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Taking US transportation professionals to European cycling cities: does it matter?

Cortney Mild, Marc Schlossberg

Introduction

Over the past few decades, Americans have started using bicycles for transportation more often. Cities such as Portland, Oregon, for example, have implemented a wide range of pro-bicycle measures and have experienced the greatest increase in rates of cycling in the US (Pucher, Buehler, & Seinen, 2011). Although a few dozen US cities have made significant efforts and achievements around cycling, they do not begin to approach the fully integrated policy packages and rates of cycling seen in some European cities in The Netherlands, Denmark, and Germany where top bicycle modal shares reach 40% (Pucher & Buehler, 2007). Contrary to popular myth, these European cities have not always been world-class bicycling environments (Pucher & Buehler, 2008) suggesting that US cities may also have the potential to significantly increase rates of bicycle commuting.

There are many common ways that transatlantic lessons are traditionally shared, such as professional reports, academic case studies, sharing best practices and design manuals at international conferences, or bringing US professionals to world-class bicycling cities. This last technique is exactly what the Bikes Belong Foundation and the Federal Highway Administration (FHWA) have used over the last two decades, giving professionals the opportunity to experience how bicycle transportation functions as part of an integrated, multi-modal, balanced transportation system. Their goal is to give policymakers and transportation professionals the opportunity to learn lessons they can apply in the US to encourage bicycle transportation.

While the goal is clear, there has been no research to date regarding the impact of these study tours on professionals and their US communities. The purpose of this research is to assess the impact of these study tours by investigating major lessons learned, how participants implemented lessons, and barriers impeding their implementation. The intention of this research is not to determine if participating in a

study tour is a necessary prerequisite for developing a world-class cycling city in the US. Rather, the intention of this research is to evaluate study tours as one of a milieu of techniques for sharing transatlantic lessons and promoting bicycle transportation in US cities. There are many potential paths other than travelling to the world's best cycling cities to improve one's cycling systems, such as learning directly from staff in other U.S. cities, accessing the latest research and expanding set of books on cycling, viewing the large expanse of on-line videos, bringing in consultants, or learning from other professionals at conferences, for example. Learning by seeing and doing, however, is one approach that has been supported by Bikes Belong and the FHWA, and assessing the impact of what can be considered a more costly investment than just attending a conference or browsing the internet deserves some assessment and evaluation. The remainder of this paper explores the impact of experiential learning within the setting of robust European cycling cities on transportation professionals interested in improving cycling infrastructure in their own cities in the United States.

Background

Bicycle Commuting in the US

Bicycling is on the rise in the US. The percent of total trips taken by bike nearly doubled between 1977 and 2009 (0.6% to 1%), and the number of daily bike commuters increased significantly between 2000 and 2009 alone (488,000 to 766,000) (USDOT, 2004, 2010a; USDOC, 1980-2000, 2009, 2010). The US Department of Transportation (USDOT) has recently embraced cycling as an important part of the overall transportation mix as a mode that can "improve individual health as well as reduce air pollution, carbon emissions, congestion, noise, traffic dangers, and other harmful impacts of car use" (Pucher, Dill, & Handy, 2010). At the 2010 National Bike Summit, President Obama's Transportation Secretary, Republican Ray LaHood asserted that bicycling is central to livable communities. His department issued the US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations indicating that "walking and biking should

not be an afterthought in roadway design" (USDOT, 2010b).

The modern era of federal support of bicycling began in 1991 with the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), raising annual federal funding for walking and biking from \$5 million to \$150 million per year from 1992 to 1998. Subsequently, the Transportation Equity Act for the 21st Century (TEA21) and the Safe, Accountable, Flexible, Efficient, Transportation Equity Act (SAFETEA-LU) built on this momentum and increased funding (Pucher, Buehler, & Seinen, 2011). While the most recent transportation bill, MAP-21, is largely considered a step backward for supporting bicycle transportation, some cities may have crossed their own tipping point where bicycle planning will carry on despite the reduced federal support.

Growing rates of cycling and pro-bike policies may be indicative of a "bicycling renaissance" in the United States, albeit not distributed evenly. Rather, "the boom in cycling... has been limited to a few dozen cities, which have implemented a wide range of programs to aggressively promote cycling" (Pucher, Buehler, & Seinen, 2011)

Of all the US cities, Portland may have transitioned most significantly toward bicycle supportive infrastructure and policies. Portland experienced a 5-fold increase in bike mode share between 1990 and 2009 achieving the highest rate of cycling in North America (5.8%). On the infrastructure side, "The cornerstone of Portland's policy package is the steadily expanding and improving bikeway network, consisting of bike paths and lanes as well as superbly designed bike boulevards through residential neighborhoods". Portland is also increasing the supply of bicycle parking, instituting education and marketing programs, organizing community cycling events, enforcing cyclists' legal rights to the roadway, and offering incentives to employers who provide end-of-trip facilities (Pucher, Buehler, & Seinen, 2011). It is this comprehensive approach to infrastructure and culture, which most closely resembles the approach of top European cities for cycling that led to Portland's

5-fold increase in cycling rates.

