat, "The Influence of Built Environment to the Trends in Commuting Journeys in the Netherlands", *Transportation* 34, no. 5 (2007); Fraser and Lock, "Cycling for Transport", 742.

26 Thomas Krag, "Cycling, Environment, Exercise and Health", in *Cost Benefit Analysis of Cycling*, ed. Gunnar Lind (Copenhagen: Tema Nord, Nordic Council, 2005), 64; Lowe, *The Bicycle*, 37; Pucher and Buehler, "Walking and Cycling"; Till Koglin, "Vélomobility—A Critical Analysis of Planning and Space" (dissertation, Lund University, 2013), 159, 171;

in Holland and Denmark, perhaps for the very reason that the two-wheeler's modal share in daily traffic is already so large compared to other countries.[27] Cycling policies may have exhausted their potential: the Dutch and Danes who still do not bicycle will probably, for several reasons, never do so. Danish and Dutch bicycle policies, which are a shining example for many bicycle advocates, researchers and urban planners in other countries, apparently have not so much brought about a substantial rise of the bicycle's modal share. The result is rather a continuance and facilitation of the existing cycle traffic at the same steady level, while also having made cycling more convenient, safe and enjoyable for the fairly large numbers of people who used to pedal anyway.[28]

5 Attitudes, Perceptions and Habits

Policy-oriented bicycle research used to be dominated by traffic engineers and mobility experts, who focused on technological and infrastructural problems and solutions, and showed little interest in the experiences of cyclists and the social meanings of pedalling. More recently, however, a growing number of scholars have begun to criticize the one-sided emphasis on the "hard" material conditions of cycling, particularly infrastructural facilities, which would go at the expense of "soft" interventions, like information, education, promotion and marketing, aimed at improving the image and status of the two-wheeler. These scholars have drawn attention to the individual motivation as

Thomas A. Sick Nielsen, Hans Skov-Petersen, and Trine A. Carstensen, "Urban Planning Practices for Bikeable Cities—The Case of Copenhagen", *Urban Research & Practice* 6, no. 1 (2013): 111–12.

27 On the exemplary international role of Dutch cycling policies, see Ministry of Transport, Public Works and Water Management, *Cities Make Room for Cyclists* (The Hague: Ministry of Transport, Public Works and Water Management, 1995); Ministry of Transport, Public Works and Water Management, *Cycling in the Netherlands* (The Hague: Ministry of Transport, Public Works and Water Management, 2006); Jan Ploeger, "Designing for Cycling: The New Dutch Design Manual", in *The Greening of Urban Transport: Planning for Walking and Cycling in Western Cities*, ed. Rodney Tolley (Chichester: John Wiley & Sons, 1997).

28 Ministry of Transport, Public Works and Water Management, *Eindrapport*, 41–44, 50–54; Ministry of Transport, Public Works and Water Management, *The Dutch Bicycle Master Plan*, 38, 83–84; Krizek, Forsyth, and Baum, *Walking and Cycling*, 37; see also Ruth Oldenziel and Adri Albert de la Bruhèze, "Contested Spaces: Bicycle Lanes in Urban Europe, 1900–1995", *Transfers* 1, no. 2 (2011). For critical accounts of Dutch cycling policies, see Ida H.J. Sabelis, "Diversity in Cycle Policies", in *Cycling Cultures*, ed. Peter Cox (Chester: University of Chester Press, 2015); Angela van der Kloof, "Lessons Learned through Training Immigrant Women in the Netherlands to Cycle", in *Cycling Cultures*, ed. Cox.

to whether or not to use the bicycle for transportation.[29] Two perspectives can be distinguished in their studies. The first assumes that the choice for a mode of mobility is based on a rational-instrumental assessment by individuals of its costs and benefits in the light of their circumstances and available options. The bicycle's usefulness in daily commuting is central in this perspective. The second perspective centres on the influence of so-called affective motives (norms and values, beliefs, perceptions, attitudes and habits) that are largely shaped by the social environment and the wider culture. This perspective, which dovetails with more general pleas for a cultural turn in transport and mobility studies,[30] stresses that cycling experiences are moulded in various ways and that they cannot be reduced to economic and other utilitarian considerations.[31]

29 Mark Wardman, Richard Hatfield, and Michael Page, "The UK National Cycling Strategy: Can Improved Facilities Meet the Targets?" *Transport Policy* 4, no. 2 (1997); Christopher Porter, John Suhrbier, and William L. Schwartz, "Forecasting Bicycle and Pedestrian Travel: State of the Practice and Research Needs", *Transportation Research Record* 1674 (1999); Jones, "Promoting Cycling"; James Harrison, "Planning for More Cycling: The York Experience Bucks the Trend", *World Transport Policy & Practice* 7, no. 3 (2001); Paul Rosen, *How Can Research into Cycling Help Implement the National Cycling Strategy? Review of Cycling Research Findings and Needs*, Report of Whitehall Summer Placement in the Department for Transport, CLT3 and CLT4 (York: University of York, Science and Technology Studies Unit, 2003); Jillian Anable and Birgitta Gatersleben, "All Work and No Play? The Role of Instrumental and Affective Factors in Work and Leisure Journeys by Different Travel Modes", *Transportation Research Part A: Policy and Practice* 39, nos. 2–3 (2005); Barnes and Krizek, "Estimating"; De Geus et al., "Psychosocial and Environmental Factors"; Transport for London, *Cycling*; Krizek, Handy, and Forsyth, "Explaining"; Heinen, Van Wee, and Maat, "Commuting". See also Veronique Van Acker, Bert van Wee, and Frank Witlox, "When Transport Geography Meets Social Psychology: Toward a Conceptual Model of Travel Behaviour", *Transport Reviews* 30, no. 2 (2010); S. Bamberg, "Understanding and Promoting Bicycle Use: Insights from Psychological Research", in Parkin, *Cycling and Sustainability*, Transport and Sustainability, Volume 1, ed. John Parkin; Winters et al., "Motivators and Deterrents"; Georgina S.A. Trapp et al., "On Your Bike! A Cross-Partal Study of the Individual, Social and Environmental Correlates of Cycling to School", *International Journal of Behavioral Nutrition and Physical Activity* 8, no. 123 (2011); Robert J. Schneider, "Theory of Routine Mode Choice Decisions: An Operational Framework to Increase Sustainable Transportation", *Transport Policy* 25 (2013); Tim Jones, "Getting the British Back on Bicycles: The Effects of Urban Traffic-Free Paths on Everyday Cycling", *Transport Policy* 20 (2012).

30 See, e.g., Colin Divall and George Revill, "Cultures of Transport: Representation, Practice and Technology", *Journal of Transport History* 26, no. 1 (2005); Mimi Sheller and John Urry, "The New Mobilities Paradigm", *Environment and Planning A: Economy and Space* (2006); Justin Spinney, "Cycling the City: Movement, Meaning and Method", *Geography Compass* 3, no. 2 (2009); Phillip Vannini, "Mobile Cultures: From the Sociology of Transportation to the Study of Mobilities", *Sociology Compass* 4, no. 2 (2010).

31 Anable and Gatersleben, "All Work"; De Geus et al., "Psychosocial and Environmental Factors"; Heinen, Van Wee, and Maat, "Commuting"; Goetzke and Rave, "Bicycle Use". See also Bas Verplanken et al., "Attitude versus General Habit: Antecedents of Travel Mode

Some English studies indicate that deciding whether or not to cycle is closely linked to the perception of benefits (fun, fitness or health, low costs, flexibility and relatively fast on short distances) and disadvantages (slow on long distances, too much physical effort and sweating, too much climbing, exposed to speedy motorized traffic and bad weather, and loss of social status). People who never pedal predominantly perceive insurmountable obstacles and policies will not change this perception. Interventions only lead to behavioural change if people already have considered the possibility of riding a bicycle, have cycling experience or have a positive view on it, thus reducing objections such as discomfort and safety-risks.[32] These studies also make clear that cycling experience among regular and motivated cyclists is linked to positive feel-

Choice", *Journal of Applied Social Psychology* 2, no .44 (1994); Bas Verplanken, Henk Aarts and Ad van Knippenberg, "Habit, Information Acquisition, and the Process of Making Travel Mode Choices", *European Journal of Social Psychology* 27, no. 5 (1997); Sebastian Bamberg, Izek Ajzen, and Peter Schmidt, "Choice of Travel Mode in the Theory of Planned Behavior: The Roles of Past Behavior, Habit, and Reasoned Action", *Basic and Applied Social Psychology* 25, no. 3 (2003); Sylvia Titze, Willibald J. Stronegger, Susanne Janschitz, and Pekka Oja, "Association of Built-Environment, Social-Environment and Personal Factors with Bicycling as a Mode of Transportation among Austrian City Dwellers", *Preventive Medicine* 47, no. 3 (2008); Bamberg, "Understanding and Promoting"; Michelle Daley and Chris Rissel, "Perspectives and Images of Cycling as a Barrier or Facilitator of Cycling", *Transport Policy* 18, no. 1 (2011); Luuk H. Engbers and Ingrid J.M. Hendriksen, "Characteristics of a Population of Commuter Cyclists in the Netherlands: Perceived Barriers and Facilitators in the Personal, Social and Physical Environment", *International Journal of Behavioral Nutrition and Physical Activity* 7, no. 1 (2011); Eva Heinen, Kees Maat, and Bert van Wee, "The Role of Attitudes toward Characteristics of Bicycle Commuting on the Choice to Cycle to Work over Various Distances", *Transportation Research Part D: Transport and Environment* 16, no. 2 (2011); Eva Heinen, Kees Maat, and Bert van Wee, "The Effect of Work-Related Factors on the Bicycle Commute Mode Choice in the Netherlands", *Transportation* 40, no. 1 (2013); Colin G. Pooley et al., "Policies for Promoting Walking and Cycling in England: A View from the Street", *Transport Policy* 27 (2013); Liang Ma, "The Objective versus the Perceived Environment: What Matters for Active Travel" (dissertation, Portland State University, 2014); Liang Ma and Jennifer Dill, "Associations between the Objective and Perceived Built Environment and Bicycling for Transportation, *Journal of Transport and Health* 2, no. 2 (2015); Rachel Aldred and Katrina Jungnickel, "Why Culture Matters for Transport Policy: The Case of Cycling in the UK", *Journal of Transport Geography* 34 (2014); Devon Willis, Kevin Manaugh, and Ahmed El-Geneidy, "Cycling under Influence: Summarizing the Influence of Attitudes, Habits, Social Environments and Perceptions on Cycling for Transportation", *International Journal of Sustainable Transportation* 9, no. 8 (2015); Lake Sagaris, "Lessons from 40 Years of Planning for Cycle-Inclusion: Reflections from Santiago, Chile", *Natural Resources Forum* 39, no. 1 (2015); Caroline E. Scheepers, "Opportunities to Stimulate Active Transport" (dissertation, Free University Amsterdam, 2016).

