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Adolescent Attitudes Towards Active  
Transportation: Bicycling in Youth in  
Retrospect from Adulthood

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# Adolescent attitudes towards active transportation: *bicycling in youth in retrospect from adulthood*

## **ABSTRACT**

Bicycling as a form of ‘active transportation’ is an easy way to integrate physical activity into a person’s daily life. Bicycling in youth is especially beneficial because it provides physical activity at a time when youth obesity rates are soaring. Yet few studies have examined bicycling in adolescence. This study begins to fill that gap through an exploratory study of the formation of attitudes and practices regarding bicycling among residents of Davis, California, a mid-sized city in the United States where bicycling is normative. Participants, 25-65 years of age, responded to self-administered questionnaires and open-ended interview questions regarding their bicycling experience throughout their life course. In this paper, we focus on responses related to the “youth period”. Results showed that bicycling activity decreased during the youth period, as did positive attitudes towards bicycles and bicycling. High school youth, especially females, were particularly sensitive to negative images, even stigma, associated with bicycling. Bikes were abandoned for other modes of transportation, particularly walking and driving. To achieve a more bicycle-friendly society, communities must encourage bicycling and positive attitudes toward bicycling *throughout* the life course, particularly during the teen years when drop-off rates are high. This can be done by implementing bicycle promotion programs developed *by* and *for* teens as well as by implementing restrictive licensing or driving policies.

**Keywords:** bicycling, cycling, adolescence, teenagers, attitudes, transportation, life course

### **Research Highlights:**

- How participants conceptualized their bicycles changed over the course of their youth, leading to decreased bicycling.
- In early youth, many participants saw their bikes as “toys” that provided fun and independence.
- High school youth, especially females, were particularly sensitive to negative images, even stigma, associated with bicycling.
- The supremacy of social norms over individual attitudes in relation to bicycling has important implications for policy.

# Adolescent attitudes towards active transportation: *bicycling in youth in retrospect from adulthood*

## INTRODUCTION

Bicycling as a form of “active transportation” is an easy way to integrate physical activity into a person’s daily life, thereby helping to reduce the risk of heart disease, improve mental health, lower blood pressure, and reduce risk of overweight and obesity (Frank, Andresen, & Schmid, 2004). This is especially pertinent at a time when the prevalence of obesity has increased significantly in the United States and worldwide (Centers for Disease Control and Prevention, 2009; Withrow & Alter, 2011; World Health Organization, 2011 ). Riding a bicycle can raise the heart rate sufficiently and improve cardiovascular fitness, which is linked to improved health outcomes for both young people and adults (Cooper, Jago, Page, Wedderkopp, Kristensen, Moller et al., 2008; de Geus, Joncheere, & Meeusen, 2009; Hamer & Chida, 2008; Shephard, 2008).

Bicycling in youth is especially beneficial because it provides physical activity at a time when youth obesity rates are soaring (Heinberg & Thompson, 2009), and it can set in place good habits that can carry over into adulthood. Garcia et al (1998) found that “Childhood and adolescence are ideal periods of development for fostering active lifestyles that can be maintained throughout life.” It may be that children living in bicycle-friendly societies, where bicycling levels increase over the course of childhood, are more likely to become bicycling adults (J. Pucher & Buehler, 2008). This is especially pertinent given the fact that physical activity tends to decline from childhood to adulthood (Corder, Ogilvie, & Van Sluijs, 2009). Thus adolescence appears to be pivotal in the formation of attitudes towards bicycling that carry forward into adulthood.

In this paper, we focus on youth and adolescent attitudes towards bicycling, as seen in retrospect from adulthood. The objective of the larger study from which this paper was drawn was to explore the contexts in which attitudes about bicycling developed throughout the life course. We used a mixed-methods approach (quantitative survey and qualitative interview) to explore the various life stages of each participant in-depth and compare it to their current bicycling attitudes and practices. Our analysis shows that the way in which participants conceptualized their bicycles changed over the course of their youth, leading to decreased bicycling as teenagers.