The success of Portland and other US cities that have begun to implement a wide range of pro-bike measures demonstrate that US cities may have the potential to significantly increase rates of bicycle commuting. While Portland's efforts and accomplishments are significant, they do not begin to approach the fully integrated policy packages and cycling rates in some European cities. Thus, these European cities may still offer valuable lessons for the US (Pucher & Buehler, 2007).

Top European Cycling Cities

Cycling rates are highest in the Netherlands, where 27% of all trips are made by bike. Many Dutch cities achieve even higher levels of cycling. In Amsterdam 50% of residents made daily bicycle trips in 2003. In Groningen, 59% of local trips are made by bicycle. Denmark is second to the Netherlands, with cycling rates of 18%. Copenhagen, a Danish city with many large streets like those in the US, achieved cycling rates of 20%, with 36% of work trips by bike in 2005. Even Germany, home of the Autobahn, is closely tied with Finland and Sweden with 10% of trips by bike (Pucher & Buehler, 2007). Rates of cycling in these countries are distributed fairly evenly across a range of demographics including gender, income, and age. All types of people bicycle in the Netherlands, Denmark, and Germany (Pucher & Buehler, 2008).

The "universality" of cycling is due in part to the safety of cycling in these countries. Cyclist fatality rates are lowest in the Netherlands, despite having the highest cycling rates. Averaged over the years 2002 to 2005, the number of bicyclists killed per 100 million km cycled was 1.1 in the Netherlands, 1.5 in Denmark, 1.7 in Germany, and 5.8 in the US. Evidence suggests that safer bicycling environments increase the rates of cycling, (Pucher & Buehler, 2007) and motorists are less likely to collide with bicyclists when there are more people bicycling (Jacobsen, 2003). This phenomenon is commonly referred to as "safety in numbers"; (Pucher & Buehler, 2007) that is, the more people there are biking, the safer it is.

Although cities are “ultimately responsible for implementing the key transport and land use policies that establish the necessary supportive environment for cycling to thrive”, (Pucher & Buehler, 2007) since the 1980s, the central governments of all three countries have become increasingly involved in cycling by promoting research, disseminating best practices, creating National Bicycling Master Plans, and funding innovative projects. Prior to the 1970s, cycling levels had fallen in these countries, but oil shortages and environmental awakening prompted explicit transportation and urban planning to support bicycles as an important transportation mode (Pucher & Buehler, 2008). These European cities were not always “cycling cities” but became so through deliberate policies that created balanced transportation systems integrated into an urban environment conducive to bicycle transportation.

Study Tours as Experiential Learning

Taking professionals to Europe to learn about cycling firsthand involves experiential learning. Literature on educational theory indicates that learning is most effective when linked with action and experience (Dewey, 1938; Revans, 1998). Experiential learning in unfamiliar environments encourages students to question the origins, causes, and implications of cultural paradigms and take action for social change (Mezirow, 1998).

Educational theorists David Kolb and Ronald Fry delineate four key aspects of effective experiential learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. During these stages, learners engage “fully and openly” in new experiences, “reflect on and observe these experiences from many perspectives”, “create concepts that integrate ... observations into logically sound theories”, and “use these theories to make decisions and solve problems” (Kolb & Fry, 1975).

Kolb and Fry’s description of effective experiential learning has obvious connections to the hands-on learning tours sponsored by FHWA and Bikes Belong, where the goal is to immerse participants in a new environment in the hopes that it leads eventually to active experimentation with

new insights that have been learned and experienced. Yet, there is no research to date that has linked theories of experiential learning to bicycle transportation system change. Analyzing study tours that allow American professionals to experience how bicycles are integrated into some European transportation systems is intended to fill that gap.

Methods

The purpose of this research is to determine how study tours impact participants and their communities. Study tours are one technique that the Bikes Belong Foundation and FHWA utilize to expose transportation professionals and politicians to these cities in Europe where bicycling is more “normal”. The Bikes Belong Foundation is the non-profit branch of the Bikes Belong Coalition, a national organization for bicycle retailers who work to “put more people on bicycles more often” (“What We Do,” 2012). Bikes Belong has led separate tours for representatives from Madison, Wisconsin and the San Francisco Bay Area (Bikes Belong, 2011).

FHWA is concerned with design, construction, maintenance, and safety of the nation’s highways (“About FHWA,” n.d.). FHWA has supported transportation professionals from across the nation on a study tour to Europe focused on bicyclist and pedestrian safety and mobility, (Fischer et al., 2010) although this program is currently suspended.

