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TRANSIT CUSTOMER SATISFACTION INDEX FOR FLORIDA TRANSIT PROPERTIES

Technical Memorandum No. 3
Results and Analysis of Florida Transit Properties Customer Satisfaction Index Project

CUTR

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Prepared for:

Department of Transportation
State of Florida

By:

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PREFACE

The Center for Urban Transportation Research (CUTR) contracted with the Florida Department of Transportation (FDOT) to develop a Transit Customer Satisfaction Index (CSI) for fixed-route transit properties in the state. This index was intended to provide a datum from which each transit property could systematically evaluate the satisfaction of its customers with its services. The effort to derive such an index should also contribute to an enhanced understanding of the factors that drive customer satisfaction with transit. In addition, the index will provide another measure of performance with which the Florida transit systems and peer systems from around the U.S. can be related and compared.

For this study, six Florida transit properties were selected to aid in the development, application, and evaluation of a transit CSI: Broward County Mass Transit Division in Pompano Beach, Pinellas Suncoast Transit Authority in Clearwater/St. Petersburg, Jacksonville Transportation Authority, LYNX Transit in Orlando, Tallahassee Transit, and Lee County Transit in Ft. Myers.

This third technical memorandum details the results of the data analysis and modeling efforts. An overview of the details of the survey methodology, sampling, response weighting, and questionnaire design are also provided. The memorandum contains CUTR's recommendations for the approach to be followed in future Florida Transit CSI projects and a proposed questionnaire to be used.

TECHNICAL MEMORANDUM NUMBER THREE
Results and Analysis of
Florida Transit Properties Customer Satisfaction Index Project

EXECUTIVE SUMMARY

The objectives of the Transit Customer Satisfaction Index (CSI) project were to provide:

- a systematic evaluation of each participating transit authority's customer satisfaction;
- insight into which factors drive customer satisfaction;
- a comparison of customer satisfaction data from each system with data from other Florida transit systems and other systems in the nation;
- recommendations for how to increase customer satisfaction.

Six Florida transit properties were selected to aid in the development, application, and evaluation of a transit CSI: Broward County Mass Transit Division (BCT) in Pompano Beach, Jacksonville Transportation Authority (JTA), Lee County Transit (LeeTran) in Ft. Myers, LYNX Transit in Orlando, Pinellas Suncoast Transit Authority (PSTA) in Clearwater/St. Petersburg, and Tallahassee Transit (TALTRAN).

A standard survey questionnaire was administered at all six systems, containing 22 identical customer satisfaction-oriented questions. The surveys were distributed by drivers at several systems, and by CUTR personnel boarding buses at key transfer centers in other systems. The returned surveys were weighted according to ridership frequency and ridership on the routes surveyed. The customer satisfaction questions were factor analyzed to produce uncorrelated factors, which were then used to develop the customer satisfaction models for each system. The customer satisfaction indices for each item, the resulting factors, the customer satisfaction models, and the frequency distribution of responses to each question in each system are detailed in the body of this document.

Other Florida systems are encouraged to conduct surveys with the same battery of customer satisfaction questions, to see how their systems compare in customer satisfaction performance. Surveys should be distributed on as many routes to as many passengers as possible. Where possible, CUTR recommends using drivers to distribute the surveys.

INTRODUCTION

The purpose of this memorandum is provide an overview of the results and analysis of the data collected in the Florida Transit Properties Customer Satisfaction Index project, as well as to briefly review the sampling and weighting methodologies, and the development of the questionnaire used in the study.

OBJECTIVES

The objectives of the Transit Customer Satisfaction Index project were to provide:

- a systematic evaluation of each participating transit authority's customer satisfaction;
- insight into which factors drive customer satisfaction;
- a comparison of customer satisfaction data from each system with data from other Florida transit systems and other systems in the nation, which will enhance understanding of each system's relative performance; and,
- recommendations for how to increase customer satisfaction.

SELECTED SYSTEMS

For this study, six Florida transit properties were selected to aid in the development, application, and evaluation of a transit CSI:

- Broward County Mass Transit Division (BCT) in Pompano Beach,
- Jacksonville Transportation Authority (JTA),
- Lee County Transit (LeeTran) in Ft. Myers,
- LYNX Transit in Orlando,
- Pinellas Suncoast Transit Authority (PSTA) in Clearwater/St. Petersburg,
- Tallahassee Transit (TALTRAN).

DEVELOPMENT OF SATISFACTION QUESTIONNAIRES

Customer satisfaction-oriented questions in on-board surveys have historically followed similar patterns. Riders are asked how satisfied they are with the service overall and are also asked to rate their satisfaction with a number of service components that typically comprise the transit experience..

Most of the on-board questionnaires reviewed (as part of the project's literature review task, described in more detail in Technical Memorandum Number 2) contain similar questions which follow similar patterns. Respondents rate their level of satisfaction with the following items:

- hours of service by weekday & weekend
- frequency of service
- convenience of routes
- on-time performance
- travel time
- ease of transferring & transfer policy
- cost of fare & transfers
- availability of route information
- vehicle cleanliness
- comfort of ride
- employee courtesy
- perception of safety on bus & at stop
- bus stop locations
- overall satisfaction

The survey prepared by Portland's Tri-County Metropolitan Transportation District of Oregon (Tri-Met) for the TCRP IDEA project is the most extensive transit customer satisfaction questionnaire that was uncovered in this literature search. However, TCRP group's use of a telephone interviewing methodology, rather than on-board surveying, meant that the questionnaire's length was not impacted by the necessity of having the respondent complete the questionnaire within a single trip. The TCRP group was able to ask more questions than would be possible in an on-board framework. However, The TCRP report does contain some valuable insight as to the important components of customer satisfaction for the users of the transit systems in the study. The major categories of factors that the

report cites as key drivers of rider satisfaction are:

- Bus operator
- System performance (on-time, frequency, etc.)
- Safety/cleanliness of deboarding area
- Safety/cleanliness of boarding area
- Safety/cleanliness of vehicle
- Other vehicle attributes (ride, comfort, availability of seats)
- Bus signage and boarding procedures (paying fare, route names visible, etc.)
- Attributes of waiting area (availability of schedule, seating, etc.)

In the TCRP study, the relative importance of each of these factors varied by transit district. However, each of the factors received a calculated weight (i.e., importance for overall satisfaction) of at least 10 percent. In any comprehensive analysis of transit customer satisfaction, at least one measurement should be made for each of the factors.

The factor that was not addressed in most of the other surveys reviewed concerns the deboarding area. CUTR included a question relating to the deboarding area in its final survey instrument. For five of the Florida transit properties, CUTR's final survey instrument included between 16 and 19 questions in addition to the customer satisfaction section. The survey covered both sides of an 8 ½ · 11 sheet. Only the LeeTran survey included such a large number of questions (31) that both sides of an 8 ½ · 14 sheet was required. A more extensive questionnaire was needed for LeeTran because the resulting survey data were also needed for the system's recent Transit Development Plan update.

The wording on the survey form was tested for readability using the Flesch-Kincaid readability scale provided in the WordPerfect release 6.1 software. That instrument indicated that the survey had a reading level of 3.15 (i.e, a third-grade reading level), a sentence complexity of 12, and a vocabulary complexity of 2. The simplest standard of comparison provided is a Hemingway short story, which has a reading level of 4, a sentence complexity of 14, and a vocabulary complexity of 5.

The actual survey instruments used for each system are presented in later sections of this report, together with system-specific information and charts. The satisfaction question section that was included on each questionnaire is presented below.

How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with (System)	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

SAMPLING AND WEIGHTING METHODOLOGY

a. Selection of Routes and Trips

To collect data for this project, CUTR used an on-board surveying methodology. Where possible, CUTR used system personnel (i.e., bus operators) to distribute the surveys. Surveys were returned to boxes on board the buses which were collected by CUTR personnel at the end of the service day. CUTR project personnel provided training to transit system drivers and staff, as well as supervision of the survey distribution and collection process.

Drivers handed out surveys at the PSTA, LeeTran, and TALTRAN systems. At LYNX, BCT, and JTA, a fractional sampling method was used, where surveyors were stationed at key transfer centers and surveyed passengers by boarding as many buses as they could for one weekday and one weekend day. The transfer centers were selected to provide maximum coverage of the routes operated by the system, with particular emphasis on the most heavily traveled routes. Route coverage, determined by percentage of routes from which surveys were returned, is summarized below.

Table 1
Route Coverage by Transit System

System	Total Major Routes	Total Routes with Returned & Key-Entered Surveys	Coverage of Total Routes
BCT	35	26	74%
JTA	39	37	95%
LeeTran	15	15	100%
LYNX	48	31	65%
PSTA	43	35	81%
TALTRAN	35	33	94%

Clearly at PSTA, BCT and TALTRAN, where only 20-50 percent of the surveys returned were actually key-entered, coverage would have been more extensive had all the surveys been entered. When the final surveys had been collected, it was necessary for some of the systems to select a further subsample for full data entry. This was due to some of the survey efforts producing more surveys than were needed to conduct the analysis, particularly in those cases where drivers handed out the surveys. A summary of the surveys returned appears below.

Table 2 Returned Surveys by Transit System			
System	Total Surveys Returned	Total Surveys Key-Entered	Total Surveys with Sufficient Information for Modeling*
BCT	2,697	1,347	1,128
JTA	942	942	920
LeeTran	1,308	1,308	1,024
LYNX	1,105	1,105	980
PSTA	6,077	1,191	974
TALTRAN	2,390	1,199	1,098

* Included only those surveys with satisfaction ratings and ridership for last week question filled out.

b. Response Rates

Response rates are difficult to estimate, particularly for those cases where a fractional sampling method was used. For logistical and budgetary purposes, the number of survey 'refusals' was not counted. For the systems where drivers handed out the surveys, response rate could be estimated as the number of returned surveys divided by number of riders, but it was clear in some systems that drivers were not necessarily completely cooperative with the survey effort, meaning that some riders were not offered surveys. The system with the highest level of cooperation was TALTRAN. In TALTRAN the response rate for the weekday was 2,130 surveys for 7,615 riders, or 28 percent. PSTA and LeeTran were both at about 15 percent returns using this method. However, it should be noted that the vast majority of riders did not fill out a survey more than once, which did not allow us to use the validation method described in Technical Memorandum Number two. This circumstance also artificially compresses the response rate calculation.

c. Handling of the Ridership Frequency Response Bias

In Technical Memorandum Number two, a particular difficulty in sampling is described, where higher frequency riders are more likely to be surveyed in an on-board surveying effort than low frequency riders. CUTR's analysis of the on-board representation problem yields a simple method for creating a rough estimate of the proper weighting for each response. The *problem* can be illustrated with the following example.

Suppose bus ridership for a particular route has frequency of use characteristics as described in Table 3 below. If we assume equal trips per day for each category of use, the percentage of all system trips by each category of use can be calculated with the following formula:

(Equation 1): % of trips by users in category I =

$$\frac{(\%\text{ of riders in category } I) \cdot (\text{frequency of use by category } I)}{\sum (\%\text{ of riders in category } I) \cdot (\text{frequency of use by category } I) \text{ for all } I}$$

For those who use the system once per week, the formula would yield the result from Equation 1:

((35 percent) · (1 day/week)) / (.35*5+.1*4+.1*3+.1*2+.35*1) = (.35/3) = 11.7%

Application of the formula to each category yields the results in the right hand column of Table 3 below.

Table 3
Relationship of Rider Use Frequency to Percentage of Trips Taken

Frequency of Use	Percentage of Riders	Percentage of Trips
5/week	35%	58%
4/week	10%	13%
3/week	10%	10%
2/week	10%	7%
1/week	35%	12%

Any sampling plan that distributes surveys randomly to riders on a bus (or people waiting for a bus) will necessarily result in survey returns that are proportional to the trips taken by each category of rider, rather than to the percentage of the overall system ridership. In this admittedly extreme example, it is clear that the ridership would not be properly represented.

To minimize this problem, CUTR utilized a weighting scheme based on the respondents' self-assessment of frequency of bus ridership. Respondents were asked to note on which of the last seven days (Monday through Sunday) they had ridden the bus. Using the answers to these questions, CUTR determined the *probability* that each frequency category would have been surveyed and, from that probability and the total number of responses for each category, estimated the distribution of riders in each frequency category. Weights were assigned by dividing the estimated number of riders by the actual percentage of responses for each frequency category.

The exact formula for estimating the total distribution of weekday riders is then determined with the following formula:

$$\%\text{ of riders in category } I = \frac{\%\text{ of surveys returned by category } I \,/\, \text{Frequency of use by category } I}{\sum\left((\%\text{ of surveys returned by category } I) \,/\, (\text{Frequency of use by category } I)\right) \text{ for all } I}$$

These results were analyzed *for the system as a whole only,* since route-level results were not required for this project.

RESULTS INDEXING

Following the weighting of the survey results, mean scores were calculated for each of the 22 satisfaction items for each system. To create the overall mean between systems, the system weight (described in the previous paragraph) was also used. Each of the individual system means for each item was divided by the overall mean and then multiplied by 100.

For example, on the row summarizing Overall Satisfaction results, the weighted mean for all six systems was a 3.88 average. For BCT, the mean was 3.59, which resulted in an index score of 3.59 / 3.88, or 0.9261, which is then converted to 92.61 for the index score. Index scores for the other systems and on the other items were calculated in a similar fashion.

The results are summarized in the Table 4 on the following page.

Table 4

Transit Customer Satisfaction Index Summary

Item	Overall	BCT		JTA		LeeTran		LYNX		PSTA		TALTRAN	
	Mean	Index	Mean	Index	Mean	Index	Mean	Index	Mean	Index	Mean	Index	Mean
Overall satisfaction	3.88	92.61	3.59	91.26	3.54	109.87	4.26	100.30	3.89	105.21	4.08	100.17	3.88
Frequency of service	3.30	92.85	3.07	93.21	3.08	105.99	3.50	100.16	3.31	106.65	3.52	100.82	3.33
Can get to destination	3.91	96.88	3.79	92.48	3.61	105.76	4.13	99.81	3.90	104.61	4.09	100.19	3.92
Number of transfers needed	3.35	94.40	3.16	90.25	3.02	106.42	3.57	105.72	3.54	99.43	3.33	104.09	3.49
Ease of transfers	3.79	97.73	3.70	89.31	3.38	107.20	4.06	101.72	3.85	100.25	3.80	104.23	3.95
Buses on time	3.51	94.90	3.33	91.83	3.22	108.71	3.81	100.51	3.53	107.40	3.77	96.82	3.40
Time to make trip	3.45	94.13	3.25	93.97	3.24	106.19	3.67	99.06	3.42	105.31	3.64	101.31	3.50
Value of bus fare	3.96	95.46	3.78	98.45	3.90	110.03	4.36	100.29	3.97	104.58	4.14	91.51	3.62
Obtaining schedule/route info.	4.10	96.94	3.98	96.41	3.96	107.48	4.41	98.87	4.06	105.38	4.32	95.31	3.91
Using schedule/route information	4.12	98.33	4.05	98.99	4.08	103.92	4.28	100.70	4.15	105.35	4.34	93.09	3.83
Earliest weekday runs	3.77	96.00	3.62	95.07	3.58	107.02	4.03	101.67	3.83	104.28	3.93	96.76	3.64
Latest weekday runs	3.12	94.52	2.95	91.95	2.87	105.46	3.29	107.20	3.35	102.07	3.19	99.51	3.11
Earliest weekend runs	3.32	92.74	3.08	89.96	2.99	113.58	3.77	100.48	3.34	104.43	3.47	99.96	3.32
Latest weekend runs	2.89	90.58	2.62	91.60	2.65	113.50	3.28	98.13	2.84	104.08	3.01	103.00	2.98
Cleanliness of stops & buses	3.67	81.30	2.98	94.41	3.46	114.78	4.21	102.78	3.77	106.20	3.89	100.94	3.70
Safety at stops	3.84	92.18	3.54	93.42	3.59	111.46	4.28	100.28	3.85	103.08	3.96	99.69	3.83
Safety on buses	4.12	94.73	3.91	97.21	4.01	106.37	4.39	99.21	4.09	103.40	4.26	99.24	4.09
Safety after getting off bus	4.02	96.44	3.87	95.49	3.83	106.23	4.27	100.71	4.04	102.13	4.10	99.10	3.98
Temperature in buses	3.94	100.62	3.97	93.94	3.70	106.80	4.21	101.92	4.02	99.29	3.91	97.66	3.85
Seats available	4.03	95.79	3.86	96.66	3.89	106.09	4.27	97.31	3.92	103.21	4.16	100.94	4.07
Bus driver's driving ability	4.32	98.78	4.26	95.93	4.14	105.95	4.57	98.35	4.25	101.28	4.37	99.80	4.31
Bus driver's courtesy	4.15	94.46	3.92	93.23	3.87	109.77	4.55	99.52	4.13	101.79	4.22	101.06	4.19

The report for the IDEA project conducted for TRB that provided the initial impetus to implement this idea in Florida does not provide very much specific data on system ratings. Rather, ratings are combined into a factor system that cannot be precisely duplicated in this project because the questionnaires used were not identical, and the factors in the IDEA project contain a number of items not measured in the present study. However, the IDEA project report does contain overall satisfaction ratings for users of other systems, and these can be compared with the Florida system results.

Table 5
Overall Satisfaction Ratings: Florida Systems & National Systems

System	Location	Overall Satisfaction Rating
MRTA*	Akron, OH	4.38
MCTO*	Minneapolis, MN	4.36
LeeTran	Fort Myers, FL	4.28
Tri-Met*	Portland, OR	4.28
PSTA	St. Petersburg, FL	4.08
SEPTA*	Philadelphia, PA	4.03
LYNX	Orlando, FL	3.89
TALTRAN	Tallahassee, FL	3.88
CTA*	Chicago, IL	3.61
BCT	Ft. Lauderdale, FL	3.59
JTA	Jacksonville, FL	3.54

* TRB IDEA project participant.

It should be noted that the methodologies for the studies, particularly for data collection, were completely different. The IDEA project collected data via a telephone study and interviewed anyone who had used the bus system in the last month, whereas the Florida project used an on-board approach. The IDEA project approach was much more likely to contact less frequent users of the bus system, and the interview was not conducted in the context of actually using the system, whereas the on-board study instrument necessarily was filled out in that context. Because of these methodological differences, any comparisons should be interpreted with great caution. This report will make no conclusions regarding these findings.

Within the Florida-based study, LeeTran consistently had the highest index ratings on each item. PSTA typically had the highest ratings for the "larger" systems (i.e., excluding LeeTran and TALTRAN). The item with the lowest level of satisfaction in each system was the time of the latest weekend runs (mean of 2.89 across all systems), whereas the highest rated item was the ability of the bus driver to drive the bus (mean of 4.32 across all systems).

While the examination of individual rating items may yield some interesting information, it is more informative to view these ratings in conjunction with a customer satisfaction model, which combines an "importance" rating of the items (derived from the regression model of satisfaction) to the customers with the performance rating provided directly by the respondents.

CUSTOMER SATISFACTION MODELING

A simple linear regression was built to explain the overall satisfaction ratings in terms of the ratings.

Since many of the independent variables were intercorrelated, there was a high probability that the coefficients resulting from model runs would not reflect the effects of each of the independent variables. The standard approach to eliminating the effects of the multicollinearity is to run an initial factor analysis.

The analytical procedure of factor analysis involves creating uncorrelated (orthogonal) combinations of the initial independent variables. The purpose of the analysis is to reduce a mass of variables to a reasonable number of elements which the analyst can understand and explain. Often, the selection of factors to use is limited to those that explain at least as much variance as an independent variable, i.e., the output factor has an eigenvalue of at least one. However, this approach is more of a guideline for the purposes of efficiency than a required analytical rule. In fact, some factor analysts even maintain that any factor with a positive eigenvalue is relevant for analysis. In this application, the factor structures were examined to determine which factors provided suitable and explainable combinations of variables, and those factors were used as independent predictor variables for the overall satisfaction rating.

The factors are represented as combinations of the independent data elements; for example, the Safety factor combines Safety at bus stops, on buses, and after getting off the bus, and the Span of Service factor combines satisfaction with earliest and latest departure times on weekdays and weekends. A score for a factor can be calculated in two ways - either by using the variable loadings on each factor (essentially creating a weighted score) or by taking a simple average of the variables that load primarily onto the factor. The latter approach is both computationally simpler and easier to understand, so it will be applied in this instance.

The factors were created using data from only those respondents who had filled out every item of the satisfaction portion of the questionnaire. This allowed about 70 percent of the surveys to be used in the factor modeling. To do the satisfaction modeling, a mean substitution procedure was used for those respondents who had not filled out every item in order to allow their input into the satisfaction model.

The factor structures were created independently for each of the six systems, since it was considered likely that each system's riders may have a different view of their system's operations. The same argument could be made for different demographic groups (male vs. female, income levels, etc.) or other potential rider classifications (such as frequent vs. infrequent users, and so forth), but from a system operations point of view, where any changes made will likely affect the entire system, the most logical modeling process is to treat the system's riders as a homogeneous whole. A route-by-route assessment might also make sense if such detailed data were available in sufficient quantity, but this is not the case in this study.

The model was built by using the *true* factor scores, which involve multiplying each of the independent variables by its respective loading coefficient for the factor in question. The actual factor score is not precisely equal to the mean of the "main" loading variables, but this simplification will not be misleading and is much easier to understand and act upon. Where respondents had not answered some of the individual satisfaction items but had provided a response to the "overall satisfaction" question, a mean-substitution procedure was used to bolster the sample available for analysis.

Because each system's factor structure and resulting customer satisfaction model is unique, they will each be examined and discussed separately.

INDIVIDUAL SYSTEM RESULTS

The results from each of the individual systems follow. For each system, the sampling methodology is briefly described, as is the pattern of responses. The factor analyses and customer satisfaction models are presented. The recommendations arising from the indexing and modeling effort are discussed. A copy of the actual survey instrument used is included, and a graphical representation of the responses to each question concludes the summary of results for each system.

There is clearly a wealth of data remaining that could be analyzed, and a number of statistical relationships that could be established between responses to various questions on the surveys. Any number of crosstabulations could be produced and analyzed. It is, however, beyond the scope of this project to conduct these types of analyses. The purpose of the project is to develop a customer satisfaction index for all satisfaction questions, to develop models of customer satisfaction, and to provide recommendations for improving customer satisfaction to the participating systems.

BROWARD COUNTY TRANSIT (BCT)

Sampling Methodology

Surveys were distributed to riders by CUTR personnel at each of six transfer centers: Young Circle, Hollywood Mall, Lauderhill Mall, West Broward Terminal, Pompano Square Mall, and the Broward central terminal (Downtown transfer center). Surveys were distributed on Wednesday, July 9, 1997 from 3 p.m. to 8 p.m.; On Thursday, July 10, 1997, from 7 a.m. to 3 p.m.; on Saturday, July 12, 1997, from 8 a.m. to 4 p.m.. This allowed for a sampling from morning and evening peak hours, midday on weekdays, and all day on the weekend except evenings. At the transfer centers, surveyors boarded buses serving as many different routes as possible in order to distribute surveys to passengers boarding and already on board the vehicles..

Each survey contained an identification number in the upper right hand corner. The surveyors recorded the date, time, bus route, bus number, and the beginning and ending numbers of the surveys that were handed out on each vehicle. The surveys were divided in equal numbers for each transfer center and distributed in numerical order of the ID numbers to simplify recording.

A total of 26 of the 35 BCT routes had surveys returned by riders. Several of the routes, particularly those that only serve the north end of Fort Lauderdale, were not surveyed in this effort. A total of 2,697 surveys were returned, of which 1,347 were key-entered into an Excel database. A total of 1,128 surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

The factor analysis of BCT data identified five factors. Some variables will be observed to be part of more than one factor; for instance, "Value of Bus Fare" appears on three separate factors, which indicates that customer perception of value is, not surprisingly, connected with many different elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 6 BCT Factor 1 - Routes & Headways		
Item	Scores	
	Index	Mean
Can get to destination	96.88	3.79
Frequency of service	92.85	3.07
Buses on time	94.90	3.33
Time to make trip	94.13	3.25
Number of transfers needed	94.40	3.16
Ease of transfers	97.73	3.70
Value of bus fare	95.46	3.78
Overall Mean		**3.44**

Table 7 BCT Factor 2 - Comfort of Bus Ride		
Item	Scores	
	Index	Mean
Bus driver's courtesy	94.46	3.92
Bus driver's driving ability	98.78	4.26
Seats available	95.79	3.86
Temperature in buses	100.62	3.97
Safety after getting off bus	96.44	3.87
Safety on buses	94.73	3.91
Value of bus fare	95.46	3.78
Overall Mean		**3.94**

Table 8 BCT Factor 3 - Span of Service		
Item	Scores	
	Index	Mean
Earliest weekend runs	92.74	3.08
Latest weekend runs	90.58	2.62
Earliest weekday runs	96.00	3.62
Latest weekday runs	94.52	2.95
Overall Mean		**3.07**

Table 9 BCT Factor 4 - Safety & Cleanliness		
Item	Scores	
	Index	Mean
Safety at stops	92.18	3.54
Cleanliness of stops & buses	81.30	2.98
Safety on buses	94.73	3.91
Safety after getting off bus	96.44	3.87
Overall Mean		**3.58**

Table 10 BCT Factor 5 - Printed Schedules		
Item	Scores	
	Index	Mean
Obtaining schedule/route information	96.94	3.98
Using schedule/route information	98.33	4.05
Ease of transfers	97.73	3.70
Value of bus fare	95.46	3.78
Bus driver's driving ability	98.78	4.26
Overall Mean		**3.97**

The structure of the Comfort of Bus Ride factor, which includes safety elements, indicates that safety is an integral component of the bus riders' overall perception of the comfort of their ride and their enjoyment of the riding experience. The structure of the Printed Schedules factor, which includes the bus driver's driving ability and ease of transfers, indicates that the bus driver's driving ability is viewed as being an important part of adherence to printed schedules and making the transfers happen properly and in a timely fashion. The transfers are clearly a key part of bus riders' perceptions of the accuracy and useability of the printed schedules that BCT provides.

The resulting linear customer satisfaction model structure using these factors takes the form:

$$\text{Customer Satisfaction} = \alpha + \beta 1 * \text{factor1} + \beta 2 * \text{factor2} + \beta 3 * \text{factor3} + \beta 4 * \text{factor4} + \beta 5 * \text{factor5}$$

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table 11 below. The coefficients can be viewed as the relative importance of each factor to overall customer satisfaction.

Table 11 BCT Customer Satisfaction Model Coefficients		
Item	**β Coefficient (= importance)**	**Mean Performance Score**
Routes & Headways	0.67	3.44
Comfort of Bus Ride	0.38	3.94
Span of Service	0.36	3.07
Safety & Cleanliness	0.22	3.58
Printed Schedules	0.17	3.97
(Model Intercept	3.59	N/A)

The statistics relating to this model are:

R-square = 0.50 % of Overall satisfaction ratings predicted within 0.5 = 50%

Correct classification = 77%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of BCT's operations.

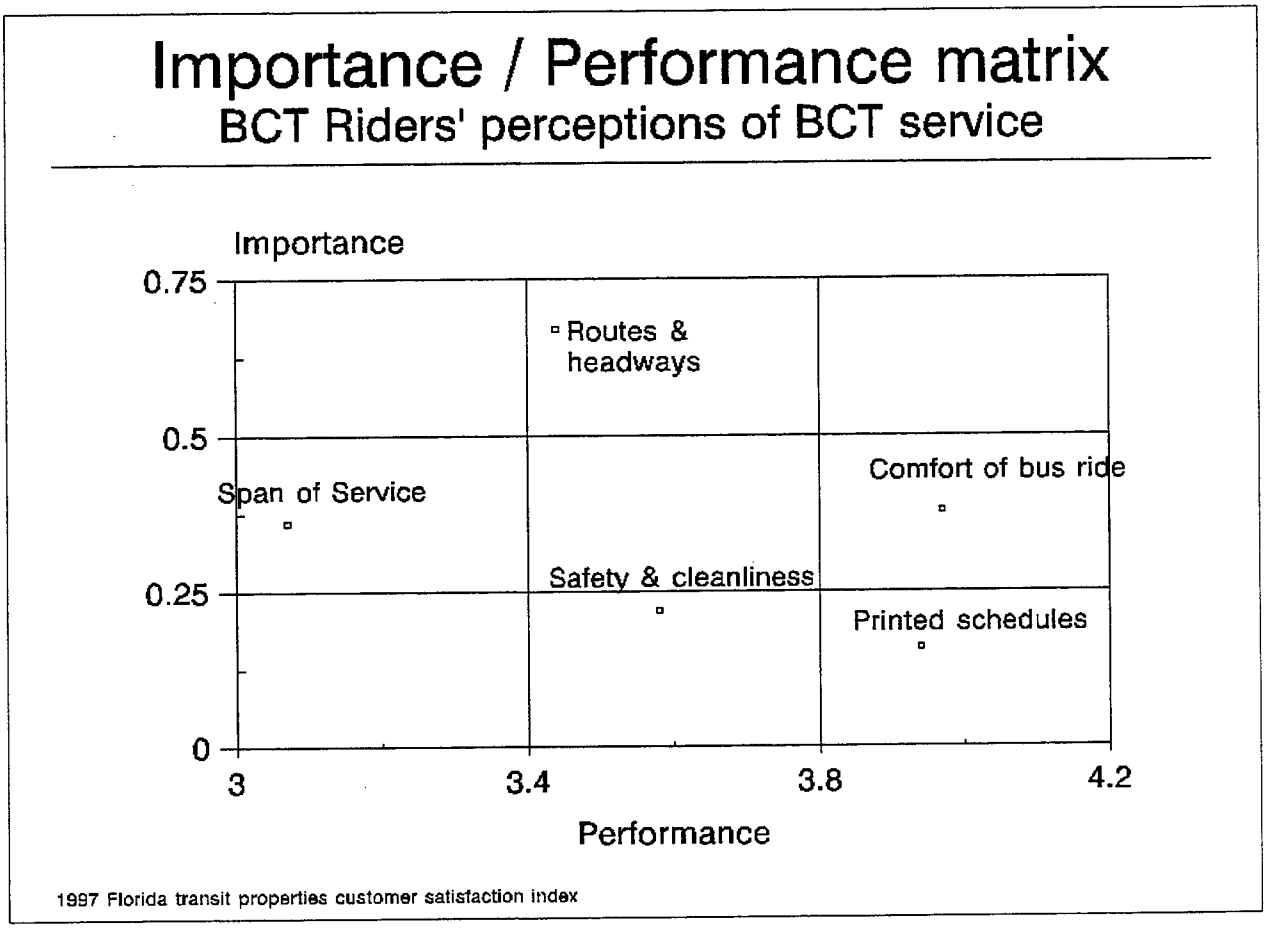


Figure 1 BCT Importance/Performance Matrix

The chart has been divided into nine regions, reflecting various combinations of low, medium, and high performance and low, medium, and high importance. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 12
Interpretations of BCT's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High	Possibly reduce focus on this area	Printed Schedules
Low	Medium	Maintain performance - no action	Safety & Cleanliness
Low	Low	Maintain performance - no action	
Medium	High	Maintain performance - no action	Comfort of Bus Ride
Medium	Medium	Maintain performance - no action	
Medium	Low	Investigate for improvements	Span of Service
High	High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	Routes & Headways
High	Low	Critical improvement area	

In BCT's case, the Printed Schedules factor falls into the "possibly reduce focus" area, while the Safety & Cleanliness and Comfort of Ride factors are both in the "maintain performance - no action" areas. The two potential action areas are Span of Service (medium importance/low performance - investigate for improvements) and Routes & Headways (high importance/medium performance, although performance is borderline - investigate for improvements). The individual Routes & Headways variables that BCT scores particularly low on are:

Item	Mean	Index
Frequency of Service	3.07	92.85
Number of Transfers Required	3.16	94.40
Time to Make Trips	3.25	94.13

The Span of Service variables with low scores are:

Item	Mean	Index
Latest Weekend Runs	2.62	90.58
Latest Weekday Runs	2.95	94.52
Earliest Weekend Runs	3.08	92.74

These areas all suggest that BCT customers feel that BCT service does not currently meet their needs and may suggest that it is time to conduct a major operational analysis of BCT routes and schedules, based on new O/D information and travel patterns. It is recommended that BCT investigate this possibility. Of course, these are the lowest scoring areas for all of the systems included in this satisfaction study, but the low index scores suggest that BCT's performance will need to be upgraded substantially in this area to achieve satisfaction levels seen in other Florida systems.

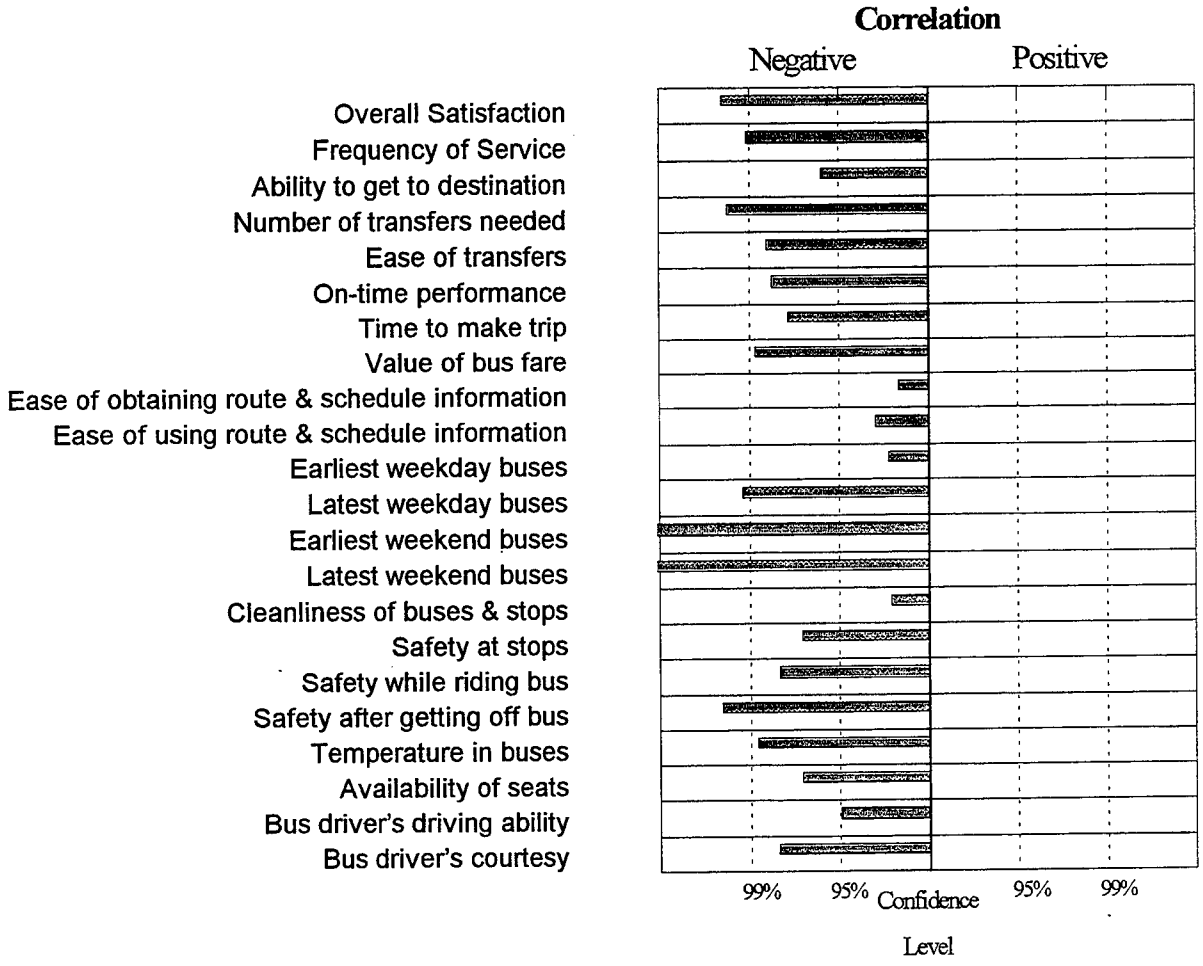
The analysis of demographics which follows suggests that BCT should

- investigate the possibility of installing additional security measures, such as more lighting at bus stops and security cameras on buses, and
- evaluate strategies to reward frequent riders.

Correlations of Demographics and Satisfaction items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics will be examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

Correlation of Frequency of Ridership and Satisfaction Items



The satisfaction items are generally negatively correlated with frequency of use characteristics. Particularly strong negative correlations exist between frequency of use and satisfaction with weekend span of service and latest weekday runs; frequency of service; number of transfers required; safety after getting off bus; and overall satisfaction. Heavier users are clearly less satisfied with almost all aspects of the service.

