12-1996

The Effect of University Characteristics on the Bicycle Transportation Mode and Helmet Usage

Carlton C. Urban
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Carlton C. Urban entitled "The Effect of University Characteristics on the Bicycle Transportation Mode and Helmet Usage." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Civil Engineering.

Lee D. Han, Major Professor

We have read this thesis and recommend its acceptance:

Frederick Wegmann, John Tidwell

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Accepted for the Council:

Associate Vice Chancellor and
Dean of The Graduate School

The Effect of University Characteristics on the Bicycle Transportation Mode and Helmet Usage

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Carlton C. Urban
December 1996

DEDICATION

I would like to dedicate this thesis to my family and the friends who have supported me during my education at The University of Tennessee. In addition, I dedicate it to engineers who encourage the bicycle transportation mode and bicycle helmet usage in their respective communities.

ACKNOWLEDGMENTS

I am grateful to my committee members Dr. Lee Han, Dr. John Tidwell, and Dr. Frederick Wegmann for being a part of this innovative and creative research experience. I also wish to thank the numerous bicyclists who responded to my survey that was established on the Internet (Please see the University Reference section for individuals who wished to be recognized). Without these individuals, this thesis would not have become a reality.

ABSTRACT

By performing a statistical analysis on data collected from the Internet, this study sought to determine if designated characteristics of a university actually affect the bicycle transportation mode and helmet usage on college campuses. The focus group for this research experience involved bicycle commuters affiliated with universities in the United States. Through the establishment of a World Wide Web home page and on-line survey, the author obtained data concerning estimated bicycle and helmet usage percentages, and campus characteristic data from bicyclist responses. The Internet was used as an innovative approach to collecting data. Essentially the participant would simply locate the survey from one of the recreation-bicycle newsgroups, complete the survey, and then submit the survey. Once submitted, the data were transferred into the established researcher's electronic mail (e-mail) account.

The bicyclist survey established on the Internet involved ten questions to estimate and evaluate bicycling activities on various campuses. Once the data were obtained, a multiple linear regression analysis was performed to explore and establish two separate models. The dependent variables for model one and model two, respectively, were estimated bicycle usage and estimated bicycle helmet usage. The first model explains the estimated bicycle usage as a function of various university characteristics, and the second model links the estimated helmet usage to various university characteristics. The university characteristics or independent variables consisted of 1994-95 full and part-time undergraduate and graduate combined enrollment, campus size, campus setting, estimated length of bicycle season, mean temperature during bicycle season, mean precipitation/

snow during bicycle season, lowest on-campus speed limit, highest on-campus speed limit, campus terrain, automotive congestion rating, designated bicycle lane facility rating, crime rating, automotive parking rating, and bicycle rack facility rating. After establishing two models, a randomly selected group of universities was used to test for accuracy. The accuracy produced from the equations of both models was limited. Therefore, the university characteristics considered had a minimal affect on the bicycle transportation mode and helmet use.

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CHAPTER I

INTRODUCTION

Background

A university environment provides students, faculty, and on-campus personnel with a variety of transportation options. The bicycle mode of transportation is a viable option for a college setting. This study sought to determine whether or not designated university characteristics affect bicycle usage and helmet usage on a campus. Estimated bicycle use for this study will reflect a bicyclists perception of bicycle trips made via bicycle considering a total university enrollment. College campuses vary in many ways. "University characteristics" is the descriptive term used to represent physical and other attributes of a campus. By performing a statistical analysis on various characteristics such as enrollment, campus size, campus terrain, campus setting, speed limits, bikeway and bicycle rack facilities, weather conditions, crime occurrence, and automotive congestion, this study sought to determine which of these characteristics possibly affect bicycling and helmet usage on campus.

Scope

This study involved collecting data via the Internet from university bicyclists throughout the United States. Internet newsgroups concerning bicyclists were considered for this research since this population group might be interested in such a survey. It was assumed that the bicyclists responding to the survey were affiliated with their respective

university (student, faculty, bicycle coordinator, etc.). Also, an individual was considered a bicycle commuter if he/she bicycled from an on or off campus residence.

To determine the effects of campus characteristics on bicycle usage and helmet usage percentages, a multiple linear regression analysis was considered for this study. Equations were developed for the representation of model 1, "the Bicycle Usage Model," estimated percentage of bicycle usage as a function of multiple university characteristics, and for model 2, "the Bicycle Helmet Usage Model," estimated percentage of helmet usage as a function of multiple university characteristics. The final equations would be constructed by eliminating variables through scatter diagrams, regression analysis of individual variables, and radar diagram analysis of the top and bottom universities. Once the impact university characteristics were determined, a randomly selected group of universities would be used to test the final multiple linear regression models.

CHAPTER II

LITERATURE REVIEW

A National Direction

The U.S. Government's 1990 National Transportation Policy incorporates the increased use of bicycling, and encourages planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas [1]. In conjunction with this federal policy, a National Bicycling and Walking Study (NBWS) was conducted by the Federal Highway Administration (FHWA) to increase the use of these two travel modes by developing a plan for making bicycling and walking safer and more appealing modes of personal transportation [2]. The specific goals of the NBWS included:

- To double the percentage of total trips made by bicycling and walking in the U.S. from 7.9% to 15.8% percent of all trips; and
- Simultaneously reduce by 10% the number of bicyclists and pedestrians killed or injured in traffic crashes [2].

Currently, research efforts are being directed toward the development of a model survey for determining levels of bicycling and walking in individual States and communities, a study of the various facilities on generating walking or bicycling trips, and a plan for studying safety effects of such facilities [2]. Hence, these studies will provide information to States and localities to use in planning and conducting bicycle and pedestrian programs [2].

Bicycle Use in the United States

Everyday in the U.S. more than 2 million trips to work and school are taken by bicycle [1]. In a 1991 survey conducted by the U.S. Consumer Product Safety Commission (CPSC), active bicyclists were found in about 29% of all U.S. households [3]. The FHWA stated, of all modes, the bicycle is the only one for which preference is consistently greater than choice [3]. To elaborate, the public expresses interest in bicycling given the right circumstances. Safe bicycle lanes and secure parking were cited as being two critical factors for people considering a commute via bicycle. In a FHWA study on demand incentives to promote bicycle usage, special facilities were cited to play a prominent role for increasing use. Other factors that influenced bicycle mode choice included distance, safety, time, convenience, climate, topography, and available facilities. Primary disincentives for potential bicyclists included fear of traffic, lack of places to ride, and weather conditions. However, the everyday cyclist revealed that distance, safety, and inadequate facilities were the greatest obstructions.

Bicycle Helmet Use in the United States

The bicycle helmet has been found to be the most effective safety device to prevent serious injury. A decrease in bicycle related fatalities and serious head injuries can be attributed to cyclists who wear helmets. Previous research has found that individuals who wear bicycle helmets reduce their risk to injury by 85% [4]. Two factors cited as influencing helmet usage included: when the bicyclist was riding in traffic, and when the bicyclist was on a long ride. Factors cited by bicyclists that warranted no helmet usage included riding a short distance, not riding in traffic, riding at low speeds, and riding on

bike paths. In general, helmet use was found to be higher among those adults who belonged to bicycle clubs. Helmet use among college students and the less informed general adult population was considerably lower.

Exploring a Vast Array of Universities

College students have shown an interest in the bicycle transportation mode because of the low cost of travel, residence fairly close to campus, physical fitness benefits, and environmental concerns [5]. However, very few university campuses or college cities/towns have conducted and publicized studies to analyze percentages for bicycle and/or helmet use. One such study, a 1992 observational study of 1000 students bicycling at the University of Florida found that 2% of the bicyclists were wearing helmets [6]. Another study conducted in 1986 by the city of Madison, WI, found that 23% of the residents used the bicycle as the primary transportation mode[7]. Of that percentage, helmet usage for these respondents was at 12% [7].

Research data, papers, and publications were limited when researching bicycling in a university environment. Therefore, this research study sought to provide information and analysis concerning the bicycle transportation mode for a variety of U.S. college campuses.

CHAPTER III

DATA COLLECTION

The following chapter describes the data collection process used for this research study. Before constructing the questions for the research survey, variables were hypothesized and measured for model 1, the Bicycle Usage Model, and for model 2, the Bicycle Helmet Usage Model. The Bicycle Usage Model evaluates the affect multiple university characteristics have on estimated bicycle use percentages. Whereas, the Bicycle Helmet Usage Model analyzes the impact multiple characteristics have on estimated percentages of bicycle helmet use. Once a survey was constructed on the Internet to analyze the selected percentages and variables, the participant would access the survey. From the survey Web site, the user could simply complete and submit the entered information to the researcher.

Variables Hypothesized For Model 1

Bicycle usage was hypothesized as possibly being a function of various university characteristics. The rationale behind the selected university characteristics are listed below.

- Enrollment constitutes a majority of a campuses population. Therefore, a larger student population might be paralleled to an increase in the percentage of bicycle use.
- Campus size might be a good measurement of commuting on-campus distances. Hence, A larger campus may increase the percentage of bicycle use due to a longer trip not suitable for walking.
- Campus setting in a rural, suburban, and urban environment could play a role in usage patterns. An urban environment could have a higher likelihood to increase the percentage of bicycle use.

- Length of bicycle season might be a good measure to determine the amount of months one is willing to bicycle on campus. A long bicycle season may lead to an increase in bicycle use and visa versa.

- Mean temperature during a campus bicycle season may shift potential bicyclists to other modes. Hot and/or humid conditions may cause a decrease in bicycle use.

- Precipitation and snow during a campus bicycle season may shift potential bicyclists to others modes. Rain and/or snow may cause a decrease in bicycle use.

- Low automotive campus speed limits may cause an increase in bicycle use. An individual may be more likely to bicycle when automotive speeds are low.

- High automotive campus speed limits may cause a decrease in bicycle use. An individual may be less likely to bicycle if the campus speeds are too high.

- Terrain may influence choice to use a bicycle. Bicycle use could decrease as the terrain approaches mountainous conditions or high street grades.

- Traffic congestion may influence choice to bicycle. If heavy automobile traffic conditions exist on campus, bicycle use may increase.

- Bicycling facilities may encourage bicycling. If bicycle lane facilities were widely available on campus, bicycle use may increase.

- Campus crime may affect the decision to bicycle. If theft was prevalent on campus, there may be a decrease of bicycle use on campus.

- Automobile parking or lack thereof may affect a decision to use a bicycle. If parking conditions were poor on campus, this may lead to an increase in other transportation modes including bicycling.

- Bicycle racks may encourage bicycling. The availability and proper placement of bicycle racks could promote bicycling and increase use.

Variable Measurements for Model 1

Each of the university characteristics or predictor variables identified earlier were assigned a measurement. Table 1 shows each predictor variable for the Bicycle Usage Model and the respective measurement.

Table 1. Variable Measurements for the Bicycle Usage Model

Y1 = Estimated Percentage of Bicycle Usage on a College Campus		
Predictor Variables		How variables were measured
X1	Enrollment	Nearest Thousand Individuals
X2	Campus Size	Acres
X3	Campus Setting	Assigned 0=rural, 1=suburban, 2=urban
X4	Length of Bicycle Season	Estimated Months
X5	Mean Temperature During Bicycle Season	Degree Fahrenheit during estimated bicycle season
X6	Mean Precipitation/ Snow During Bicycle Season	Inches of precipitation and snow combined during estimated bicycle season
X7	Lowest Campus Speed Limit	Lowest recognized mile per hour speed limit
X8	Highest Campus Speed Limit	Highest recognized mile per hour speed limit
X9	Campus Terrain	A rating from 0-10 evaluating a bicyclists perception of campus terrain
X10	Automotive Congestion Rating	A rating from 0-10 representing a bicyclists perception of automobile traffic
X11	Bike Lane Facility Rating	A rating from 0-10 representing a bicyclists perception of designated bike lanes
X12	Crime Occurrence Rating	A rating from 0-10 representing a bicyclists perception of crime on campus
X13	Parking Availability Rating	A rating from 0-10 representing a bicyclists perception of automotive parking
X14	Bike Rack Facility Rating	A rating from 0-10 representing a bicyclists perception of bike rack facilities

Variables Hypothesized for Model 2

In conjunction with the hypothesis of variables for model 1, variables of X_{13} (Parking Availability Rating), and X_{14} (Bike Rack Facility Rating) were eliminated as possible correlation's to helmet usage. The hypothesis for the Bicycle Helmet Usage Model variables included:

- Enrollment constitutes a majority of a campuses population. A larger student population may contribute to an increase in bicycle helmet use.
- Campus size might be a good measure of commuting on-campus distances. Larger campuses may increase bicycle helmet use due to a longer trip.
- Campus setting in a rural, suburban, and urban environment could play a role in usage patterns. An urban environment may contribute to a bicycle helmet use increase.
- Length of bicycle season might be a good measure to determine the amount of months one is willing to wear a bicycle safety device to campus. If there is a long bicycle season, an increase in bicycle helmet use may exist compared to a shorter season.
- Mean temperature during a campus bicycle season may shift potential bicyclists to other modes. Hot and/or humid weather are conditions that may discomfort the bicyclist and cause a decrease in bicycle helmet use.
- Precipitation and snow during a campus bicycle season may shift potential bicyclists to others modes. Treacherous weather conditions may increase bicycle helmet use.
- Low automotive campus speed limits may cause an decrease in bicycle helmet use. An individual will may be less likely to wear a bicycle helmet when automotive speed limits are low.
- High automotive campus speed limits may cause an increase in bicycle helmet use. An individual may be more likely to utilize a safety device if campus speed limits are too high.
- Terrain may influence choice to wear a bicycle helmet. Bicycle helmet use may increase as the terrain approaches mountainous conditions or high street grades.
- Traffic congestion may influence the decision to wear a safety device. If heavy traffic conditions exist on campus, bicycle helmet use may increase.

- Bicycling facilities may discourage bicycle helmet use. If bicycle lane facilities are widely available on campus, bicycle helmet use may decrease due to the safety provided by the bicycle lanes.

- Campus crime may affect the decision to wear a bicycle helmet. If crime was prevalent on campus, there may be a decrease of bicycle helmet use because of possible theft.

The variable X_{15} (Estimated Bicycle Usage on a College Campus) was added and hypothesized as the following:

- The percentage of individuals wearing a bicycle helmet may be parallel to the number of individuals who bicycle on campus. An increase in bicycle helmet use may be attributed to a larger percentage of campus bicyclists.

Variable Measurements for Model 2

Model 2 predictor variables measurements follow model 1 measurements except for the elimination of X_{13} and X_{14} with the addition of X_{15}. Table 2 shows each predictor variable and the respective measurement used in the evaluation for model 2.

Using the Internet for Data Collection

Data collection is a pivotal part of this study. While mail, telephone, and roadside surveys are still essential, the Internet can be used successfully to collect data. The processes presented in the remainder of this chapter obtained satisfying and positive results. These procedures could be used as a basic guide to collecting data.

Web Home Page Development

In order to collect data via the Internet, the data collection process began by setting up a World Wide Web home page. A home page is defined as, a Web site or document that is designed to be accessed and read over the World Wide Web (WWW)

Table 2. Variable Measurements for the Bicycle Helmet Usage Model.

Y2 = Estimated Percentage of Helmet Usage on a College Campus		
Predictor Variables		How variables were measured
X1	Enrollment	Nearest Thousand Individuals
X2	Campus Size	Acres
X3	Campus Setting	Assigned 0=rural, 1=suburban, 2=urban
X4	Length of Bicycle Season	Estimated Months
X5	Mean Temperature During Bicycle Season	Degree Fahrenheit during estimated bicycle season
X6	Mean Precipitation/ Snow During Bicycle Season	Inches of precipitation and snow combined during estimated bicycle season
X7	Lowest Campus Speed Limit	Lowest recognized mile per hour speed limit
X8	Highest Campus Speed Limit	Highest recognized mile per hour speed limit
X9	Campus Terrain	A rating from 0-10 evaluating a bicyclists perception of campus terrain
X10	Automotive Congestion Rating	A rating from 0-10 representing a bicyclists perception of automobile traffic
X11	Bike Lane Facility Rating	A rating from 0-10 representing a bicyclists perception of designated bike lanes
X12	Crime Occurrence Rating	A rating from 0-10 representing a bicyclists perception of crime on campus
X13	Parking Availability Rating	*
X14	Bike Rack Facility Rating	*
X15	Estimated Bicycle Usage on a College Campus	An estimated bicycle usage percentage

Note: * represents variable was not analyzed for correlation with helmet usage

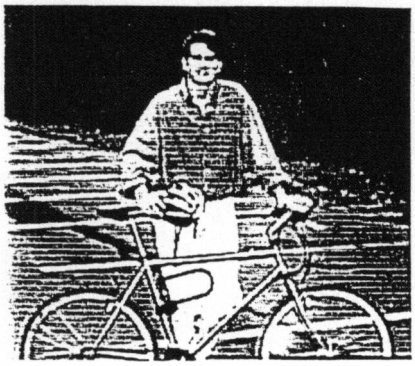
[8]. A Web home page is created through hypertext markup language (HTML) and proper Unix preferences [9,10]. A HTML for the home page is created by using text editors such as Pico or Emacs [11,12]. From the researcher's home page, another site for the survey was established. The user or participant could access the created survey by "clicking" on a highlighted word that triggers the established survey site. For example, the word "HERE" transferred the user from the home page to the Internet survey. The home page for this study, shown in Figure 1, was accessed at Uniform Resource Locator (URL) http://funnelweb.utcc.utk.edu/~ccuut. The URL is simply the address used for the researchers home page.

Web Survey Development

Knowing that surveys are generally unpopular with the public, the Internet survey was limited to 10 questions. Questions ranged from asking the bicyclist to estimate bicycle and helmet usage percentages to numerically rate various university characteristics. University characteristics such as weather, campus setting, and enrollment data were collected from university and weather home pages on the Internet and from a variety of collegiate information texts [13][14][15]. The remainder of the data required were obtained from the Internet survey.

The Internet survey questions were written using HTML. Figure 2 presents the questions the participants were asked to complete. The survey was completed by simply typing in basic information about themselves and estimating variables with a keyboard and clicking the appropriate circles or boxes with a computer mouse. In order to receive the participants submitted entries, a computer script was written for the survey HTML. The

CARLTON'S PAGE FOR BICYCLISTS



Carlton C. Urban, Engineer-In-Training

University of Tennessee, Knoxville

M.S. in Civil Engineering, August 1996
Transportation Specialization

University of Pittsburgh, Pittsburgh

B.S. in Civil Engineering, April 1994
Certificate in Transportation Eng.

I appreciate your interest in the bicycle study I am conducting at the University of Tennessee. In addition, the time you will take to complete the short 10 question survey is of great value to me. Your estimations and observations about bicyclists and university characteristics will be of great help!

To access survey for University Bicycle Commuters please press HERE

Let's Make a Difference in Transportation- Bike On!

Figure 1. Author's Internet World Wide Web home page.

Survey Form

If you would like to see your schools enrollment data before you begin the estimating process clickHERE

Name:

Email Address:

University:

Affiliation with school:

Please use your best judgment when completing survey.

Observed/ Estimated Bicycle Characteristics of your University.

Please enter a numerical value in each space provided.

1. Estimate a percent range of individuals that Bicycle to or on campus.

From Low☐% to High☐%

2. Estimate a percent range of bicyclists that wear a bicycle helmet on campus.

From Low☐% to High☐%

Observed/ Estimated University Characteristics.

Mark appropriate space(s).

3. Which MONTHS of the year is the weather favorable for bicyclists to commute around or to campus?

☐JAN ☐FEB ☐MAR ☐APR ☐MAY ☐JUN
☐JUL ☐AUG ☐SEP ☐OCT ☐NOV ☐DEC

4. On a scale from 0 to 10, which campus terrain is most prevalent on campus?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

Flat.....Rolling.....Mountainous

5. Please mark the LOWEST and HIGHEST posted speed limit for automotive vehicles on or bordering campus from the speeds listed below.

☐5mph ☐10mph ☐15mph ☐20mph ☐25mph ☐30mph ☐35mph
☐40mph ☐45mph ☐50mph ☐55mph ☐60mph ☐65mph ☐70mph

Figure 2. Author's Internet World Wide Web survey.

6. Automotive congestion on campus and on surrounding roads would be best described as?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

Light.....Moderate.....Heavy

7. Designated bike lane, bikeway, or bike path facilities on or connecting to campus are?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

Non-Existent.....Sparse.....Dense

8. On a scale from 0 to 10, the occurrence rate of crime(in general)on campus is?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

None.....Occasional.....Frequent

9. The Availability of Automotive Parking on campus is?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

Poor.....Moderate.....Excellent

10. Designated Bicycle Rack Facilities on campus provided for bicyclists would be rated as?

○0 ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10

Poor.....Adequate.....Superior

Would you like to be acknowledged in the reference section of the research paper?

○YES ○NO

Please click submit button so I can receive your data

submit

Thank you, Carlton

Figure 2. Author's Internet World Wide Web survey (continued).

computer script allowed the participant entries to be transferred into an e-mail account which was established at curban1@utk.edu. A computer script language can be created using languages such as PERL, TCL or Unix Shell Script [16,17,18]. For this research experience, PERL computer script language was selected. Once the computer script was written for the survey, participants were sought.

Acquiring Avid Bicyclists

Once the on-line survey was properly functioning, it was time to "post" or essentially type a letter in an Usenet, a world wide network exchanging news bulletins under categories called newsgroups [28]. Furthermore, these newsgroups provide the opportunity for numerous individuals to exchange information, opinions, and ideas about numerous topics. For this study, bicycling topics were found in recreation newsgroups:

- rec.bicycles.tech
- rec.bicycles.soc
- rec.bicycles.misc
- rec.bicycles.off-road
- rec.bicycles.rides
- rec.bicycles.racing
- rec.bicycles.marketplace

A newsgroup listing can be accessed by typing: http://www.bates.edu/resources/usenet/ [19].

Direct Access from Newsgroup to Survey

Once the researcher believes that he/she has chosen newsgroups applicable to participate in the transportation study, a letter is "posted" in target newsgroups. Posting a letter is simply typing a letter to inform, question, and share your thoughts with others

familiar with the newsgroup . It is essential that the URL be located somewhere in your letter. The letter posted in each of the previously mentioned newsgroups is shown in Figure 3. From there, the participant can simply "click" the address, and the researcher's home page will appear. After connecting to the home page, the participant can access the survey, complete it, and submit the data in a matter of minutes. As a quick reference, a flowchart, shown in Figure 4, was created to represent the actions for both the researcher and the participant.

Obtaining Data

After the letter was posted in the Usenet, responses were received. The letter was reposted approximately every two weeks to ensure that the letter was updated and listed as a new entry. In general, there tended to be a backlog of letters, and the letter tended to "get lost" amid other posted newsgroup letters. As responses were collected, a statistical sample size had to be established. After approximately one month, over 100 bicyclists had responded representing 100 different universities across the U.S. The distribution of responses collected from the Internet is shown in Figure 5. As shown, an outstanding coverage of the U.S. is represented. A sample of the data sheet collected through the e-mail account is shown on Figure 6. Some universities including but not limited to the University of Wisconsin and the University of Washington had more than one bicyclist respond. In this case, the mean was taken of the values received. In addition, the bicyclists were asked to estimate a percentage range of bicycle and helmet usage for his/her respective campuses. Allowing a range provided the bicyclist with an easier estimating task instead of requiring a specified number. The mean was calculated for this

Subject: Calling All University Bicycle Commuters!
Date: Fri, 28 Jun 1996 10:44:49 -0700
From: "Carlton C. Urban" <curban1@utk.edu>
Organization: University of Tennessee, Knoxville
Newsgroups: rec.bicycles.misc

Fellow Cyclist,

I am conducting a short questionnaire that will be used to promote the bicycle transportation mode and safety on United States college campuses.

If you are a student, faculty or on-campus personnel and bike to campus, please access my survey set up at

http://funnelweb.utcc.utk.edu/~curban

Your observations and estimations would be of great interest to me.

Thank you for your participation.
"Let's Make A Difference In Transportation....Bike On!"
Carlton Urban

Figure 3. Letter Posted in Usenet.

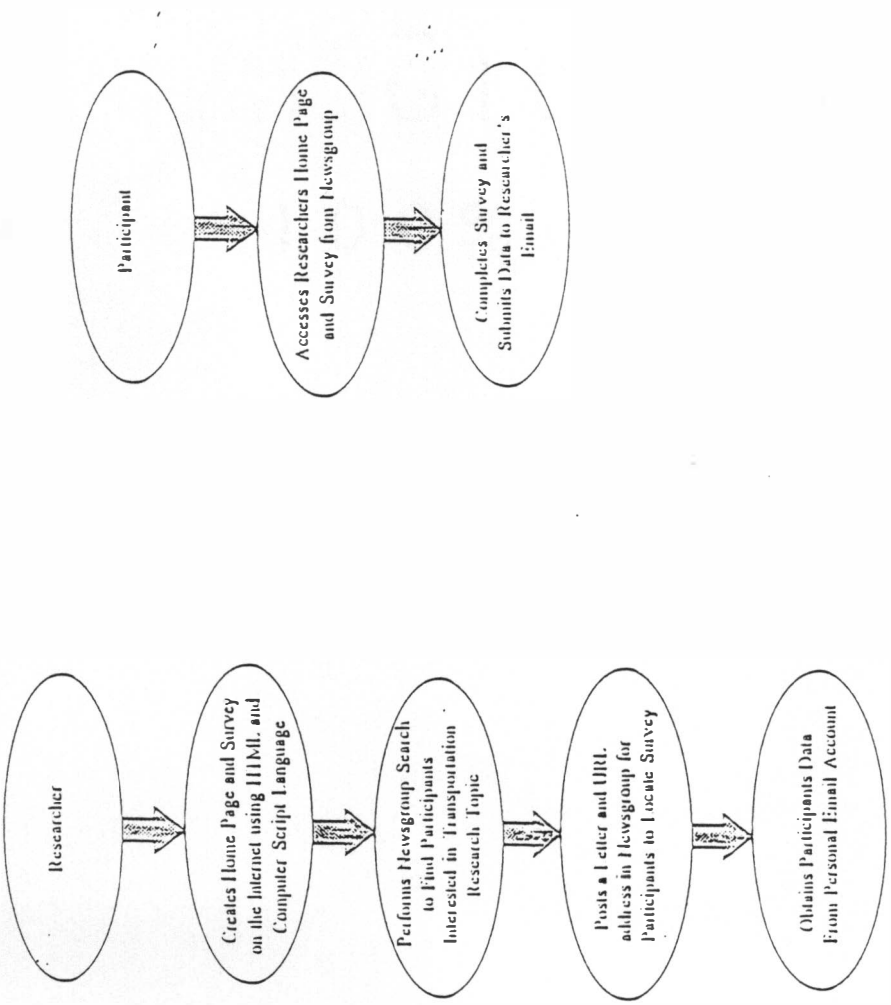


Figure 4. Flowchart of Researcher's and Participant's Actions.