## BACKGROUND

Transportation-oriented bicycling is very low in the U.S. overall, but high in certain places – like Davis, California. However, even with good bicycling conditions, many Davis residents do not choose to bicycle on a regular basis. Analysis of data collected using an on-line survey in Davis and five comparison cities in 2006 shows that cognitive factors – what’s going on in people’s minds – play a critical role in explaining bicycling behavior (Xing, Handy, & Mokhtarian, 2010 ).

Indeed, previous work has established the important role that cognitive factors play in shaping decisions about daily travel (Beirão & Sarsfield Cabral, 2007; Domarchi, Tudela, & González, 2008; Fujii & Kitamura, 2003; Johansson, Heldt, & Johansson, 2006; Parkany, Gallagher, & Viveiros, 2005; Sunkanapalli, Pendyala, & Kuppam, 2003). Cognitive factors include attitudes, perceptions, and habits (Ajzen, 1991; Fishbein & Ajzen, 1975). An attitude is “an evaluative response to some object which disposes a person to behave in a certain way toward it” (Ajzen, 1991). Attitude formation is complex, and varies over time, across situations, and according to individual experiences (Krosnik, 2005). Social psychologists suggest attitudes are formed through a combination of socialization experiences and cultural influences, and people may be highly

conscious of their attitudes toward an object, or their attitudes may be completely outside of their awareness (Albarracín, Johnson, & Zanna, 2005; Devos, 2008).

Several studies document the importance of attitudes in explaining bicycling behavior. One study found a strong connection between “liking biking” and both bicycle ownership and regular bicycle use (Handy, Xing, & Buehler, 2010), while positive attitudes towards bicycling were found to be important predictors of bicycle commuting in Portland (Dill & Voros, 2007) and the Netherlands (Heinen, Maat, & Wee, 2011). Jensen (2008) concluded that attitudes seemed to be an important factor for transport mode choice, including bicycling, among children in Denmark.

Few studies focus on the formation of these attitudes, however. A seminal report by Davies (1997) found that attitudes towards bicycling in the UK are influenced by life stage, gender, peer pressure, societal norms, and other factors. Pucher et al (1999) pointed out an inherent relationship between the “public image” of bicycling and the general attitude to bicycling within a particular country or region. Conversely, a study in the UK found that those who use a bicycle are likely to have a more positive view of a typical bicyclist than those who don’t bicycle (Gatersleben & Haddad, 2010). Steinbach et al (2011) suggest that the meaning people give to bicycling might resonate differently across gender, ethnic, and class identities. Similarly, the Safe Routes to School National Partnership (2011) states that, “Bicycling may have the stigma, similar to riding the city bus, of being something that only the desperate use, or only a sport for middle class white males, or even the symbol of gentrification in some communities.” In other words, individual attitudes are inextricably linked to public images of bicycling and social norms.

The few studies that focus on adolescents and bicycling suggest that image plays an important role. A study in the United Kingdom (UK) showed that for young girls in North Liverpool, “cycling has significant image problems, with many saying that they would not consider cycling as a regular mode of transport” (Cavill & Watkins, 2007). Another study in Canada concluded that teenage participants continued to bicycle into their mid-teens because early motivating factors (independence, fun, speed, time efficiency) as well as fitness and health outweighed any negative comments from peers (Orsini, 2007). A life course study in Australia found that bicycling is a form of mobility that is often relegated after childhood and that teenage girls abandon bicycling not because of the lack of “coolness”, but because other modes of transportation are more social (Bonham & Wilson, 2012).

In addition, the way teens feel about bicycling may be confounded by prevailing attitudes towards cars and driving. Getting a driver’s license at 16 years old has long been an American rite of passage. Using data from the National Young Driver Survey of 2007, the Children’s Hospital of Philadelphia reports that “to teens, driving is considered an essential coming of age experience, and it has become an established aspect of teens’ maturation and socialization process.”(Children’s Hospital of Philadelphia, 2007). In that regard, we expect that adolescent attitudes towards bicycling will be closely and inversely related to attitudes towards driving.

