Fifty years of bicycle policy in Davis, CA

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Please Submit to the Committee of Bicycle Transportation: ANF20

Word Count: 5378
Number of figures: 6

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ABSTRACT

Davis, California has long been known as "The Bicycle Capital of America." In the 1960s, citizens lobbied for bike lanes to make bike travel safer. After two years of lobbying and one year of engineering, Davis created the first bike lanes in postwar America. After 1967, transportation in Davis was oriented toward the bicycle. The city's Public Works staff developed many innovative designs and programs, which were fine-tuned in Davis, then exported elsewhere. The university and city worked together on engineering, education, enforcement and encouragement efforts. In the 1980s, greenways were added to the system. Davis now has 50 miles of bike lanes and 50 miles of off-street paths in a 10 square mile city, making a highly functional bicycle transportation system. However, since 1990, bicycling levels have decreased. Journey-to-work bicycling rates fell from 28% in 1980 to 14% in 2000. City and university staff attribute this to changing demographics, intercity commuting and increased transit. In addition, during this time bicycle programs have contracted and infrastructure expansion has slowed. Application of theories of public policy change suggest that the advocacy efforts in the 1960s led to a policy shift emphasizing bicycling which continued through the mid 1990s when most programs had dwindled or disappeared. In the future, a resurgence in advocacy may reverse the deterioration of bicycle programs and result in increased bicycle use by Davis residents.

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INTRODUCTION

Davis, California has long been recognized as the "Bicycle Capital of the U.S." The city's logo is a highwheeler bicycle and there is a long history of support for bicycle facilities from city council, staff, and university officials. Since the early 1960s it has boasted the highest bicycle per capita ratio, highest bike-to-work commute mode share, the highest proportion of bike lanes on city streets (1,2). Its most recent recognition was in 2005 when it became the only city to receive the League of American Bicyclists "Platinum City" rating, confirming once again that Davis is the best bicycling city in the U.S. Today Davis has 50 miles of bike lanes (on 95% of arterial streets) and 50 miles of Class 1 bike paths, all in a city of ten square miles.

Davis is more than just the best city in the U.S. for bicycling. It is, rather, the only city in the U.S. that has been designed for bicyclists from the ground up—a veritable "bicycling paradise," at least by U.S. standards. In Davis, ordinary Americans can and will ride a bike for their daily travel needs. Bicycling in Davis has few barriers-- physical or psychological--and requires a minimal skill level. Anecdotal stories are common about adults of all ages who hadn't ridden a bike since childhood until they moved to Davis. By contrast, other U.S. bicycle-oriented cities have populations of deliberate bicyclists—people who achieve a modest level of skill, ride well-maintained bikes, and often wear helmets. Davis is more like Amsterdam, where typical bicyclists ride single-speed bikes with baskets, wear street clothes and shun helmets.

While Davis's achievements in bicycle culture have long been recognized, the sequence of events that created the unique circumstances have not been thoroughly investigated. Recognition is usually given to the "university town" and "ideal geography" factors and to the role of citizen activists in the 1960s in inventing and implementing the modern bike lane. The importance of civic support and continued infrastructure expansion in later years are also noted. But these accounts fail to explain why similar cities, such as Tucson AZ, Chico CA, or Eugene OR, have never achieved the same intensity of bicycle use and culture. Why is Davis the only American city to have achieved such a high level of bicycle use? What were the unique events that triggered this condition, and how did they perpetuate themselves?

These questions are fascinating from a historical perspective, but they also have current relevance. First, climate change and high fuel prices are increasing the value of bicycle transportation, and if the successes enjoyed in Davis were better understood it would be easier to replicate them elsewhere. Second, Davis has experienced a marked decrease in bicycle use since the mid-1990s, and understanding the initial emergence of intense bicycle culture can cast light on elements that may have been lost in subsequent decades and that could help policymakers reverse this trend.

RESEARCH METHODS

Research was conducted through a series of interviews with city and university staff and members of the community. Twenty-seven individuals were interviewed, and they referred us to about 100 documents, including plans, reports, meeting minutes, and

others. Local newspapers were reviewed on microfilm for the years of rapid policy change.