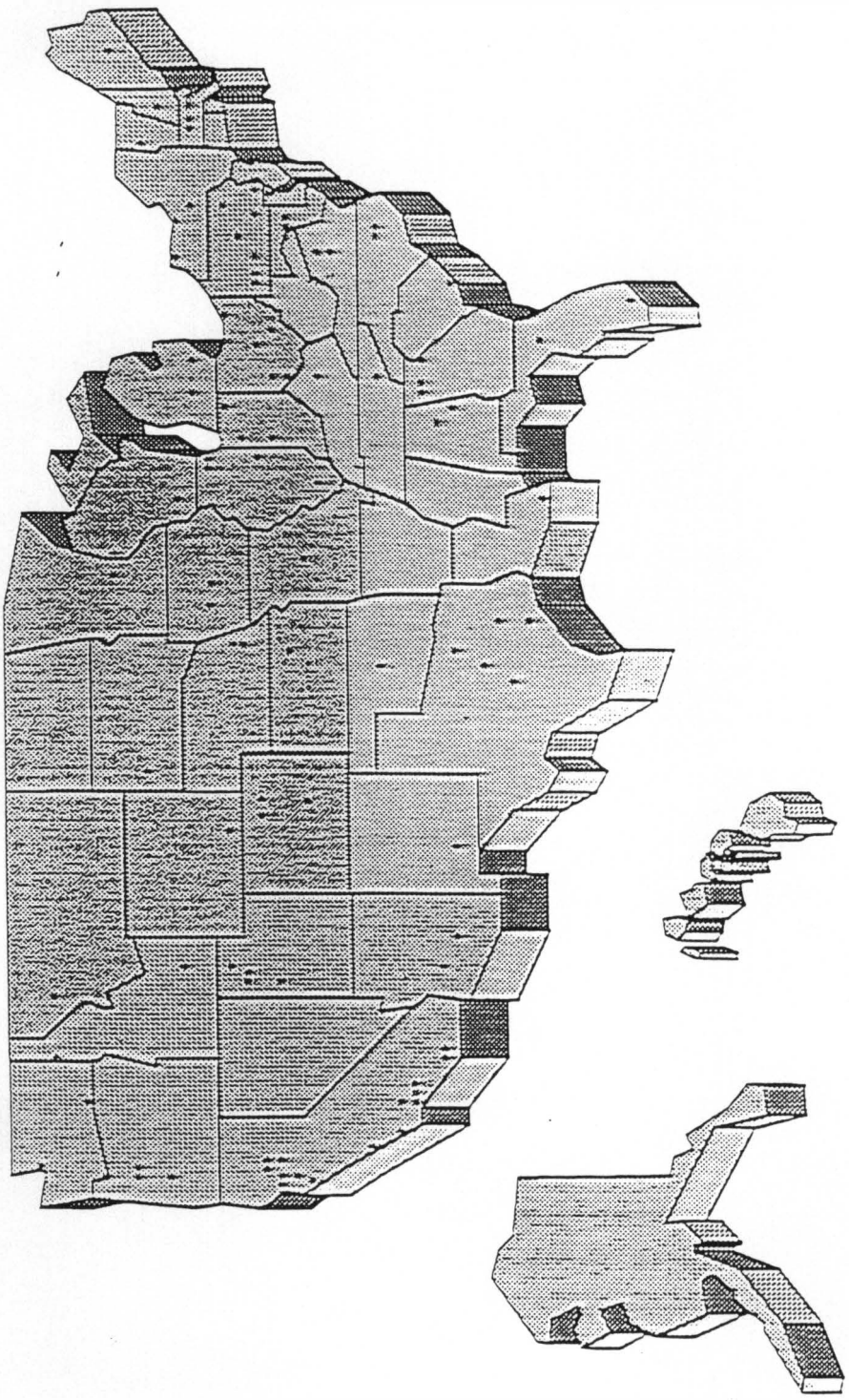


Figure 5. Geographical Representation of Survey Responses.

```
Date: Mon, 8 Apr 1996 21:36:08 -0400
From: gingrasg@tony.bc.edu
To: curban1@utk.edu
Subject: University Bicycle Survey

NAME OF PARTICIPANT: Gary Gingras
UNIVERSITY: Boston College
AFFILIATION WITH SCHOOL:  Student & Employee
(Y1)(X15)LOW BICYCLE PERCENTAGE: 30
(Y1)(X15)HIGH BICYCLE PERCENTAGE: 35
(Y2)LOW HELMET PERCENTAGE: 15
(Y2)HIGH HELMET PERCENTAGE: 20
[ ] JAN
[ ] FEB
[ ] MAR
[X] APR
[X] MAY
[X] JUN
[X] JUL
[X] AUG
[X] SEP
[X] OCT
[ ] NOV
[ ] DEC
[X] 5mph
[ ] 10mph
[X] 15mph
[ ] 20mph
[ ] 25mph
[ ] 30mph
[ ] 35mph
[ ] 40mph
[ ] 45mph
[ ] 50mph
[ ] 55mph
[ ] 60mph
[ ] 65mph
[ ] 70mph
(X9)The TERRAIN is: 7
(X10)The AUTOMOTIVE CONGESTION is: 7
(X11)DESIGNATED BICYCLE LANE FACILITY RATING is: 3
(X12)The CRIME OCCURRENCE RATING is: 2
(X13)AUTOMOTIVE PARKING AVAILABILITY is: 3
(X14)BICYCLE RACK FACILITY RATING is: 6
REFERENCED: YES
```

Figure 6. Sample of Electronic Mail Data Sheet.

range to come up with a representative bicycle usage and helmet usage percentage for the university. The data for variables representing each university are shown in Appendix A. Weather data, predictor variables X_7 and X_8 ,were determined by taking the months the bicyclist marked on the survey and evaluating the mean of the temperature and precipitation/snow data of these months. Appendix B shows the elaborate calculation of weather data for each respective campus. For other university characteristics where more than one bicyclist responded, values were always rounded up from 0.5.

CHAPTER IV

DATA ANALYSIS

After acquiring an adequate sample size, the information would be analyzed using the linear regression model. Before applying the linear model, variables were eliminated by using a variety of techniques. The techniques used for university characteristic elimination for both model 1 and model 2 included a scattar diagram analysis, radar diagram analysis, and a regression analysis of each independent variable with respect to the dependent variable. Once arriving at the meaningful or impact university characteristics, multiple linear regression was performed using these variables to arrive at the final equations. These equations were then tested using a random group of universities to test both model equations for accuracy.

The Linear Model

The linear model follows the form of:

$$Y = b + \sum_i m_i X_i \qquad \text{where}$$

Y = dependent variable
X = independent variable(s)
m = slope coefficients corresponding to x
b = constant value/intercept

To visualize the distribution of data, scatter diagrams were constructed for each university characteristic with respect to Y_1 and Y_2. From the diagrams, if the data were grouped together, a higher correlation would exist between the Y and the X. Individual scatter diagrams are shown in Appendix C to display the distribution of data for both models. As

shown, it is very difficult for the researcher to interpret this data since the distribution of data is spread out for each plot. Therefore, a radar diagram and a computer linear regression analysis was needed to interpret the best fit and establish final models.

Factors Making a Difference-- Comparing the Top and Bottom 10 Universities

After constructing scatter diagrams, an analysis was performed by comparing the university characteristics using radar diagrams. A radar diagram was prepared by using the data from the top 10 and bottom 10 universities for both models. These diagrams were used to analyze large differences in shape between the extreme universities (i.e., top 10, and bottom 10 universities). These differences would possibly explain which university characteristics have the most effect on bicycle and helmet usage. An average was then taken of the top and bottom data sets to obtain these diagrams.

After the data sets were averaged, the top 10 and bottom 10 universities for both models were normalized to a scale between 0 and 1 and then plotted. For radar diagram analysis purposes, the diagrams for each model were superimposed to visualize the differences. From the data collected for estimated bicycle usage percentages, the top 10 and bottom 10 universities are shown in Table 3.

Table 3. Top and Bottom 10 Bicycle Usage Universities.

	Top 10		Bottom 10
1	University of Delaware	100	University of the Pacific
2	University of California- Davis	99	Utah State University
3	Stanford University	98	S. Dak. Sch of Mines & Tech
4	University of California- S. Barbara	97	University of Georgia
5	Oregon State University	96	Hampshire College
6	California Institute of Tech.	95	Purdue University
7	University of Oregon	94	University of Notre Dame
8	University of Texas	93	University of Rochester
9	University of Colorado	92	University of San Diego
10	University of Michigan	91	University of Utah

For model 1, the variables with marked difference between the two groups included X_1, X_2, X_6, X_{11},X_{12}, X_{13}, and X_{14}. To visualize the differences of the university characteristics for model 1, the radar diagrams are shown consecutively as Figures 7 and 8. From the data received on helmet usage, the top and bottom 10 universities are shown in Table 4.

Table 4. Top 10 and Bottom 10 Helmet Usage Universities.

	Top 10		Bottom 10
1	Univ. of Colorado- Colorado Springs	100	Michigan State University
2	University of Michigan	99	Southern Methodist University
3	University of California- Santa Cruz	98	Utah State University
4	Harvard University	97	S. Dak. Sch of Mines & Tech
5	Rice University	96	Ohio University
6	University of Miami	95	Franklin& Marshall College
7	University of Washington	94	The Ohio State University
8	University of Alabama- Birmingham	93	University of Utah
9	University of the Pacific	92	Iowa State University
10	University of Rochester	91	Towsen State University

For model 2, the predictor variables that varied to a large degree using engineering judgment included X_3, X_7, X_8, and X_{12}. To visualize the difference of university characteristics for model 2, the radar diagrams are shown consecutively as Figures 9 and 10.

Linear Regression Analysis and Evaluation of Model 1

Model 1 was established earlier as estimated bicycle usage percentage versus multiple university characteristics. Step one in the analysis was to eliminate variables with an extremely low individual R^2 coefficient. Separate linear regression analyses of each university characteristic versus bicycle usage were performed. Table 5 presents the R^2 values that were found:

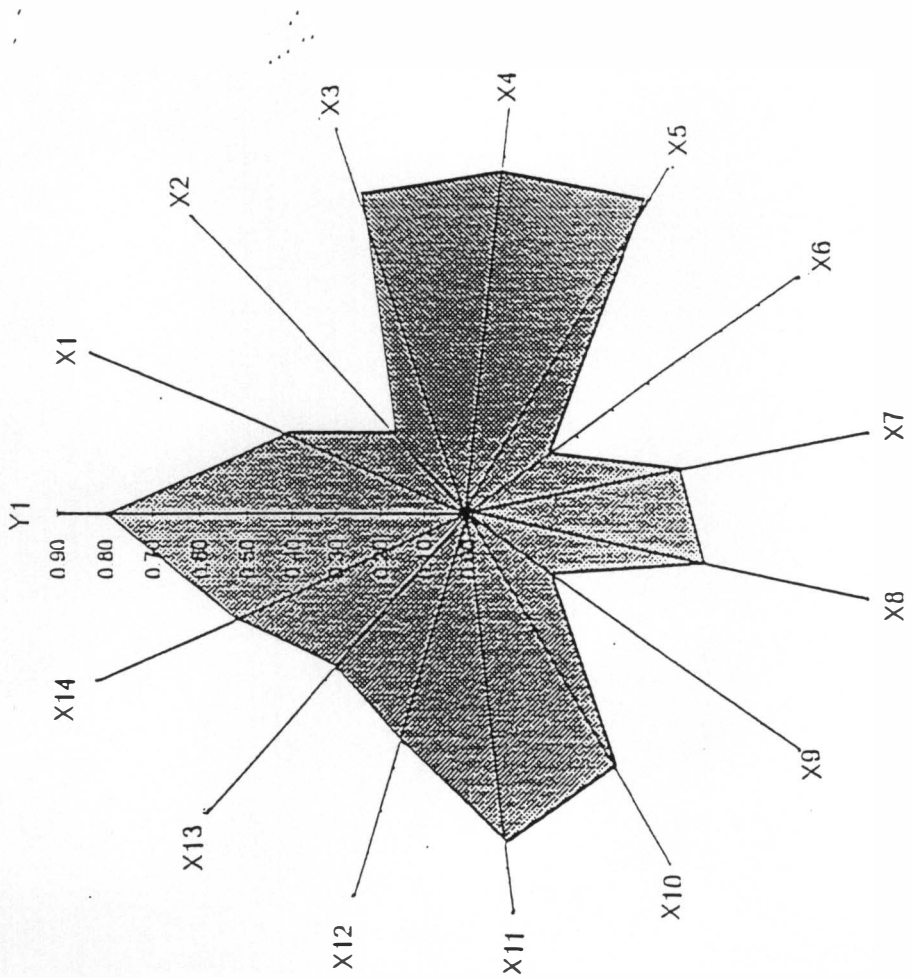


Figure 7. Radar Diagram of Top 10 Bicycle Usage Universities.

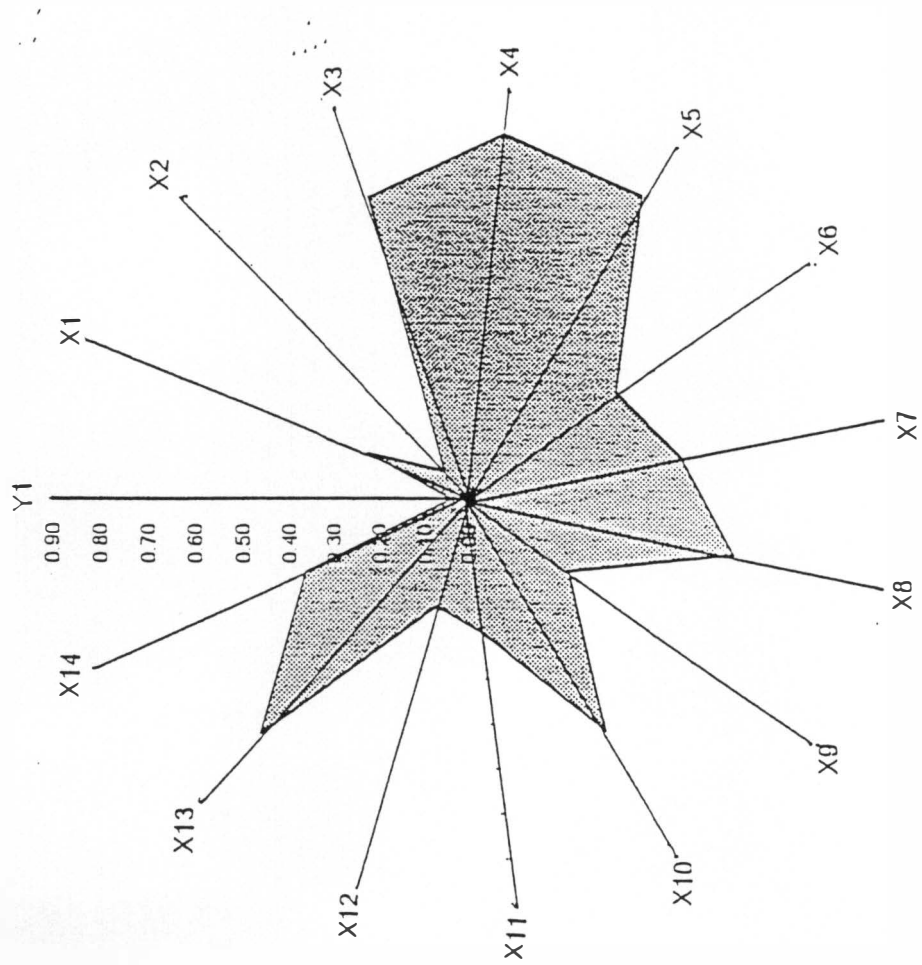


Figure 8. Radar Diagram of Bottom 10 Bicycle Usage Universities.

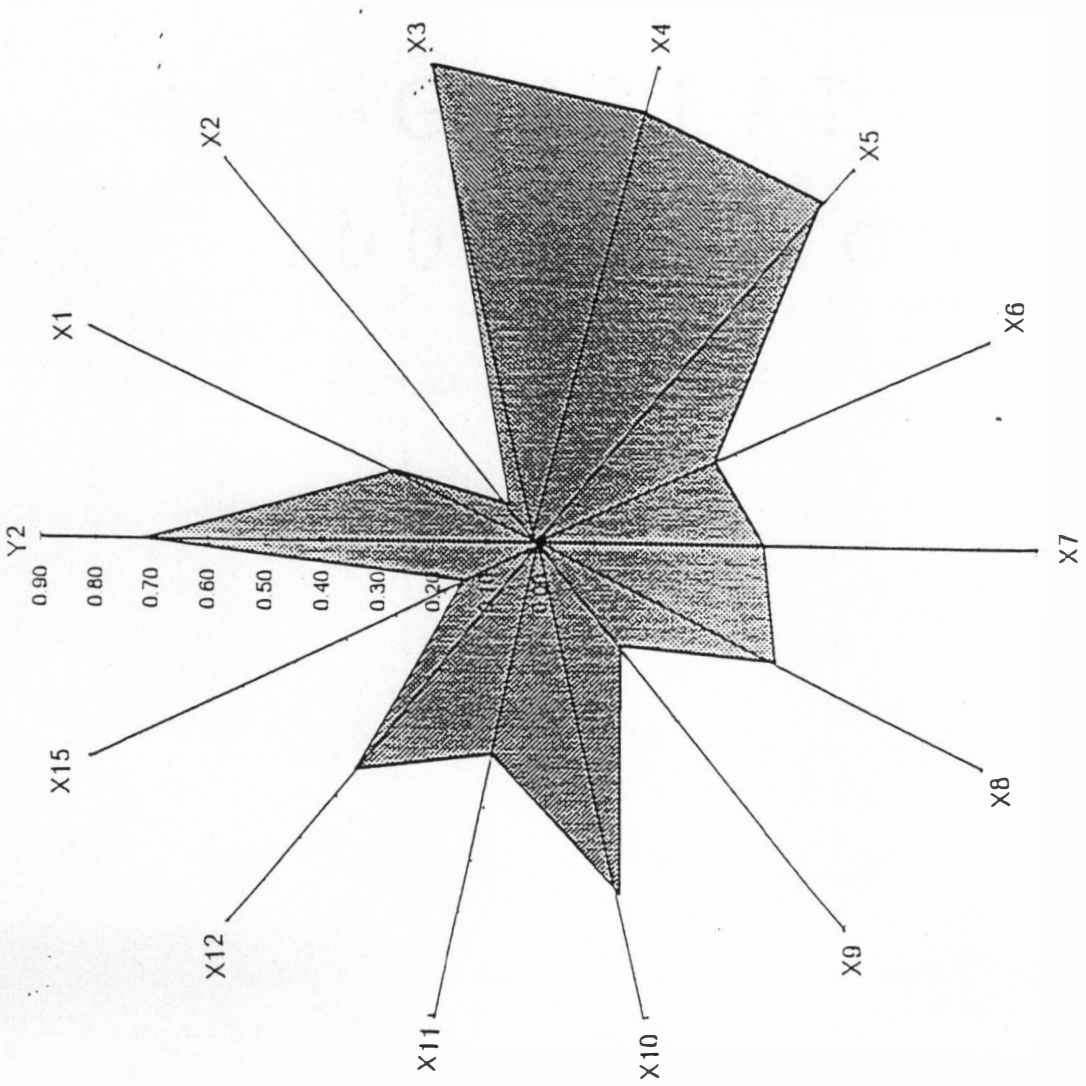


Figure 9. Radar Diagram of Top 10 Helmet Usage Universities.

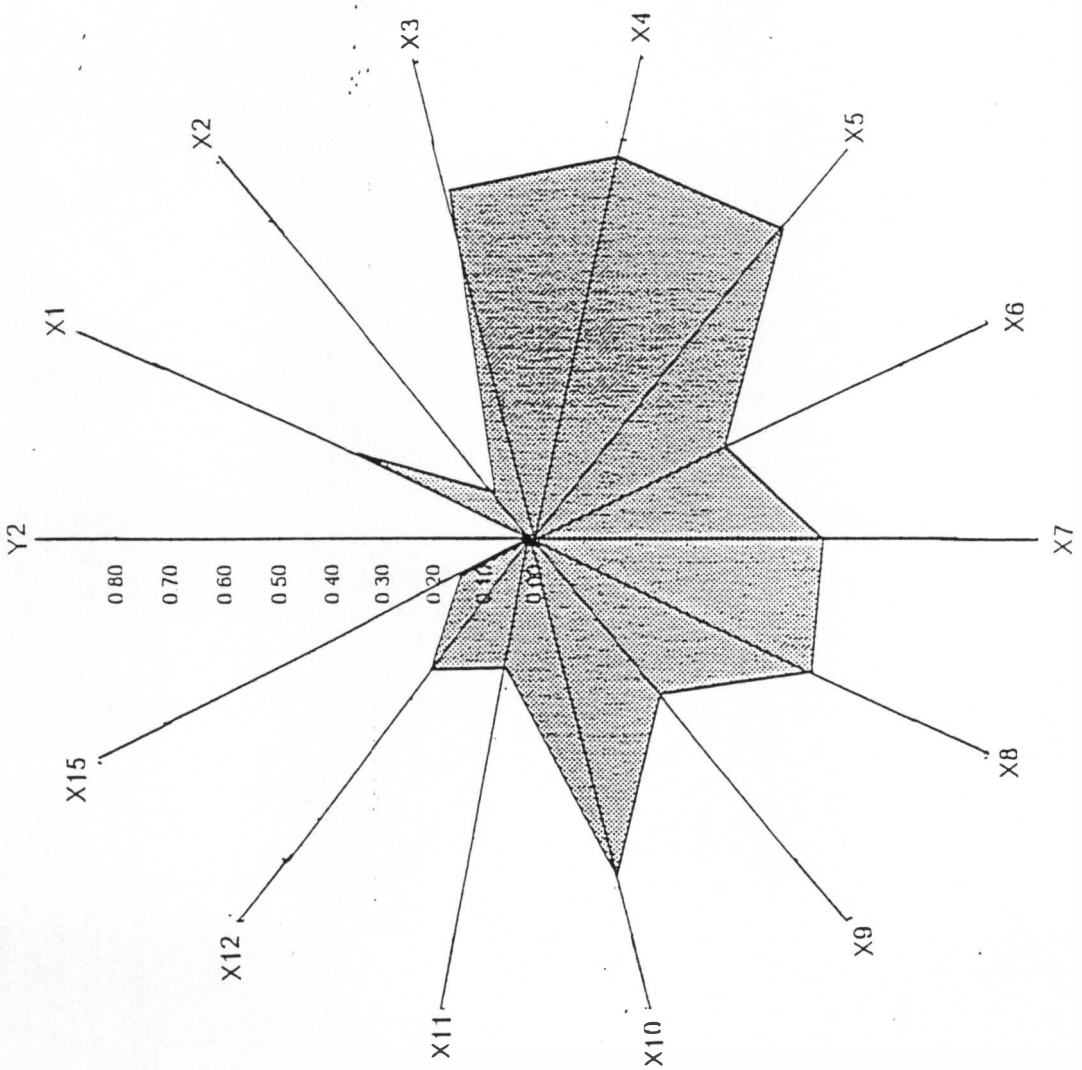


Figure 10. Radar Diagram of Bottom 10 Helmet Usage Universities.

Table 5. Individual R^2 coefficients for Model 1.

Predictor Variable	R^2 with Y1
X_1	0.0284
X_2	0.0811
X_3	0.0281
X_4	9.00 E-05
X_5	0.007
X_6	0.0781
X_7	3.00 E-06
X_8	0.0124
X_9	0.005
X_{10}	0.0031
X_{11}	0.1637
X_{12}	0.005
X_{13}	0.0392
X_{14}	0.0654

As shown above in Table 3, the R^2 variables were all quite low. These low values reflect that the individual university characteristics are poorly correlated with estimated bicycle usage. A multiple linear regression analysis was performed using the largest four variables. These variables included X_2 (campus size), X_6 (mean precipitation/snow), X_{11} (designated bike lane facility rating), and X_{14} (bike rack facility rating). These predictor variables were analyzed and the equation producing the best R^2 was determined as:

$Y_1 = 0.0016X_2 - 1.604X_6 + 1.153\ X_{11} + 1.28X_{14} + 10.397$

This equation produced a R^2 coefficient of 0.2493.

The variables that were included in the model 1 equation were X_2, X_6, X_{11}, and X_{14}. When comparing these variables to the radar diagram, the regression equation variables appear. Therefore, the radar diagram analysis supports that the variables should be incorporated into model 1 when analyzing the top 10 and bottom 10 bicycle usage universities.

Linear Regression Analysis and Evaluation of Model 2

Model 2 was established as bicycle helmet usage versus multiple university characteristics. Individual regression analyses were performed for each variable versus helmet usage. Table 6 represents each predictors measured R^2 with helmet usage.

Table 6. Individual R^2 coefficients for Model 2.

Predictor Variable	R^2 with Y2
X_1	0.001
X_2	0.0026
X_3	0.0972
X_4	0.0043
X_5	0.0014
X_6	0.0015
X_7	0.041
X_8	0.0417
X_9	0.0002
X_{10}	0.0047
X_{11}	0.0098
X_{12}	0.0346
X_{15}	0.0075

As with model 1, the R^2 coefficients were all quite low. However, the four highest variables were chosen to perform a multiple linear regression analysis. The four highest variables from Table 6 were X_3 (campus setting), X_7 (lowest campus speed limit), X_8 (highest campus speed limit), and X_{12} (crime rating). When the multiple linear regression was performed, the regression equation produced was:

$$Y_2 = 8.859X_3 - 0.528X_7 - 0.528X_8 + 1.58X_{12} + 31.816$$

This equation produced a R^2 coefficient of 0.185.