## **METHODS**

### **Participants and Setting**

This study took a qualitative approach to exploring the formation of attitudes towards bicycling, using in-depth interviews with a convenience sample of residents of Davis, CA. Our goal was to understand the meaning and relative value participants attributed to bicycling during their youth, and whether this acted as a basis for attitudes towards and continued bicycling activity into their adult years.

Participants were recruited through advertisements posted in the local newspaper and through fliers that were posted at downtown businesses and handed out at a local farmer’s market. The recruitment notice solicited

people interested in “participating in a study concerned with people’s attitudes toward transportation”. All participants were required to be English-speaking residents of Davis between the ages of 25 to 65 years old. Participants were offered a \$20 gift card in exchange for participation. Fieldwork took place between July and October 2010.

### **Data Collection**

A self-administered questionnaire gathered demographic information, and other attitudes and activities that might be correlated with attitudes towards bicycling, on the participant prior to the interview. We chose to use a biographical life course approach that solicited a “mobility biography” from each study participant. Mobility biographies, expressed through guided interviews, can improve our understanding of the underlying meanings, motives, and values that help shape attitudes about travel behavior (Frandsberg, 2006). The goal of collecting these “personal history of bicycling” biographies was to gain valuable insight into how participants formulated attitudes towards bicycle travel from youth through the life course, and help inform our understanding of bicycling as an active mode of transport.

Interview guides were developed based on a thorough review of the literature and input from a multi-disciplinary (sociology, environmental science and policy, cultural studies, and public health) research team. Questions were designed to elicit an in-depth exploration of each participant’s transition from childhood to adolescence and into adulthood, so each question was followed by a request for examples from the participant’s life experience as well as a series of probes to elicit meaningful experiences.

Using the semi-structured interview guide, two trained interviewers conducted the interviews in public locations. Interviews were audio-taped, and interviewers completed interviewer reflection notes after each interview. This included notes on difficulties participants had with questions, particularly interesting comments or emotions that emerged for the interviewee and things that could not be captured by the audio recording alone. Audio-taped interviews were transcribed by a professional transcriber and inaudible sections of transcripts were reviewed and completed or revised by the two interviewers. The early interviews raised issues that were not anticipated in the literature review, and additional questions and prompts were then discussed amongst the researchers and added to the guiding questions for subsequent interviews (Glaser & Strauss, 1967).

### **Data Analysis**

We examined past and current bicycling activity and attitudes towards bicycling during the youth period (ages 5-18). In our study, we operationalized the youth period in terms of three phases: elementary, middle, and high school education. Across these periods, differing peer groups and social contexts associated with peer involvement have been found to shape adolescent identity and attitudes more generally (Weigert, Teitge, & Teitge, 2006). We characterized bicycling during this period by whether or not participants owned a bike during the different stages of their youth, as well as what type of bicycling they did in each stage (i.e. recreation, transportation, or both). Attitude was measured by asking the degree to which participants “liked biking” for each stage of youth. Subsequent discussion revealed the underlying meanings and value participants placed on bicycling, as well as the contexts within which they developed. In our analysis we looked for gender differences, geographic location or other place effects associated with the built environment, and generational effects.

A single researcher carefully read each transcript and conducted an initial thematic analysis. Key words, phrases or discussion within the transcripts were highlighted and grouped under different meaningful headings, which categorized participants’ accounts or experiences (Green & Thorogood, 2004). Members of the multi-disciplinary research team then discussed the initial themes that emerged and identified the broad themes that were pertinent to biking in youth. One team member used these broad themes to develop a set of sub-themes and a coding template. The coding template attempted to capture the presence or absence of themes and sub-themes, as well as the time period in which they occurred (i.e. elementary, middle, or high school). Two other researchers worked with the coding template and a sample of transcripts until an

acceptable level of inter-coder reliability was achieved. The final coding template achieved 92 percent agreement among three researchers.