32 Anable and Gatersleben, "All Work"; Birgitte Gatersleben and Katherine M. Appleton, "Contemplating Cycling to Work: Attitudes and Perceptions in Different Stages of Change", *Transportation Research Part A: Policy and Practice* 41, no. 4 (2007).

ings: relaxation and fun, a sense of independence, freedom, self-confidence, self-control and flexibility, a pleasant sensory stimulation because of the exercise and being in the open air, the intense perception of and interaction with the environment, and pleasant childhood memories. On the other hand, many Brits who do not pedal can only see cyclists as reckless daredevils and accident-prone persons, who are responsible for trouble and dangerous situations in traffic. They also regard cycling as unaesthetic and uncomfortable, as "hot and sweaty" and associate it with athletic (or not so athletic middle-aged) men wearing helmets and Lycra outfits.[33] Anxieties about bodily performance and appearance impede many women and non-western immigrants to pedal.[34]

More in general, research of motivation makes clear that the decision whether or not to cycle is usually not taken exclusively on the basis of a calculation of costs and benefits and explicit views, but that it is also inspired by more intuitive perceptions, experiences and valuations. For this reason, several researchers have put the difference between instrumental and affective motivations into perspective. They argue that instrumental choices can only be understood in the context of affective motivations. In daily practice apparent objective cost and benefit assessments are usually imbued with subjective perceptions of advantages and disadvantages. Such perceptions are embedded in habits, routines, experiences and attitudes. When it comes to a cost and benefit assessment, for example with regard to the investment of time, the physical effort, the health effects, the (in)convenience, the (in)efficiency, the (lack of) safety and the financial costs or yields of cycling, judgments vary considerably between regular cyclists and people who hardly or never pedal. The last group identifies far more drawbacks—riding a bicycle is believed to be uncomfortable, too strenuous, too dangerous, too slow, or too individualistic; the weather and the roads or bicycle ways can be bad; no luggage and other passengers can be transported; it is difficult to communicate with traveling companions—than the first group and also evaluates the environmental conditions for bicycling more negatively.[35] Promotion campaigns aimed at

33 Transport for London, *Cycling*, 22, 29; Anable and Gatersleben "All Work"; Birgitta Gatersleben and David Uzzell, "Affective Appraisals of the Daily Commute: Comparing Perceptions of Drivers, Cyclists, Walkers, and Users of Public Transport", *Environment and Behavior* 39, no. 5 (2007); cf. Bonham and Wilson, "Women Cycling"; Rachel Aldred, "The Role of Advocacy and Activism", in *Cycling and Sustainability*, ed. Parkin, 97; Horton and Parkin, "Conclusion", 309; see also Marius C. Claudy and Mark Peterson, "Understanding the Underutilization of Urban Bicycle Commuting: A Behavioral Reasoning Perspective", *Journal of Public Policy & Marketing* 33, no. 2 (2014).

34 Rachel Aldred, "Incompetent or Too Competent? Negotiating Everyday Cycling Identities in a Motor Dominated Society", *Mobilities* 8, no. 2 (2013).

35 Noland and Kunreuther, "Short-Run and Long-Run", 75–76; Peter Gordon and Harry W. Richardson, "Bicycling in the United States: A Fringe Mode?" *Transportation Quarterly*

boosting the bicycle's image have a similar effect as building facilities: they mainly attract people who already cycle and who do not have to be convinced of the practical usefulness and fun of pedalling, while their impact on people who rarely or never ride a bicycle is limited or none.[36]

The positive or negative evaluation of cycling and the associated perception of its benefits and difficulties by individuals are also determined by the attitudes in their social environment and whether cycling is part of the learned pattern of daily habits, whether or not one has grown up with bicycles as a common means of transportation. Through a mutual influencing and enhancement of experiences with and perceptions of cycling, a self-fulfilling prophecy appears to be working here. A positive or negative image of cycling implies that either its pros or cons are stressed. These perceptions determine whether or not one chooses the bicycle for commuting and whether or not one develops cycling experience. And experience, in its turn, determines perception again. Opting or not opting for pedalling is embedded in an accumulation of corroborating and reinforcing meanings, perceptions, experiences and behaviours.[37]

6 The Relevance of History and National Culture

All in all, the available research offers no conclusive evidence that cycling increases substantially as a result of infrastructural planning and promotional activities. That is not to say that such policies are futile and would have to be discarded. At least they may counterbalance several social, economic and technological dynamics that all over the western world structurally impede pedalling: spatial up-scaling and increasing mobility over greater distances furthering car-driving and the use of public transport; the continuing (neoliberal)

52, no 1 (1998); Stinson and Bhat, "An Analysis", 124, 126, 128; Anable and Gatersleben, "All Work"; Barnes and Krizek, "Estimating"; Krag, "Cycling", 64–68; Gatersleben and Appleton, "Contemplating"; Gatersleben and Uzzell, "Affective Appraisals"; De Geus et al., "Psychosocial and Environmental Factors"; Krizek, Forsyth, and Baum, *Walking and Cycling*, 23–26; Akar and Clifton, "The Influence"; Heinen, Van Wee, and Maat, "Commuting"; Bonham and Wilson, "Women Cycling"; Horton and Parkin, "Conclusion"; Claudy and Peterson, "Understanding the Underutilization"; Victoria Morckel and Kathryn Terzano, "The Influence of Travel Attitudes, Commute Mode Choice, and Perceived Neighborhood Characteristics on Physical Activity", *Journal of Physical Activity and Health* 11, no. 1 (2014); Ma, "The Objective versus the Perceived"; Ma and Dill, "Associations".

36 Transport for London, *Cycling*, 40.

37 Pelzer, "Bicycling", 14, 99–100; Stinson and Bhat, "An Analysis", 128; Barnes and Krizek, "Estimating", 9; Van Acker, Van Wee, and Witlox, "When Transport Geography Meets"; Bamberg, "Understanding and Promoting".

prevalence of efficiency, speed and economic values; the regular priority of motorized transport in traffic policies; growing prosperity and car ownership; and the proportional increase of the ageing population and non-Western ethnic minorities.[38]

Be that as it may, the diverse findings and partly uncertain conclusions of the authors in the field of social-scientific and traffic engineering studies of bicycling, tacitly rather than explicitly, call into question the basic premise of cycling policies: the belief that cycling can be advanced directly and in the short term through targeted technological and social interventions. To a large extent pedalling levels seem to be determined by factors which are not amenable to rational decision-making and planning: geographical, climatological and environmental conditions, demographic characteristics, socially and culturally determined attitudes, experiences, habits and perceptions, and the popular image and social status of the bicycle. It is not entirely clear how these factors influence bicycle use, what their relative weight is, how they interact, and how they affect the outcomes of bicycle policies. Moreover, what is lacking in policy-oriented bicycle research is the consideration that most of the relevant determinants—land use patterns, the built environment, and traffic infrastructures, attitudes and motivations, meanings and perceptions, and habits and routines—have taken shape and evolved in long-term, path-dependent developments[39]—and also, largely, in the context of the modern nation state.

There are good reasons to question the assumption that the travel behaviour of people can be changed in the short term through targeted policy measures. In their historical research on the development of British commuter traffic from the late nineteenth century, Colin G. Pooley and Jean Turnbull demonstrate that historical shifts in mobility patterns can be identified—for example, before the Second World War most people walked and cycled to work while after 1960 car-driving became dominant—but that within different periods individual travel behaviour showed a large degree of rigidity: few people switched to another means of transport. Their conclusion is that the individual's choice for a particular mode of mobility is largely determined by habits and routines, many of which, in turn, go back to prevailing social practices and cultural values.[40] Such findings suggest that the historical dimension of

38 Sudhir C. Rajan, "Automobility and the Liberal Disposition", *Sociological Review* 54, no. 1 (2006); Oliver Schwedes, "The Field of Transport Policy: An Initial Approach", *German Policy Studies* 7, no. 2 (2011); Aldred, "Governing Transport".

39 Cf. Pelzer, "Bicycling".

40 Pooley and Turnbull, "Modal Choice", 15, 23; Colin G. Pooley, Jean Turnbull, and Mags Adams, *A Mobile Century? Changes in Everyday Mobility in Britain in the Twentieth Century* (Aldershot: Ashgate, 2005); cf. Scheiner, "Mobility Biographies".

bicycling is relevant and they question the assumption that policies can bring about substantial changes in pedalling behaviour, at least in the short term.

Strikingly, policy-oriented researchers have not taken notice of the many historical works on bicycling published in the past three decades—at least I did not find any references to such studies in their papers. Some of them refer in passing to the possible impact of history and culture, in particular if their surveys fail to establish correlations between wheeling levels and other factors, while at the same time they play down that influence.[41] Typical is the assertion of John Pucher and his co-author Ralph Buehler that "policies appear to be far more important than history and culture in explaining … cycling trends".[42] Comparing American and European cycling levels, they claim that "[t]he much higher levels of cycling in Europe are not simply historical artefacts or culturally determined".[43] Their way of reasoning suggests that policies can be made and implemented apart from historical and cultural contexts. Apparently, they do not consider that the more or less successful cycling policies and the extensive bicycle infrastructures in countries such as the Netherlands and Denmark could only be realized because of the bicycle-minded culture which had emerged and had been upheld in these nations since the early twentieth century.

Although more and more policy-oriented studies—more often implicitly than explicitly—suggest that the degree to which bicycle use can be substantially increased through policies depends on social-cultural contexts, only a few social-scientific researchers clearly acknowledge that historical factors may be highly relevant and deserve more serious attention.[44] Considering research into the relation between policies and infrastructures on the one hand and the volume of pedalling traffic on the other, the American bicycle scholars Gary Barnes and Kevin Krizek, for example, have pointed out that local variations in cycling levels across different American regions and cities cannot be reasonably explained by differences in policies and infrastructures. "Unmeasured factors, perhaps cultural or historical", they write, "appear to play an extremely large role in determining the level of cycling in an area". In their conclusion

41 See, e.g., the passing reference to "culture, custom and habit" in Pucher, Dill, and Handy, "Infrastructure, Programs, and Politics", 121.

42 Pucher and Buehler, "Walking and Cycling", 408.

43 Pucher and Buehler, "Why Canadians Cycle", 277; cf. Pucher and Buehler, "Making Cycling Irresistible".

44 See Barnes and Krizek, "Estimating", 45, 50; Krizek, Handy, and Forsyth, "Explaining", 725, 737; Parkin, Riley, and Jones, "Barriers"; David Skinner and Paul Rosen, "Hell is Other Cyclists: Rethinking Transport and Identity", in *Cycling and Society*, ed. Horton, Rosen, and Cox, 83–96; Sagaris, "Lessons"; Scheepers, *Opportunities*.

they assert: "It seems that local or even 'subcultural' attitudes and perhaps history play a very substantial role in the perception of bicycling as an appealing or even 'normal' thing for an adult to do". They add that "soft factors such as culture and attitudes" should be researched "in some systematic way", without indicating, however, how this should be done.[45] Together with Susan Handy and Ann Forsyth, Krizek also suggests that the disregard for history is related to bicycle researchers' strong and optimistic belief in planning and design and their one-sided and possibly biased focus on the practical effects of their studies. Their work is, according to these authors, "fraught with practical challenges as well as political ones: expectations are high, interventions are modest, and effects may be unclear", while planners and policymakers "have a responsibility to understand the limitations of the available evidence and not misuse that evidence in making the case for bicycle and pedestrian interventions".[46]

However, for Krizek and his co-authors this appears to be no reason to fundamentally question the basic approach and purpose of policy-oriented bicycle research and to take up his earlier suggestion that historical and cultural analysis should be included. On the contrary, in an evaluative survey he and his co-authors Ann Forsyth and Daniel Rodríquez call for more research along the established lines on the basis of more refined data collection and analysis, more sophisticated social-scientific theories and models as well as more precise quantitative methods in order to increase the usefulness of such work for policymaking.[47] In my view, the relevance of such an appeal and the implied belief in procedural rationality is disputable, and perhaps even counterproductive, because it may undermine the very societal (and also scholarly) bearing of such research.[48] Apart from the fact that history and culture are beyond planning and design, one of the main reasons that these "soft" factors

45 Barnes and Krizek, "Estimating", 45, 50.

46 Krizek, Handy, and Forsyth, "Explaining", 725, 737; cf. D. Ogilvie et al., "Promoting Walking and Cycling as an Alternative to Using Cars: Systematic Review", *British Medical Journal* 329, no. 7469 (2004); Krizek, "Cycling", 123, 125–26; Krizek, Forsyth, and Baum, *Walking and Cycling*; Ann Forsyth and Kevin J. Krizek, "Promoting Walking and Bicycling: Assessing the Evidence to Assist Planners", *Built Environment* 36, no. 4 (2010); Lin Yang et al., "Interventions to Promote Cycling: Systematic Review", *British Medical Journal* 341, c5293 (2010); Parkin and Koorey, "Network Planning".

