Cycling for Everyone: Lessons from the Netherlands, Denmark, and Germany

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Reasons for everyone to support cycling:

• More daily physical activity and better personal health

• Reduced medical costs for everyone, directly and indirectly

• Improved traffic safety and more livable neighborhoods

• Better Environment: Reduced air, water, and ground pollution; less noise; less disruption of natural ecosystems

• Reduced Greenhouse Gases and global warming

• Improved accessibility and increased social and economic integration of all groups

• Reduced traffic congestion, parking needs, energy use

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Walking and Cycling: the **MOST** sustainable transport modes

- **MOST environmentally friendly:**
  - Virtually no pollution at all
  - Almost no nonrenewable resources used

- **MOST equitable:**
  - Financially affordable by virtually everyone
  - Physically possible by all but the severely disabled

- **MOST economical:**
  - Minimal private and public costs
  - Although they take more time, they provide exercise that reduces medical costs and greatly extends our healthy life expectancy
CYCLING IS DIVINE!!

How Catholic nuns get around in Muenster, Germany

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Lots of Potential for Increased Cycling in the USA: Short trips

Many daily trips in American urban areas are short enough to make by bike!

• 25% of all trips in U.S. metro areas were a mile or shorter in 2001
• 40% of all trips were shorter than two miles
Lots of Potential for Increased Cycling in the USA:

Almost EVERYONE could bike!

- Cycling is possible at any age, except for very young and very old
- Women can cycle as well as men
- Cycling possible for wide range of skills and physical fitness
- Cycling affordable by everyone
Cycling and walking can provide valuable physical activity for almost everyone

- Both for daily, practical travel and for recreation
- Cheaper, easier, and more dependable than formal exercise routines that require trips to gym, home exercise equipment, organized sports events
- Can be integrated into daily lifestyle since cycling and walking can be used for purposeful travel and thus achieve practical objectives
- Urgent need to increase physical activity levels of Americans
Crucial importance of regular physical exercise:

- Obviously, the daily physical exercise of walking and cycling for practical travel helps burn up calories and helps avoid the problems of **overweight and obesity**

- Moreover:

  “Whether normal-weight, overweight, or obese, physically inactive persons are 2 to 3 times more likely to die prematurely.”

Huge Health Benefits of Even Small Increases in Physical Activity

Obesity Rate by Country (Body Mass Index ≥ 30)

Does speaking English make us fat?


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Obesity Trends* Among U.S. Adults
BRFSS, 1990, 1995, 2005
(*BMI ≥ 30, or about 30 lbs overweight for 5’4” person)

1990

1995

2005

No Data          <10%           10%–14% 15%–19%           20%–24%          25%–29%          ≥30%

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Worsening Obesity Epidemic among American Children and Adolescents, 1963-2002 (% with body mass index of 30+)

SOURCE: CDC/NCHS, NHES and NHANES
Trend in Obese Children vs. Rate of Biking and Walking to School

- Percent of kids who bike or walk to school
- Percent of kids who are obese

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Does auto-dependency make us fat? Obesity falls sharply with increased walking, cycling, and transit use!
Bike share of trips in Europe, North America, and Australia
(Percent of total trips by bicycle)
Kilometers cycled per inhabitant per day in Europe and USA
Most cycling in Europe is for daily, utilitarian trips compared to mostly recreational cycling in the USA.
Lots of women cycle in Denmark!

Photo: Susan Handy

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Women’s share of bike trips in Europe, Australia, and North America

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent of Bike Trips by Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>21%</td>
</tr>
<tr>
<td>USA</td>
<td>25%</td>
</tr>
<tr>
<td>UK</td>
<td>29%</td>
</tr>
<tr>
<td>Canada</td>
<td>30%</td>
</tr>
<tr>
<td>Denmark</td>
<td>45%</td>
</tr>
<tr>
<td>Germany</td>
<td>49%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>55%</td>
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</tbody>
</table>
Cycling can start at a very young age
And we can keep cycling all life long!!!
Bike Share of Local Trips by Age Group in the USA, Germany, Denmark, and the Netherlands (2000-2002)


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Make Cycling Safe for Everyone!