From model 2, the variables incorporated included X_3, X_7, X_8, and X_{12}. As shown from the radar diagrams, the variables are identical, which emphasizes the validity of the equation for model 2.

Using SYSTAT to Further Analyze Both Sets of Data

SYSTAT, a statistical package, was used to generate new computer model equations to verify the predictor variables used in the previous analyses. A backward elimination approach was used to eliminate characteristics. This approach begins with the full model and drops the weakest predictor variables compared to the other variables. It must be noted that different packages use different criteria for deciding which variables to drop and when to terminate the procedure [20]. The backward elimination approach is preferred by many because it: 1) considers the full model; 2) all predictors are considered to have an equal chance to be incorporated into final model; and 3) the final product will produce an equation without missing any of the key variables.

For model 1, the variables incorporated in the model included X_3, X_5, X_6, X_8, X_{11}, X_{13}, and X_{14}. Using these predictor variables produced the following multiple linear regression equation:

$$Y_1 = -5.048X_3 + 0.433X_5 - 1.207X_6 - 0.285X_8 + 1.834X_{11} - 1.23X_{13} + 1.116X_{14} + 6.533$$

This produced an R^2 equivalent to 0.357. In addition to obtaining a regression equation, a Pearson correlation matrix was obtained. This would show if any of the variables were highly correlated with one another. The matrix was produced, and there were no high correlation's between variables. If the variables were highly correlated with one another, a combination of the two variables would have been considered. When comparing the

original regression equation to the SYSTAT equations, the variable X_2 was dismissed from the SYSTAT package. However X_2 does appear to have a large difference when comparing the radar diagrams, thereby possibly warranting its use in the final model. The backward elimination procedure and Pearson correlation matrix are shown together in Appendix D.

For model 2, the variables SYSTAT produced included X_3, X_7, X_8, X_{11}, X_{12}, and X_{15}. The equation to be used for this model was:

$Y_2 = 7.589X_3 - 0.505X_7 - 0.666X_8 + 1.224X_{11} + 1.562X_{12} - 0.248X_{15} + 38.24$

This equation produced an R^2 equivalent to 0.212. As with model 1, a Pearson correlation matrix was performed on this data set. The result showed no highly correlated variables between individual predictors to warrant combining variables. The backward elimination procedure and Pearson correlation matrix for model 2 are shown together in Appendix E.

The equations produced for model 1 and model 2 should follow the equations produced from the original regression equations. Although the SYSTAT equations may have a larger coefficient of determination, these equations are too complex to warrant usage.

Testing 5 Universities with Model Equations

Despite low R^2 values, five universities were tested with each of the linear regression equations. The university characteristic data for these additional universities are shown in Appendix F. (Note: only university characteristic data needed for the equations were incorporated.) The calculations for the weather for these respective universities are shown in Appendix G.

The results of using the model 1 equation compared to what the bicyclists originally estimated for their respective universities are shown in Table 7.

Table 7. Comparing Model Bicycle Usage to Estimated Bicycle Usage.

Test Universities							
Model 1 Equation	0.0016	-1.604	1.153	1.28	10.397	(=Y1)	
	(*X2)	(*X6)	(*X11)	(*X14)			Estimated Range
Arkansas University	0.672	-7.25008	0	8.96	10.397	12.77892	(5%~10%)
Columbia University	0.0432	-5.82252	0	6.4	10.397	11.01768	(1%~3%)
San Diego State Univ.	0.48	-0.99448	0	5.12	10.397	15.00252	(1%~5%)
Vanderbilt University	0.5328	-6.35184	0	3.84	10.397	8.41796	(15%~40%)
Youngstown St. Univ.	0.168	-6.416	0	0	10.397	4.149	(1%~3%)

As shown from Table 7, the predicted Y_1 values for these universities do not fall into any of the estimated ranges using the model 1 equation.

For model 2, Table 8 shows the comparison of the predicted helmet usage percentage versus the estimated range provided by the bicyclist.

Table 8. Comparing Model Helmet Usage to Estimated Helmet Usage.

Test Universities							
Model 2 Equation	8.859	-0.528	-0.528	1.58	31.86	(=Y2)	
	(*X3)	(*X7)	(*X8)	(*X12)			Estimated Range
Arkansas University	8.859	-10.56	-15.84	6.32	31.86	20.639	(1%~5%)
Columbia University	17.718	-2.64	-18.48	4.74	31.86	33.198	(1%~3%)
San Diego State U.	17.718	-7.92	-23.76	15.8	31.86	33.698	(50%~50%)
Vanderbilt University	17.718	-10.56	-18.48	0	31.86	20.538	(2%~15%)
Youngstown St. Univ.	17.718	-13.2	-18.48	3.16	31.86	21.058	(15%~25%)

As shown from Table 8, for only one of the test universities, Youngstown State University, did the predicted helmet usage percentage fall within the range of the estimated percentage provided by the bicyclist.

CHAPTER V

INVESTIGATING THE INTERNET

Data collection with the Internet can play a prominent role in future research projects among the transportation profession. Before the researcher accepts the Internet as a means to conduct research, one should be familiar with the advantages and limitations that might be experienced.

Advantages Associated with the Internet

The Internet can provide a user friendly environment for both the researcher and the participant. Possible benefits to Internet usage include, but are not limited to:

- time savings for the participant and the researcher.
- inexpensive for the researcher to conduct.
- researcher receives data from e-mail print-outs.

The first benefit attributed to Internet data collection is the time saved for the participant and the researcher. When establishing a survey on the Internet, consideration must be given to the time an individual might take to complete a survey. In order for an Internet survey to be completed, a user can simply enter and submit information via keyboard or computer mouse. These simple tasks to complete the on-line survey translate into user responses being obtained by the researcher in seconds. In comparison, lengthy postal service delays or roadside interviews would consume an enormous amount of the researcher's time.

A second benefit to WWW data collection is cost. Money is an important issue when conducting research. For most universities, computer access fees established by the

university are the only required cost to set up a WWW home page and e-mail account. These fees are normally required as a part of a university tuition. However, the postage cost and possible travel costs that are avoided with the Internet is of great savings to the researcher.

The final benefit that may be attributed to Internet usage is obtaining data in a ready to use electronic form. As the e-mail messages appear in the researcher's account, the researcher can simply process the submitted information by using a computer. Also, the Internet process eliminates interpretation problems that may be attributed to a hand written survey.

Limitations Associated with the Internet

Limitations also occur when considering the Internet for research. Possible concerns attributed to this data collection process include, but are not limited to:

- participant haphazardly "clicking" survey entries.
- participants misinterpretation of survey questions.
- audience limited.
- validity of survey participants.
- researchers time in the initial establishment of a home page, on-line survey, and writing of the computer script.

The first limitation to Internet data collection are invalid and "thoughtless" submitted entries from the user. Inaccuracies possibly existed from participants "clicking" desired responses, but not personally verifying his/her respective answers before submitting the survey.

Secondly, careful attention must be given to the construction of the survey questions. Although alterations to the on-line survey can be easily made in a matter on

minutes, the researcher must come up questions that eliminate problems with clarity. If changes are made to the HTML and the computer script, all previous data would have to be discarded.

Next, special attention must be given to the Internet participants. The WWW is vastly growing in popularity. Currently, the Internet appeals to a small percentage of users. A Nielsen Media Research Study conducted in October 1995 found that 37 million people in the U.S. and Canada have access to the Internet [21]. Internet users were found to be typically younger with more education and more income than other adults [22]. In addition, these individuals read more and spent more in electronic and office supply stores [23]. Therefore, if research is being conducted by this means, a vast number of participants are possibly being ignored and hence producing biased results.

A fourth limitation exists with survey validity. A possible test for Internet data collection is a check to parallel the e-mail address to the participants name. This should be considered because part of an individuals name normally appears in e-mail addresses of university students and personnel. In addition to checking the e-mail and participants name correlation, sending personal e-mail messages to a participant may also validate an individuals response.

The last limitation to Internet data collection is the time spent by the author in initially creating the home page and on-line survey. This task can be quite time consuming for the researcher. However, reading about HTML and computer script can alleviate some problems. In addition, if in a university environment, the computer center can add great assistance to a first time Internet data collection attempt.

As more individuals enter into the realm of the Internet, the need to handle the limitations of data collection is essential in order to gain credibility among researchers. Once these issues are resolved, the possibilities for Internet data collection become exceptional.

CHAPTER VI

CONCLUSIONS

Research Bias and Perception Differences Among Bicyclists

Questions might be raised in reference to the survey responses and about the participants. Individuals who choose bicycling as their primary transportation mode tend to be politically active with regards to planning and legislative issues. Therefore, since this research requested information solely from campus bicyclists, his/her perception of campus facilities may have been biased compared to an other mode user. A bicyclist may be biased in order to improve bicycling at his/her respective campus by possibly rating facilities worse then actuality. However, a bicyclists perception of bicycle and helmet usage for this study would more likely produce a closer estimate to actual data compared to a non-bicyclist. Different estimations appeared in the survey responses among bicyclists who represented the same school. This probably occurred because of the difficulty in measuring campus characteristics, and from the different perceptions of bicycle and helmet use percentages.

Summary of Findings

Both models produce low coefficient of determination values. Therefore, the university characteristics considered in this study have limited effect on the bicycle transportation mode or helmet usage. These model characteristics were chosen because the scatter diagram, radar diagram, and individual regression analyses revealed that these characteristics would have the most impact when compared to the other variables.

When comparing the variables used in model 1 to the original hypothesis on how these variables might affect bicycle use, campus setting, designated bicycle lanes, and bicycle rack facilities would cause an increase in bicycle usage. Whereas, precipitation/ snow would cause a decrease in this mode of transportation. In summary, the original hypothesis for these variables paralleled the findings of the model.

When comparing the variables used in model 2 to the original assumption on how these variables might affect bicycle helmet use, campus setting and crime occurrence would cause an increase in helmet use. Whereas, lowest campus speed and highest campus speed limit would cause a decrease in bicycle helmet use. The two variables that did not parallel the original assumption were crime occurrence and highest campus speed limit. The difference between the original hypothesis of variables to the final model may have been attributed to sources of error in the data or incorrect assumption.

By testing five universities, the predicted dependent variable for both models rarely fell within the estimated range provided by the bicyclist. This was expected because of the limited accuracy of the R^2 values produced from the equations.

Further Research Needs

Beside university characteristics, bicycle usage and helmet usage may be correlated with a variety of other issues This could possibly lead to another statistical analysis on issues that include, but are not limited to, automotive ownership, efficient campus transit systems, policy, bicycle ownership, financial standing, and trip length. It is the hope of the author that this research study will inspire future research among university students, personnel, and bicycle coordinators. Information for future research could possibly be

obtained from student observation counts, installation of video cameras at access points of campus, and mandated bicycle registration. From this actual data, the transportation engineer or planner may then be able to determine if a model can be developed to explain the bicycle mode and helmet usage at a university.

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APPENDICES

APPENDIX A: UNIVERSITY CHARACTERISTIC DATA

			University Characteristics	
University- City (Bicyclist(s) Represented)	Y1 Bicycle Usage (Estimated %)	Y2 Helmeted Bicyclists (Estimated %)	X1 Enrollment (Nearest Thousand)	X2 Campus Size (Acres)
Arizona State University- Tempe(1)	35.00	5.00	34000	700
Auburn University- Auburn(2)	25.00	2.50	21000	1871
Boston College- Chesnut Hill(1)	32.50	17.50	9000	700
Bringham Young University- Provo(1)	6.00	25.00	28000	638
California Institute of Tech.- Pasadena(1)	50.00	35.00	900	124
Cal. Poly. State Univ.- San Luis Obispo(1)	17.50	25.00	13000	5000
California State University- Sacramento(1)	30.00	40.00	19000	288
Carnegie Mellon University- Pittsburgh(1)	22.50	40.00	7000	105
Case Western Reserve Univ.- Cleveland(2)	6.00	13.25	3000	128
College of Charleston- Charleston(1)	15.00	3.00	7000	52
Colorado State University- Ft. Collins(3)	30.50	30.83	20000	833
Cornell University- Ithaca(1)	10.00	15.00	19000	754
Dartmouth College- Hanover(1)	15.00	6.00	4000	265
Emory University- Atlanta(1)	15.00	40.00	6000	631
Franklin & Marshall College- Lancaster(1)	6.00	1.00	2000	125
Georgia Institute of Technology- Atlanta(2)	8.33	11.00	12000	330
Hampshire College- Amherst(1)	3.00	30.00	1000	800
Harvard University- Cambridge(3)	11.33	71.67	18000	380
Haverford College- Haverford (1)	12.50	50.00	1000	216
Humboldt State University- Arcadia(1)	20.00	7.50	6000	42
Idaho State Univ.- Pocatello (1)	20.00	15.00	7000	735
Indiana University- Bloomington(1)	17.50	10.00	35000	1860
Iowa State University- Ames(2)	3.25	1.50	24000	1736
James Madison University- Harrisonburg(1)	17.50	2.10	10000	472
Johns Hopkins University- Baltimore(1)	4.00	2.00	3000	140
Kansas State University- Manhattan(1)	6.50	4.00	15000	668
Lehigh University- Bethlehem(1)	10.00	35.00	6000	1600
Massachusetts Inst.of Tech.- Boston(1)	10.00	50.00	10000	146
Miami University- Oxford(1)	30.00	3.50	16000	1921
Michigan State University- East Lansing(1)	14.00	0.13	40000	2100
New Mexico State University- Las Cruces(1)	20.00	50.00	10000	5800
North Carolina State University- Raleigh(1)	20.00	45.00	23000	1600
Ohio University-Athens(2)	21.50	0.78	15000	1300
Oklahoma State University- Stillwater(2)	30.00	1.50	17000	480

University- City (Bicyclist(s) Represented)	University Characteristics			
	X3 Campus Setting (0-2)	X4 Length of Bicycle Season (Months)	X5 Mean Temperature (Degrees Fahrenheit)	X6 Mean Precipitation / Snow (inches)
Arizona State University- Tempe(1)	2	12	70.97	0.63
Auburn University- Auburn(2)	1	12	64.70	4.32
Boston College- Chesnut Hill(1)	2	7	61.97	3.45
Bringham Young University- Provo(1)	2	12	50.97	6.12
California Institute of Tech.- Pasadena(1)	2	12	62.29	1.02
Cal. Poly. State Univ.- San Luis Obispo(1)	1	7	74.10	0.21
California State University- Sacramento(1)	2	6	70.15	0.32
Carnegie Mellon University- Pittsburgh(1)	2	9	59.29	4.66
Case Western Reserve Univ.- Cleveland(2)	2	8	58.81	4.76
College of Charleston- Charleston(1)	2	12	66.12	4.06
Colorado State University- Ft. Collins(3)	2	10	54.03	5.80
Cornell University- Ithaca(1)	1	8	54.91	5.11
Dartmouth College- Hanover(1)	0	12	45.84	8.47
Emory University- Atlanta(1)	2	7	68.91	4.16
Franklin & Marshall College- Lancaster(1)	1	8	61.78	4.21
Georgia Institute of Technology- Atlanta(2)	2	8	60.38	4.18
Hampshire College- Amherst(1)	0	10	51.34	7.80
Harvard University- Cambridge(3)	2	7	61.97	3.45
Haverford College- Haverford (1)	2	9	61.39	4.04
Humboldt State University- Arcadia(1)	0	5	66.98	0.10
Idaho State Univ.- Pocatello (1)	1	7	59.00	1.96
Indiana University- Bloomington(1)	1	7	65.90	3.91
Iowa State University- Ames(2)	1	8	61.43	4.52
James Madison University- Harrisonburg(1)	1	7	63.74	4.52
Johns Hopkins University- Baltimore(1)	2	7	68.42	3.70
Kansas State University- Manhattan(1)	1	9	62.53	3.99
Lehigh University- Bethlehem(1)	2	6	61.62	9.57
Massachusetts Inst.of Tech.- Boston(1)	2	9	57.18	4.52
Miami University- Oxford(1)	0	9	60.79	4.31
Michigan State University- East Lansing(1)	2	7	59.94	3.43
New Mexico State University- Las Cruces(1)	2	12	63.71	0.72
North Carolina State University- Raleigh(1)	2	8	67.75	3.71
Ohio University-Athens(2)	0	11	54.36	4.91
Oklahoma State University- Stillwater(2)	1	9	67.11	3.35

	University Characteristics			
University- City (Bicyclist(s) Represented)	X7 Lowest Speed Limit (mph)	X8 Highest Speed Limit (mph)	X9 Campus Terrain (0-10)	X10 Automotive Congestion (0-10)
Arizona State University- Tempe(1)	10	45	0	8
Auburn University- Auburn(2)	20	40	3	7
Boston College- Chesnut Hill(1)	5	15	7	7
Bringham Young University- Provo(1)	20	40	2	6
California Institute of Tech.- Pasadena(1)	10	35	1	9
Cal. Poly. State Univ.- San Luis Obispo(1)	35	35	4	4
California State University- Sacramento(1)	25	65	3	8
Carnegie Mellon University- Pittsburgh(1)	25	25	6	5
Case Western Reserve Univ.- Cleveland(2)	15	30	1	8
College of Charleston- Charleston(1)	25	35	0	8
Colorado State University- Ft. Collins(3)	20	30	2	8
Cornell University- Ithaca(1)	25	45	9	6
Dartmouth College- Hanover(1)	15	35	1	3
Emory University- Atlanta(1)	5	35	3	7
Franklin & Marshall College- Lancaster(1)	15	40	3	6
Georgia Institute of Technology- Atlanta(2)	15	45	7	9
Hampshire College- Amherst(1)	15	50	2	6
Harvard University- Cambridge(3)	15	30	2	9
Haverford College- Haverford (1)	10	25	4	7
Humboldt State University- Arcadia(1)	5	25	9	7
Idaho State Univ.- Pocatello (1)	20	35	5	3
Indiana University- Bloomington(1)	15	40	2	7
Iowa State University- Ames(2)	20	30	2	8
James Madison University- Harrisonburg(1)	25	25	4	7
Johns Hopkins University- Baltimore(1)	15	25	2	6
Kansas State University- Manhattan(1)	10	30	4	10
Lehigh University- Bethlehem(1)	20	35	10	6
Massachusetts Inst.of Tech.- Boston(1)	10	30	0	10
Miami University- Oxford(1)	20	35	4	8
Michigan State University- East Lansing(1)	25	45	0	8
New Mexico State University- Las Cruces(1)	15	35	4	6
North Carolina State University- Raleigh(1)	5	45	3	5
Ohio University-Athens(2)	10	30	6	6
Oklahoma State University- Stillwater(2)	20	40	2	4

	University Characteristics			
University- City (Bicyclist(s) Represented)	X11 Bicycle Lane Facility Rating (0-10)	X12 Crime Occurrence Rating (0-10)	X13 Parking Availability Rating (0-10)	X14 Bicycle Rack Facility Rating (0-10)
Arizona State University- Tempe(1)	9	8	8	9
Auburn University- Auburn(2)	0	3	2	5
Boston College- Chesnut Hill(1)	3	2	8	6
Bringham Young University- Provo(1)	2	2	3	6
California Institute of Tech.- Pasadena(1)	5	7	6	7
Cal. Poly. State Univ.- San Luis Obispo(1)	7	5	4	4
California State University- Sacramento(1)	9	7	8	10
Carnegie Mellon University- Pittsburgh(1)	2	3	4	5
Case Western Reserve Univ.- Cleveland(2)	0	7	1	7
College of Charleston- Charleston(1)	0	5	2	2
Colorado State University- Ft. Collins(3)	7	4	4	4
Cornell University- Ithaca(1)	5	5	6	4
Dartmouth College- Hanover(1)	4	2	3	7
Emory University- Atlanta(1)	2	3	5	7
Franklin & Marshall College- Lancaster(1)	0	2	7	3
Georgia Institute of Technology- Atlanta(2)	1	8	6	8
Hampshire College- Amherst(1)	6	4	10	8
Harvard University- Cambridge(3)	0	3	2	5
Haverford College- Haverford (1)	4	3	9	6
Humboldt State University- Arcata(1)	3	4	5	4
Idaho State Univ.- Pocatello (1)	1	3	5	7
Indiana University- Bloomington(1)	0	7	3	6
Iowa State University- Ames(2)	7	5	3	5
James Madison University- Harrisonburg(1)	0	7	0	5
Johns Hopkins University- Baltimore(1)	2	0	5	3
Kansas State University- Manhattan(1)	1	2	2	7
Lehigh University- Bethlehem(1)	0	4	8	3
Massachusetts Inst.of Tech.- Boston(1)	0	5	2	0
Miami University- Oxford(1)	0	2	2	4
Michigan State University- East Lansing(1)	4	5	3	6
New Mexico State University- Las Cruces(1)	5	4	3	6
North Carolina State University- Raleigh(1)	0	3	7	4
Ohio University-Athens(2)	2	3	2	6
Oklahoma State University- Stillwater(2)	8	1	3	7

			University Characteristics	
University- City (Bicyclist(s) Represented)	Y1 Bicycle Usage (Estimated %)	Y2 Helmeted Bicyclists (Estimated %)	X1 Enrollment (Nearest Thousand)	X2 Campus Size (Acres)
Oregon State University- Corvallis(1)	50.00	35.00	14000	422
Pennsylvania State Univ.- State College(4)	25.63	19.13	36000	5013
Purdue University- West Lafayette(1)	3.00	10.00	33000	1565
Reed College- Portland(1)	12.50	15.00	1000	100
Rice University- Houston(1)	4.50	70.00	3000	300
Santa Clara University- Santa Clara(1)	15.00	35.00	4000	104
S. Dak. Sch of Mines & Tech.- Rapid City(1)	2.02	0.52	2000	120
Southern Illinois University- Carbondale(2)	22.50	4.50	23000	7253
Southern Methodist University- Dallas(1)	30.00	0.50	9000	600
Southwest Texas St. Univ.- San Marcos(1)	15.00	6.00	14000	332
Stanford University- Palo Alto(3)	59.17	26.67	14000	8200
State University of New York- Buffalo(1)	11.50	22.50	14000	1350
Texas A&M University- College Station(1)	15.00	2.50	42000	5142
The Ohio State University- Columbus(2)	12.50	1.01	50000	1644
Towsen State University- Towsen(1)	7.50	1.50	15000	320
Tulane University- New Orleans(1)	15.00	5.50	10000	110
University of Alabama- Birmingham(1)	3.50	62.50	20000	265
University of Arizona- Tucson(1)	15.00	35.00	22000	325
University of California- Berkeley(4)	17.71	25.86	31000	1232
University of California- Davis(4)	61.50	10.88	23000	5200
University of California- Irvine(1)	9.00	2.75	14000	1489
University of California- Los Angeles(2)	7.00	42.50	35000	419
University of California- San Diego(2)	10.50	30.25	18000	1200
University of California- Santa Barbara(2)	50.00	8.75	19000	813
University of California-Santa Cruz(1)	17.50	75.00	9000	2000
University of Chicago- Chicago(1)	5.50	13.00	10000	190
University of Colorado-Boulder(3)	41.67	22.50	25000	606
University of Colorado-Colorado Springs(1)	5.00	99.50	2000	400
University of Delaware- Newark(2)	63.25	12.50	16000	1100
University of Florida- Gainesville(2)	28.75	12.00	39000	2000
University of Georgia- Athens(1)	2.55	40.00	30000	605
University of Idaho- Moscow(1)	7.50	20.00	9000	1450
University of Illinois - Chicago(1)	10.00	20.00	13000	183

University- City (Bicyclist(s) Represented)	University Characteristics			
	X3 Campus Setting (0-2)	X4 Length of Bicycle Season (Months)	X5 Mean Temperature (Degrees Fahrenheit)	X6 Mean Precipitation / Snow (inches)
Oregon State University- Corvallis(1)	1	4	63.98	1.03
Pennsylvania State Univ.- State College(4)	1	8	59.34	4.70
Purdue University- West Lafayette(1)	1	9	60.03	4.19
Reed College- Portland(1)	2	5	58.38	1.90
Rice University- Houston(1)	2	12	68.29	3.92
Santa Clara University- Santa Clara(1)	2	5	60.62	0.29
S. Dak. Sch of Mines & Tech.- Rapid City(1)	1	12	46.81	4.67
Southern Illinois University- Carbondale(2)	1	9	62.57	4.22
Southern Methodist University- Dallas(1)	2	11	67.19	2.92
Southwest Texas St. Univ.- San Marcos(1)	1	9	73.56	3.49
Stanford University- Palo Alto(3)	1	10	57.84	1.16
State University of New York- Buffalo(1)	2	6	62.22	3.11
Texas A&M University- College Station(1)	1	11	68.90	4.03
The Ohio State University- Columbus(2)	2	10	56.10	4.65
Towsen State University- Towsen(1)	2	8	63.85	4.06
Tulane University- New Orleans(1)	2	9	64.23	4.74
University of Alabama- Birmingham(1)	2	8	69.70	4.45
University of Arizona- Tucson(1)	2	12	67.63	1.07
University of California- Berkeley(4)	2	9	59.33	0.73
University of California- Davis(4)	1	10	63.61	1.09
University of California- Irvine(1)	1	12	62.29	1.02
University of California- Los Angeles(2)	2	12	62.29	1.02
University of California- San Diego(2)	2	12	62.31	0.82
University of California- Santa Barbara(2)	2	12	59.26	0.93
University of California-Santa Cruz(1)	1	12	56.51	1.58
University of Chicago- Chicago(1)	2	6	67.47	3.55
University of Colorado-Boulder(3)	2	7	60.83	3.88
University of Colorado-Colorado Springs(1)	2	12	48.64	5.16
University of Delaware- Newark(2)	0	10	58.40	4.50
University of Florida- Gainesville(2)	2	12	68.52	4.22
University of Georgia- Athens(1)	1	12	61.62	4.37
University of Idaho- Moscow(1)	0	9	54.22	2.43
University of Illinois - Chicago(1)	2	8	62.34	3.65