From the material gathered, a general historical overview of events was identified, from the mid-1950s to the present. After the order in which events occurred was determined, the development of policy was interpreted using two different frameworks. First, the *Advocacy Coalition Framework* describes how groups of actors, based on common beliefs and personal connections, can effect changes in policy. Coalitions are necessary because of the technical information required, the long incubation period, and the distribution of power and knowledge across groups (3). The *Multiple Streams Theory* describes a sequence of events required to change policy. Change requires the confluence of a problem, a policy solution, and political will, all of which can be shaped by a "policy entrepreneur" into opening a temporal "policy window". Once the window is open, major policy change can occur, and the window can be maintained as long as there is political reward for developing and testing new policies. After the policy window closes, policy tends to remain static for a long period of time. (4).

HISTORICAL OVERVIEW

The 1964 – 1973 time period is commonly termed by Davis residents as the period "when everything happened," framed by the time periods "before everything happened" and "after everything happened." This division of time is only a slight oversimplification and is useful in understanding the policy changes through a multiple streams theory.

Pre-1964: "Before everything happened"

Davis has always been a bicycle-friendly city. In 1950, it had excellent circumstances for the development of a bicycle culture. It was a small town, home to the University of California's agricultural research campus. The climate was mild, with occasional freezes in the winter and dry summers. It is topographically flat. The downtown was compact, and located immediately adjacent to the university core. Rail service to Sacramento and the San Francisco Bay area was excellent. While there are no unusual historical references to bicycles in the 1950s, many people report that the city was dominated by bicycles to a greater extent than neighboring cities.

Figure 1. On campus, nearly everyone bicycled in 1966, Ansel Adams, Fiat Lux collection

In 1959, Davis's future prospects changed when the University of California made Davis an autonomous campus and planned for an increase from 2000 to 10,000 students within a decade. This growth presented the opportunity to shape the campus, and the newly named chancellor, Emil Mrak, was a supporter of bicycling. As a teen he loved to ride his bike around the Santa Clara valley, and as chancellor he directed his architects "to plan for a bicycle-riding, tree-lined campus" (5,6). The first campus plan featured extensive bike paths looping through the proposed developments, passing under streets, and having exclusive parking areas outside each building. Core campus would be closed to cars. In acceptance letters to new students, Mrak instructed them to "bring a bicycle to campus so you can get to classes on time" on the sprawling campus (7). Under Mrak's leadership, bicycle use became almost universal on campus, and resulted in increased bicycling in the city.

City leaders took a less enthusiastic view of bicycles. Bicycles crowded the streets, and many riders had little regard for traffic laws. In May, 1963, the city police chief orchestrated a crackdown on bicyclists, and city council passed a broad range of penalties to be administered to errant riders, such as "be deprived of a bicycle for a period not to exceed 30 days" or "copy 100 times the section of the bicycle ordinance violated." At the same time, city fathers had enthusiastically razed a section of downtown businesses to open the first parking lot. (8).

The growing enthusiasm for bicycling on campus and among city residents contrasted with retrenchment in the city, and it created an opportunity to open a policy window in the city government as the streams of problem, politics and political will converged.

1964 – 1973: "When everything happened"

Growing automobile use in the 1960s was having an adverse effect on bicycling conditions. Citizens had made small steps in trying to control the impact of cars, such as maverick city councilor Kathleen Green who wove pro-bicycle language into the city's first General Plan in 1958. But it wasn't until 1963, when Davis residents Frank and Eve Child returned from a sabbatical in the Netherlands, that the simmering discontent heated to a boil.

Identifying the problem and winning political support

Frank was a professor of Economics, and his family of six enjoyed riding bicycles in The Hague so much that when they returned to Davis they sold their second car. Davis had many bicyclists, but the streets provided no guidance for the interaction of bikes and cars. Conflicts were common, and bicyclists were being literally run off the city's streets by increased driving. For Frank and Eve, it made perfect sense that Davis could simply reconfigure their streets and reduce or eliminate the conflicts between bikes and cars (9). When initial efforts got them nowhere, they penned a letter to the newspaper, proposing separate lanes for bikes, inviting supporters to meet at their house, and concluding "where there is no vision, the people perish." (10).