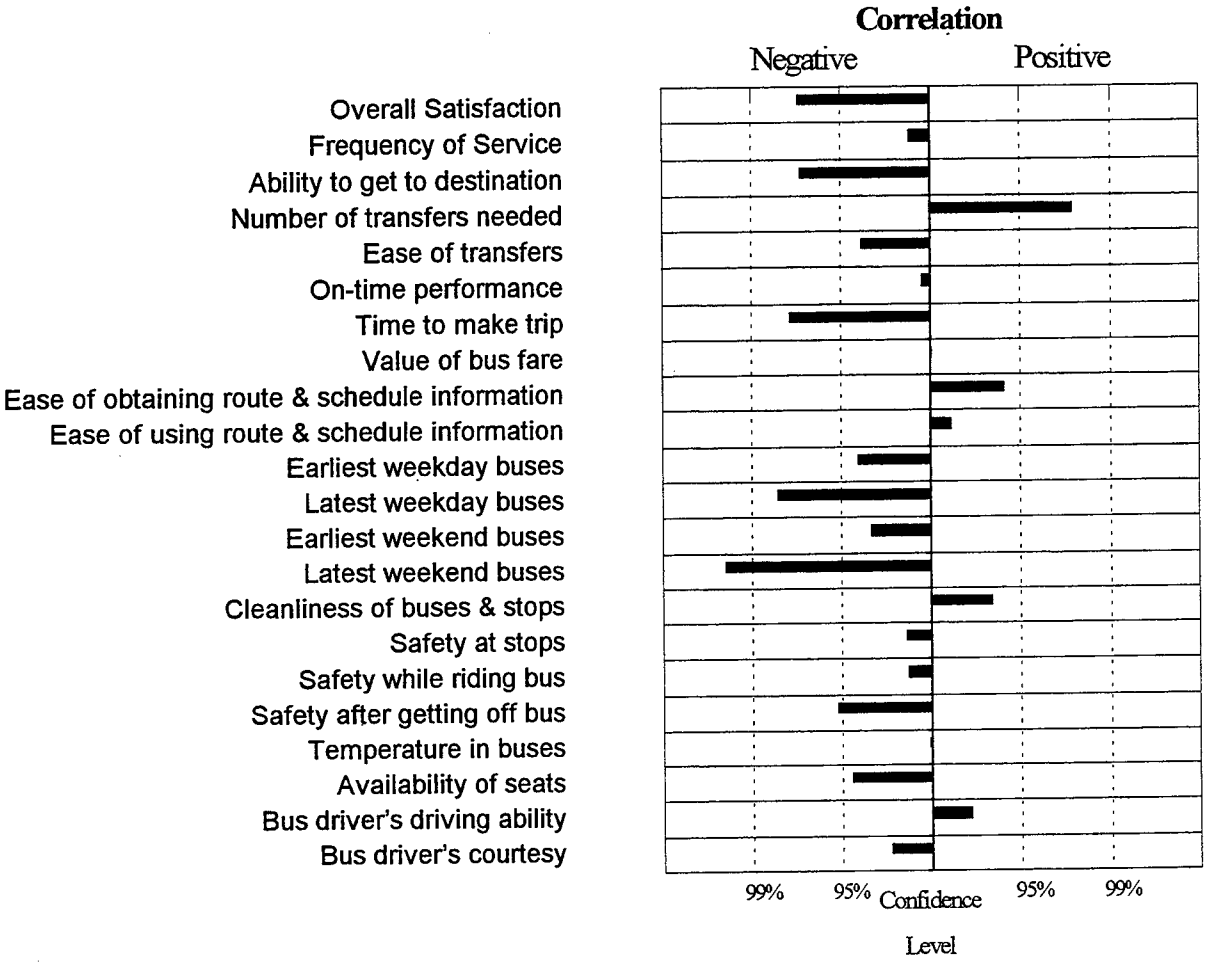
People who use the bus 5 days per week or more make up 53% of the riders on the transit system, according to the estimates developed from these survey results. The represent an absolutely key constituency for the transit systems, and efforts to improve overall customer satisfaction should focus on this core group of customers.

Many industries have implemented approaches to reward the heaviest users of their

products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a relatively unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance telephone service or air travel).

With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services. In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25th time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Number of Times Boarding a Bus and Satisfaction Items



As with the frequency of use results, most satisfaction items are negatively correlated with the number of times respondents boarded a bus on the day they responded. However, 95% chance of significance is only reached for six of the items. These include overall satisfaction, ability to get where respondent wants to go, time to make a trip, time of day latest buses run on weekdays and weekends, and safety after getting off the bus.

Given that the number of times a respondent boards a bus is correlated with both the number of transfers the respondent has to make and the level of dependence the respondent has on the bus to get around, it is not surprising that those who board buses more are less satisfied with routing, scheduling, and the time it takes to make trips. Solutions for these types of problems are similar to those involved in improving scores for the Span of service factor, namely an operational analysis of routes and schedules.

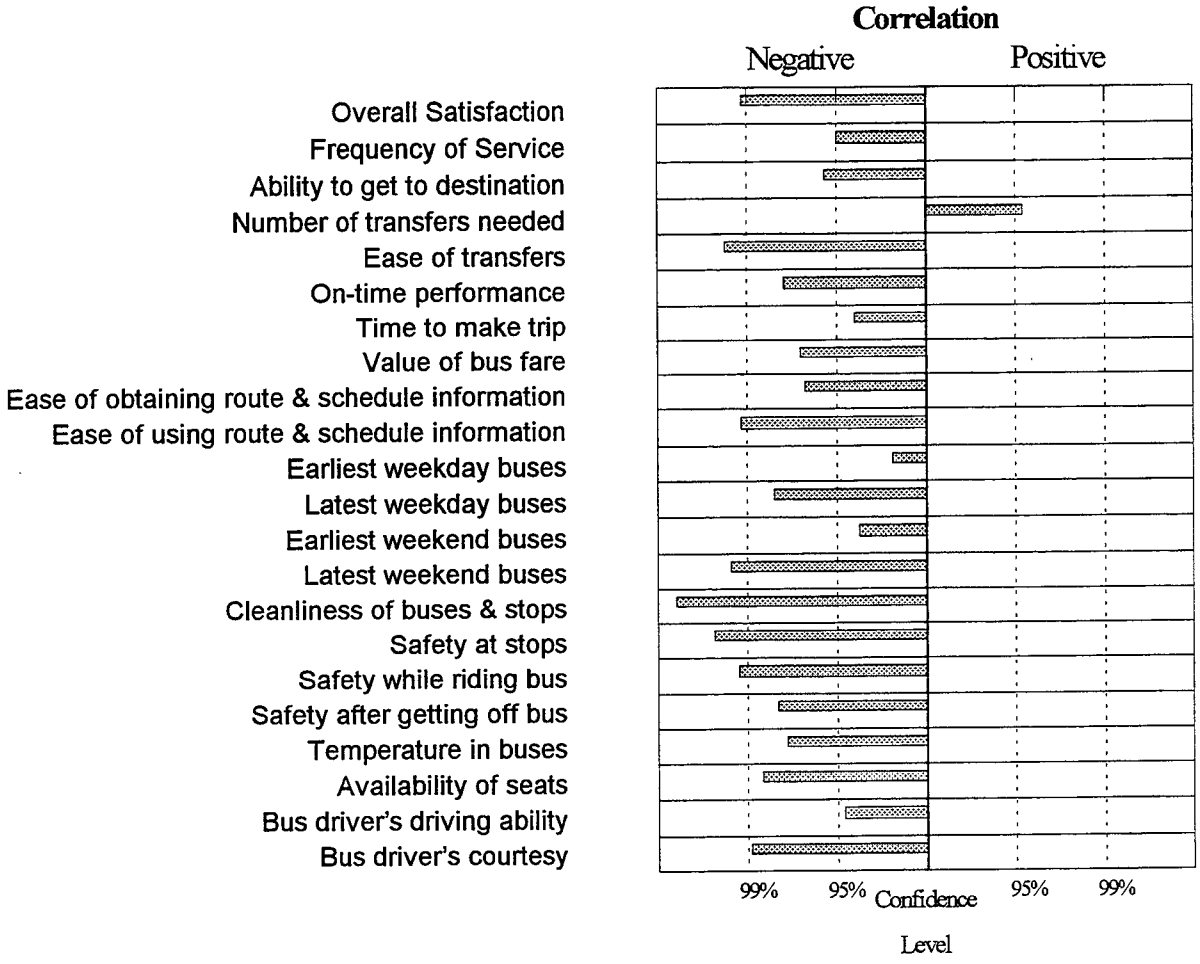
Correlation of Trip Origins & Destinations and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

The differences seem to reflect a product of mood regarding the nature of the trip origin or destination. For those whose origin or destination is work or school, satisfaction levels tend to be lower. For those who have shopping as an origin or destination, satisfaction levels tend to be higher.

For those who have visiting or recreation as a destination, satisfaction levels tend to be higher. However, for those who have visiting or recreation as an origin, levels tend to be lower with some notable exceptions: span of service for weekdays (higher rating), and ease of using route and schedules. However, the number of respondents having visiting recreation as an origin was small enough that these results do not reach a 95% level of confidence for significance.

Correlation of Number of Adults Employed outside the Home and Satisfaction Items



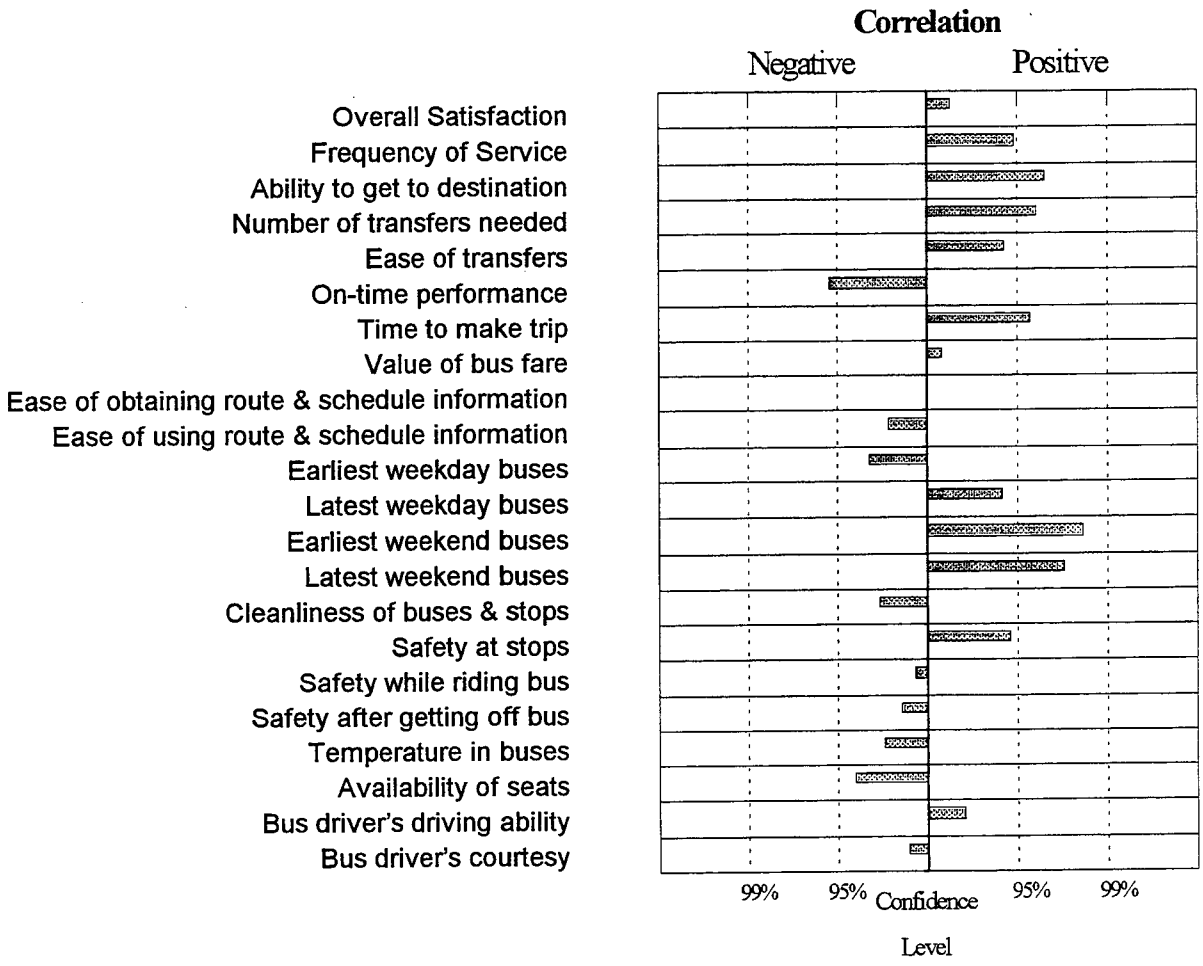
This demographic characteristic is also negatively correlated with almost all satisfaction items, indicating that those riders living in households with larger numbers of adults working outside the home tend to be significantly less satisfied with many aspects of transit service.

The explanation for this is that the respondents in households with more adult workers tend to be the highest income respondents in the sample. As will be seen, higher incomes also relate negatively to satisfaction. These respondents are the people who have the highest levels of income yet still need to ride the bus. It is likely that they have at least one vehicle in the home, but another household member may be using it. The level of frustration felt by these people in being dependent on fixed route services is probably the highest of all groups. Also, these people may live in areas that are less well served by

transit.

There is little the transit agency can do to alleviate this situation. By its nature, fixed route service will tend to provide less satisfaction to this type of group and little about the nature of the service, other than significant service increases, can change that fact.

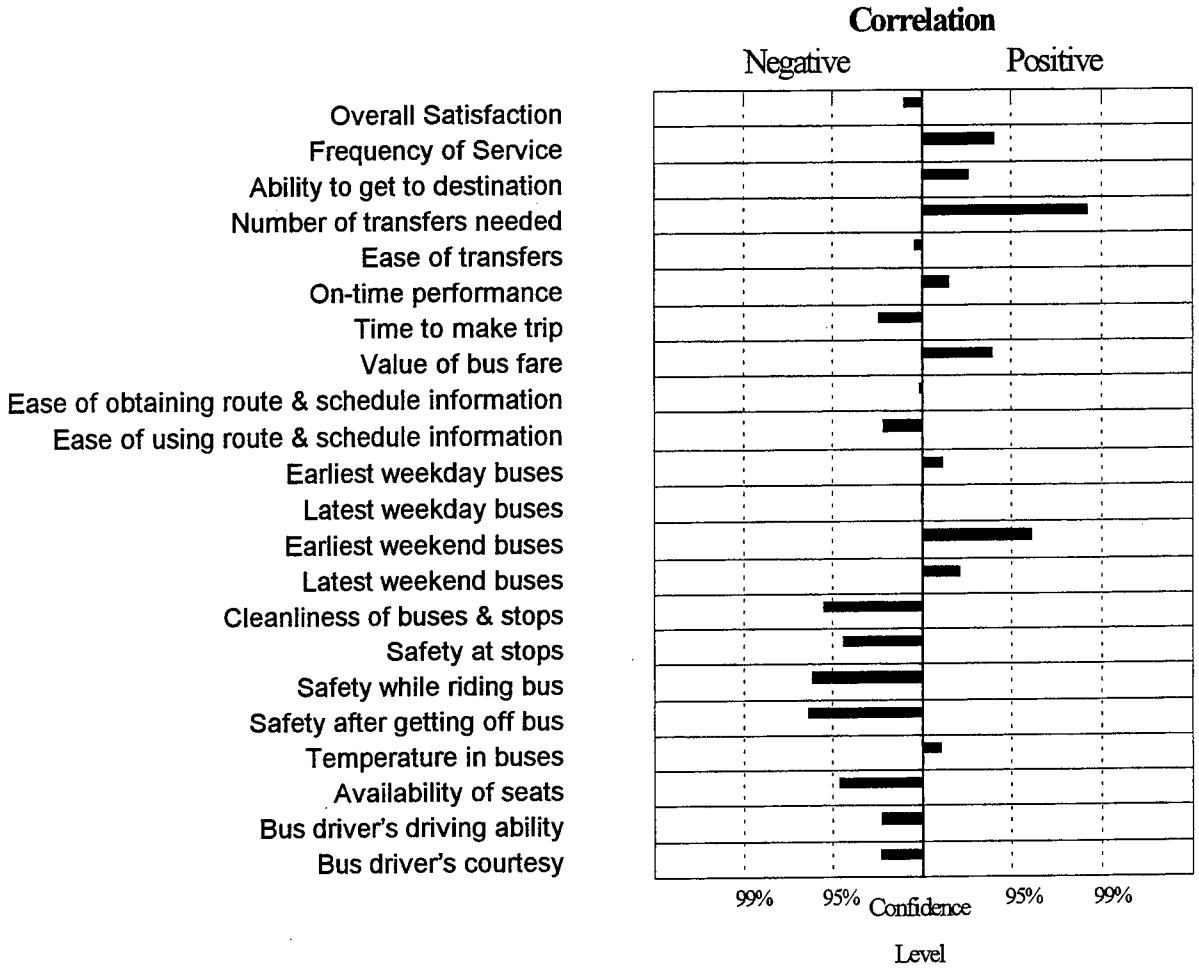
Correlation of Number of Children under 16 in the Home and Satisfaction Items



This characteristic tends to actually be positively correlated with customer satisfaction levels. The only truly strong negative correlation occurs between number of children in the home and on-time performance. This may be due to trying to coordinate with children's school schedules. Safety issues, interestingly, are not highly correlated with increasing number of children.

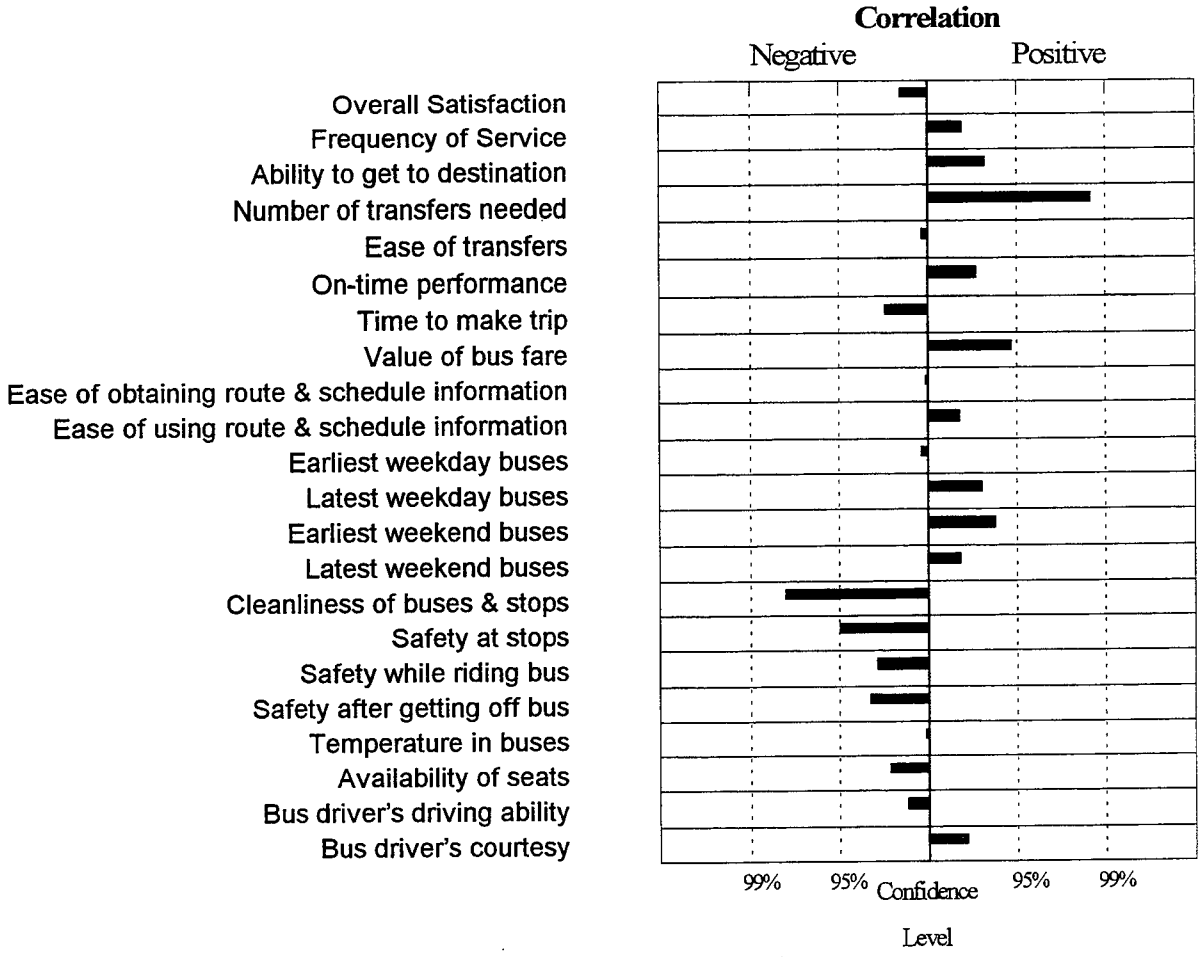
Positive correlations occur with several of items. Significant positive correlations are found between number of children in the home and ability to get to desired destinations, number of transfers required, time it takes to make trips, and weekend span of service. This indicates that the geographic locations with large numbers of homes with children are satisfactorily served by the bus service.

Correlation of Number of Working Vehicles in the Home and Satisfaction Items



Correlations for this item are generally positive, except for safety issues. Strong positive and significant correlations exist for number of transfers required and earliest buses on weekends. People with more vehicles are generally less dependent on transit service to meet their transportation needs, particularly on non-weekdays. Thus the positive correlation may be best understood as a much *lower* level of satisfaction among riders who have the *least* number of working vehicles in their households.

Correlation of Number of Working Telephones in the Home and Satisfaction Items



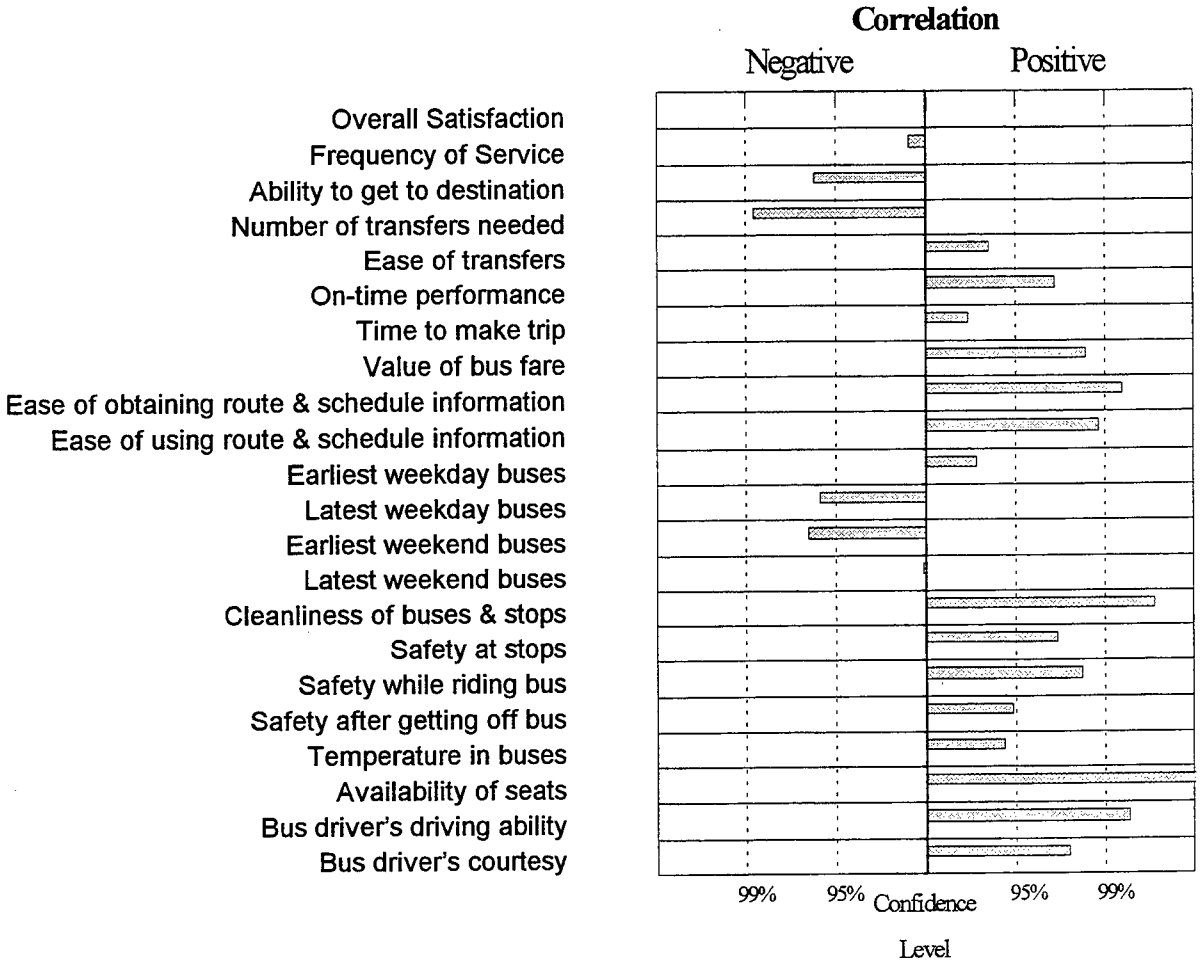
There are few strong correlations for this item, not surprisingly. The main purpose of data collection for this item was to demonstrate that a sizable proportion of the bus-riding population does not have telephones and thus telephone-based surveys might inadequately cover this segment. A significant positive correlation exists between the number of working phones and satisfaction with the number of transfers required. Very likely this is a random finding as explained in the introduction to this section.

A negative correlation exists between number of working telephones and perception of cleanliness of buses and stops, as well as safety at bus stops. Again, the reason for this is difficult to establish

It would seem that these correlations might be tied to income levels, and that the number of working telephones would also be tied to income levels. While the number of telephones and income levels are indeed highly related, the relationships between income levels and the satisfaction items do not match those seen in the results described above.

It is quite possible that the "random" element involved is the existence of multi-phone households in some part of the BCT service area that also have direct routes to common destinations. This is not an element of service design but rather an apparently unsystematic relationship, which does not lead to any specific recommendations.

Correlation of Age and Satisfaction Items



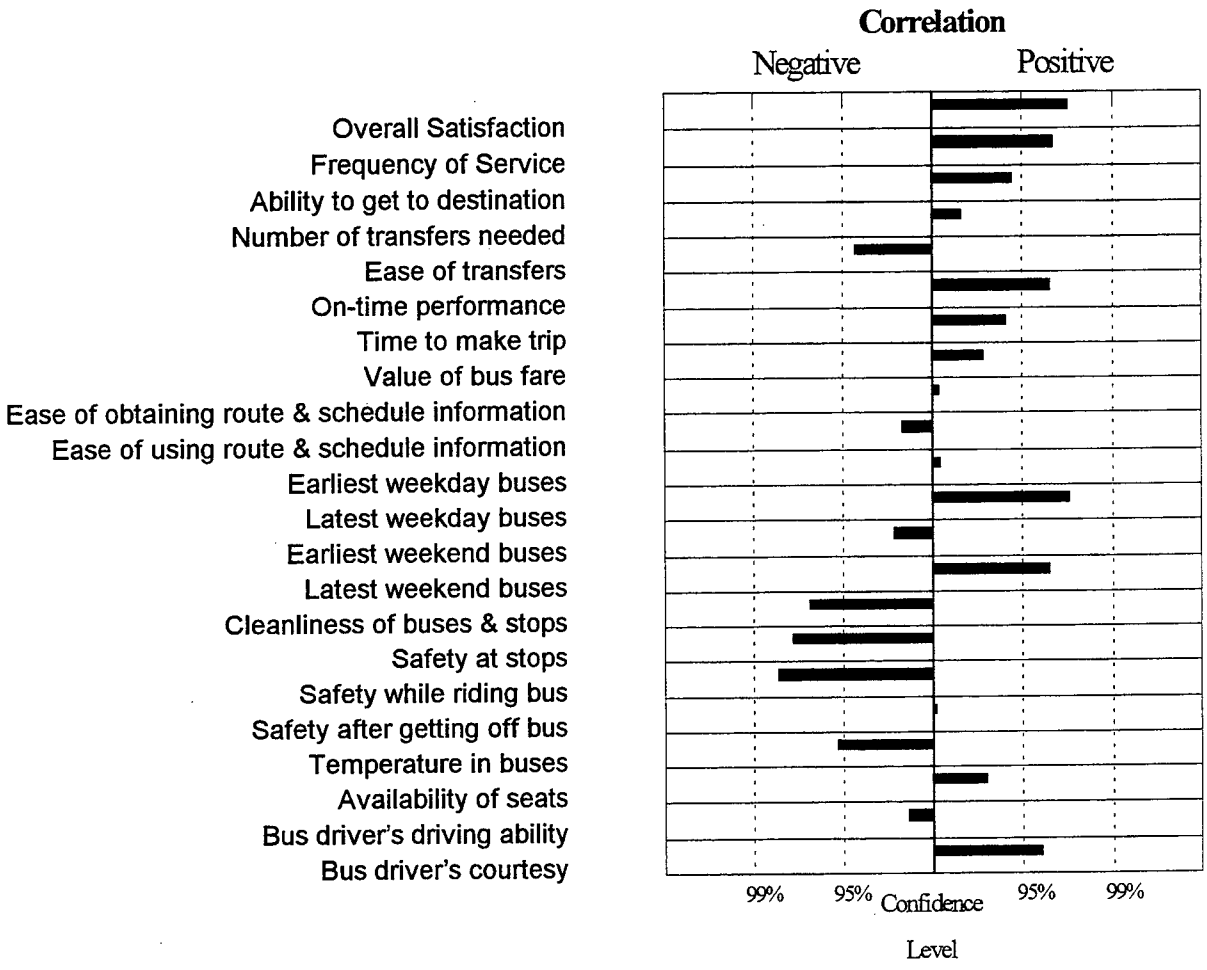
Respondent age is highly related to the satisfaction items, usually positively – that is, the older the respondent, the higher the level of satisfaction with most items. The individual items that are negatively correlated with age include a very strong negative correlation between increasing age and satisfaction with number of transfers required, and a less strong but still significant negative correlation between age and the time of day the earliest buses run on weekends and the time of day latest buses run on weekdays. Both of these correlations are quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs. Older riders are probably also more sensitive to initial weekend run times since they are likely to be active earlier in the day and still require the transit system for transportation on those days.

Many items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders.

The items that have significant positive correlations, in order of strength of correlation, are: Availability of seats on buses, cleanliness of stops and buses, bus drivers ability to drive bus, ease of obtaining and using route & schedule information, bus driver's courtesy, safety while riding bus, value of bus fare, on-time performance, safety at bus stop.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves with transportation, they should be viewed as a key customer segment. BCT should consider it a notable achievement that they have been able to provide service that is more satisfactory to this group of customers.

Correlation of Gender and Satisfaction Items



Many of the satisfaction items had significant correlations with respondent gender. These are listed below:

Less satisfactory for females: cleanliness of stops & buses, safety while riding bus, safety at bus stop.

Less satisfactory for males: Overall satisfaction, frequency of service, on-time performance, time of day latest buses run both on weekends and weekdays, and bus driver's courtesy.

Clearly there is a major issue of safety – males would rather have buses run later, while

females are relatively satisfied with the time of day the latest buses run; conversely, females feel less safe when they are using the bus, compared to males.

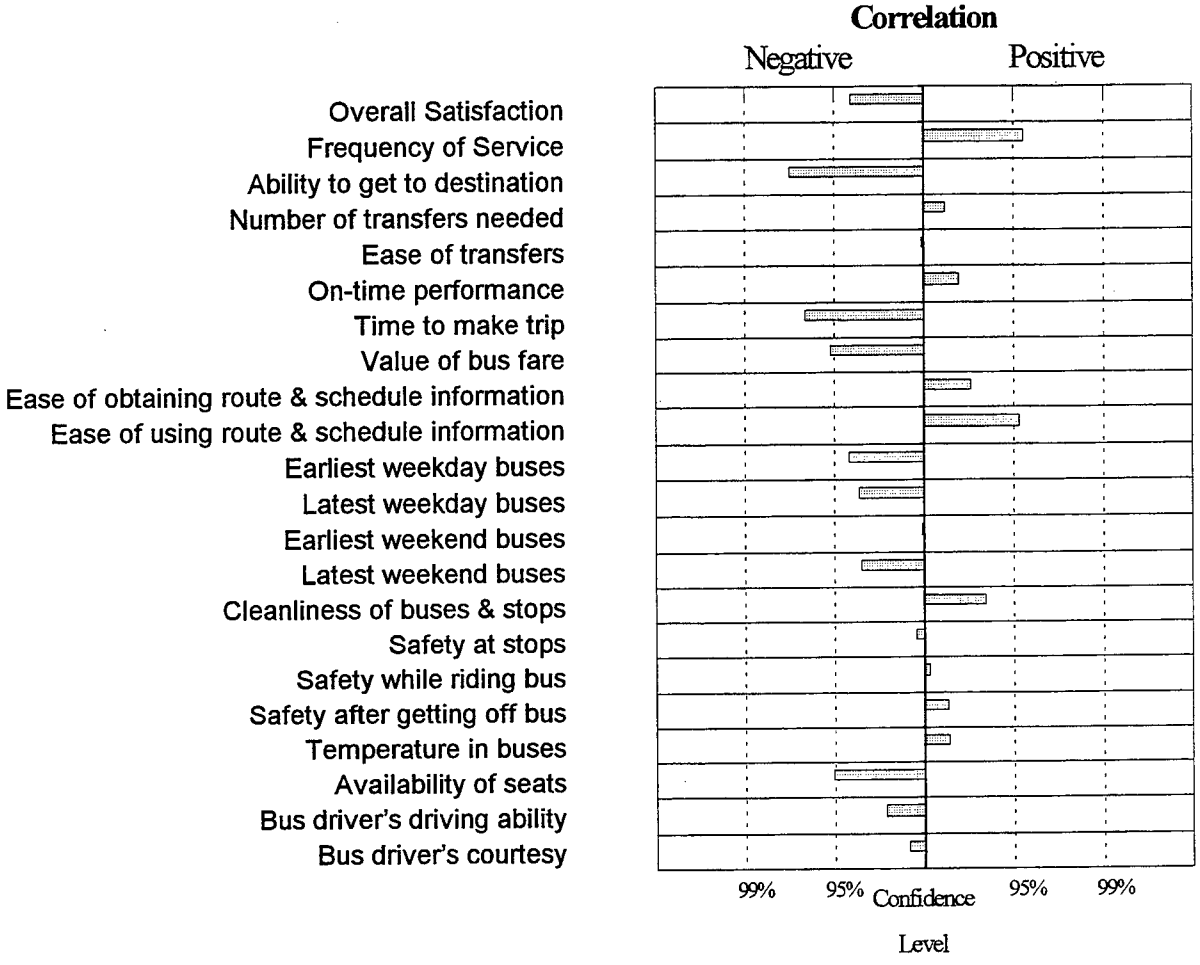
This is not a surprising result. However, BCT should investigate any improvements that could be made to make women feel safer at bus stops and while riding the buses, such as such as increased lighting at stops and shelters and installing security cameras on buses.

Correlation of Race and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

The only group with markedly different levels of satisfaction by race was the Hispanics. Hispanics had higher levels of satisfaction for safety while riding the bus, temperature in the buses, and availability of seats, but lower levels of satisfaction for ability to get where they wanted to go.

Correlation of Income and Satisfaction Items



Most satisfaction items are negatively correlated with income. The items that have significant negative correlations with income include ability to get where respondent wants to go, time it takes to make trip, value of bus fare, and availability of seats. There is a positive correlation between satisfaction with frequency of service, and satisfaction with ease of using route and schedule information and income levels. The latter finding may be more strongly related to education levels (not measured in this survey).

As explained earlier in the section on number of adults working outside the home, these results are most likely demonstrating the frustration felt by higher income respondents who still need to use the bus.

Survey Instrument

The survey instrument is provided on the following pages. The survey was printed on 60# blue cardstock, on both sides of an 8 ½ · 11 sheet.

Dear BCT Customer: Please help us! Your opinions and information about your trip are very important in helping us improve our service for you. Please complete **both sides** of this survey and place it **in the box by the bus door** when you get off the bus. **Even if you are not finished** with the survey when you complete your trip, please drop it in the box when you get off the bus. Thanks for your help!

1. Have you filled out this survey earlier today? ❒ no **Continue** ❒ yes **STOP! Please place in return box**

2. In a **typical week**, *on how many* **days** do you ride the bus?

1❒ One day/ week or less 2❒ 2 days/ week 3❒ 3 days/ week 4❒ 4 days/ week 5❒ 5 days/ week 6❒ 6 days/ week 7❒ 7 days/ week

3. How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with BCT	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

Continue on other side

4a. Thinking only about **last week**, did you ride the bus on:

Monday?	Tuesday?	Wednesday?	Thursday?	Friday?	Saturday?	Sunday?
1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes
2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No

4b. How many times will you board a bus today, including any times you transfer? **(circle ONE answer)**
1 2 3 4 5 6 7 8 9 10 or more

5. What is the nearest major street intersection to where you:
boarded this bus? _____ & _____
will get off this bus? _____ & _____

6a. Where are you coming from on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

6b. Where are you going on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

7. Are you transferring buses on this trip? 1 ☐ Yes How many times? ___ 2 ☐ No

8. How many adults in your household are employed outside the home? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

9. How many children under the age of 16 do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

10. How many working motor vehicles does your household have? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

11. How many working telephones do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

12. What is your age? 1 ☐ Under 18 2 ☐ 18-24 3 ☐ 25-34 4 ☐ 35-44 5 ☐ 45-54 6 ☐ 55-64 7 ☐ 65 or over

13. What is your gender? 1 ☐ male 2 ☐ female

14. What is your ethnic heritage? 1 ☐ White 2 ☐ Black 3 ☐ Hispanic 4 ☐ Asian 5 ☐ Something else (specify: _____)

15. In what range was **your household's total income** for 1996?

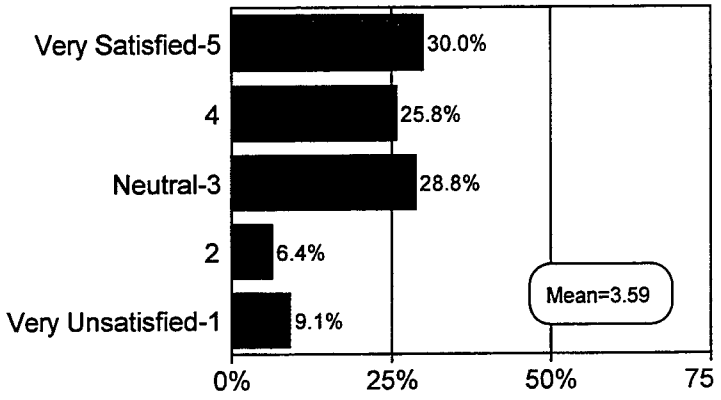
1 ☐ Under $5,000 2 ☐ $5,000 to $9,999 3 ☐ $10,000 to $14,999
4 ☐ $15,000 to $19,999 5 ☐ $20,000 to $24,999 6 ☐ $25,000 to $29,999
7 ☐ $30,000 to $39,999 8 ☐ $40,000 to $49,999 9 ☐ $50,000 or more

Thank you for your assistance!

