

University of Groningen

Power to the pedals

Plazier, Paul Arnaud

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Plazier, P. A. (2018). *Power to the pedals: Perspectives on the potential of e-bike mobility for sustainable and active transport systems*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

References

Agervig Carstensen, T. & Ebert, A.-K., 2012. Cycling cultures in Northern Europe: From “golden age” to “renaissance,” in: Parkin, J. (Ed.), *Cycling and Sustainability*. Emerald Group Publishing Limited, Bingley, pp. 23–58.

Ajzen, I., 1985. From intentions to actions: A theory of planned behavior, in: Kuhl, J., Beckman, J. (Eds.), *Action Control: From Cognition to Behavior*. Springer Verlag, Berlin Heidelberg, pp. 11–39. doi:10.1007/978-3-642-69746-3_2

Aldred, R., 2014. The new mobilities paradigm and sustainable transport: Finding synergies and creating new methods, in: Lockie, S., Sonnenfeld, D.A., Fisher, D.R. (Eds.), *The Routledge International Handbook of Social and Environmental Change*. Routledge, Abingdon, pp. 190–203.

Astegiano, P., Tampère, C.M.J., Beckx, C., 2015. A preliminary analysis over the factors related with the possession of an electric bike. *Transportation Research Procedia* 10, 393–402. doi:10.1016/j.trpro.2015.09.089

Bai, L., Liu, P., Guo, Y., Yu, H., 2015. Comparative analysis of risky behaviors of electric bicycles at signalized Intersections. *Traffic Injury Prevention* 16, 424–428. doi:10.1080/15389588.2014.952724

Balsas, C.J.L., 2003. Sustainable transportation planning on college campuses. *Transport Policy* 10, 35–49. doi:10.1016/S0967-070X(02)00028-8

Bamberg, S., Ajzen, I., Schmidt, P., 2003. 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, 175–187.

Banister, D., 2008. The sustainable mobility paradigm. *Transport Policy* 15, 73–80. doi:10.1016/j.tranpol.2007.10.005

Banister, D., 2005. *Unsustainable transport: City transport in the new century*. Routledge, London.

Banister, D., Anderton, K., Bonilla, D., Givoni, M., Schwanen, T., 2011. Transportation and the Environment. *Annual Review of Environment and Resources* 36, 247–270. doi:10.1146/annurev-environ-032310-112100

Barr, S., Prillwitz, J., 2014. A smarter choice? Exploring the behaviour change agenda for environmentally sustainable mobility. *Environment and Planning C: Government and Policy* 32, 1–19. doi:10.1068/c1201

- Behrendt, F., 2017. Why cycling matters for e-mobility: How e-velomobility contributes to sustainable futures. *Mobilities* 1–17. doi:10.1080/17450101.2017.1335463
- Beirão, G., Sarsfield Cabral, J.A., 2007. Understanding attitudes towards public transport and private car: A qualitative study. *Transport Policy* 14, 478–489. doi:10.1016/j.tranpol.2007.04.009
- Bell, M.M., Osti, G., 2010. Mobilities and ruralities: An introduction. *Sociologia Ruralis* 50, 199–204. doi:10.1111/j.1467-9523.2010.00518.x
- Beller, T., 2017. The electric-bike conundrum. *The New Yorker* 18-8–2017.
- Berntsen, S., Malnes, L., Langåker, A., Bere, E., 2017. Physical activity when riding an electric assisted bicycle. *The International Journal of Behavioral Nutrition and Physical Activity* 14, 1–7. doi:10.1186/s12966-017-0513-z
- Bolton, O., 1895. Electrical bicycle (No. 552271). United States Patent Office, USA.
- Cairns, S., Behrendt, F., Raffo, D., Beaumont, C., Kiefer, C., 2017. Electrically-assisted bikes: Potential impacts on travel behaviour. *Transportation Research Part A* 103, 327–342. doi:10.1016/j.tra.2017.03.007
- Cass, N., Faulconbridge, J., 2016. Commuting practices: New insights into modal shift from theories of social practice. *Transport Policy* 45, 1–14. doi:10.1016/j.tranpol.2015.08.002
- Cass, N., Shove, E., Urry, J., 2005. Social exclusion, mobility and access. *Sociological Review* 53, 539–555. doi:10.1111/j.1467-954X.2005.00565.x
- Chatterjee, K., Sherwin, H., Jain, J., 2013. Triggers for changes in cycling: The role of life events and modifications to the external environment. *Journal of Transport Geography* 30, 183–193. doi:10.1016/j.jtrangeo.2013.02.007
- Chen, X., 2012. Statistical and activity-based modeling of university student travel behavior. *Transportation Planning and Technology* 35, 591–610. doi:10.1080/03081060.2012.701818
- Cherry, C.R., Weinert, J.X., Xinmiao, Y., 2009. Comparative environmental impacts of electric bikes in China. *Transportation Research Part D: Transport and Environment* 14, 281–290. doi:10.1016/j.trd.2008.11.003
- Cherry, C.R., Yang, H., Jones, L.R., He, M., 2016. Dynamics of electric bike ownership and use in Kunming, China. *Transport Policy* 45, 127–135. doi:10.1016/j.tranpol.2015.09.007
- Clark, B., Chatterjee, K., Melia, S., Knies, G., Laurie, H., 2014. Examining the relationship between life transitions and travel behaviour change: New insights from the UK household longitudinal study, in: 46th Universities' Transport Studies Group Conference, Newcastle University, 6-8 January 2014. pp. 6–8.