47 Ann Forsyth, Kevin Krizek and Daniel Rodríguez, "Non-Motorized Travel Research and Contemporary Planning Initiatives", *Progress in Planning* 71, no. 4 (2009).

48 Having read dozens of research reports of quantitative bicycle research, I cannot escape the impression that many are full of truisms and that their conclusions are often trivial. See, e.g., Kevin J. Krizek and Rio W. Roland, "What Is at the End of the Road? Understanding Discontinuities of On-Street Bicycle Lanes in Urban Settings", *Transportation Research Part D: Transport and Environment* 10, no. 1 (2005).

appear as residual categories and remain invisible in social-scientific bicycle research, is precisely that they cannot be probed on the basis of the prevailing quantitative methods. Since bicycle-researchers do not question their basic assumption that bicycling can be planned and designed, and do not put in perspective their narrow approach, they continue to disregard the cultural and historical dimension, and therefore also the tenacity and persistence of pedalling patterns.

As a first move towards bridging the gap between historical and policy-oriented bicycle studies, as well as a broader and also international-comparative perspective, I would suggest that, generally, three partly contrasting bicycle cultures can be distinguished in the western world on the basis of different volumes and purposes of bicycle use; different meanings, images and perceptions of pedalling; different patterns of engrained cycling behaviour (*habitus*[49]); different characteristics of cyclists and their motivations; and differences in the nature of cycling policies and activism. There is a marked contrast between the bicycle culture in the Netherlands and Denmark, which provides a prominent role for the two-wheeler in daily transport, and is historically rooted in its image of a "democratic horse" and "civilizing tool", and the English-speaking countries and to a certain extent Germany, in which the bicycle has a marginalized or exclusive position, as either the poor man's humble utensil or as an alternative and trendy vehicle. The third bicycle culture can be found in France, Italy and Belgium, where the popularity of cycling centred on sports and (professional) racing: the bicycle was (and is) especially glorified as a record-breaker, while pedalling for utilitarian purposes, with the exception of the Flemish part of Belgium since the 1970s, has declined to rather low levels.

These cycling cultures have taken shape in specific historical trajectories and in the context of modern nation states. In the following parts I will sketch these trajectories and contexts on the basis of existing studies[50] with a focus

49 The concept of 'national habitus' was coined by the historical sociologist Norbert Elias in order to refer to culturally and socially shaped patterns of behaviour that are self-evident on a national scale. See Kuipers, "The Rise and Decline".

50 In the field of bicycle history (and, to a certain extent, also sociology), the focus has shifted from the technological development of bicycles to the social, cultural, and political dimensions of pedalling. For a historiographical overview, see Manuel Stoffers and Harry Oosterhuis, "Ons populairste vervoermiddel. De Nederlandse fietshistoriografie in internationaal perspectief", *Bijdragen en Mededelingen betreffende de Geschiedenis der Nederlanden/The Low Countries Historical Review* 124, no. 3 (2009): 390–418; Manuel Stoffers, Harry Oosterhuis, and Peter Cox, "Bicycle History as Transport History: The Cultural Turn", in *Mobility in History: Themes in Transport: T2M Yearbook 2011*, ed. Gijs Mom, Peter Norton, Georgina Clarsen, and Gordon Pirie (Neuchâtel: Alphil, 2010). For

on three phases in the bicycle's history from its introduction in the late nineteenth century onwards resulting in growing diversity in cycling patterns between countries. First, when bicycles made their entry into society in the late nineteenth century, specific meanings and values were attached to pedalling, and particular wheeling practices were highlighted and promoted. Second, in the first half of the twentieth century the two-wheeler established itself as a means of transport for the masses and at the same time bicycle practices and experiences were increasingly affected by growing motorized traffic. Third, after the Second World War, the nationally diverse cycling patterns that had evolved in the previous period consolidated in restraining or enhancing vicious circles. The various relevant factors—cycling volumes and practices; meanings, perceptions and public images; attitudes and habits; land use, urban design and traffic infrastructures; government policies and bicycle lobbying and activism—mutually supported and strengthened each other in either an inhibiting or stimulating way and hardened in positive and negative spirals.

7 Modernity and Nationalism

The introduction of bicycles in late nineteenth-century society—the "velocipede mania" in the 1860s which was followed in the 1890s by a "bicycle boom" in many parts of the western world—was generally caught up in praise of modernity. The new vehicle was strongly associated with scientific and technological innovation, social progress and individual liberation, in particular among the liberal and urban middle-class citizens who had sufficient means and time to afford and ride it. The two-wheeled "freedom machine" enabled flexible mobility at an unprecedented speed, and it thus involved not only a new experience of time and space, but also self-autonomy and a widening of one's mental horizon.[51] Although the two-wheeler was introduced in postal

sociological contributions, see Horton, Rosen, and Cox, eds., *Cycling and Society*; Cox, *Cycling Cultures*.

51 John Pinkerton, "Who Put the Working Man on a Bicycle?" *Cycle History 8: Proceedings of the 8th International Cycling History Conferences*, ed. Nicholas Oddy and Rob van der Plas (San Francisco: Van der Plas Publications, 1998), 101; Glen Norcliffe, *The Ride to Modernity: The Bicycle in Canada, 1869–1900* (Toronto, Buffalo, and London: University of Toronto Press, 2001); Joachim Radkau, "Das Fahrrad in den Technikvisionen der Jahrhundertwende, oder: das Erlebnis in der Technikgeschichte", *Wege zur Fahrradgeschichte*, ed. Volker Briese, Wilhelm Matthies, and Gerd Renda (Bielefeld: BVA Bielefelder Verlag, 1995); Nadine Besse, ed., *The Velocipede, Object of Modernity 1860–1870/Le velocipede, objet de modernité 1860–1870* (Saint-Étienne: Musée d'Art et d'Industrie, 2008); Joachim Krausse, "Versuch auf's Fahrrad zu kommen. Zur Technik und Ästhetik der Velo-Evolution", in

services, police and fire departments, and the army before 1900,[52] the first civilian cyclists did not so much use it for utilitarian rather than for sporting and leisure purposes. Riding the velocipede and the high-wheeler, which was risky and required agility, was largely restricted to athletic young men.[53] For women and older men, pedalling became feasible only after the more practical and comfortable "safety bicycle" came onto the market. Their use of the new vehicle was above all recreational: touring in the countryside and enjoying nature, which provided townsfolk with a counterbalance to the supposedly harmful and unhealthy sides of industrial society.[54] Cycling, an activity that combined physical exercise and mental respite, reflected and fostered a growing anxiety about individual as well as collective health. Riding on two wheels was a way to take part in modernity's dynamism, while at the same time, by keeping balance and mastering the machine and experiencing inner tranquillity, to be in control of its disruptive restlessness.

In order to defend their interests against authorities who impeded their freedom of movement as well as against other users of roads such as coachmen and pedestrians, from the 1870s onwards, upper- and middle-class bicycle

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Absolut modern sein: Culture technique in Frankreich 1889–1937, ed. Hans Joachim Neyer (Berlin: Elefanten Press, Staatliche Kunsthalle, 1986); Peter Hinrichs, Ingo Kolboom, and Hans Joachim Neyer, "Zwischen Fahrrad und Fliessband. Culture technique in Frankreich zwischen Belle Epoque and Front Populaire", in *Absolut modern sein*, ed. Neyer; Titia Berlage, ed., *De fiets* (Rotterdam: Museum Boymans-Van Beuningen, 1977); Anne-Katrin Ebert, "Zwischen 'Radreiten' und 'Kraftmaschine'. Der bürgerliche Radsport am Ende des 19. Jahrhundert", *Werkstatt Geschichte* 44 (2007); Duncan R. Jamieson, "Bicycle Touring in the Late Nineteenth Century", in *Cycle History 12: Preceedings of the 12th Internıational Cycling History Conference*, ed. Andrew Ritchie and Rob van der Plas (San Francisco: Cycle Publishing, 2002); Lars Amenda, "Mit dem Fahrrad um die Welt—Radfernreisen vor hundert Jahren", in *Das Fahrrad: Kultur, Technik, Mobilität*, ed. Mario Bäumer, 112–16 (Hamburg: Junius, 2014); Jim Fitzpatrick, *Wheeling Matilda: The Story of Australian Cycling* (Kilcoy: Star Hill Studio, 2013); Smethurst, *The Bicycle*, 32–39, 67–104.

52 Jim Fitzpatrick, *The Bicycle in Wartime* (Washington: Brassey's, 1998); G.D. Cornelissen de Beer, "Invoering en gebruik van het rijwiel bij de Europese legers in de 19e eeuw", *Armamentaria. Jaarboek Legermuseum* 19 (1984–1985): 60–87.

53 Nick Clayton, "The Quest for Safety: What Took So Long?" in *Cycle History 8*, ed. Oddy and van der Plas; see also Wiebe E. Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (Cambridge, MA: MIT Press, 1995), 19–100.

54 Gary A. Tobin, "The Bicycle Boom of the 1890s: The Development of Private Transportation and the Birth of the Modern Tourist", *Journal of Popular Culture* 7, no. 4 (1974): 838–49; Richard Holt, "The Bicycle, The Bourgeoisie and the Discovery of Rural France, 1880–1914", *British Journal of Sports History* 2, no. 2 (1984): 127–39; Catherine Bertho-Lavenir, *La Roue et le stylo. Comment nous sommes devenus touristes* (Paris: Odile Jacob, 1999); Christopher Thompson, "Bicycling, Class and the Politics of Leisure in Belle Epoque France", in *Histories of Leisure*, ed. Rudy Koshar, 131–46 (Oxford and New York: Berg, 2002).

hobbyists organized themselves into local clubs as well as national associations. Such organizations, which were part of civil society, associated pedalling with particular social and political values.[55] They lobbied for the improvement of traffic infrastructure and the civil right of riding on public roads, while at the same time they pressed wheelers to behave as civilized and self-disciplined traffic participants by learning the proper art of cycling. The individual freedom afforded by the new vehicle should be balanced by decency and responsible citizenship. The meaning which these organizations bestowed on bicycling reflected not only the values of bourgeois respectability and liberalism, but also nationalist ideals. Lobbying for more and better roads and other traffic facilities served the cause of connecting the nation. Their promotion of bicycle tourism as a way to discover native landscapes, the unspoiled, "traditional" countryside and national heritage, as well as to bridge the distance between town and countryside and between different regions radiated national pride. Bicycle shows and parades also became part of nationalist celebrations. Since cycling clubs sought official recognition by government authorities, it was not unusual that their members paraded in uniforms and rode in formation—the similarity with horse-riding including military cavalry was obvious—in order to present themselves as patriotic citizens. Pointing out the bicycle's military potential was also part of the scheme to win the approval of the authorities.