• Especially important for the young, the old, for anyone with disabilities, for the timid or risk-averse
• Women more sensitive to safety than men
• Safety of cycling in the Netherlands, Denmark, and Germany helps explain why everyone cycles there
Cycling Fatality Rates in North America and Europe, 2002
(cyclist deaths per 100 million km cycled)

The Dutch do NOT wear safety helmets, yet have the safest cycling in the world!
Cycling Safety in Muenster, Germany

- Population of 265,000
- 135 million bike trips per year (370,000 per day)
- Bike share of total trips: 35%
- Most complete and most separate bicycling facilities of any German city
- Only 222 cyclist injuries per year:

ONE CYCLING INJURY PER 608,000 BIKE TRIPS!
SAFETY IN NUMBERS

• As levels of cycling and walking increase, injury and fatality rates per trip and per km traveled fall dramatically.

• Fatality rates per trip and per km are much lower for countries and cities with high bicycling and walking shares of total travel, and fatality rates fall for any given country or city as cycling and walking levels rise.

Fate of Cycling
Determined by Public Policies

• Pro-car policies in European cities in 1950s and 1960s caused huge decline in cycling
• Dramatic policy turn-around since 1970s to limit car use and promote cycling, walking, and public transport in Dutch, Danish, and German cities
• Cycling levels rose sharply, doubling or tripling in some cities (such as Munich, Cologne, and Berlin)
• WHAT did these cities do to increase cycling?
# German Cycling Boom Engineered by Explicit Shifts in Transport Policy in 1970s

<table>
<thead>
<tr>
<th>City</th>
<th>Time Period</th>
<th>Change in Bicycle Modal Split Share</th>
<th>Percentage Increase in Bicycle Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munich</td>
<td>1976 to 1996</td>
<td>6% to 13%</td>
<td>+117%</td>
</tr>
<tr>
<td>Nuremberg</td>
<td>1976 to 2001</td>
<td>4% to 9%</td>
<td>+125%</td>
</tr>
<tr>
<td>Cologne</td>
<td>1976 to 1998</td>
<td>6% to 12%</td>
<td>+100%</td>
</tr>
<tr>
<td>Freiburg</td>
<td>1976 to 1998</td>
<td>12% to 19%</td>
<td>+58%</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>1976 to 2000</td>
<td>2% to 6%</td>
<td>+200%</td>
</tr>
<tr>
<td>Bremen</td>
<td>1976 to 1997</td>
<td>16% to 21%</td>
<td>+31%</td>
</tr>
<tr>
<td>Muenster</td>
<td>1976 to 2001</td>
<td>29% to 35%</td>
<td>+21%</td>
</tr>
<tr>
<td>Average for all urban areas in Western Germany</td>
<td>1972 to 2002</td>
<td>8% to 10%</td>
<td>+25%</td>
</tr>
</tbody>
</table>

How to Increase Cycling by Broadening its Appeal to all Groups

• Better cycling facilities (incl. bike-friendly roads!)
• Integration of bike with public transport
• Traffic calming of residential neighborhoods
• Mixed-use zoning and improved urban design
• Restrictions on motor vehicle use
• Traffic education
• Traffic regulations and enforcement
Extensive car-free districts ideal for walking and cycling
Bikes and buses take up much less space than cars!!

Demonstration on main street of Muenster how much space cars take compared to buses or bikes to transport the same number of people

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Peaceful co-existence of trams, bicyclists, and pedestrians in Freiburg’s center
Car-free intermodal harmony in Amsterdam
Car-free zones in the USA: Davis, California
Keeping out cars in Davis
Fahrradstrassen in Germany, bicycle streets where cyclists have absolute priority over cars for entire width of roadway
Bicycling facilities in Berlin, Germany’s capital and largest city

- 860 km of completely separate bike paths
- 60 km of bike lanes on streets
- 70 km of combined bike/bus lanes on streets
- 100 km of combined pedestrian/bike paths
- 3,800 km of city streets (72%) are traffic calmed, with speed limit of 30km/hr or less, and thus ideal for cycling on street, without any special lanes or paths

10% of all trips in Berlin are by bike

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Muenster offers 280 km of separate bike lanes and paths, and shared bus-bike lanes.
Two-way bike path in middle of pedestrian zone in Amsterdam
Bike lanes and paths in Amsterdam designed to reduce traffic conflicts with other modes
This 6 km beltway encircles central city and connects 16 major bike paths radiating outward toward the suburbs and 26 bike paths and lanes leading to Cathedral Square.