Clifton, K.J., Handy, S.L., 2003. Qualitative methods in travel behaviour research. Prepared for the International Conference on Transport Survey Quality and Innovation, Kruger National Park, South Africa, August 5-10, 2001 283–302.

CONEBI, 2016. European Bicycle Market 2016 Edition - Industry & market profile. CONEBI, Brussels.

Cox, P., 2008. The role of human powered vehicles in sustainable mobility. *Built Environment* 34, 140–160. doi:10.2148/benv.34.2.140

Cresswell, T., 2012. Mobilities II: Still. *Progress in Human Geography* 36, 645–653. doi:10.1177/0309132511423349

Cresswell, T., 2010. Mobilities I: Catching up. *Progress in Human Geography* 35, 550–558. doi:10.1177/0309132510383348

CROW, 2016. Meer bereiken met een brede blik op mobiliteit [Achieving more with a comprehensive approach to mobility]. CROW, Ede.

CROW-Fietsberaad, 2015. De speed-pedelec is een bromfiets, zonder uitzondering [the speed-pedelec is a moped, without exception] [online] Available at: <http://www.fietsberaad.nl/?section=Nieuws&lang=nl&mode=newsArticle&newsYear=2015&repository=De+speed-pedelec+is+een+bromfiets,+zonder+uitzondering> (accessed 11.12.15).

Cycling Embassy of Denmark, 2017. About the Cycling Embassy of Denmark [online] Available at: http://www.cycling-embassy.dk/about_cycling_embassy_of_denmark/ (accessed 12.7.17).

Dave, S., 2010. Life cycle assessment of transportation options for commuters. Massachusetts Institute of Technology (MIT), Boston.

Davison, K.K., Werder, J.L., Lawson, C.T., 2008. Children's active commuting to school: Current knowledge and future directions. *Preventing Chronic Disease* 5, 1–11.

De Jong, W., Vogels, J., Van Wijk, K., Cazemier, O., 2011. The key factors for providing successful public transport in low-density areas in the Netherlands. *Research in Transportation Business and Management* 2, 65–73. doi:10.1016/j.rtbm.2011.07.002

De la Bruhèze, A.A.A., Veraart, F., 1999. Fietsverkeer in praktijk en beleid in de twintigste eeuw [Bicycle transport in practice and policy in the twentieth century]. Ministerie van Verkeer en Waterstaat, Directoraat-Generaal Rijkswaterstaat, Hoofdkantoor van de Waterstaat, Directie Kennis.

De Witte, A., Macharis, C., Lannoy, P., Polain, C., Steenberghen, T., Van de Walle, S., 2006. The impact of “free” public transport: The case of Brussels. *Transportation Research Part A: Policy and Practice* 40, 671–689. doi:10.1016/j.tra.2005.12.008

- Delmelle, E.M., Delmelle, E.C., 2012. Exploring spatio-temporal commuting patterns in a university environment. *Transport Policy* 21, 1–9. doi:10.1016/j.tranpol.2011.12.007
- Dill, J., Rose, G., 2012. Electric bikes and transportation policy - Insights from early adopters. *Transportation Research Record: Journal of the Transportation Research Board* 2314, 1–6. doi:10.3141/2314-01
- Dill, J., Voros, K., 2007. Factors affecting bicycling demand: Initial survey findings from the Portland, Oregon, region. *Transportation Research Record: Journal of the Transportation Research Board* 2031, 9–17.
- Driscoll, D.L., Salib, P., Rupert, D.J., 2007. Merging qualitative and quantitative data in mixed methods research: how to and why not. *Ecological and Environmental Anthropology* 3, 18–28.
- Dutch Cycling Embassy, 2017. About Dutch Cycling Embassy [online]. Available at: <https://www.dutchcycling.nl/organization/organization-2> (accessed 12.7.17).
- Eom, J., Stone, J., Ghosh, S., 2009. Daily activity patterns of university students. *Journal of Urban Planning and Development* 135, 141–150.
- Ettema, D., Gärling, T., Olsson, L.E., Friman, M., 2010. Out-of-home activities, daily travel, and subjective well-being. *Transportation Research Part A: Policy and Practice* 44, 723–732. doi:10.1016/j.tra.2010.07.005
- European Commission, 2011. Roadmap to a single European transport Area – towards a competitive and resource efficient transport system [White paper]. Commission staff working paper COM(2011), 170.
- European Commission, 2006. Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC. *Official Journal of the European Union* L 266, 1–14.
- EUROSTAT, 2017. Population on January 1 by sex and age [online]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en (accessed 10.26.17).
- Fietsberaad, 2013. Feiten over de elektrische fiets [Facts concerning the electrically-assisted bike]. Fietsberaad, Utrecht.
- Fietsberaad, 2006. Continuous and integral: The cycling policies of Groningen and other European cycling cities, Fietsberaad. Fietsberaad, Utrecht.
- Fishbein, M., 1967. Readings in attitude theory and measurement. Wiley, New York.
- Fishman, E., Cherry, C., 2015. E-bikes in the mainstream: Reviewing a decade of research. *Transport Reviews* 36, 1–20. doi:10.1080/01441647.2015.1069907