55 Roman Sandgruber, "Cyclisation und Zivilisation. Fahrradkultur um 1900", in *Glücklich ist, wer vergisst …? Das andere Wien um 1900*, ed Hubert Ch. Ehalt, Gernot Heiss, and Hannes Stekl (Vienna, Cologne, Graz: Hermann Böhlaus, 1986); Les Bowerman, "Clubs: Their Part in the Study of Cycles and Cycling History", *Cycle History 5: Proceedings of the 5th International Cycling History Conference*, ed. Rob van der Plas (San Francisco: Bicycle Books, 1995); Catherine Bertho-Lavenir, "Normes de comportement et contrôle de l'espace. Le Touring Club de Belgique avant 1914", *Le Mouvement Social* 178 (1997); Alex Poyer, *Les premiers temps des vélo-clubs. Apparition et diffusion du cyclisme associative français entre 1867 et 1914* (Paris: L'Harmattan, 2003); Thomas Burr, "National Cycling Organizations in Britain, France, and the United States, 1875–1905", in *Cycle History 18: Proceedings of the 18th International Cycling History Conference*, ed. Rob van der Plas (San Francisco: Van Der Plas Publications, 2009); Glen Norcliffe, "Associations, Modernity and the Insider-Citizens of a Victorian Highwheel Bicycle Club", *Journal of Historical Sociology* 19, no. 2 (2006); Raymond Henry, "Origins and Brief History of the Fédération Française de Cyclotourisme", in *Cycle History 19: Proceedings of the 19th International Cycle History Conference*, ed. Anne Henry (St. Etienne: Musée d'Arts et d'Industries, 2010); Norbert Stellner, *Radfahrervereine in der bayerischen Provinz. Raum Mühldorf/Altötting 1882–1994* (Regensburg: EditionVulpis, 2000); Mikko Kylliäinen, Cycling towards Civil Society: Estonian Cycling History in the 19th Century", in *Cycle History 21: Proceedings of the 21st International Cycling History Conference*, ed. Andrew Ritchie (Birmingham: Cycling History Publishing, 2012); Reid, *Roads Were Not Built*, 123–33, 143–58, 173–82.

To be sure, such patriotic manifestations were partly a rhetorical means to gain general approval. In some countries, however, pedalling was instilled with national values in a more fundamental and lasting way. In the early twentieth century, the Netherlands and Denmark came to be regarded by their own populations (as well as others) as cycling nations par excellence, while in France, Belgium and Italy cycle racing became a source of national pride. In the English-speaking countries, Germany and most other western nations, on the other hand, the two-wheeler was not linked to national distinctiveness, although Britain set the tone in the organization of cycle clubs and pedalling as amateur sports, and, together with France, was also leading in bicycle engineering and production, while the invention of the bicycle was claimed by Germans as well as Brits and French.[56]

8 Democratization and Status Decline

In the late nineteenth century, bicycles were expensive luxury items and therefore restricted to the upper and middle classes. In the first three decades of the twentieth century, ever more efficient mass production of safety bicycles entailed falling prices and their widespread adoption in daily traffic and for other utilitarian purposes.[57] The two-wheeler enabled a longer distance be-

56 See Jacques Seray, *Deux Roues. La véritable histoire du vélo* (Rodez: Éditions de Rouergue, 1988) 19, 26, 46–47, 83, 112; Tony Hadland and Hans-Erhard Lessing, *Bicycle Design: An Illustrated History* (Cambridge, MA: MIT Press, 2014), 45–53; Smethurst, *The Bicycle*, 53–57.

57 Ross D. Petty, "Peddling the Bicycle in the 1890s: Mass Marketing Shifts into High Gear", *Journal of Macromarketing* 15, no. 1 (1995); Roger Lloyd-Jones and Myrddin John Lewis, *Raleigh and the British Bicycle Industry: An Economic and Business History, 1870–1960* (Burlington, VT: Ashgate, 2000); Bruce Epperson, "Failed Colossus: Strategic Error at the Pope Manufacturing Company, 1878–1900", *Technology and Culture* 41, no. 2 (2000); Bruce Epperson, "After Pope: The Pope Manufacturing Company and the American Bicycle Industry, 1899–1990", in *Cycle History 10: Proceedings of the 10th International Cycling History Conference*, ed. Rob van der Plas (San Francisco: Van der Plas Publications, 2000); Bruce Epperson, "Chasing the 'isms': Fordism, Taylorism, Popeism, and the Search for Meaning in the History of the American Bicycle Industry", in *Cycle History 20: Proceedings of the 20th International Cycling History Conference*, ed. Gary Sanderson (Chesham: John Pinkerton Memorial Publishing Fund, 2010); Paul Rosen, *Framing Production: Technology, Culture, and Change in the British Bicycle Industry* (Cambridge, MA: MIT Press, 2002); Thomas Burr, "Building Community, Legitimating Consumption: Creating the US Bicycle Market, 1876–1884", *Socio-Economic Review* 4, no. 3 (2006); Tony Hadland, *Raleigh: Past and Presence of an Iconic Bicycle Brand* (San Francisco: Cycle Publishing, 2011); Robert J. Turpin, "'Our Best Bet Is the Boy': Bicycle Marketing Schemes and American Culture after World War I", in *Cycle History 22: Proceedings of the 22nd International Cycling History Conference*, ed. Andrew Ritchie (San Francisco: Cycling History, 2012); Carlo Mari, "Putting the Italians

tween home and work, and thus contributed to suburbanization. Traders, shopkeepers and artisans used it to transport goods or offer their services. In the countryside, it advanced the opening up of isolated settlements: schooling and dating opportunities broadened, distant relatives and friends as well as new consumption options came within reach, and participation in social and club life on a regional and even national scale was facilitated. In some countries, the bicycle was employed to bridge long distances in sparsely populated and barren areas for economic purposes, for example in Sweden's northern forest regions and Australia's Western territories during the big gold rush.[58]

The interbellum period saw the onset of national differences in bicycle use and its public image, which have left their mark to this day. These variations evolved from (1) the diverging effects of growing motoring traffic; (2) the ensuing traffic policies implemented by governments; (3) the association of class and status distinctions with car-driving versus bicycle-riding, (4) the responses by bicycle organizations to these developments, and (5) their varying positions vis-à-vis professional cycle racing.

In several countries, the upsurge of utilitarian cycling among the lower middle and working class incited a social status decline of the two-wheeler. In Germany and Britain for example, where class and status distinctions were marked, the aristocracy and bourgeoisie more and more turned their back on the vehicle and exchanged it for the motorcycle and the car in order to distinguish themselves from the pedalling masses. Although the volume of cycle traffic was greater than ever between the First World War and the mid-1950s, the bicycle's aura as an icon of modernity was eclipsed by the automobile. The changing image of the two-wheeler from innovative to outmoded, was at odds with the growing practical use of the vehicle in the first half of the twentieth century.[59] Even so, membership of middle-class cycling associations

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on Bicycles: Marketing at Bianchi, 1885–1955", *Journal of Historical Research in Marketing* 7, no. 1 (2015).

58 Tiina Männistö-Funk, "The Prime, Decline, and Recalling of Rural Cycling: Bicycle Practices in 1920s' and 1930s' Finland Remembered in 1971–1972", *Transfers* 2, no. 2 (2012); Anna-Maria Rautio and Lars Östlund, "'Starvation Strings' and the Public Good: Development of a Swedish Bike Trail Network in the Early Twentieth Century", *The Journal Of Transport History* 33, no. 1 (2012); Fitzpatrick, *Wheeling Matilda*, 16–33; Georgina Clarsen, "Pedaling Power: Bicycles, Subjectivities and Landscapes in a Settler Colonial Society", *Mobilities* 10, no. 5 (2015).

59 Karl Hodges, "Did the Emergence of the Automobile End the Bicycle Boom?", in *Cycle History 4: Proceedings of the 4th International Cycle History Conference*, ed. Rob van der Plas (San Francisco: Bicycle Books, 1995); Adri A. Albert de la Bruhèze and Frank C.A. Veraart, "Fietsen en verkeersbeleid. Het fietsgebruik in negen West-Europese steden in de twintigste eeuw", NEHA-*jaarboek voor economische, bedrijfs- en techniekgeschiedenis* 62

declined, while at the same time they barred or failed to draw the lower classes. German, British, and Italian workers established their own organizations, in which the bicycle was put into action for the socialist cause.[60] As a consequence, the cycle lobby became hampered by organizational and ideological fragmentation. In this dynamic, the two-wheeler was more and more regarded as a "humble utensil", as the typical lower class transport mode.[61] In the United States, where the car became a mass product and an affordable means of transportation for the common man between the two world wars, the bicycle was socially marginalized even earlier and more rapidly than in European countries. Driving a car became part of the American dream and the two-wheeler was viewed as the vehicle for losers and eccentrics or for those with no status to lose such as youngsters and students. Already in the interwar period American wheeling levels were much lower than European ones.[62]

At the same time the influence of British, American and German pressure groups of cyclists, which in the preceding decades had lobbied successfully for improving the traffic infrastructure, dwindled when driving started to grow after the First World War. Not only did governments intensify their interference in traffic, experts gained more influence in policies at the expense

(1999); Ruth Oldenziel, Martin Emanuel, Adri A. Albert de la Bruhèze, and Frank Veraart, eds., *Cycling Cities: The European Experience* (Eindhoven: Foundation for the History of Technology, 2016); Daniel Hart London, "Keeping a Respectable Distance: The Rise and Fall of the Bicycle as an Instrument of Gentility", in *Cycle History 20*, ed. Sanderson; Nicolas Lefevre, "Popularité du Cyclisme et Cyclisme Populaire. Pour en Fin avec le Mythe et le Misérablilisme", In *Cycle History 23: Proceedings of the 23rd International Cycling History Conference*, ed. Andrew Ritchie (San Francisco: Cycling History, 2013); Stoffers and Ebert, "New Directions".

60 Ralf Beduhn and Jens Klocksin, eds., *Rad-Kultur-Bewegung. 100 Jahre rund ums Rad: Rad- und Kraftfahrerbund Solidarität. Illustrierte Geschichte 1896–1996* (Essen: Klartext, 1995); Rüdiger Rabenstein, *Radsport und Gesellschaft. Ihre sozialgeschichtlichen Zusammenhänge in der Zeit von 1867 bis 1914* (Hildesheim, München, and Zürich: Weidmann, 1991); Denis Pye, *Fellowship Is Life: The Story of the Clarion Cycling Club* (Bolton: Clarion, 2004); Stefano Pivato, "The Bicycle as a Political Symbol: Italy, 1885–1955", *International Journal of the History of Sport* 7, no. 2 (1990) 172–87; Mari, "Putting the Italians on Bicycles", 134.

61 Fitzpatrick, *Wheeling Matilda*, 88.

62 Paul Rubenson, "Missing Link: The Case for Bicycle Transportation in the United States in the Early 20th Century", in *Cycle History 16: Proceedings of the 16th International Cycling History Conference*, ed. Andrew Ritchie (San Francisco: Cycling History, 2006); Evan Friss, "The Path Not Taken: The Rise of America's Cycle Paths and the Fall of Urban Cycling", in *Cycle History 20*, ed. Sanderson; David V. Herlihy, *Bicycle: The History* (New Haven, CT: Yale University Press, 2004), 298–305, 328; Pryor Dodge, *The Bicycle* (Paris and New York: Flammarion, 1996), 180; John Forester, "American Cycling History from the 1940s; As I Remember It", John Forester's Home Page, accessed 28 December 2017, http://www.johnforester.com/Articles/Social/My%20History.htm; Reid, *Roads Were Not Built*, 249.

of laymen such as cycle lobbyists. The modernist, forward-looking traffic and urban planning creed, in which upscaling and efficiency was central, prioritized the facilitation of motorized traffic and the construction of public transport networks. Policymakers, urban planners and traffic engineers viewed motoring in terms of progress and economic growth. Bicycle transportation was disparaged as out-dated, slow, inefficient and unsafe, as an impediment to a smooth and speedy circulation of traffic.[63] In the English-speaking countries, and to a lesser extent also in Germany, this approach forced bicyclists, although still ever-present on public roads, on the defensive already before the Second World War. Lower-class cyclists who used their means of transport for utilitarian purposes and out of sheer necessity, did not have a voice in traffic policies.[64] Policymakers and traffic experts largely excluded cycling from their (middle-class and future-oriented) frame of reference and thus made it invisible as a useful and convenient mode of transport. Moreover, because in general cyclists, unlike (middle-class) motorists, did not pay taxes for road use, their associations were no match for the much stronger car lobby, in particular