Twenty-five US transportation professionals and politicians participated in one of the three European study tours organized by either Bikes Belong or FHWA between 2009 and 2010, and eleven were interviewed for this study. Data was collected through semi-structured interviews conducted over the phone and digitally recorded using Google voice. Interviews lasted approximately 30 minutes. Interviewees were chosen based on being representative of the diversity of the larger study population. FHWA participants included representatives from the federal, state, and local levels in three different states while Bikes Belong participants included both politicians and transportation professionals from April and August 2010 tours. Table 1 outlines the characteristics

Tour	Cities visited	Participant	Position at time of tour
FHWA May 2009	Denmark Copenhagen & Nakskov Germany Berlin & Potsdam Sweden Lund & Malmö Switzerland Bern & Winterthur United Kingdom Bristol & London	Ernie Blais	Division administrator, FHWA Vermont Division
		Cindy Engelhart	Bicycle/pedestrian transportation engineer, Northern Virginia District, Virginia Department of Transportation
		David Henderson	Bicycle/pedestrian coordinator, Miami-Dade County Metropolitan Planning Organization
		Jon Kaplan	Bicycle/pedestrian program manager, Local Transportation Facilities; Vermont Agency of Transportation
Bikes Belong April 2010	Germany Muenster The Netherlands Amsterdam, Nijmegen, s'Hertogenbosch, & Utrecht	Peter Bock	Former state legislator, Wisconsin state assembly
		Dave Ciezlewicz	Mayor, City of Madison
		Tony Fernandez	City engineer, City of Madison
		Dan McCormick	Traffic engineer
Bikes Belong August 2010	The Netherlands Amsterdam, The Hague, Rotterdam, & Utrecht	David Chiu	President, San Francisco Board of Supervisors
		Ed Reiskin	Director, Department of Public Works; City of San Francisco
		Bridget Smith	Director, Livable Streets Program; San Francisco Municipal Transportation Agency

Table 1. Outline of study tours and interviewees

of the interviewees and the tours in which they participated.

Participants were questioned about their motivation for participating in the study tour, their experience of bicycle transportation in Europe, how they implemented lessons in the US, barriers to implementation upon return, what would help them better implement lessons learned, and their major recommendations for increasing bicycle transportation in the US. Follow-up questions were used to clarify responses and encourage participants to elaborate. Audio recordings of the interviews were transcribed and information provided by interviewees was grouped thematically to identify similarities and differences by study tour, professional affiliation, and city base.

Two pilot interviews were conducted with national experts Jay Wallajasper and Gary Obery to test the data collection instrument and the audio recording equipment. Mr. Wallajasper is a freelance writer and editor who joined Bikes Belong's August 2010 tour. Mr. Obery is an alternative modes traffic engineer with the Oregon Department of Transportation, who attended the Velo-city conference in Copenhagen, Denmark in June, 2010.

Additional interviews were conducted with Gabe Rousseau (FHWA) and Zach Vanderkooy (Bikes Belong), organizers of the respective tours, as well as Charlie Zegeer, associate director of the University of North Carolina's Highway Safety Research Center. Zegeer participated in FHWA tours in 1993 and 2009. These interviews provided background and context for the study. The tour organizers provided

additional insight into their intentions for creating the tours.

Findings

Data from the interviews can be grouped into four main categories: lesson learned, lessons implemented, lessons that participants hope to implement, and barriers to implementation.

Lessons Learned

Participants shared major lessons from their study tours regarding what they saw, heard about, and experienced. Their responses can be grouped into these broad categories: general observations, policies, infrastructure, and soft measures.

General Observations

Sheer Number of Cyclists Participants were overwhelmed by the sheer number of people commuting by bicycle. Peter Bock, former representative to the Wisconsin State Assembly was “very impressed with the high numbers of people who use a bicycle to do their daily routines, whether that’s going to work, going to the store, or traveling to the nearest town”. Ernie Blais, Division Administrator of FHWA’s New Jersey Division, described, “We started off in Copenhagen, and it was just amazing the number of people that use bicycles for transportation year round, and the weather there is comparable to many of our Mid-western and Northeastern cities”.

Bicycling as a Normal, Everyday Activity

Another commonly-expressed observation was that commuting by bicycle seemed to be an ordinary, everyday activity for all types of people in the cities visited. Jon Kaplan, Bicycle and Pedestrian Program Manager, Vermont Agency of Transportation, saw “women in skirts and heels and guys in business suits” on bicycles. Anthony Fernandez, Project Engineer, City Engineering, City of Madison shared that “biking can be as ordinary as driving a car. People of all ages, athletic abilities, genders, and economic statuses will get on a bike as just an ordinary thing to do ... whereas here I tend to associate it with a little bit more committed group of people who are quite aware that they are swimming against the stream”. Participants saw people of all ages, sexes, and socio-economic

classes riding bikes as a normal way of getting around.