Frank, L.D., Engelke, P.O., 2001. The built environment and human activity patterns: Exploring the impacts of urban form on public health. *Journal of Planning Literature* 16, 202–218. doi:10.1177/08854120122093339

Frank, L.D., Sallis, J.F., Conway, T.L., Chapman, J.E., Saelens, B.E., Bachman, W., 2006. Many pathways from land use to health: Associations between neighborhood walkability and active transportation, body mass index, and air quality. *Journal of the American Planning Association* 72, 75–87. doi:10.1080/01944360608976725

Fyhri, A., Fearnley, N., 2015. Effects of e-bikes on bicycle use and mode share. *Transportation Research Part D: Transport and Environment* 36, 45–52. doi:10.1016/j.trd.2015.02.005

Geels, F.W., 2012. A socio-technical analysis of low-carbon transitions: Introducing the multi-level perspective into transport studies. *Journal of Transport Geography* 24, 471–482. doi:10.1016/j.jtrangeo.2012.01.021

Goetz, A.R., Vowles, T.M., Tierney, S., 2009. Bridging the qualitative–quantitative divide in transport geography. *The Professional Geographer* 61, 323–335. doi:10.1080/00330120902931960

Gojanovic, B., Welker, J., Iglesias, K., Daucourt, C., Gremion, G., 2011. Electric bicycles as a new active transportation modality to promote health. *Medicine & Science in Sports & Exercise* 43, 2204–2210. doi:10.1249/MSS.0b013e31821cbdc8

Gray, D., Shaw, J., Farrington, J., 2006. Community transport, social capital and social exclusion in rural areas. *Area* 38, 89–98. doi:10.1111/j.1475-4762.2006.00662.x

Greene, D.L., Wegener, M., 1997. Sustainable transport. *Journal of Transport Geography* 5, 177–190. doi:10.1016/S0966-6923(97)00013-6

Groot, J. De, Steg, L., 2007. General beliefs and the theory of planned behavior: The role of environmental concerns in the TPB. *Journal of Applied Social Psychology* 1817–1836.

Grosvenor, T., 2000. Qualitative research in the transport sector. Resource paper for the workshop on qualitative/quantitative methods. Proceedings of an International Conference on Transport Survey Quality and Innovation. May 24–30, 1997 (Grainau, Germany). *Transportation Research E-Circular*, Number E-C008.

Groves, R.M., Presser, S., Dipko, S., 2004. The role of topic interest in survey participation decisions. *Public Opinion Quarterly* 68, 2–31. doi:10.1093/poq/nfh002

Guell, C., Panter, J., Jones, N.R., Ogilvie, D., 2012. Towards a differentiated understanding of active travel behaviour: Using social theory to explore everyday commuting. *Social Science and Medicine* 75, 233–239. doi:10.1016/j.socscimed.2012.01.038

Haartsen, T., Huigen, P.P.P., Groote, P., 2003. Rural areas in the Netherlands. *Tijdschrift voor economische en sociale geografie* 94, 129–136.

Hägerstrand, T., 1970. What about people in regional science? *Papers in Regional Science* 24, 6–21.

Hannam, K., Sheller, M., Urry, J., 2006. Editorial : mobilities, immobilities and moorings. *Mobilities* 1, 1–22. doi:10.1080/17450100500489189

Hanson, S., 2003. Transportation: hooked on speed, eyeing sustainability, in: Sheppard, E., Barnes, T. (Eds.), *A Companion to Economic Geography*. Blackwell, Malden, MA, pp. 133–148. doi:10.1002/9780470693445.ch9

Harms, L., 2008. Overwegend onderweg. De leefsituatie en de mobiliteit van Nederlanders [Deliberately mobile. Living arrangements and mobility of the Dutch population]. The Netherlands Institute for Social Research, The Hague.

Harms, L., Bertolini, L., Te Brömmelstroet, M., 2014. Spatial and social variations in cycling patterns in a mature cycling country exploring differences and trends. *Journal of Transport & Health* 1, 232–242. doi:10.1016/j.jth.2014.09.012

Haustein, S., Møller, M., 2016. E-bike safety: Individual-level factors and incident characteristics. *Journal of Transport & Health* 3, 386–394. doi:10.1016/j.jth.2016.07.001

Heath, Y., Gifford, R., 2002. Extending the theory of planned behavior: Predicting the use of public transportation. *Journal of Applied Social Psychology* 32, 2154–2189.

Heinen, E., van Wee, B., Maat, K., 2010. Commuting by bicycle: An overview of the literature. *Transport Reviews* 30, 59–96. doi:10.1080/01441640903187001

Hendrickx, L., Uiterkamp, A.J.M.S., 2001. Technology and behavior: The case of passenger transport, in: Verbeek, P.; Slob, A. (Ed.), *User Behavior and Technology Development: Shaping Sustainable Relations between Consumers and Technologies*. University of Groningen, Centre for Energy and Environmental Sciences, Groningen, pp. 95–106.