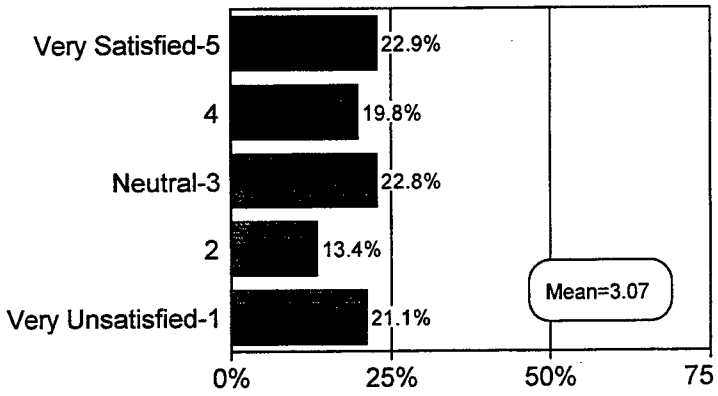
Results by Question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

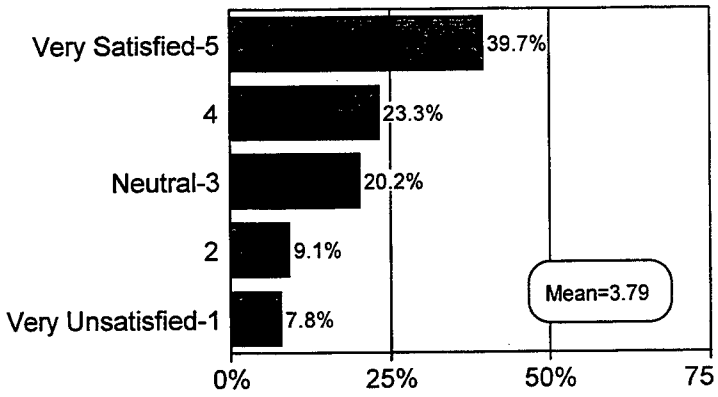
3a. Your overall satisfaction with BCT...



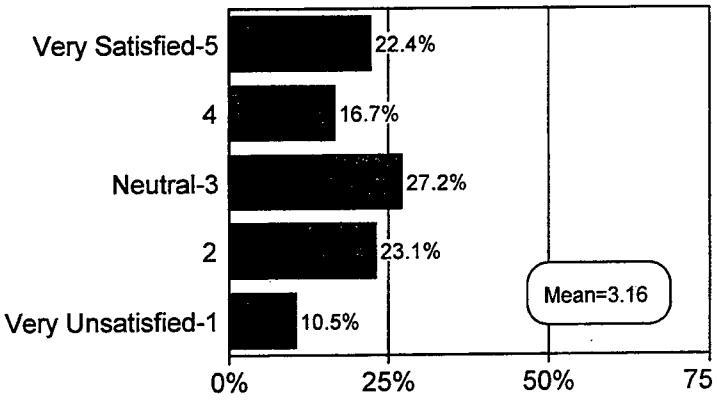
3b. Frequency of service (how often buses run)...



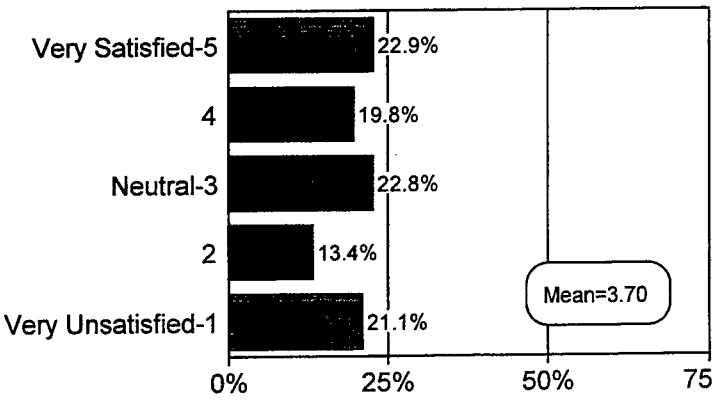
3c. Your ability to get where you want to go using the bus...



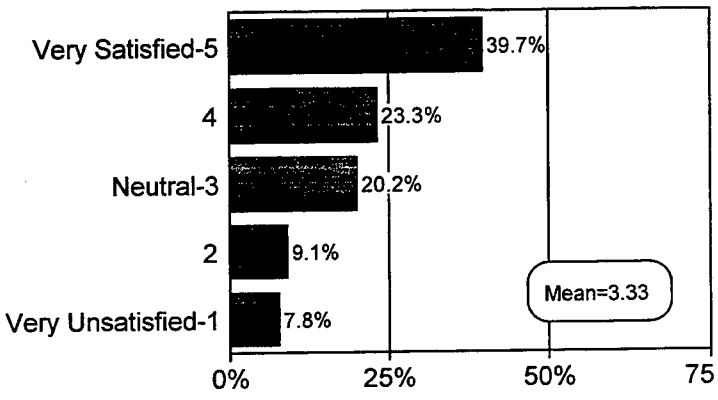
3d. The number of times you have to transfer buses...



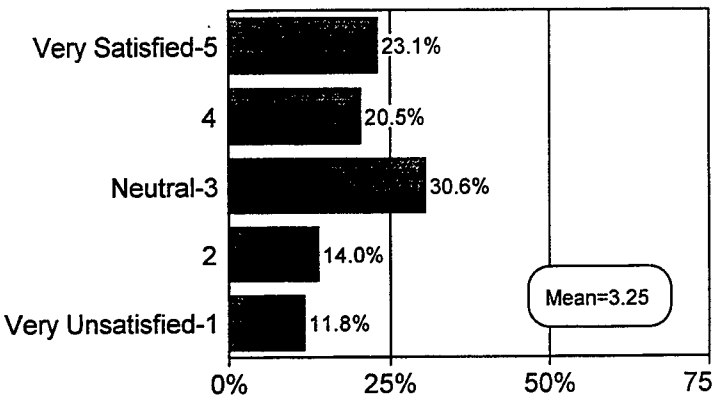
3e. How easy it is to transfer buses...



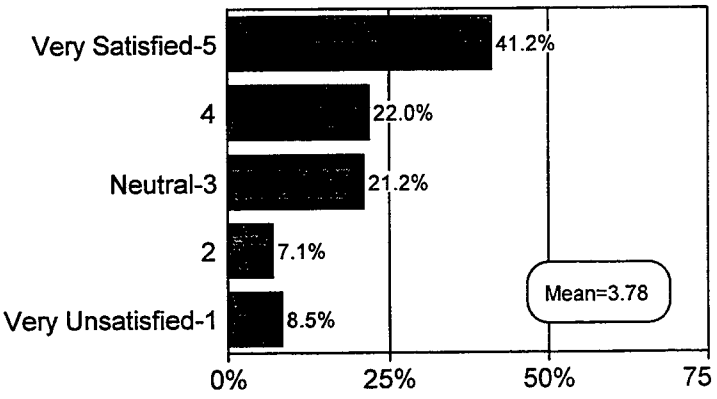
3f. How regularly buses arrive on time...



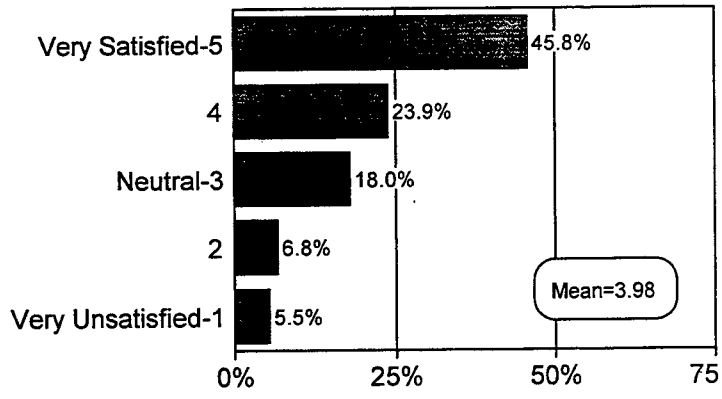
3g. The time it takes to make a trip by bus...



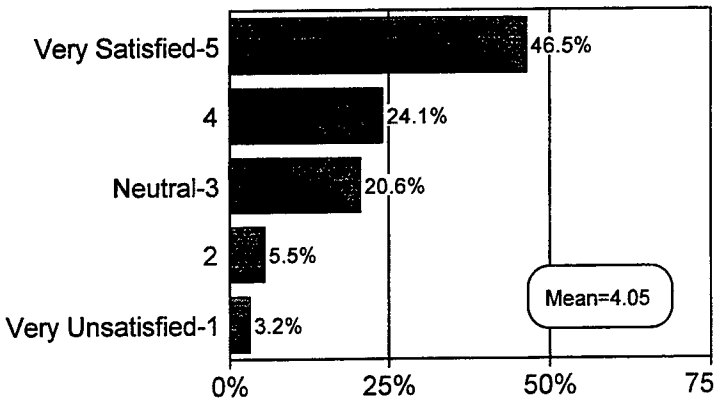
3h. Value of bus fare (service you get for what you pay)...



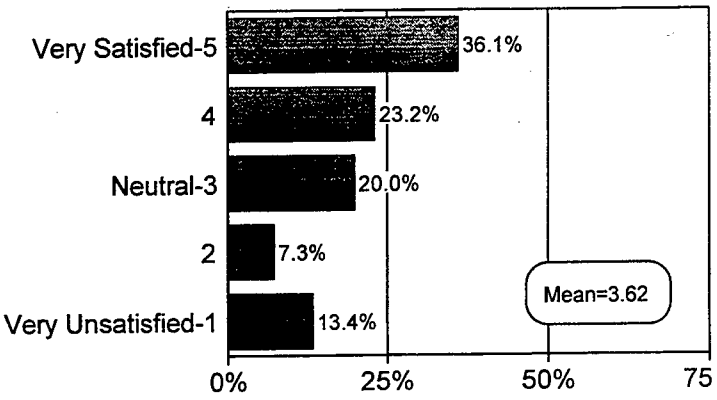
3i. How easy it is to obtain bus route & schedule information...



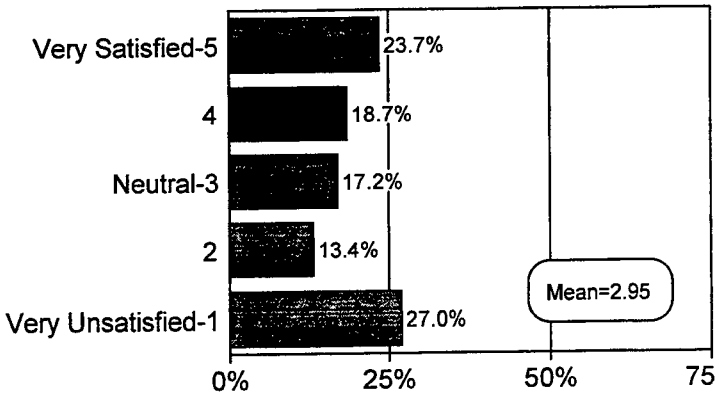
3j. How easy it is to use bus route & schedule information...



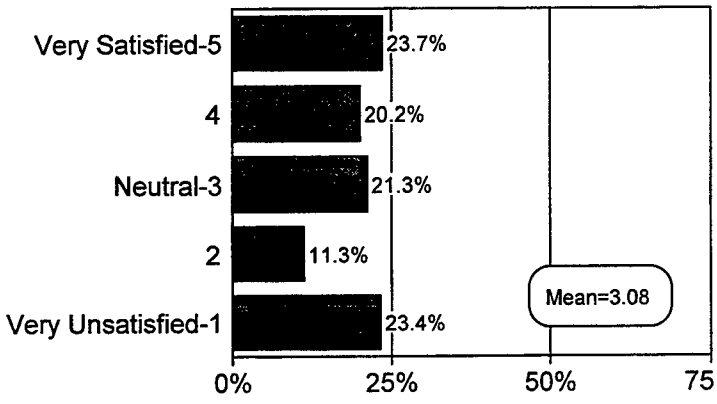
3k. The time of day the earliest buses run on weekdays...



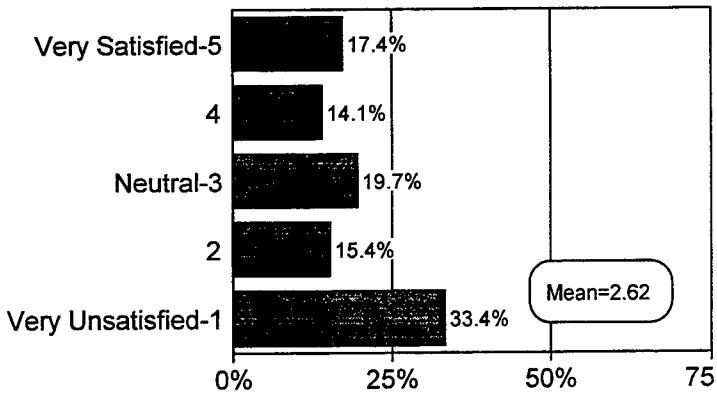
3l. The time of day the latest buses run on weekdays...



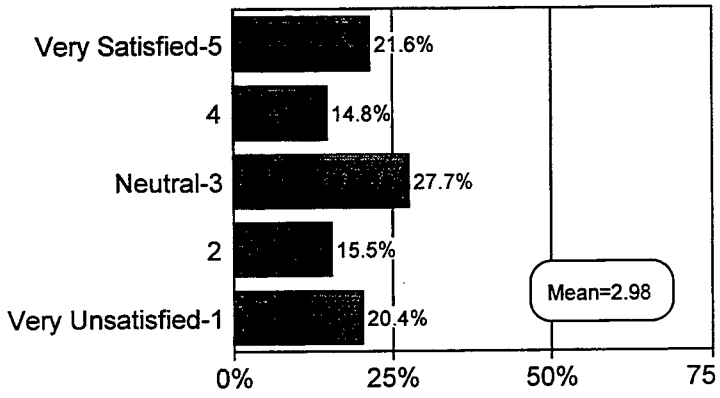
3m. The time of day the earliest buses run on weekend days...



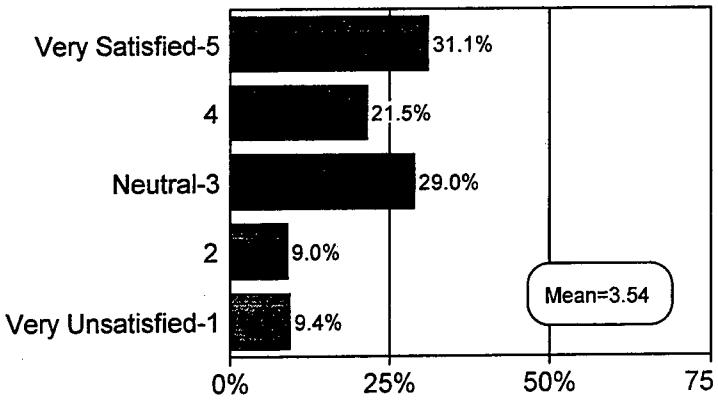
3n. The time of day the latest buses run on weekend days...



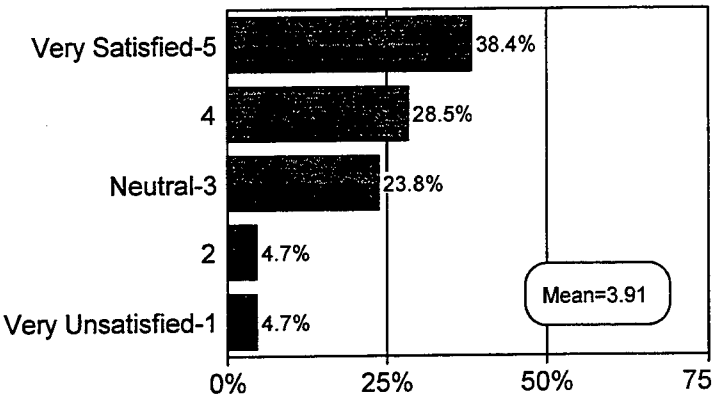
3o. How clean the buses and bus stops are...



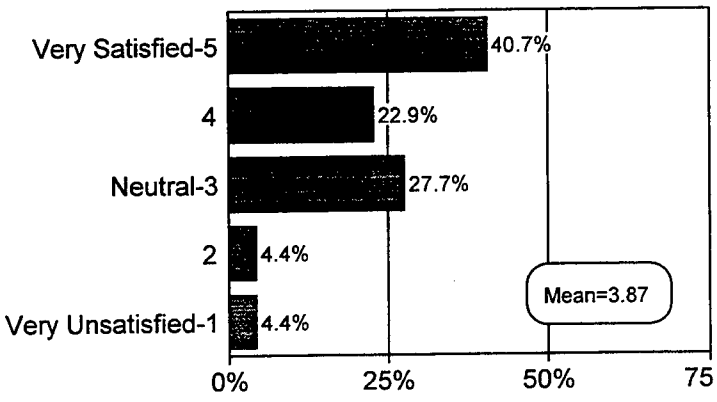
3p. Safety at the bus stop...



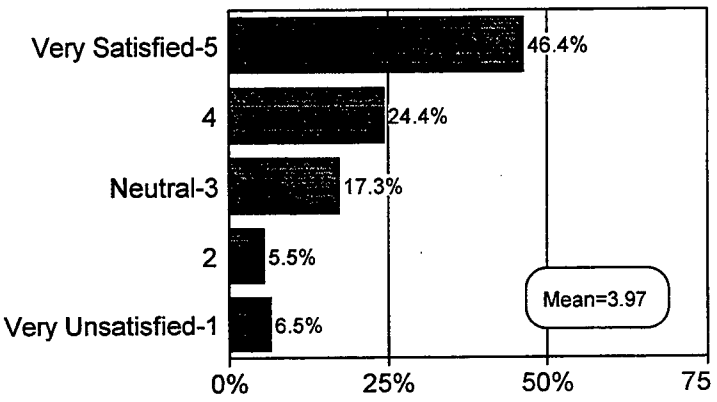
3q. Safety while riding the bus...



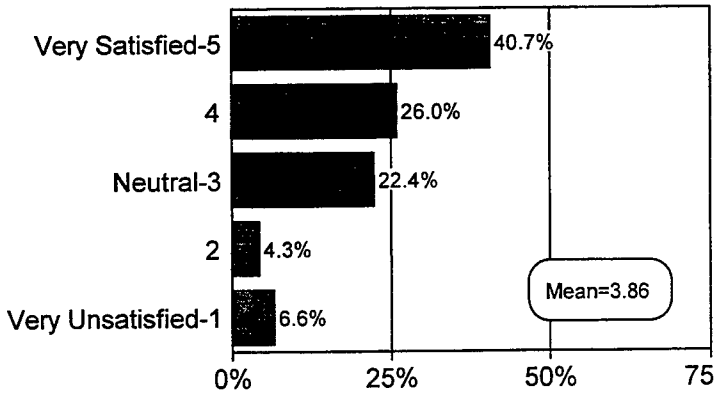
3r. Safety after getting off the bus...



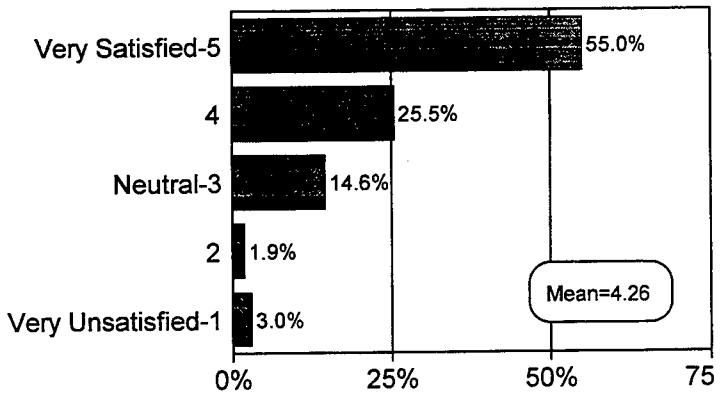
3s. Temperature inside the buses...



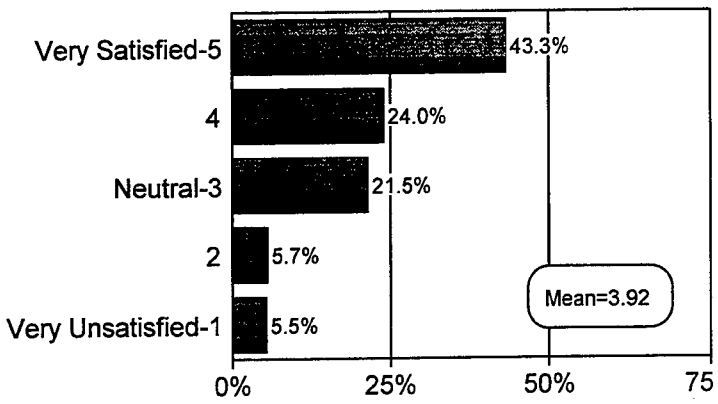
3t. Availability of seats on buses...



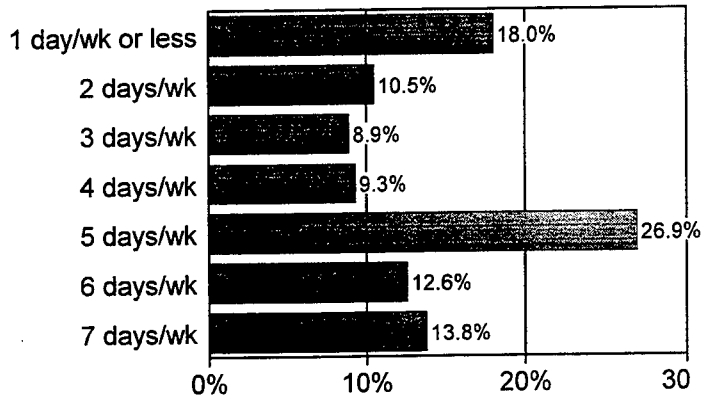
3u. The bus driver's ability to drive the bus...



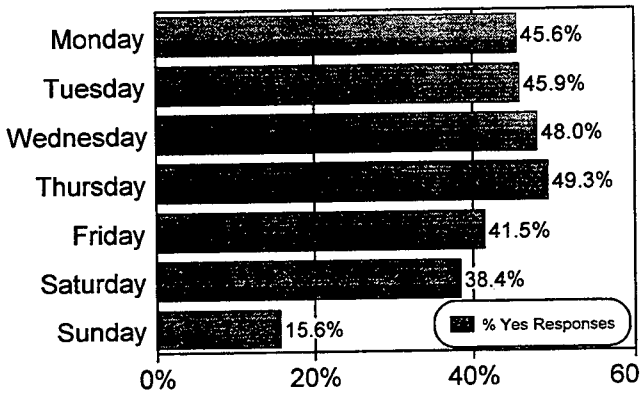
3v. The bus driver's courtesy...



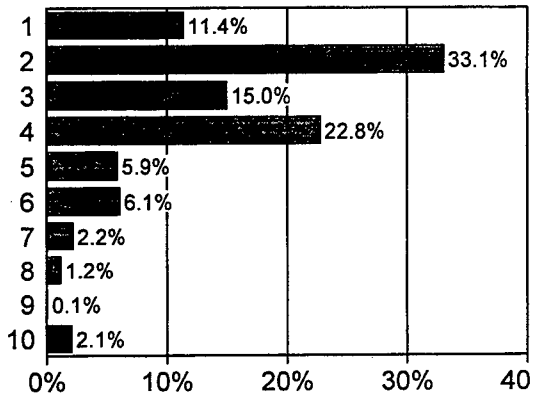
2. In a typical week, on how many days do you ride the bus?



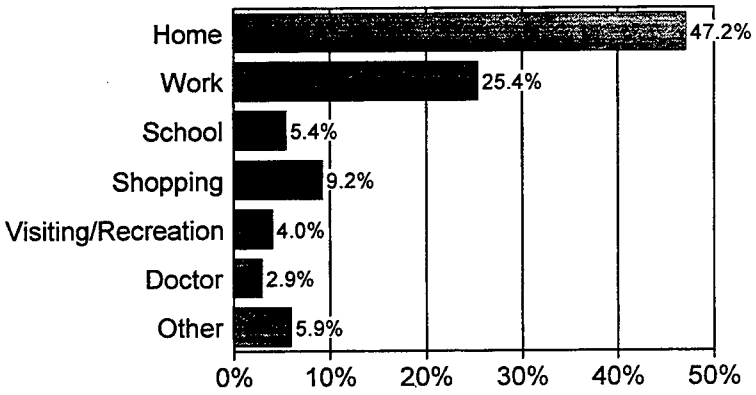
4a. Thinking only about last week, did you ride the bus on...



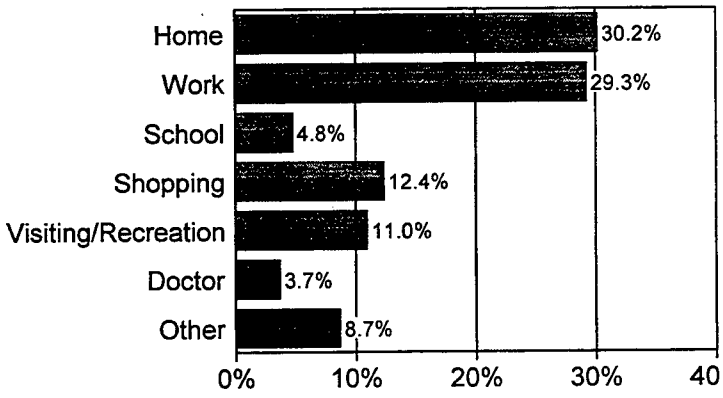
4b. How many times will you board a bus today, including transfers?



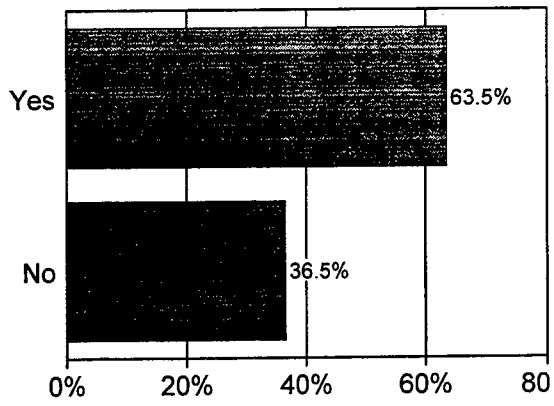
6a. Where are you coming from on this trip?



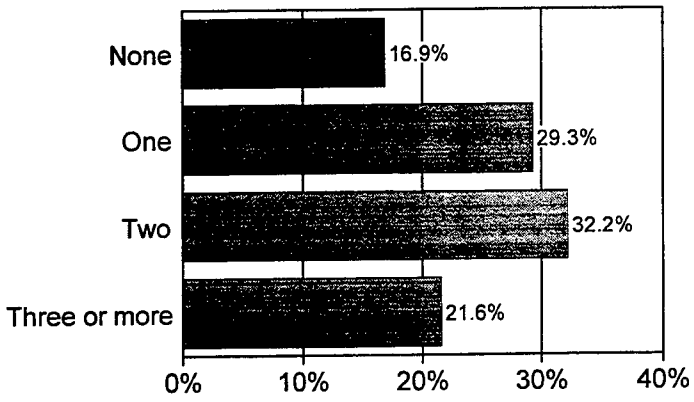
6b. Where are you going on this trip?



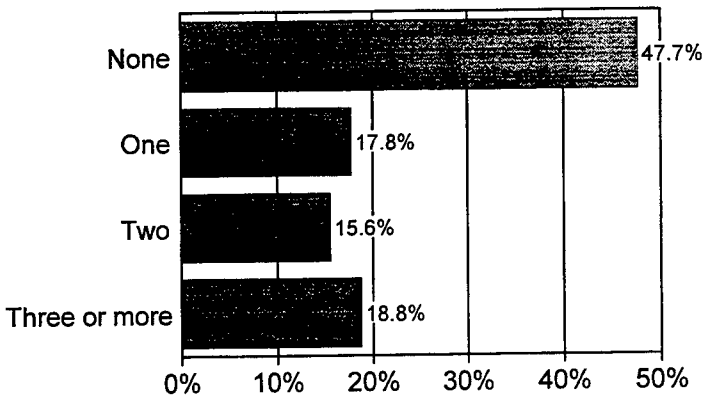
7. Are you transferring buses on this trip?



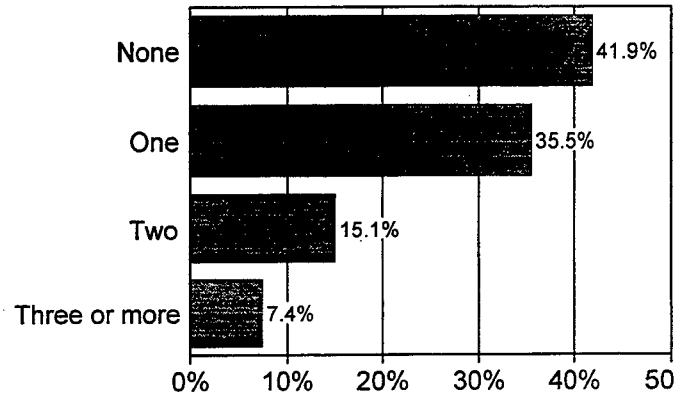
8. How many adults in your household are employed outside the home?



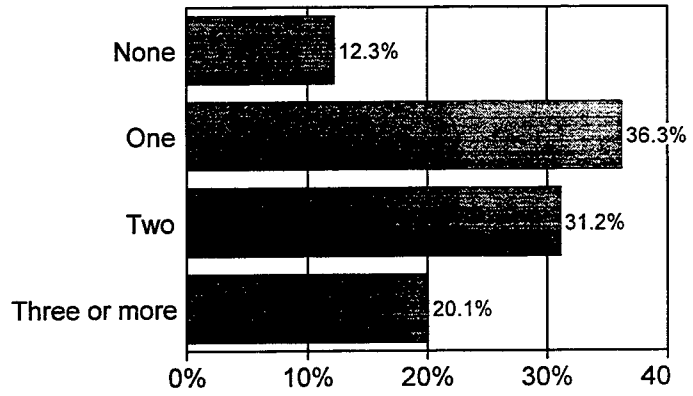
9. How many children under the age of 16 do you have in your household?



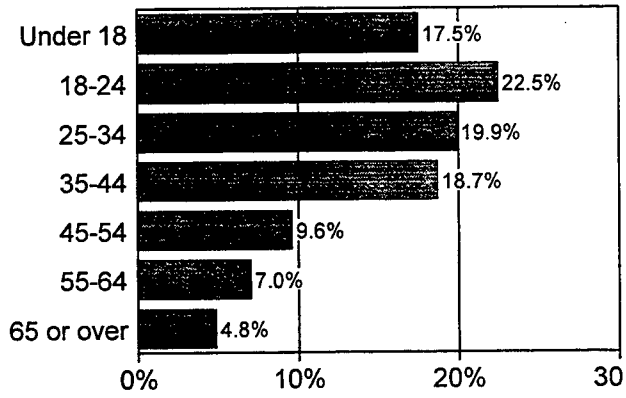
10. How many working motor vehicles does your household have?



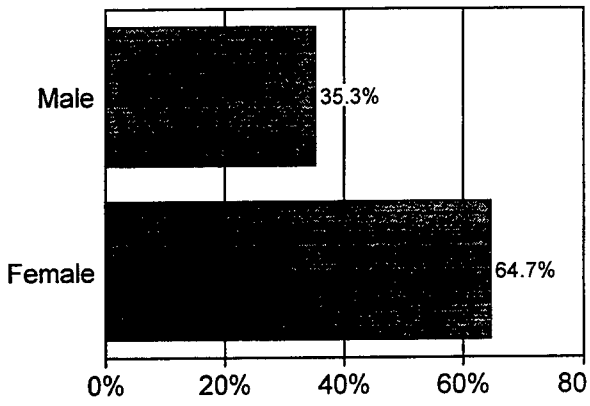
11. How many working telephones do you have in your household?



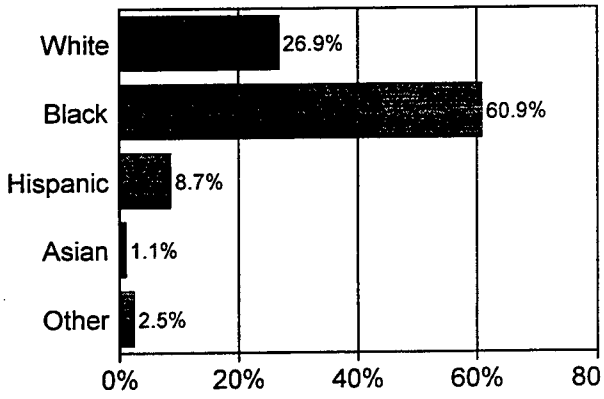
12. What is your age?



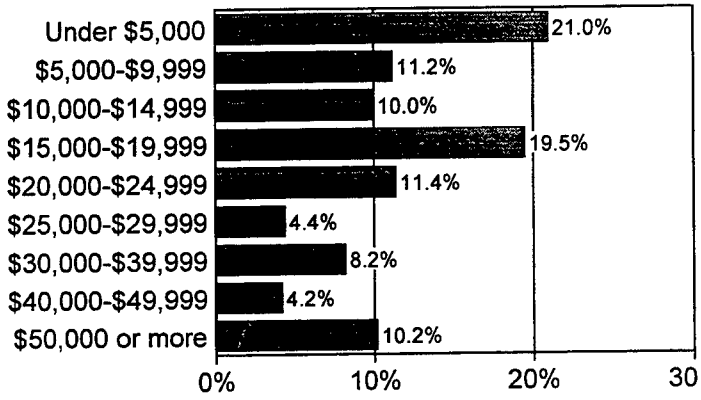
13. What is your gender?



14. What is your ethnic heritage?



15. In what range was your household's total income for 1996?



JACKSONVILLE TRANSPORTATION AUTHORITY (JTA)

Sampling Methodology

Surveys were distributed to riders by CUTR personnel at each of three transfer centers:. The FCCJ Downtown station, Regency Mall, and Gateway mall. Surveys were distributed on Wednesday, August 6, 1997 from 3 p.m. to 8 p.m.; on Thursday, August 7, 1997, from 7 a.m. to 3 p.m.; and on Saturday, August 9, 1997, from 8 a.m. to 4 p.m.. This allowed for a sampling from morning and evening peak hours, midday on weekdays, and all day on the weekend except evenings. At the transfer centers, surveyors boarded buses serving as many different routes as possible in order to distribute surveys to passengers boarding and already on board the vehicles.

Each survey contained an identification number in the upper right hand corner. The surveyors recorded the date, time, bus route, bus number, and the beginning and ending numbers of the surveys that they handed out on each vehicle. The surveys were divided in equal numbers for each transfer center and distributed in numerical order of the ID numbers to simplify recording.

A total of 37 of the 39 JTA routes had surveys returned by riders. A total of 942 surveys were returned, all of which were key-entered into an Excel database. A total of 920 surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

The factor analysis of JTA data identified five factors. Some variables will be observed to be part of more than one factor; for instance, "Value of Bus Fare" appears on two separate factors, which indicates that customer perception of value is, not surprisingly, connected with many different elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 13 JTA Factor 1 - Routes & Headways		
Item	**Scores**	
	Index	**Mean**
Buses on time	91.83	3.22
Time to make trip	93.97	3.24
Frequency of service	93.21	3.08
Can get to destination	92.48	3.61
Ease of transfers	89.31	3.38
Value of bus fare	98.45	3.90
Number of transfers needed	90.25	3.02
Overall Mean		**3.35**

Table 14 JTA Factor 2 - Comfort of Bus Ride		
Item	**Scores**	
	Index	**Mean**
Bus driver's courtesy	93.23	3.87
Temperature in buses	93.94	3.70
Bus driver's driving ability	95.93	4.14
Seats available	96.66	3.89
Cleanliness of stops & buses	94.41	3.46
Safety on buses	97.21	4.01
Safety after getting off bus	95.49	3.83
Overall Mean		**3.84**

Table 15 JTA Factor 3 - Span of Service		
Item	**Scores**	
	Index	**Mean**
Earliest weekend runs	89.96	2.99
Latest weekend runs	91.60	2.65
Latest weekday runs	91.95	2.87
Earliest weekday runs	95.07	3.58
Number of transfers needed	90.25	3.02
Frequency of service	93.21	3.08
Can get to destination	92.48	3.61
Overall Mean		**3.11**

Table 16 JTA Factor 4 - Safety & Cleanliness		
Item	**Scores**	
	Index	**Mean**
Safety at stops	93.42	3.59
Safety after getting off bus	95.49	3.83
Safety on buses	97.21	4.01
Cleanliness of stops & buses	94.41	3.46
Number of transfers needed	92.48	3.61
Seats available	96.66	3.89
Overall Mean		**3.73**

Table 17 JTA Factor 5 - Familiarity with Bus System		
Item	Scores	
	Index	Mean
Obtaining schedule/route information	96.41	3.96
Using schedule/route information	98.99	4.08
Value of bus fare	98.45	3.90
Safety on buses	97.21	4.01
Seats available	96.66	3.89
Overall Mean		**3.97**

The structure of the Comfort of Bus Ride factor, which includes safety elements, indicates that safety is an integral component of the bus riders' overall perception of the comfort of their ride and their enjoyment of the riding experience. The structure of the Span of Service factor, which includes transfer and destination elements, implies that JTA riders have a concern about their ability to get to destinations toward the end of the service period. The structure of the Safety & Cleanliness factor, which again includes transfers, also indicates that safety, particularly at the bus stops, is a concern for those riders who are unhappy about the number of transfers they need to make to get to their final destinations.

The structure of the Familiarity with Bus System factor indicates is that those people who don't feel confident using the schedules are also somewhat unsure of their safety on the bus system. Interestingly, those people also are not satisfied with their ability to find seats on the buses. However, as the overall average score on this factor is high, this seems to be a small, isolated issue.

The resulting linear customer satisfaction model structure using these factors takes the form:

$$\text{Customer Satisfaction} = \alpha + \beta 1 * \text{factor1} + \beta 2 * \text{factor2} + \beta 3 * \text{factor3} + \beta 4 * \text{factor4} + \beta 5 * \text{factor5}$$

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table

18 below. The coefficients can be viewed as the relative importance of each factor to overall customer satisfaction.