63 Burkhard Horn, "Vom Niedergang eines Massenverkehrsmittels. Zur Geschichte der städtischen Radverkehrsplannung" (thesis, Gesamthochschule Kassel, 1990); Burkhard Horn, "Geschichte der städtischen Radverkehrsplanung", in *Handbuch der kommunalen Verkehrsplanung*, ed. Tilman Bracher et al., Ch. 2.1.1.2. (Berlin: VDE Verlag, 2002); Nicholas Oddy, "Cycling's Dark Age? The Period 1900–1920 in Cycling History", in *Cycle History 15: Proceedings of the 15th International Cycling History Conference*, ed. Rob van der Plas (San Francisco: Van der Plas and Cycle, 2005); Albert de la Bruhèze and Veraart, "Fietsen en verkeersbeleid"; Jeffrey Brown, Eric A. Morris, and Brian D. Taylor, "Planning for Cars in Cities: Planners, Engineers, and Freeways in the 20th Century", *Journal of the American Planning Association* 75, no. 2 (2009); Jennifer Bonham and Peter Cox, "The Disruptive Traveller? A Foucauldian Analysis of Cycleways", *Road & Transport Research* 19, no. 2 (2010); Oldenziel and Albert de la Bruhèze, "Contested Spaces"; Martin Emanuel, "Understanding Conditions for Bicycle Traffic through Historical Inquiry: The Case of Stockholm", *Journal of the Institute of Urban Transport of India*, December (2010); Martin Emanuel, "Constructing the Cyclist: Ideology and Representations in Urban Traffic Planning in Stockholm, 1930–1970", *Journal Of Transport History* 33, no. 1 (2012); Aldred, "Governing Transport"; Koglin, *Vélomobility*; Till Koglin and Tom Rye, "The Marginalisation of Bicycling in Modernist Urban Transport Planning", *Journal of Transport & Health* 1, no. 4 (2014); Till Koglin, "Vélomobility and the Politics of Transport Planning", *GeoJournal* 80, no. 4 (2014); Till Koglin, "Organisation Does Matter—Planning for Cycling in Stockholm and Copenhagen", *Transport Policy* 39 (2015): 55–62.

64 More in general, they were less outspoken about their cycling experiences than the late nineteenth-century upper and middle-class pioneers for whom the vehicle was novel and special, and they have left behind far less historical sources in which their voice can be heard. See, e.g., Männistö-Funk, "The Prime, Decline, and Recalling"; also Tiina Männistö-Funk, "The Crossroads of Technology and Tradition: Vernacular Bicycles in Rural Finland, 1880–1910", *Technology and Culture* 52, no. 4 (2011).

if it was supported by the powerful automobile industries. If the economic crisis of the 1930s and the hardships during and after World War II impelled the massive utilization of the two-wheeler, from the 1950s on growing prosperity fostered car-ownership and driving as well as mobility on motorcycles, scooters and mopeds, while post-war traffic policies further cleared the way for the ascendency of motoring on the roads. Functional differentiation of the built environment, urban sprawl and the upscaling of land use patterns entailed an increase of the number and distances of daily trips. Making room for moving and parked cars was the tenet of modernist urban design, which could be implemented in cities that had been destroyed in the Second World War.[65]

In several countries, such as Germany and to a lesser extent also Britain and the United States, bicycle paths were planned and sometimes built before the Second World War, but mostly only locally and not systematically. Moreover, they were generally poorly constructed, too narrow, incomplete, and not direct and continuous. Officially cycling tracks served the safety and convenience of cyclists, but the main purpose, backed up by governmental authorities, planners, police and motoring organizations, was to keep wheelers away from highways and serve the facilitation and speeding up of motorized traffic.[66] In the Anglo-Saxon world, the construction of cycling infrastructure was half-hearted, ironically in part because bicycle rights advocates did not support it. They divined that separated facilities, even if they were incomplete, implied the suggestion that cyclists did not belong on regular roads and should be banned from them. British cycle associations insisted that wheelers should behave and be treated as drivers of a vehicle with the full right, like motorists, to move on public roads. This argument in favour of so-called vehicular cycling is still current in Britain and the United States. Although vehicular cycling was controversial among bicycle lobbyists and activists and many of them advocated segregated facilities, policymakers adopted it because this approach took the

65 Nicholas Oddy, "The Flaneur on Wheels?" in *Cycling and Society*, ed. Horton, Rosen, and Cox; David L. Patton, "Aspects of a Historical Geography of Technology: A Study of Cycling, 1919–1939", in *Cycle History 5*, ed. van der Plas; Pooley and Turnbull, "Modal Choice"; Pooley, Turnbull, and Adams, *A Mobile Century*; Peter Cox, "'A Denial of Our Boasted Civilisation': Cyclists' Views on Conflicts over Road Use in Britain, 1926–1935", *Transfers* 2, no. 3 (2012); Reid, *Roads Were Not Built*.

66 Volker Briese, "From Cycling Lanes to Compulsory Bike Path: Bicycle Path Construction in Germany, 1897–1940", in *Cycle History 5*, ed. van der Plas; Bonham and Cox, "The Disruptive Traveller"; Laura Golbuff and Rachel Aldred, *Cycling Policy in the UK: A Thematic and Historical Overview* (London: University of East London, 2011); Anne-Katrin Ebert, "When Cycling Gets Political: Building Cycling Paths in Germany and the Netherlands, 1910–40", *Journal of Transport History* 33, no. 1 (2012); Reid, *Roads Were Not Built*, 159–72, 251–58; Rautio and Östlund, "'Starvation Strings'"; Fitzpatrick, *Wheeling Matilda*, 16–33.

least effort and was cheapest.[67] As the volume and speed of motorized traffic on the roads kept increasing, however, vehicular cycling came with the unintended consequence of a growing preoccupation with the danger of cycling. This caused more and more people to abandon pedalling for commuting; only a minority of strongly motivated and experienced cyclists was not going to be put off by its real or alleged risks.

At the same time cycling suffered from a further loss of social status, now also among the working classes: only those without a driver's licence or who could not afford a car (the lowest income groups, youngsters, students and women) merely pedalled out of sheer necessity.[68] On the basis of his own experience as a devoted wheeler in California during the 1940s and 1950s, the American engineer and bicycle activist John Forester relates that he faced a social stigma. He was impeded in his professional career and his wife felt embarrassed because the neighbours saw him commuting to work on his bicycle. Only certain groups, according to Forester, could use the bicycle in daily commuter traffic without losing standing. "The small community of cyclists that had always existed consisted largely of persons who could resist the social convention that despised cycling: those with no status to lose (working class, students) and those whose status was proof against derision (doctors, professors), and those who chose not to obey convention".[69]

67 John Forester, "Ideas in Motion: The Bicycle Transportation Controversy", *Transportation Quarterly* 55, no. 2 (2001); John Forester, "Objective and Psychological Explanations for Differences in the Bicycling Programs of Different Nations", in *The Bicycle: Global Perspectives: Papers Presented at the Conference vélo mondiale Pro Bike–Velo-city, Montreal, Canada, 13–17 September 1992*, ed. Robert Boivin and Jean-François Pronovost (Québec: Vélo Québec, 1992); Gordon and Richardson, "Bicycling"; John Forester, "Bicycling, Transportation and the Problem of Evil", American Dream Coalition, accessed 28 December 2017, http://www.americandreamcoalition.org/safety/CTEvil.pdf; John Forester, "Fight for Your Right to Cycle Properly!", John Forester's Home Page, accessed 28 December 2017, http://www.johnforester.com/; John Pucher, "Cycling Safety on Bikeways vs. Roads", *Transportation* Quarterly 55, no. 4 (2001); John Pucher and Ralph Buehler, "Cycling for a Few or For Everyone: The Importance of Social Justice in Cycling Policy", *World Transport Policy & Practice* 15, no. 1 (2009); Bruce D. Epperson, "The Great Schism: Federal Bicycle Safety Regulation and the Unraveling of American Bicycle Planning", *Transportation Law Journal* 37, no. 2 (2010).

68 Thomas Fläschner, "Out of Date, Out of Mind: Public Awareness of the Bicycle during the 1950s in Germany's Saarland State", in *Cycle History 13: Proceedings of the 13th International Cycling History Conference*, edited by Nick Clayton and Andrew Ritchie (San Francisco: Cycle Publishing/Van der Plas Publications, 2003); Thomas Fläschner, "Stahlroß auf dem Aussterbe-Etat. Zur Geschichte des Fahrrads und seiner Verdrängung in den 50er Jahren", *Eckstein. Journal für Geschichte* 9 (2000).

69 Forester, *American Cycling History*, 9.

As a consequence of the marginalization of pedalling, up to now infrastructural cycling policies have received little support among tax-paying citizens. Two American transportation experts, who refute pleas for more bicycle facilities and pushing back motoring, probably voice the views of a large segment of the American population when they argue that such policies do not make sense in the United States because a substantial rise of pedalling levels is unlikely to come about. They consider such policy as undesirable because its benefits would not outweigh its costs, and it would violate the interests of most Americans: "we strongly object to the use of disincentives to driving as an inducement to bicycling. [...] It is bad policy to damage severely the welfare of 99 per cent (or even 98 per cent, assuming a consequent doubling of bicycling's current modal share) to benefit the 1 per cent (or, eventually, 2 per cent) who bicycle".[70] This demonstrates that in countries with low cycling levels, not only the United States, but also Britain, Canada and Australia, democratic legitimacy is a thorny issue that troubles cycling policies: substantial returns on investments depend on consistent long-term planning, whereas politicians and their voters may expect relatively quick results. If substantial results fail to occur in the short run, the political will and legitimacy to continue investing in bicycle infrastructure may be undermined. Against this background, the analysis of costs and benefits has gained in importance in bicycle research, the more so under neoliberal governance.[71]

9 The Dutchness and Danishness of Pedalling

The twentieth-century development of bicycling in the Netherlands and Denmark differed significantly from that in other countries. Already around

70 Gordon and Richardson, "Bicycling", 11.

71 P. Hopkinson and Mark Wardman, "Evaluating the Demand for New Cycle Facilities", *Transport Policy* 3, no. 4 (1996); Buis and Wittink, *The Economic Significance*; Glen F. Koorey, "Why a Cycling Strategy on Its Own Will NOT Increase Cycling" (presentation, New Zealand Cycling Conference, North Shore, 10–11 October 2003); Parkin and Koorey, "Network Planning", 156–57; cf. Gunnar Lind, ed., *Cost Benefit Analysis of Cycling* (Copenhagen: Tema Nord, Nordic Council, 2005); Kevin J. Krizek et al., "Analysing the Benefits and Costs of Bicycle Facilities via Online Guidelines", *Planning, Practice & Research* 22, no. 2 (2007); Krizek, "Cycling"; Börjesson and Eliasson, "The Benefits of Cycling"; Horton and Parkin, "Conclusion"; Nick Cavill et al., "Economic Analyses of Transport Infrastructure and Policies Including Health Effects Related to Cycling and Walking: A Systematic Review", *Transport Policy* 15, no. 5 (2008); Kjartan Saelensminde, "Cost-Benefit Analyses of Walking and Cycling Track Networks Taking into Account Insecurity, Health Effects and External Costs of Motorized Traffic", *Transportation Research Part A: Policy and Practice* 38, no. 8 (2004); Aldred, "Governing Transport".

the First World War, the Netherlands was seen as a cycling country par excellence by Dutch and foreigners alike, and in Denmark the bicycle became a national token from the 1920s on. The two-wheeler's establishment as a widely shared means of transportation and its lasting popularity in both countries was not so much, or at least not only, related to favourable material conditions (minor or no differences in elevation, relatively short distances, high levels of urbanization and compact historical towns) and the cycling volume in itself, which hardly differed from their neighbouring countries until the 1950s. What set the Netherlands and Denmark apart from the rest of the Western world, was rather the socio-political meaning attached to pedalling and its public image.[72]