Hennink, M., Hutter, I., Bailey, A., 2011. *Qualitative research methods*. SAGE Publications Ltd, London.

Hiselius, L.W., Rosqvist, L.S., 2016. Mobility Management campaigns as part of the transition towards changing social norms on sustainable travel behavior. *Journal of Cleaner Production* 123, 34–41. doi:10.1016/j.jclepro.2015.08.055

Jain, J., Lyons, G., 2008. The gift of travel time. *Journal of Transport Geography* 16, 81–89. doi:10.1016/j.jtrangeo.2007.05.001

Jeekel, H., 2014. Social exclusion, vulnerable groups and driving forces: Towards a social research based policy on car mobility. *Case Studies on Transport Policy* 2, 96–106. doi:10.1016/j.cstp.2014.06.005

- Ji, S., Cherry, C.R., Bechle, M.J., Wu, Y., Marshall, J.D., 2012. Electric vehicles in China: Emissions and health impacts. *Environmental Science and Technology* 46, 2018–2024. doi:10.1021/es202347q
- Johnson, M., Rose, G., 2015. Extending life on the bike: Electric bike use by older Australians. *Journal of Transport & Health* 2, 276–283. doi:10.1016/j.jth.2015.03.001
- Johnson, R.B., Onwegbuzie, A.J., 2004. Mixed methods research: A research paradigm whose time has come. *Educational Researcher* 33, 14. doi:10.3102/0013189X033007014
- Jones, T., Harms, L., Heinen, E., 2016. Motives, perceptions and experiences of electric bicycle owners and implications for health, wellbeing and mobility. *Journal of Transport Geography* 53, 41–49. doi:10.1016/j.jtrangeo.2016.04.006
- Kager, R., Bertolini, L., Te Brömmelstroet, M., 2016. Characterisation of and reflections on the synergy of bicycles and public transport. *Transportation Research Part A: Policy and Practice* 85, 208–219. doi:10.1016/j.tra.2016.01.015
- Kaplan, D.H., 2015. Transportation sustainability on a university campus. *International Journal of Sustainability in Higher Education* 16, 173–186.
- Keeling, D.J., 2007. Transportation geography: New directions on well-worn trails. *Progress in Human Geography* 31. doi:10.1177/0309132507075370
- Keizer, K., Schultz, P.W., 2013. Social norms and pro-environmental behaviour, in: Steg, L., Van den Berg, A.E., Groot, J. De (Eds.), *Environmental Psychology - An Introduction*. Wiley-Blackwell, Oxford.
- Kenworthy, J.R., Laube, F.B., 1996. Automobile dependence in cities: An international comparison of urban transport and land use patterns with implications for sustainability. *Environmental Impact Assessment Review* 16, 279–308. doi:10.1016/S0195-9255(96)00023-6
- KiM, 2017. *Mobiliteitsbeeld 2017 [Mobility monitor 2017]*. The Netherlands Institute for Transport Policy Analysis, The Hague.
- KiM, 2016. *Mobiliteitsbeeld 2016 [Mobility monitor 2016]*. The Netherlands Institute for Transport Policy Analysis, The Hague.
- KiM, 2015a. *Mobiliteitsbeeld 2015 [Mobility monitor 2015]*. The Netherlands Institute for Transport Policy Analysis, The Hague.
- KiM, 2015b. *Fietsen en lopen: de smeerolie van onze mobiliteit [Walking and cycling: greasing our mobility]*. The Netherlands Institute for Transport Policy Analysis, The Hague.

- Klößner, C., Verplanken, B., 2013. Yesterday's habits preventing change for tomorrow? The influence of automaticity on environmental behavior, in: Steg, L., Van den Berg, A., de Groot, J. (Eds.), *Environmental Psychology - An Introduction*. Wiley-Blackwell, Oxford.
- Kollosche, I., 2014. Communicating electric mobility futures: Towards a school of mobility. Combining futures research and strategic implementation process. *Transportation Research Procedia* 4, 116–119. doi:10.1016/j.trpro.2014.11.010
- Krizek, K.J., 2003. Neighborhood services, trip purpose, and tour-based travel. *Transportation* 30, 387–410.
- Kroesen, M., 2017a. To what extent do e-bikes substitute travel by other modes? Evidence from the Netherlands. *Transportation Research Part D: Transport and Environment* 53, 377–387. doi:10.1016/j.trd.2017.04.036
- Kroesen, M., 2017b. To what extent do e-bikes substitute travel by other modes? Evidence from the Netherlands. *Transportation Research Part D: Transport and Environment* 53, 377–387. doi:10.1016/j.trd.2017.04.036
- Kwan, M.-P., Hong, X.-D., 1998. Network-based constraints-oriented choice set formation using GIS. *Geographical Systems* 5, 139-162
- Laird, J., Page, M., Shen, S., 2013. The value of dedicated cyclist and pedestrian infrastructure on rural roads. *Transport Policy* 29, 86–96. doi:10.1016/j.tranpol.2013.04.004
- Laker, L., 2017. Rise of the ebike: how going electric could revolutionise your ride. *The Guardian* 16-11-2017.
- Langford, B.C., Cherry, C.R., Bassett, D.R., Fitzhugh, E.C., Dhakal, N., 2017. Comparing physical activity of pedal-assist electric bikes with walking and conventional bicycles. *Journal of Transport & Health* 0–1. doi:10.1016/j.jth.2017.06.002
- Lee, A., Molin, E., Maat, K., Sierchula, W., 2015. Electric bicycle use and mode choice in the Netherlands. *Transportation Research Record* 2520, 1–7.
- Libbey, H.W., 1897. *Electric Bicycle* (No. 596272). United States Patent Office, USA.
- Lindenberg, S., Steg, L., 2007. Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues* 63, 117–137. doi:10.1111/j.1540-4560.2007.00499.x
- Litman, T., Burwell, D., 2006. Issues in sustainable transportation. *International Journal of Global Environmental Issues* 6, 331–347. doi:10.1504/IJGENVI.2006.010889
- Lopez, A.J., Astegiano, P., Gautama, S., Ochoa, D., Tampère, C.M.J., Beckx, C., 2017. Unveiling e-bike potential for commuting trips from GPS traces. *ISPRS International Journal of Geo-Information* 6, 1–13. doi:10.3390/ijgi6070190