Table 18
JTA Customer Satisfaction Model Coefficients

Item	β Coefficient (= importance)	Mean Performance Score
Routes & Headways	0.70	3.35
Comfort of Bus Ride	0.36	3.84
Span of Service	0.48	3.11
Safety & Cleanliness	0.23	3.73
Familiarity with Bus System	0.30	3.97
(Model Intercept	3.48	N/A)

The statistics relating to this model are:

R-square = .51 % of Overall satisfaction ratings predicted within 0.5 = 46%

% Correct classification = 77%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of JTA's operations:

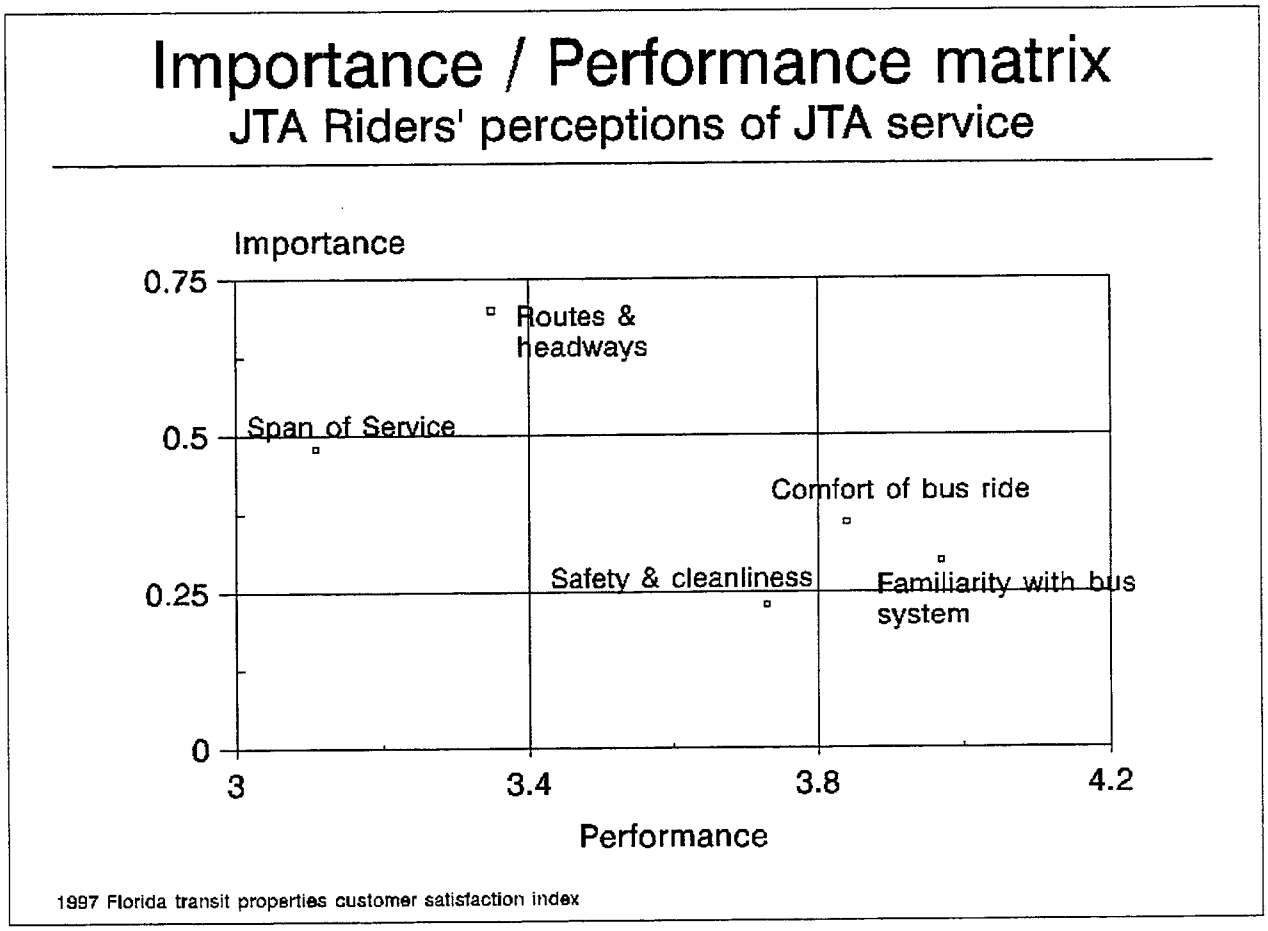


Figure 2 JTA Importance/Performance Matrix

The chart has been divided into nine regions, reflecting various combinations of low, medium, and high performance and low, medium, and high importance. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 19
Interpretations of JTA's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High	Possibly reduce focus on this area	Familiarity with Bus System
Low	Medium	Maintain performance - no action	
Low	Low	Maintain performance - no action	
Medium	High	Maintain performance - no action	Comfort of Bus Ride
Medium	Medium	Maintain performance - no action	Safety & Cleanliness
Medium	Low	Investigate for improvements	
High	High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	
High	Low	Critical improvement area	Routes & Headways, Span of Service

In JTA's case, the Familiarity with Bus System factor, which mainly covers obtaining and using printed schedules as well as some safety elements, falls into the "possibly reduce focus" area, while the Safety & Cleanliness and Comfort of Ride factors are both in the "maintain performance - no action" areas. The two potential action areas are Span of Service and Routes & Headways (high importance/low performance, although performance is borderline - critical improvement area).

The individual Routes & Headways variables that JTA scores particularly low on are:

Item	Mean	Index
Number of Transfers Required	3.02	90.25
Frequency of Service	3.08	93.21
Buses on Time	3.22	91.83
Time to make trips	3.24	93.97

The Span of Service variables with low scores are:

Item	Mean	Index
Latest Weekend Runs	2.65	91.60
Latest Weekday Runs	2.87	91.95
Earliest Weekend Runs	2.99	89.96

These areas all suggest that JTA customers feel that JTA service does not currently meet their needs and may suggest that it is time to conduct a major operational analysis of JTA routes and schedules, based on new O/D information and travel patterns. It is recommended that JTA investigate this possibility. Of course, these are the lowest scoring areas for all of the systems included in this satisfaction study, but the low index scores suggest that JTA's performance will need to be upgraded substantially in this area to achieve satisfaction levels seen in other Florida systems. Also, the rating of on-time performance is significantly lower than that for other systems, *at least in the customers' perception.* JTA should seek to remedy this situation, either through better communications with customers or operational improvements.

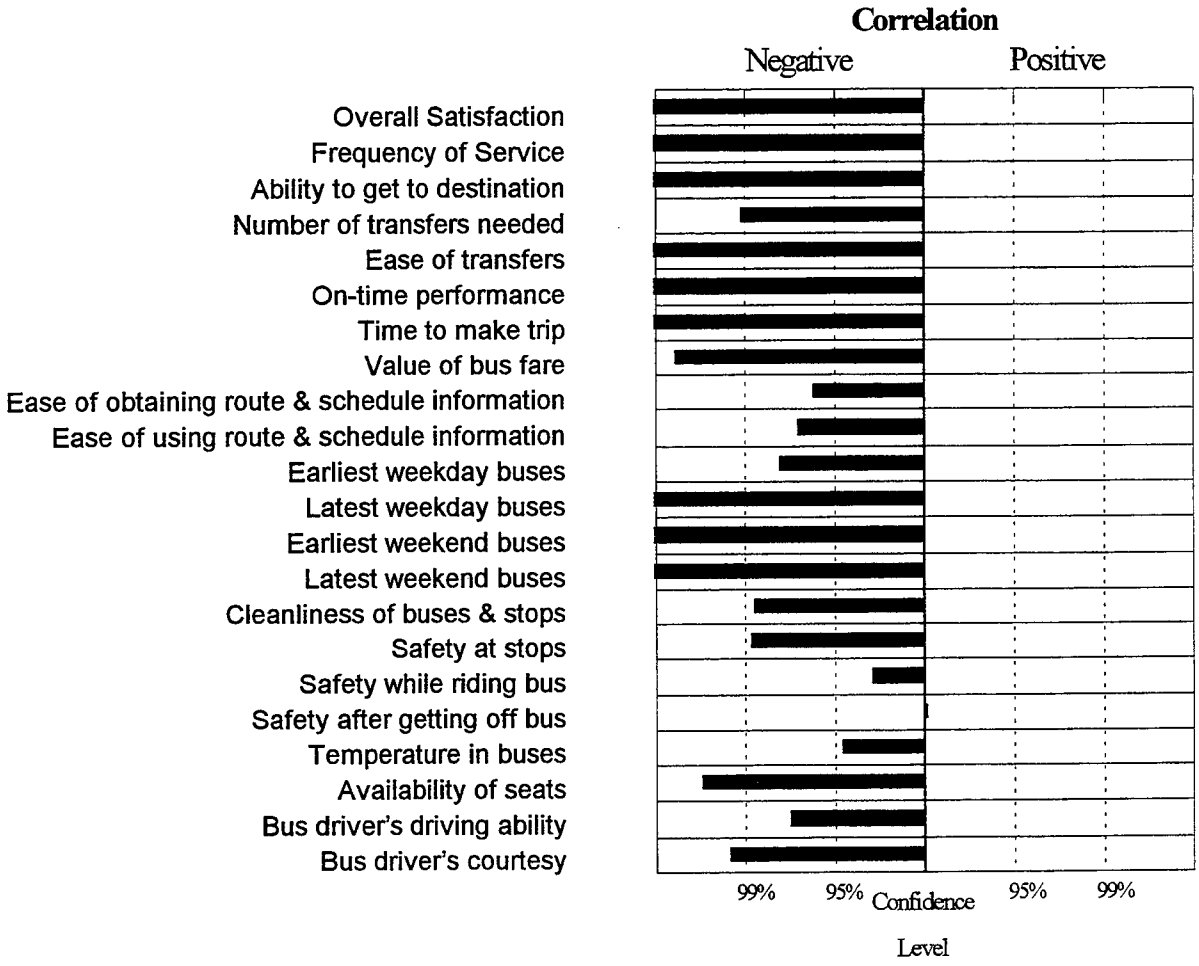
The analysis of demographics, which follows, also suggests that JTA should:

- consider implementation of strategies to reward frequent users of the transit system, and
- investigate routing and scheduling in areas with higher concentrations of older residents.

Correlation of Demographics and Satisfaction Items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics are being examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

Correlation of Frequency of Ridership and Satisfaction Items



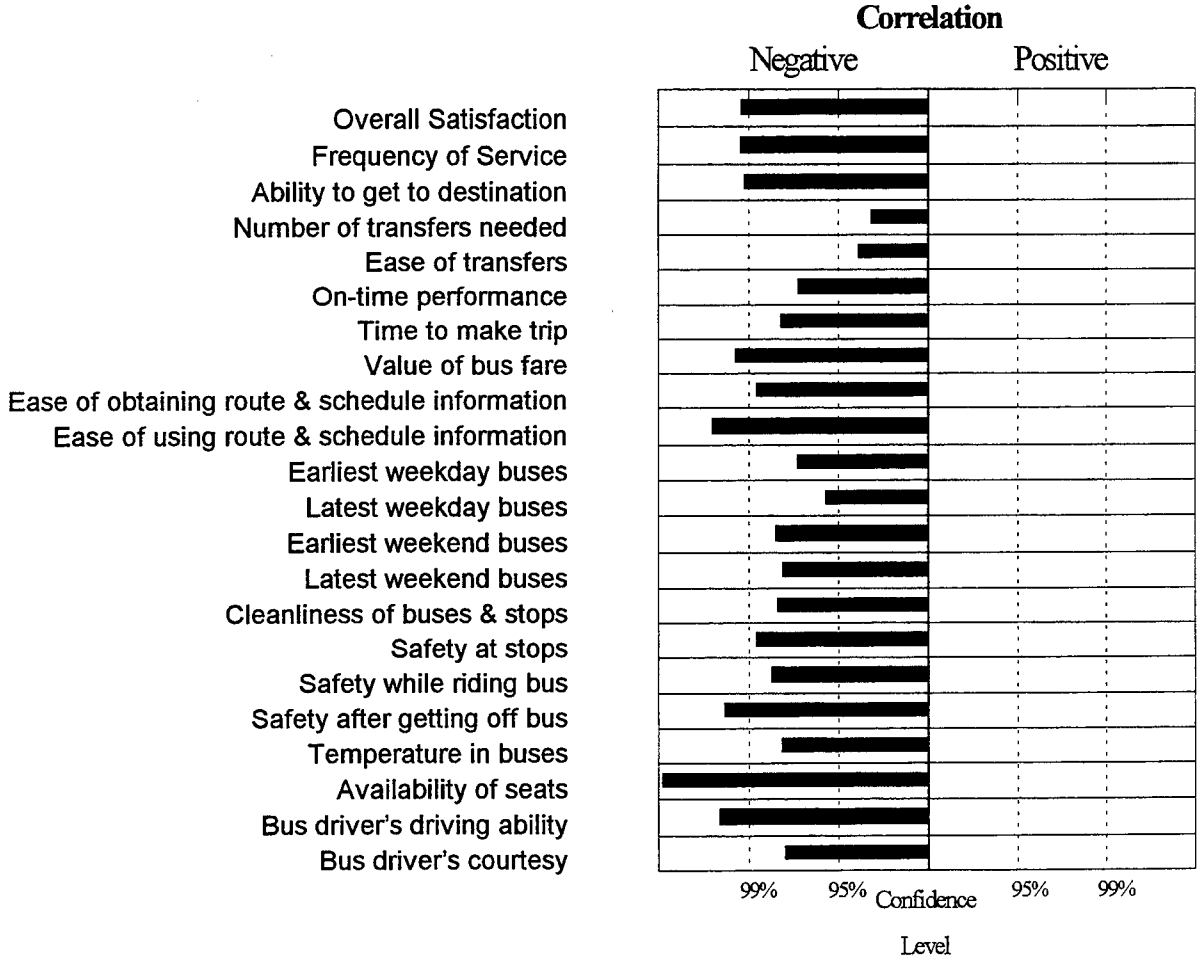
The satisfaction items are very strongly negatively correlated with frequency of use characteristics, more so than in any of the other systems surveyed. The strongest negative correlations exist between frequency of use and span of service, including latest weekday runs, and earliest and latest weekend day runs; frequency of service; ease of transfers; ability to get to desired destination, on-time performance, time to make trips, and overall satisfaction. Heavier users are clearly less satisfied with almost all aspects of the service.

People who use the bus 5 times per week or more make up 55% of the riders on the transit system, according to the estimates developed from these survey results. They represent an absolutely key constituency for the transit systems, and efforts to improve overall customer satisfaction should focus on this core group of customers.

Many industries have implemented approaches to reward the heaviest users of their products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance service or air travel).

With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25th time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. . This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Number of Times Boarding a Bus and Satisfaction Items



As with the frequency of use results, most satisfaction items are negatively correlated with the number of times respondents boarded a bus on the day they responded. Significance is reached for almost every item tested. Again, clearly, there is a very strong relationship between number of times boarding a bus each day and satisfaction. The number of times a respondent boards a bus is correlated with both the number of transfers the respondent has to make and the level of dependence the respondent has on the bus for transportation. This being the case, it is not surprising that those who board buses more often are less satisfied with routing, scheduling, and the time it takes to make trips. Solutions for these types of problems are similar to those involved in improving scores for the span of service factor, namely an operational analysis of routes and schedules.

It should also be noted that correlations between number of transfers required and the satisfaction items found strong negative correlations between number of transfers and ease of obtaining route & schedule information and safety at bus stops.

Correlation of Trip Origins & Destinations and Satisfaction Items

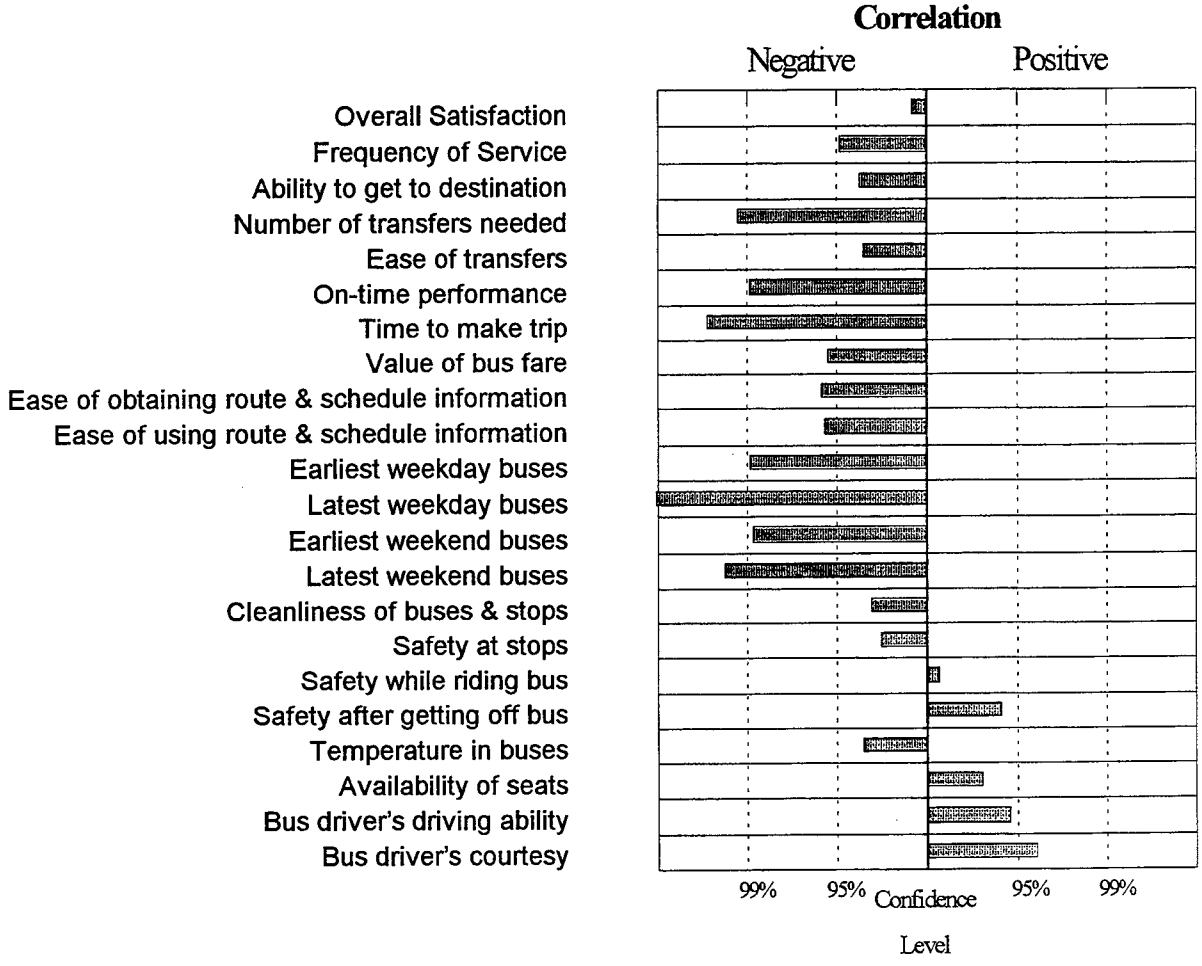
This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

The differences seem to reflect a product of mood regarding the nature of the trip origin or destination. For those who have shopping as an origin, satisfaction levels tend to be lower, particularly for satisfaction with number of transfers required, ease of transferring buses, and time to make trips. For those who have shopping as a *destination,* however, satisfaction levels are higher for a number of items, including frequency of service, on time performance, and time to make trips, but lower for others, particularly safety-related items and comfort of ride items (temperature, availability of seats, etc.).

For people who have visiting or recreation as an origin, satisfaction is significantly lower for frequency of service and time of day latest buses run on weekends. For those who have visiting/recreation as a destination, satisfaction levels are higher for earliest buses on weekdays and weekends, number of transfers required, time it takes to make trip, and safety after getting off bus.

Many of these findings appear to be products of mood, producing more positive opinions when the respondent is looking forward to the activity and less positive responses when the activity is over.

Correlation of Number of Adults Employed outside the Home and Satisfaction Items



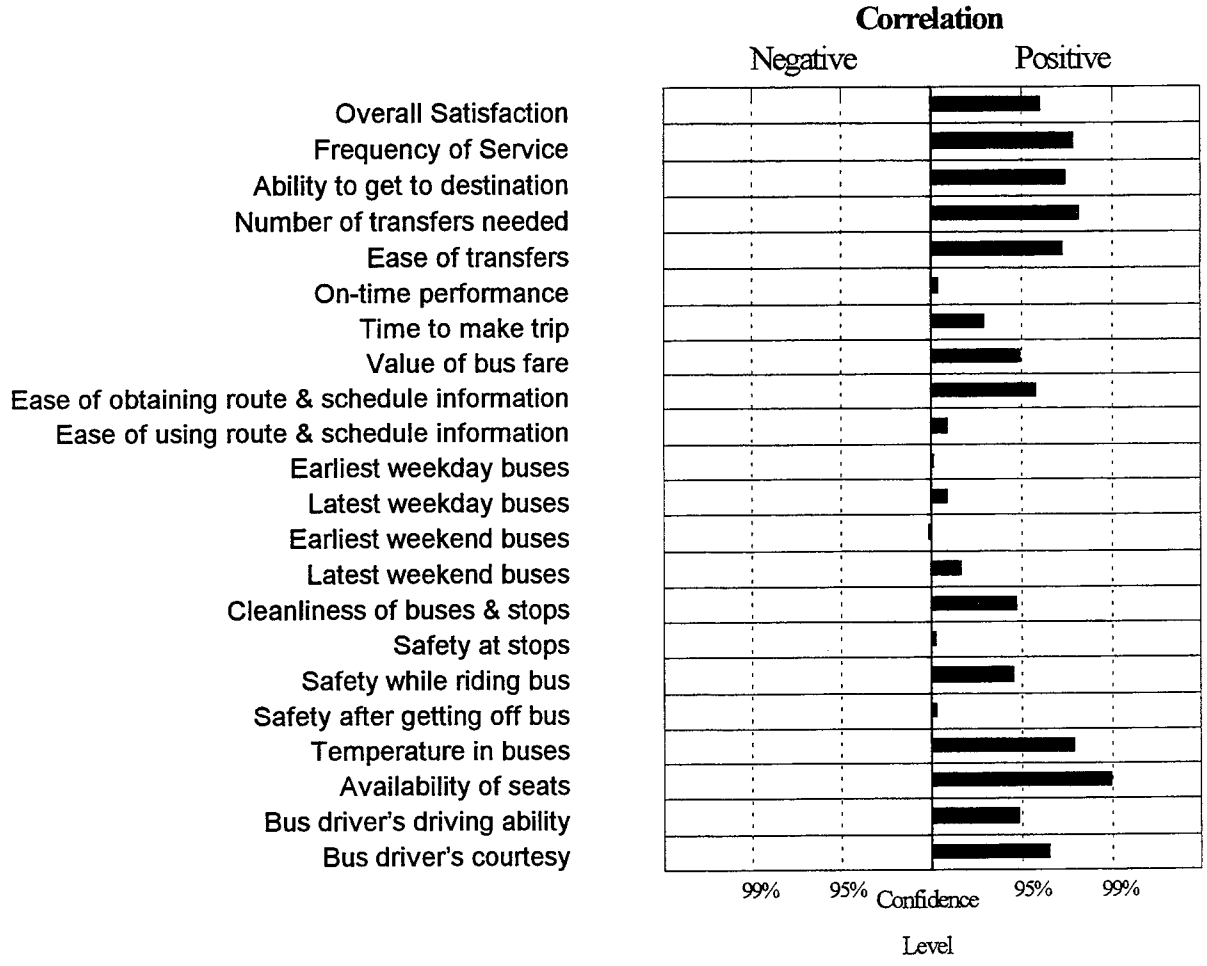
This demographic characteristic is also negatively correlated with almost all satisfaction items, indicating that those riders living in households with larger numbers of adults working outside the home tend to be substantially less satisfied with many aspects of transit service. The strongest negative correlations are found between number of adults working outside the home and satisfaction with on-time performance, number of transfers required, and time to make trips, and span of service issues.

The explanation for this is that the respondents in households with more adult workers tend to be the highest income respondents in the sample. As will be seen, higher incomes also relate negatively to satisfaction. These respondents are the people who have the highest levels of income yet still need to ride the bus. It is likely that they have at least one vehicle in the home, but cannot use it. The level of frustration felt by these people in being

dependent on fixed route services is probably the highest of all groups. Also, these people may live in areas that are less well served by transit.

There is little the transit agency can do to alleviate this situation. By its nature, fixed route service will tend to provide less satisfaction to this type of group and little about the nature of the service, other than significant service increases, can change that fact.

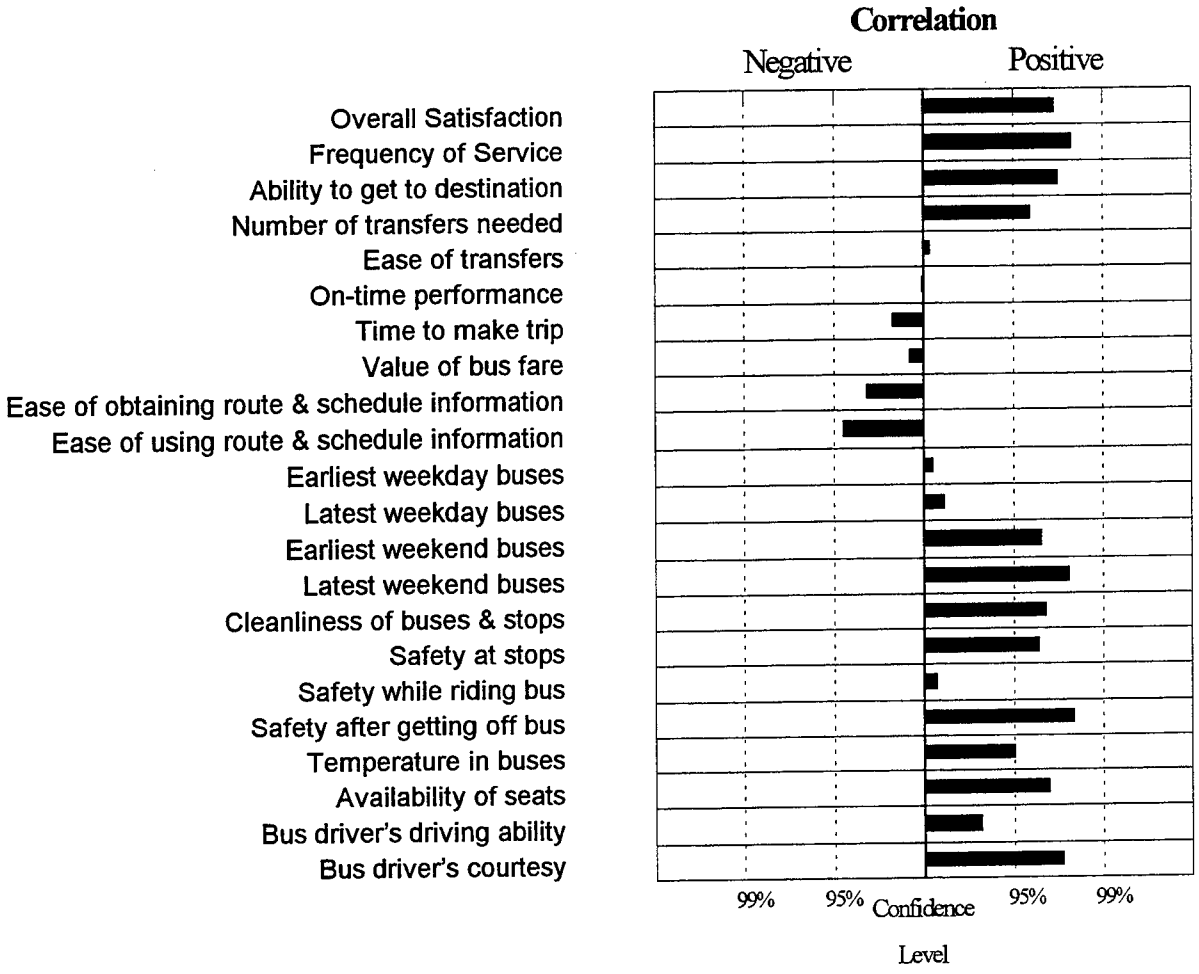
Correlation of Number of Children under 16 in the Home and Satisfaction Items



Most satisfaction items are positively correlated with presence of children in the home, particularly comfort of ride items (availability of seats, bus driver's ability to drive bus, etc.) and routes & headways items (frequency of service, ability to get to destination, etc.).

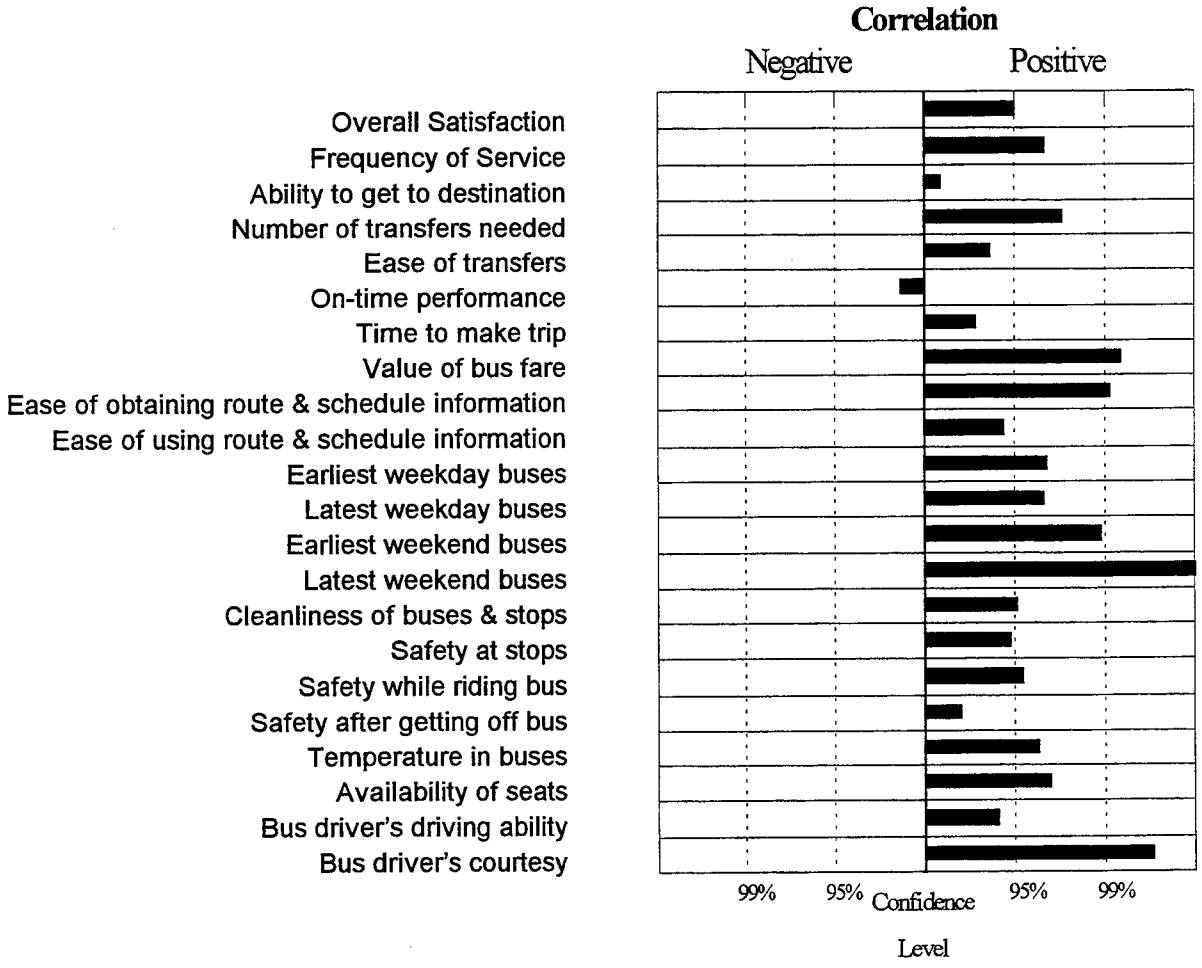
It appears that the geographic areas where these families live are well served by JTA. Conversely, riders whose households have few or no children under the age of 16 are significantly less satisfied in all of these areas.

Correlation of Number of Working Vehicles in the Home and Satisfaction Items



Correlations for this item are generally positive. Strong positive and significant correlations exist for satisfaction with frequency of service, number of transfers required, and weekend span of service. People with more vehicles are generally less dependent on transit service to meet their transportation needs, particularly on non-weekdays. Thus the positive correlation may be best understood as a much *lower* level of satisfaction among riders who have the *least* number of working vehicles in their households.

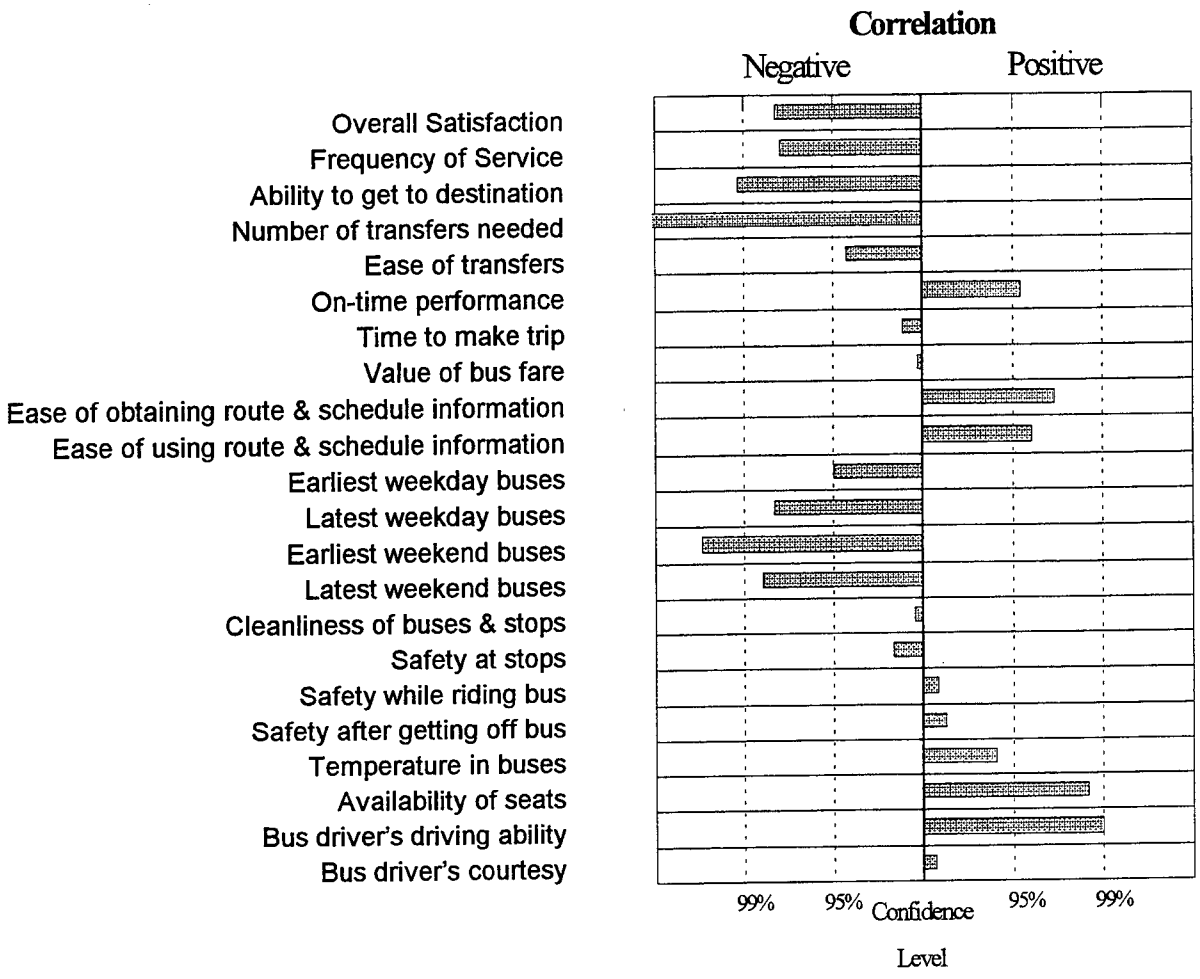
Correlation of Number of Working Telephones in the Home and Satisfaction Items



As with the number of children in the home and the number of vehicles, this demographic characteristic tends to be positively correlated with many satisfaction items: The more working telephones in the home, the more satisfied the rider.

What is surprising is that these patterns of correlations are not seen for riders who live in homes with more working adults, or for riders who live in homes with higher incomes. These positive correlations appear to be family-related, indicating that it is families with children that are the most satisfied JTA riders.

Correlation of Age and Satisfaction Items



Respondent age is highly related to the satisfaction items – in some cases positively, in others negatively. The individual items that are negatively correlated with age include a very strong negative correlation between increasing age and satisfaction with number of transfers required, and less strong but still significant negative correlations between age and satisfaction with frequency of service, ability to get to desired destinations, ease of transfers, and the time of day the earliest buses run on weekends. Most of these correlations are quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs. Older riders are probably also more sensitive to initial weekend run times since they are likely to be active earlier in the day and still require the transit system for transportation on those days.