The Childs and others formed the "Citizens' Bicycle Study Group" and began quietly meeting with city officials. Their proposal was politely turned down by the city's planners, engineers, police, and council itself. The city engineer assured them that since most bicycle accidents occurred at intersections, lanes wouldn't solve safety problems. The police chief didn't think it would be enforceable (7).

Unperturbed, in the fall of 1964 the group began circulating a petition for bike lanes, citing the health, economic benefits of bicycling, the growing hazards of bicycling, and the self-reinforcing traffic problem. They petitioned council to provide bike lanes on all arterial streets, and to take action before city growth "made such action prohibitively expensive" (8). This well reasoned, well articulated argument received wide public support. Frank Child routinely appeared at council meetings and reported how many citizens had signed. After some discussion, the council considered the matter, voted to study bike lanes on neighborhood streets to elementary schools, and proceeded to form a "study committee" with representatives from everyone *except* the Citizen's Bicycle Study Group (8).

As another year went by, the number of signatories grew to 2000, and city council elections were coming up. By this time, the Childs were known as representatives of the large bicyclist population, and Child was courted by and endorsed several candidates who made bike lanes a campaign issue. One even put cardboard discs in his supporters' bike wheels proclaiming "Maynard Skinner for Council!" (11). Bike lane supporters won a landslide victory. Now, with a problem, a proposed policy, and political will, a policy window was opened. Within a few months, council voted to instruct Public Works staff to create bike lanes on city arterial streets.

Implementing a policy

Now that the problem was identified and political will assembled, the policy needed to be refined and proven. The advocacy coalition expanded from its citizen base to include elected officials and city staff. The engineers, planners and police officers all quickly changed their approach to dealing with the bicycle study group, and everyone met and discussed their visions and concerns. They then set out to develop geometric standards for striping bike lanes on the streets of Davis (10).

Another challenge was changing the state street and highway legislation to accept bicycle lanes as legal elements of California roadways. Fortunately, city councilor Norm Woodbury was a professional lobbyist at the state capitol in Sacramento and was able to

steer city staff to the right contacts to get a bill through the Assembly and signed by Governor Reagan (11).

In the fall of 1967 the plans were ready, the state laws were changed, and Davis striped bike lanes on several city streets. The bike lanes were an instant success. Bicyclists liked having a designated spot on the roads, and motorists liked having bicyclists out of the way. The momentum began with Chancellor Mrak in 1961 and continued with the Childs in 1964, resulting in the creation of the first bike lanes in the United States.

Experimentation in policy application

City staff were under pressure to create bike lanes with few precidents. Everyone had different ideas about how bikes should be accommodated on the roads. Frank Child preferred the Amsterdam model, with bikes on paths behind curbs or parked cars. City staff thought bikes would be best riding in the street next to the moving traffic. Fortunately, city staff had adequate support from council to experiment with many different lane and path configurations, including:

- a bike lane between the moving traffic and parked cars,
- a bike lane between the parked cars and the curb,
- a bike path behind the parked cars and the curb,
- a two way bike lane on one side of the street, behind concrete buttons, and
- a reverse-flow bike lane on a one-way street (12).

Figure 2. Amsterdam-style bike lane prototype, with one-way bike travel behind parked cars. (12)

Figure 3. California Senator Marler and Assemblyman Jensen enjoy the first example of what has become the standard North American bike lane.

Eventually all lanes were converted to the now familiar configuration of the bike lane between the moving cars and parked cars, but this example is illustrative of the type of experimentation that was done to see how different configurations worked. "The city was our laboratory" professor Bob Sommer observed, and it is likely that the eventual

success of bike lane design benefited by open experimentation. Had one mindset ruled the process, the lanes might have been a only a partial success and Davis bicycle use might never have reached the famously high levels it enjoyed in the 1970s.

Other city and university programs also blossomed during this time. Students opened a "Bike Barn" on campus where bicyclists had access to tools, instruction, and emotional support when repairing their bikes. Campus closed the core to cars in 1967, and soon invented "bicycle roundabouts" to channel gridlocked bicycle flow during peak periods. Several greenbelts were constructed—linear parks with class 1 bikeways and grade-separated intersections. The subdivision code required bike lanes on all new streets. The police department had extensive education programs, including a talking bicycle named "Mr. Smartspokes" that would visit schools.