University- City (Bicyclist(s) Represented)	University Characteristics			
	X7 Lowest Speed Limit (mph)	X8 Highest Speed Limit (mph)	X9 Campus Terrain (0-10)	X10 Automotive Congestion (0-10)
Oregon State University- Corvallis(1)	15	35	1	5
Pennsylvania State Univ.- State College(4)	20	35	5	7
Purdue University- West Lafayette(1)	20	30	0	8
Reed College- Portland(1)	10	25	3	2
Rice University- Houston(1)	25	25	0	3
Santa Clara University- Santa Clara(1)	5	25	0	3
S. Dak. Sch of Mines & Tech.- Rapid City(1)	15	45	7	4
Southern Illinois University- Carbondale(2)	20	40	2	5
Southern Methodist University- Dallas(1)	20	30	3	4
Southwest Texas St. Univ.- San Marcos(1)	25	45	6	5
Stanford University- Palo Alto(3)	25	30	5	6
State University of New York- Buffalo(1)	5	55	1	8
Texas A&M University- College Station(1)	35	45	0	8
The Ohio State University- Columbus(2)	10	40	2	10
Towsen State University- Towsen(1)	35	35	6	7
Tulane University- New Orleans(1)	25	35	0	8
University of Alabama- Birmingham(1)	15	35	1	9
University of Arizona- Tucson(1)	15	40	1	8
University of California- Berkeley(4)	20	30	8	7
University of California- Davis(4)	15	30	0	3
University of California- Irvine(1)	15	35	5	7
University of California- Los Angeles(2)	20	40	6	9
University of California- San Diego(2)	15	45	6	8
University of California- Santa Barbara(2)	10	30	2	6
University of California-Santa Cruz(1)	5	40	9	6
University of Chicago- Chicago(1)	10	55	0	8
University of Colorado-Boulder(3)	10	40	3	6
University of Colorado-Colorado Springs(1)	10	25	5	7
University of Delaware- Newark(2)	30	40	2	8
University of Florida- Gainesville(2)	20	45	4	8
University of Georgia- Athens(1)	15	40	6	3
University of Idaho- Moscow(1)	15	35	10	3
University of Illinois - Chicago(1)	35	35	0	9

University- City (Bicyclist(s) Represented)	University Characteristics			
	X11 Bicycle Lane Facility Rating (0-10)	X12 Crime Occurrence Rating (0-10)	X13 Parking Availability Rating (0-10)	X14 Bicycle Rack Facility Rating (0-10)
Oregon State University- Corvallis(1)	7	4	7	6
Pennsylvania State Univ.- State College(4)	4	7	3	5
Purdue University- West Lafayette(1)	2	1	8	5
Reed College- Portland(1)	0	2	6	7
Rice University- Houston(1)	0	2	10	5
Santa Clara University- Santa Clara(1)	1	3	2	6
S. Dak. Sch of Mines & Tech.- Rapid City(1)	1	1	7	4
Southern Illinois University- Carbondale(2)	5	6	6	6
Southern Methodist University- Dallas(1)	0	3	7	5
Southwest Texas St. Univ.- San Marcos(1)	2	3	5	1
Stanford University- Palo Alto(3)	9	3	6	6
State University of New York- Buffalo(1)	4	10	5	1
Texas A&M University- College Station(1)	7	5	10	4
The Ohio State University- Columbus(2)	4	6	0	6
Towsen State University- Towsen(1)	0	6	3	6
Tulane University- New Orleans(1)	0	10	4	10
University of Alabama- Birmingham(1)	0	7	6	1
University of Arizona- Tucson(1)	10	7	7	2
University of California- Berkeley(4)	6	9	3	5
University of California- Davis(4)	10	5	5	8
University of California- Irvine(1)	4	4	8	3
University of California- Los Angeles(2)	4	4	10	4
University of California- San Diego(2)	8	6	5	2
University of California- Santa Barbara(2)	9	5	4	3
University of California-Santa Cruz(1)	7	7	3	4
University of Chicago- Chicago(1)	6	8	9	7
University of Colorado-Boulder(3)	8	6	3	6
University of Colorado-Colorado Springs(1)	7	5	3	5
University of Delaware- Newark(2)	6	6	5	4
University of Florida- Gainesville(2)	9	7	2	10
University of Georgia- Athens(1)	0	3	7	5
University of Idaho- Moscow(1)	5	1	9	8
University of Illinois - Chicago(1)	0	10	5	3

			University Characteristics	
University- City (Bicyclist(s) Represented)	Y1 Bicycle Usage (Estimated %)	Y2 Helmeted Bicyclists (Estimated %)	X1 Enrollment (Nearest Thousand)	X2 Campus Size (Acres)
University of Illinois- Urbana Champaign(4)	14.63	10.00	36000	1470
University of Iowa- Iowa City(2)	9.25	37.50	15000	1900
University of Kentucky- Lexington(1)	7.50	2.00	24000	673
University of Maine- Orono(1)	6.00	17.50	11000	3298
University of Maryland- College Park(3)	11.67	11.00	35000	1539
University of Miami- Coral Gables(1)	3.50	70.00	8000	260
University of Michigan- Ann Arbor(1)	40.00	85.00	51000	2900
University of Minnesota- Twin Cities(3)	10.83	43.33	37000	2000
University of Missouri- Rolla(1)	25.00	2.50	5000	105
University of Montana- Missoula(1)	17.50	42.50	12000	220
University of Nebraska- Lincoln(2)	7.50	10.25	24000	570
University of North Carolina- Chapel Hill(3)	20.00	20.17	23000	729
University of Notre Dame- Notre Dame(1)	3.00	12.50	8000	1250
University of Oregon- Eugene(2)	45.00	26.00	14000	250
University of the Pacific- Stockton(1)	1.50	55.00	3000	175
University of Pennsylvania- Philadelphia(2)	5.00	20.50	9000	260
University of Pittsburgh- Johnstown(1)	3.50	1.50	3000	650
University of Pittsburgh- Pittsburgh(2)	20.00	45.00	13000	132
University of Rochester- Rochester(1)	3.00	55.00	5000	100
University of San Diego- San Diego(1)	3.00	2.00	4000	180
University of Tennessee- Knoxville(3)	20.83	29.67	26000	417
University of Texas- Austin(1)	44.00	9.00	49000	357
University of Utah- Salt Lake City(1)	3.00	1.25	19000	1500
University of Vermont- Burlington(1)	37.50	15.00	9000	715
University of Virginia- Charlottesville(2)	30.00	35.00	11000	1094
University of Washington- Seattle(6)	10.92	67.90	35000	694
University of Wisconsin-Madison(8)	25.50	26.00	40000	929
University of Wisc. Stout- Monomonie(1)	40.00	4.50	6000	120
University of Wyoming- Laramie(1)	10.00	30.00	8000	785
Utah State University- Logan(1)	2.00	0.50	20000	400
Whitman College- Walla Walla(1)	25.00	6.00	1000	47
Willamette University- Salem(1)	9.00	20.00	2000	60
Wright State University- Dayton (1)	6.00	3.00	9000	557

	University Characteristics			
University- City (Bicyclist(s) Represented)	X3 Campus Setting (0-2)	X4 Length of Bicycle Season (Months)	X5 Mean Temperature (Degrees Farhenheight)	X6 Mean Precipitation / Snow (inches)
University of Illinois- Urbana Champaign(4)	2	7	65.01	3.91
University of Iowa- Iowa City(2)	1	11	53.42	5.02
University of Kentucky- Lexington(1)	2	8	63.96	4.21
University of Maine- Orono(1)	1	7	56.89	3.87
University of Maryland- College Park(3)	2	9	61.91	4.09
University of Miami- Coral Gables(1)	1	12	75.92	4.67
University of Michigan- Ann Arbor(1)	2	8	59.75	3.69
University of Minnesota- Twin Cities(3)	2	7	60.93	3.72
University of Missouri- Rolla(1)	0	8	63.54	4.03
University of Montana- Missoula(1)	2	7	56.03	1.80
University of Nebraska- Lincoln(2)	2	9	60.06	3.95
University of North Carolina- Chapel Hill(3)	1	10	61.57	4.22
University of Notre Dame- Notre Dame(1)	2	9	57.31	5.93
University of Oregon- Eugene(2)	2	7	59.19	1.82
University of the Pacific- Stockton(1)	2	12	61.17	1.15
University of Pennsylvania- Philadelphia(2)	2	10	58.86	4.32
University of Pittsburgh- Johnstown(1)	1	7	64.37	3.26
University of Pittsburgh- Pittsburgh(2)	2	7	64.37	3.53
University of Rochester- Rochester(1)	2	4	65.98	3.05
University of San Diego- San Diego(1)	2	12	62.31	0.82
University of Tennessee- Knoxville(3)	2	9	64.78	4.17
University of Texas- Austin(1)	2	12	68.09	2.83
University of Utah- Salt Lake City(1)	2	9	59.43	3.88
University of Vermont- Burlington(1)	1	7	58.34	3.79
University of Virginia- Charlottesville(2)	1	9	63.08	4.72
University of Washington- Seattle(6)	2	11	54.20	3.19
University of Wisconsin-Madison(8)	2	8	56.05	4.45
University of Wisc. Stout- Monomonie(1)	0	5	66.26	3.48
University of Wyoming- Laramie(1)	1	6	58.35	2.87
Utah State University- Logan(1)	1	8	60.99	2.78
Whitman College- Walla Walla(1)	1	10	56.03	1.61
Willamette University- Salem(1)	2	8	57.46	2.08
Wright State University- Dayton (1)	2	7	64.23	3.43

	University Characteristics			
University- City (Bicyclist(s) Represented)	X7 Lowest Speed Limit (mph)	X8 Highest Speed Limit (mph)	X9 Campus Terrain (0-10)	X10 Automotive Congestion (0-10)
University of Illinois- Urbana Champaign(4)	30	35	1	7
University of Iowa- Iowa City(2)	15	35	2	8
University of Kentucky- Lexington(1)	25	45	6	7
University of Maine- Orono(1)	25	40	2	7
University of Maryland- College Park(3)	15	50	4	8
University of Miami- Coral Gables(1)	10	40	0	8
University of Michigan- Ann Arbor(1)	25	35	1	8
University of Minnesota- Twin Cities(3)	25	40	0	6
University of Missouri- Rolla(1)	10	45	2	5
University of Montana- Missoula(1)	15	35	0	8
University of Nebraska- Lincoln(2)	15	40	0	6
University of North Carolina- Chapel Hill(3)	20	40	2	7
University of Notre Dame- Notre Dame(1)	20	25	0	8
University of Oregon- Eugene(2)	15	40	3	6
University of the Pacific- Stockton(1)	5	25	0	5
University of Pennsylvania- Philadelphia(2)	20	40	1	8
University of Pittsburgh- Johnstown(1)	35	65	9	5
University of Pittsburgh- Pittsburgh(2)	25	25	6	10
University of Rochester- Rochester(1)	15	35	1	6
University of San Diego- San Diego(1)	15	40	1	4
University of Tennessee- Knoxville(3)	15	45	6	7
University of Texas- Austin(1)	15	35	5	8
University of Utah- Salt Lake City(1)	20	45	10	10
University of Vermont- Burlington(1)	25	40	6	8
University of Virginia- Charlottesville(2)	15	35	6	9
University of Washington- Seattle(6)	20	25	5	5
University of Wisconsin-Madison(8)	20	35	5	7
University of Wisc. Stout- Monomonie(1)	15	25	3	5
University of Wyoming- Laramie(1)	15	30	0	3
Utah State University- Logan(1)	25	45	0	5
Whitman College- Walla Walla(1)	30	30	0	4
Willamette University- Salem(1)	25	35	0	5
Wright State University- Dayton (1)	10	45	1	10

	University Characteristics			
University- City (Bicyclist(s) Represented)	X11 Bicycle Lane Facility Rating (0-10)	X12 Crime Occurrence Rating (0-10)	X13 Parking Availability Rating (0-10)	X14 Bicycle Rack Facility Rating (0-10)
University of Illinois- Urbana Champaign(4)	7	6	5	4
University of Iowa- Iowa City(2)	2	6	5	4
University of Kentucky- Lexington(1)	2	3	5	7
University of Maine- Orono(1)	3	10	2	7
University of Maryland- College Park(3)	2	5	8	7
University of Miami- Coral Gables(1)	3	10	8	3
University of Michigan- Ann Arbor(1)	7	6	3	9
University of Minnesota- Twin Cities(3)	6	6	6	5
University of Missouri- Rolla(1)	0	2	2	5
University of Montana- Missoula(1)	4	2	0	7
University of Nebraska- Lincoln(2)	5	3	3	4
University of North Carolina- Chapel Hill(3)	5	4	3	5
University of Notre Dame- Notre Dame(1)	0	3	9	5
University of Oregon- Eugene(2)	9	5	3	8
University of the Pacific- Stockton(1)	0	2	7	2
University of Pennsylvania- Philadelphia(2)	0	8	5	5
University of Pittsburgh- Johnstown(1)	3	1	8	0
University of Pittsburgh- Pittsburgh(2)	2	10	3	8
University of Rochester- Rochester(1)	8	7	3	5
University of San Diego- San Diego(1)	5	2	8	0
University of Tennessee- Knoxville(3)	2	3	3	5
University of Texas- Austin(1)	4	6	4	1
University of Utah- Salt Lake City(1)	8	1	6	3
University of Vermont- Burlington(1)	4	2	1	8
University of Virginia- Charlottesville(2)	4	6	5	4
University of Washington- Seattle(6)	8	5	6	7
University of Wisconsin-Madison(8)	8	4	3	6
University of Wisc. Stout- Monomonie(1)	3	4	5	6
University of Wyoming- Laramie(1)	7	3	7	6
Utah State University- Logan(1)	0	1	5	3
Whitman College- Walla Walla(1)	0	4	0	3
Willamette University- Salem(1)	4	5	7	5
Wright State University- Dayton (1)	7	6	10	4

APPENDIX B: WEATHER DATA CALCULATIONS FOR UNIVERSITIES

University : Arizona State Univ.
Location : Tempe, AZ (Phoenix, AZ)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	52.20	0.76
FEB	●	56.10	0.73
MAR	●	61.00	0.73
APR	●	68.50	0.34
MAY	●	76.80	0.13
JUN	●	86.10	0.10
JUL	●	91.40	0.93
AUG	●	89.60	1.02
SEP	●	84.10	0.79
OCT	●	72.40	0.52
NOV	●	60.40	0.63
DEC	●	53.00	0.89
SUM	12	851.60	7.57
	AVG	70.97	0.63

University : Auburn Univ.
Location : Auburn, AL (Columbus, GA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	45.50	4.99
FEB	●	49.00	5.35
MAR	●	56.90	5.77
APR	●	64.60	4.30
MAY	●	72.10	4.17
JUN	●	78.90	4.07
JUL	●	81.40	5.54
AUG	●	81.00	3.73
SEP	●	76.10	3.23
OCT	●	65.60	2.22
NOV	●	56.40	3.54
DEC	●	48.90	4.97
SUM	12	776.40	51.88
	AVG	64.70	4.32

University : Boston College
Location : Chesnut Hill, MA (Boston, MA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	47.10	4.50
MAY	●	57.80	3.27
JUN	●	67.10	3.16
JUL	●	72.70	3.18
AUG	●	70.90	3.60
SEP	●	64.10	3.15
OCT	●	54.10	3.29
NOV			
DEC			
SUM	7	433.80	24.15
	AVG	61.97	3.45

University : Bringham Young Univ.
Location : Provo, UT (Salt Lake City, UT)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	28.10	14.27
FEB	●	23.30	10.82
MAR	●	41.00	11.76
APR	●	49.30	6.99
MAY	●	58.40	2.39
JUN	●	68.40	0.87
JUL	●	77.40	0.63
AUG	●	75.50	0.87
SEP	●	65.20	1.05
OCT	●	53.20	2.71
NOV	●	40.50	7.76
DEC	●	31.30	13.35
SUM	12	611.60	73.47
	AVG	50.97	6.12

University : California Institute of Technology
Location : Pasadena, CA (Los Angeles, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	55.40	2.45
FEB	●	56.50	2.73
MAR	●	57.40	1.97
APR	●	59.80	0.86
MAY	●	62.30	0.12
JUN	●	65.30	0.02
JUL	●	68.60	0.01
AUG	●	69.70	0.09
SEP	●	69.00	0.25
OCT	●	65.80	0.36
NOV	●	60.90	1.43
DEC	●	56.80	1.94
SUM	12	747.50	12.23
	AVG	62.29	1.02

University : Cal. Poly. State Univ.-San Luis Obispo
Location :San Luis Obispo, CA (Bakersfield, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	62.80	0.60
MAY	●	70.10	0.29
JUN	●	77.60	0.08
JUL	●	83.80	0.01
AUG	●	81.80	0.03
SEP	●	75.80	0.13
OCT	●	66.80	0.32
NOV			
DEC			
SUM	7	518.70	1.46
	AVG	74.10	0.21

University : Cal. State Univ.- Sacramento
Location : Sacramento, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	64.80	0.44
JUN	●	71.10	0.10
JUL	●	75.40	0.03
AUG	●	74.30	0.05
SEP	●	71.50	0.30
OCT	●	63.80	0.98
NOV			
DEC			
SUM	6	420.90	1.90
	AVG	70.15	0.32

University : Carnegie Mellon Univ.
Location : Pittsburgh, PA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	39.90	11.36
APR	●	51.00	4.88
MAY	●	61.60	3.50
JUN	●	70.20	3.78
JUL	●	74.30	3.97
AUG	●	72.50	3.22
SEP	●	66.30	2.67
OCT	●	54.70	2.68
NOV	●	43.10	5.86
DEC			
SUM	9	533.60	41.92
	AVG	59.29	4.66

University : Case Western Reserve Univ.
Location : Cleveland, OH

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	36.20	13.19
APR	●	47.20	5.24
MAY	●	58.30	3.33
JUN	●	67.80	3.38
JUL	●	72.30	3.42
AUG	●	70.60	3.07
SEP	●	64.60	3.19
OCT	●	53.50	3.22
NOV			
DEC			
SUM	8	470.50	38.04
	AVG	58.81	4.76

University : College of Charleston
Location : Charleston, SC

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	48.30	3.46
FEB	●	51.00	3.16
MAR	●	57.90	4.40
APR	●	65.40	2.44
MAY	●	72.80	3.53
JUN	●	78.80	5.83
JUL	●	81.80	6.00
AUG	●	80.90	7.25
SEP	●	76.70	4.67
OCT	●	67.90	2.78
NOV	●	59.70	2.29
DEC	●	52.20	2.90
SUM	12	793.40	48.71
	AVG	66.12	4.06

University : Colorado State Univ.
Location : Fort Collins, CO (Denver, CO)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	38.00	13.94
APR	●	47.40	10.96
MAY	●	57.20	4.13
JUN	●	67.00	1.50
JUL	●	73.50	1.73
AUG	●	71.40	1.43
SEP	●	62.60	2.69
OCT	●	51.90	4.71
NOV	●	38.70	8.89
DEC	●	32.60	8.03
SUM	10	540.30	58.01
	AVG	54.03	5.80

University : Cornell Univ.
Location : Ithaca, NY

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	32.70	12.47
APR	●	43.90	6.81
MAY	●	54.90	3.61
JUN	●	63.90	3.77
JUL	●	68.50	3.45
AUG	●	66.90	3.44
SEP	●	59.60	3.53
OCT	●	48.90	3.76
NOV			
DEC			
SUM	8	439.30	40.84
	AVG	54.91	5.11

University : Dartmouth College
Location : Hanover, NH (Concord, NH)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	21.00	21.00
FEB	●	22.80	17.31
MAR	●	32.10	13.66
APR	●	44.40	5.31
MAY	●	56.20	3.27
JUN	●	64.80	3.31
JUL	●	70.00	3.55
AUG	●	67.30	3.42
SEP	●	59.70	3.36
OCT	●	48.90	3.29
NOV	●	37.50	7.46
DEC	●	25.40	16.74
SUM	12	550.10	101.68
	AVG	45.84	8.47

University : Emory University
Location : Atlanta, GA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	53.30	6.17
APR	●	61.40	4.26
MAY			
JUN	●	76.00	3.56
JUL	●	78.80	5.01
AUG	●	78.00	3.66
SEP	●	72.60	3.42
OCT	●	62.30	3.05
NOV			
DEC			
SUM	7	482.40	29.13
	AVG	68.91	4.16

University : Franklin & Marshall College
Location : Lancaster, PA (Harrisburg, PA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	40.40	9.31
APR	●	50.70	3.55
MAY	●	62.10	3.80
JUN	●	70.80	3.62
JUL	●	75.30	3.62
AUG	●	73.30	3.68
SEP	●	66.50	3.15
OCT	●	55.10	2.92
NOV			
DEC			
SUM	8	494.20	33.65
	AVG	61.78	4.21

University : Georgia Institute of Technolgy
Location : Atlanta, GA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	53.30	6.17
APR	●	61.40	4.26
MAY	●	69.10	4.29
JUN	●	7.60	3.56
JUL	●	78.70	5.01
AUG	●	78.00	3.66
SEP	●	72.60	3.42
OCT	●	62.30	3.05
NOV			
DEC			
SUM	8	483.00	33.42
	AVG	60.38	4.18

University : Hampshire College
Location : Amherst, MA (Worcester, MA)

Month	Bike Season	Mean Temperature (F)	Mean Precipitation (inches)
JAN			
FEB	●	25.50	19.58
MAR	●	33.50	17.40
APR	●	45.10	7.95
MAY	●	55.80	4.48
JUN	●	64.80	3.65
JUL	●	70.10	3.73
AUG	●	68.20	4.25
SEP	●	60.30	3.83
OCT	●	50.40	4.90
NOV	●	39.70	8.24
DEC			
SUM	10	513.40	78.01
	AVG	51.34	7.80

University : Harvard Univ.
Location : Cambridge, MA (Boston, MA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	47.10	4.50
MAY	●	57.80	3.27
JUN	●	67.10	3.16
JUL	●	72.70	3.18
AUG	●	70.90	3.60
SEP	●	64.10	3.15
OCT	●	54.10	3.29
NOV			
DEC			
SUM	7	433.80	24.15
	AVG	61.97	3.45

University : Haverford College
Location : Haverford, PA (Philadelphia, PA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	41.80	7.10
APR	●	52.30	3.66
MAY	●	63.00	3.47
JUN	●	71.80	3.59
JUL	●	76.70	4.16
AUG	●	74.90	4.42
SEP	●	68.40	3.37
OCT	●	57.30	2.79
NOV	●	46.30	3.83
DEC			
SUM	9	552.50	36.39
	AVG	61.39	4.04

University : Humboldt State Univ.
Location : Arcadia, CA (Los Angeles, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	62.30	0.12
JUN	●	65.30	0.02
JUL	●	68.60	0.01
AUG	●	69.70	0.09
SEP	●	69.00	0.25
OCT			
NOV			
DEC			
SUM	5	334.90	0.49
	AVG	66.98	0.10

University : Idaho State Univ.
Location : Pocatello, ID

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	45.90	5.56
MAY	●	54.40	1.95
JUN	●	62.90	1.03
JUL	●	71.60	0.65
AUG	●	69.60	0.68
SEP	●	59.70	0.93
OCT	●	48.90	2.89
NOV			
DEC			
SUM	7	413.00	13.69
	AVG	59.00	1.96

University : Indiana Univ.
Location : Bloomington, IN

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	53.50	4.20
MAY	●	63.20	4.76
JUN	●	71.90	3.56
JUL	●	75.80	4.76
AUG	●	73.70	3.88
SEP	●	67.30	3.26
OCT	●	55.90	2.93
NOV			
DEC			
SUM	7	461.30	27.35
	AVG	65.90	3.91

University : Iowa State Univ.
Location : Ames, IA (Des Moines, IA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	37.30	7.73
APR	●	50.90	5.76
MAY	●	62.30	3.66
JUN	●	71.80	4.46
JUL	●	76.60	3.78
AUG	●	73.90	4.20
SEP	●	65.10	3.53
OCT	●	53.50	3.02
NOV			
DEC			
SUM	8	491.40	36.14
	AVG	61.43	4.52

University : James Madison Univ.
Location : Harrisonburg, VA(Charlottesville, VA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	56.40	4.88
MAY	●	64.90	3.74
JUN	●	72.50	4.75
JUL	●	76.40	4.70
AUG	●	68.90	4.11
SEP	●	58.20	4.78
OCT	●	48.90	4.68
NOV			
DEC			
SUM	7	446.20	31.64
	AVG	63.74	4.52

University : Johns Hopkins Univ.
Location : Baltimore, MD

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	53.90	3.36
MAY	●	63.30	3.67
JUN	●	72.30	3.67
JUL	●	77.00	3.91
AUG	●	75.40	4.22
SEP	●	68.60	3.38
OCT			
NOV			
DEC			
SUM	6	410.50	22.21
	AVG	68.42	3.70

University : Kansas State Univ.
Location : Manhattan, KS (Topeka, KS)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	42.90	6.04
APR	●	55.00	3.63
MAY	●	64.50	4.43
JUN	●	74.00	4.84
JUL	●	78.90	3.85
AUG	●	77.30	4.07
SEP	●	69.10	3.58
OCT	●	57.60	2.62
NOV	●	43.50	2.87
DEC			
SUM	9	562.80	35.93
	AVG	62.53	3.99

University : Lehigh Univ.
Location : Bethlehem, PA (Allentown, PA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	49.90	38.20
MAY	●	60.20	4.25
JUN	●	69.30	3.77
JUL			
AUG	●	72.00	4.30
SEP	●	64.60	3.98
OCT	●	53.70	2.94
NOV			
DEC			
SUM	6	369.70	57.44
	AVG	61.62	9.57

University : Massachusetts Inst. of Technology
Location : Boston, MA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	37.10	11.22
APR	●	47.10	4.50
MAY	●	57.80	3.27
JUN	●	67.10	3.16
JUL	●	72.70	3.18
AUG	●	70.90	3.60
SEP	●	64.10	3.15
OCT	●	54.10	3.29
NOV	●	43.70	5.29
DEC			
SUM	9	514.60	40.66
	AVG	57.18	4.52

University : Miami Univ.
Location : Oxford, OH (Cincinnati, OH)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	42.30	8.23
APR	●	53.40	4.04
MAY	●	63.10	4.05
JUN	●	71.70	3.91
JUL	●	75.60	4.20
AUG	●	74.10	3.14
SEP	●	67.40	2.82
OCT	●	55.60	2.96
NOV	●	43.90	5.52
DEC			
SUM	9	547.10	38.87
	AVG	60.79	4.32