The large and influential National Dutch Wheelers' Association, founded in 1883, steadily promoted the bicycle as a widely accessible and convenient means of transportation. In public expressions and events, the liberal and national-minded bourgeois citizens who directed the association promoted wheeling in terms of supposedly longstanding Dutch qualities and certain civil virtues, such as independence, self-control, soberness, modesty and stability. The Dutchness of pedalling was underlined by comparing it with ice-skating. On the other hand, the bourgeois cycling-vanguard mostly considered (commercial) cycle racing as vulgar and indecent, as contrary to the image of wheelers as respectable and responsible road users. This view made itself felt in government policies: road cycling races became rare as a consequence of prohibitions in a traffic law adopted in 1905. Touring, on the other hand, and also practical cycling were actively promoted. When the bicycle came within reach of the popular masses, the Dutch Wheeler's Association advocated it as an egalitarian means of transportation—"the democratic horse" as the editor of the organization's periodical phrased it—that would bring progress for all

72 Anne-Katrin Ebert, *Radelnde Nationen. Die Geschichte des Fahrrads in Deutschland und den Niederlanden bis 1940* (Frankfurt am Main: Campus, 2010); Anne-Katrin Ebert, "Cycling towards the Nation: The Use of the Bicycle in Germany and the Netherlands, 1880–1940", *European Review of History* 11, no. 3 (2004); Anne-Katrin Ebert. "Het 'paard der democratie'. Fatsoenlijk fietsen in Nederland, 1900–1920", in *Fatsoenlijk vertier. Deugdzame ontspanning voor arbeiders na 1870*, ed. Christianne Smit, 209–37 (Amsterdam: Bert Bakker, 2008); Frank C.A. Veraart, "Geschiedenis van de fiets in Nederland 1870–1940. Van sportmiddel naar massavervoermiddel" (thesis, Technische Universiteit Eindhoven, 1995); Kaspar Hanenbergh and Michiel Röben, eds., *Ons stalen ros. Nederland wordt een land van fietsers 1820 tot 1920* (Utrecht: Uitgeverij Ons Stalen Ros, 2015); Carstensen and Ebert, "Cycling Cultures"; Marie Kastrup, "Hverdagens beskedne demokrati. Analyser af cyklen som symbol pa danskhed" (thesis, University of Copenhagen, 2007); Walther Knudsen, Thomas Krag, and Dansk Cyklistforbund, *På cykel i 100 år. Dansk Cyklistforbund 1905–2005* (Copenhagen: Dansk Cyklistforbund, 2005); Koglin, *Vélomobility*; Koglin, "Vélomobility and the Politics".

ranks.[73] Its diffusion among the working classes was viewed as a way to integrate them into the nation.

The technical design of the two-wheeler that became standard in the Netherlands, reflected the idea of the vehicle as a practical and civilizing tool. The solid and sturdy Dutch wheeler (*Hollandrad* as Germans still refer to it), was not meant to break speed records, to work oneself, dressed in sports outfits and leaning forward, into a sweat, or to incite sensual or aesthetic feelings, but to ride neatly upright, in regular and decent clothes and in an unhurried pace. Equipped with luggage carrier, chain guard, dress-guards and lighting, and usually painted in black, it was tailored to everyday use as well as civil standards of propriety. With pictures of cyclists against the backgrounds of typical Dutch landscapes, historical towns, windmills, the Dutch flag and folk in traditional costumes, the marketing of the Dutch bicycle industry stressed the embeddedness of wheeling in national culture.[74] The Dutch image of the two-wheeler differed from its aura in other countries—in France, Belgium and Italy in particular—where bicycle models were often geared to sports and racing. Associations with lightness and flying as well as with fashion and eroticism—if cycling women were depicted—were also prominent in advertising the vehicle, but such attributes were in general lacking in the Netherlands.

Developments in Denmark largely were similar to Dutch patterns. The Danish Bicycle Club and Cycling Federation, founded in 1881 and 1905 respectively, dissociated themselves from cycle racing and promoted the construction of bicycle ways and touring, which was marked as a national pastime. Unlike the German, British and American bicycle organizations, which were divided along class-lines and over different bicycle activities (sports versus utilitarian use and touring, as well as the English ideal of gentleman-amateur sports versus professional and commercial racing), the Dutch and Danish associations spoke with one voice and could claim to represent the common interests of all cyclists in the country. Contrary to German and British workers, the Dutch and Danish labour movements did not develop a distinct socialist vision on bicycling and the attitudes among their constituencies were largely in line with

73 Ebert. "Het 'paard der democratie'", 236; on the topic of cycling women, see also Anne-Katrin Ebert, "Liberating Technologies? Of Bicycles, Balance and the 'New Woman' in the 1890s", ICON: *Journal of the International Committee for the History of Technology* 16 (2010).

74 Ebert, "Het 'paard der democratie'", 223–24; Manuel Stoffers, "Exoot wordt icoon: de inburgering van de fiets. Van gewild buitenlands product naar nationaal vervoermiddel", in *Ons stalen ros*, ed. Hanenbergh and Röben; Sue-Yen Tjong Tjin Tai, "Hoe werd de fiets een Nederlands product? Hollandse degelijkheid vormt de fiets voor dagelijks gebruik", in *Ons stalen ros*, ed. Hanenbergh and Röben.

the national and civil values (practicality, modesty, simplicity, soberness, level-headedness, and diligence) which the middle-class cycling lobby disseminated. In both countries the definition of the two-wheeler as a practical transport mode for all citizens and as a civilizing and assimilating utensil prevailed. In this way it was moulded into a vehicle of national identity, while at the same time cycle racing did not incite national pride, as happened in France, Italy and Belgium. The bicycle's enduring omnipresence and popularity and the riding style in the Netherlands and Denmark—characterized by a Dutch sociologist as "distinction through simplicity"—was and is related to the fairly egalitarian social ethos and distaste for showing off and status distinctions.[75] This is underlined by the fact that (in particular female) members of the Dutch royal family and cabinet ministers regularly appeared (and still appear) in public on a bicycle. In Denmark, images of pedalling women played an important role in linking the bicycle with liberal attitudes, emancipation and equality, which have been presented as national virtues. In particular during the First and Second World Wars, cycling was connected to qualities that supposedly contrasted the Dutch and Danish nations with everything that characterized the militaristic belligerent nations, and especially German authoritarianism and hyper-masculinity.

In the Netherlands and Denmark, the growth of motoring—which in both countries was slower than in other parts of the Western world, partly because there was no large automobile industry and cars were more heavily taxed than in car-producing countries—led to a decrease in bicycle use, but to a much lesser extent than elsewhere and neither did it entail a social devaluation of the vehicle.[76] Again, the approach of the Dutch and Danish cycling associations and government policies played a major part. Whereas in other countries bicycle traffic and motoring were increasingly considered as mutually exclusive and conflicting, in the Netherlands and Denmark their complementary nature and shared needs (good roads, signposting, traffic safety, and largely separated facilities) were underlined—which reflected that most drivers were also accustomed to pedalling. Therefore the Dutch and Danish cycling organizations, which promoted bicycle ways, succeeded in influencing government policies more effectively than the marginalized bicycle interest groups elsewhere. From the early twentieth century onwards, bicycle ways were constructed in these countries, at first mostly for leisure touring, but increasingly also for utilitarian purposes, and over the decades the bicycle infrastructure

75 Kuipers, "The Rise and Decline", 24.

76 Vincent van der Vinne, *De trage verbreiding van de auto in Nederland 1896–1939* (Amsterdam 2007); Koglin, *Vélomobility*.

steadily expanded. While the Dutch Wheelers' Association played an initiating role, the government used the revenues of the—generally resented—bicycle tax levied between 1924 and 1941, for funding cycling facilities. The growing contrast between, on the one hand, the Netherlands and Denmark and, on the other, the English-speaking world and, to a lesser extent, Germany, can be partly explained on the basis of the long-term effects of the infrastructural facilities put in decades earlier, which in their turn had been advanced by the previously established image of the bicycle as a widely shared means of transportation as well as a vehicle for national distinctiveness.[77]

While, from the 1950s onwards, daily bicycle-use strongly diminished in most western countries, it remained relatively high in the Netherlands and Denmark. Whereas in the late 1930s the level of bicycle traffic was even higher in Denmark, in the late 1940s and the 1950s the Netherlands developed and maintained the highest bicycle density in the world.[78] Although the Dutch and Danish governments did not promote cycling actively until the 1970s and motoring swelled rapidly from around 1960, bicycle traffic was not hampered to the same extent as elsewhere and it continued to be more visible. The leftist, "green" bicycle activism that arose in the 1970s, affirmed the self-evident view of pedalling as a sensible means of mobility. The more radical lobbyists, just like the established ones earlier on, became involved in policy-making by local and national governments.

10 Contrasting National Cycling Cultures

The twentieth-century trends in, on the one hand, the Netherlands and Denmark and, on the other, the English-speaking world and, partly, also Germany, have resulted in contrasting bicycle cultures. In the first two countries the benefits of cycling are self-evident: it is largely part of people's natural daily routine from an early age. The bicycle is used first of all for practical purposes; its role in leisure and sports, although also significant, is secondary. The demographic characteristics of wheelers largely represent those of the

77 Welleman, "Why a Bicycle Policy"; Albert de la Bruhèze and Veraart, "Fietsen en verkeersbeleid"; Oldenziel and Albert de la Bruhèze, "Contested Spaces".

78 Peter Eloy Staal, *Automobilisme in Nederland. Een geschiedenis van gebruik, misbruik en nut* (Zutphen: Walburg Pers, 2003), 115; Adri A. Albert de la Bruhèze and Frank C.A.Veraart, *Fietsverkeer in praktijk en beleid in de twintigste eeuw. Overeenkomsten en verschillen in fietsgebruik in Amsterdam, Eindhoven, Enschede, Zuidoost-Limburg, Antwerpen, Manchester, Kopenhagen, Hannover en Basel* (Den Haag: Ministry of Transport, Public Works and Water Management/Stichting Historie der Techniek, 1999), 50.

population as a whole and cycling is hardly associated with a particular alternative lifestyle or political viewpoint. Government and bicycle interest groups cooperate and cycling policies are hardly disputed. Apart from non-European immigrants, the Dutch and the Danes hardly need to be convinced of the usefulness and benefits of bicycle transport. The emphasis is on the improvement of the general infrastructural preconditions, and facilitation of the already high levels of bicycle traffic, especially for the benefit of the flow of *all* traffic. Since many Dutch and Danes both drive and pedal, cyclists and motorists are not pitted against each other to the same extent as in car-dominated countries. Wheelers enjoy a high level of security in traffic and bicycle-riding is not regarded as particularly dangerous.[79]

In the United States, Britain, Canada and Australia, where the bicycle was pushed out by the car to a much greater extent than in most European countries, and cycling policies, if they exist at all, are contested and do not elicit broad support, the two-wheeler is rather used for leisure and exercise than in daily commuting. For many people pedalling is a typical childhood and youth experience at best and bicycles are often regarded as toys rather than useful vehicles. Younger men are strongly overrepresented among wheelers, while women and the elderly are underrepresented. In the public perception of utilitarian cycling, negative valuations as abnormal, eccentric, inferior, unsafe, uncomfortable and (too) strenuous abound. Also, pedalling is associated with either poverty and low social status (although nowadays well-educated people are overrepresented) or, on the other hand, an exclusive "Lycra-and-helmet, sporty-and-skilled" and fashionable yuppie practice, whereas some wheelers, in particular bicycle couriers, are labelled as "kamikaze riders".[80] Many mo-

79 Ministry of Transport, Public Works and Water Management, *The Dutch Bicycle Master Plan*; Ministry of Transport, Public Works and Water Management, *Cycling in the Netherlands*; Berlage, *De fiets*; Welleman, "Why a Bicycle Policy"; Ministry of Transport, Public Works and Water Management, *Eindrapport*, 11, 27, 41; Huwer, "Let's Bike", 43; Buis and Wittink, *The Economic Significance*, 38; Pete Jordan, *In the City of Bikes: The Story of the Amsterdam Cyclist* (New York: Harper Collins, 2013); Florentine M.W. Bax, "Bicycle Use in the Netherlands versus the United States" (thesis, Rijksuniversiteit Groningen, 2004): Pelzer, "Bicycling"; City of Copenhagen, *Cycle Policy*; Krag, "Cycling"; Krag, "Bicycle Promotion"; Koglin, *Vélomobility*; Koglin, "Vélomobility and the Politics".