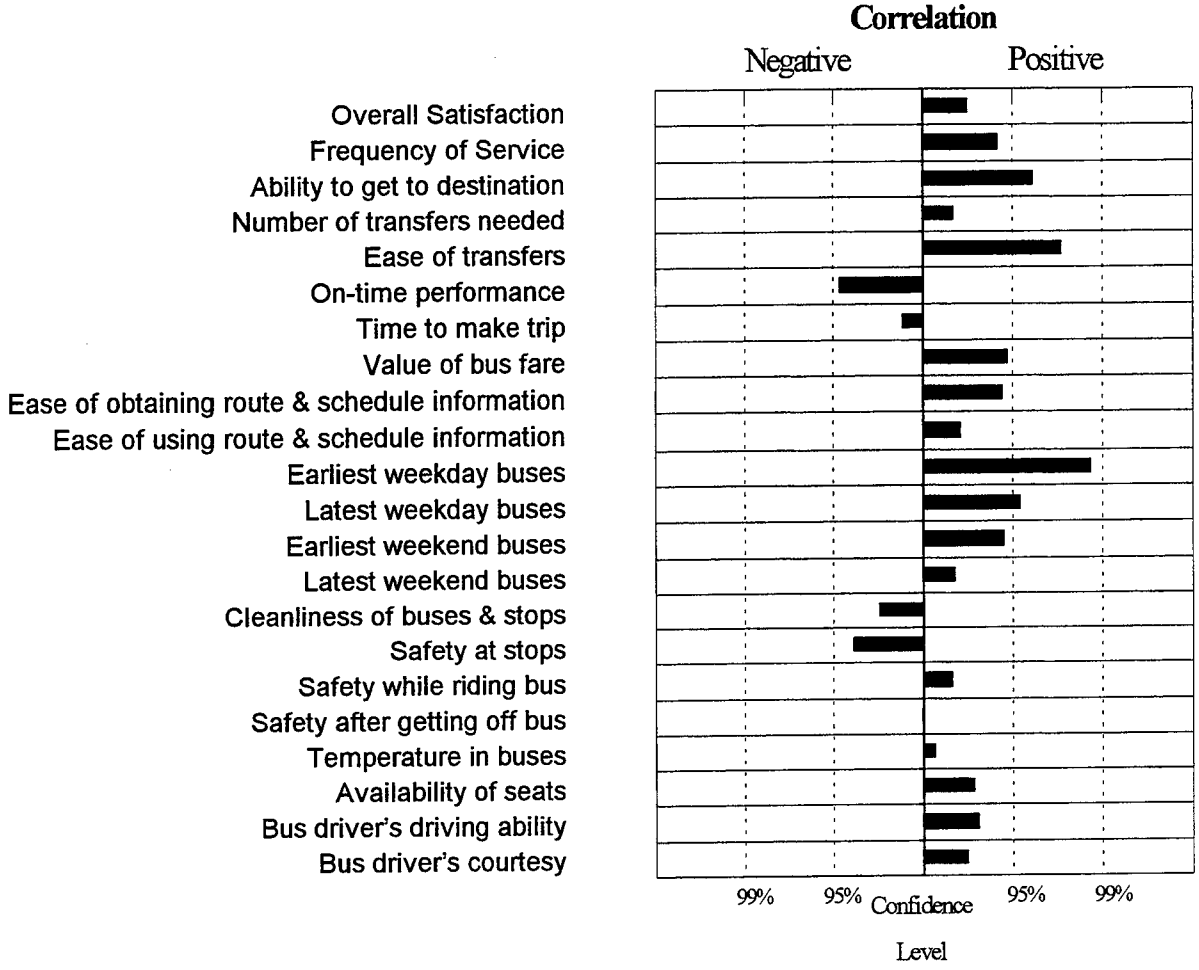
Several items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders.

The items that have significant positive correlations, in order of strength of correlation, are: bus driver's ability to drive bus, availability of seats on buses, and ease of obtaining and using route and schedule information.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves transportation, they should be viewed as a key customer segment.

The low levels of satisfaction with the routing & scheduling items indicate that JTA should examine geographic areas with concentrations of older residents, and determine if any service increases would be justified.

Correlation of Gender and Satisfaction Items



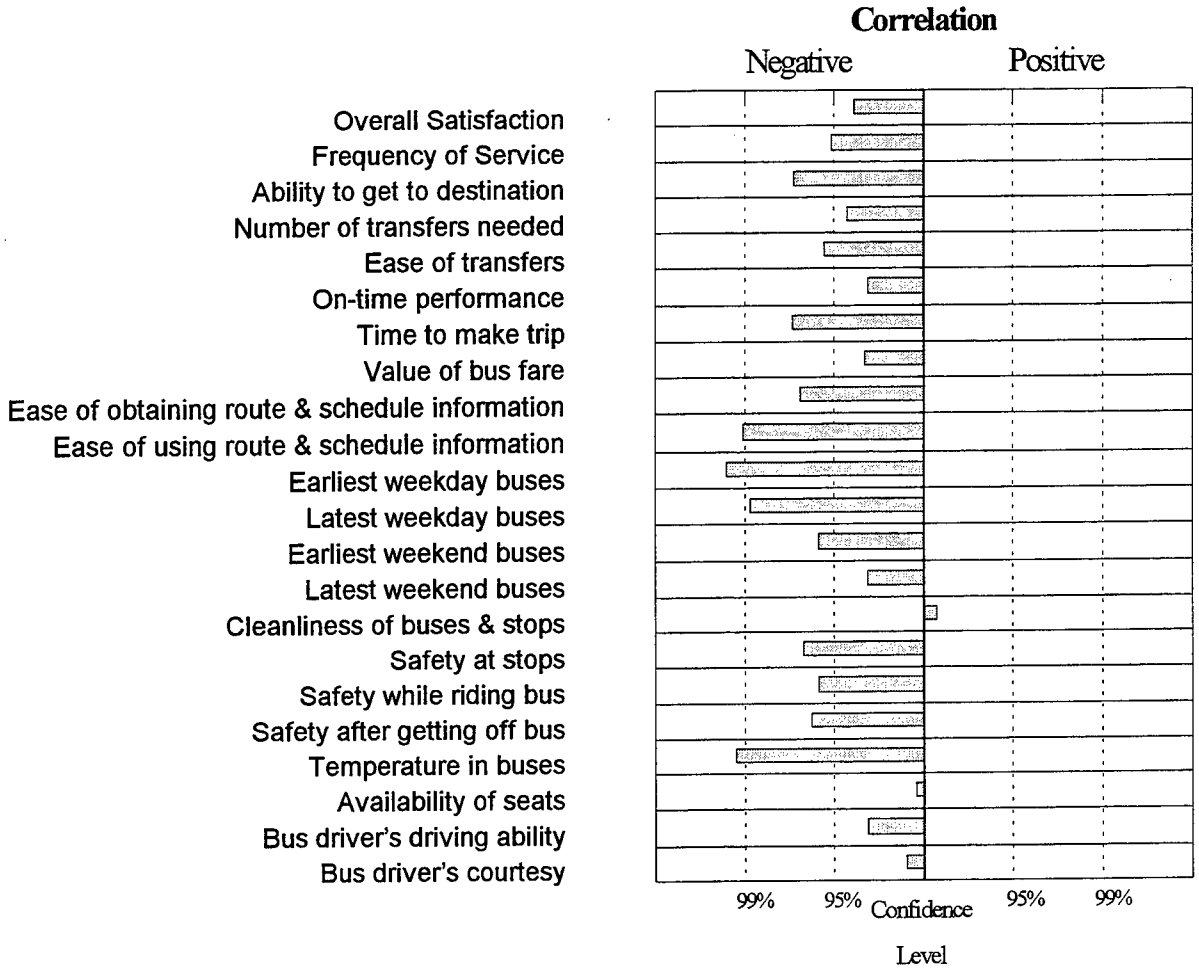
Most of the satisfaction items did not correlate significantly with gender. In a few areas, females were more satisfied: Ability to get to destination, ease of transferring, and span of service on weekdays. In all other areas differences in gender were not correlated with differences in satisfaction levels.

Correlation of Race and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

No major differences were found on the basis of race in this study. There were few respondents who did not report either white or black as their ethnic heritage.

Correlation of Income and Satisfaction Items



Most satisfaction items are negatively correlated with income. The items that have the strongest negative correlations with income include time it takes to make a trip by bus, ease of using route & schedule information, time of day latest buses run on weekdays, and ability to get where respondent wants to go.

As explained earlier in the section on number of adults working outside the home, these results are most likely demonstrating the frustration felt by higher income respondents who still need to use the bus.

Survey Instrument

The survey instrument is provided on the following pages. The survey was printed on 60# blue cardstock, on both sides of an 8 ½ · 11 sheet.

Dear JTA Customer: Please help us! Your opinions and information about your trip are very important in helping us improve our service for you. Please complete **both sides** of this survey and place it **in the box by the bus door** when you get off the bus. **Even if you are not finished** with the survey when you complete your trip, please drop it in the box when you get off the bus. Thanks for your help!

1. Have you filled out this survey earlier today? ❒ no **Continue** ❒ yes **STOP! Please place in return box**

2. In a **typical week**, *on how many* **days** do you ride the bus?

1❒ One day/ week or less 2❒ 2 days/ week 3❒ 3 days/ week 4❒ 4 days/ week 5❒ 5 days/ week 6❒ 6 days/ week 7❒ 7 days/ week

3. How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with JTA	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

Continue on other side

4a. Thinking only about **last week**, did you ride the bus on:

Monday?	Tuesday?	Wednesday?	Thursday?	Friday?	Saturday?	Sunday?
1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes
2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No

4b. How many times will you board a bus today, including any times you transfer? **(circle ONE answer)**

1 2 3 4 5 6 7 8 9 10 or more

5. What is the nearest major street intersection to where you:

boarded this bus? _____ & _____

will get off this bus? _____ & _____

6a. Where are you coming from on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

6b. Where are you going on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

7. Are you transferring buses on this trip? 1 ☐ Yes How many times? ___ 2 ☐ No

8. How many adults in your household are employed outside the home? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

9. How many children under the age of 16 do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

10. How many working motor vehicles does your household have? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

11. How many working telephones do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

12. What is your age? 1 ☐ Under 18 2 ☐ 18-24 3 ☐ 25-34 4 ☐ 35-44 5 ☐ 45-54 6 ☐ 55-64 7 ☐ 65 or over

13. What is your gender? 1 ☐ male 2 ☐ female

14. What is your ethnic heritage? 1 ☐ White 2 ☐ Black 3 ☐ Hispanic 4 ☐ Asian 5 ☐ Something else (specify: _____)

15. In what range was **your household's total income** for 1996?

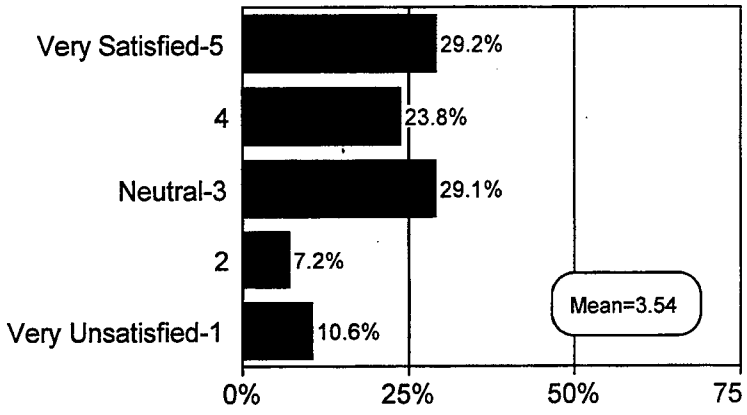
1 ☐ Under $5,000 2 ☐ $5,000 to $9,999 3 ☐ $10,000 to $14,999
4 ☐ $15,000 to $19,999 5 ☐ $20,000 to $24,999 6 ☐ $25,000 to $29,999
7 ☐ $30,000 to $39,999 8 ☐ $40,000 to $49,999 9 ☐ $50,000 or more

Thank you for your assistance!

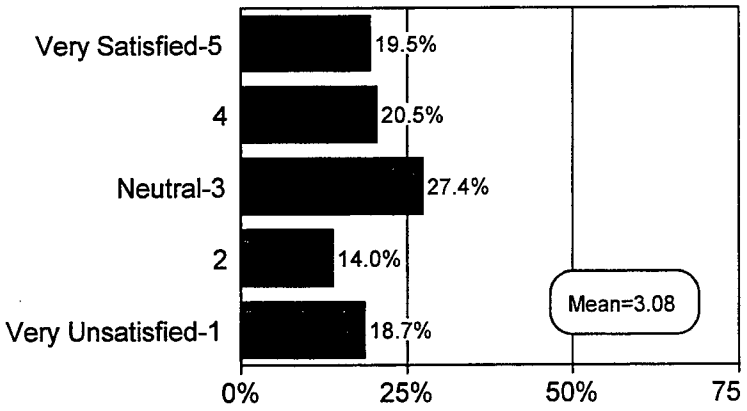
Results by Question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

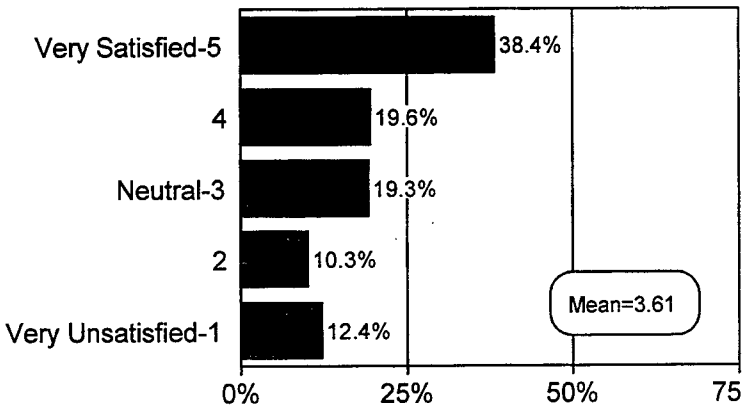
3a. Your overall satisfaction with JTA...



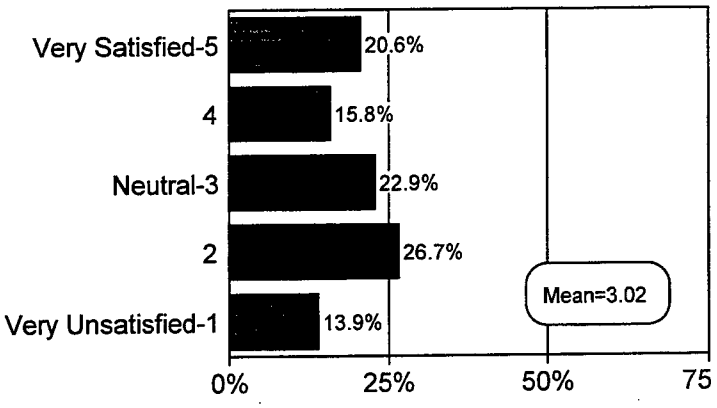
3b. Frequency of service (how often buses run)...



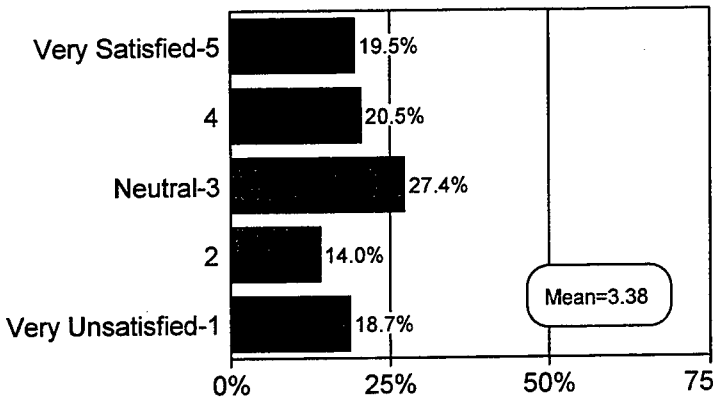
3c. Your ability to get where you want to go using the bus...



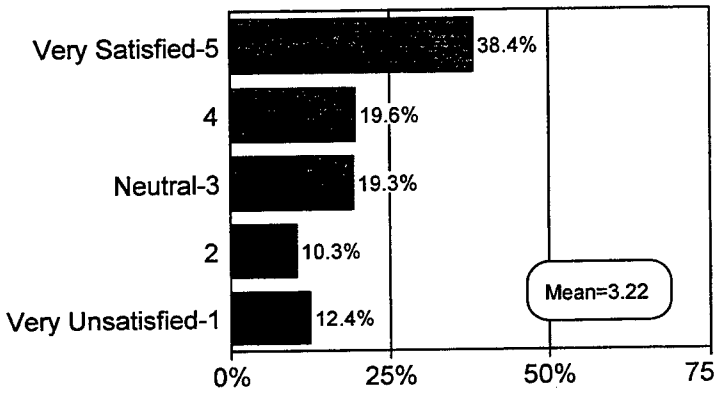
3d. The number of times you have to transfer buses...



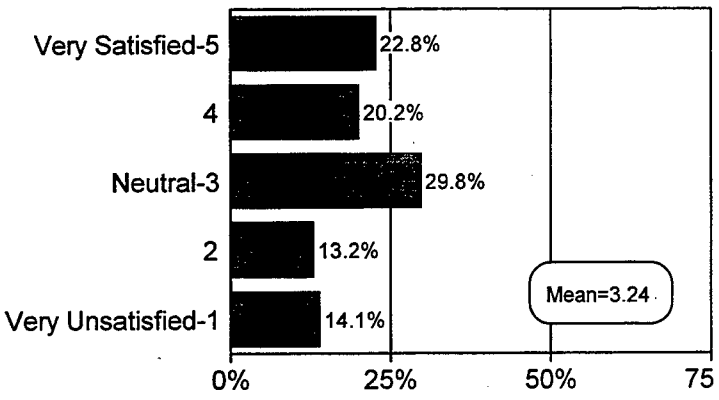
3e. How easy it is to transfer buses...



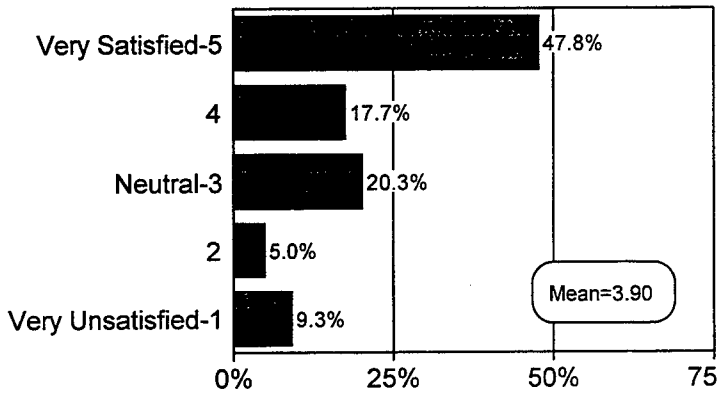
3f. How regularly buses arrive on time...



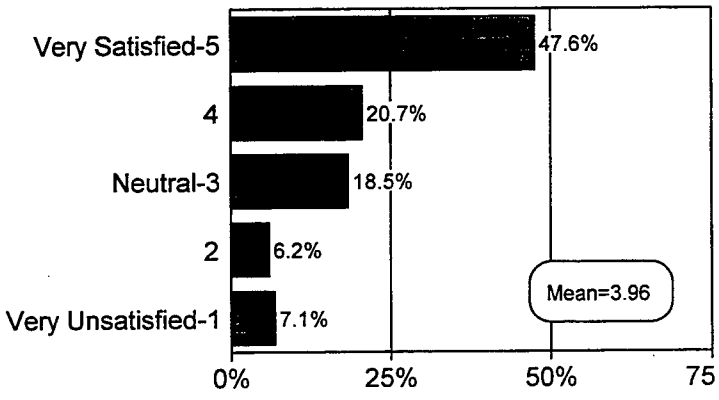
3g. The time it takes to make a trip by bus...



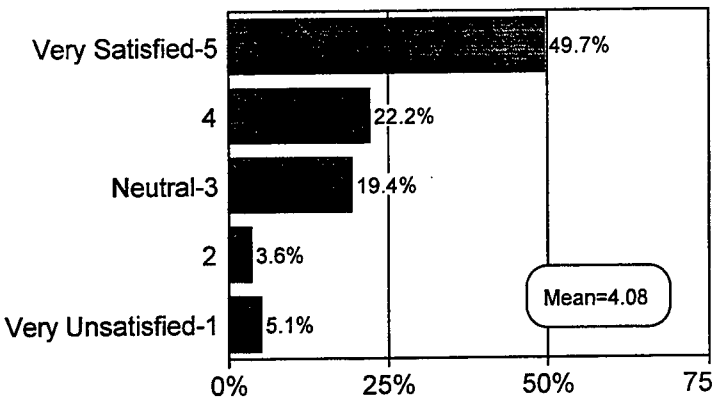
3h. Value of bus fare (service you get for what you pay)...



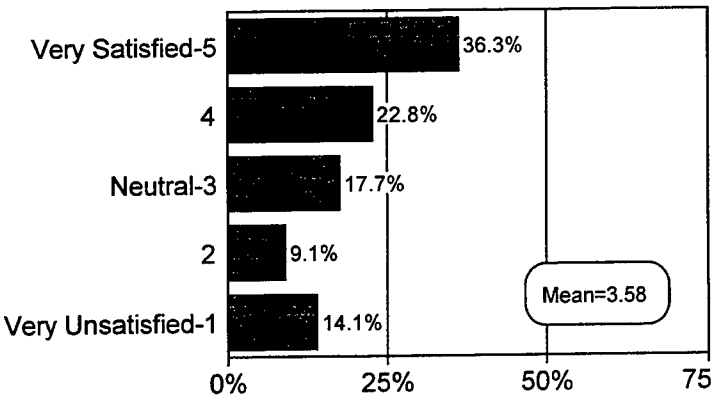
3i. How easy it is to obtain bus route & schedule information...



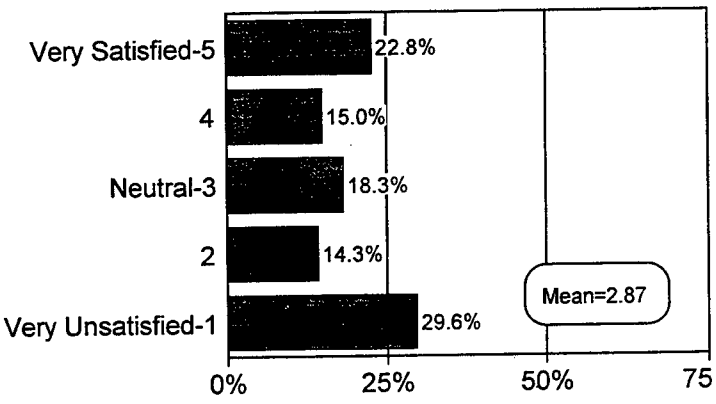
3j. How easy it is to use bus route & schedule information...



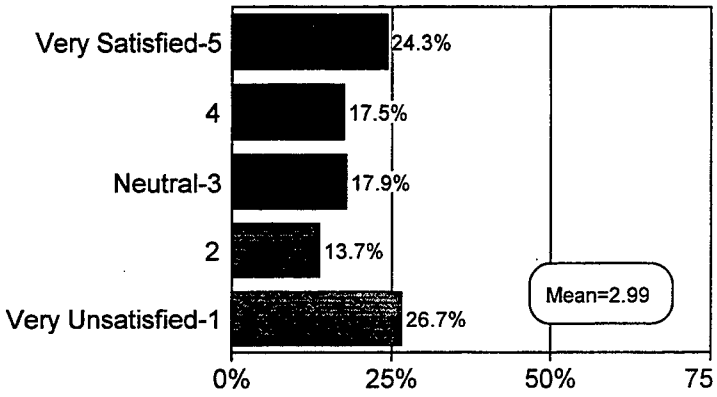
3k. The time of day the earliest buses run on weekdays...



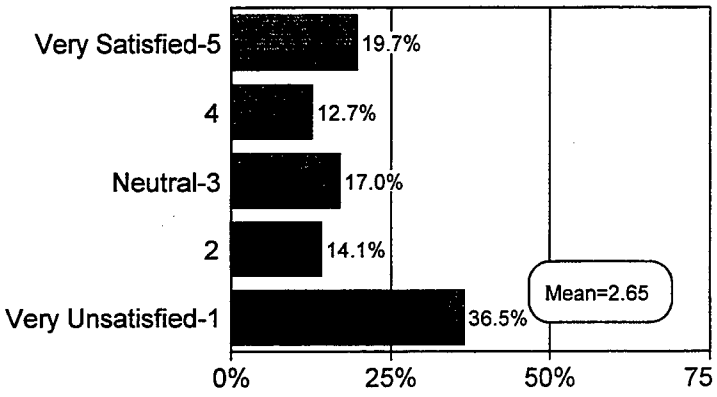
3l. The time of day the latest buses run on weekdays...



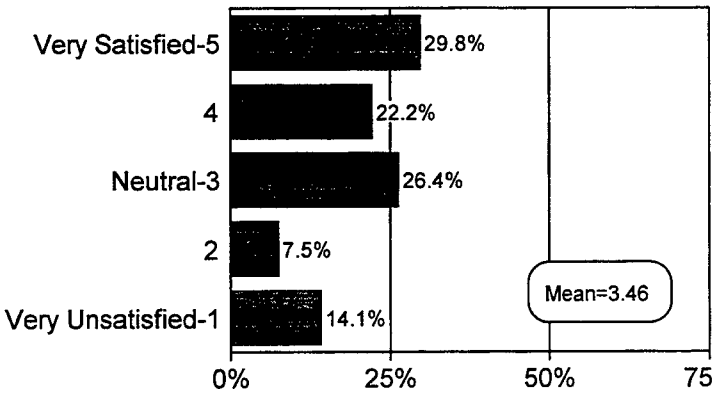
3m. The time of day the earliest buses run on weekend days...



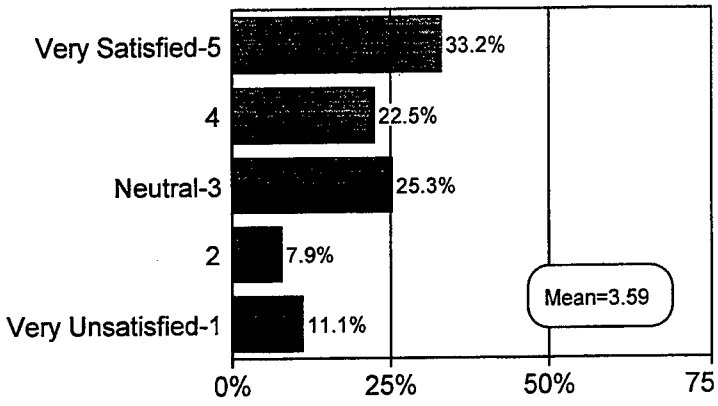
3n. The time of day the latest buses run on weekend days...



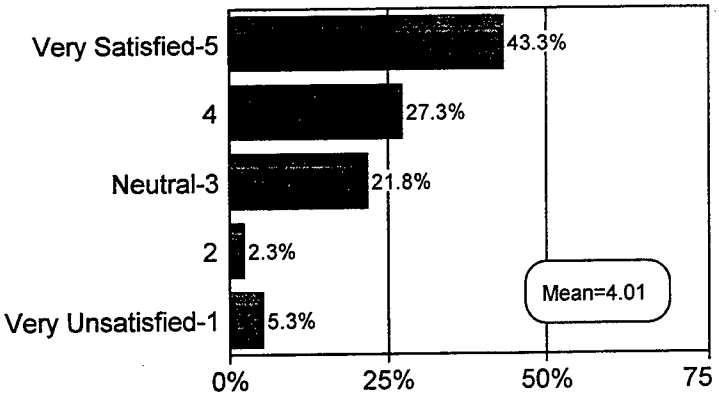
3o. How clean the buses and bus stops are...



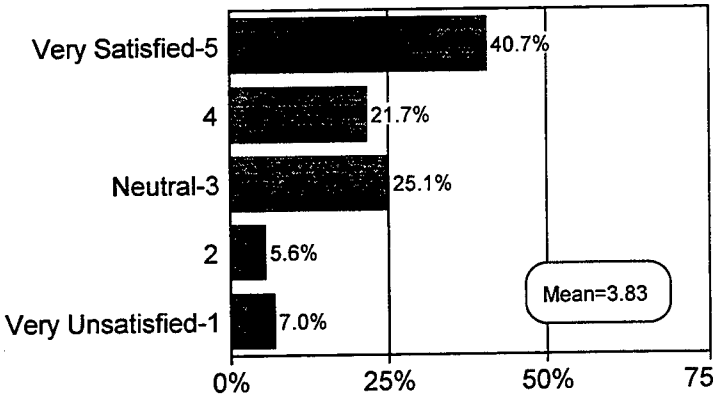
3p. Safety at the bus stop...



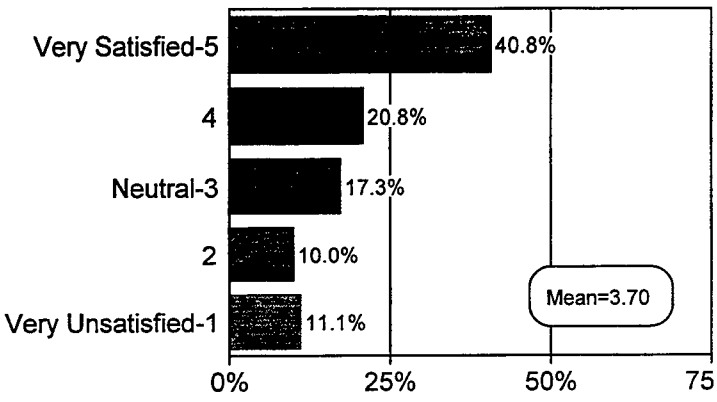
3q. Safety while riding the bus...



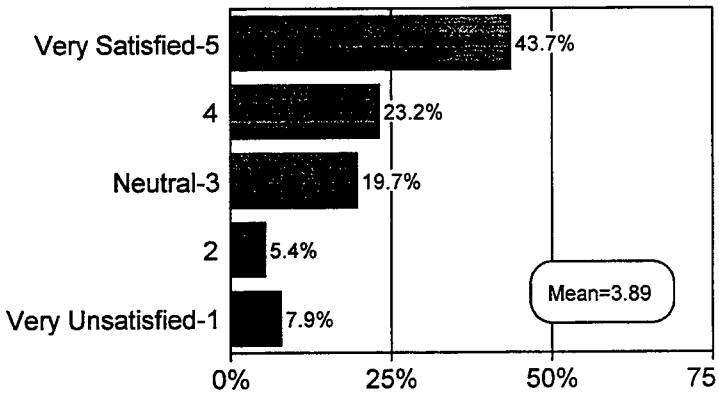
3r. Safety after getting off the bus...



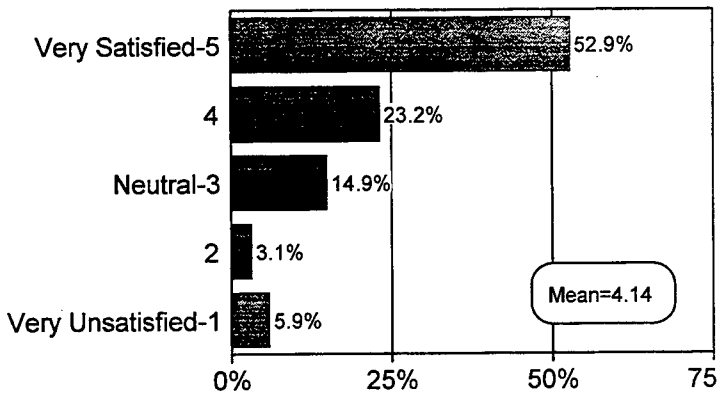
3s. Temperature inside the buses...



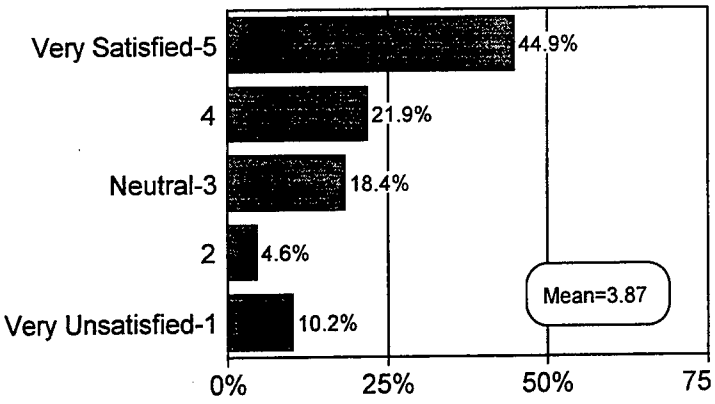
3t. Availability of seats on buses...



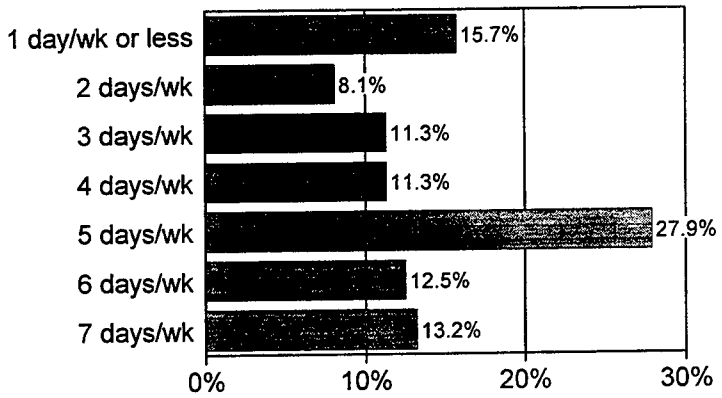
3u. The bus driver's ability to drive the bus...



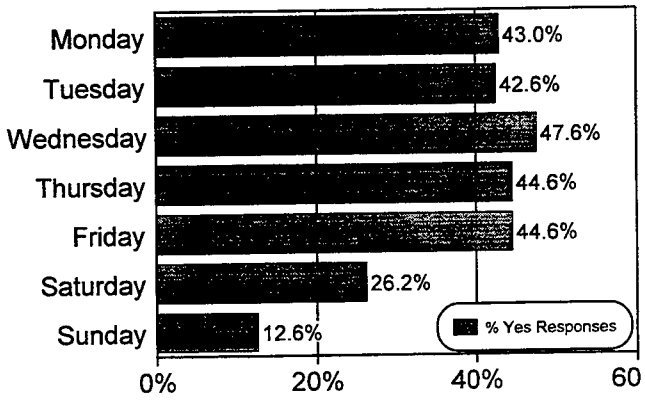
3v. The bus driver's courtesy...



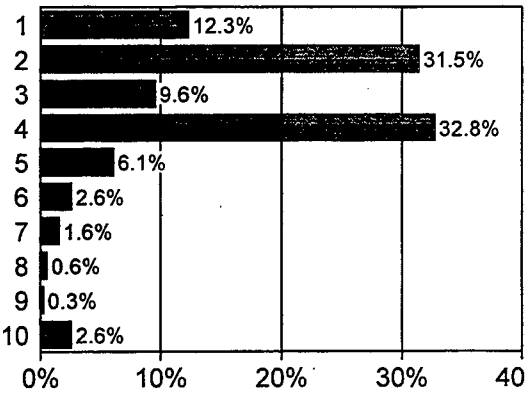
2. In a typical week, on how many days do you ride the bus?



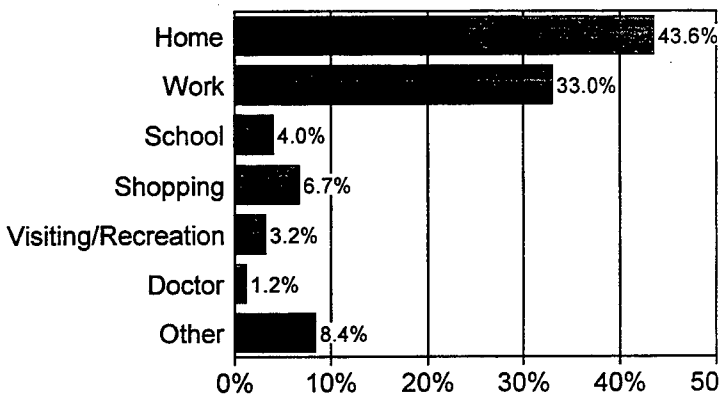
4a. Thinking only about last week, did you ride the bus on...



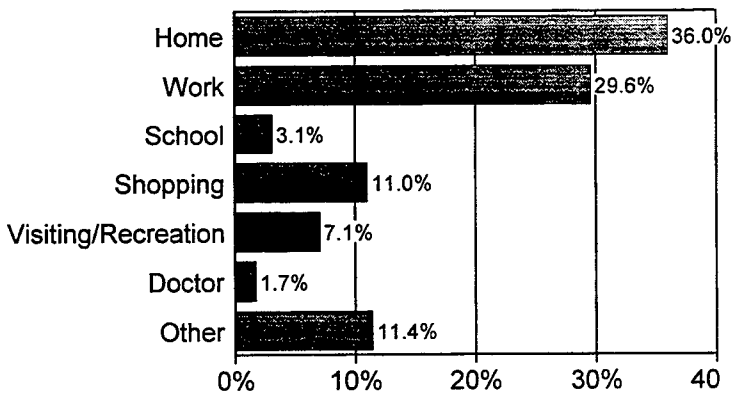
4b. How many times will you board a bus today, including transfers?



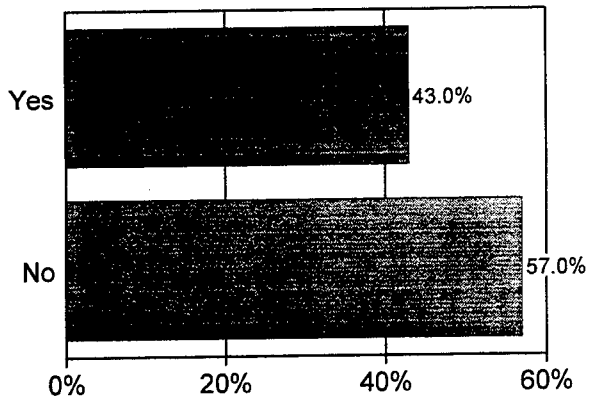
6a. Where are you coming from on this trip?



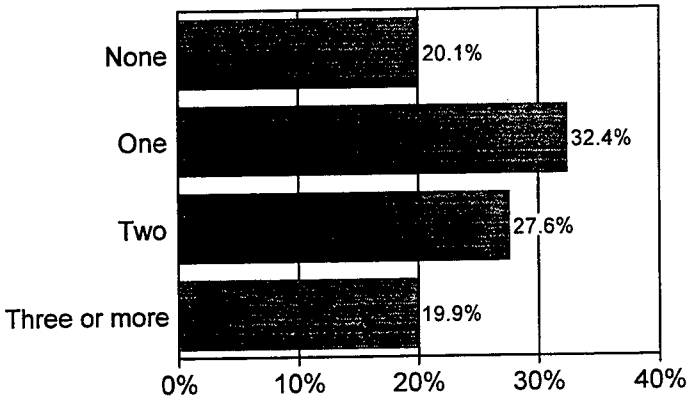
6b. Where are you going on this trip?