University : Michigan State Univ.
Location : East Lansing, MI (Lansing, MI)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	45.00	5.51
MAY	●	56.80	3.50
JUN	●	66.20	3.45
JUL	●	70.80	2.67
AUG	●	68.90	2.99
SEP	●	61.60	3.11
OCT	●	50.30	2.80
NOV			
DEC			
SUM	7	419.60	24.03
	AVG	59.94	3.43

University : New Mexico State Univ.
Location : Las Cruces, NM (El Paso, TX)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	44.50	0.43
FEB	●	49.20	0.41
MAR	●	55.60	0.33
APR	●	63.60	0.25
MAY	●	72.10	0.34
JUN	●	80.70	0.63
JUL	●	82.00	1.67
AUG	●	80.20	1.52
SEP	●	74.70	1.31
OCT	●	64.50	0.82
NOV	●	52.40	0.44
DEC	●	45.00	0.53
SUM	12	764.50	8.68
	AVG	63.71	0.72

University : North Carolina State Univ.
Location : Raleigh, NC

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	59.50	2.94
MAY	●	67.40	4.28
JUN	●	74.80	3.90
JUL	●	78.50	4.55
AUG	●	77.60	4.31
SEP	●	71.60	3.18
OCT	●	60.40	3.39
NOV	●	52.20	3.15
DEC			
SUM	8	542.00	29.70
	AVG	67.75	3.71

University : Ohio Univ.
Location : Athens, OH (Columbus, OH)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	30.70	8.67
MAR	●	40.20	8.41
APR	●	51.10	4.13
MAY	●	61.80	3.72
JUN	●	70.70	3.73
JUL	●	74.70	3.83
AUG	●	72.80	3.23
SEP	●	66.40	2.63
OCT	●	54.80	2.26
NOV	●	42.40	5.09
DEC	●	32.40	8.33
SUM	11	598.00	54.03
	AVG	54.36	4.91

University : Oklahoma State Univ.
Location : Stillwater, OK (Oklahoma City, OK)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	50.00	3.68
APR	●	60.30	3.17
MAY	●	68.20	5.20
JUN	●	77.00	4.08
JUL	●	81.60	2.70
AUG	●	81.20	2.68
SEP	●	73.80	3.28
OCT	●	62.50	2.97
NOV	●	49.40	2.41
DEC			
SUM	9	604.00	30.17
	AVG	67.11	3.35

University : Oregon State Univ.
Location : Corvallis, OR (Eugene, OR)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY			
JUN	●	61.10	1.39
JUL	●	66.60	0.44
AUG	●	66.30	0.84
SEP	●	61.90	1.46
OCT			
NOV			
DEC			
SUM	4	255.90	4.13
	AVG	63.98	1.03

University : Pennsylvania State Univ.
Location : State College, PA (Williamsport, PA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	38.00	11.14
APR	●	49.50	4.60
MAY	●	59.50	3.88
JUN	●	68.10	3.91
JUL	●	72.60	4.07
AUG	●	71.00	3.46
SEP	●	63.50	3.35
OCT	●	52.50	3.20
NOV			
DEC			
SUM	8	474.70	37.61
	AVG	59.34	4.70

University : Purdue Univ.
Location : West Lafayette, IN (Indianapolis, IN)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	40.40	7.27
APR	●	52.00	4.16
MAY	●	62.50	3.96
JUN	●	71.80	4.02
JUL	●	75.70	3.92
AUG	●	73.60	3.32
SEP	●	66.80	3.14
OCT	●	55.30	2.90
NOV	●	42.20	5.01
DEC			
SUM	9	540.30	37.70
	AVG	60.03	4.19

University : Reed College
Location : Portland, OR

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	46.60	4.14
APR	●	51.10	2.28
MAY			
JUN	●	61.30	1.58
JUL	●	66.50	0.57
AUG	●	66.40	0.94
SEP			
OCT			
NOV			
DEC			
SUM	5	291.90	9.51
	AVG	58.38	1.90

University : Rice Univ.
Location : Houston, TX

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	50.80	3.78
FEB	●	54.20	3.27
MAR	●	61.60	2.75
APR	●	68.30	3.32
MAY	●	74.90	4.84
JUN	●	80.70	4.65
JUL	●	83.10	4.07
AUG	●	82.90	3.98
SEP	●	78.50	4.55
OCT	●	69.80	3.96
NOV	●	60.90	3.97
DEC	●	53.80	3.94
SUM	12	819.50	47.08
	AVG	68.29	3.92

University : Santa Clara Univ.
Location : Santa Clara, CA (San Francisco, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	57.70	0.33
JUN	●	60.70	0.12
JUL	●	61.90	0.02
AUG	●	62.40	0.03
SEP			
OCT	●	60.40	0.94
NOV			
DEC			
SUM	5	303.10	1.44
	AVG	60.62	0.29

University : South Dakota Sch. of Mines & Tech.
Location : Rapid City, SD

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	22.90	5.21
FEB	●	25.40	6.87
MAR	●	33.30	10.10
APR	●	45.00	7.90
MAY	●	55.10	3.86
JUN	●	64.70	3.32
JUL	●	72.40	2.24
AUG	●	70.80	1.64
SEP	●	60.70	1.36
OCT	●	49.30	2.53
NOV	●	35.80	5.51
DEC	●	26.30	5.51
SUM	12	561.70	56.05
	AVG	46.81	4.67

University : Southern Illinois Univ.
Location : Carbondale, IL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	44.80	6.58
APR	●	56.10	4.29
MAY	●	65.10	4.58
JUN	●	73.80	4.13
JUL	●	77.60	3.81
AUG	●	75.30	4.02
SEP	●	68.20	3.07
OCT	●	56.70	2.88
NOV	●	45.50	4.64
DEC			
SUM	9	563.10	38.00
	AVG	62.57	4.22

University : Southern Methodist Univ.
Location : Dallas, TX

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	45.20	3.10
FEB			
MAR	●	56.90	2.63
APR	●	65.20	3.77
MAY	●	72.70	4.77
JUN	●	80.90	2.99
JUL	●	84.60	2.19
AUG	●	84.70	2.18
SEP	●	77.90	2.84
OCT	●	67.60	2.99
NOV	●	56.00	2.37
DEC	●	47.40	2.25
SUM	11	739.10	32.08
	AVG	67.19	2.92

University : Southwest Texas State Univ.
Location : San Marcos, TX (Austin, TX)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	60.60	2.22
APR	●	68.10	3.39
MAY	●	74.90	4.34
JUN	●	81.50	7.95
JUL	●	84.20	2.21
AUG	●	84.30	2.11
SEP	●	79.10	3.55
OCT	●	69.90	3.17
NOV	●	59.40	2.49
DEC			
SUM	9	662.00	31.43
	AVG	73.56	3.49

University : Stanford University
Location : Palo Alto, CA (San Francisco, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	53.10	2.89
APR	●	55.10	1.34
MAY	●	57.70	0.33
JUN	●	60.70	0.12
JUL	●	61.90	0.02
AUG	●	62.40	0.03
SEP	●	63.30	0.19
OCT	●	60.40	0.94
NOV	●	54.50	2.17
DEC	●	49.30	3.54
SUM	10	578.40	11.57
	AVG	57.84	1.16

University : State Univ. of New York- Buffalo
Location : Buffalo, NY

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	55.00	3.25
JUN	●	64.80	2.93
JUL	●	70.50	2.91
AUG	●	69.00	3.22
SEP	●	62.50	3.08
OCT	●	51.50	3.29
NOV			
DEC			
SUM	6	373.30	18.68
	AVG	62.22	3.11

University : Texas A&M Univ.
Location : College Station, TX (Houston, TX)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	50.80	3.78
FEB	●	54.20	3.27
MAR			
APR	●	68.30	3.32
MAY	●	74.90	4.84
JUN	●	80.70	4.65
JUL	●	83.10	4.07
AUG	●	82.90	3.98
SEP	●	78.50	4.55
OCT	●	69.80	3.96
NOV	●	60.90	3.97
DEC	●	53.80	3.94
SUM	11	757.90	44.33
	AVG	68.90	4.03

University : The Ohio State Univ.
Location : Columbus, OH

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	40.90	7.67
APR	●	51.00	4.31
MAY	●	61.20	3.93
JUN	●	69.20	4.04
JUL	●	73.20	4.31
AUG	●	71.50	3.72
SEP	●	65.50	2.96
OCT	●	53.70	2.25
NOV	●	42.90	5.12
DEC	●	31.90	8.16
SUM	10	561.00	46.47
	AVG	56.10	4.65

University : Towsen State Univ.
Location : Towsen, MD (Baltimore, MD)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	43.40	7.25
APR	●	53.90	3.36
MAY	●	63.30	3.67
JUN	●	72.30	3.67
JUL	●	77.00	3.91
AUG	●	75.40	4.22
SEP	●	68.60	3.38
OCT	●	56.90	2.98
NOV			
DEC			
SUM	8	510.80	32.44
	AVG	63.85	4.06

University : Tulane Univ.
Location : New Orleans, LA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	53.30	4.70
FEB	●	56.00	5.25
MAR	●	61.80	5.26
APR	●	68.10	4.71
MAY	●	75.40	4.65
JUN			
JUL			
AUG			
SEP	●	78.80	5.39
OCT	●	70.30	3.12
NOV	●	61.10	4.34
DEC	●	53.30	5.26
SUM	9	578.10	42.68
	AVG	64.23	4.74

University : Univ. of Alabama- Birmingham
Location : Birmingham, AL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	54.30	6.29
APR	●	62.10	5.16
MAY	●	69.50	4.85
JUN	●	76.50	3.73
JUL	●	79.70	5.24
AUG	●	79.10	3.59
SEP	●	73.70	3.93
OCT	●	62.70	2.81
NOV			
DEC			
SUM	8	557.60	35.60
	AVG	69.70	4.45

University : Univ. of Arizona
Location : Tucson, AZ

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	50.50	1.25
FEB	●	53.50	1.01
MAR	●	58.00	1.02
APR	●	64.80	0.45
MAY	●	72.90	0.19
JUN	●	82.30	0.26
JUL	●	86.10	2.25
AUG	●	84.10	2.17
SEP	●	80.10	1.32
OCT	●	69.60	0.72
NOV	●	58.30	0.85
DEC	●	51.40	1.31
SUM	12	811.60	12.80
	AVG	67.63	1.07

University : Univ. of California- Berkeley
Location : Berkeley, CA (San Francisco, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	53.10	2.89
APR	●	55.10	1.34
MAY	●	57.70	0.33
JUN	●	60.70	0.12
JUL	●	61.90	0.02
AUG	●	62.40	0.03
SEP	●	63.30	0.19
OCT	●	60.40	0.94
NOV			
DEC			
SUM	8	474.60	5.86
	AVG	59.33	0.73

University : Univ. of California- Davis
Location : Davis, CA (Sacramento, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	50.20	2.91
MAR	●	53.50	2.47
APR	●	58.50	1.34
MAY	●	64.80	0.44
JUN	●	71.10	0.10
JUL	●	75.40	0.03
AUG	●	74.30	0.05
SEP	●	71.50	0.30
OCT	●	63.80	0.98
NOV	●	53.00	2.27
DEC			
SUM	10	636.10	10.89
	AVG	63.61	1.09

University : Univ. of California- Irvine
Location : Irvine, CA (Los Angeles, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	55.40	2.45
FEB	●	56.50	2.73
MAR	●	57.40	1.97
APR	●	59.80	0.86
MAY	●	62.30	0.12
JUN	●	65.30	0.02
JUL	●	68.60	0.01
AUG	●	69.70	0.09
SEP	●	69.00	0.25
OCT	●	65.80	0.36
NOV	●	60.90	1.43
DEC	●	56.80	1.94
SUM	12	747.50	12.23
	AVG	62.29	1.02

University : Univ. of California- Los Angeles
Location : Los Angeles, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	55.40	2.45
FEB	●	56.50	2.73
MAR	●	57.40	1.97
APR	●	59.80	0.86
MAY	●	62.30	0.12
JUN	●	65.30	0.02
JUL	●	68.60	0.01
AUG	●	69.70	0.09
SEP	●	69.00	0.25
OCT	●	65.80	0.36
NOV	●	60.90	1.43
DEC	●	56.80	1.94
SUM	12	747.50	12.23
	AVG	62.29	1.02

University : Univ. of California- San Diego
Location : San Diego, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	55.50	1.87
FEB	●	56.50	1.87
MAR	●	57.40	1.57
APR	●	60.20	0.72
MAY	●	62.30	0.27
JUN	●	65.10	0.06
JUL	●	68.80	0.04
AUG	●	70.20	0.09
SEP	●	68.80	0.14
OCT	●	65.10	0.42
NOV	●	60.80	1.00
DEC	●	57.00	1.83
SUM	12	747.70	9.88
	AVG	62.31	0.82

University : Univ. of California- Santa Barbara
Location : Santa Barbara, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	51.80	1.35
FEB	●	53.00	2.71
MAR	●	56.10	2.11
APR	●	59.00	0.59
MAY	●	60.40	0.13
JUN	●	62.80	0.07
JUL	●	66.20	0.01
AUG	●	66.00	0.12
SEP	●	65.30	0.29
OCT	●	62.30	0.55
NOV	●	56.40	1.25
DEC	●	51.80	1.97
SUM	12	711.10	11.15
	AVG	59.26	0.93

University : Univ. of California- Santa Cruz
Location : Santa Cruz, CA (San Francisco, CA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	48.40	4.13
FEB	●	51.30	3.26
MAR	●	53.10	2.89
APR	●	55.10	1.34
MAY	●	57.70	0.33
JUN	●	60.70	0.12
JUL	●	61.90	0.02
AUG	●	62.40	0.03
SEP	●	63.30	0.19
OCT	●	60.40	0.94
NOV	●	54.50	2.17
DEC	●	49.30	3.54
SUM	12	678.10	18.96
	AVG	56.51	1.58

University : Univ. of Chicago
Location : Chicago, IL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	60.50	3.55
JUN	●	70.50	4.06
JUL	●	75.40	3.78
AUG	●	74.30	3.92
SEP	●	67.70	3.47
OCT	●	56.40	2.52
NOV			
DEC			
SUM	6	404.80	21.30
	AVG	67.47	3.55

University : Univ. of Colorado- Boulder
Location : Boulder, CO (Denver, CO)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	47.40	10.96
MAY	●	52.20	4.13
JUN	●	67.00	1.50
JUL	●	73.30	1.73
AUG	●	71.40	1.43
SEP	●	62.60	2.69
OCT	●	51.90	4.71
NOV			
DEC			
SUM	7	425.80	27.15
	AVG	60.83	3.88

University : Univ.of Colorado- Colorado Springs
Location : Colorado Springs, CO

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	29.10	5.50
FEB	●	32.00	8.77
MAR	●	36.80	10.58
APR	●	46.10	7.63
MAY	●	55.40	3.78
JUN	●	65.30	2.09
JUL	●	70.80	2.92
AUG	●	68.80	2.72
SEP	●	60.40	2.40
OCT	●	50.30	4.02
NOV	●	38.00	5.37
DEC	●	30.70	6.18
SUM	12	583.70	61.96
	AVG	48.64	5.16

University : Univ. of Delaware
Location : Newark, DE (Wilmington, DE)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	42.10	6.84
APR	●	52.30	3.71
MAY	●	62.70	3.69
JUN	●	71.30	3.76
JUL	●	76.10	4.56
AUG	●	74.30	4.53
SEP	●	67.80	3.59
OCT	●	56.50	3.13
NOV	●	45.70	4.25
DEC	●	35.20	6.92
SUM	10	584.00	44.98
	AVG	58.40	4.50

University : Univ. of Florida
Location : Gainesville, FL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	54.00	3.04
FEB	●	56.50	4.52
MAR	●	62.20	3.27
APR	●	68.00	1.98
MAY	●	74.50	3.07
JUN	●	79.00	6.83
JUL	●	80.60	6.83
AUG	●	80.60	8.31
SEP	●	77.90	5.49
OCT	●	70.30	2.00
NOV	●	62.70	2.40
DEC	●	55.90	2.89
SUM	12	822.20	50.63
	AVG	68.52	4.22

University : Univ. of Georgia
Location : Athens, GA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	41.70	5.80
FEB	●	45.30	5.52
MAR	●	53.60	5.86
APR	●	61.50	3.99
MAY	●	69.40	4.37
JUN	●	76.40	3.93
JUL	●	79.50	4.88
AUG	●	78.50	3.70
SEP	●	72.90	3.36
OCT	●	62.20	3.28
NOV	●	53.40	3.66
DEC	●	45.00	4.09
SUM	12	739.40	52.44
	AVG	61.62	4.37

University : Univ. of Idaho
Location : Moscow, ID (Spokane, WA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	39.50	5.46
APR	●	47.60	1.79
MAY	●	55.60	1.47
JUN	●	62.40	1.28
JUL	●	69.90	0.55
AUG	●	68.60	0.62
SEP	●	59.30	0.83
OCT	●	48.50	1.61
NOV	●	36.60	8.25
DEC			
SUM	9	488.00	21.86
	AVG	54.22	2.43

University : Univ. of Illinois- Chicago
Location : Chicago, IL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	50.40	4.50
MAY	●	60.50	3.55
JUN	●	70.50	4.06
JUL	●	75.40	3.78
AUG	●	74.30	3.92
SEP	●	67.70	3.47
OCT	●	56.40	2.52
NOV	●	43.50	3.39
DEC			
SUM	8	498.70	29.19
	AVG	62.34	3.65

University : Univ. of Illinois- Urbana Champaign
Location : Urbana, IL

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	51.90	4.74
MAY	●	62.70	3.97
JUN	●	71.80	4.07
JUL	●	75.00	4.46
AUG	●	72.70	4.03
SEP	●	66.50	3.36
OCT	●	54.50	2.76
NOV			
DEC			
SUM	7	455.10	27.39
	AVG	65.01	3.91

University : Univ. of Iowa
Location : Iowa City, IA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	25.90	6.76
MAR	●	38.20	6.36
APR	●	51.70	5.39
MAY	●	62.80	4.04
JUN	●	72.10	4.54
JUL	●	76.30	4.91
AUG	●	73.70	4.41
SEP	●	66.00	3.90
OCT	●	54.60	3.12
NOV	●	40.40	3.62
DEC	●	25.90	8.16
SUM	11	587.60	55.21
	AVG	53.42	5.02

University : Univ. of Kentucky
Location : Lexington, KY

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	45.30	6.60
APR	●	54.80	4.28
MAY	●	64.00	4.47
JUN	●	72.20	3.66
JUL	●	75.80	5.00
AUG	●	74.70	3.93
SEP	●	68.20	3.20
OCT	●	56.70	2.57
NOV			
DEC			
SUM	8	511.70	33.71
	AVG	63.96	4.21

University : Univ. of Maine
Location : Orono, ME (Portland, ME)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	53.30	3.67
JUN	●	62.30	3.28
JUL	●	68.30	3.12
AUG	●	66.70	2.99
SEP	●	59.50	3.19
OCT	●	49.40	3.60
NOV	●	38.70	7.22
DEC			
SUM	7	398.20	27.07
	AVG	56.89	3.87

University : Univ. or Maryland- College Park
Location : College Park, MD (Baltimore, MD)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	43.40	7.25
APR	●	53.90	3.36
MAY	●	63.30	3.67
JUN	●	72.30	3.67
JUL	●	77.00	3.91
AUG	●	75.40	4.22
SEP	●	68.60	3.38
OCT	●	56.90	2.98
NOV	●	46.40	4.34
DEC			
SUM	9	557.20	36.78
	AVG	61.91	4.09

University : Univ. of Miami
Location : Coral Gables, FL (Miami, FL)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	67.30	2.01
FEB	●	68.30	2.08
MAR	●	71.80	2.39
APR	●	75.20	3.03
MAY	●	78.60	6.21
JUN	●	81.30	9.33
JUL	●	82.80	5.70
AUG	●	83.00	7.58
SEP	●	81.90	7.63
OCT	●	78.30	5.64
NOV	●	73.40	2.66
DEC	●	69.10	1.83
SUM	12	911.00	56.09
	AVG	75.92	4.67

University : Univ. of Michigan
Location : Ann Arbor, MI

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	48.30	5.21
MAY	●	59.80	2.88
JUN	●	68.90	3.47
JUL	●	73.00	3.02
AUG	●	70.40	3.37
SEP	●	64.20	3.11
OCT	●	52.50	2.35
NOV	●	40.90	6.13
DEC			
SUM	8	478.00	29.54
	AVG	59.75	3.69

University : Univ. of Minnesota- Twin Cities
Location : Minneapolis, MN

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	46.40	6.02
MAY	●	58.50	3.49
JUN	●	68.20	4.05
JUL	●	73.60	3.53
AUG	●	70.50	3.62
SEP	●	60.50	2.72
OCT	●	48.80	2.59
NOV			
DEC			
SUM	7	426.50	26.02
	AVG	60.93	3.72

University : University of Missouri- Rolla
Location : Rolla, MO (Jefferson City, MO)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	42.70	5.38
APR	●	54.20	3.85
MAY	●	63.40	4.94
JUN	●	72.00	4.41
JUL	●	77.40	3.04
AUG	●	75.40	3.14
SEP	●	67.40	3.97
OCT	●	55.80	3.49
NOV			
DEC			
SUM	8	508.30	32.22
	AVG	63.54	4.03

University : Univ. of Montana
Location : Missoula, MT

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	44.90	3.20
MAY	●	52.60	2.62
JUN	●	60.00	1.94
JUL	●	67.60	0.94
AUG	●	66.00	0.94
SEP	●	56.10	1.19
OCT	●	45.00	1.78
NOV			
DEC			
SUM	7	392.20	12.61
	AVG	56.03	1.80

University : Univ. of Nebraska- Lincoln
Location : Lincoln, NE

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	38.50	7.49
APR	●	52.00	3.65
MAY	●	62.30	3.94
JUN	●	72.40	4.25
JUL	●	77.90	3.57
AUG	●	75.70	3.46
SEP	●	66.90	3.06
OCT	●	55.00	2.19
NOV	●	39.80	3.92
DEC			
SUM	9	540.50	35.53
	AVG	60.06	3.95

University : Univ. of North Carolina
Location : Chapel Hill, NC

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	40.20	6.07
MAR	●	48.70	5.42
APR	●	57.80	3.22
MAY	●	65.60	4.40
JUN	●	73.10	4.38
JUL	●	76.80	4.05
AUG	●	75.80	4.51
SEP	●	69.50	3.20
OCT	●	58.20	3.47
NOV	●	50.00	3.49
DEC			
SUM	10	615.70	42.21
	AVG	61.57	4.22

University : Univ. of Notre Dame
Location : Notre Dame, IN (South Bend, IN)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	37.40	12.80
APR	●	48.70	6.22
MAY	●	59.40	3.22
JUN	●	69.10	4.11
JUL	●	72.90	3.82
AUG	●	70.90	3.67
SEP	●	63.90	3.62
OCT	●	52.60	4.08
NOV	●	40.90	11.87
DEC			
SUM	9	515.80	53.41
	AVG	57.31	5.93

University : Univ. of Oregon
Location : Eugene, OR

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	50.00	2.78
MAY	●	55.30	2.09
JUN	●	61.10	1.39
JUL	●	66.60	0.44
AUG	●	66.30	0.84
SEP	●	61.90	1.46
OCT	●	53.10	3.74
NOV			
DEC			
SUM	7	414.30	12.74
	AVG	59.19	1.82

University : Univ. of the Pacific
Location : Stockton, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	45.10	2.71
FEB	●	50.10	2.04
MAR	●	53.80	2.13
APR	●	59.20	1.20
MAY	●	65.80	0.36
JUN	●	72.30	0.07
JUL	●	77.00	0.03
AUG	●	75.70	0.05
SEP	●	72.30	0.30
OCT	●	64.10	0.76
NOV	●	53.00	1.80
DEC	●	45.60	2.35
SUM	12	734.00	13.80
	AVG	61.17	1.15

University : Univ. of Pennsylvania
Location : Philadelphia, PA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	41.80	7.10
APR	●	52.30	3.66
MAY	●	63.00	3.47
JUN	●	71.80	3.59
JUL	●	76.70	4.16
AUG	●	74.90	4.42
SEP	●	68.40	3.37
OCT	●	57.30	2.79
NOV	●	46.30	3.83
DEC	●	36.10	6.78
SUM	10	588.60	43.17
	AVG	58.86	4.32

University : Univ. of Pittsburgh- Johnstown
Location : Johnstown, PA (Pittsburgh, PA)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	51.00	3.08
MAY	●	61.60	3.40
JUN	●	70.20	3.78
JUL	●	74.30	3.97
AUG	●	72.50	3.22
SEP	●	66.30	2.67
OCT	●	54.70	2.68
NOV			
DEC			
SUM	7	450.60	22.80
	AVG	64.37	3.26

University : Univ. of Pittsburgh
Location : Pittsburgh, PA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	51.00	4.88
MAY	●	61.60	3.50
JUN	●	70.20	3.78
JUL	●	74.30	3.97
AUG	●	72.50	3.22
SEP	●	66.30	2.67
OCT	●	54.70	2.68
NOV			
DEC			
SUM	7	450.60	24.70
	AVG	64.37	3.53

University : Univ. of Rochester
Location : Rochester, NY

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	56.80	3.21
JUN	●	66.40	3.00
JUL	●	71.40	3.07
AUG	●	69.30	2.90
SEP			
OCT			
NOV			
DEC			
SUM	4	263.90	12.18
	AVG	65.98	3.05

University : Univ. of San Diego
Location : San Diego, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	55.50	1.87
FEB	●	56.50	1.87
MAR	●	57.40	1.57
APR	●	60.20	0.72
MAY	●	62.30	0.27
JUN	●	65.10	0.06
JUL	●	68.80	0.04
AUG	●	70.20	0.09
SEP	●	68.80	0.14
OCT	●	65.10	0.42
NOV	●	60.80	1.00
DEC	●	57.00	1.83
SUM	12	747.70	9.88
	AVG	62.31	0.82

University : Univ. of Tennessee
Location : Knoxville, TN

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	50.10	6.39
APR	●	58.60	4.42
MAY	●	66.50	4.13
JUN	●	74.00	3.97
JUL	●	77.40	4.67
AUG	●	76.80	3.13
SEP	●	70.90	3.07
OCT	●	59.20	3.84
NOV	●	49.50	3.95
DEC			
SUM	9	583.00	37.57
	AVG	64.78	4.17