Policy

Conscious and Balanced Approach Toward Transportation System Planning Another common theme was a realization that cities achieved high rates of bicycle commuting through conscious policy decisions. Dave Cieslewicz, former Mayor, City of Madison, recognizes that people in the US assume that the Netherlands has high rates of bicycling “because the price of gas is so high and the land is flat”. He acknowledges that the Netherlands “does have some built in advantages”, but that it achieved high rates of cycling “by making conscious decisions about bicycle infrastructure and policies”.

Participants also observed that the cities take a balanced approach towards transportation system planning. Jon Kaplan noted that bicycle transportation was not “a stand-alone program” overseen by one or two bike planners. Rather, all city engineers and planners integrated bicycling into their overall transportation work. Dan McCormick, Traffic Operations Engineer, City of Madison Traffic Engineering Division, commented, “the bicycle was a third feature on every street and at every intersection”. Germany and the Netherlands provide traffic signals not only for motorists and pedestrians, but also cyclists. He contrasted that with US streets, which are “ambiguous about bicycles”. Participants learned that bicycling is not a preexisting part of the culture, but has been promoted through conscious policy decisions and a balanced approach towards transportation system planning.

Infrastructure

Complete Bicycle Networks Participants learned that the cities visited are committed to building complete networks of bicycle facilities rather than project-by-project bicycle enhancements. David Henderson, Bicycle/Pedestrian Coordinator, Miami-Dade County Metropolitan Planning Organization, noticed these cities were committed to “connect(ing) origins and destinations and build(ing) a robust network” for bicyclists. Dan McCormick explained, “there was never a facility that

was built but not connected". He contrasted the "contiguous" bicycle networks he saw in Europe with the "scatter shot of projects" in Madison that are "not connected in a strong way".

On-street Separated Facilities Participants noted the importance of separating automobiles from bicyclists on high-volume, high-speed streets. Peter Bock expressed, "Segregat(ing) the bike lane with a curb or having it slightly elevated, right next to the road" provides a sense of security to cyclists. Cindy Engelhart, Northern Virginia District Bicycle/Pedestrian Coordinator, learned about cycle track intersection design from Copenhagen. Cycle tracks in Copenhagen are "raised about four inches (above the roadway), but four inches below the sidewalk". Copenhagen found a reduction in the crashes on cycle tracks after dropping them down to the road level at intersections so automobiles could merge into the cycle track. This lesson resonated with Ms. Engelhart because she is hearing more discussion about cycle tracks among US transportation professionals.

Colored Pavement Participants frequently referred to the use of colored pavement to delineate bicycle facilities. Peter Bock described that cyclists sense that colored pavement is their "territory" and drivers are "very aware that it is a different surface". Bridget Smith noticed how color "functioned to brand the bike space", creating a "visually intuitive" system that is "easily understood by all of the users".

Bike Parking The third infrastructural element that arose as a common theme is bike parking. Anthony Fernandez learned that "bike parking needs to keep pace with bike usage, particularly with an emphasis on preventing theft". Fernandez "never thought of bike parking as a huge issue", but he realized that "as the number of bikers goes up it clearly is".

Soft measures

Marketing/Encouragement Although participants mentioned a wide range of soft measures for promoting bicycle transportation, such as education, evaluation, and providing access to bicycles equipped for everyday activities, only marketing arose as a common theme across multiple partic-

ipants. Participants realized the cities visited actively encourage bicycle transportation with techniques such as incentives for cycling and advertising campaigns. Dan McCormick expressed that European cities market bicycling as "trendy and normal", which seems to both encourage a wide array of users and provide reinforcement to those already cycling.

Experiential Learning Successes: Lessons Implemented

Ultimately, the purpose of these study tours is to influence the professional work back home to increase the safety, comfort, and ultimately the number of people who use a bicycle for some of their daily trips. Participants most commonly implemented infrastructure improvements upon returning home, perhaps because of the direct, firsthand experience with complete networks of low-stress bicycling routes on the study tours.

Colored Pavement

Participants on both FHWA and Bikes Belong tours experienced the benefit of colored pavement in communicating to all road users where people on bikes should be. Upon return, participants from Madison used colored pavement to delineate a separate crossing for bikes adjacent to an existing crosswalk in a complicated intersection. After this redesign the City received "great feedback from bikers that suddenly they understand the intersection".

Bridget Smith explained that San Francisco had been using some colored pavement before receiving permission from the federal government. She was forced to convince one of San Francisco's engineers that color was "decorative". The City had been "locked in a discussion with the state traffic control device committee," which said color was an experimental traffic control device, and the City would be limited in the way it could use color. Now that colored pavement is allowed by FHWA as a temporary provision, it is easier to implement. After experiencing the extensive use of color in the study tour locations and with fewer regulatory barriers, San Francisco started to use color to "alert bicyclists to weaving situations with cars" upon return.