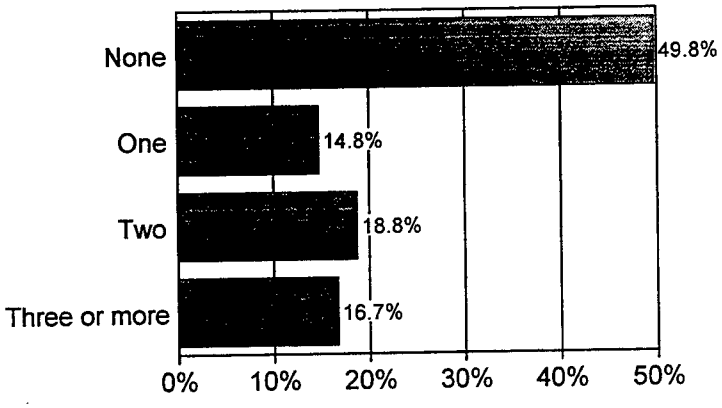
7. Are you transferring buses on this trip?



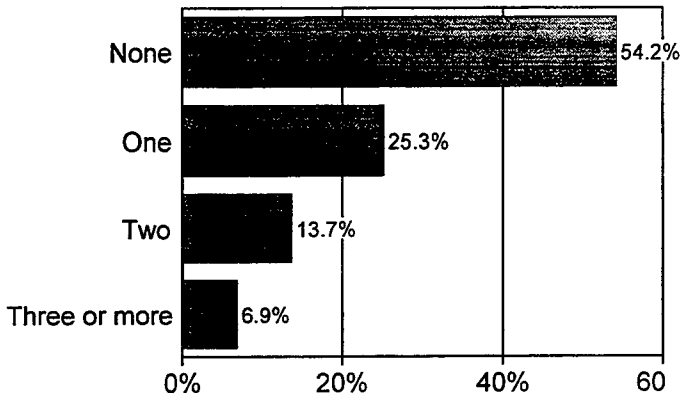
8. How many adults in your household are employed outside the home?



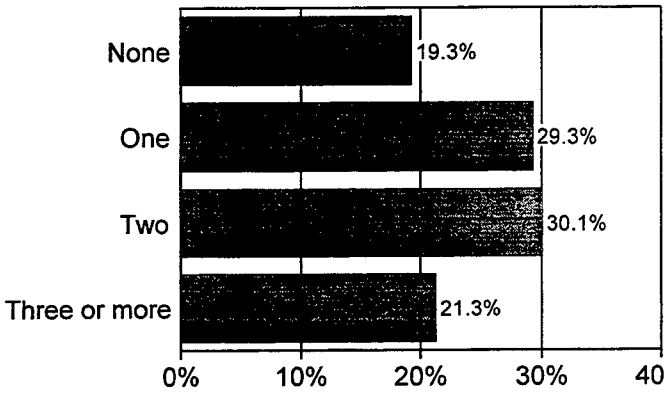
9. How many children under the age of 16 do you have in your household?



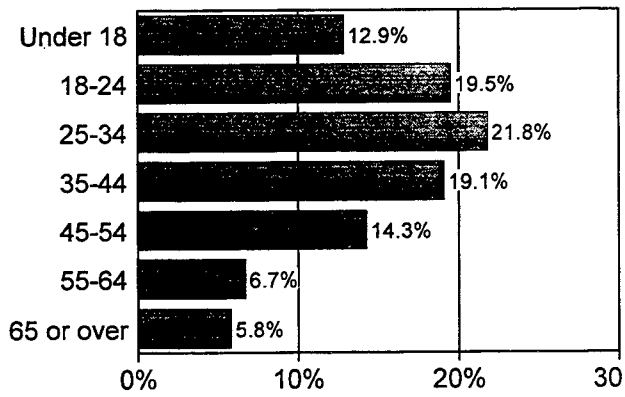
10. How many working motor vehicles does your household have?



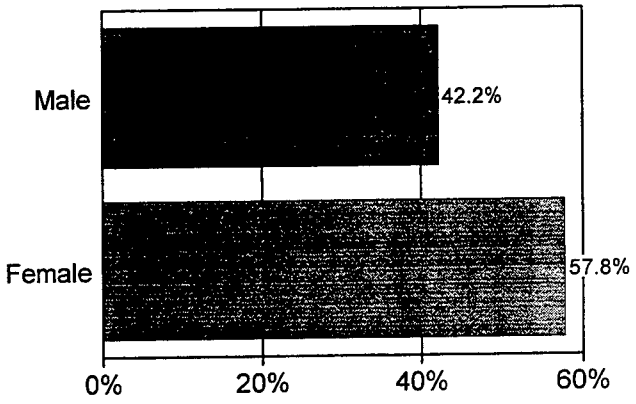
11. How many working telephones do you have in your household?



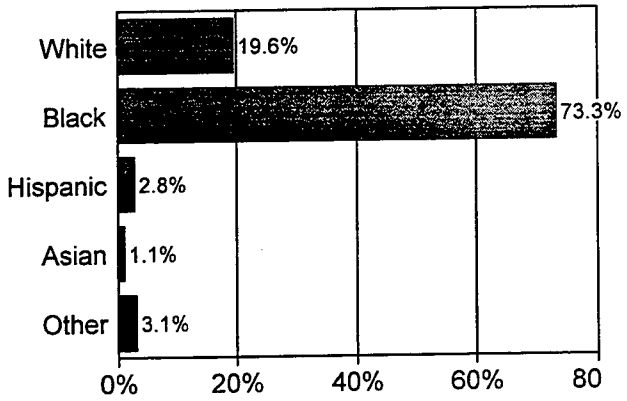
12. What is your age?



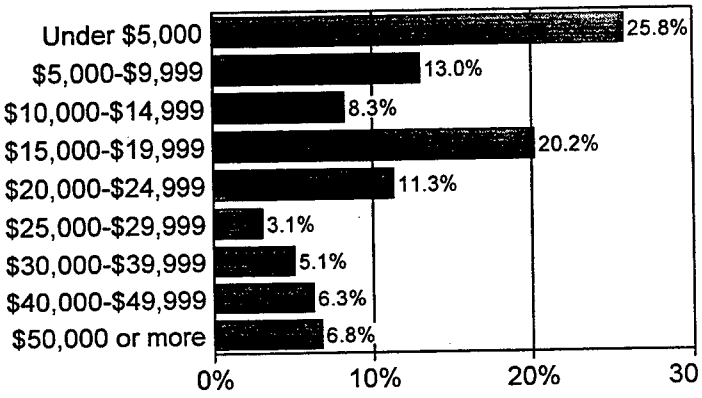
13. What is your gender?



14. What is your ethnic heritage?



15. In what range was your household's total income for 1996?



LEE COUNTY TRANSIT (LeeTran)

Sampling Methodology

Surveys were distributed to riders by LeeTran drivers on all routes. Surveys were distributed on Thursday, February 20, 1997 and on Saturday, February 22, 1997, during all hours of service.

Each survey contained an identification number in the upper right hand corner. The bus drivers were instructed to record the date, time, run number, and the beginning and ending numbers of the surveys that they handed out during their shifts. However, the logs kept by the drivers were generally incomplete. The survey form also asked respondents to identify the route that they were on, and the route numbers identified on the surveys were used to match survey responses with route numbers (for weighting purposes) rather than using the driver logs.

All 15 LeeTran routes had surveys returned by riders. A total of 1,308 surveys were returned, all of which were key-entered into an Excel database. A total of 1,024 surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question, and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

It should be noted that LeeTran's passenger demographics were markedly different from the demographics of other systems' riders. In particular, LeeTran serves more older riders and provides more trips for non-work (or school) purposes. These facts may have had a role in LeeTran's relatively higher satisfaction ratings.

The factor analysis of LeeTran data identified three factors. Some variables will be observed to be part of more than one factor; for instance, "Value of Bus Fare" appears on two separate factors, which indicates that customer perception of value is, not surprisingly, connected with many different elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 20 LeeTran Factor 1 - Scheduled Service		
Item	**Scores**	
	Index	**Mean**
Latest weekday runs	105.46	3.29
Latest weekend runs	113.50	3.28
Frequency of service	105.99	3.50
Time to make trip	106.19	3.67
Earliest weekend runs	113.58	3.77
Earliest weekday runs	107.02	4.03
Buses on time	108.71	3.81
Number of transfers needed	106.42	3.57
Overall Mean		**3.62**

Table 21 LeeTran Factor 2 - Safety and comfort		
Item	**Scores**	
	Index	**Mean**
Safety on buses	106.37	4.39
Safety after getting off bus	106.23	4.27
Safety at stops	111.46	4.28
Seats available	106.09	4.27
Bus driver's driving ability	105.95	4.57
Temperature in buses	106.80	4.21
Bus driver's courtesy	109.77	4.55
Cleanliness of stops & buses	114.78	4.21
Value of bus fare	110.03	4.36
Ease of transfers	107.20	4.06
Obtaining schedule/route information	107.48	4.41
Overall Mean		**4.32**

Table 22 LeeTran Factor 3 - Printed Schedules		
Item	Scores	
	Index	Mean
Using schedule/route information	103.92	4.28
Obtaining schedule/route information	107.48	4.41
Can get to destination	105.76	4.13
Value of bus fare	110.03	4.36
Ease of transfers	107.20	4.06
Earliest weekday runs	107.02	4.03
Overall Mean		**4.21**

The structure of the Safety & Comfort factor indicates that ease of transfers is an issue in having a pleasant bus riding experience, which presumably has to do with having a "worry-free" transfer. Ease of obtaining schedule and route information is related to this factor probably due to people having increased comfort levels when they know what they are supposed to do and how the system operates - i.e., if they have route and schedule information they know hot to get where they want to go, and know what time they have to leave, when they'll arrive, and so forth.

The resulting linear customer satisfaction model structure using these factors takes the form:

$$\text{Customer Satisfaction} = \alpha + \beta 1 * \text{factor1} + \beta 2 * \text{factor2} + \beta 3 * \text{factor3} + \beta 4 * \text{factor4} + \beta 5 * \text{factor5}$$

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table 23 below. The coefficients can be viewed as the relative importance of the factor to overall customer satisfaction.

Table 23 LeeTran Customer Satisfaction Model Coefficients		
Item	**β Coefficient (= importance)**	**Mean Performance Score**
Scheduled Service	0.38	3.62
Safety & Comfort	0.45	4.32
Printed Schedules	0.41	4.21
(Model Intercept	4.32	N/A)

The statistics relating to this model are:

R-square = .46 % of Overall satisfaction ratings predicted within 0.5 = 58%

% Correct classification = 72%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of LeeTran's operations.

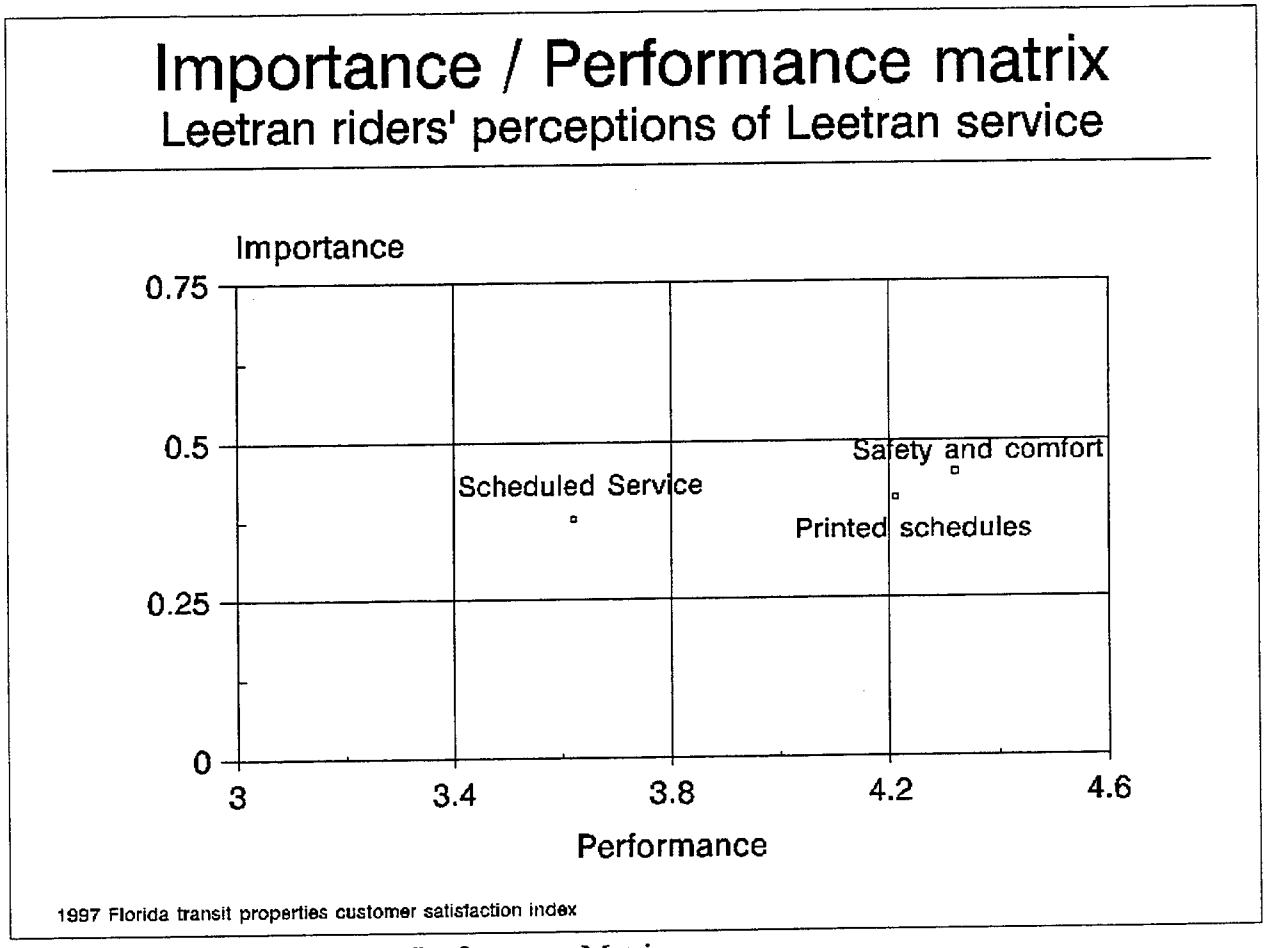


Figure 3 LeeTran Importance Performance Matrix

The chart has been divided into twelve regions, reflecting various combinations of low, medium, high, and extremely high performance and low, medium, and high importance. Only one of the other systems in the study achieved any average factor ratings over 4.2, which is already an excellent score. Two of the three LeeTran factors scored over 4.2 on average, which is an extremely impressive result. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 24
Interpretations of LeeTran's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High/Ex. High	Possibly reduce focus on this area	
Low	Medium	Maintain performance - no action	
Low	Low	Maintain performance - no action	
Medium	High/Ex. High	Maintain performance - no action	Safety & Comfort, Printed Schedules
Medium	Medium	Maintain performance - no action	
Medium	Low	Investigate for improvements	
High	High/Ex. High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	Scheduled Service
High	Low	Critical improvement area	

Two of the three LeeTran factors are in the "maintain performance/no action" area. The only area potentially requiring action is in the Scheduled Service factor. The individual Scheduled Service variables that LeeTran scores relatively low on are:

Item	Mean	Index
Latest weekend runs	3.28	105.46
Latest weekend runs	3.29	113.50

The index scores for these variables are still very high, indicating that LeeTran's customers are at least

somewhat more satisfied with the schedules provided to them than are other system's customers. However, LeeTran may want to investigate an additional run or two on the most heavily used routes.

Other than in that area, LeeTran's customers are very satisfied and LeeTran's performance is exemplary.

The analysis of demographics, which follows, also suggests that LeeTran should:

- consider implementation of strategies to reward frequent users of the transit system, and
- examine the possibility of providing additional information or marketing on fare structures (particularly monthly passes and multi-trip tickets) to their riders.

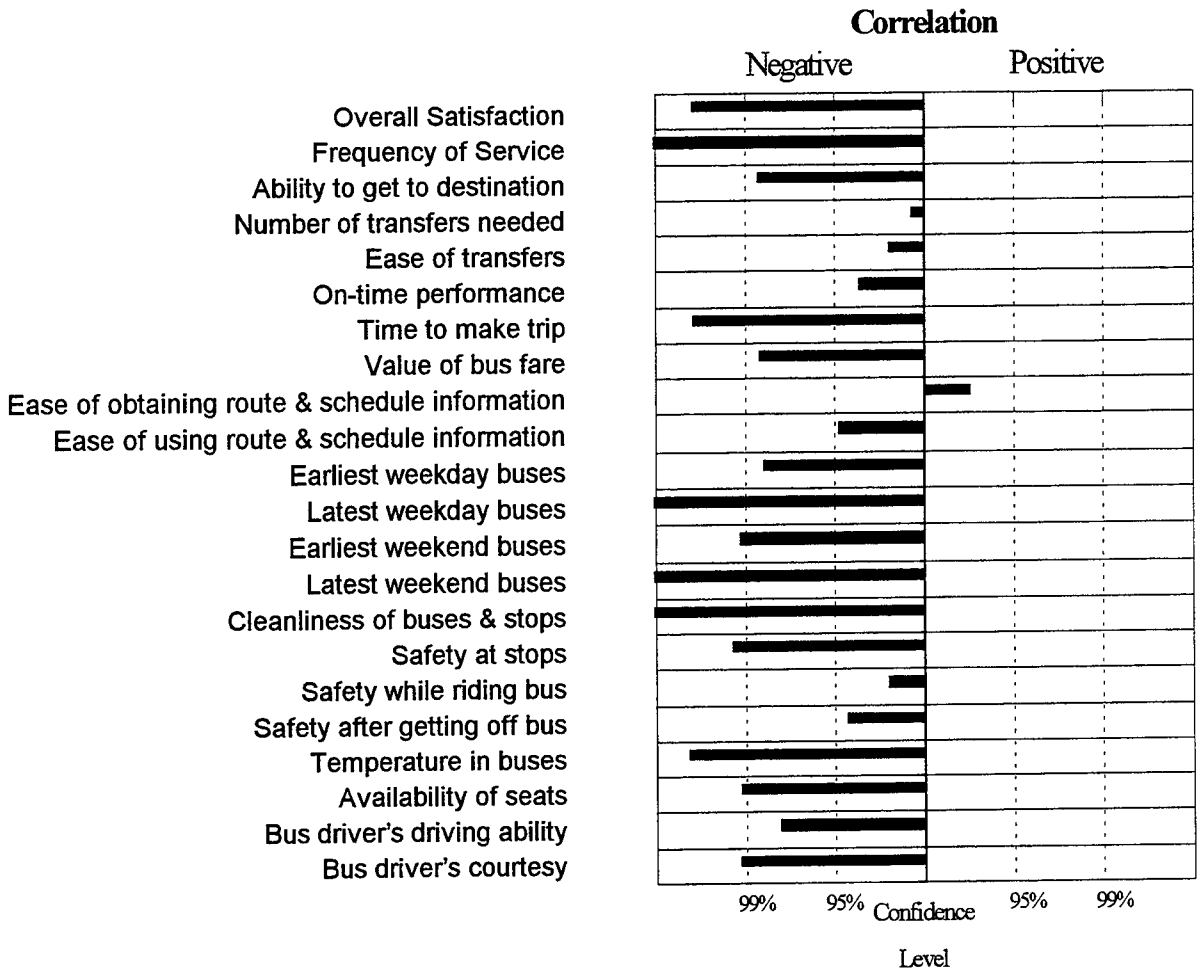
Correlation of Demographics and Satisfaction Items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics are being examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

It should also be kept in mind that the satisfaction levels for LeeTran customers were at an extremely high level. A strong negative correlation with a particular data item need not necessarily indicate that a certain group is highly dissatisfied with that item. In many cases, those groups will be at about the same level of satisfaction as the *most* satisfied groups in other systems.

Finally, as noted earlier, the demographic makeup of LeeTran's riders is completely different than for other systems in this analysis, as are their reasons for using transit. This causes a very different set of relationships between demographic items and satisfaction items than is typical for many of the other transit systems.

Correlation of Frequency of Ridership and Satisfaction Items



The satisfaction items tend to be negatively correlated with frequency of use characteristics. The strongest negative correlations exist between frequency of use and overall satisfaction, frequency of service, time it takes to make a trip, time of day latest buses run (both weekdays and weekends), earliest buses on weekends, cleanliness of buses and stops, safety at the bus stop, temperature inside buses, availability of seats and the bus driver's courtesy.

Since the heaviest users are those who are also most dependent on transit service, it is perhaps not surprising that the lower levels of satisfaction exist. People who use the bus 5 times per week or more make up 23% of the riders on the transit system, according to the estimates developed from these survey results. This indicates that there are more

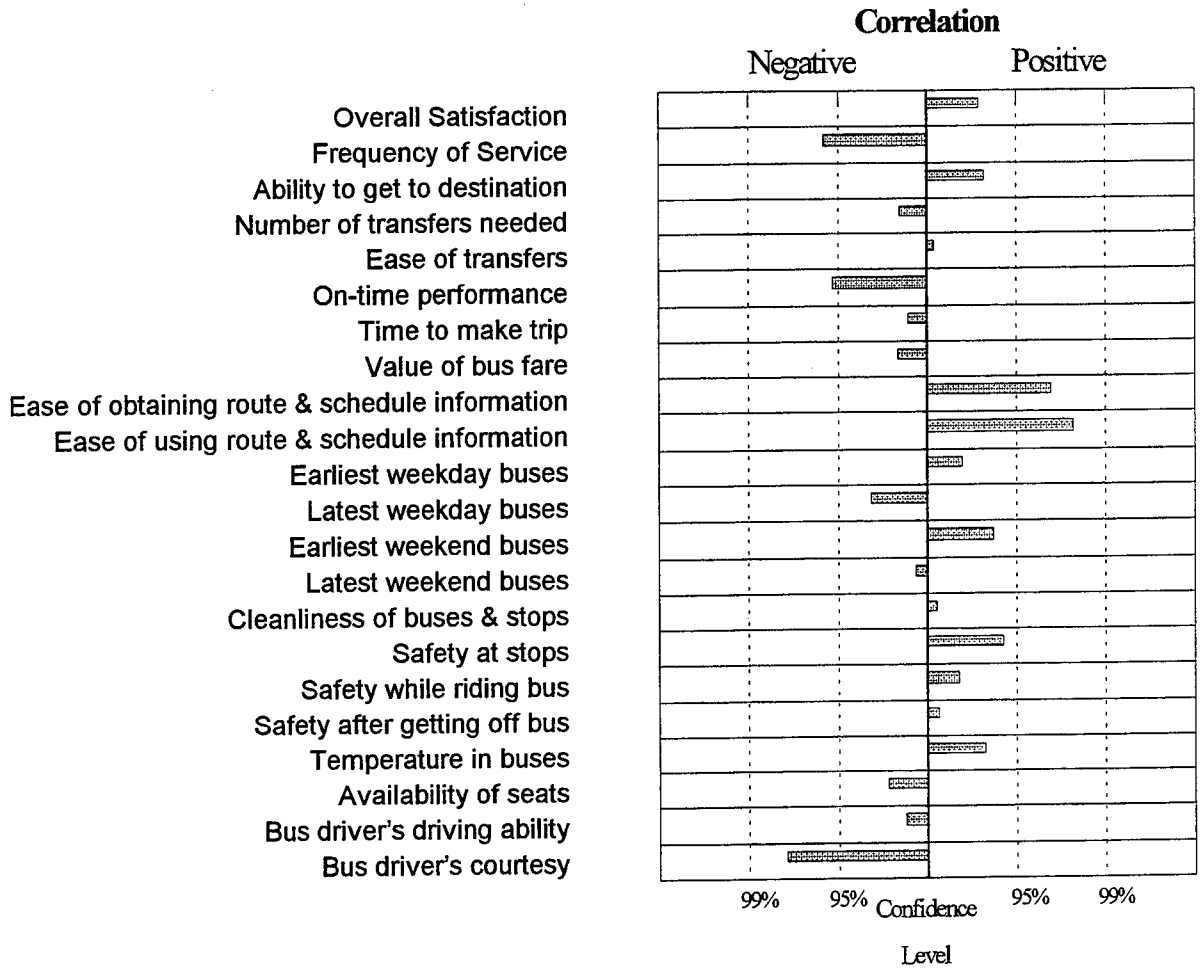
occasional riders in the LeeTran system than in any of the other systems surveyed. Most of the other systems had 50% or more of their riders riding 5 days per week or more.

This indicates that LeeTran may have attracted less of the regular working population than they might be able to serve. The approaches described below may help to strengthen the level of use among those who do try LeeTran, and may eventually help to attract and retain new riders.

Many industries have implemented approaches to reward the heaviest users of their products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance service or air travel).

With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services. In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25^{th} time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Length of time using LeeTran and Satisfaction Items



Those riders who have been using LeeTran the longest are significantly more satisfied with obtaining and using schedule and route information, most likely because they have become accustomed to the format in which the information is presented and have seen the improvements made in schedule and route information.

However, longer-term riders are significantly less satisfied with frequency of service, on-time performance, and bus driver courtesy. These riders are more likely to have had an unpleasant experience regarding a late bus, and so their satisfaction levels may have dropped for frequency and on-time performance ratings.

Appreciation for regular users, as described in the previous section, may help to remedy this situation.

Correlation of Trip Origins & Destinations and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Those who have work as a trip origin are significantly less satisfied with on-time performance, time to make trips, and weekday span of service. Those who have work as a destination are less satisfied overall, and have lower levels of satisfaction with frequency of service, latest weekday runs, and latest weekend runs.

Span of service appears to be a major issue with those who use transit to go to or from work. This issue should be examined as mentioned earlier in the section describing the customer satisfaction model importance/performance matrix.

Those who have shopping as a destination are less satisfied with number of transfers required and ease of transfers. Those who have shopping as an origin are less satisfied with on-time performance, and cleanliness and safety issues. However they are more satisfied than other riders for overall satisfaction, ability to get to destination, and obtaining and using route & schedule information.

Those who had visiting/recreation as either origins or destinations are generally more satisfied in a number of different areas, particularly with frequency of service and span of service. This probably reflects both the *dis*satisfaction among other types of users and the success of the numerous (and heavily used) beach trolley services that LeeTran provides.

Correlation of Location of bus stop and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Riders who walk two blocks or less to get to the bus stop are less satisfied with ease of transfers, cleanliness of stops and buses, and safety at the bus stops, indicating a large number of them were transferring buses. Those who walk three blocks are *more* satisfied with span of service issues, whereas those who walk 4 or more blocks are less satisfied

with ease of transfers, on-time performance, time to make trips by bus, latest weekday runs and the bus driver's driving ability.

Riders who have been dropped off at the bus stop are more satisfied with ease of transfers and on-time performance of buses, but less satisfied with using schedule & route information and temperature inside the buses. Again, these probably reflect attitudes of riders who were making same-stop transfers.

Riders who drive and park are more satisfied with frequency of service and value of bus fare than average riders.

Riders who have to walk 2 blocks to get to their final destination are more satisfied with earliest weekend service and with temperature in buses than average riders. Those walking three blocks have lower levels of overall satisfaction, whereas those who walk four blocks or more are less satisfied with frequency of service and ability to get to destination. Those who are will get dropped off at their destination are less satisfied with earliest weekend service. Finally, those who will drive to their final destination are more satisfied in a number of areas.

Clearly those who have better access to the bus stops going to and from their destinations tend to be more satisfied.

Correlation of how Fare is paid and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Those customers that use a pass or multi-fare ticket tended to be more satisfied in a number of areas than average riders, particularly with number of transfers required, ease of transferring, and on-time performance. This is probably due to the lower fare paid per trip by these customers and the convenience afforded them by these payment options.

The survey does not provide results on passenger awareness and understanding of fare structures. LeeTran may have an opportunity to market these options more forcefully to their riders and create higher levels of satisfaction for them.

Correlation of Reasons for Riding bus and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Those who ride the bus through choice (saying the bus is more economical and/or convenient) tend to be more satisfied in a number of different areas than those who ride the bus for other reasons. Those who ride because a car is not available are less satisfied with frequency of service, which is not at all surprising.

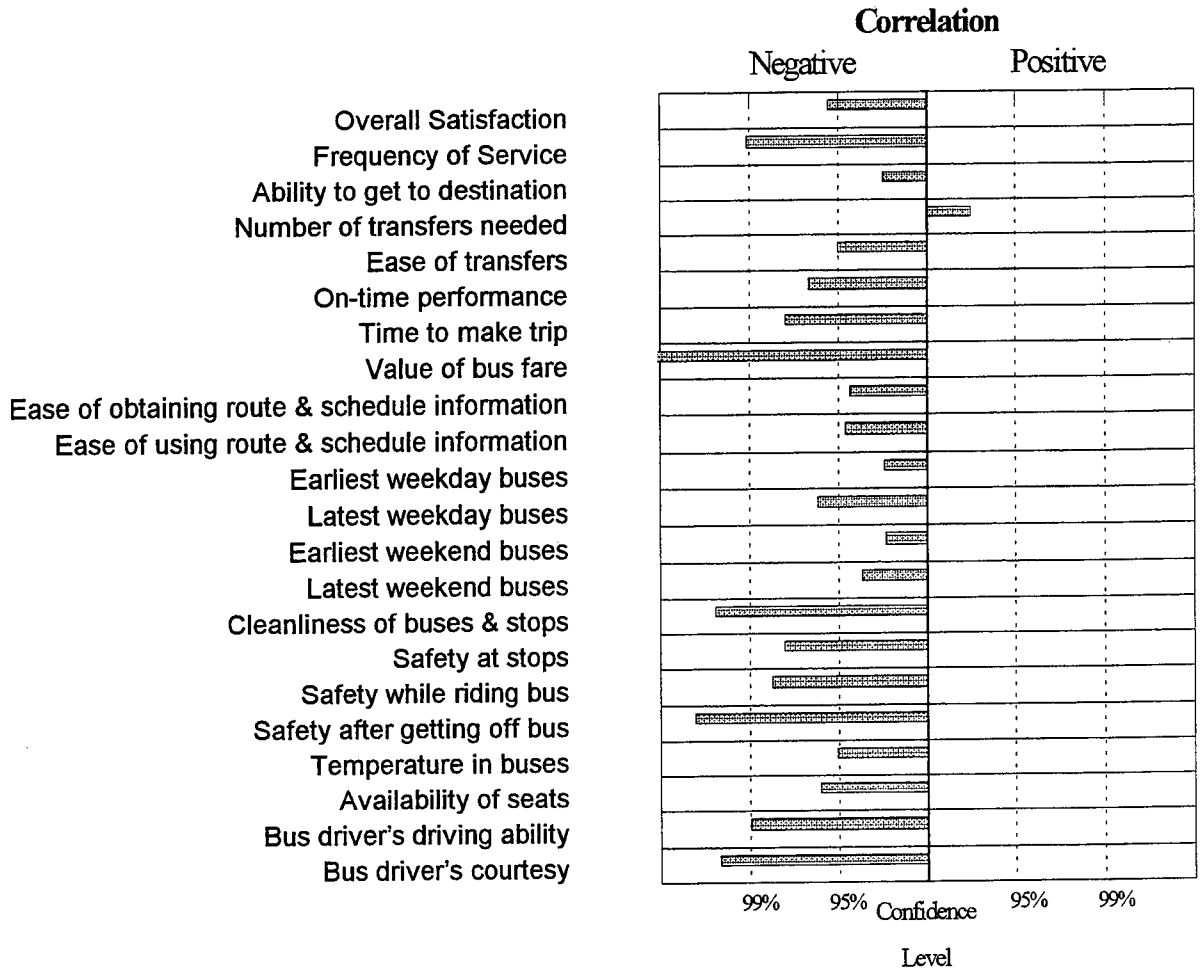
Correlation of Other Options for making trip and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Those who would otherwise drive are more satisfied than other riders in a number of areas, including satisfaction with frequency of service, value, and span of service issues. Presumably they are essentially riding by choice, and so have made a judgement that the current bus service is better for them and therefore are more likely to be satisfied with the service.

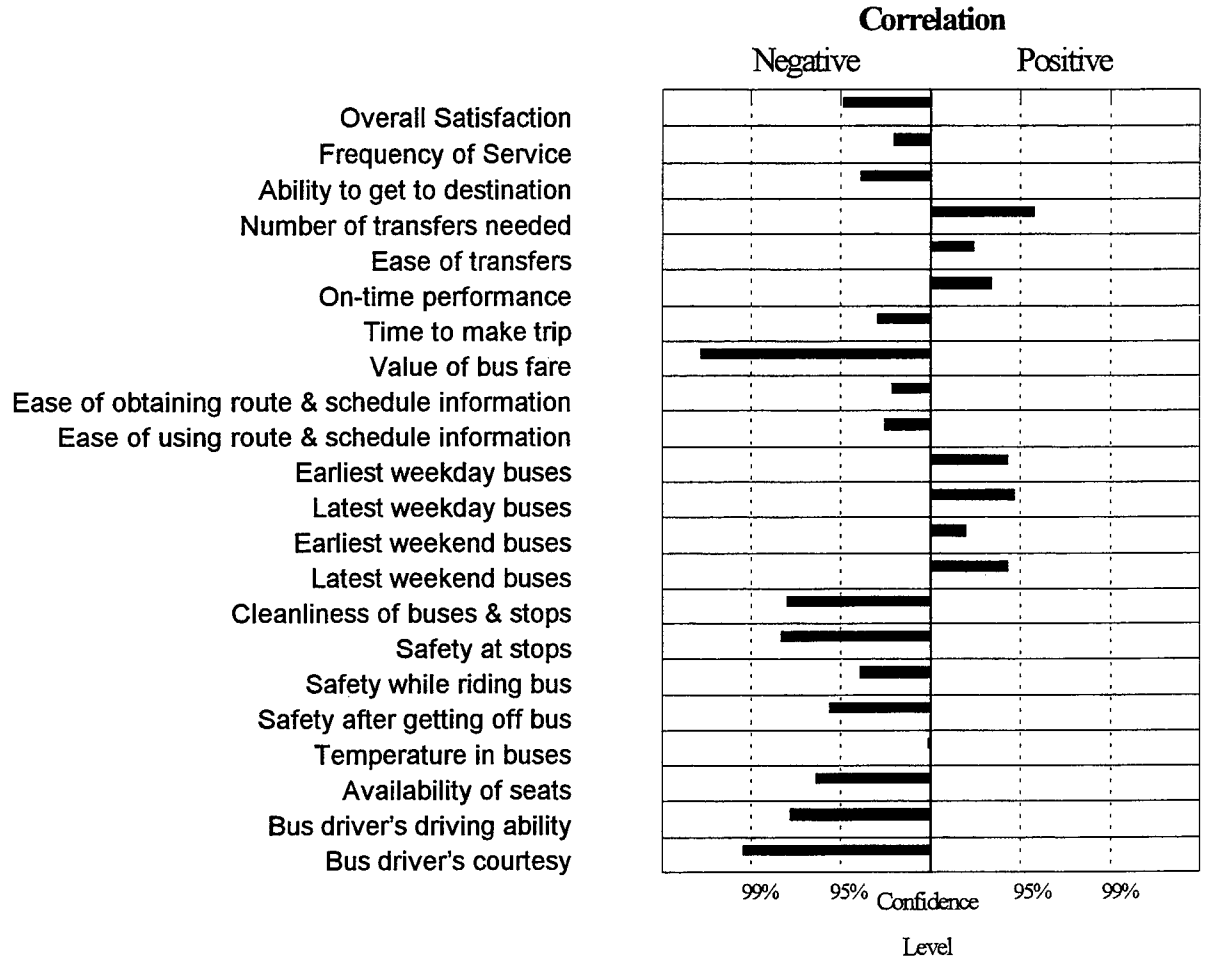
Those who would otherwise bike, walk, or take a taxi are more dependent on the system and, therefore, less satisfied in many areas of performance.

Correlation of Number of Adults Employed outside the Home and Satisfaction Items



This demographic characteristic is negatively correlated with many satisfaction items, indicating that those riders living in households with larger numbers of adults working outside the home tend to be significantly less satisfied with many aspects of transit service. The strongest negative correlations are those with ratings of frequency of service, value of bus fare, cleanliness of stops and buses, safety after getting off bus, bus driver's ability to drive and bus driver's courtesy.