- Lucas, K., 2012. Transport and social exclusion: Where are we now? *Transport Policy* 20, 105–113. doi:10.1016/j.tranpol.2012.01.013
- Lyons, G., 2003. The introduction of social exclusion into the field of travel behaviour. *Transport Policy* 10, 339–342. doi:10.1016/j.tranpol.2003.09.001
- MacArthur, J., Dill, J., Person, M., 2014. Electric bikes in North America - results of an online survey. *Transportation Research Record: Journal of the Transportation Research Board* 2468, 123–130. doi:10.3141/2468-14
- Marsden, G., Stead, D., 2011. Policy transfer and learning in the field of transport: A review of concepts and evidence. *Transport Policy* 18, 492–500. doi:10.1016/j.tranpol.2010.10.007
- Mason, J., Fulton, L., McDonald, Z., 2015. A global high shift cycling scenario: the potential for dramatically increasing bicycle and e-bike use in cities around the world, with estimated energy, co2 and cost impacts. UC Davis Institute of Transportation Studies, Davis, CA.
- Mckenzie-Mohr, D., 2000. Promoting sustainable behavior: An introduction to community-based social marketing. *Journal of Social Issues* 56, 543–554. doi:10.1111/0022-4537.00183
- McNally, M.G., 2007. The four step model, in: Hensher, D.A., Button, K.J. (Eds.), *Handbook of Transport Modelling*. Pergamon, Oxford.
- McNally, M.G., Rindt, C.R., 2007. The activity-based approach, in: Hensher, D.A., Button, K.J. (Eds.), *Handbook of Transport Modelling*. Pergamon, Oxford.
- Meijering, L., Weitkamp, G., 2016. Numbers and narratives: Developing a mixed-methods approach to understand mobility in later life. *Social Science & Medicine* 168, 200-206. doi:10.1016/j.socscimed.2016.06.007
- Milbourne, P., Kitchen, L., 2014. Rural mobilities: Connecting movement and fixity in rural places. *Journal of Rural Studies* 34, 326–336. doi:10.1016/j.jrurstud.2014.01.004
- Mokhtarian, P.L., Salomon, I., Lothlorien, R.S., 2001. Understanding the demand for travel: It's not purely "derived." *Innovation, the European Journal of Social Science Research* 14. doi:10.1080/13511610120106
- Montano, D.E., Kasprzyk, D., 2008. Theory of reasoned action, theory of planned behavior, and the integrated behavioral model, in: Glanz, K., Rimer, B.K., Viswanath, K. (Eds.), *Health Behavior and Health Education. Theory, Research and Practice*. Jossey-Bass, San Francisco.
- Müggenburg, H., Busch-Geertsema, A., Lanzendorf, M., 2015. Mobility biographies: A review of achievements and challenges of the mobility biographies approach and a framework for further research. *Journal of Transport Geography* 46, 151–163. doi:10.1016/j.jtrangeo.2015.06.004

Nelson, N.M., Foley, E., O’Gorman, D.J., Moyna, N.M., Woods, C.B., 2007. Active commuting to school: How far is too far? *International Journal of Behavioral Nutrition and Physical Activity* 4, 61–71. doi:10.1186/1479-Received

O’Dolan, C., 2013. How do we share the benefits of walking and cycling? Lessons learned from the Activity Access project, in: Gronau, W., Fischer, W., Ed. R.P. (Eds.), *Studies on Mobility and Transport Research*. p. 162.

Ogilvie, D., Egan, M., Hamilton, V., Pettierew, M., 2004. Promoting walking and cycling as an alternative to using cars: systematic review. *BMJ: British Medical Journal* 329, 763–0. doi:10.1136/bmj.38216.714560.55

Orfeuill, J.-P., 2010. La mobilité, nouvelle question sociale? *SociologieS* 1–18. [online] Available at: <http://sociologies.revues.org/3321>

Ory, D.T., Mokhtarian, P.L., 2005. When is getting there half the fun? Modeling the liking for travel. *Transportation Research Part A: Policy and Practice* 39, 97–123. doi:10.1016/j.tra.2004.09.006

Osti, G., 2010. Mobility demands and participation in remote rural areas. *Sociologia Ruralis* 50, 296–310. doi:10.1111/j.1467-9523.2010.00517.x

OV-bureau Groningen Drenthe, 2016. *Trendmonitor 2016*. Assen.