Policy maturation

By the early 1970s the policies that governed the city had been set in place. Bike lane configuration had been standardized and new policies were in place. Yet, public support was so broad that innovation and invention continued for several more years, until it seemed there wasn't anything left to try. Professors Bob Sommer and Dale Lott and researcher Donna Lott conducted surveys on bicycle use, such as the effect of opening new bike lanes through a "road diet" –reconfiguring a four lane street into three lanes plus bike lanes, and on development of the bicycle left-turn lane. Civil engineering professor Mel Ramey led a team to determine the appropriate widths and standards for bicycle facilities. Public works officials Dave Pelz and Duane Copley were routinely invited to give presentations on the latest practices invented in Davis. Meanwhile, the bike lane design standards established by Davis were adopted as part of the state highway code and in 1974 by the Federal Highway Administration (13).

In 1971 engineering consultant firm De Leuw Cather was commissioned to write a "bicycle circulation and safety study" that identified all the current best practices and charted a course for the city and campus for many years to come (14). This document symbolized the end of local, passionate, organic research and represented an "end point" to the policy innovation. Local research and inventions slowed down after this point not so much because of a lack of support or interest, but because facility designs were fine-tuned to a high level of function and researchers had answered all of their questions.

Also at this time civic attention had spread to other progressive issues. In 1964 the environmental movement was in its infancy, but by the early 1970s it was in full bloom, and Davis had transferred its inventive efforts to pioneering citywide recycling, composting and energy efficiency programs. The bold ambition and lauded success of these subsequent programs was built on the success of the bike lane movement (15).

1974 – 2000: "After everything happened"

In 1974, Davis' unique transportation system was firmly entrenched. Bicycle advocates from around the country made pilgrimages to Davis to marvel at the sight of a modern American city teeming with bicycles.

In the ensuing years, Davis grew from 20,000 residents to 40,000 residents, with the bicycle infrastructure and bicycle use growing proportionally. Relatively few changes occurred during this time, as the early pioneering efforts had proven so successful that the bicycle programs were almost on autopilot. All city codes required

bicycle facilities, and the team of engineers at Public Works was able to ensure that codes were followed and make appropriate modifications in unique circumstances. Because bicycling programs were institutionalized throughout city and university governments, there was no longer the need for advocacy coalitions to advance innovative policy.

The Davis Greenway

The greenway network is one important element of modern Davis infrastructure that appeared during this time. In the early 1970s some neighborhood greenways had been built, connecting schools, neighborhoods and parks. In 1988, UC Davis professor Mark Francis and a coalition of students and colleagues developed a plan for a greenway system—a multiuse trail that would loop around the city, with "spokes" radiating into downtown and out into the country. After being rebuffed by engineers, planners and the city's general plan update committee, Francis established an advocacy coalition with city councilors and the university chancellor, and eventually the concept was added to the general plan (16).

Francis's timing was excellent, as Davis was on the cusp of a building boom that would see most of the undeveloped land in the city built out over the following ten years. The greenway, complete with lawns, playgrounds, picnic areas, water retention ponds and grade-separations at most streets, is now complete around 80% of the city's perimeter, with a green-street connection bridging the gap.

Innovation elsewhere

Elsewhere in the U.S., however, bicycle infrastructure design was still evolving. Bike routes acquired names or numbers to improve navigation. Residential yard waste was collected in containers, rather than dumped in and collected from bike lanes. Bike parking standards were established to ensure riders all had access to secure racks. Multi-use paths adjacent to streets were discouraged and phased out. Engineering standards for lane surface quality, traction and markings were developed. The California Highway Design Manual called for multi-use paths with clear zones, long sight distances, and painted markings around bollards.

Davis was slow to adopt designs invented elsewhere. In the early 2000s, bicyclists still had to dodge piles of yard waste in bike lanes, the city built an entire subdivision with street-side class 1 bikeways, and over 5000 campus bicyclists lacked secure bike parking. Not a single multi-use path had been built with state-required clear zones or bollard markings.