Each transcript was loaded into Atlas.ti, a qualitative analysis software program. The coding of quotes within Atlas.ti was based on whole statements by respondents (i.e. everything said between questions by the interviewer), which could range from a single or partial sentence to a series of sentences. Individual quotes were analyzed in order to understand the nuances and generate further meaning about the themes. The coded data was then combined with the self-administered questionnaire data. This compiled data was then cross-tabulated and sorted using SPSS to identify frequencies and basic patterns.

## RESULTS

The sample of participants was fairly representative of both Davis, California as well as the U.S. population based on income and race (Table 1). The educational achievement level of the sample was significantly higher than that of the U.S. population, and somewhat higher than that of the Davis population. The 25-35 year age bracket was the most represented in the sample (Table 2).

**Table 1. Comparing demographic characteristics (n = 54)**

	Participant Sample	Davis*	U.S.*
Median Age*	38	25.2	37.2
Median Household Income**	\$45,000	\$59,517	\$51,914
Percent White*	74%	64.9%	72.4%
Educational Achievement: Bachelor's degree or higher**	81%	68.4%	27.9%

\*2010 Census

\*\*2010 ACS 5-year estimates

**Table 2. Age and gender distribution of participants (n = 54)**

	25-35 years	36-45 years	46-55 years	56-65 years	Total
Male	9	5	4	2	20
Female	13	6	7	8	34
Total	22	11	11	10	54

As a whole, bicycling for transportation and recreation decreased over the youth period for the sample. Recreational biking was greatest during the elementary school period, between approximately ages 5 to 12 years. Transportation or utility bicycling was greatest in middle school (also known as junior high in some U.S. communities), between approximately ages 12 to 15 years. The least amount of bicycling, for both recreation and transportation, took place in high school, between approximately 15 to 18 years.

The guiding questions solicited each participant's general attitude towards bicycling by asking if they "liked biking" at different stages in life. However, in discussing their bicycling experiences during different periods in their youth, participants expressed many views towards bicycling that helped us to understand the underlying meanings and values they attributed to bicycling. Views on bicycling had to do with personal attributes of the participant, the attributes of other people on bikes, or the general "image" of biking. The most frequent and poignant themes related to attitudes are highlighted below.



### **Liking Biking**

In general, “liking biking” decreased over the youth period for the sample. Seventy percent of participants indicated that they “liked biking” in elementary school. In middle school this number dropped to 39 percent and by high school only 20 percent of participants claimed that they had liked biking. Interestingly, sixteen participants, or 30 percent of the sample, responded to the question of “liking biking” with the response that “biking was off the radar” at some point in their youth. For example, a 40 year old woman said, *“Attitude towards bicycling? It was non-existent. It wasn’t on the radar other than kids to go to their friend’s house or whatever, at least not in my world.”* A 38 year old man commented, *“By junior high, I didn’t think about bicycling. It just wasn’t ever something I even thought about.”* A 25 year old woman summed it up with, *“I definitely didn’t care about biking, and didn’t think about it much. It was off the radar.”*

### **Biking as Exciting and Fun**

Fifty six percent of participants said that being on their bike during some point of their youth period was “exciting” or “fun”. Of those comments, 60 percent of them were made about bicycling in their elementary school years. Many participants fondly reminisced about the fun, excitement, and adventure of bicycling in their childhood. A 30 year old woman said, *“I remember going down these hills really fast and having fun, sometimes falling off, flying over the handle bars. You know when you fall as a kid it’s kind of exciting.”* One interesting nuance of this theme was the fact that some participants thought of their bikes as recreational, fun “toys” of their childhood. For example, a 55 year old woman said, *“Well in my age group, and at the time it was a toy. It was mostly entertainment for kids.”* A 35 year old man commented on his elementary school years, *“I used to have a lot of fun with bicycles and my friends. We used to play games on bicycles with a soccer ball.”*