Peel, C., Baker, P., Roth, D., 2005. Assessing mobility in older adults: the UAB Study of Aging Life-Space Assessment. *Physical Therapy* 85 1008–1019.

Peine, A., van Cooten, V., Neven, L., 2016. Rejuvenating design: Bikes, batteries, and older adopters in the diffusion of e-bikes. *Science, Technology & Human Values* 42, 429–459. doi:10.1177/0162243916664589

Perry, F., 2014. Is London ready for a mini-Holland? *The Guardian* 3-10-2014.

Plazier, P.A., Weitkamp, G., Van den Berg, A.E., 2017a. “Cycling was never so easy!” An analysis of e-bike commuters’ motives, travel behaviour and experiences using GPS-tracking and interviews. *Journal of Transport Geography* 65, 25–34. doi:10.1016/j.jtrangeo.2017.09.017

Plazier, P.A., Weitkamp, G., Van den Berg, A.E., 2017b. The potential for e-biking among the younger population: a study of Dutch students. *Travel Behaviour and Society* 8, 37–45. doi:10.1016/j.tbs.2017.04.007

Poos, H.P.A.M., Lefarth, T.L., Harbers, J.S., Wendt, K.W., El Moumni, M., Reininga, I.H., 2017. E-bikers are more often seriously injured in bicycle accidents: results from the Groningen bicycle accident database. *Nederlands Tijdschrift voor Geneeskunde* 161.

- Popovich, N., Gordon, E., Shao, Z., Xing, Y., Wang, Y., Handy, S., 2014. Experiences of electric bicycle users in the Sacramento, California area. *Travel Behaviour and Society* 1, 37–44. doi:10.1016/j.tbs.2013.10.006
- Preston, J., Rajé, F., 2007. Accessibility, mobility and transport-related social exclusion. *Journal of Transport Geography* 15, 151–160. doi:10.1016/j.jtrangeo.2006.05.002
- Provincie Gelderland, 2016. *Bycycle: scholieren op de e-bike!* [Bycycle: students on the e-bike!]. Province of Gelderland.
- Provincie Groningen, 2016. *Verbinden met de fiets. Fietsstrategie 2016-2025* [Connecting by bicycle. Cycling Strategy 2016-2025]. Groningen.
- Pucher, J., Buehler, R., 2010. Walking and cycling for healthy cities. *Built Environment* 36, 391–414.
- Pucher, J., Buehler, R., 2008. Making cycling irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews* 28, 495–528. doi:10.1080/01441640701806612
- Pucher, J., Komanoff, C., Schimek, P., 1999. Bicycling renaissance in North America? Recent trends and alternative policies to promote bicycling. *Transportation Research Part A: Policy and Practice* 33.
- Pucher, J., Renne, J.L., 2005. Rural mobility and mode choice: Evidence from the 2001 National Household Travel Survey. *Transportation* 32, 165–186. doi:10.1007/s11116-004-5508-3
- Rau, H., Manton, R., 2016. Life events and mobility milestones: Advances in mobility biography theory and research. *Journal of Transport Geography* 52, 51–60. doi:10.1016/j.jtrangeo.2016.02.010
- Rijksoverheid, 2017. *Welke regels gelden voor mijn elektrische fiets (e-bike)?* [What rules apply to my electric bike (e-bike)?] [online]. Available at: <https://www.rijksoverheid.nl/onderwerpen/fiets/vraag-en-antwoord/welke-regels-gelden-voor-mijn-elektrische-fiets-e-bike> (accessed 11.19.17).
- Røe, P.G., 2000. Qualitative research on intra-urban travel: An alternative approach. *Journal of Transport Geography* 8, 99–106. doi:10.1016/S0966-6923(99)00039-3
- Rogers, E.M., 2003. *Diffusion of innovations*, 5th ed. Free Press, New York.
- Rose, G., 2012. E-bikes and urban transportation: emerging issues and unresolved questions. *Transportation* 39, 81–96. doi:10.1007/s11116-011-9328-y
- Rosenbloom, S., 2003. Facing societal challenges: the need for new paradigms in rural transit service. *Journal of Public Transportation* 6, 1–18.

Saelens, B., Sallis, J., Frank, L., 2003. Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *Annals of behavioral medicine* 80–91.

Sandy Thomas, C.E., 2012. How green are electric vehicles? *International Journal of Hydrogen Energy* 37, 6053–6062. doi:10.1016/j.ijhydene.2011.12.118

Schäfer, A., 2012. Introducing behavioral change in transportation into energy / economy / environment Models. The World Bank Development Research Group Environment and Energy Team & Sustainable Development Network, Office of the Chief Economist, Washington D.C.