Early on, it was reasoned that these innovations were not needed for Davis. Davis had a high enough number of bicyclists and light car traffic that bike lane blockage was not an issue, and drivers knew to check for traffic on bike paths before making left turns. The town was small and flat enough that people didn't need bikes fancy enough to be stolen, and navigation wasn't difficult enough to warrant signage. As the town grew into a small city, this attitude may have been responsible for the lack of subsequent innovation.

Citizen's advocacy groups emerged in many cities across the state in the 1990s, but had been absent in Davis since the late 1960s. The role of upholding good design was held by the city's Public Works department. In the late 1990s, the three senior

engineers, all regular bicyclists, who had run the program since the mid 1960s quietly retired.

While the city and university's commitment to ensure high quality bicycling as the city grew continued, officials evidently failed to foresee the full range of improvements necessary for a city of 60,000 residents. As Davis grew in size and area, distances grew longer and motorized traffic became denser, and the quality of the core Davis bike system saw little improvement to compensate for these changes.

Early 2000s, Bicycling in Flux

In the 1990s, many Davis residents noted that bicycling was falling out of favor, and there seemed to be many more people driving than in the past. Critics didn't have any hard data to express their alarm or dismay, as the city has never counted bicycles or mode share, and the campus only conducted surveys every ten years. The 1980 U.S. Census measured bicycling to work, but did not explicitly publish results for small cities. It wasn't until the 2000 census became available and was compared to the 1990 data that anecdotal observations were quantified and confirmed as precipitous. Bicycle commute mode share dropped from 22% in 1990 to 14% in 2000.

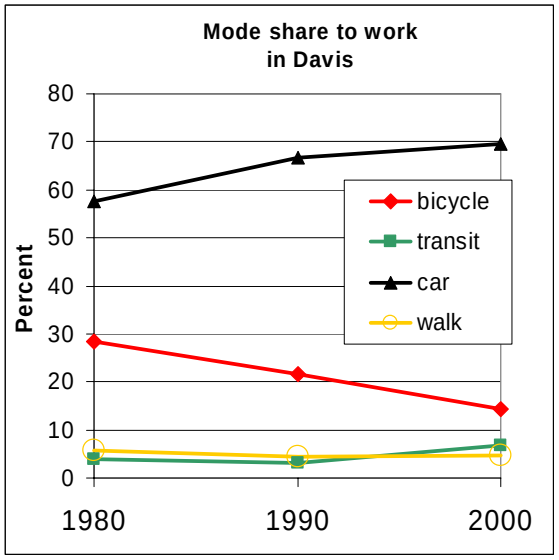

Figure 4. Bicycle mode share in Davis has dropped since 1980, with lost bike mode share replaced by cars. 1980 mode share interpolated from Davis and Sacramento area census data (17)

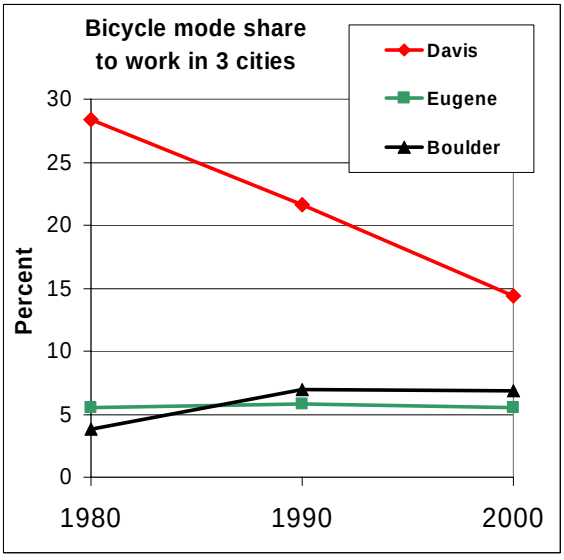

Figure 5. Bicycle mode share was maintained in Davis's peer cities of Eugene and Boulder. (17)

Quiet chatter began over the decline in bicycling. In a May, 2003 exchange in the Davis Enterprise, emeritus professor Bob Sommer penned an op-ed piece titled "Where have all the cyclists gone" stating "the masses of cyclists are gone from the intersections and from campus," and "I feel like a bird who has lost his flock." Campus bicycle coordinator David Takemoto-Weerts responded with eight reasons why bicycling was declining, including the fareless transit program adopted in 1992, increased affluence among students, retirement of Public Works staff, and increased intercity commuting of workers and students (8).