### **Independence and Freedom while Biking**

Fifty four percent of participants talked about biking as a source of “independence” and “freedom” for themselves, and in some cases that of parents who didn’t have to chaperone them around. Of these comments, 57 percent were mentioned in relation to the elementary school years. For example, a 37 year old woman said, *“It was definitely my first experience of really being independent. After school we would go to stores and get ice cream and not have to beg our parents to let us go. We had our bikes to go there on our own.”* A 32 year old man said, *“It was a way I could get farther away from the house than walking, and it was freeing for my parents.”* A 34 year old man commented, *“When we were in junior high, I remember distinctly when we were allowed to bike to the 7-Eleven. That was a milestone. I felt like the world was our oyster at that point. There wasn’t anywhere we couldn’t go.”*

A few participants compared the independence that comes with bicycling to the independence that comes with being able to drive a car. For example, a 56 year old woman commented, *“I think when you’re a kid...it’s the closest thing you can get to having a car. You can take off and just go anywhere on your bike. Even though you really can’t, but you feel like you could...and that’s such independence.”* Another 42 year old woman commented on her adolescent daughter in Davis, *“It’s a core part of who she is. Its independence...it’s like turning 16 and getting a car. It was that equivalent.”*

### **Biking as Cool**

Twenty six percent of participants saw biking as “cool” at some point in their youth. Fifty seven percent of these comments were made in relation to the elementary school years. For example, a 44 year old woman said, *“In elementary school I had a banana seat bicycle. It was pretty cool.”* A 34 year old man said, *“We thought we were pretty cool. We were more of the little bike gangsters during that time; ride around and knock over people’s garbage cans with our bikes and build jumps.”*

Thirteen percent of participants commented on the “coolness” of biking in middle school and high school. A 53 year old man said, *“In 7<sup>th</sup> grade my bike was really important to me because it was brand new, and it was the type of bike that I don’t think anyone on the East Coast saw. It was called a Chopper and it was cool.”* A 37 year old woman from Palo Alto, California (another well-known bicycle friendly city) said about her high

school years, *“I do remember when it was seen as cool. I really wanted to play up the environmental cred, and there was a small group that thought it was really cool that I rode my bike and they did too.”* A 56 year old woman said, *“I wanted to ride my bike to school, I wanted that independence again. And there was a bus, but it was not cool to ride the bus. I wasn’t old enough to get a driver’s license, but it started to get cool to ride bikes, because we were all into the whole environment thing.”*

### **Biking as Uncool**

Thirty nine percent of participants used the word “uncool” to describe bicycling during middle school or high school and 62 percent of these comments came from women. For example, a 58 year old woman said, *“Once I was in junior high school it was not the cool thing to do, to ride bikes.”* Seventy five percent of the comments about biking as uncool came up exclusively in the high school years. For example, a 50 year old man said, *“You wouldn’t be caught dead on a bike. It wouldn’t be cool to be riding a bicycle in high school.”* A 55 year old woman said, *“What were they going to say about me riding a bike? Nobody did, so why am I going to do what nobody does?”* A 26 year old man commented, *“If you were on your bike....especially in high school, then something is wrong with you.”*

Twenty percent of participants described biking in youth as being “nerdy”, “dorky”, “geeky”, “weird”, “lame”, and for “losers”. Sixty-nine percent of these comments were made in relation to biking in the high school years, and 77 percent of these comments were made by women. For example, a 25 year old woman who went to high school in Davis said, *“People that biked generally speaking were nerdier...big backpacks versus the cars with the purse and the book bag.”* A 25 year old man said, *“It wasn’t lame to do, but it was still one notch below driving and driving was like the holy grail of getting to school.”* Similarly, a 50 year old man said, *“If you were a teenager riding your bicycle you were probably considered a loser, because everybody drove or had a ride. It would be hard for someone to ride their bike and not get teased.”*