Correlation of Number of Children under 16 in the Home and Satisfaction Items

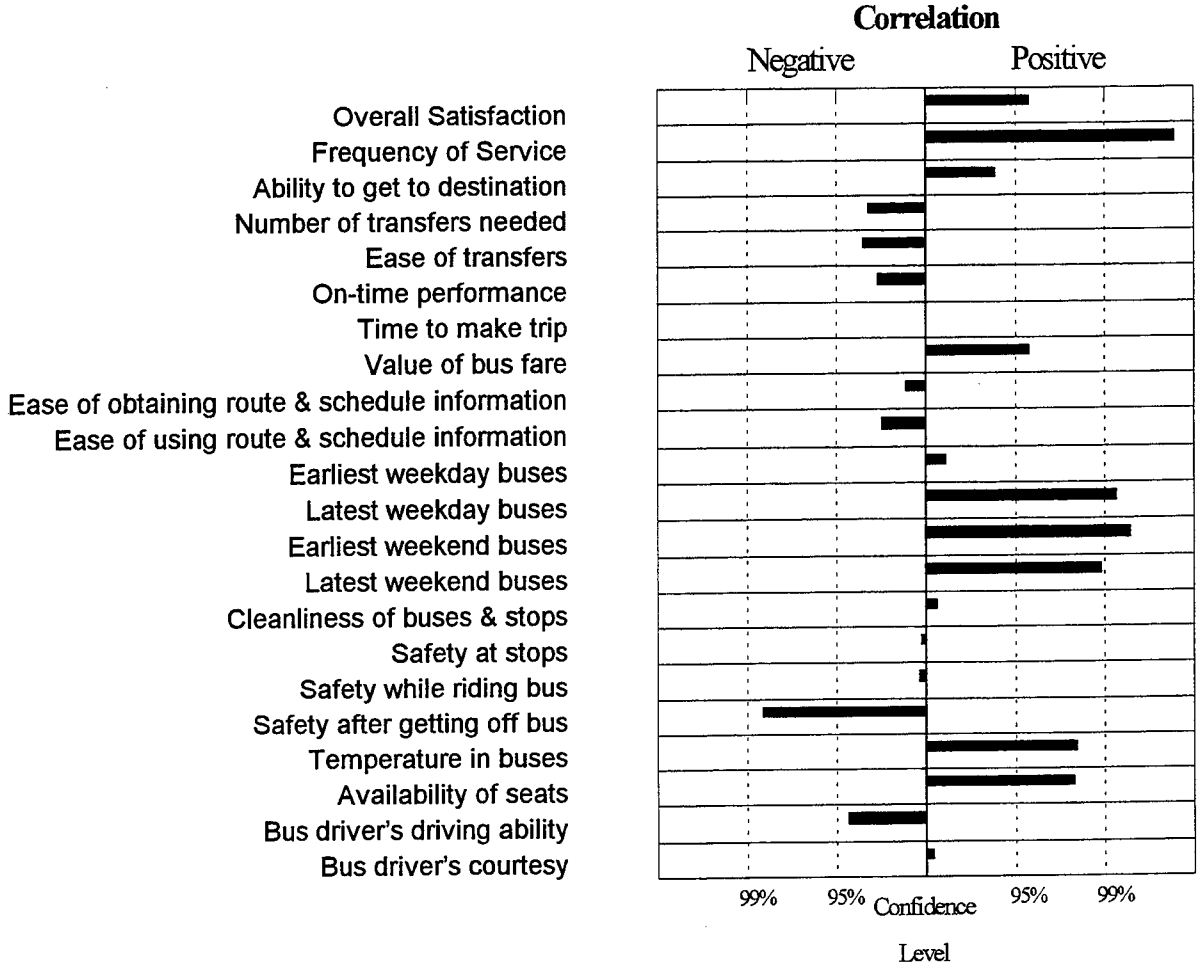


In LeeTran, as opposed to the other transit systems, this data item tends to be negatively correlated with many of the satisfaction items. By a good margin the strongest negative correlation is with value of bus fare. Other strong negative correlations occur with cleanliness of stops and buses, safety at bus stops, safety after getting off bus, availability of seats on buses, bus driver's ability to drive bus and bus driver's courtesy.

A positive correlation occurs between number of children in the home and number of transfers needed.

Many of these correlations are a reflection of attitudes related to age of the rider rather than presence of children in the home. The cleanliness and safety issues may also reflect parent's concern for children's safety on those occasions where children use the bus.

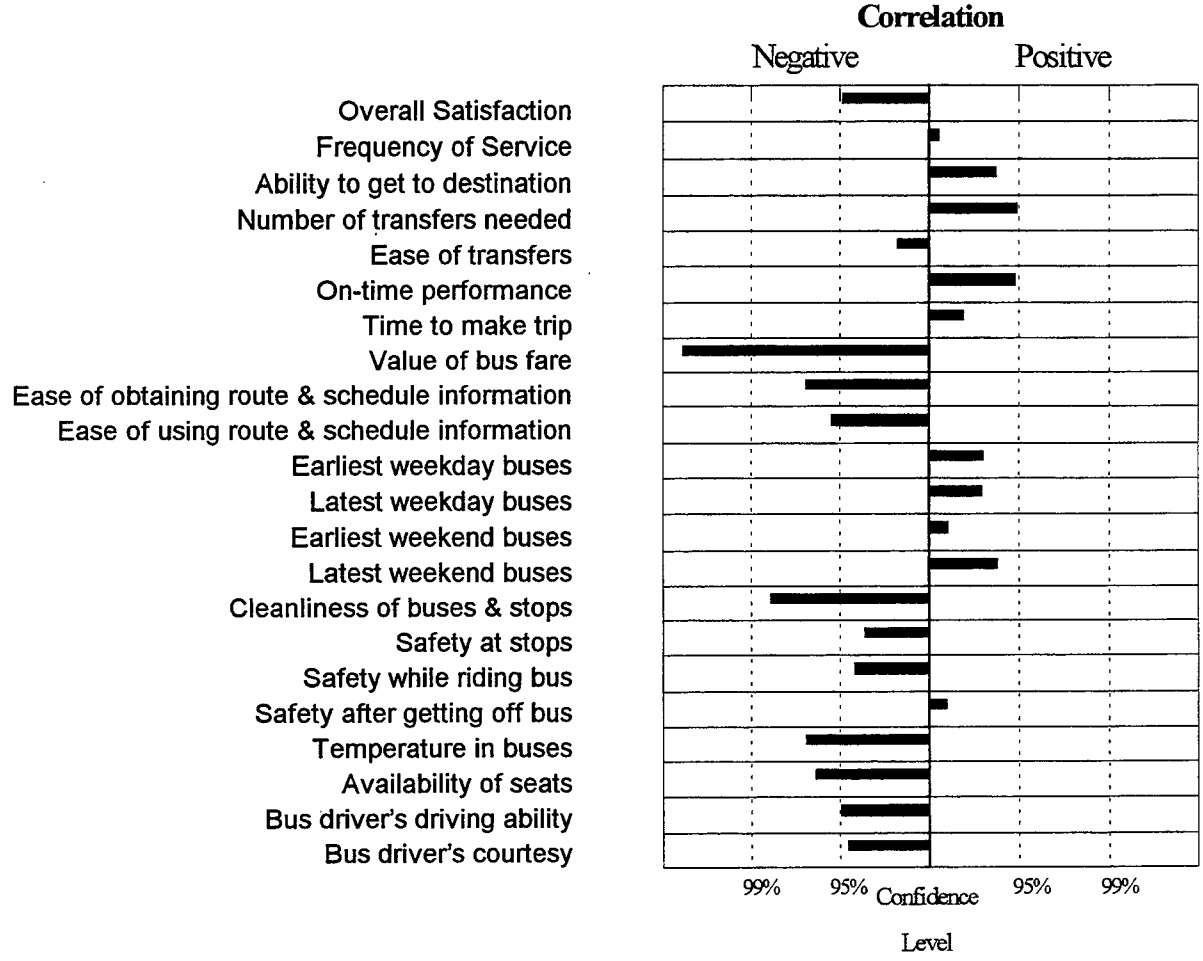
Correlation of Number of Working Vehicles in the Home and Satisfaction Items



Correlations for this item are generally positive. Strong positive and significant correlations exist for overall satisfaction, frequency of service, value of bus fare, span of service for weekdays and weekends, temperature in buses and availability of seats. The only negative correlation is with safety after getting off buses, where people with fewer vehicles feel safer.

People with more vehicles are generally less dependent on transit service to meet their transportation needs, particularly on non-weekdays. Thus the positive correlation may be best understood as a much *lower* level of satisfaction among riders who have the *least* number of working vehicles in their households.

Correlation of Possession of Driver's License and Satisfaction Items

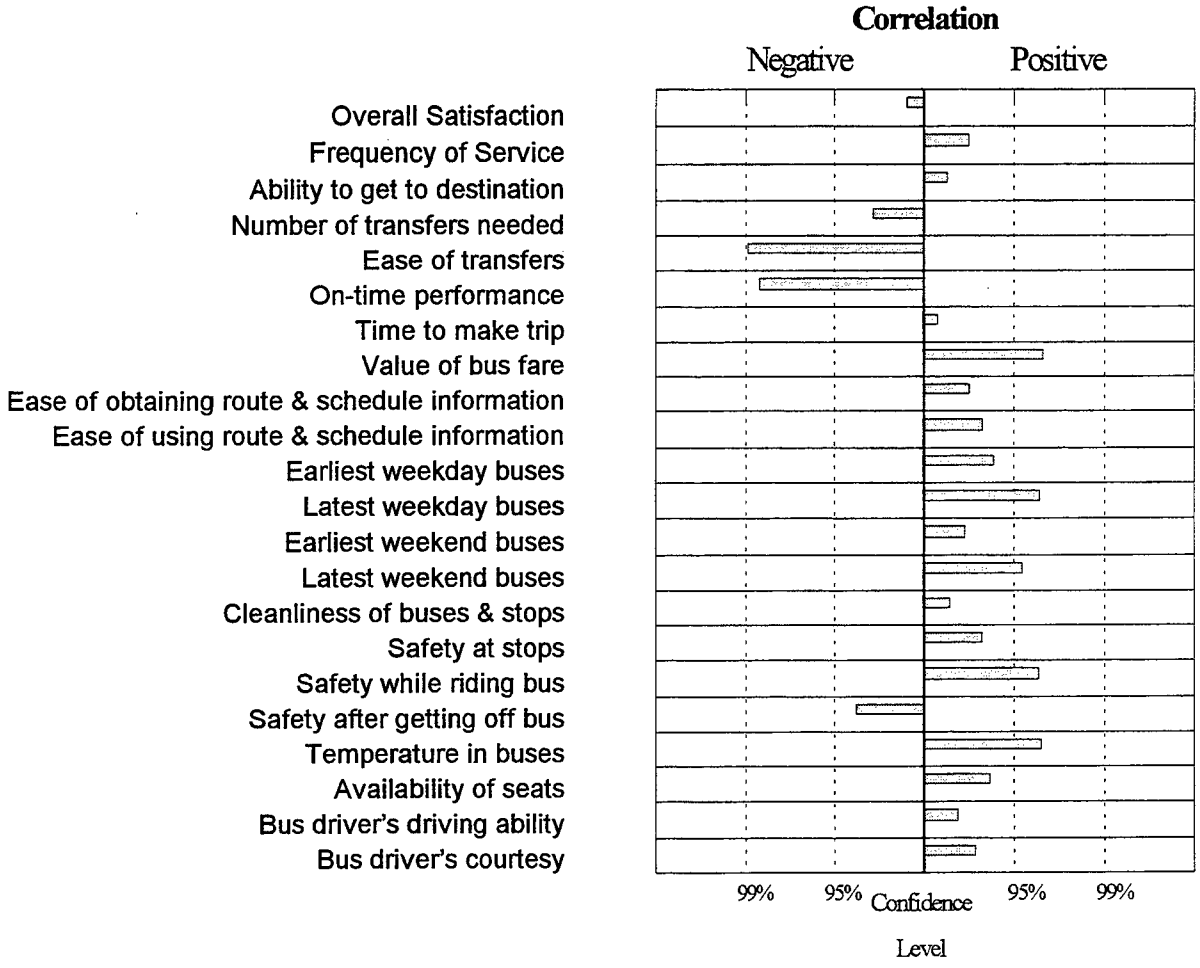


Riders who have driver's licenses are generally more satisfied with LeeTran service than riders who do not have licenses. Items for which licensed drivers are significantly more satisfied include value of bus fare, obtaining and using schedule and route information, cleanliness of buses and stops, temperature in buses, availability of seats, and bus driver's driving ability.

Having a driver's license is positively correlated with the number of vehicles in the rider's household. Those with drivers' licenses are less dependent on the transit system for transportation, and thus are more likely to be choosing the bus system as a more convenient or cost effective mode of transportation. They are therefore more likely to be satisfied with many aspects of service than are those without driver's licenses who have less choice in transportation.

Interestingly, there are several items that are negatively correlated with possession of driver's licenses. These items include satisfaction with number of transfers required and on-time performance. The system appears to do a better job serving those riders without licenses with direct routes to their destinations.

Correlation of Number of Working Telephones in the Home and Satisfaction Items

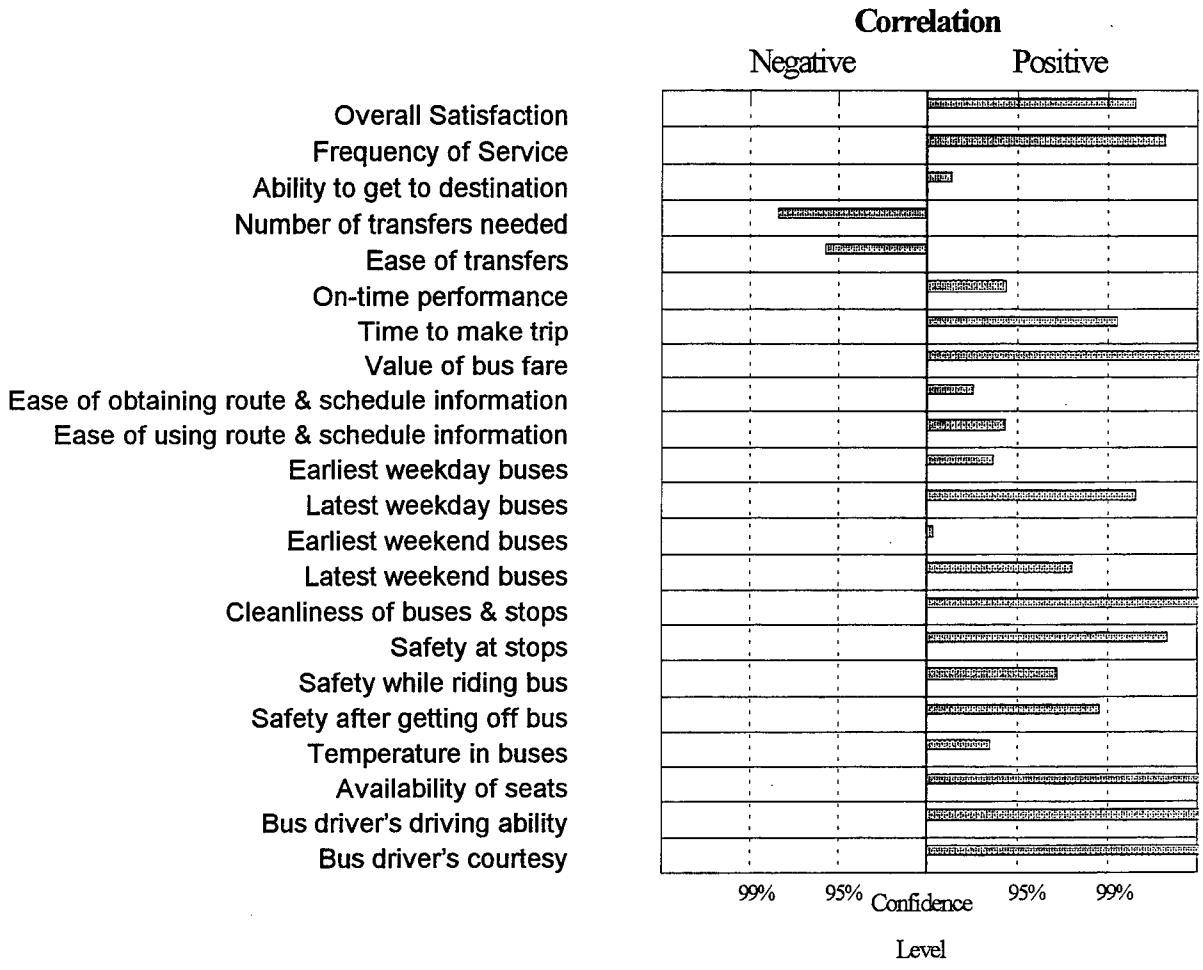


There are a number of strong correlations for this item. This indicates that no-telephone households are less satisfied with many aspects of service, and that a telephone-based survey approach would therefore report higher levels of satisfaction than is appropriate. The main purpose of data collection for this item was to demonstrate that a sizable proportion of the bus-riding population does not have telephones and thus telephone-based surveys might inadequately cover this segment.

Significant positive correlations exist between number of working phones and overall satisfaction, frequency of service, ability to get to desired destination, value of bus fare, and span of service.

The number of working telephones in the home would likely be correlated with both income levels and number of adults (working or not working) in the home. The presence of a large number of adults might also imply more working motor vehicles. In fact, the strongest correlation that exists is between number of phones and number of working vehicles (r=.43). The pattern of correlation with satisfaction items also closely mirrors the pattern between those items and the number of working vehicles in the home. The comments in the previous section also explain the results in this section.

Correlation of Age and Satisfaction Items



Respondent age is highly related to the satisfaction items, usually positively – that is, the older the respondent, the higher the level of satisfaction with most items. The individual items that are negatively correlated with age include a negative correlation between increasing age and satisfaction with number of transfers required and ease of transferring. Both of these correlations are quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs.

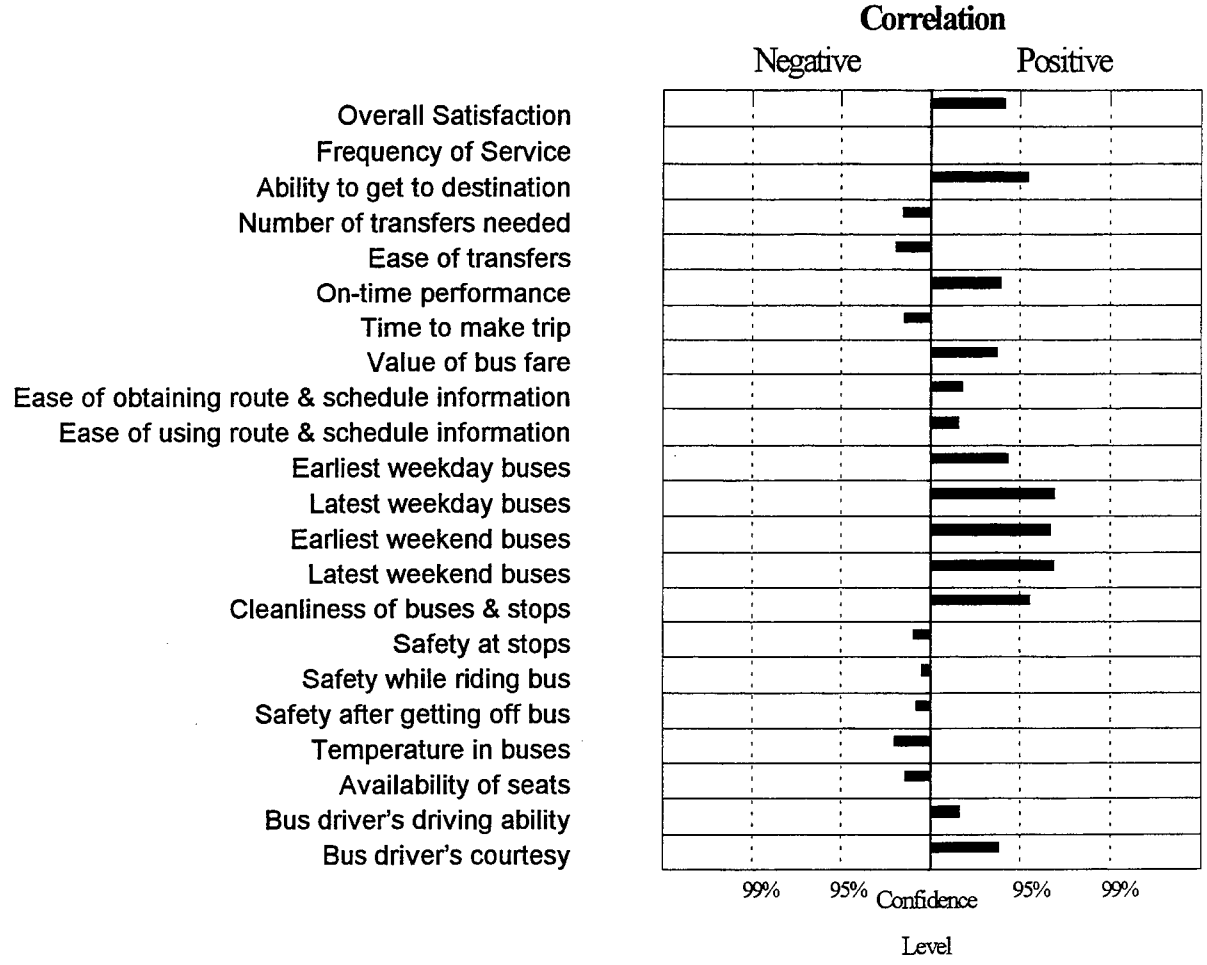
Many items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders. It should

also be noted that the youngest riders, (i.e. those under 18) tended to be more satisfied than slightly older riders (i.e. those aged 25-44).

The items that have the strongest positive correlations are: Value of bus fare, cleanliness of stops & buses, availability of seats, bus driver's courtesy, and bus driver's ability to drive bus.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves transportation, they should be viewed as a key customer segment. LeeTran should consider it a notable achievement that they have been able to provide service that is more satisfactory to this group of customers.

Correlation of Gender and Satisfaction Items



Several satisfaction items have significant correlations with respondent gender, and females are consistently the group more satisfied. The items that females are significantly more satisfied with were: ability to get to destination, span of service on weekends and latest buses on weekdays, and cleanliness of buses and stops.

In other systems, there was a tendency for females to feel significantly less safe. This perception does not occur among LeeTran riders. LeeTran has done a very good job of making all of their customers feel secure when using the transit system.

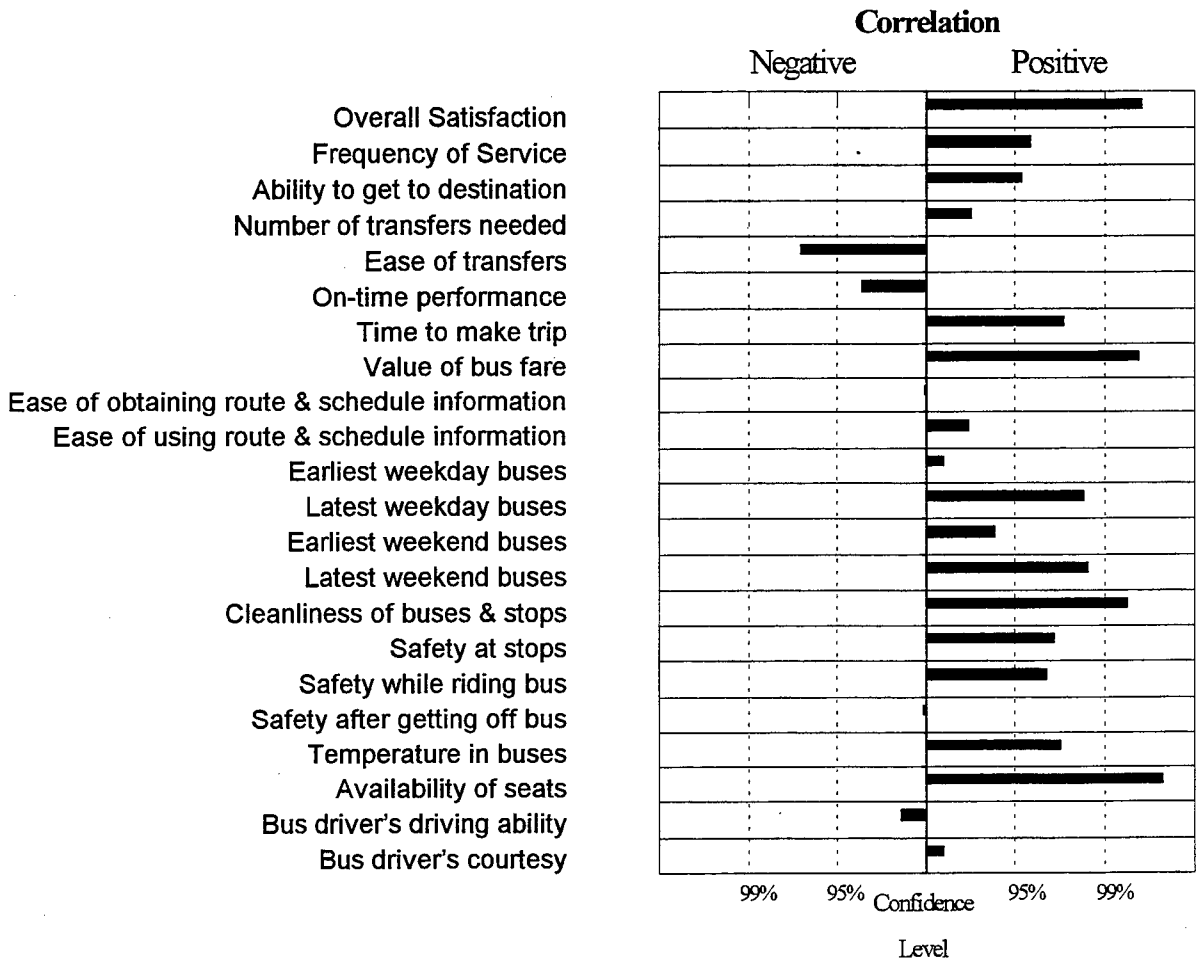
Correlation of Race and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Above average levels of satisfaction were observed for blacks for ease of transferring buses and time of earliest weekday buses. Hispanics give above average ratings for number of transfers required but are less satisfied with value of bus fare.

There do not appear to be any systematic differences based on rider race.

Correlation of Income and Satisfaction Items



Most satisfaction items are positively correlated with income. There are only significant negative correlation is between income and ease of transferring buses.

This type of result is at odds with the results in many other systems. However, among LeeTran riders, there is a positive correlation (admittedly rather weak) between age and income, which is not true in the other transit systems.

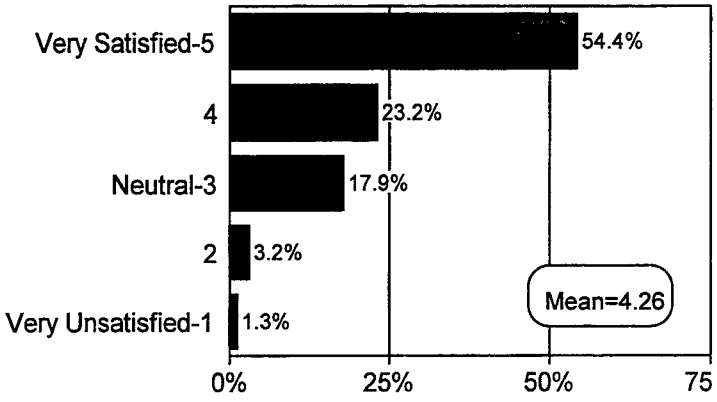
Survey Instrument

Due to the larger size of LeeTran's survey instrument, it has not been included herein. However, the survey instrument has already been provided to LeeTran. The questionnaire was customized to serve the purposes of the system's most recent Transit Development Plan update as well as the Customer Satisfaction Index project. It did, however, contain all of the questions used in the CSI analysis for the other systems. The survey was printed on 60# yellow cardstock, on both sides of an 8 ½ · 14 sheet.

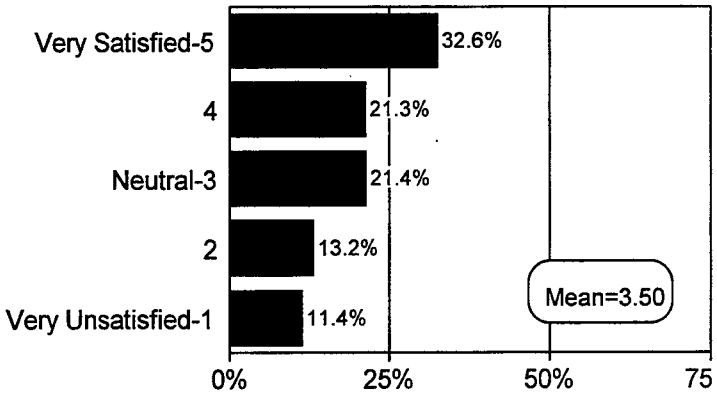
Results by Question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

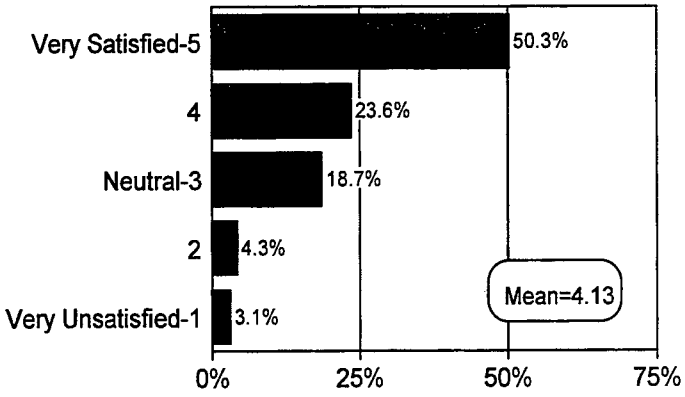
31a. Your overall satisfaction with LeeTran...



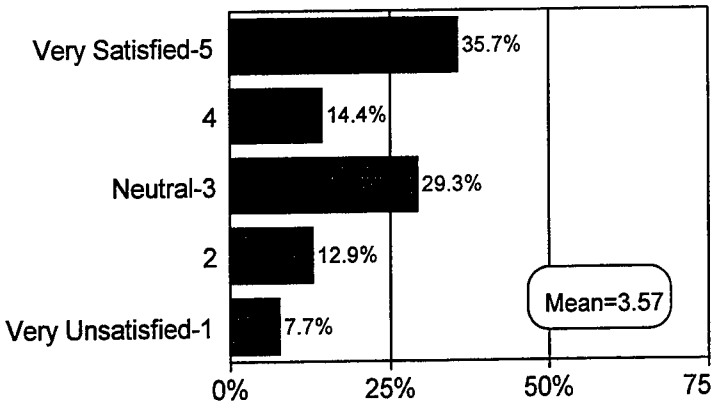
31b. Frequency of service (how often buses run)...



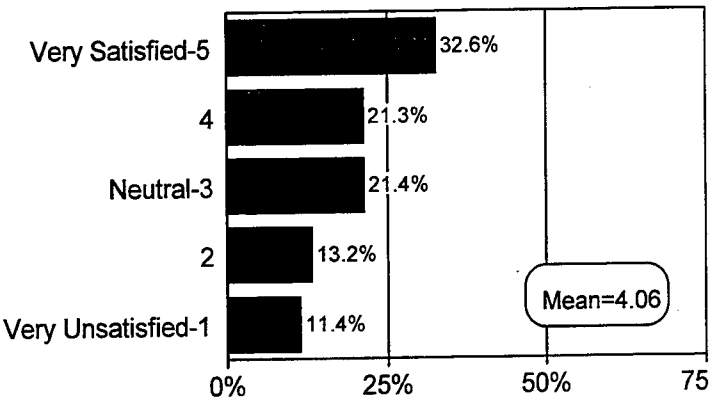
31c. Your ability to get where you want to go using the bus...



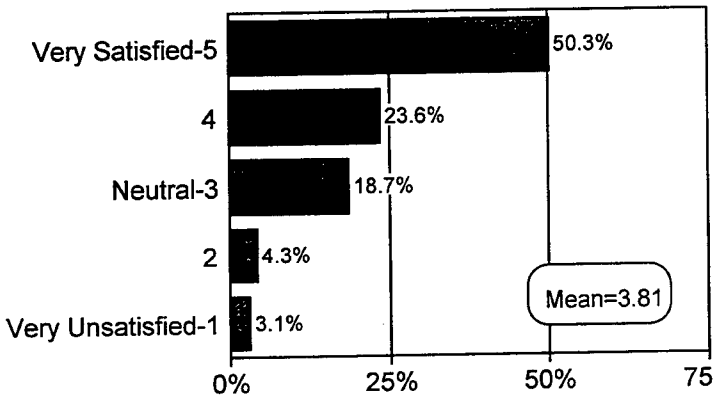
31d. The number of times you have to transfer buses...



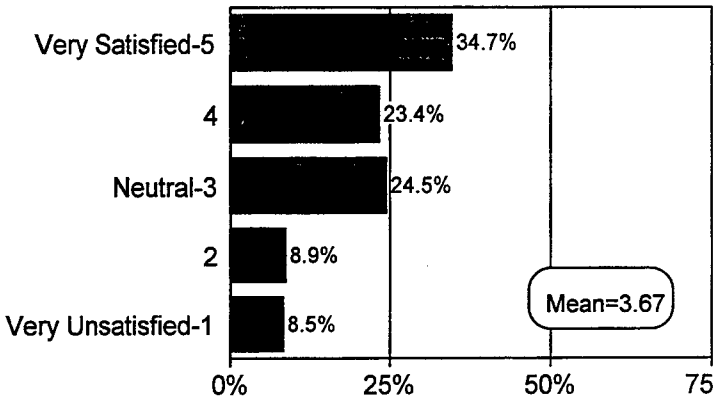
31e. How easy it is to transfer buses...



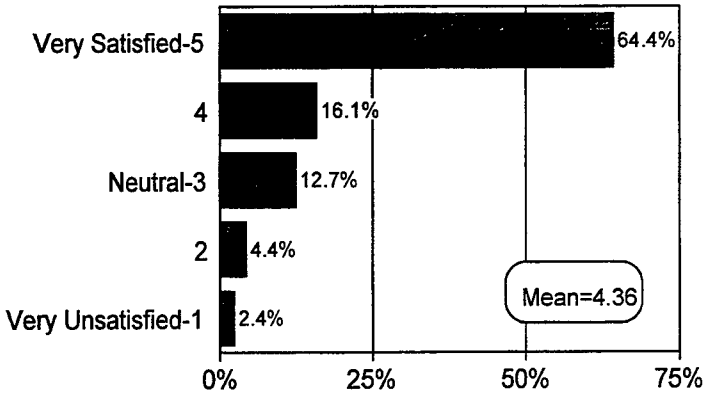
31f. How regularly buses arrive on time...



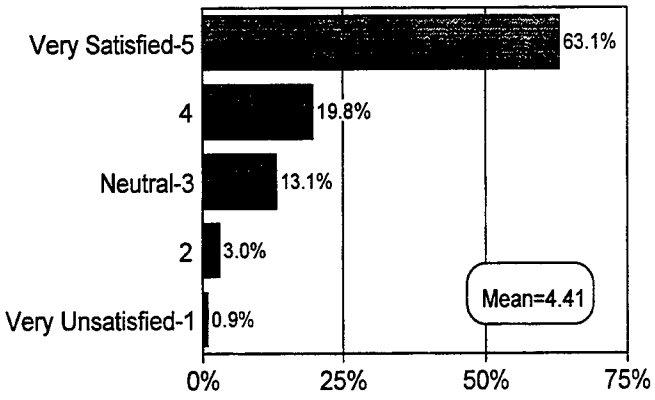
31g. The time it takes to make a trip by bus...



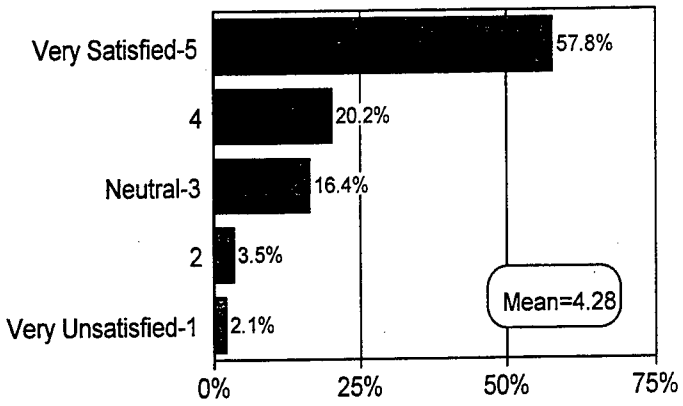
31h. Value of bus fare (service you get for what you pay)...



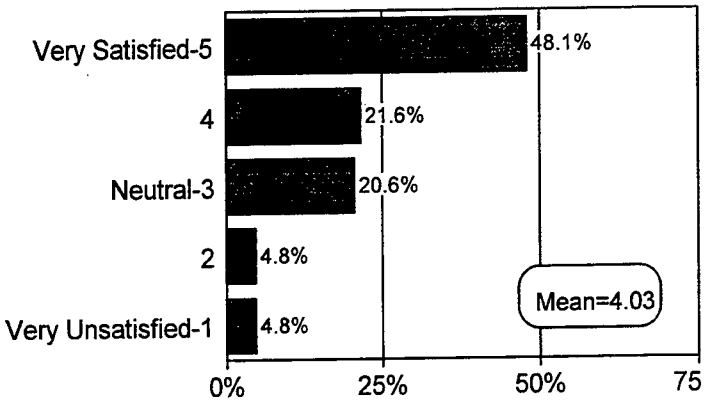
31i. How easy it is to obtain bus route & schedule information...



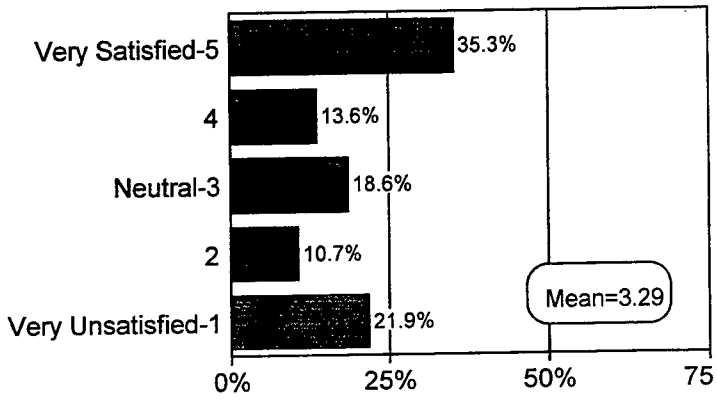
31j. How easy it is to use bus route & schedule information...



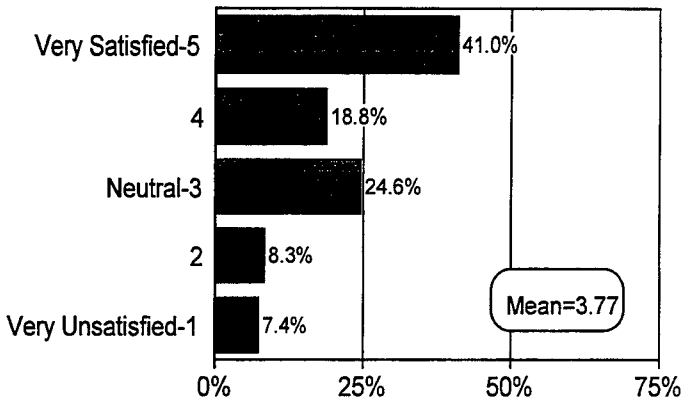
31k. The time of day the earliest buses run on weekdays...