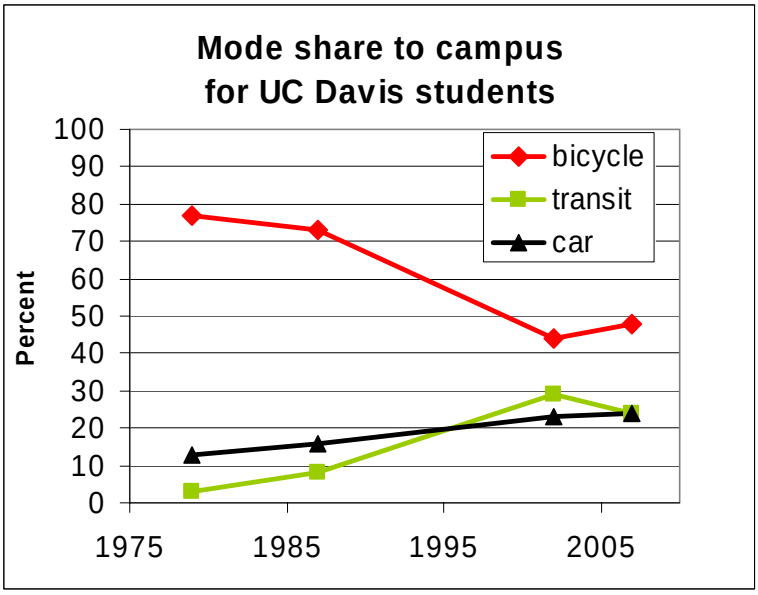

Figure 6. Student bicycle mode share fell from 1977 to 2003, with a small recovery in 2007. (5, 18)

Curiously, there is no evidence that Davis's leaders were particularly disturbed by the decline, nor were resources allocated to learn why people were bicycling less or to provide incentives to bicycle more. No planning documents since 1991 at the city or campus level indicate an effort to change the mode share. Instead, the campus and city combined spent over $60 million on new parking garages between 1991 and 2005, but no funds were allocated to replace obsolete bicycle parking.

Nor was there chatter about how *internal* factors might be responsible for the decline in bicycling—factors that are controlled at a city level. Our research revealed many internal factors that could be responsible for the decline. These are programs that the old-timers cited as being pivotal to the success of Davis bicycling movement in the 1970s, but had quietly disappeared by 2000. These included

- subsidized helmet programs,
- elementary school education programs,
- incoming university student orientation programs,
- u-fix services at the Bike Barn,
- removal of abandoned bicycles from racks,
- strict enforcement of traffic laws, and
- high minimum standards for new bicycle infrastructure.

When current staff were asked about these programs individually, the response was that they had become too difficult to manage, too costly, or they had decided they weren't really all that important anyway. In many ways Mr. Smartspokes, the talking bicycle, had retired, and nobody saw fit to find a replacement.

BICYCLING AND THEORIES OF POLICY CHANGE

Development of Davis's bicycle policy is a classic case study in the effectiveness of advocacy coalitions and use of the multiple streams theory. Both the rise and decline of bicycling can be described through these frameworks. Davis's past, interpreted through policy change theory, can be used to predict the future of bicycling in Davis.

Understanding the past

In the 1960s, the Childs and others formed an advocacy coalition—a group of people with similar values and goals, and they networked with members of the community until they had assembled enough power to affect political change. The first major achievement was to assemble enough political power in town to change the priorities of city council and city staff. Of the three streams required for policy change, they now had the problem and the political will, and just needed to develop a functional policy to open the policy window.

Building bike lanes was a challenge on many levels. The advocacy coalition had to expand to include a larger constituency, and it was able to make this transition smoothly. Now, as a unified front of elected officials, city staff, and citizens they developed reasonable policy proposals for how bike lanes might work. Issues of width, markings, enforcement, appropriate reasons for bikes to leave a bike lane or cars to enter a bike lane all had to be worked out.