Nineteen percent of participants brought up the idea that biking was “unfashionable” or “untrendy”. Eighty percent of these comments were in relation specifically to high school, and all of these comments came from women. For example, a 25 year old woman said, *“In high school biking is not that cool; it didn’t seem trendy enough to do.”* A 52 year old woman said, *“My younger brother rode a bike a lot in high school, but I didn’t. It wasn’t a fashionable thing to do.”*

### **Abandoning bicycling for other modes of transport**

Seven percent of participants indicated a clear preference for walking over bicycling in middle and high school. A 56 year old woman said, *“When you got into junior high it was almost cooler to even just walk somewhere than to pull up on your bike. I still liked biking, but it wasn’t enough to get me through the peer pressure.”* A 38 year old man said, *“At that point it was not cool to ride your bike. I liked walking around in groups. You met girls back then, so you’d walk with the girls.”*

Several participants made comments that highlighted the connection between their attitude towards bicycling and the onset of driving cars. For example, a 53 year old man said, *“Biking wasn’t as cool once people started getting their own cars. It was a little bit of an embarrassment when they were in their cars, and I was on my bike. I think things starting shifting where I would rather have someone pick me up from my house and go with them in the car than on my bike.”* Another 48 year old woman said, *“In high school I just kind of forgot about biking, I was so excited to be able to drive.”*

In addition, thirteen percent of participants said bicycling was abandoned due the increased distance to middle or high school. A 50 year old man said, *“Our high school was out in the middle of bean fields and corn fields and it would have been quite of a hike for anybody to ride their bike to school. In addition, several participants mentioned the increased demands of secondary school caused them to abandon bicycling. For example, a 27 year old woman said, “I just remember high school being an insanely busy time. And so that wasn’t what I did as recreation, and it also didn’t fit into my daily life.”*

Finally, there were other factors related to the abandoning bicycling in middle or high school for other modes of transport that were significant. Seventeen percent of participants mentioned hills and topography, twenty percent of participants said poor weather, thirteen percent cited rural roads, and twenty two percent said roads with high amounts of traffic were barriers to bicycling in their middle and high school years.

## DISCUSSION

How participants conceptualized their bicycles changed over the course of their youth. In early youth, many participants saw their bikes as fun “toys” that provided independence and were sometimes even considered “cool”. In later youth, bicycles were often supplanted by cars, which became the new symbol for fun and independence. For 30 percent of participants, bicycling was “off the radar” and relegated after elementary school as something “only kids do”. Bikes were abandoned for other modes of transportation, particularly walking and driving.

Participants cited numerous reasons for why they abandoned bicycling in later youth. For some participants, it had to do with a greater distance to school, or an increase in extracurricular activities or homework that led to a lack of time for bicycling. For others, walking and driving were preferred because those modes helped facilitate more social interactions with peers. In addition, hilly topography, poor weather, and perceived unsafe bicycling conditions were reasons given for the lack of bicycling in later youth.

However, it is significant that 39 percent of participants specified that bikes were “uncool” in later youth, and 20 percent used similarly negative terms to describe bicycling such as “nerdy, dorky, geeky, weird, lame, and for losers.” It is also noteworthy that the majority of these comments were made by women in reference to their high school years. In our study, high school youth, especially females, were particularly sensitive to negative images, even stigma, associated with bicycling. Adolescence is a time of identity formation (Weigert et al., 2006), and transportation mode choice may be tied to self-presentation for some teens. The extent to which bicycling can be stigmatized for high school aged youth is captured by the quote from above, “*If you were on your bike...especially in high school, then something is wrong with you.*” In some cases the negative image or stigma described was in relation to the participant themselves, and in other cases it was in relation to others. However, in cases where participants had abandoned their bicycles for other modes of transportation, it may have been that their attitudes towards bicycling were formed more by social norms and public images of bicycling rather than from their own experiences.