80 Peter L. Jacobsen, Francesca Racioppi, and Harry Rutter, "Who Owns the Roads? How Motorized Traffic Discourages Walking and Bicycling", *Injury Prevention* 15, no. 6 (2009); Chris Rissel et al., "Representations of Cycling in Metropolitan Newspapers: Changes over Time and Differences between Sydney and Melbourne, Australia", BMC *Public Health* 10, no. 371 (2010); Elliot Fishman, Simon Washington, and Narelle L. Haworth, "Understanding the Fear of Bicycle Riding in Australia", *Journal of the Australasian College of Road Safety* 23, no. 3 (2012); Horton and Parkin, "Conclusion", 310; Aldred, "The Role of Advocacy", 97; Dave Horton, "Fear", in *Cycling and Society*, ed. Horton, Rosen, and Cox;

torists view wheelers as a nuisance and as incompetent and dangerous road users. Reporting on his experience as a commuter cyclist in Birmingham (Britain), geographer Phil Jones points out how he "was being loaded with a whole series of labels: 'fit', 'healthy', 'eco-friendly', 'sustainable' (and also 'mad', 'crazy', 'reckless'). No longer myself, I was constructed as a 'cyclist'."[81] Both in the public perception and in their self-image Anglo-Saxon wheelers are "a breed apart" and this impedes the "normalization" of cycling.[82] Many British and American bicyclists, women even more than men, seem to struggle with the image of being either a "hard-core" cyclist and "'too much' of a cyclist" or a "bad" (that is unskilled and irresponsible) cyclist.[83]

In the English-speaking world, and also in Germany, the minority of regular and determined cyclists not only share a strong sensitivity for the partly bicycle-hostile and unsafe traffic conditions, but also pronounced motives and great appreciation of, and identification with, their vehicle.[84] In general, in

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see also Rachel Aldred, "On the Outside: Constructing Cycling Citizenship", *Social and Cultural Geography* 11, no. 1 (2010); Aldred, "Incompetent or Too Competent?"; Gibson, "The Rise and Fall of Adrian Fenty"; Stehlin, "Regulating Inclusion"; Pucher, Komanoff, and Schimeck, "Bicycling Renaissance", 13; Ben Fincham, "Bicycle Messengers and the Road to Freedom", in *Against Automobility*, ed. Steffan Böhm, Campbell Jones, Chris Land, and Matthew Peterson (Malden: Blackwell, 2006); Aldred, "The Role of Advocacy", 91, 97; Horton and Parkin, "Conclusion", 309–10.

81 Phil Jones, "Performing the City: A Body and a Bicycle Take on Birmingham, UK", *Social & Cultural Geography* 6, no. 6 (2005): 814; cf. L. Basford et al., *Drivers' Perceptions of Cyclists* (London: Department of Transport, and Crowthorne: Transport Research Limited, 2002), 29; Simon Christmas et al., *Cycling, Safety and Sharing the Road: Qualitative Research with Cyclists and Other Road Users* (London: Department for Transport, 2010).

82 Transport for London, *Cycling*, 22, 29; Aldred, "The Role of Advocacy", 97; Horton and Parkin, "Conclusion", 310; Birgitta Gatersleben and Hebba Haddad, "Who Is the Typical Bicyclist?" *Transportation Research Part F: Traffic Psychology and Behaviour* 13, no. 1 (2010), 47; Rebecca Steinbach et al., "Cycling and the City: A Case Study of How Gendered, Ethnic and Class Identities Can Shape Healthy Transport Choices", *Social Science & Medicine* 72, no. 7 (2011); Peter Cox, "Cycling Cultures and Social Theory", in *Cycling Cultures*, ed. Cox, 14–42; Dave Horton and Tim Jones, "Rhetoric and Reality: Understanding the English Cycling Situation", in *Cycling Cultures*, ed. Cox, 63–77; Rachel Aldred, "Who are Londoners on Bikes and What Do They Want? Negotiating Identity and Issue Definition in a 'Pop-up' Cycle Campaign." *Journal of Transport Geography* 30 (2013); Pooley et al., "Policies for Promoting"; Aldred and Jungnickel, "Why Culture Matters"; Jennifer Bonham and Marily Johnson eds., *Cycling Futures* (Adelaide: University of Adelaide Press, 2015).

83 Aldred, "Incompetent or Too Competent?"; see also Aldred, "On the Outside"; Deborah McCarthy, "'I'm a Normal Person': An Examination of How Utilitarian Cyclists in Charleston South Carolina Use an Insider/Outsider Framework to Make Sense of Risks", *Urban Studies* 48, no. 7 (2011).

84 Rosen, "Up the Vélorution"; Les Lumsdon and Rodney Tolley, "The National Cycle Strategy in the UK: To What Extent Have Local Authorities Adopted Its Model Strategy Spproach?"

these countries a much more explicit reflection on the significance and experience of pedalling is present than in the Netherlands and Denmark, where it is an entrenched routine without there being a need for political-ideological arguments about its benefits.[85] In Britain and America, the striving for being treated as equal traffic participants and for wheelers' safety is (and apparently still needs to be) articulated in political terms such as the civil right of having free access to mobility regardless of the means of transportation. In the United States in particular, a militant and politicized cycling movement and subculture have developed, in which the glorification of two-wheelers is intrinsically linked to fundamental criticism of the dominance of motoring and the interrelated urban planning, economic prerequisites and lifestyle.[86] In a similar vein, many German wheelers seem to distinguish themselves from the majority of the population by their conscious lifestyle, "green" political affiliation and critical attitude towards the dominant car-oriented traffic culture and policies. Until the 1970s, the use-pattern and popular image of the two-wheeler in Germany resembled those in the English-speaking world. Since the 1970s, however, German pedalling levels have risen considerably above those of Britain, the United States, Canada and Australia, and over the last three

Journal of Transport Geography 9, no. 4 (2001): 293; Pucher, Komanoff, and Schimeck, "Bicycling Renaissance", 3–4; Sener, Eluru, and Bhat, "An Analysis"; Pucher and Buehler, "Making Cycling", 4–5; Aldred, "The Role of Advocacy"; Australian Bicycle Council and Austroads, *Gearing up*, 15–16; John Pucher, Jan Garrard, and Stephen Greaves, "Cycling Down Under: A Comparative Analysis of Bicycling Trends and Policies in Sydney and Melbourne", *Journal of Transport Geography* 19, no. 2 (2011); Daley and Rissel, "Perspectives and Images"; Horton and Parkin, "Conclusion", 310–11; Bonham and Wilson, "Women and Cycling".

85 Paradoxically, this may also explain why there has been more (popular as well as academic) interest in cycle history in Great Britain, the United States, Canada, Germany, and France than in the Netherlands and Denmark. In the last two countries, pedalling seems to be so obvious and so uncontested that it does not give cause to substantial reflection or foster a deeply felt need to pursue its history. See Harry Oosterhuis and Manuel Stoffers, "A Strong Presence, but a Weak History: The Bicycle in Dutch Historiography", *Cycle History* 21, ed. Ritchie; Manuel Stoffers, "Cycling as Heritage: Representing the History of Cycling in the Netherlands", *Journal of Transport History* 33, no. 1 (2012).

86 Zachary Mooradian Furness, "'Put the Fun between Your Legs!' The Politics and Counterculture of the Bicycle" (dissertation, University of Pittsburgh, 2005); Zack Furness, "Critical Mass, Urban Space and Vélomobility", *Mobilities* 2, no. 2 (2007); Theodore J. Buehler, "Fifty Years of Bicycle Policy in Davis, CA" (Davis: University of California, 2007), htttp://www.davishistoryresearch.org/3-authors/BuehlerThesisFinalDraft.pdf; J. Harry Wray, *Pedal Power: The Quiet Rise of the Bicycle in American Public Life* (Boulder and London: Paradigm Publishers, 2008); Jeff Mapes, *Pedaling Revolution: How Cyclists Are Changing American Cities* (Corvallis: Oregon State University Press, 2009). On the history of British cycling policies, see Golbuff and Aldred, *Cycling Policy in the UK*.

decades in several parts of the country the cycling culture has shifted into the direction of the Dutch and Danish one. At the same time, however, the car, supported by an all-powerful industrial and automobile lobby, has preserved its absolute priority in traffic policies, while the bicycle infrastructure and its upkeep, which are geared to touring rather than daily commuting, lags far behind that in Denmark and the Netherlands.

Apart from being fragmentary, inconsistent and controversial, British, American, Australian, and, to a lesser extent, German bicycle policies do not elicit broad public interest or support. In particular, with respect to discussions about the (lack of) safety of bicycle riding, policymakers as well as cycling activists have different views on the need for separate bicycle facilities. Some of them oppose the segregation of bicycle and motorized traffic and argue that cyclists should be enabled to share the regular roads with other vehicles and that they as well as motorists should adapt their traffic behaviour and driving skills to this situation.[87] Furthermore, the highlighting of safety issues, including the promotion of bicycle helmets, has had an adverse effect: the image of the bicycle as a risky vehicle and cyclists as extremely vulnerable road users has again and again been confirmed and even strengthened.[88] In countries with low cycling levels, it is difficult to change this image of the bicycle—and the reality underpinning it. Bicycle studies strongly suggest that there is a statistical correlation—called safety in numbers—between the (lack of) safety of pedalling and the volume of cycling traffic. The statistical risk of an accident is relatively smaller or larger as more or less cyclists use the roads.[89] As long as cycling levels are low and motorized transportation is dominant, the

87 Gordon and Richardson, "Bicycling", 11; Forester, "Ideas in Motion"; Forester, "Objective and Psychological"; John Forester, "The Place of Bicycle Transportation in Modern Industrialized Societies", American Dream Coalition, accessed 28 December 2017, http://americandreamcoalition.org/safety/forester.pdf; Martin Wachs, "Creating Political Pressure for Cycling", *Transportation Quarterly* 52, no. 1 (1998); Susan Blickstein and Susa Hanson, "Critical Mass: Forging a Politics of Sustainable Mobility in the Information Age", *Transportation* 28, no. 4 (2001); Susan G. Blickstein, "Automobility and the Politics of Bicycling in New York City", *International Journal of Urban and Regional Research* 34, no. 4 (2010) 886–905; Furness, "Put the Fun"; Furness, "Critical Mass"; Chris Carlsson, ed., *Critical Mass: Bicycling's Defiant Celebration* (Oakland: AK Press, 2002); Wray, *Pedal Power*; Mapes, *Pedaling Revolution*; Pelzer, "Bicycling"; Bax, "Bicycle Use".

88 Warren Salomon, "How Australian Cyclists Got Their New Helmet Laws", in *The Bicycle*, ed. Boivin and Pronovost; Wardlaw, "Three Lessons"; Rosen, *How Can Research*; Horton, "Fear".