Schäfer, A., Heywood, J.B., Jacoby, H.D., Waitz, I. a., 2009. *Transportation in a climate-constrained world*, 1st ed. The MIT Press, Cambridge, MA.

Schepers, J.P., Fishman, E., Den Hertog, P., Wolt, K.K., Schwab, A.L., 2014. The safety of electrically assisted bicycles compared to classic bicycles. *Accident Analysis & Prevention* 73, 174–180. doi:10.1016/j.aap.2014.09.010

Schipperijn, J., Kerr, J., Duncan, S., Madsen, T., Klinker, C.D., Troelsen, J., 2014. Dynamic accuracy of GPS receivers for use in health research: A novel method to assess GPS accuracy in real-world settings. *Frontiers in public health* 2, 21. doi:10.3389/fpubh.2014.00021

Schwanen, T., Banister, D., Anable, J., 2012. Rethinking habits and their role in behaviour change: The case of low-carbon mobility. *Journal of Transport Geography* 24, 522–532. doi:10.1016/j.jtrangeo.2012.06.003

Schwanen, T., Banister, D., Anable, J., 2011. Scientific research about climate change mitigation in transport: A critical review. *Transportation Research Part A: Policy and Practice* 45, 993–1006. doi:10.1016/j.tra.2011.09.005

Schwedes, O., Kettner, S., Tiedtke, B., 2013. E-mobility in Germany: White hope for a sustainable development or Fig leaf for particular interests? *Environmental Science and Policy* 30, 72–80. doi:10.1016/j.envsci.2012.10.012

Shannon, T., Giles-Corti, B., Pikora, T., Bulsara, M., Shilton, T., Bull, F., 2006. Active commuting in a university setting: Assessing commuting habits and potential for modal change. *Transport Policy* 13, 240–253. doi:10.1016/j.tranpol.2005.11.002

Shaw, J., Hesse, M., 2010. Transport, geography and the “new” mobilities. *Transactions of the Institute of British Geographers* 35, 305–312. doi:10.1111/j.1475-5661.2010.00382.x

Sheller, M., Urry, J., 2006. The new mobilities paradigm. *Environment and Planning A* 38, 207–226. doi:10.1068/a37268

Shergold, I., Parkhurst, G., 2012. Transport-related social exclusion amongst older people in rural Southwest England and Wales. *Journal of Rural Studies* 28, 412–421. doi:10.1016/j.jrurstud.2012.01.010

- Simons, M., Van Es, E., Hendriksen, I., 2009. Electrically assisted cycling: A new mode for meeting physical activity guidelines? *Medicine & Science in Sports & Exercise* 41, 2097–2102. doi:10.1249/MSS.0b013e3181a6aaa4
- Smith, N., Hirsch, D., Davis, A., 2012. Accessibility and capability: The minimum transport needs and costs of rural households. *Journal of Transport Geography* 21, 93–101. doi:10.1016/j.jtrangeo.2012.01.004
- Smith, R.E., Swinyard, W.R., 1983. Attitude-behavior consistency: The impact of product trial versus advertising. *Journal of Marketing Research* 20, 257–267.
- Snizek, B., Sick Nielsen, T.A., Skov-Petersen, H., 2013. Mapping bicyclists' experiences in Copenhagen. *Journal of Transport Geography* 30, 227–233. doi:10.1016/j.jtrangeo.2013.02.001
- Sperlich, B., Zinner, C., Hébert-Losier, K., Born, D.-P., Holmberg, H.-C., 2012. Biomechanical, cardiorespiratory, metabolic and perceived responses to electrically assisted cycling. *European Journal of Applied Physiology* 112, 4015–4025. doi:10.1007/s00421-012-2382-0
- Statistics Netherlands, 2017a. Ruim 10-duizend snelle e-bikes moeten op de rijbaan [Over 10-thousand speed e-bikes need to go on the motorway]. The Hague.
- Statistics Netherlands, 2017b. CBS StatLine - electronic databank of Statistics Netherlands [online]. Available at: <http://statline.cbs.nl/Statweb/> (accessed 11.11.17).
- Statistics Netherlands, 2016. Transport en mobiliteit 2016 [transport and mobility 2016]. CBS, The Hague.
- Statistics Netherlands, 1992. Gebiedsindelingenregister 1992 [Register of type of area]. Voorburg/Heerlen.
- Steg, L., 2005. Car use: Lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A: Policy and Practice* 39, 147–162. doi:10.1016/j.tra.2004.07.001
- Steg, L., Gifford, R., 2005. Sustainable transportation and quality of life. *Journal of Transport Geography* 13, 59–69. doi:10.1016/j.jtrangeo.2004.11.003
- Steg, L., Nordlund, A., 2013. Models to explain environmental behavior, in: Steg, L., van den Berg, A.E., de Groot, J. (Eds.), *Environmental Psychology - An Introduction*. Wiley-Blackwell, Oxford.
- Stichting BOVAG-RAI Mobiliteit, 2016. Mobiliteit in cijfers tweewielers 2016/2017 [Mobility in numbers two-wheelers 2016/2017]. BOVAG-RAI Foundation, Amsterdam.
- SWOV, 2017. Fact sheet - Pedelecs and speed pedelecs [online]. Available at: <https://www.swov.nl/en/facts-figures/factsheet/pedelecs-and-speed-pedelecs> (accessed 12.7.17).