Our research showed that biking can be seen as “cool” by some sub-groups of adolescents. The “coolness” may be associated with the bike itself (a trendy or popular style of bike), a value (such as environmentalism or being “green”) or in some cases deviant behaviour that happens while biking. For some teens, a bike can even be associated with status and self-esteem. The relative “coolness” of biking seems to be dependent upon the values and meanings ascribed by teens as a group to bicycling. The quote from above illustrates this point, “*I do remember when it was seen as cool...there was a small group that thought it was really cool that I rode my bike and they did too.*” It should be noted that this quote comes from a participant who lived in Palo Alto, where bicycling is a normal activity.

Cars and driving were prominent in the discussion of bicycling in youth. For some participants, it was the relative “coolness” of cars and driving that contributed to the “uncoolness” of bikes and bicycling. Teenage aspirations for cars and driving may help to explain why bicycling has historically been a less acceptable mode of transportation, especially when cars are associated with high status among peers. However, this sentiment among youth may be changing. According to Sivak et al, over the past 25 years the percentage of young people who have a driver’s license in the U.S. has declined substantially (Sivak & Schoettle, 2011). Economic barriers as well as changing attitudes towards driving and car ownership in youth could promote long-term reductions in car use and more active travel, including bicycling (Driscoll, 2011; George, 2010).

In summary, these results suggest that if bicycling is not socially normalized or seen as “cool” in a community, teenagers are less likely to accept it. This is especially true for girls, a finding that may help to explain lower rates of bicycling among women in countries with low rates of utilitarian bicycling (Garrard, Rose, & Lo, 2008). Even when teenagers themselves still enjoy bicycling, they may be loath to continue bicycling if social norms discourage them. This quote, from above, perfectly encapsulates this point: *“I still liked biking, but it wasn’t enough to get me through the peer pressure.”* The supremacy of social norms over individual attitudes in relation to bicycling has important implications for policy.

### **Policy Implications**

Cultural stigmas can be challenging to overcome, but making bicycling “cool” may be the first step toward increasing support for bicycling as transportation for the teen population. According to the Safe Routes to School Partnership (2011), “messages about bicycling as a way for students to be active and have fun may be a better starting point than trying to start a program focused on riding to school.” Starting a bicycling club or team may be a good way for teens to take ownership of a program and its goals, which may help bicycling to be embraced as “cool” by other teens in the region. This requires that youth leaders are recruited, trained and supported to create innovative strategies that will be effective with their peers.

In some cases, stigma may be overshadowed and confounded by the issue of bicycle access. Many low-income youth in the U.S. do not have access to safe bicycles and cannot afford to get their bicycles repaired. Community bike shops located in low-income communities can help overcome this barrier. In addition to classes, used bike sales and self-service repair space, some of these shops may operate an ‘earn-a-bike/build-a-bike’ program geared especially for young people (Cycles of Change, 2011 ; Recycle-A-Bicycle, 2011 ). Youth learn in-depth bike mechanics and build up a bike of their own by the end of the session.. Another type of program incorporates bike education into the middle and high school curriculum, preparing students for careers in the bicycle industry (Project Bike Trip, 2011). Some programs are tailored exclusively for girls, who tend to bicycle less than boys in adolescence

However, the experiences of European countries like the Netherlands, Denmark, and Germany, where high bicycling rates continue throughout the teenage years and into old age (J. Pucher & Buehler, 2008), suggest that policies about driving may be even more important than bicycling programs. The legal age for a motor vehicle driver’s license in many European countries is 18 years. In addition, there are high fees and strict training requirements to obtain a driver’s license (Buehler, 2010; European Union Commission, 2010 ; National Research Council, 2001; Nivola, 1999; J. Pucher & Buehler, 2010). The UK Department of Transport reports that in 2009 the top three reasons teens ages 17 to 20 gave for not driving include the following: “cost of learning to drive,” “cost of buying a car,” and “cost of insurance” (Department for Transport, 2009 ). The fact that many European adolescents must wait two or more years more than adolescents in the U.S. to get their driver’s license and also pay significant fees means that their aspirations to drive and own a car are delayed. As a result, they rely on alternative, cheaper means of transportation, including bicycling.