The shift in federal standards on colored pavement was due in part to lessons implemented by FHWA study tour participants. Participants identified infrastructure innovations, such as colored pavement for bicycle facilities, which would require changes to the Manual on Uniform Traffic Control Devices (MUTCD) to be approved in the US. Now colored pavement is allowed as a temporary provision for cities and states nationwide.

Hope to Implement

Firsthand experience with the use of colored pavement in Europe helped tour participants to implement these facilities in the US. That said, colored pavement may have been easier to implement than other infrastructure innovations because it is relatively inexpensive compared to other facilities and is a reasonable step forward from current US practice of striping bike lanes for on-street bicycle facilities, which involves little else than paint on the road, but participants experienced a greater range of facilities and more comprehensive systems and thus were interested in doing more than using color at potential modal conflict points.

Cycle Tracks

Of all the experiences participants had, cycle tracks were overwhelmingly mentioned as the key for future implementation and eventual success in increasing the number of trips by bike. Dan McCormick explained that Madison has “type A cyclists who will ride in any conditions” and other people who feel safe only on off-street paths. McCormick suggests that ridership will not increase dramatically until the City builds cycle tracks. Similarly David Henderson suggested that even if US cities “fully implemented the kinds of facilities that are commonly applied in the US”, they would appeal to less than 20% of the population. Striping complete networks of bike lanes would result in a six to eight percent mode shift. Developing facilities with broader appeal” such as “buffered bike lanes, cycle tracks, and protected bike lanes” is more challenging.

Guided partly by her experience on a study tour, Cindy Engelhart is working with a team to create national guidance for cycle track design, which she says goes

hand-in-hand with bicycle signals. As of 2012, though, the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities does not contain finalized guidance on cycle tracks and the MUTCD does not contain finalized guidance on bicycle signals, despite the successful use of this infrastructure in the study tour cities for decades.

Barriers to Greater Implementation

Participants were also asked about barriers to implementing some of their lessons from the tour and what would help them to overcome these barriers. Four barriers arose commonly: lack of funding for bicycle projects, regulations that allow innovative facilities, expertise on bicycle facility design, and public acceptance.

Funding

Multiple participants mentioned lack of funding for bicycle projects as a barrier. Dave Cieslewicz hopes for long-term, consistent, dedicated federal funding for bicycle transportation. “It could be a small fraction of the money spent on highways but a little bit ... would go a long way”. With the new transportation act, Cieslewicz was hoping the federal government would establish a new program for bicycle transportation with enough funding “to make some real changes”.

Peter Bock described the challenge of securing government funding for cycling when America is “so in love with automobiles”, prioritizing them over bicycles and pedestrians. “We have the resources”, he says, but “we prioritize building roads and highways and things to benefit vehicular traffic.” Although Madison is “more progressive than other places” in terms of spending on bicycle infrastructure, the City does not have sufficient resources to “designate as many bike paths or lanes as (it) would like.”

Ed Reiskin, San Francisco Municipal Transportation Agency’s Director of Transportation, believes that better data on cycling’s benefits to the economy, business, traffic, and health would generate greater political support and subsequently more funding for bicycle transportation. “Sometimes cycling can be hard to sell here,” he ex-

plains, “because it seems like you’re trying to spend scarce transportation dollars to appease a very small portion of the population who tend to be very strong advocates that people see as on the fringe”. If people do not understand the benefits of bicycle transportation, they “tend to see these investments as narrowly benefiting a small constituency rather than (contributing to) the large benefits that we get when people are on bicycles instead of in cars taking up space and polluting the air”.

Regulations

Regulatory barriers also arose as a common deterrent to greater implementation of lessons from the study tours. Jon Kaplan mentioned the difficulty of implementing innovations like bicycle-specific traffic signals because “it’s hard to find something that complies with the MUTCD”. Despite such signals being used with success in the study tour locations, U.S. transportation officials are reluctant to use infrastructure not explicitly approved within the MUTCD or the AASHTO guide. “Until the MUTCD adopts interim approval of more (facilities) or goes through another revision”, there will be very little experimentation with bicycle-specific innovations.

Anthony Fernandez suggests that “proven standards” could help transportation professionals implement unconventional cross-sections such as “bicycle boulevards, bike preferential streets, and contra-flow lanes. Engineers are conservative by nature”, he explains, “and don’t want to go out on a limb on anything that’s not tested or in a manual”. He considers the National Association of City Transportation Officials’ (NACTO) urban bikeway design guide to be “a good step in that direction”. Fernandez says, “Anything that helps develop some standards like the CROW manual gives designers a place to stand so it doesn’t look like they’re inventing it as they go along”. CROW, the Dutch national information and technology platform for infrastructure, traffic, transport, and public space, produces a design manual for bicycle traffic in the Netherlands (Groot, 2007).