University : Univ. of Texas- Austin
Location : Austin, TX

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN	●	50.00	2.50
FEB	●	53.40	2.67
MAR	●	60.60	2.22
APR	●	68.10	3.39
MAY	●	74.90	4.34
JUN	●	81.50	2.95
JUL	●	84.20	2.21
AUG	●	84.30	2.11
SEP	●	79.10	3.55
OCT	●	69.90	3.17
NOV	●	59.40	2.44
DEC	●	51.70	2.42
SUM	12	817.10	33.97
	AVG	68.09	2.83

University : Univ. of Utah
Location : Salt Lake City, UT

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	41.00	11.76
APR	●	49.30	6.98
MAY	●	58.40	2.39
JUN	●	68.40	0.87
JUL	●	77.40	0.63
AUG	●	75.50	0.87
SEP	●	65.20	0.95
OCT	●	53.20	2.71
NOV	●	46.50	7.76
DEC			
SUM	9	534.90	34.92
	AVG	59.43	3.88

University : Univ. of Vermont
Location : Burlington, VT

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	42.90	6.11
MAY	●	55.50	3.24
JUN	●	64.80	3.49
JUL	●	69.80	3.62
AUG	●	67.40	3.54
SEP	●	59.50	3.36
OCT	●	48.50	3.14
NOV			
DEC			
SUM	7	408.40	26.50
	AVG	58.34	3.79

University : Univ. of Virginia
Location : Charlottesville, VA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	46.60	7.19
APR	●	56.40	3.61
MAY	●	64.90	4.88
JUN	●	72.50	3.74
JUL	●	76.40	4.75
AUG	●	74.90	4.70
SEP	●	68.90	4.11
OCT	●	58.20	4.78
NOV	●	48.90	4.68
DEC			
SUM	9	567.70	42.44
	AVG	63.08	4.72

University : Univ. of Washington
Location : Seattle, WA

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	44.50	4.85
MAR	●	46.70	4.32
APR	●	51.10	2.30
MAY	●	56.40	1.65
JUN	●	61.50	1.48
JUL	●	65.60	0.74
AUG	●	65.60	1.05
SEP	●	61.40	1.76
OCT	●	54.10	3.18
NOV	●	46.80	6.07
DEC	●	42.50	7.72
SUM	11	596.20	35.12
	AVG	54.20	3.19

University : Univ. of Wisconsin
Location : Madison, WI

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	32.30	10.07
APR	●	45.40	5.46
MAY	●	56.50	3.24
JUN	●	66.20	3.66
JUL	●	71.00	3.39
AUG	●	68.30	4.04
SEP	●	59.80	3.37
OCT	●	48.90	2.37
NOV			
DEC			
SUM	8	448.40	35.60
	AVG	56.05	4.45

University : Univ. of Wisconsin- Stout
Location : Monomonie, WI (Minneapolis, MN)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	58.50	3.49
JUN	●	68.20	4.05
JUL	●	73.60	3.53
AUG	●	70.50	3.62
SEP	●	60.50	2.72
OCT			
NOV			
DEC			
SUM	5	331.30	17.41
	AVG	66.26	3.48

University : Univ. of Wyoming
Location : Laramie, WY (Cheyenne, WY)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●	51.10	5.93
JUN	●	61.10	2.03
JUL	●	67.80	2.01
AUG	●	66.30	1.57
SEP	●	57.40	1.17
OCT	●	46.40	4.48
NOV			
DEC			
SUM	6	350.10	17.19
	AVG	58.35	2.87

University : Utah State Univ.
Location : Logan, UT (Salt Lake City, UT)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	49.30	6.98
MAY	●	58.40	2.39
JUN	●	68.40	0.87
JUL	●	77.40	0.63
AUG	●	75.50	0.87
SEP	●	65.20	1.05
OCT	●	53.20	1.71
NOV	●	40.50	7.76
DEC			
SUM	8	487.90	22.26
	AVG	60.99	2.78

University : Whitman College
Location : Walla Walla, WA (Lewiston, ID)

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB	●	38.10	3.38
MAR	●	43.60	2.45
APR	●	50.70	1.22
MAY	●	58.60	1.46
JUN	●	66.20	1.44
JUL	●	73.80	0.62
AUG	●	72.80	0.74
SEP	●	63.80	0.80
OCT	●	52.00	1.11
NOV	●	40.70	2.89
DEC			
SUM	10	560.30	16.11
	AVG	56.03	1.61

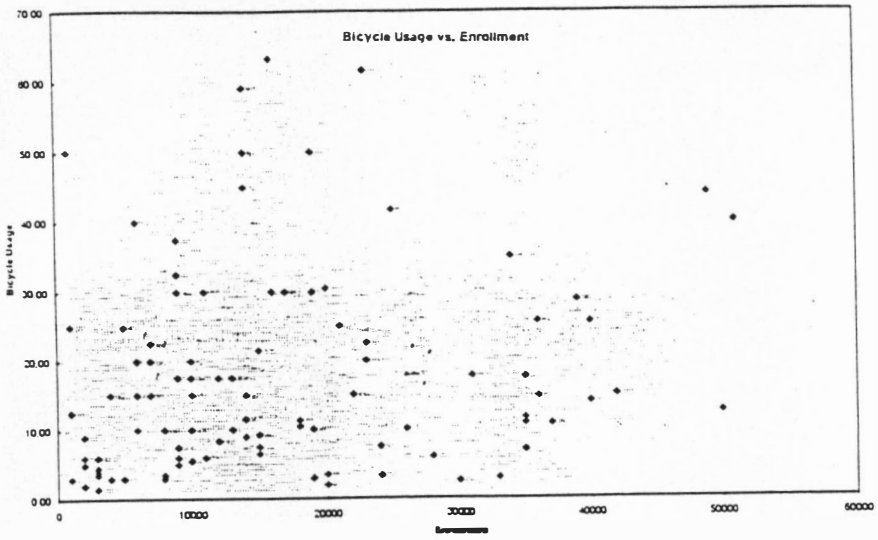
University : Willamette Univ.
Location : Salem,OR

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR	●	45.60	4.95
APR	●	49.80	2.31
MAY	●	55.50	1.97
JUN	●	61.30	1.36
JUL	●	66.60	0.48
AUG	●	66.40	0.64
SEP	●	61.40	1.50
OCT	●	53.10	3.46
NOV			
DEC			
SUM	8	459.70	16.67
	AVG	57.46	2.08

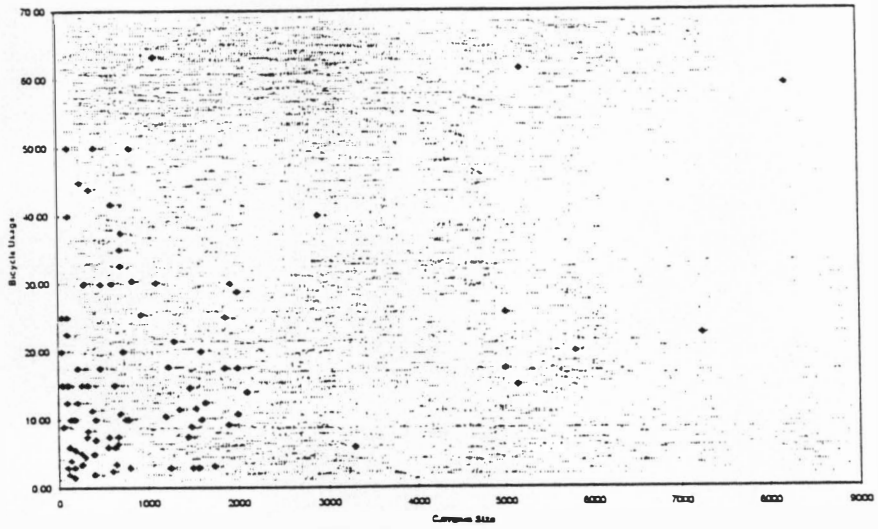
University : Wright State Univ.
Location : Dayton, OH

Month	Bike Season	Mean Temperature (F)	Mean Precp./Snow (inches)
JAN			
FEB			
MAR			
APR	●	51.20	4.26
MAY	●	61.70	3.88
JUN	●	70.40	3.82
JUL	●	74.20	3.54
AUG	●	72.20	3.20
SEP	●	65.80	2.54
OCT	●	54.10	2.78
NOV			
DEC			
SUM	7	449.60	24.02
	AVG	64.23	3.43

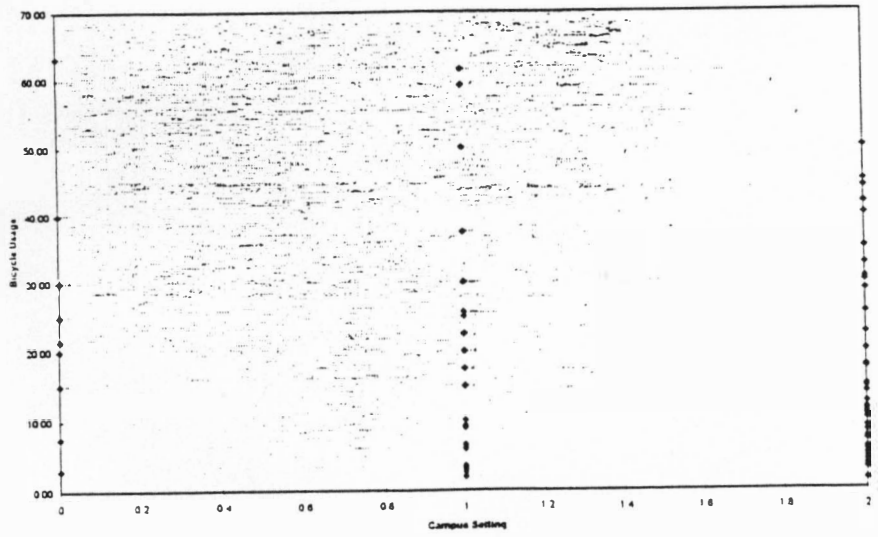
APPENDIX C: SCATTER DIAGRAMS FOR MODELS 1 AND 2



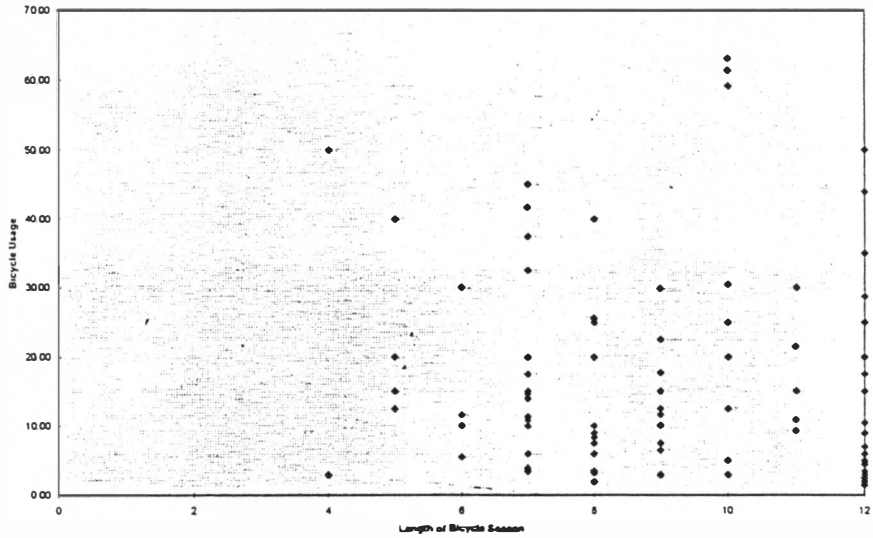
Bicycle Usage vs. Campus Size



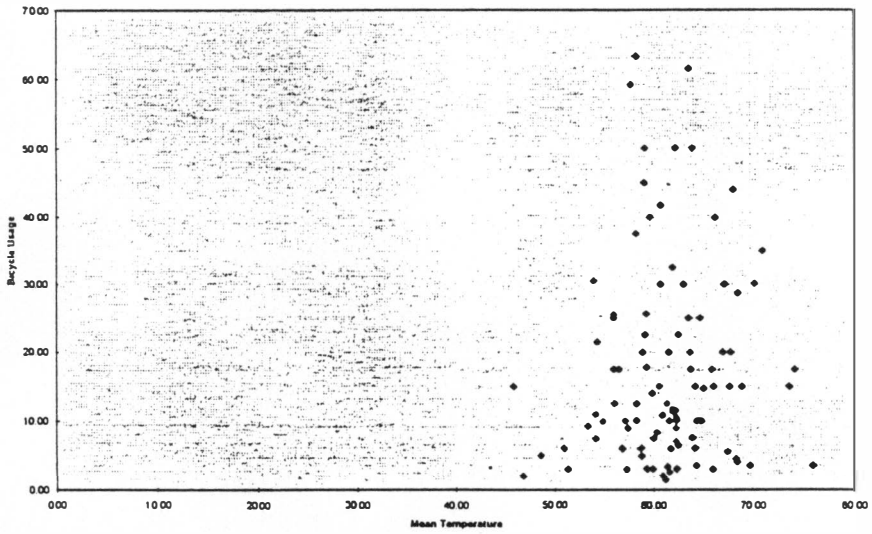
Bicycle Usage vs. Campus Setting



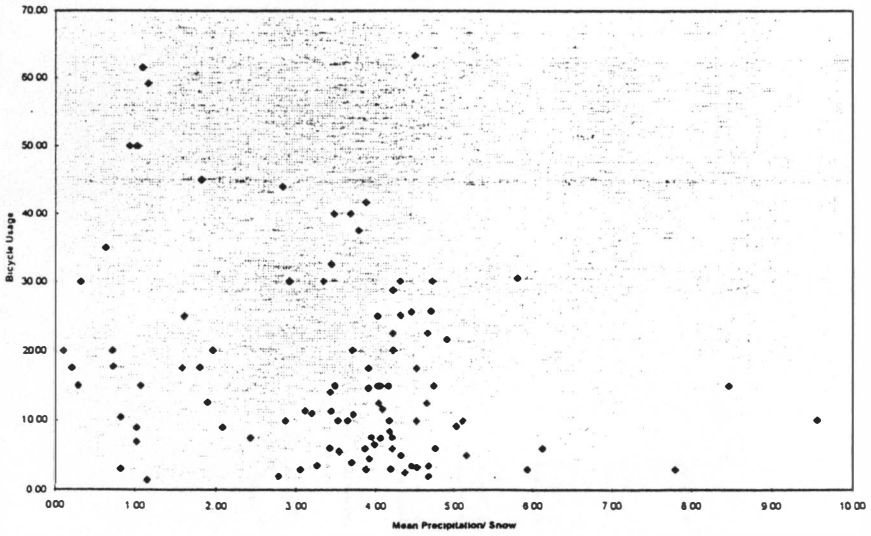
Bicycle Usage vs. Length of Bicycle Season



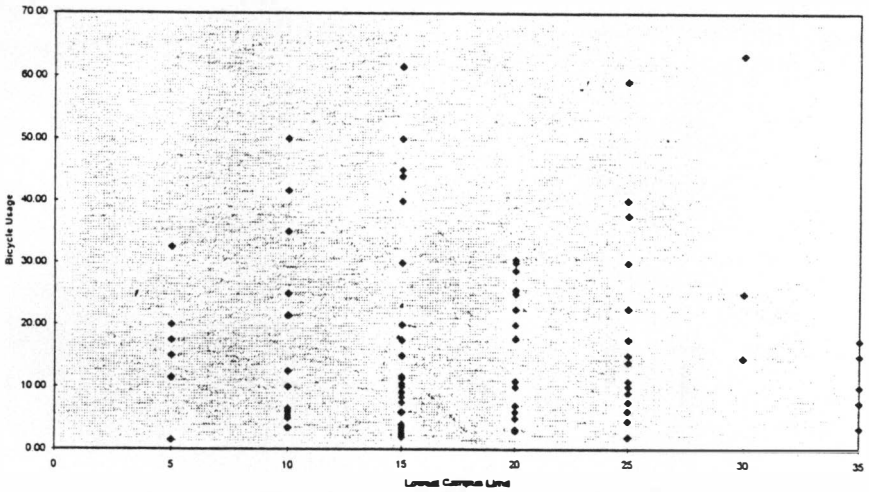
Bicycle Usage vs. Mean Temperature



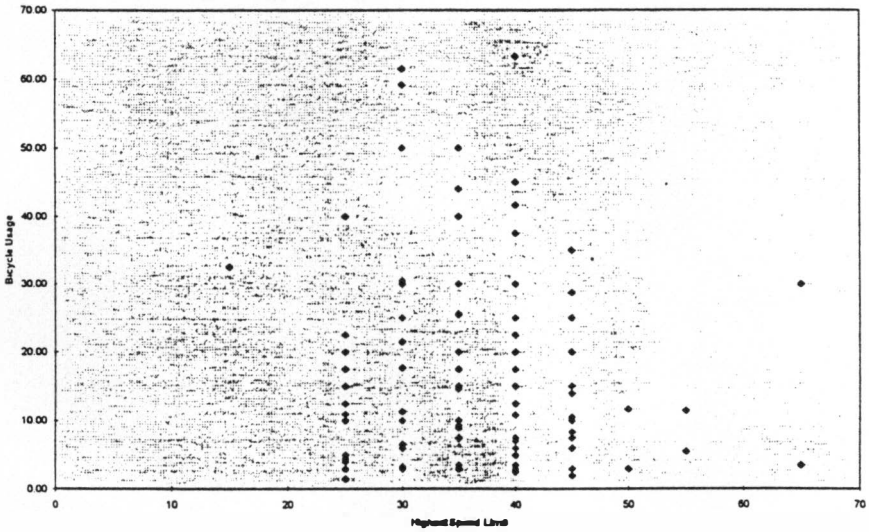
Bicycle Usage vs. Mean Precipitation/ Snow



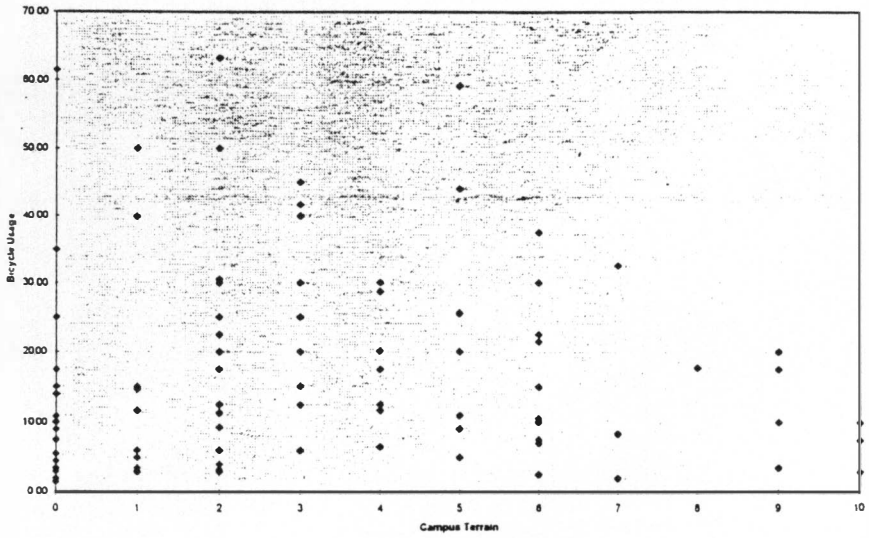
Bicycle Usage vs. Lowest Speed Limit



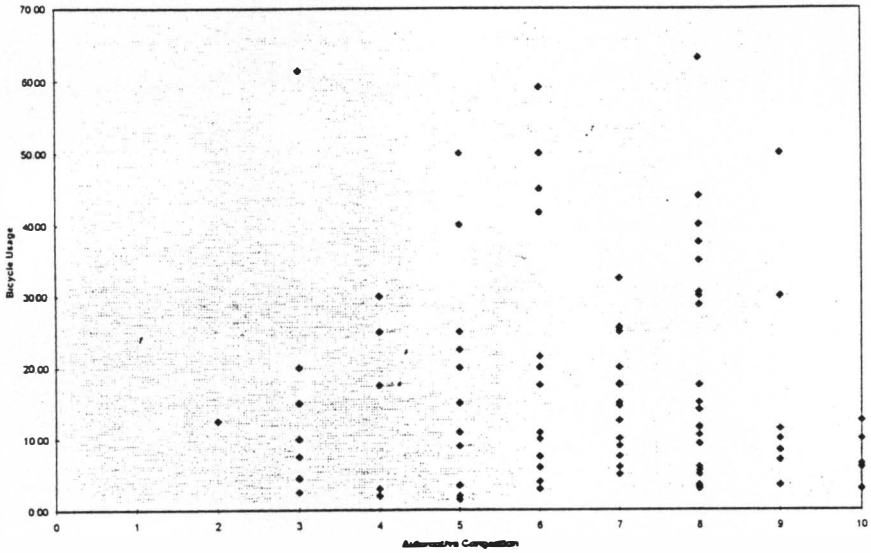
Bicycle Usage vs. Highest Speed Limit



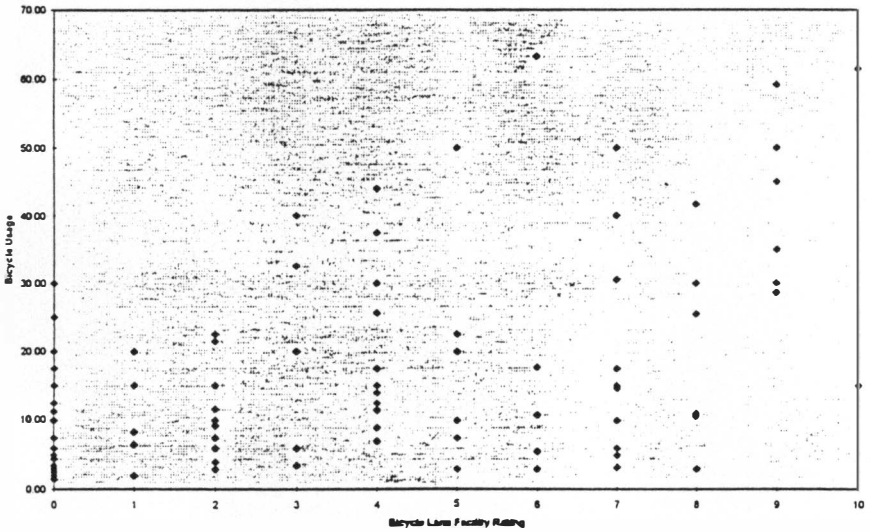
Bicycle Usage vs. Campus Terrain



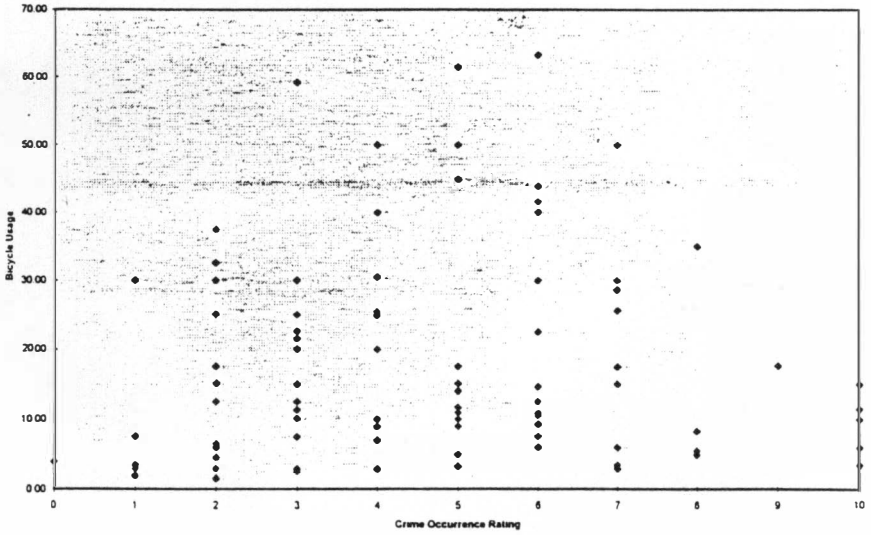
Bicycle Usage vs. Automotive Congestion



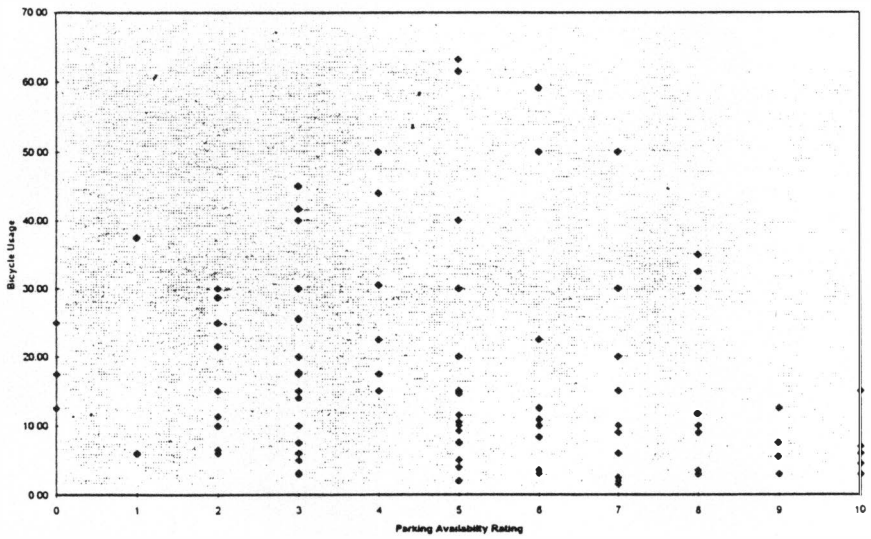
Bicycle Usage vs. Bicycle Lane Facility Rating