Note exclusive cycle path in middle and completely separate pedestrian walkways on both sides.
Regular laser inspection of bikeway surfaces for preventive maintenance!

Bike lanes sprayed with salt water and cleared before rest of roadway!

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Special contraflow lanes in Toronto and Melbourne that permit cyclists to travel in both directions.
Relaxing traffic restrictions for cyclists by permitting bi-directional travel on one-way streets, turns, and thru-travel for bikes where prohibited for cars.
Convenient bike cut-thru for cyclists in Melbourne

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Some Australian successes: Extensive ped-bike cut-throughs and dead-ends for cars in Newtown (Sydney)

(on Car-free John’s daily route to University of Sydney)
Bike path along major arterial in Davis

House knocked down to build cut-thru for cyclists in Davis
Combined pedestrian/bike paths in Muenster

Cyclists and pedestrians can peacefully and safety use the same paths!
“Cut-thru” short cut for cyclists in residential area

Short-cut for cyclists between two adjacent streets to avoid round-about route that would involve crossing street and making two left turns
Most new suburban developments in Germany and the Netherlands have sidewalks and cycle paths
CRUCIAL to have full connectivity of cycling facilities! Usually lacking in North America

Extensive, fully-integrated bikeway network in Freiburg, Germany
Free internet bike trip planning in Berlin

• Cyclists enter origin, intermediate stops and final destination of their intended bike trips

• Cyclists can indicate preferences for route speeds, whether main streets or side roads, type of pavement, whether on separate bikeways, light or heavy traffic, through parks, etc.

• Program determines optimal route, shows route on map, and provides exact directions, segment by segment

• For recommended route, program calculates the total trip length, total trip time, and number of traffic lights encountered
Recommended route appears **in red** on computer screen, as shown below, along with trip details shown at top of screen.
Bike Route Planning by Mobile Phone, with suggested route shown on LCD display
Bike bridge along Yarra River in Melbourne

Bike bridge along Ems River in Muenster

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Bike bridge in Davis
Bike lane in Davis with parallel off-street path
Lots of obstacles to bicycling

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Brisbane’s floating bikeway
Floating Bike Path in Portland, Oregon

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Special traffic signals and signs give priority to cyclists
Bike lane, advance stop line, and priority signal for cyclists in Muenster
Special bike lane to permit direct access to intersection
Left-hand turn, in two stages, with special waiting space reserved for cyclists, and advance green light for cyclists.
Highly visible red bike lanes for intersection crossings on all four sides
Four-way all-green signal for cyclists in Portland

How to Use the New Bicycle Signal

1. TO GET A GREEN LIGHT
   Place your bicycle on the marking on the sidewalk, with your wheels directly on the lines.

2. When the bicycle signal here is green...

3. ...cyclists can cross the intersection as shown here.

Bike sensor in pavement

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Bike lane approach to intersection in Davis

Note two green bike-only traffic signals.

Bike sensors in pavement trigger green light automatically

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Denmark: Ubiquitous short-cuts for right-hand turns and full-speed ahead for cyclists at red lights at T-intersections

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Green wave for *cyclists* in Odense, Denmark

Troels Andersen, “Cycling in Odense, Denmark”
Green wave for *cyclists* in Copenhagen, Denmark
Innovative directional signs and bike trip counters in Denmark
Convenient air pumps for bikes throughout Odense

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Traffic Calming of Residential Neighborhoods

- Speed limited *by law* to 30km per hour (19mph) or less

- *Physical measures* that force cars to slow down:
  - Road narrowing, zigzag routing, chicanes
  - Raised intersections and crosswalks
  - Traffic circles
  - Speed humps and bumps
  - Mid-block closures and artificial dead-ends
  - Bulb-outs at intersections and crosswalks, with sidewalk widening
Traffic Calming Measures