Design Expertise

According to participants, peer-to-peer exchange would also help transportation professionals gain design expertise for in-

novative bicycle facilities. David Henderson cited how roundabouts “spread like wildfire” because the “technical evaluation and standards development ...were translated very effectively...through the engineering community”. He emphasized, “Recommendations that come from outside the engineering community don’t have nearly the same level of acceptance, rapid implementation, and buy-in from the professional community as those coming from within”. Perhaps increasing the number of traffic engineers who experience the variety of bicycle facilities visited on the tours could be one strategy for accelerating the approval and adoption of such facilities throughout more US cities.

Public Acceptance

Another common barrier was the lack of public support for bicycle transportation. Dan McCormick expressed that Madison gets “backlash” for spending money on bicycling. “If we compare the numbers,” he says, “it’s unbalanced”, and “bike space is only taking up five percent or less of the pavement” but “people feel like bikes don’t pay for anything”.

Bridget Smith suggested “getting some really great facilities on the ground” as a strategy for increasing public acceptance for bicycling. Smith described how the buffered bicycle lane on Market Street, the very facility that violates California state traffic code, garnered community support: A couple of people told me that the first time they rode through it, they cried because it was such a transformative experience. They felt so much more dignified, ... like they had a space of their own, and ... much safer. The people who didn’t bicycle regularly said, ‘if you could get more of these, I would start biking because ... they don’t feel safe riding with auto traffic anywhere near them.

Smith thinks that building more on-street separated facilities will improve public acceptance of cycling.

Discussion

Kolb and Fry's model of experiential learning provides a solid theoretical foundation to explain tour participants' reflections and subsequent actions. The tours provided concrete experience in cities where bicycle transportation systems have been consciously and deliberately created through policy and infrastructure design. Participants' vision for transportation expanded and their approach toward their work shifted through reflective observation and abstract conceptualization during the tours. Participants carried lessons about colored pavement through the entire experiential learning cycle to the active experimentation phase, with other treatments still being worked on.

Why Concrete Experience is Important

Zach Vanderkooy, International Programs Manager, Bikes Belong Foundation says the motivation behind the study tours was to provide concrete experiences in a "living, 3D, functioning example of world-class transportation systems that are about connecting people to places and are multi-modal". Tour participants confirmed that traveling to Europe is key because North America does not yet have examples of world-class bicycle transportation systems. David Chiu explained:

Until I went (on the tour), it was an intellectual concept to see on a piece of paper that Dutch cities have mode shares of 40 to 50 percent ... It's one thing to hear it as numbers and it's another thing to actually see it on the street. It's one thing to look at pictures of traffic signals and segregated bike-ways and it's another thing to actually be in a segregated bike lane and feel safer ... That real tangible experience opened my eyes, made me a better advocate and allowed me to really speak about (bicycle transportation) with much more authority when I articulate a vision for the city.

Study tours to Europe give participants firsthand experience in cities with rates of bicycling that are unparalleled in North America.

Engaging In Reflective Observation and Abstract Conceptualization

Study tours allowed participants to speak with local counterparts and meet amongst themselves to discuss their experiences, prompting reflective observation and abstract conceptualization. In these stages of the experiential learning cycle, participants often changed their vision for transportation and approach towards their work.

Peter Bock's vision for transportation expanded as a result of the study tour. He admitted he was a "bike snob", who only rode for recreation. After seeing bicycle commuting as "commonplace" on the tour, he realized it is a legitimate form of transportation, and also started commuting by bike.

Anthony Fernandez shared that until local hosts emphasized the importance of bicycles equipped for commuting, he "never really thought of the equipment as an important issue". Fernandez' vision has expanded. He believes providing access to upright bikes with built-in fenders, lights, chain guards, and skirt guards, is an important aspect of promoting bicycle transportation.

In addition to changing participants' visions for transportation, tours can alter the way they approach their work. Ed Reiskin noticed that European hosts "never talked about cycling as a standalone", but as "one component of the transportation system". As a result, Reiskin now relates how cycling "fits into the overall transportation system" in San Francisco.

For Bridget Smith, the tour reframed her approach towards marketing. Previously, San Francisco had launched campaigns about safe riding with messages such as "don't ride in the door zone". European hosts encouraged tour participants, "Tap into people's memory that biking is fun". Now San Francisco is developing a "joy of biking" campaign.

Active Experimentation

Individual participants experimented with the following lessons upon return to the US: bike boxes, buffered bike lanes, contra-flow lanes, bike signals, bike boule-

wards, bike parking, goals of achieving a particular bike mode share, goals of prioritizing certain streets for certain modes, issuing policy summaries, marketing, education, bike count programs, bike share, and integrating bike facilities with transit. Participants from all three tours have used colored pavement to delineate space for bicycles on the roadway. They were able to experiment with colored facilities because of their firsthand experiences on the tours and the relatively small regulatory and financial barriers involved. After FHWA tour participants saw the widespread use of colored pavement in Europe, they encouraged FHWA to grant interim approval for colored facilities, making it is easier for cities and states to install. Subsequently, Jon Kaplan applied for approval for municipalities in the state of Vermont to use colored pavement, and both Madison and San Francisco installed colored pavement.