Then they had to advance to a higher level of politics at the state, and generate enough attention for their cause to get it through the legislature. It required a strong local coalition and a plausible policy proposal to broaden their group to include assemblymen and senators, and the expediency with which this occurred is testament to their power as advocates and the sensible, transparent nature of the policy solution. Finally, with the problem, policy and politics all assembled, the policy window was open, and Davis Public Works was able to transform the city by installing bike lanes.

In this case, the policy window stayed open for many years. Citizen response to the bike lanes and other infrastructure was highly favorable, and the engineering staff and others were able to leverage the political support into a whole range of infrastructure and support services. Similarly, the emergence of bicycle culture on campus with Chancellor Mrak in the early 1960s and the development of the Davis Greenway in the 1980s were also examples of advocacy coalitions and the convergence of multiple streams to open policy windows.

This synergy of public will, public coalition-building, political support and engineering skills, three times over between 1960 and 1990, are likely responsible for making Davis not only the "Bicycle Capital of the U.S." but also a "bicycling paradise." Without the concentration of advocacy, the ability to develop policy solutions, and the willingness of leaders to support solutions, Davis would not have become the bicycling paradise. Had Mrak, Child and Francis been recruited by Chico State University (in Davis's sister city to the up the Sacramento Valley), Davis might have become known only as "The Square Tomato Capital of the U.S."

Possible futures for Davis

In 2005, Davis was in a similar position to Davis in 1963. Bicycling was declining, car use was increasing, and casual requests at city hall for improved facilities had not yielded any results. There was no organized coalition of bicycle advocates, just a few lone agents. Of the three streams, the problem was poorly defined, the political will was lacking, and the policy solutions were unknown or ambiguous. If these conditions were to continue, no policy windows would be opened, no policy change would occur, and bicycling levels would continue to decline.

Conversely, if Davis were to address the decline in bicycling and create policy changes that would reverse the trend, it would require an organized coalition of

advocates, a well defined problem, political will, and effective policy proposals. The greatest problem in 2005 was, perhaps, the lack of policy proposals. Davis had been so entrenched in developing its own brand of bicycle infrastructure and programs, and had not felt the need to investigate successful programs developed elsewhere, that a defeatist attitude became pervasive when bicycling declined. However, the fact that many of Davis's once-lauded bicycle programs and policies had fallen by the wayside, and others had been developed elsewhere that could be cherry-picked to address problems in Davis, suggests that policy solutions do exist, and that in concert with an advocacy coalition, political will, and a well defined problem, the decline in bicycling can be reversed.

CONCLUSIONS

The "Davis model" of physically building a city for bicycles from the ground up has never been tried elsewhere in the U.S. But at least two other American cities have become equally interesting case studies in policy development—Boulder, CO and Portland, OR. Both of these cities had populations of bicycle advocates in the 1990s that opened policy windows around 2000, resulting in major improvements to bicycling. Now enthusiastic Public Works departments are retrofitting Portland and Boulder into very good bicycling environments. Portland now has many more bicycle commuters than Davis, and Boulder may have a higher bicycle commute mode share. In ten years, these cities will certainly be lauded in the same way Davis was in the 1970s, having achieved what had never been done before and that few believed was possible.

These other success stories suggest that bicycling levels can be dramatically increased in many American cities in the future. The combined experiences of Portland, Boulder, and Davis suggest that the requirements for high levels of bicycle use are not, as has often been cited in the Davis case, "ideal geography and a university town" but rather "a strong advocacy coalition, clear identification of problems facing bicyclists, nourishment of political will, and development of policy solutions." With this as a basic requirement, Davis is well positioned to regain lost bicycle mode share, and many other cities around the country, regardless of geographical and other physical challenges, are candidates for comparable achievements in enabling large numbers of Americans to bicycle for their daily travel needs.

ACKNOWLEDGEMENTS

We are grateful to the "bike lane pioneers" of Davis for perseverance in creating "the city of bicycles" – Emil Mrak, Kathleen Greene, Frank and Eve Child, Donna and Dale Lott, Kent Gill, Norm Woodbury, Maynard Skinner, Fred Kendall, Dave Pelz, Art Eichorn, Duane Copley and many others.

Research was funded through a grant from the University of California Transportation Center.

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