The U.S. has also moved toward restricting driving among teenagers, although to a lesser degree. X states in have adopted graduated driver licensing (GDL) laws that restrict the conditions under which young drivers can drive and require new drivers to obtain a year or more of experience before receiving a regular license (Insurance Institute for Highway Safety and Highway Loss Data Institute, 2011 ; National Highway Traffic Safety Administration, 2011). Research demonstrates that GDL laws reduce the incidence of teen driving injuries and fatalities (Chen, Baker, & Li, 2006; Foss & Goodwin, 2003; Shope & Molnar, 2004). The benefits of this are tremendous, since mile for mile teenagers are involved in three times as many fatal crashes as all other drivers (McCarthy & Brown, 2004; National Highway Traffic Safety Administration, 2011 ). There is also evidence that these laws may potentially reduce the number of youths licensed to drive (Ferguson, Leaf, Williams, & Preusser, 1996; Frith & Perkins, 1992). By discouraging teenagers from acquiring licenses and restricting their driving when they do, these GDL laws may inadvertently helping to promote bicycling.

In addition to GDL laws, limiting student parking or charging parking permit fees at high school campuses is another strategy that might encourage students to use other modes of transportation. Henry M. Gunn High School in Palo Alto, California implemented a parking permit program to discourage unnecessary driving, and to incentivize carpooling, taking public transit, bicycling and walking. Students who carpool to school receive preferred parking. Motivated by environmental concerns, the program was created by students themselves, helping to reduce social stigmas against bicycling. In Davis, however, proposed parking fees at the high school have met stiff resistance from parents and others. Adopting any restrictions on driving, particularly those that do not have a direct impact on safety, remains politically challenging in the U.S.

### **Study Limitations**

Several limitations of this study should be noted. The sample was limited to 54 participants currently living in Davis, where their experiences with bicycling are not likely to be typical of other communities in the U.S. However, while 27 participants spent their youth exclusively in the western U.S., including five people who grew up exclusively in Davis, the rest spent their youth elsewhere in the U.S. and internationally. In this regard, our study drew on narratives from a much wider geographic distribution than just Davis, which may contribute to its generalizability.

The guiding questions prompted participants to reflect on their past experiences with bicycles, but reconstructing a “mobility biography” may raise concerns about validity due to missing, selective or mistaken memory on the part of participants, or their own wrong assessment of their experiences (Pooley, Turnbull, & Adams, 2006; Scheiner, 2007). In this regard, data may have been skewed in favor of individuals who had better memory recall. However, using a systematic chronological approach to constructing a “bicycling biography” with participants may have helped to improve memory recall for some participants.

Although the focus of the analysis was on adolescent attitudes to bicycling, we did not conduct interviews with contemporary adolescents. The accounts provided by adult retrospectives are reconstructions of their past experiences and attitudes and they may not reflect attitudes of current day youth (Weigert et al., 2006).

## **CONCLUSION**

Even when teenagers themselves still enjoy bicycling, they may be loath to continue bicycling if social norms discourage them. High school youth, especially females, may be particularly sensitive to negative images, even stigma, associated with bicycling. Investigating the attitudes and underlying meanings and values that adolescents ascribe to bicycles and bicycling will improve our understanding of the conditions that contribute to negative image and stigma towards bicycling. Improving positive attitudes towards bicycling is vital to increasing rates of bicycling in the teen population. Improved attitudes may be achieved through bicycle promotional programs developed by and for teens, or restrictive licensing or driving policies. Further research should be conducted with adolescents from varying minority and ethnic groups, residential settings, and income groups. In addition, the attitudes of sub-groups of adolescents who are known to have either distinctive positive or negative attitudes to bicycling should be investigated.

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