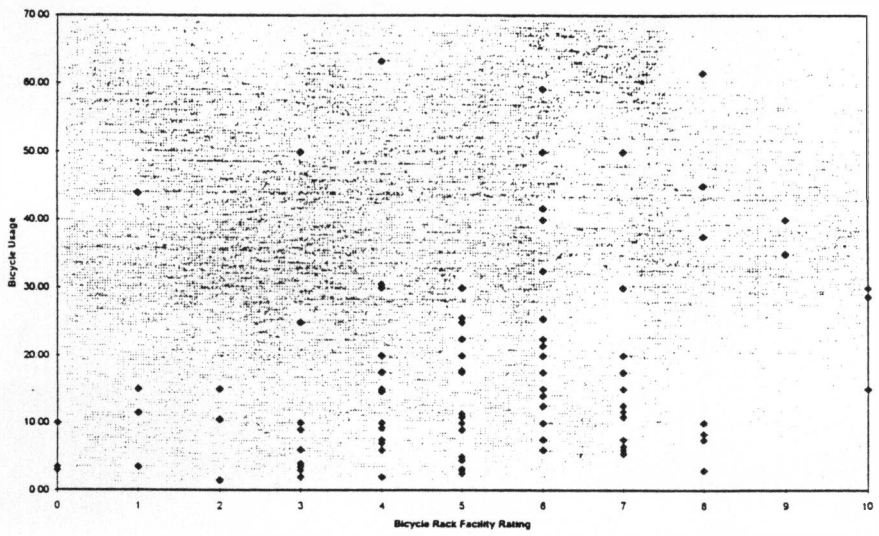
Bicycle Usage vs. Crime Occurrence Rating



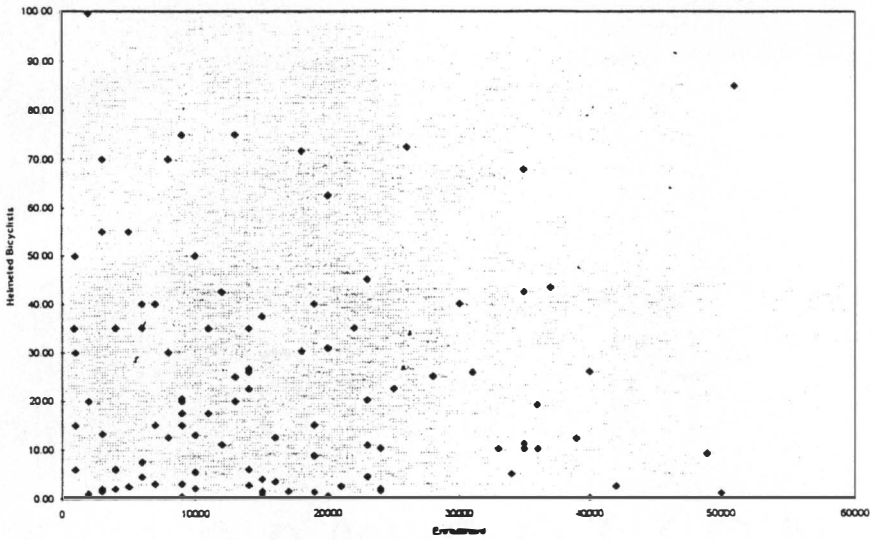
Bicycle Usage vs. Parking Availability Rating



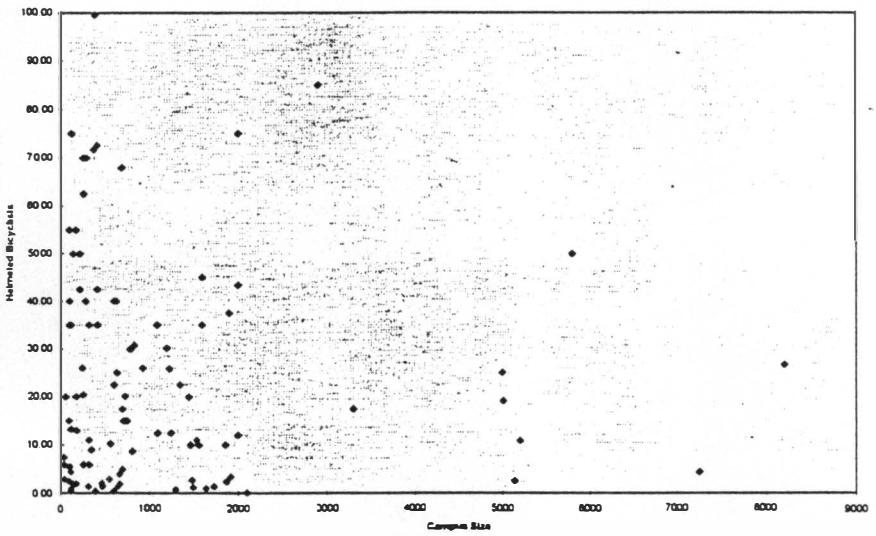
Bicycle Usage vs. Bicycle Rack Facility Rating



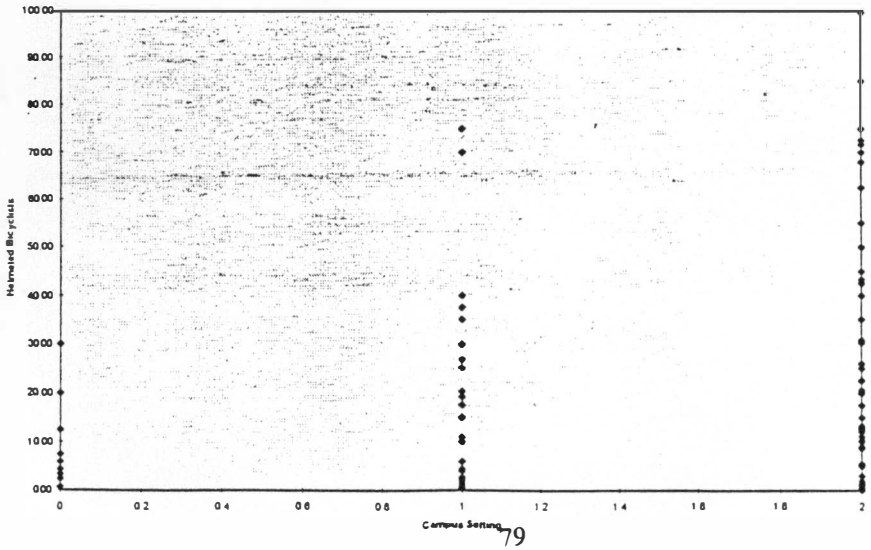
Helmeted Bicyclists vs. Enrollment



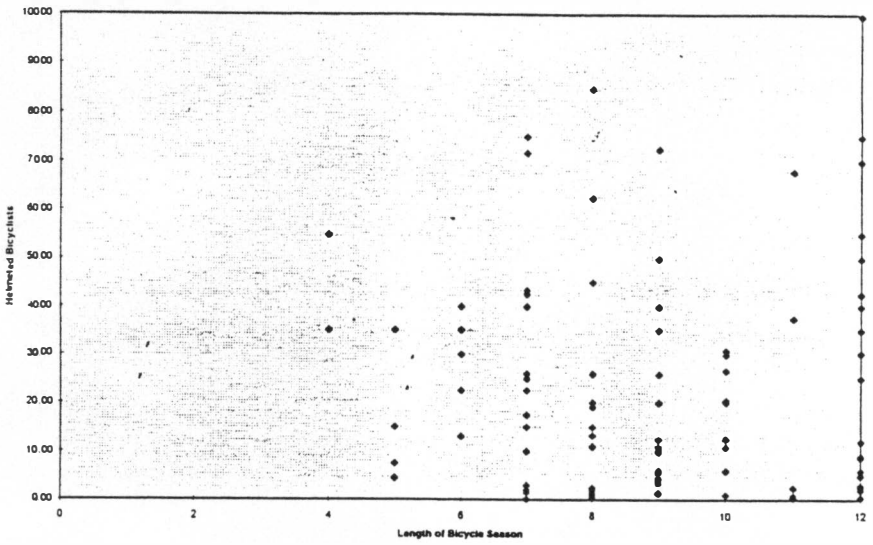
Helmeted Bicyclists vs. Campus Size



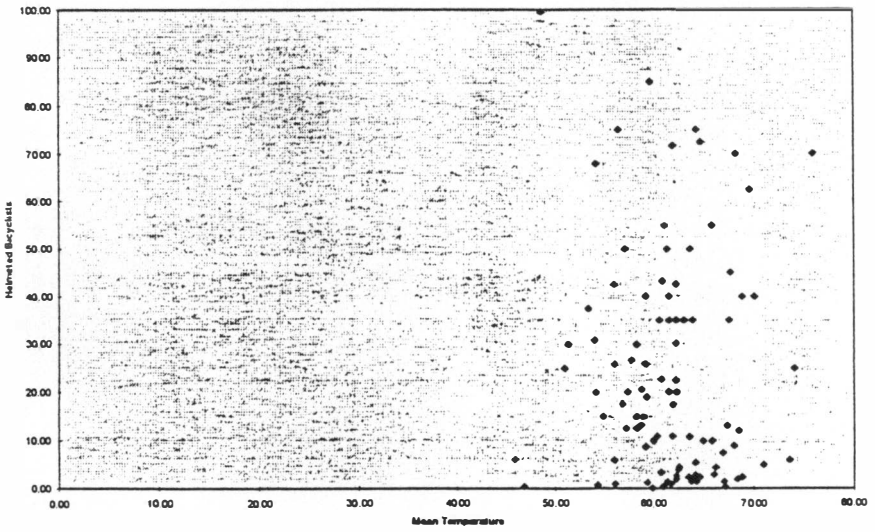
Helmeted Bicyclists vs. Campus Setting



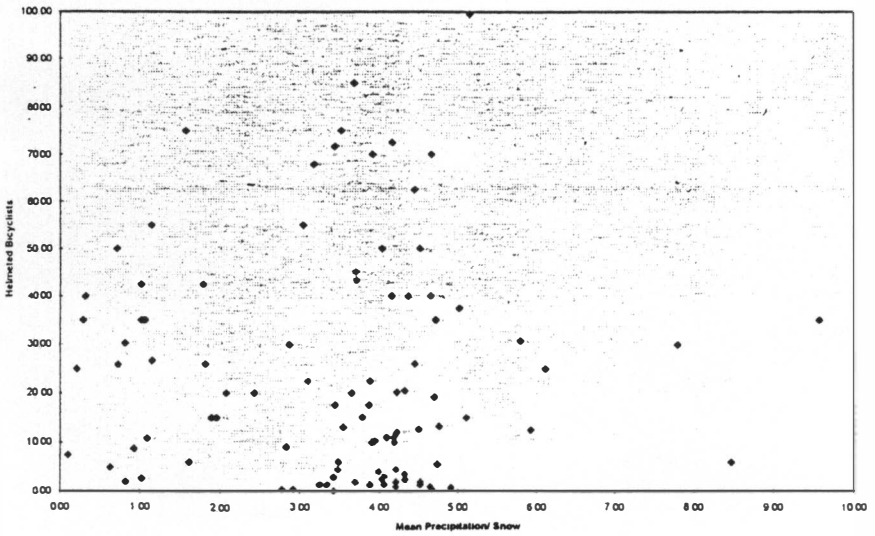
Helmeted Bicyclists vs. Length of Bicycle Season



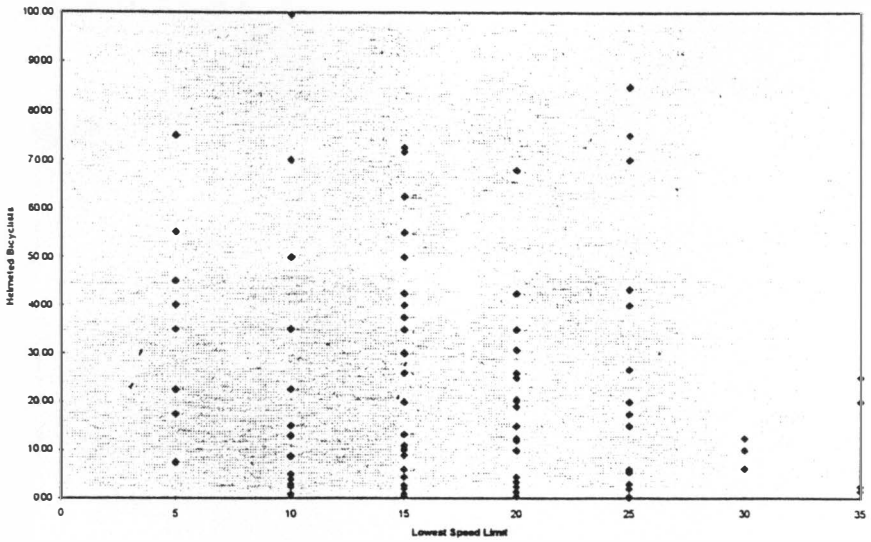
Helmeted Bicyclists vs. Mean Temperature



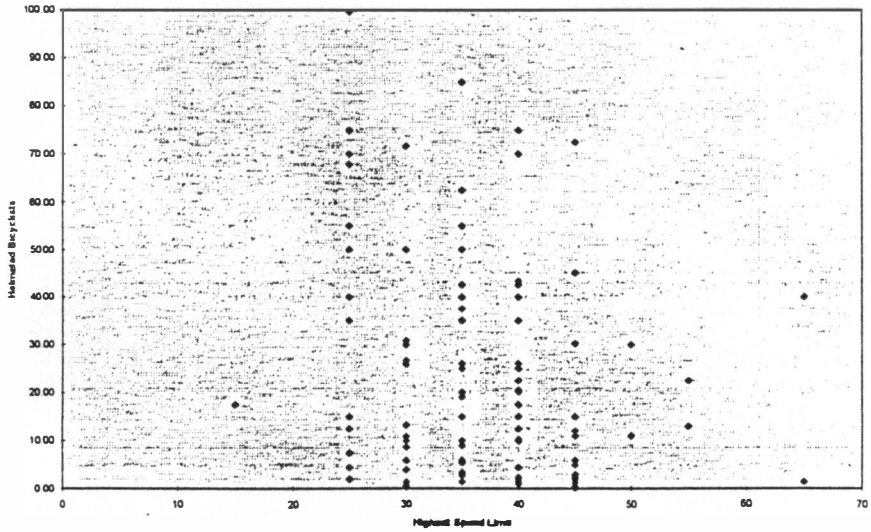
Helmeted Bicyclists vs. Mean Precipitation/ Snow



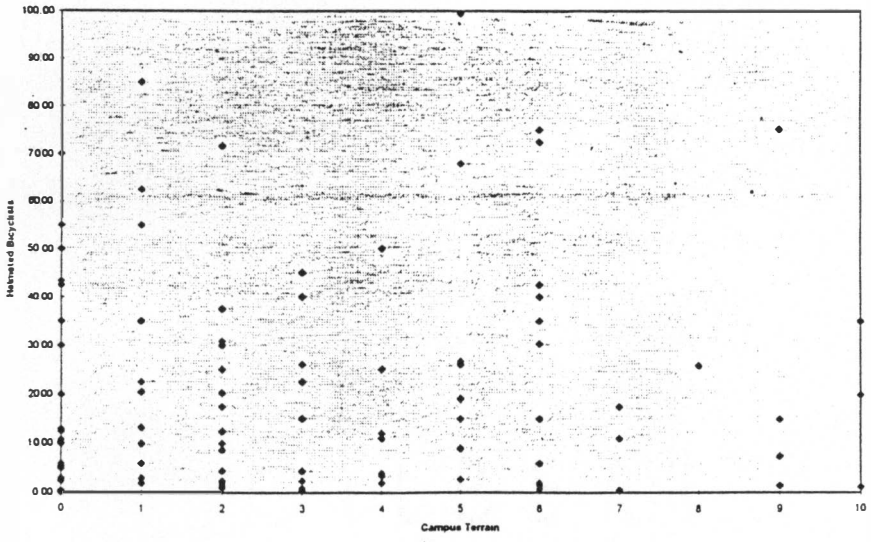
Helmeted Bicyclists vs. Lowest Speed Limit



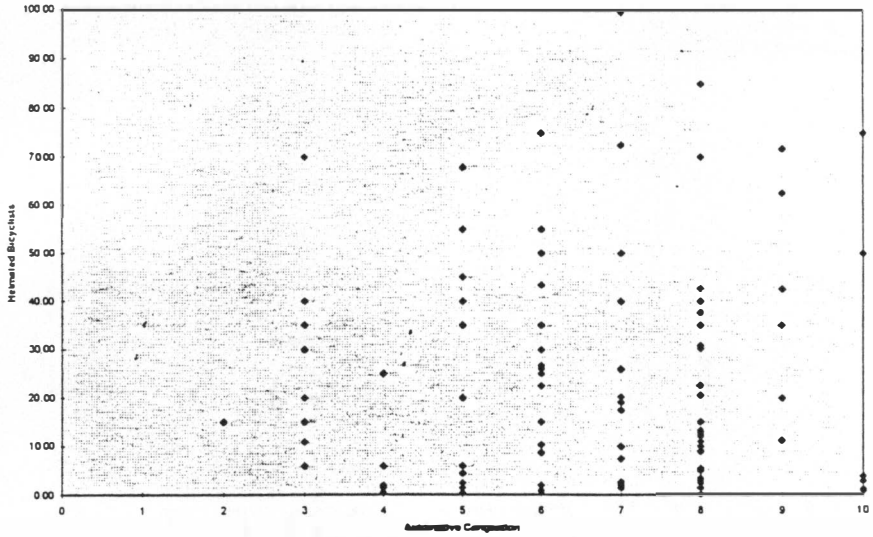
Helmeted Bicyclists vs. Highest Speed Limit



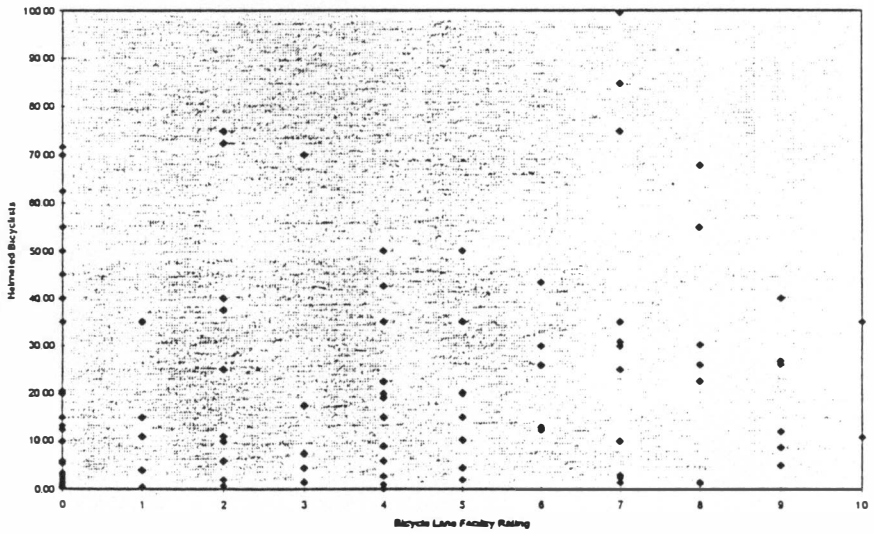
Helmeted Bicyclists vs. Campus Terrain



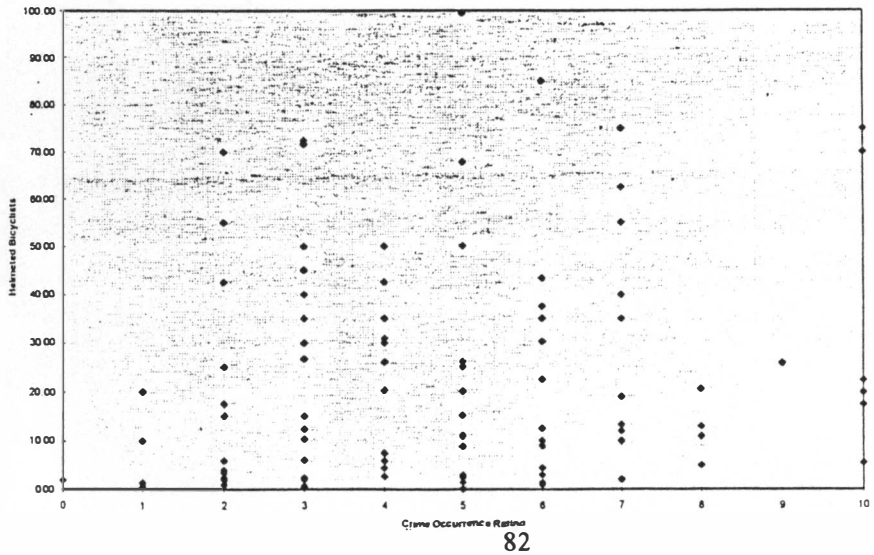
Helmeted Bicyclists vs. Automotive Congestion

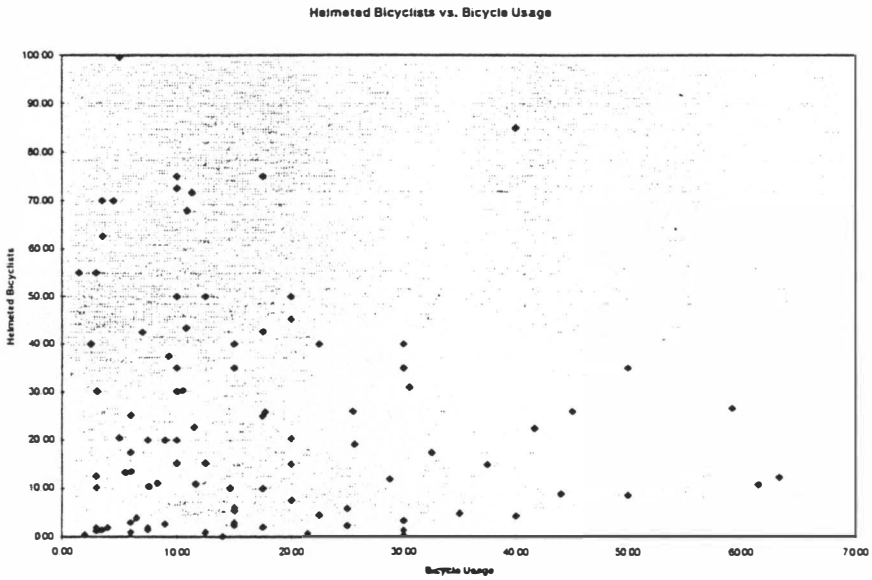


Helmeted Bicyclists vs. Bicycle Lane Facility Rating



Helmeted Bicyclists vs. Crime Occurrence Rating




Helmeted Bicyclists vs. Bicycle Usage
Helmeted Bicyclists
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
Bicycle Usage

APPENDIX D: SYSTAT VERSION 5.0 DATA FOR MODEL 1

```
MON 6/10/96 8:42:17 AM

SYSTAT VERSION 5.0
COPYRIGHT, 1990-1992
SYSTAT, INC.

Welcome to SYSTAT!
 WORKSPACE CLEAR FOR CREATING NEW DATASET

>USE 'A:\MODEL1.SYS'
 SYSTAT FILE VARIABLES AVAILABLE TO YOU ARE:
          Y1              X1              X2              X3              X4
          X5              X6              X7              X8              X9
         X10             X11             X12             X13             X14

>MGLH
>MODEL Y1 = CONSTANT + X1+X10+X11+X12+X13+X14+X2+X3+X4+X5+X6+X7+X8+,
>X9
>STEP/ BACKWARD


MON 6/10/96 8:42:53 AM   A:\MODEL1.SYS


 DEPENDENT VARIABLE        Y1

 MINIMUM TOLERANCE FOR ENTRY INTO MODEL =    .010000

 BACKWARD STEPWISE WITH ALPHA-TO-ENTER= .150 AND ALPHA-TO-REMOVE= .150


STEP #    0 R= .609 RSQUARE=   .371
```

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
---						
1 CONSTANT						
2 X1	0.000	0.000	0.045	0.65242	0.180	0.673
3 X10	-0.011	0.810	-0.001	0.63555	0.000	0.989
4 X11	1.622	0.493	0.349	0.65713	10.834	0.001
5 X12	-0.089	0.623	-0.015	0.67396	0.020	0.887
6 X13	-1.206	0.538	-0.214	0.81077	5.027	0.028
7 X14	1.144	0.616	0.173	0.84817	3.449	0.067
8 X2	0.001	0.001	0.086	0.73011	0.734	0.394
9 X3	-4.829	2.154	-0.221	0.76330	5.025	0.028
10 X4	0.325	0.606	0.049	0.86980	0.287	0.594
11 X5	0.428	0.273	0.161	0.69535	2.450	0.121
12 X6	-1.261	0.871	-0.151	0.68389	2.095	0.151
13 X7	-0.018	0.179	-0.009	0.87311	0.010	0.920
14 X8	-0.284	0.162	-0.167	0.81313	3.058	0.084
15 X9	-0.109	0.461	-0.021	0.92550	0.056	0.814

OUT PART. CORR

---

none

STEP # 1 R= .609 RSQUARE= .371
TERM REMOVED: X10

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
2 X1	0.000	0.000	0.045	0.68054	0.187	0.666
4 X11	1.622	0.490	0.349	0.65714	10.962	0.001
5 X12	-0.092	0.568	-0.016	0.80082	0.026	0.871
6 X13	-1.205	0.531	-0.214	0.82338	5.157	0.026
7 X14	1.145	0.609	0.174	0.85916	3.541	0.063
8 X2	0.001	0.001	0.086	0.73528	0.749	0.389
9 X3	-4.835	2.101	-0.221	0.79301	5.295	0.024
10 X4	0.324	0.602	0.049	0.87100	0.290	0.591
11 X5	0.427	0.270	0.161	0.70140	2.496	0.118
12 X6	-1.263	0.843	-0.151	0.72143	2.246	0.138
13 X7	-0.018	0.177	-0.009	0.88298	0.010	0.921
14 X8	-0.284	0.161	-0.167	0.81706	3.112	0.081
15 X9	-0.109	0.456	-0.021	0.93470	0.058	0.811
OUT	PART. CORR					
---						
3 X10	-0.001	.	.	0.63555	0.000	0.989