Recommendations

While this research made clear the value of study tours and experiential learning when it comes to advancing the understanding of what is possible within bicycle transportation planning in American cities for the participating professional, it also identified a disconnect between some lessons that participants learned abroad and what they were hoping to implement more readily in the US. Although participants carried colored pavement through the entire experiential learning cycle, for other lessons, full carry through to implementation was more difficult. As mentioned previously, part of the barriers toward implementation could be due to the lack of federal standards and funding and a lack of local community support to try new approaches to allocating roadway space, but it could also be that the study tours themselves could better serve participants' needs.

We have six key recommendations for future study tours to help participants more quickly translate their experiences into tangible change.

Cycle Track Specific Tour

Based on participants' responses, a tour focused on cycle tracks could be valuable. Such a tour would allow professionals to have more in-depth experience of cycle tracks, talk with the designers, consider

how they function within the bicycle network, and learn how to retrofit US streets to include cycle tracks. While cities across the US are starting to experiment with on-street, separated facilities, no North American city has a complete system of cycle tracks on high volume streets where many people feel unsafe riding a bike directly adjacent to moving vehicles. A cycle track specific study tour would be especially valuable because participants could experience cities with complete bicycle networks that include a variety of cycle track designs.

Since the FHWA bicycle technical committee is currently drafting guidance for cycle track design, FHWA would be the logical agency to host the tour. If the FHWA were able to draft design guidance and provide interim approval for cycle tracks as a result of the tour, it would help to remove the regulatory barriers for cities that hope to build these facilities. Unfortunately, FHWA's International Technology Scanning Program has been suspended. It is unknown if or when it will be reinstated.

Concrete Experience of Policy Formation and Soft Measures

Program organizers should consider developing tours that provide more concrete experience of policy formation and the implementation of soft measures because participants were most successful in implementing lessons that they were able to see and experience firsthand.

For the next five years, tours should continue to provide a general overview of the comprehensive package of infrastructure, policies, and programs that support bicycle transportation. After that, certain cities that have participated in general tours should be prepared to explore bicycle-supportive policies and soft measures at greater depth.

Starting in 2017, program organizers could select a policy or soft measure focus of the year, identify the cities or agencies that are primed to participate, and lead in-depth tours on the focal area. For example, if bicycle education for school-aged children were the soft measure focus of the year, the tour could include discussions with local professionals who are responsible for

coordinating education programs; visits to local schools; meetings with administrators, teachers, parents, and students; observations of bicycle safety courses; and bike rides to school with parents and children. Other policy focal areas could include financial incentives for cycling, legal interventions, and cycle-friendly land use planning. Other soft measure focal areas could include encouragement programs, evaluation, and bicycle access.

Peer-to-peer Information Sharing

Participants suggested peer-to-peer information sharing as a way to help US transportation professionals develop design expertise and share best practices. Professionals could learn how to implement facilities that tour participants observed, such as colored pavement, cycle tracks, bicycle signals, and bicycle preferential streets. David Henderson suggested that a national organization should be responsible for coordinating peer-to-peer information sharing because "professionals at the local level are taking their cues from national professional organizations and national regulatory agencies".

Readjustment Assistance

Readjustment assistance could address questions or barriers that arise when participants return to work with a new approach or try implementing lessons from the tour. ThinkBike workshops offered by the Dutch Cycling Embassy are one possible resource for such support. These workshops bring Dutch transportation professionals to US cities to help them "develop strategies for increase(ing) bike ridership" and redesign priority routes for bicycle transportation ("Sustainable Transportation," n.d.). San Francisco participated in a ThinkBike workshop as a follow-up to its Bikes Belong study tour. Bridget Smith found the workshop valuable because Dutch professionals examined transportation issues specific to San Francisco and were able to both adjust design recommendations to the San Francisco context and also help expand the types of conversations community participants could engage in.

Encouragingly, both of these latter methods of support are actually being introduced in a new 2012 program organized by

the Bikes Belong Foundation - The Green Lane Project. The Green Lane Project will take representatives from six cities on study tours. Participants will have opportunities for peer-to-peer information sharing with counterparts from two other US cities participating on study tours to either Denmark or the Netherlands ("Project Events," 2012). The Project staff will facilitate communication between the focus cities to help them develop a "forum for information sharing and joint problem solving" ("Focus Cities," 2012). Participants will have opportunities for readjustment assistance through workshops, including the North American City Transportation Officials (NACTO) Cities for Cycling Road Shows and Dutch ThinkBike Workshops ("Project Events," 2012). In addition to these two forms of support, "Bikes Belong will dedicate 70% of its annual grants budget to support the focus cities in their efforts to improve and promote bicycling in their communities" ("Grants," 2012). The Green Lane Project is an interesting evolution of the experiential learning program it previously supported, and future research can provide insight into whether these additional approaches yield better results.