89 Peter L. Jacobsen, "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling", *Injury Prevention* 9, no. 3 (2009); Conor C.O. Reynolds et al., "The impact of Transportation Infrastructure on Bicycling Injuries and Crashes: A Review of the Literature", (*Environmental Health* 8, no. 47 (2009), https://ehjournal.biomedcentral.com/

risk of an accident seems large and pedalling is (perceived as) dangerous. And as long as cyclists are depicted as potential victims, most people will shy away from heavy traffic and only a few will use the bicycle in daily traffic or let their children pedal. Cycling among children and young people has considerably declined in recent decades, resulting in fewer people who in fact get used to ride a bicycle in traffic and more people who do not develop any bicycle skills at all. Lack of cycle experience and the self-perpetuating association of biking with danger discourage people later in life from using a bicycle as a means of transport. Not only real risks, but also the related image of pedalling as dangerous, strengthen the sense of insecurity and hamper bicycle promotion policies in the English-speaking world.[90]

Apart from the marked contrast between on the one hand the Netherlands and Denmark and, on the other, the English-speaking countries, and, to a large extent, Germany, a third national bicycle culture can be distinguished, that of France, Italy, Belgium, and, to a lesser extent, Spain.[91] The nationalist

articles/10.1186/1476–069X-8–47; Wardlaw, "Three Lessons"; Wardlaw, "Assessing"; Buis and Wittink, *The Economic Significance*, 38.

90 Pucher, Komanoff, and Schimeck, "Bicycling Renaissance"; Wardman, Hatfield, and Page, "The UK National Cycling Strategy"; Transport for London, *Cycling*, 17–18, 20–23, 29, 45, 50; Krizek, Forsyth, and Baum, *Walking and Cycling*, 6, 23, 25–26; Wardlaw, "Assessing", 353; Stinson and Bhat, "An Analysis", 124; Noland and Kunreuther, "Short-Run and Long-Run"; Parkin, Wardman, and Page, "Estimation"; Akar and Clifton, "The Influence"; Wardlaw, "Three Lessons"; Horton, "Fear"; Bonham and Cox, "The Disruptive Traveller"; Oldenziel and Albert de la Bruhèze, "Contested Spaces".

91 Richard Holt, *Sport and Society in Modern France* (London and Oxford 1981); Pivato, "The Bicycle as a Political Symbol"; Stefano Pivato, "Italian Cycling and the Creation of a Catholic Hero: The Bartali Myth", *International Journal of the History of Sport* 13, no. 1 (1996); R.J.B. Bosworth, "The Touring Club Italiano and the Nationalization of the Italian Bourgeoisie", *European History Quarterly* 27, no. 3 (1997); Georges Vigarello, "Le Tour de France", in *Les lieux de mémoire*, vol. 3, ed. Pierre Nora (Paris: Gallimard, 1992); Philippe Gaboriau, *Le Tour de France et le vélo. Histoire sociale d'une épopée contemporaine* (Paris: L'Harmattan, 1995); Daniele Marchesini, *L'Italia del Giro d'Italia* (Bologna: Il Mulino, 1996); Hugh Dauncey and Geoff Hare, eds., *The Tour de France: A Century of Sporting Structures, Meanings and Values* (London: Routledge, 2003); Christopher S. Thompson, *The Tour de France: A Cultural History* (Berkeley, CA: University of California Press, 2006); Anthony Cardoza, "Making Italians? Cycling and National Identity in Italy: 1900–1950", *Journal of Modern Italian Studies* 15, no. 3 (2010); Bernat López, "The Failed Vuelta Ciclista a Espana of 1913 and the Launching of the Volta a Catalunya (1911–1913): Centre versus Periphery in the Struggle for the Governance of Cycling in Early Twentieth-Century Spain", *Sport in History* 30, no. 4 (2010); Bernat López, "Sport, Media, Politics and Nationalism on the Eve of the Spanish Civil War: The First Vuelta Ciclista a Espana", *The International Journal of the History of Sport* 27, no. 4 (2010); Hugh Dauncey, *French Cycling; A Social and Cultural History* (Liverpool: Liverpool University Press, 2012); Stijn Knuts, "Converging and Competing Courses of Identity Construction: Shaping and Imagining Society through

dimension of cycling in these countries did not concern, as in the Netherlands and Denmark, daily commuting, which since the 1960s fell to similar low levels as in many other parts of the western world, but was connected to sports and (professional) racing. Around 1900 there was considerable social resistance against competitive professional racing in the Netherlands, Denmark, Britain and Germany because most bicycle organizations in these countries not only followed the English sports ideal of the gentleman-amateur, but also prioritized touring and, later on, utilitarian bicycling as well. Leading French, Belgian (Flemish as well as Walloon), Italian and Spanish cycling associations, on the other hand, embraced and promoted bicycle racing, which entailed the commercial involvement of the (sports) media and the bicycle industry. Together with bourgeois lobbyists, bicycle manufacturers and newspapers organized and sponsored races in order to attract customers and subscribers. In the many local, national and international seasonal races, which replaced or were embedded in more traditional community entertainment and which attracted mass audiences, the achievements and sporting virtues of native racing heroes were celebrated, widely publicized and associated with the nation's vitality. Annual highlights such as the long-distance and staged road races *Tour de France* (from 1903 onwards), *Ronde van België* (Tour of Belgium, from 1906 onwards) and *Ronde van Vlaanderen* (Flanders, from 1913 on), *Giro d'Italia* (from 1909 onwards), and the Spanish *Vuelta Ciclista* (from 1935 on) became national events and grew into cherished traditions. Since the racers crossed the entire country, the extensive media reports covered its geographic contours, spurring the spectators along the roads and the reading audience to identify with the nation. In Belgium, bicycle racing was also instrumental in the emancipation struggle of the (lower-class) Flemish population against the dominant Francophone upper classes.

Most of the professional racers originated from the working class; for them a cycling-career offered an attractive opportunity to reap local, national or even international fame, make money and climb the social ladder. Although socialists and communists criticized the commercialization of professional pedalling and accused the bourgeois organizers of exploiting working-class racers for capitalist purposes, the sport enjoyed broad popularity among the lower as well as the middle classes. With the exception of the Flemish bicycle culture

Cycling and Bicycle Racing in Belgium before World War Two" (dissertation, KU Leuven, 2014). Cf. Rabenstein, *Radsport*; Rüdiger Rabenstein, "The Vienna–Berlin Race of 1893 and Its Influence on the Cycling Movement in Germany and Austria", *Cycle History 4*, ed. van der Plas; Andrew Ritchie, *Quest for Speed: A History of Early Bicycle Racing, 1868–1903* (San Francisco: Cycle Publishing/Van der Plas Publications, 2011).

and volumes, which have tended to shift towards Dutch and Danish patterns, the racing nations show rather low utilitarian pedalling levels while their infrastructural cycling facilities and policies (with local exceptions, such as many Northern Italian towns) are lagging behind those of North-Western and Central European countries. The overrepresentation of men among cyclists and the strong presence of racing bicycles in these countries signal a continuing strong association of cycling with sports, although the popularity of touring is growing and rent-bicycles have been introduced in several tourist cities.[92]

11 Conclusion: The Relevance of History for Bicycle Policies

Natural, spatial and demographic factors cannot adequately explain the large international differences in cycling levels. Also, the often-assumed causal link between infrastructural design and promotional activities on the one hand and pedalling volumes on the other has not been confirmed empirically. Bicycle studies do not provide conclusive evidence that "hard" infrastructural policies bring about an increase in cycling. An inverse relation cannot be ruled out: the building of facilities and their use may be the consequence of a preceding surge in cycling, caused by other factors and advancing the demand for cycle provisions. In that case infrastructures principally serve the needs of already accustomed wheelers—an effect which is in itself not without merit, although much less spectacular and visible than facilities causing an upsurge of cycling. In a similar vein, "soft" policies, such as education, promotion and marketing, primarily affect people who already pedal and believe in its benefits, whereas those who never or seldom mount a bicycle, are barely reached, let alone convinced, so that among them changes in perception and behaviour are not realized. Policies during the last two decades have largely failed to generate significant increases in utilitarian cycling in countries with low to average pedalling levels, whereas in countries with relatively high cycling volumes,

92 Philippe Gaboriau, "Les trois ages du vélo en France", *Vingtième Siècle. Revue d'histoire* 29 (1991); Giuseppe Di Donna, "Bicycle World in Italy", in *The Bicycle*, ed. Boivin and Pronovost; Jean-René Carré, "La situation de la bicyclette en France", in *The Bicycle*, ed. Boivin and Pronovost; Peter Cox, "Strategies Promoting Cycle Tourism in Belgium: Practices and Implications", *Tourism Planning & Development* 9, no. 1 (2012); Dauncey, *French Cycling*; Francis Papon, "The Evolution of Bicycle Mobility in France", *Cycle History* 22, ed. Ritchie; Francis Papon, "Historiographical Needs in the Study of Bicycling Mobility in France", *Mobility in History* 5, no. 1 (2014); Ester Anaya and Santiago Gorostiza, "The Historiography of Cycling Mobility in Spain in the Twentieth Century", *Mobility in History* 5, no. 1 (2014); Santiago Gorostiza and Ester Anaya, "Under the Shade of Bahamontes: Bicycle Decline in Spain between 1950 and 1975", *Cycle History 23*, ed. Ritchie.

such policies have contributed to a consolidation of its existing, relatively high level, rather than to further growth.

The widely diverging national cycling volumes and their large degree of permanence are rooted in diverse long-term national trajectories which have shaped built environments and traffic infrastructures as well as the collective meanings attributed to cycling and interrelated attitudes, perceptions, experiences and habits. These factors are largely immune to direct and short-term planning and, in particular, to policies which are based on the assumption that travel behaviour is motivated by rational decision-making. Taken together, the factors that are relevant for cycling levels appear to be trapped in either an inhibiting or stimulating vicious circle, in dynamics from which it is difficult to break out. In countries where land use patterns, urban planning and traffic infrastructure are not conductive to cycling, and the two-wheeler is not broadly regarded as an obvious means of transport, few people use it. As long as cycling continues to be a fringe mode of an exceptionally motivated and skilled minority, motoring will dominate traffic, the idea will prevail that pedalling is deviant, inferior, uncomfortable and dangerous, and there will be a lack of sufficient social pressure, democratic support and willingness among policy-makers for changing the traffic infrastructure and the image of the bicycle. Although governments in the English-speaking world have made efforts to promote bicycling, overall, apart from some modest results on the local level, the outcomes have been disappointing because such efforts are not structurally embedded in policies and lack continuity. In Denmark and the Netherlands, and perhaps increasingly in some other countries, such as Germany and Flanders, on the other hand, the enduring high or increased bicycle volumes and the familiarity of the majority (or a substantial part) of the population with bicycle-riding guarantee broad or adequate support for bicycle policies. The steady and structural development and upkeep of cycling facilities warrants that pedalling remains attractive and a matter of course. In these countries, bicycle policies have contributed less to a significant growth of bicycling than to a consolidation of its existing level.

Policymakers and social-scientific bicycle researchers have largely disregarded the persistent influence of history and (national) culture on current cycling levels and patterns. Both determining factors, which are largely invisible in policy-oriented bicycle research, put limits on what policies can realize in the short run. As a corrective to the over-optimistic belief in rational planning and in order to develop more realistic and effective policies, it may be advisable for policymakers and bicycle researchers to consider the historical and national specific interrelations between natural and built environments, traffic infrastructures, meanings and perceptions, and habits and attitudes with

regard to cycling. Adopting historical knowledge and an international comparative angle may temper unrealistic expectations among bicycle researchers and policymakers, and help them to attune policies to what is feasible and what is not within existing bicycle cultures. Also, it may be wise to shift the focus in bicycle policies from rational planning to nudging strategies in order to influence through more subtle, socio-psychological and cultural means the engrained habits and attitudes that play such a crucial, but not always clearly visible motivational role in traffic behaviour and mobility patterns. Finally, efforts to promote bicycling can only be successful in an enduring way if politicians and other policymakers have the courage to defy powerful car lobbies and to introduce structural measures that discourage and curb motoring.