STEP # 2 R= .609 RSQUARE= .371
TERM REMOVED: X7

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
2 X1	0.000	0.000	0.044	0.68719	0.183	0.670
4 X11	1.626	0.486	0.350	0.66017	11.184	0.001
5 X12	-0.094	0.565	-0.016	0.80152	0.028	0.868
6 X13	-1.202	0.527	-0.214	0.82554	5.207	0.025
7 X14	1.148	0.604	0.174	0.86130	3.609	0.061
8 X2	0.001	0.001	0.084	0.76554	0.753	0.388
9 X3	-4.830	2.089	-0.221	0.79351	5.347	0.023
10 X4	0.328	0.597	0.050	0.87461	0.302	0.584
11 X5	0.426	0.268	0.161	0.70365	2.515	0.116
12 X6	-1.273	0.833	-0.152	0.73012	2.332	0.130
14 X8	-0.286	0.159	-0.168	0.82974	3.242	0.075
15 X9	-0.110	0.453	-0.021	0.93471	0.059	0.809

```
OUT             PART. CORR
---
  3 X10              -0.000          .            . 0.64273    0.000   0.998
 13 X7               -0.011          .            . 0.88298    0.010   0.921


STEP #    3 R=  .609 RSQUARE=   .371
TERM REMOVED: X12

VARIABLE          COEFFICIENT    STD ERROR  STD COEF TOLERANCE     F     'P'

IN
---
  1 CONSTANT
  2 X1                 0.000        0.000     0.044 0.68725    0.183   0.670
  4 X11                1.615        0.479     0.348 0.67239   11.365   0.001
  6 X13               -1.187        0.516    -0.211 0.85287    5.298   0.024
  7 X14                1.138        0.598     0.173 0.87046    3.622   0.060
  8 X2                 0.001        0.001     0.083 0.76852    0.747   0.390
  9 X3                -4.905        2.028    -0.224 0.83229    5.849   0.018
 10 X4                 0.328        0.594     0.050 0.87463    0.304   0.583
 11 X5                 0.417        0.261     0.157 0.73403    2.541   0.115
 12 X6                -1.285        0.826    -0.153 0.73579    2.422   0.123
 14 X8                -0.290        0.157    -0.170 0.84558    3.426   0.068
 15 X9                -0.101        0.447    -0.020 0.94785    0.051   0.822

OUT             PART. CORR
---
  3 X10              -0.007          .            . 0.76073    0.005   0.946
  5 X12              -0.018          .            . 0.80152    0.028   0.868
 13 X7               -0.011          .            . 0.88376    0.011   0.916


STEP #    4 R=  .609 RSQUARE=   .370
TERM REMOVED: X9

VARIABLE          COEFFICIENT    STD ERROR  STD COEF TOLERANCE     F     'P'

IN
---
  1 CONSTANT
  2 X1                 0.000        0.000     0.043 0.68745    0.182   0.671
  4 X11                1.615        0.476     0.348 0.67239   11.486   0.001
  6 X13               -1.194        0.512    -0.212 0.85601    5.439   0.022
  7 X14                1.144        0.594     0.173 0.87244    3.711   0.057
  8 X2                 0.001        0.001     0.083 0.76866    0.749   0.389
  9 X3                -4.837        1.995    -0.221 0.85090    5.879   0.017
 10 X4                 0.333        0.590     0.051 0.87601    0.318   0.574
 11 X5                 0.424        0.258     0.160 0.74620    2.706   0.104
 12 X6                -1.281        0.821    -0.153 0.73604    2.436   0.122
 14 X8                -0.292        0.156    -0.171 0.84778    3.515   0.064

OUT             PART. CORR
---
```

3 X10	-0.008	.	.	0.76226	0.006	0.937
5 X12	-0.015	.	.	0.81279	0.020	0.889
13 X7	-0.011	.	.	0.88376	0.011	0.916
15 X9	-0.024	.	.	0.94785	0.051	0.822

STEP # 5 R= .608 RSQUARE= .369
TERM REMOVED: X1

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
4 X11	1.662	0.461	0.358	0.71038	12.969	0.001
6 X13	-1.245	0.495	-0.221	0.90552	6.314	0.014
7 X14	1.164	0.590	0.176	0.87775	3.899	0.051
8 X2	0.001	0.001	0.095	0.83858	1.077	0.302
9 X3	-4.618	1.919	-0.211	0.91121	5.791	0.018
10 X4	0.375	0.580	0.057	0.90062	0.418	0.520
11 X5	0.443	0.253	0.167	0.76751	3.057	0.084
12 X6	-1.218	0.804	-0.145	0.76100	2.296	0.133
14 X8	-0.278	0.152	-0.163	0.88310	3.366	0.070
OUT	PART. CORR					
2 X1	0.045	.	.	0.68745	0.182	0.671
3 X10	-0.000	.	.	0.78842	0.000	1.000
5 X12	-0.015	.	.	0.81283	0.019	0.891
13 X7	-0.007	.	.	0.89244	0.004	0.949
15 X9	-0.023	.	.	0.94813	0.048	0.827

STEP # 6 R= .605 RSQUARE= .366
TERM REMOVED: X4

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
4 X11	1.679	0.459	0.362	0.71289	13.380	0.000
6 X13	-1.214	0.491	-0.216	0.91425	6.097	0.015
7 X14	1.081	0.574	0.164	0.92112	3.554	0.063
8 X2	0.001	0.001	0.102	0.85037	1.266	0.263
9 X3	-4.560	1.911	-0.208	0.91324	5.695	0.019
11 X5	0.410	0.247	0.155	0.79852	2.751	0.101
12 X6	-1.212	0.801	-0.145	0.76109	2.290	0.134
14 X8	-0.279	0.151	-0.164	0.88312	3.398	0.069
OUT	PART. CORR					
2 X1	0.056	.	.	0.70677	0.280	0.598
3 X10	0.005	.	.	0.79241	0.002	0.964

5	X12	-0.014	.	.	0.81294	0.017	0.897
10	X4	0.068	.	.	0.90062	0.418	0.520
13	X7	-0.010	.	.	0.89452	0.009	0.925
15	X9	-0.026	.	.	0.94945	0.059	0.808

STEP # 7 R= .598 RSQUARE= .357
TERM REMOVED: X2

VARIABLE		COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN							
1	CONSTANT						
4	X11	1.834	0.439	0.395	0.78339	17.491	0.000
6	X13	-1.230	0.492	-0.218	0.91508	6.254	0.014
7	X14	1.116	0.574	0.169	0.92373	3.783	0.055
9	X3	-5.048	1.864	-0.231	0.96295	7.339	0.008
11	X5	0.433	0.247	0.163	0.80382	3.074	0.083
12	X6	-1.207	0.802	-0.144	0.76112	2.263	0.136
14	X8	-0.285	0.151	-0.168	0.88446	3.557	0.062
OUT		PART. CORR					
2	X1	0.088	.	.	0.77875	0.715	0.400
3	X10	0.003	.	.	0.79252	0.001	0.974
5	X12	-0.006	.	.	0.81659	0.003	0.956
8	X2	0.117	.	.	0.85037	1.266	0.263
10	X4	0.081	.	.	0.91328	0.598	0.441
13	X7	0.018	.	.	0.94542	0.028	0.868
15	X9	-0.024	.	.	0.94967	0.051	0.822

THE SUBSET MODEL INCLUDES THE FOLLOWING PREDICTORS:

CONSTANT
X11
X13
X14
X3
X5
X6
X8

DEP VAR: Y1 N: 100 MULTIPLE R: 0.598 SQUARED MULTIPLE R: 0.357
ADJUSTED SQUARED MULTIPLE R: .308 STANDARD ERROR OF ESTIMATE: 11.992

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	T	P(2 TAIL)
CONSTANT	6.533	16.641	0.000	.	0.393	0.696

X11	1.834	0.439	0.395	0.783	4.182	0.000
X13	-1.230	0.492	-0.218	0.915	-2.501	0.014
X14	1.116	0.574	0.169	0.924	1.945	0.055
X3	-5.048	1.864	-0.231	0.963	-2.709	0.008
X5	0.433	0.247	0.163	0.804	1.753	0.083
X6	-1.207	0.802	-0.144	0.761	-1.504	0.136
X8	-0.285	0.151	-0.168	0.884	-1.886	0.062

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
REGRESSION	7356.853	7	1050.979	7.309	0.000
RESIDUAL	13229.607	92	143.800		

```
>CORR
>PEARSON X1 X10 X11 X12 X13 X14 X2 X3 X4 X5 X6 X7 X8 X9

MON 6/10/96 8:44:40 AM   A:\MODEL1.SYS

 PEARSON CORRELATION MATRIX
```

	X1	X10	X11	X12	X13
X1	1.000				
X10	0.299	1.000			
X11	0.312	0.036	1.000		
X12	0.204	0.459	0.179	1.000	
X13	-0.113	-0.127	0.109	-0.106	1.000
X14	0.122	-0.034	0.199	0.128	-0.118
X2	0.320	-0.054	0.312	0.082	0.001
X3	0.180	0.291	0.059	0.243	0.036
X4	0.140	0.039	0.071	-0.042	0.090
X5	0.103	0.125	-0.002	0.212	0.191
X6	0.015	0.156	-0.321	-0.049	-0.054
X7	0.186	-0.002	-0.006	0.080	-0.047
X8	0.216	0.150	0.192	0.155	0.199
X9	-0.026	-0.024	0.014	-0.169	0.042

	X14	X2	X3	X4	X5
X14	1.000				
X2	0.113	1.000			
X3	-0.014	-0.188	1.000		
X4	-0.177	0.102	-0.000	1.000	
X5	-0.129	0.029	0.154	-0.160	1.000
X6	0.033	-0.093	-0.139	0.029	-0.323
X7	-0.014	0.220	-0.057	-0.036	0.072
X8	-0.031	0.038	-0.032	0.004	0.162
X9	-0.027	0.042	-0.175	0.001	-0.126

	X6	X7	X8	X9
X6	1.000			
X7	0.112	1.000		
X8	0.032	0.157	1.000	
X9	0.042	0.010	0.054	1.000

```
NUMBER OF OBSERVATIONS:  100

>
```

```
MON 6/10/96 8:53:30 AM

SYSTAT VERSION 5.0
COPYRIGHT, 1990-1992
SYSTAT, INC.

Welcome to SYSTAT!
 WORKSPACE CLEAR FOR CREATING NEW DATASET

>EDIT

>NEW

>DATA
 WORKSPACE CLEAR FOR CREATING NEW DATASET

>EDIT

>TYPE = Rectangular
>ESAV 'A:\MODEL2.SYS'
>ESAV 'A:\MODEL2.SYS'

>DATA
 WORKSPACE CLEAR FOR CREATING NEW DATASET
>USE 'A:\MODEL2.SYS'
 SYSTAT FILE VARIABLES AVAILABLE TO YOU ARE:
          Y2              X1              X2              X3              X4
          X5              X6              X7              X8              X9
         X10             X11             X12             X15

>MGLH
>MODEL Y2 = CONSTANT + X1+X10+X11+X12+X15+X2+X3+X4+X5+X6+X7+X8+X9
>STEP/ BACKWARD


MON 6/10/96 8:57:40 AM   A:\MODEL2.SYS


 DEPENDENT VARIABLE        Y2

 MINIMUM TOLERANCE FOR ENTRY INTO MODEL =    .010000

 BACKWARD STEPWISE WITH ALPHA-TO-ENTER= .150 AND ALPHA-TO-REMOVE= .150


 STEP #    0 R=   .484 RSQUARE=    .235

 VARIABLE            COEFFICIENT    STD ERROR  STD COEF TOLERANCE    F     'P'

 IN
 ---
   1 CONSTANT
```

2 X1	-0.000	0.000	-0.066	0.67761	0.336	0.564
3 X10	-0.943	1.392	-0.079	0.65280	0.459	0.500
4 X11	1.250	0.883	0.169	0.62068	2.003	0.161
5 X12	2.062	1.068	0.218	0.69654	3.732	0.057
6 X15	-0.208	0.180	-0.131	0.69579	1.343	0.250
7 X2	0.000	0.002	0.024	0.72671	0.049	0.826
8 X3	9.603	3.850	0.276	0.72445	6.220	0.015
9 X4	0.684	1.017	0.066	0.93643	0.452	0.503
10 X5	-0.029	0.457	-0.007	0.75241	0.004	0.950
11 X6	0.814	1.522	0.061	0.67918	0.286	0.594
12 X7	-0.510	0.311	-0.165	0.87951	2.688	0.105
13 X8	-0.626	0.284	-0.232	0.80481	4.854	0.030
14 X9	0.809	0.801	0.099	0.92688	1.020	0.315

OUT	PART. CORR
---	
none	

STEP # 1 R= .484 RSQUARE= .234
TERM REMOVED: X5

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
---						
1 CONSTANT						
2 X1	-0.000	0.000	-0.067	0.68044	0.346	0.558
3 X10	-0.950	1.379	-0.080	0.65714	0.474	0.493
4 X11	1.262	0.858	0.171	0.65038	2.163	0.145
5 X12	2.056	1.056	0.218	0.70367	3.789	0.055
6 X15	-0.209	0.178	-0.132	0.70003	1.379	0.244
7 X2	0.000	0.002	0.024	0.72733	0.049	0.826
8 X3	9.587	3.820	0.276	0.72753	6.298	0.014
9 X4	0.694	0.998	0.067	0.96121	0.484	0.489
11 X6	0.848	1.412	0.064	0.77978	0.361	0.550
12 X7	-0.512	0.309	-0.165	0.88285	2.743	0.101
13 X8	-0.630	0.278	-0.233	0.83406	5.144	0.026
14 X9	0.814	0.793	0.100	0.93495	1.052	0.308
OUT	PART. CORR					
---						
10 X5	-0.007	.	.	0.75241	0.004	0.950

STEP # 2 R= .484 RSQUARE= .234
TERM REMOVED: X2

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
---						
1 CONSTANT						
2 X1	-0.000	0.000	-0.060	0.73227	0.305	0.582

3	X10	-0.978	1.366	-0.082	0.66279	0.513	0.476
4	X11	1.295	0.839	0.176	0.67154	2.380	0.126
5	X12	2.076	1.046	0.220	0.70899	3.936	0.050
6	X15	-0.205	0.176	-0.129	0.70583	1.358	0.247
8	X3	9.401	3.706	0.271	0.76481	6.435	0.013
9	X4	0.710	0.990	0.068	0.96649	0.515	0.475
11	X6	0.835	1.403	0.063	0.78123	0.354	0.553
12	X7	-0.499	0.302	-0.161	0.91467	2.732	0.102
13	X8	-0.635	0.275	-0.235	0.84025	5.326	0.023
14	X9	0.819	0.789	0.100	0.93578	1.079	0.302

OUT		PART. CORR					
7	X2	0.024	.	.	0.72733	0.049	0.826
10	X5	-0.006	.	.	0.75305	0.003	0.955

STEP # 3 R= .481 RSQUARE= .231
TERM REMOVED: X1

VARIABLE		COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN							
1	CONSTANT						
3	X10	-1.138	1.330	-0.095	0.69388	0.732	0.395
4	X11	1.192	0.815	0.162	0.70666	2.137	0.147
5	X12	2.084	1.042	0.221	0.70915	4.000	0.049
6	X15	-0.220	0.174	-0.139	0.72194	1.605	0.208
8	X3	9.075	3.644	0.261	0.78461	6.201	0.015
9	X4	0.638	0.977	0.061	0.98381	0.426	0.516
11	X6	0.762	1.392	0.057	0.78827	0.300	0.586
12	X7	-0.531	0.295	-0.172	0.94920	3.233	0.076
13	X8	-0.656	0.271	-0.243	0.85757	5.858	0.018
14	X9	0.823	0.785	0.101	0.93587	1.098	0.297

OUT		PART. CORR					
2	X1	-0.059	.	.	0.73227	0.305	0.582
7	X2	0.007	.	.	0.78273	0.004	0.947
10	X5	-0.010	.	.	0.75729	0.010	0.922

STEP # 4 R= .478 RSQUARE= .229
TERM REMOVED: X6

VARIABLE		COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN							
1	CONSTANT						
3	X10	-0.974	1.291	-0.082	0.73060	0.570	0.452
4	X11	1.097	0.793	0.149	0.74028	1.911	0.170
5	X12	2.052	1.036	0.217	0.71148	3.919	0.051

6 X15	-0.239	0.170	-0.150	0.75109	1.982	0.163
8 X3	8.660	3.550	0.249	0.82022	5.949	0.017
9 X4	0.661	0.972	0.063	0.98562	0.462	0.499
12 X7	-0.512	0.292	-0.165	0.96218	3.074	0.083
13 X8	-0.656	0.270	-0.243	0.85758	5.897	0.017
14 X9	0.822	0.782	0.101	0.93587	1.104	0.296

OUT	PART. CORR				
2 X1	-0.053	.	.	0.73887	0.250	0.618
7 X2	0.006	.	.	0.78295	0.003	0.954
10 X5	-0.030	.	.	0.86657	0.082	0.775
11 X6	0.058	.	.	0.78827	0.300	0.586

STEP # 5 R= .474 RSQUARE= .225
TERM REMOVED: X4

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
3 X10	-0.913	1.284	-0.077	0.73419	0.506	0.479
4 X11	1.142	0.788	0.155	0.74546	2.098	0.151
5 X12	1.998	1.030	0.212	0.71561	3.761	0.056
6 X15	-0.241	0.169	-0.152	0.75140	2.033	0.157
8 X3	8.624	3.540	0.248	0.82040	5.936	0.017
12 X7	-0.517	0.291	-0.167	0.96286	3.158	0.079
13 X8	-0.658	0.269	-0.243	0.85767	5.968	0.017
14 X9	0.814	0.780	0.100	0.93611	1.088	0.300

OUT	PART. CORR				
2 X1	-0.043	.	.	0.75283	0.164	0.687
7 X2	0.014	.	.	0.79192	0.017	0.897
9 X4	0.071	.	.	0.98562	0.462	0.499
10 X5	-0.041	.	.	0.88801	0.152	0.698
11 X6	0.061	.	.	0.78972	0.334	0.565

STEP # 6 R= .470 RSQUARE= .221
TERM REMOVED: X10

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
4 X11	1.181	0.784	0.160	0.74919	2.269	0.135
5 X12	1.692	0.934	0.179	0.86632	3.284	0.073
6 X15	-0.240	0.169	-0.151	0.75147	2.025	0.158
8 X3	8.077	3.446	0.233	0.86112	5.495	0.021
12 X7	-0.507	0.290	-0.164	0.96511	3.060	0.084

13 X8	-0.680	0.267	-0.252	0.86898	6.490	0.013
14 X9	0.764	0.775	0.093	0.94359	0.973	0.326

OUT	PART. CORR					
2 X1	-0.059	.	.	0.80021	0.321	0.572
3 X10	-0.074	.	.	0.73419	0.506	0.479
7 X2	0.016	.	.	0.79268	0.023	0.879
9 X4	0.066	.	.	0.99048	0.396	0.530
10 X5	-0.041	.	.	0.88801	0.153	0.697
11 X6	0.042	.	.	0.83274	0.162	0.688

STEP # 7 R= .461 RSQUARE= .212
TERM REMOVED: X9

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	F	'P'
IN						
1 CONSTANT						
4 X11	1.224	0.783	0.166	0.75151	2.445	0.121
5 X12	1.562	0.924	0.165	0.88419	2.854	0.094
6 X15	-0.248	0.168	-0.156	0.75334	2.173	0.144
8 X3	7.589	3.410	0.218	0.87918	4.955	0.028
12 X7	-0.505	0.290	-0.163	0.96515	3.040	0.085
13 X8	-0.666	0.266	-0.247	0.87125	6.254	0.014

OUT	PART. CORR					
2 X1	-0.058	.	.	0.80029	0.310	0.579
3 X10	-0.065	.	.	0.74007	0.385	0.536
7 X2	0.018	.	.	0.79305	0.030	0.863
9 X4	0.065	.	.	0.99057	0.385	0.537
10 X5	-0.049	.	.	0.89411	0.221	0.639
11 X6	0.044	.	.	0.83299	0.176	0.676
14 X9	0.102	.	.	0.94359	0.973	0.326

THE SUBSET MODEL INCLUDES THE FOLLOWING PREDICTORS:

CONSTANT
X11
X12
X15
X3
X7
X8

DEP VAR: Y2 N: 100 MULTIPLE R: 0.461 SQUARED MULTIPLE R: 0.212

ADJUSTED SQUARED MULTIPLE R: .161 STANDARD ERROR OF ESTIMATE: 20.964

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	T	P(2 TAIL)
CONSTANT	38.240	12.338	0.000	.	3.099	0.003
X11	1.224	0.783	0.166	0.752	1.564	0.121
X12	1.562	0.924	0.165	0.884	1.689	0.094
X15	-0.248	0.168	-0.156	0.753	-1.474	0.144
X3	7.589	3.410	0.218	0.879	2.226	0.028
X7	-0.505	0.290	-0.163	0.965	-1.744	0.085
X8	-0.666	0.266	-0.247	0.871	-2.501	0.014

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
REGRESSION	11014.499	6	1835.750	4.177	0.001
RESIDUAL	40870.824	93	439.471		

>CORR
>PEARSON X1 X10 X11 X12 X15 X2 X3 X4 X5 X6 X7 X8 X9

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PEARSON CORRELATION MATRIX

	X1	X10	X11	X12	X15
X1	1.000				
X10	0.299	1.000			
X11	0.312	0.036	1.000		
X12	0.204	0.459	0.179	1.000	
X15	0.168	-0.056	0.405	0.071	1.000
X2	0.320	-0.054	0.312	0.082	0.284
X3	0.180	0.291	0.059	0.243	-0.167
X4	0.140	0.039	0.071	-0.042	0.009
X5	0.103	0.125	-0.002	0.212	0.083
X6	0.015	0.156	-0.321	-0.049	-0.279
X7	0.186	-0.002	-0.006	0.080	0.002
X8	0.216	0.150	0.192	0.155	-0.111
X9	-0.026	-0.024	0.014	-0.169	-0.022

	X2	X3	X4	X5	X6
X2	1.000				
X3	-0.188	1.000			
X4	0.102	-0.000	1.000		
X5	0.029	0.154	-0.160	1.000	

X6	-0.093	-0.139	0.029	-0.323	1.000
X7	0.220	-0.057	-0.036	0.072	0.112
X8	0.038	-0.032	0.004	0.162	0.032
X9	0.042	-0.175	0.001	-0.126	0.042

	X7	X8	X9
X7	1.000		
X8	0.157	1.000	
X9	0.010	0.054	1.000

NUMBER OF OBSERVATIONS: 100

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APPENDIX F: TEST UNIVERSITY CHARACTERISTIC DATA

		University Characteristics			
University- City (Bicyclist(s) Represented)	Y1 Bicycle Usage (Estimated %)	X2 Campus Size (Acres)	X6 Mean Precipitation/Snow (inches)	X11 Bicycle Lane Facility Rating (0-10)	X14 Bicycle Rack Facility Rating (0-10)
University of Arkansas- Fayettville(1)	7.5	420	4.52	0	7
Columbia University- Morningside(1)	2	27	3.63	0	5
San Diego State University(1)	3	300	0.62	0	4
Vanderbilt University(1)	27.5	333	3.96	0	3
Youngstown State University(1)	2	105	4	0	0

		University Characteristics			
University- City (Bicyclist(s) Represented)	Y2 Helmeted Bicyclists (Estimated %)	X3 Campus Setting (0-2)	X7 Lowest Speed Limit (mph)	X8 Highest Speed Limit (mph)	X12 Crime Occurrence Rating (0-10)
University of Arkansas- Fayettville(1)	3	1	20	30	4
Columbia University- Morningside(1)	2	2	5	35	3
San Diego State University(1)	50	2	15	45	10
Vanderbilt University(1)	8.5	2	20	35	0
Youngstown State University(1)	20	2	25	35	2

APPENDIX G: WEATHER DATA CALCULATIONS FOR TEST UNIVERSITIES

University : University of Arkansas
Location : Fayetteville, AR (Little Rock, AR)

Month	Bike Season	Mean Temperature (F)	Mean Precp /Snow (inches)
JAN	●		7.01
FEB	●		5.43
MAR	●		5.21
APR	●		5.14
MAY	●		5.04
JUN	●		3.66
JUL	●		3.42
AUG	●		3.29
SEP	●		3.39
OCT	●		3.08
NOV	●		4.59
DEC	●		5.00
SUM	12		54.26
	AVG		4.52

University : Columbia University
Location : New York, NY

Month	Bike Season	Mean Temperature (F)	Mean Precp /Snow (inches)
JAN			
FEB			
MAR			
APR			
MAY	●		3.66
JUN			
JUL			
AUG			
SEP	●		3.70
OCT	●		3.52
NOV			
DEC			
SUM	3		10.88
	AVG		3.63

University : San Diego State University
Location : San Diego, CA

Month	Bike Season	Mean Temperature (F)	Mean Precp /Snow (inches)
JAN			
FEB	●		1.87
MAR	●		1.57
APR	●		0.72
MAY	●		0.27
JUN	●		0.06
JUL	●		0.04
AUG	●		0.09
SEP	●		0.14
OCT	●		0.42
NOV	●		1.00
DEC			
SUM	10		6.18
	AVG		0.62

University : Vanderbilt University
Location : Nashville, TN

Month	Bike Season	Mean Temperature (F)	Mean Precp /Snow (inches)
JAN			
FEB			
MAR	●		6.46
APR	●		4.17
MAY	●		4.07
JUN	●		3.78
JUL	●		3.92
AUG	●		3.38
SEP	●		3.26
OCT	●		2.50
NOV	●		4.11
DEC			
SUM	9		35.65
	AVG		3.96

University : Youngstown State University
Location : Youngstown, OH

Month	Bike Season	Mean Temperature (F)	Mean Precipitation (inches)
JAN			
FEB			
MAR			
APR	●		5.97
MAY	●		3.88
JUN	●		3.85
JUL	●		4.01
AUG	●		3.34
SEP	●		3.29
OCT	●		3.05
NOV			
DEC			
SUM	7	0	27.39
	AVG	0	4

VITA

Carlton Clifford Urban was born in Mentor, Ohio on April 27, 1972. He spent a majority of his life growing up in Murrysville, Pennsylvania, a suburb east of Pittsburgh, Pennsylvania. After graduating from Franklin Regional High School in Murrysville, he attended the University of Pittsburgh. While attending school, he was an active member of the Pi Kappa Alpha Fraternity, a brotherhood where he gained numerous memories and friendships. He received his Bachelor of Science degree in Civil Engineering on April 30, 1994. His first professional experience was obtained in Mercer, Pennsylvania, a rural community located near Youngstown, Ohio. After approximately one year of construction management experience, he was awarded a fellowship to pursue his transportation engineering interests at the University of Tennessee, Knoxville. He is very grateful for this fellowship, and for the financial support he received at the University of Pittsburgh from his parents, Carl and Eleanor. In addition, he is appreciative of the love and encouragement provided by his parents, and his sister, Eva.