Traffic Calming

Volume Control Measures
- Full & partial closures
- Diverters
- Median barriers
- Forced turn islands

Speed Control Measures

Active Measures
- Speed Humps/Tables
- Raised Crosswalks
- Raised Intersections
- Speed Cushions

Horizontal Deflection Measures
- Roundabouts
- Mini Roundabouts
- Chicanes
- Alternate Side Parking
- Realigned Intersection
- Center Island Medians

Constrictions
- Curb Extensions
- Neck downs
- Chokers
- Slow Points
- Gateways
- Ped. Refuge Islands

Passive Measures
- On-Street Parking
- Bicycle Lanes
- Narrowed Lanes
- Streetscape
- Speed Gun w/VMS
- Special Signs
- Forced Perspective
- Rumble Strips
- Rumble Stripes
- Color Pavement
- Textured Pavement
- Textured Markings
3,800 km of traffic-calmed streets in Berlin: ideal for cycling

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Traffic Calming of Residential Neighborhoods

Improves safety and encourages more walking and cycling
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Bike and Ride

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Convenient and secure parking for 3,500 bikes at main train station in Muenster
Bike Wash at Muenster Bike Station
Millennium Park Bike Station, Chicago
Deluxe bike parking even at bus stops!
Simple but convenient bike parking even at bus stops

Bike and Ride
Over 50,000 buses in the USA now come equipped with bike racks, as here in Seattle.
bike and ride in Davis
On-street car parking in German and Dutch cities often replaced by bike parking
Conversion of car parking to bike parking in San Francisco

Also being adopted in other US cities

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Cycling Can Serve Many Different Travel Purposes

- Commuting to work
- Traveling to school or university
- Shopping
- Recreation and exercise
- Visiting friends, running errands, etc.
Transporting kids in Copenhagen: the famous Christiania bike
Police are friendlier and more effective on bikes!

Melbourne Bike Police

Foto by Damon Rao

NSW Police patrolling coastal path from Bondi to Coogee

Foto by John Pucher who nagged these bike police to pose several times for the perfect shot! And they are still smiling!!
Postal deliveries by bike in Germany and Denmark
Many potential uses of bikes

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Cycling, eating, and drinking wine along 80km of the *car-free* German Wine Route every August

On Sundays in August, *cars are banned* from 80km of the German Wine Route connecting dozens of scenic wine villages in southwest Germany.

Why not do this in Napa and Sonoma Counties?
MARKETING CYCLING TO ALL SOCIAL GROUPS

• Very diverse needs of different groups
• Need to tailor cycling facilities, policies, and programs to serve this broad range
• Be as inclusive as possible
• Need good facilities as well as active marketing of cycling, with different approaches to each potential group of cyclists
Cycling Duckie for very young kids in Odense, Denmark
Cycling competitions for somewhat older kids in Odense, Denmark

Troels Andersen, “Cycling in Odense, Denmark”

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Most German and Dutch children take cycling lessons by the 3rd or 4th grade and must pass a police-administered cycling safety test!

Cycling training and testing course in Berlin

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German traffic laws generally favor cyclists and pedestrians over motorists.
For Employees: Company bicycles provided by firms for business trips during the day

The perfect zero emissions vehicles!!

Troels Andersen, “Cycling in Odense, Denmark”
Get on a bike and lose weight!

“Get rid of the sack” Campaign aimed at overweight middle-aged men with pot bellies

Troels Andersen, “Cycling in Odense, Denmark”
Guided Bicycle Tours for Seniors

Troels Andersen, “Cycling in Odense, Denmark”
CONCLUSIONS

• Almost everyone has the potential to cycle
• Many local trips in American cities are short enough to cover by bike
• Crucial to design cycling policies and programs for everyone!
• Must cater to huge range of cycling preferences and meet the diverse needs of different groups
• Must be inclusive in cycling policies and programs to encourage widespread cycling and thus generate widespread public and political support