Study Tour Composition

In addition to highlighting the type of support and in-depth experience that tour participants need, interviews provided insight into the cities that the tours should visit and the types of professionals that should participate. Study tours that focus on integrating bicycling into the transportation system should visit the countries that have made the greatest advances in the field: the Netherlands, Denmark, and Germany. The specific cities can vary according to the participants' cities of origin, but they should include a mix of cities that have achieved the highest mode share and built the most robust networks of infrastructure and cities with systems that seem more achievable in the short term.

Each tour should include a politician, engineer, planner, and community leader from the same city because each plays a unique and vital role in implementation. Politicians communicate the vision for transportation to the public and make decisions about policies and funding. Engineers are direct-

ly responsible for implementing infrastructure and have the power to approve the use of innovative facilities. Planners consider how bicycle networks function within the transportation system and how to create supportive policies and programs. Community leaders garner public support and excitement for bicycling. Politicians, engineers, planners, and community leaders from two to three cities can participate in the same tour to begin the process of peer-to-peer information sharing.

Future Research

Long Term Impacts

Future tours should integrate research into the process to help assess the long-term impacts of study tours. Such research could involve interviews with participants before, during, and at several points after they return to the US. Pre-tour interviews will allow researchers to gauge the change in participants' vision for transportation and approach towards their work.

Interviews during the tour would allow the program organizers and local hosts to determine which lessons participants found most memorable. The content and delivery of the presentations and discussions can be altered for future groups to resolve any disparities between lessons learned and lessons that local hosts hoped to convey. Feedback during tours can also lead to customized, post-tour readjustment assistance.

Post-tour interviews can record lessons that participants implement within one, three, five, and ten years of the tour. Are participants better able to implement lessons sooner or later? Do participants who move to new agencies carry the lessons with them? Do organizations develop institutional support for the lessons learned on the study tour, or do the tour participants act as individual champions for the lessons within the organization? These are all questions that could be addressed by long-term research on study tours.

Impetus for Change

The purpose of this research was not to determine if study tours are a necessary prerequisite for creating world-class cycling cities in the US. It is clear that there are many paths to innovation and

adoption, and in fact the volume of U.S. cities experimenting with building bicycle infrastructure is growing. Future research should evaluate study tours as they compare to other techniques that spur cities to embrace cycling. Cities such as Minneapolis, Minnesota and New York City, New York seem to have made as great or perhaps greater strides towards becoming world-class cycling cities compared to the cities researched here without participating in formal study tours. What was the impetus for change in cities like these? Did their transportation professionals read the voluminous works of John Pucher and watch video clips of cycling in European best practice cities? Did their mayor visit Amsterdam, the Netherlands for a family vacation and return inspired? Did an international consultant begin working with the city to institute transformative change? Researching the variety of techniques that have encouraged US cities to embrace cycling would be informative for other cities and national organizations that promote cycling as they are faced with making decisions about how to use limited resources to instigate change.

Understanding when each educational approach is most effective will also allow resources to be used wisely. For anyone who has ridden a bike in a city like Copenhagen or Amsterdam, where more than 35% of all trips are taken by bike, the experience alters what one thinks is possible in terms of bike use. Understanding when that experiential opportunity can serve as a catalyst for action, or to reinforce some bicycle experimentation, is important to know. Moreover, fully understanding who and how many people from any given city is optimal for sustainable success after an experiential study tour, would further ensure that such study tours are used for maximum effect.

Conclusions

The research suggests that experiential learning of robust transportation systems through study tours provide significant value for professionals' vision for transportation and approach towards their work. The study also revealed that participants were able to carry some experiences through to implementation (i.e. colored bicycle facilities). Other aspects have proven difficult

such as implementing cycle tracks, bicycle supportive policies, and soft measures, despite clear evidence of their critical nature within bicycle transportation planning.

We recommend that such experiential learning opportunities continue in the future with some modifications so that the impact of the experiential learning on practice can be strengthened. In addition, perhaps in the near future, US transportation professionals and politicians may be able to engage in domestic study tours as San Francisco, Madison, and Portland, continue to expand their bicycle infrastructure in an attempt to make complete networks of low-stress bicycle facilities, integrated seamlessly into well-balanced, multi-modal transportation systems. That said, we believe, based on the interviews of past study tour participants, that study tours to top European cities for cycling are highly effective means of helping US professionals see what is truly possible within the realm of complete, multi-modal transportation systems.

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