- Te Brömmelstroet, M., 2014. Sometimes you want people to make the right choices for the right reasons: Potential perversity and jeopardy of behavioural change campaigns in the mobility domain. *Journal of Transport Geography* 39, 141–144. doi:10.1016/j.jtrangeo.2014.07.001
- Te Brömmelstroet, M., Nikolaeva, A., Glaser, M., Skou Nicolaisen, M., Chan, C., 2017. Travelling together alone and alone together : mobility and potential exposure to diversity. *Applied Mobilities* 2, 1–15. doi:10.1080/23800127.2017.1283122
- Thaler, R., Wiederkehr, P., Krutak, R., 2012. Promoting e-mobility in Austria. Presented at ECOMM Frankfurt, 12-6-2012.
- Transport for London, 2017. Mini-Hollands [online]. Available at: <https://tfl.gov.uk/travel-information/improvements-and-projects/cycle-mini-hollands> (accessed 12.7.17).
- Van der Laan, T., 2015. Echt iets voor de patatgeneratie. *de Volkskrant* 22-10–2015.
- Van Duppen, J., Spierings, B., 2013. Retracing trajectories: The embodied experience of cycling, urban sensescapes and the commute between “neighbourhood” and “city” in Utrecht, NL. *Journal of Transport Geography* 30, 234–243. doi:10.1016/j.jtrangeo.2013.02.006
- Van Hagen, M., 2011. Waiting experience at train stations. Eburon Academic Publishers, Delft.
- Van Wee, B., Ettema, D., 2016. Travel behaviour and health: A conceptual model and research agenda. *Journal of Transport & Health* 3, 240–248. doi:10.1016/j.jth.2016.07.003
- Vélosuisse, 2017. Uebersicht fahrradmarkt 2016 [Bicycle market overview 2016]. Vélosuisse, Bern.
- Vlakveld, W.P., Twisk, D., Christoph, M., Boele, M., Sikkema, R., Remy, R., Schwab, A.L., 2015. Speed choice and mental workload of elderly cyclists on e-bikes in simple and complex traffic situations: A field experiment. *Accident Analysis & Prevention* 74, 97–106. doi:10.1016/j.aap.2014.10.018
- Wallack, R.M., 2017. Why are e-bikes all the rage? Because they're plenty of fun to ride. *L.A. Times* 22-10–2017.
- Weber, T., Scaramuzza, G., Schmitt, K.-U., 2014. Evaluation of e-bike accidents in Switzerland. *Accident Analysis & Prevention* 73, 47–52. doi:10.1016/j.aap.2014.07.020
- Wei, V., 2014. E-Bike Markets Maturing in China and US. *BIKE europe* 24-6–2014.
- Weinert, J., Ma, C., Cherry, C., 2007. The transition to electric bikes in China: history and key reasons for rapid growth. *Transportation* 34, 301–318. doi:10.1007/s11116-007-9118-8
- Weinert, J., Ogden, J., Sperling, D., Burke, A., 2008. The future of electric two-wheelers and electric vehicles in China. *Energy Policy* 36, 2544–2555. doi:10.1016/j.enpol.2008.03.008

Weinert, J.X., Burke, A.F., Wei, X., 2007. Lead-acid and lithium-ion batteries for the Chinese electric bike market and implications on future technology advancement. *Journal of Power Sources* 172, 938–945. doi:10.1016/j.jpowsour.2007.05.044

WHO, 2005. Health effects of transport-related air pollution. Copenhagen. doi:10.1080/01422419908228843

WHO, 1999. Charter on Transport, Environment and Health. Copenhagen.

Winslott Hiselius, L., Svensson, Å., 2017. E-bike use in Sweden – CO2 effects due to modal change and municipal promotion strategies. *Journal of Cleaner Production* 141, 818–824. doi:10.1016/j.jclepro.2016.09.141

Wolf, A., Seebauer, S., 2014. Technology adoption of electric bicycles: A survey among early adopters. *Transportation Research Part A: Policy and Practice* 69, 196–211. doi:10.1016/j.tra.2014.08.007

Wright, M., 2011. There is more to “going Dutch” than having a separate cycling lane. *The Guardian* 27-10–2011.

Yang, J., Hu, Y., Du, W., Powis, B., Ozanne-Smith, J., Liao, Y., Li, N., Wu, M., 2014. Unsafe riding practice among electric bikers in Suzhou, China: an observational study. *BMJ Open* 4, e003902–e003902. doi:10.1136/bmjopen-2013-003902

Zhang, Y., Li, Y., Yang, X., Liu, Q., Li, C., 2013. Built environment and household electric bike ownership. *Transportation Research Record: Journal of the Transportation Research Board* 2387, 102–111. doi:10.3141/2387-12

Zhou, J., 2012. Sustainable commute in a car-dominant city: Factors affecting alternative mode choices among university students. *Transportation Research Part A: Policy and Practice* 46, 1013–1029. doi:10.1016/j.tra.2012.04.001

Zwetsloot, J., 2015. E-bike is groen, maar is hij cool genoeg ? *de Volkskrant* 21-10–2015.