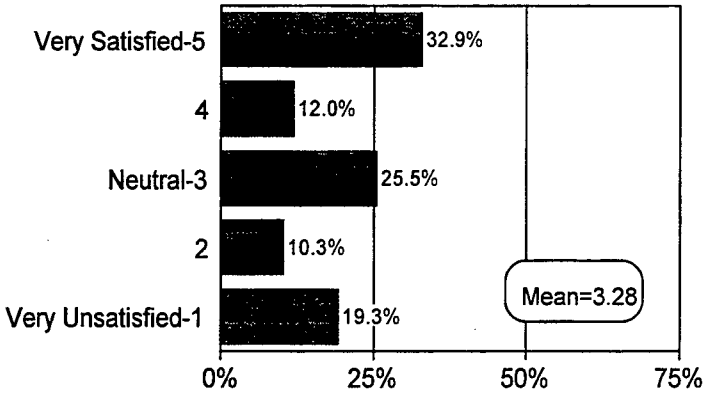
31l. The time of day the latest buses run on weekdays...



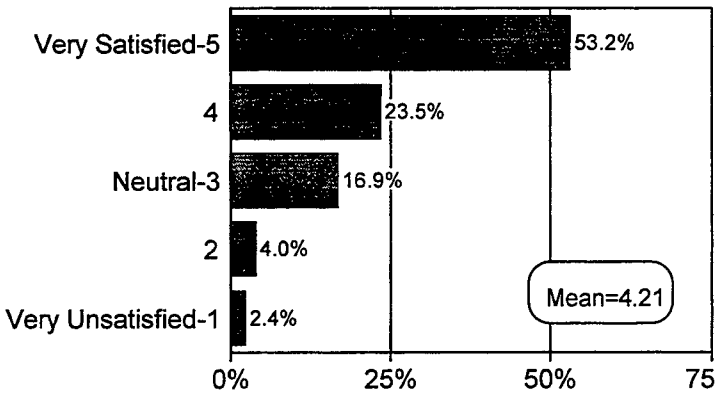
31m. The time of day the earliest buses run on weekend day



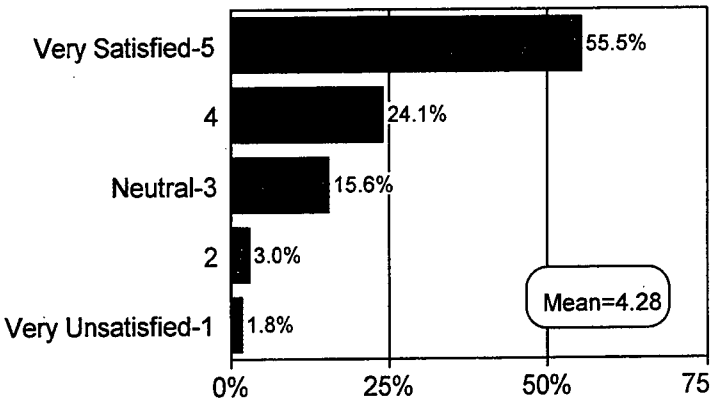
31n. The time of day the latest buses run on weekend days



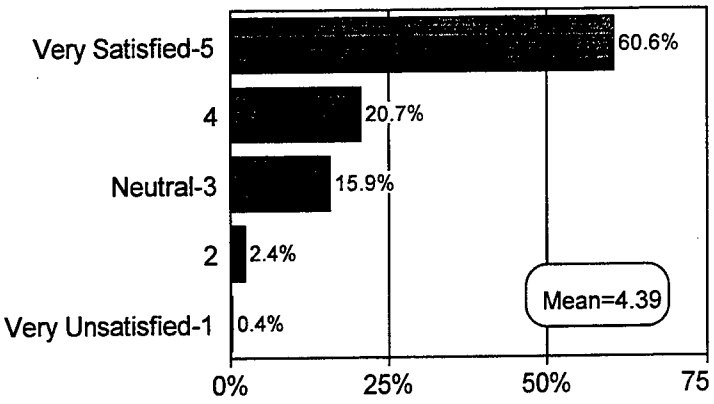
31o. How clean the buses and bus stops are...



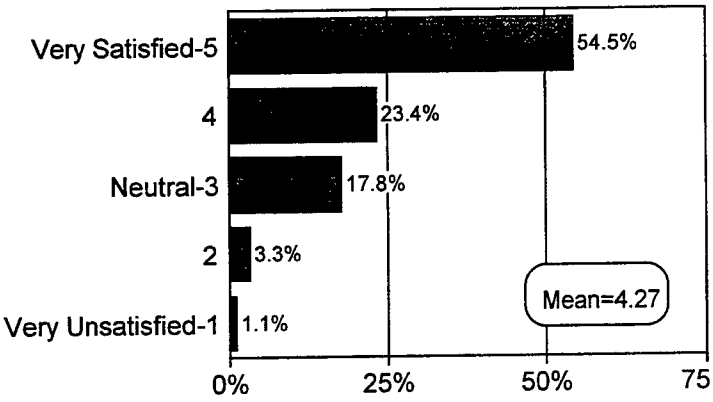
31p. Safety at the bus stop...



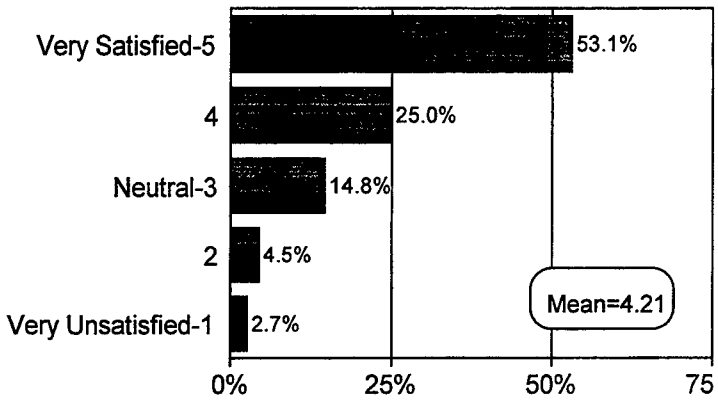
31q. Safety while riding the bus...



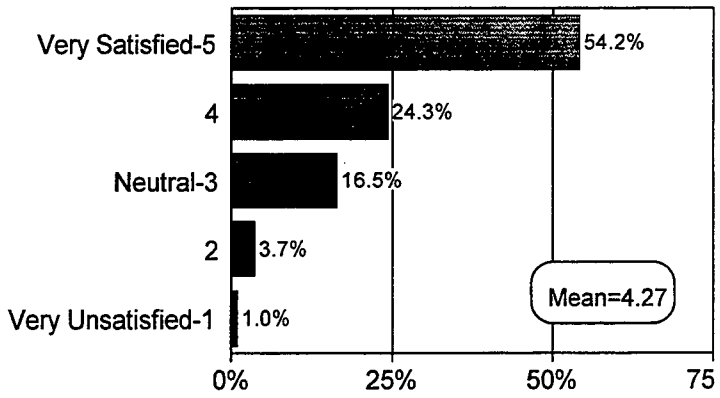
31r. Safety after getting off the bus...



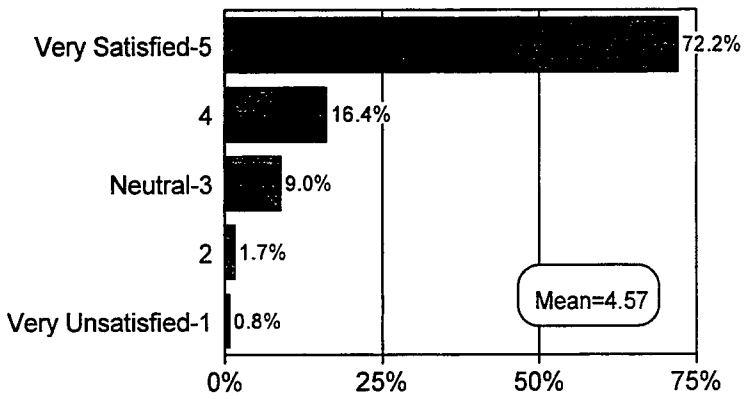
31s. Temperature inside the buses...



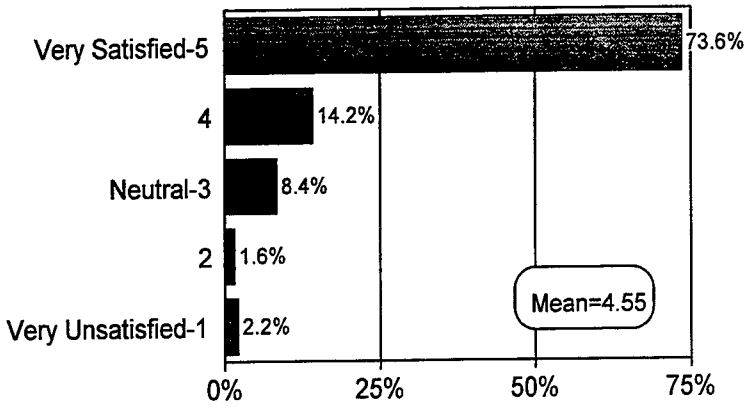
31t. Availability of seats on buses...



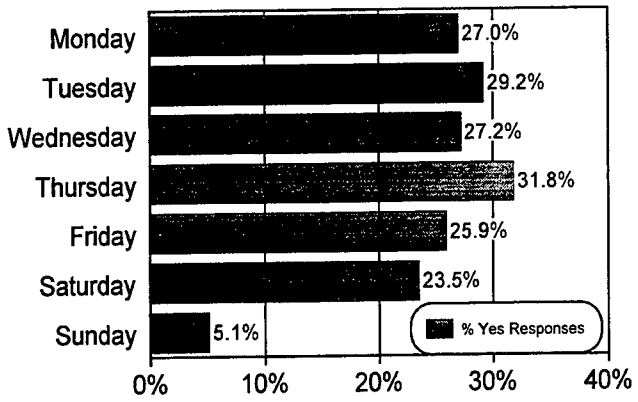
31u. The bus driver's ability to drive the bus...



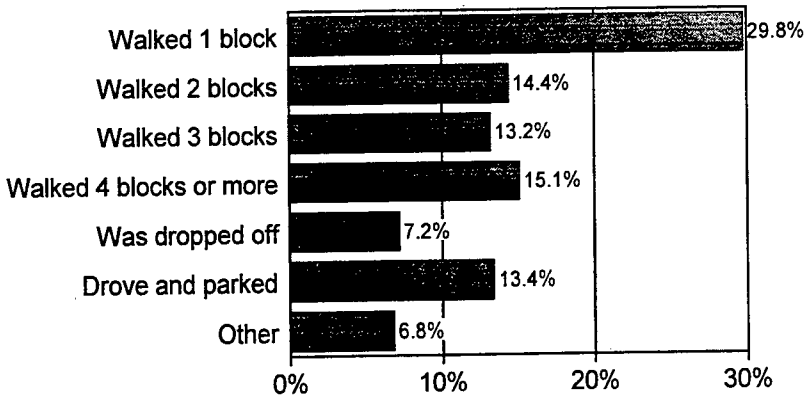
31v. The bus driver's courtesy...



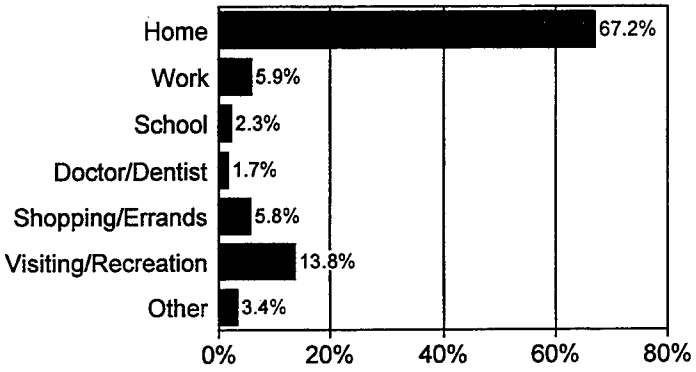
3. Thinking only about last week, did you ride the bus on...



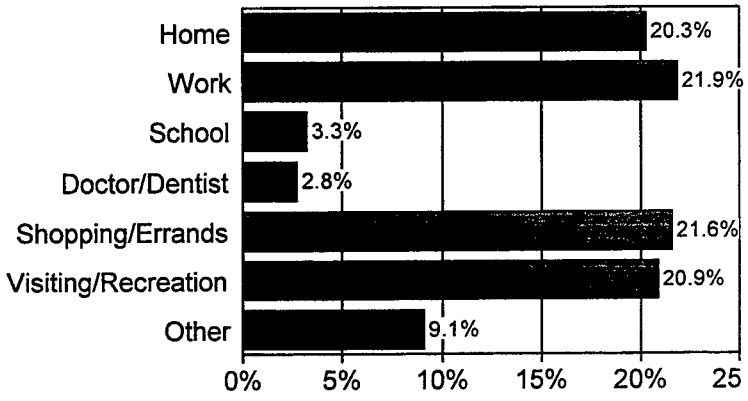
5. How did you get to the bus stop for this trip?



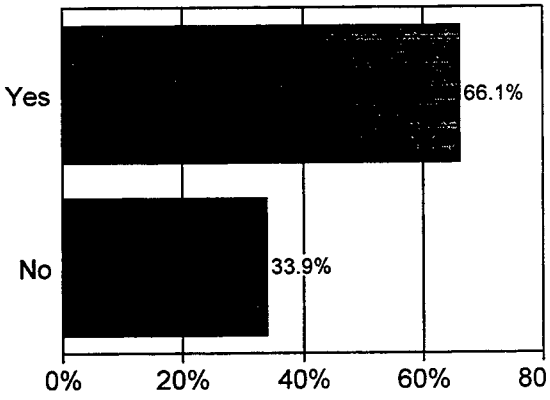
6. Where did you come from before you got on the bus for this trip?



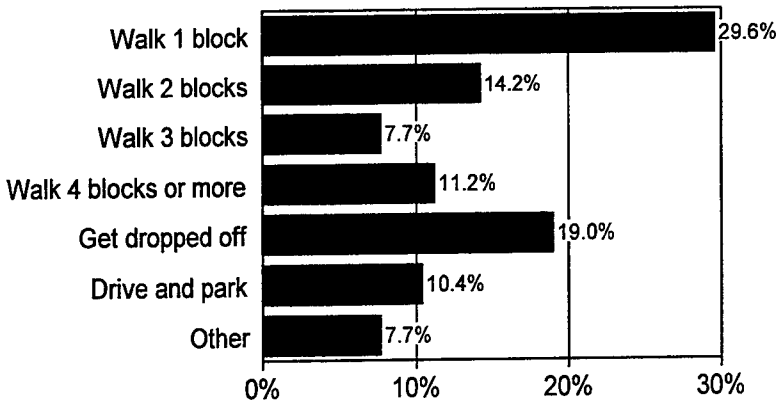
8. Where are you going on your trip?



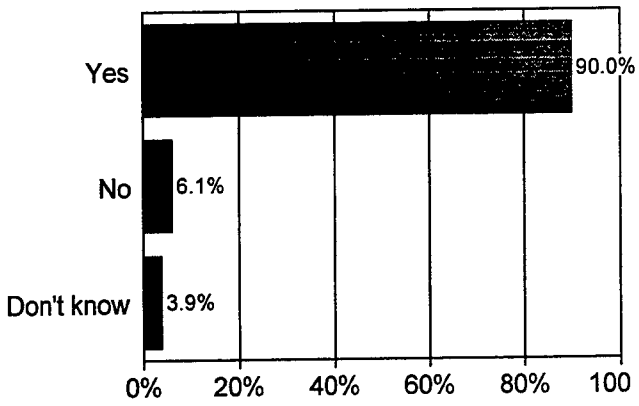
9. Do you have a current driver's license?



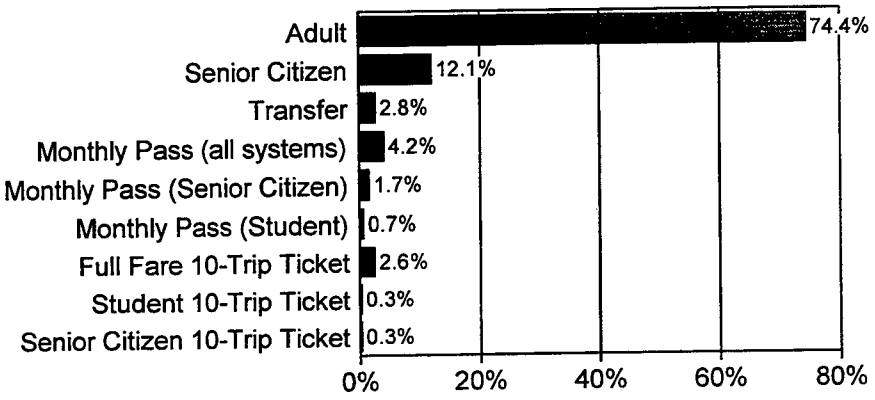
10. How will you get to your final destination?



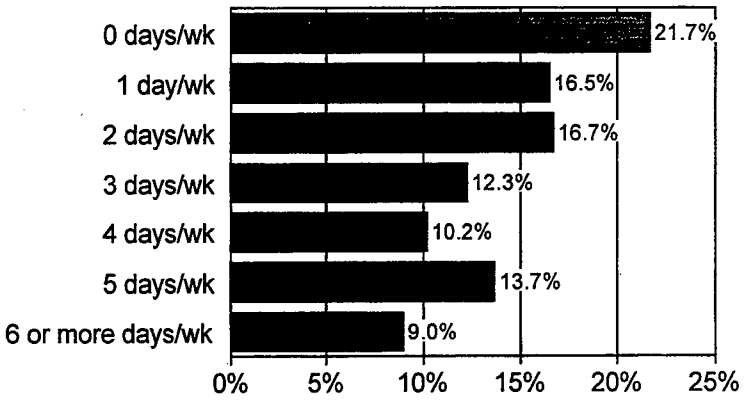
11. Is the bus stop you boarded at conveniently located?



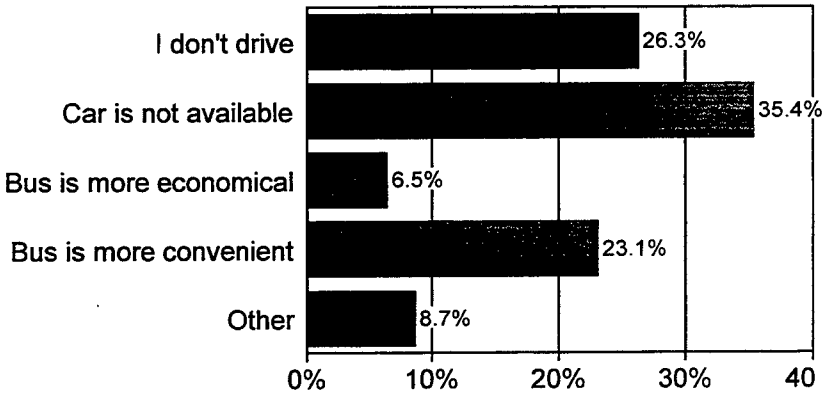
12. What type of fare did you pay when you boarded this bus?



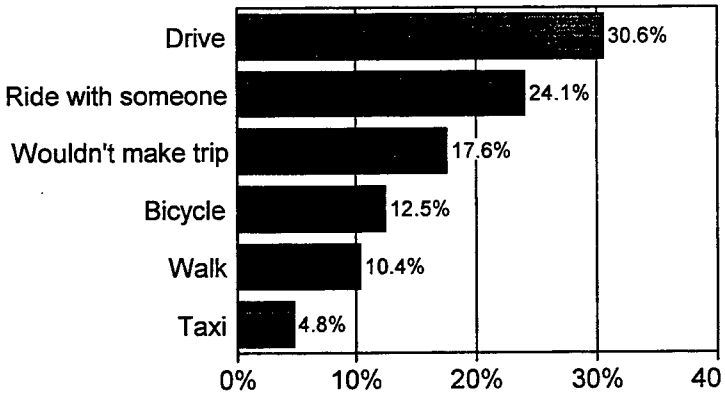
13. On average, how many days a week do you ride the bus?



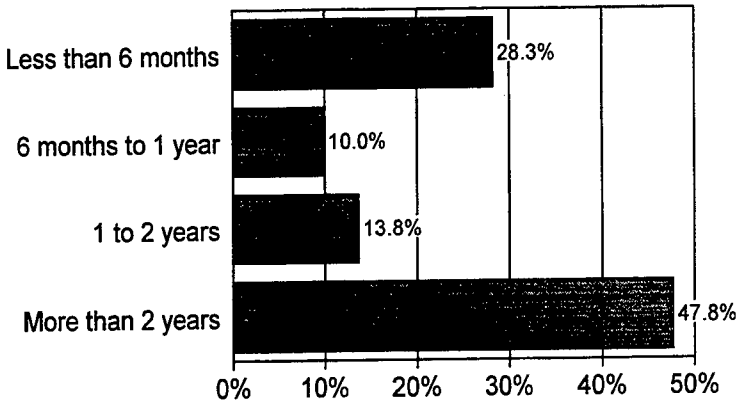
14. What is the most important reason you ride the bus?



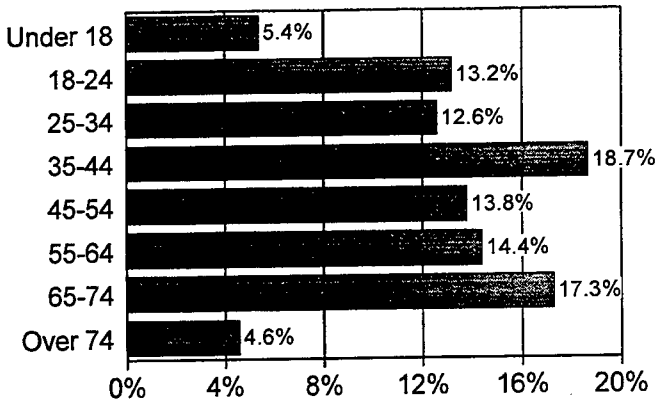
15. How would you make this trip if not by bus?



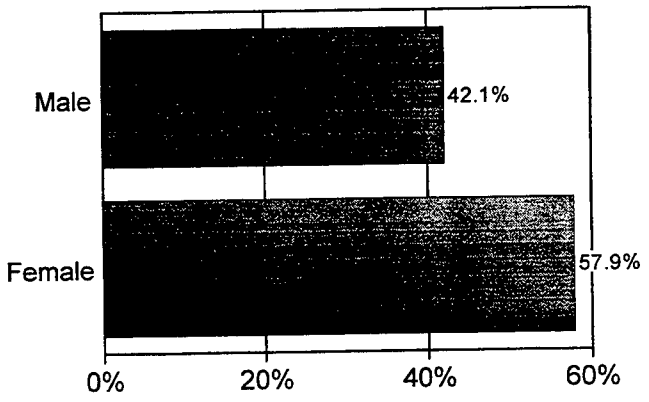
16. How long have you been using LeeTran bus service?



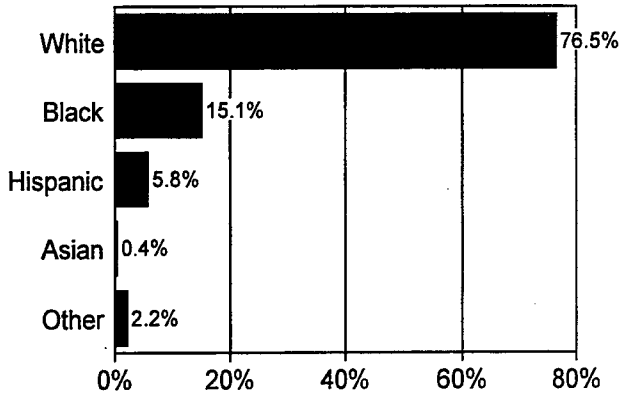
19. Your age is...



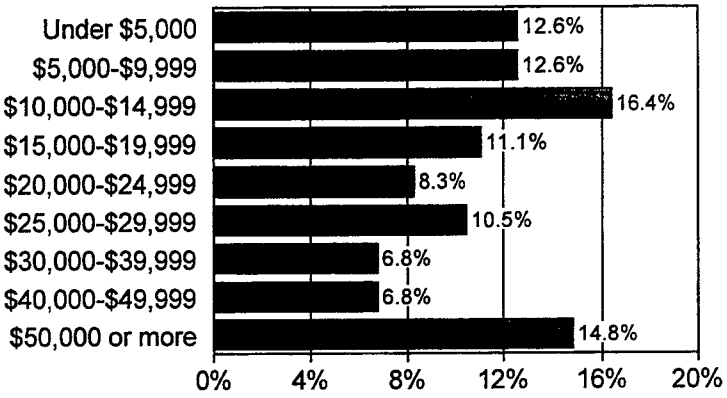
20. What is your gender?



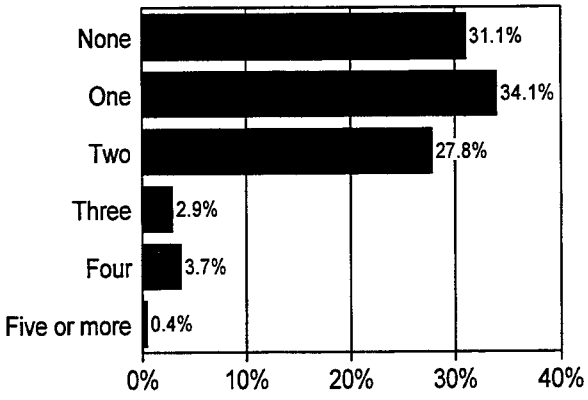
21. What is your ethnic heritage?



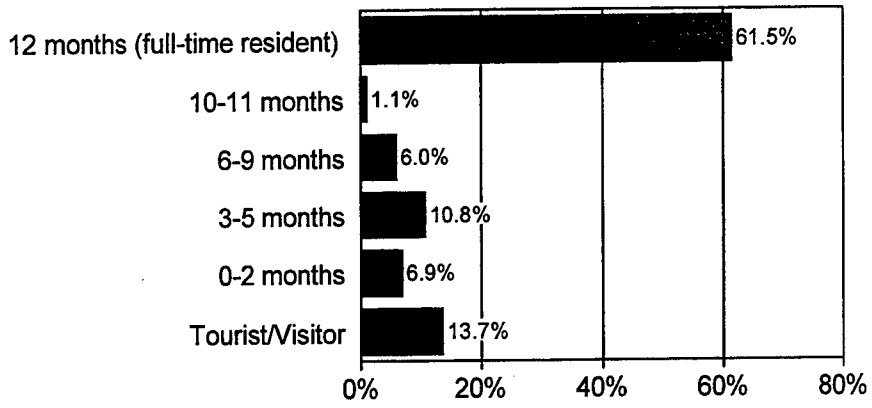
22. What was the range of your total household income for 1996?



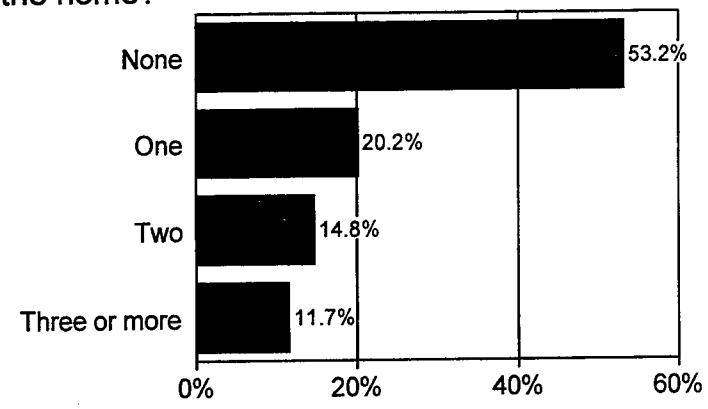
23. How many working cars, vans, and/or light trucks are available in your household?



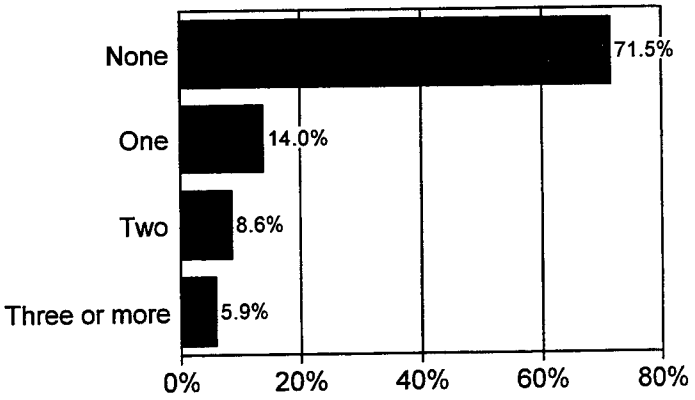
24. How many months out of the year do you reside in Lee County?



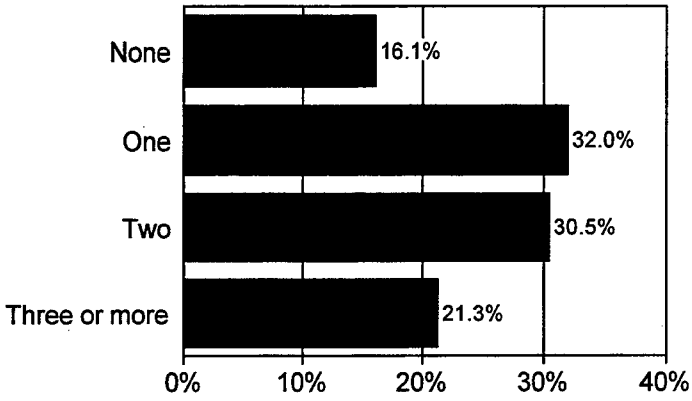
25. How many persons age 16 or older in your household are employed outside the home?



26. How many children under the age of 16 do you have in your household?



27. How many working telephones do you have in your household?



LYNX TRANSIT

Sampling Methodology

Surveys were distributed to riders by CUTR personnel at each of four transfer centers: South Orange Blossom Trail (where routes 4 & 8 converge, two of the most heavily used routes in the LYNX system), Washington Shores Transfer Center mall, Orlando International Airport, and the Downtown Transfer Center. Surveys were distributed on Wednesday, August 13, 1997 from 3 p.m. to 8 p.m.; On Thursday, August 14, 1997, from 7 a.m. to 3 p.m.; on Saturday, August 16, 1997, from 8 a.m. to 4 p.m.. This allowed for a sampling from morning and evening peak hours, midday on weekdays, and all day on the weekend except evenings. At the transfer center, surveyors boarded buses serving as many different routes as possible in order to distribute surveys to passengers boarding and already on board the vehicles.

Each survey contained an identification number in the upper right hand corner. The surveyors recorded the date, time, bus route, bus number, and the beginning and ending numbers of the surveys that they handed out on each vehicle. The surveys were divided in equal numbers for each transfer center and distributed in numerical order of the ID numbers to simplify recording.

A total of 31 of the 48 LYNX routes had surveys returned by riders. A total of 1,105 surveys were returned, all of which were key-entered into an Excel database. A total of 980 surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

The factor analysis of LYNX data identified five factors. Some variables will be observed to be part of more than one factor; for instance, "Value of Bus Fare" appears on two separate factors, which indicates that customer perception of value is, not surprisingly, connected with many different elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 25 LYNX Factor 1 - Routes & Headways		
Item	Scores	
	Index	Mean
Number of transfers needed	105.72	3.54
Ease of transfers	101.72	3.85
Time to make trip	99.06	3.42
Can get to destination	99.81	3.90
Frequency of service	100.16	3.31
Buses on time	100.51	3.53
Overall Mean		**3.59**

Table 26 LYNX Factor 2 - Span of Service		
Item	Scores	
	Index	Mean
Earliest weekend runs	100.48	3.34
Earliest weekday runs	101.67	3.83
Latest weekday runs	107.20	3.35
Latest weekend runs	98.13	2.84
Frequency of service	100.16	3.31
Overall Mean		**3.33**

Table 27 LYNX Factor 3 - Safety & Cleanliness		
Item	Scores	
	Index	Mean
Safety at bus stops	100.28	3.85
Safety after getting off bus	100.71	4.04
Safety on buses	99.21	4.09
Cleanliness of stops & buses	102.78	3.77
Bus driver's driving ability	98.35	4.25
Overall Mean		**4.00**

Table 28 LYNX Factor 4 - Comfort of Ride		
Item	Scores	
	Index	Mean
Temperature in buses	101.92	4.02
Bus driver's driving ability	98.35	4.25
Bus driver's courtesy	99.52	4.13
Seats available	97.31	3.92
Buses on time	101.72	3.85
Value of bus fare	100.29	3.97
Overall Mean		**4.02**

Table 29 LYNX Factor 5 - Printed schedules		
Item	Scores	
	Index	Mean
Obtaining schedule/route information	98.87	4.06
Using schedule/route information	100.70	4.15
Value of bus fare	100.29	4.07
Overall Mean		**4.09**

The resulting linear customer satisfaction model structure using these factors takes the form:

$$\text{Customer Satisfaction} = \alpha + \beta 1 * \text{factor1} + \beta 2 * \text{factor2} + \beta 3 * \text{factor3} + \beta 4 * \text{factor4} + \beta 5 * \text{factor5}$$

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table 30 below. The coefficients can be viewed as the relative importance of each factor to overall customer satisfaction.

Table 30 LYNX Customer Satisfaction Model Coefficients		
Item	**β Coefficient (= importance)**	**Mean Performance Score**
Routes & Headways	0.55	3.59
Span of Service	0.24	3.33
Safety & Cleanliness	0.21	4.00
Comfort of Ride	0.36	4.02
Printed Schedules	0.27	4.09
(Model Intercept	3.92	N/A)

The statistics relating to this model are:

R-square = .49 % of Overall satisfaction ratings predicted within 0.5 = 54%

% Correct classification = 78%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of LYNX's operations.

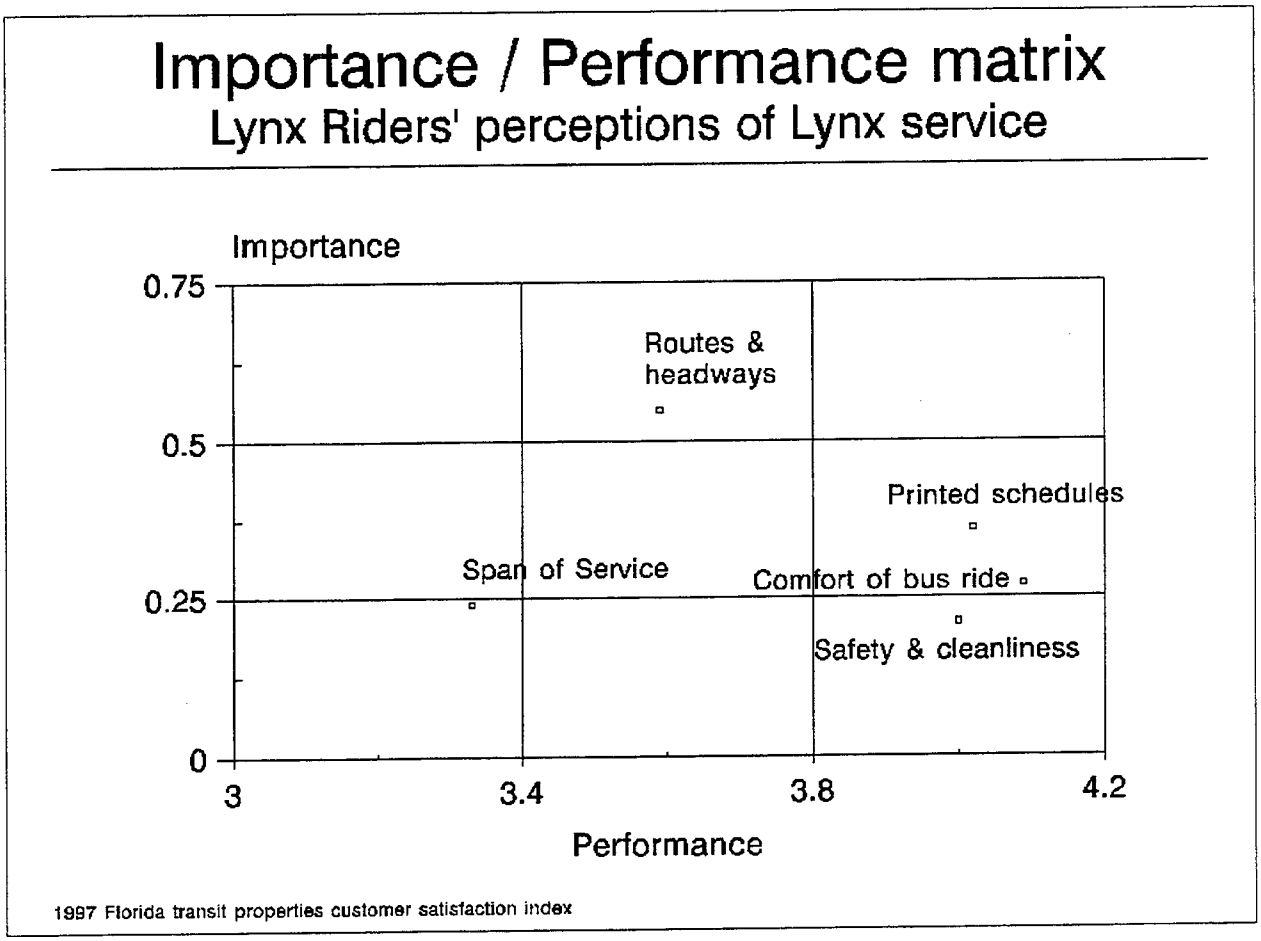


Figure 4 LYNX Importance/Performance Matrix

The chart has been divided into nine regions, reflecting various combinations of low, medium, and high performance and low, medium, and high importance. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 31
Interpretations of LYNX's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High	Possibly reduce focus on this area	Safety & Cleanliness
Low	Medium	Maintain performance - no action	
Low	Low	Maintain performance - no action	
Medium	High	Maintain performance - no action	Comfort of Bus Ride, Printed Schedules
Medium	Medium	Maintain performance - no action	
Medium	Low	Investigate for improvements	Span of Service
High	High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	Routes & Headway
High	Low	Critical improvement area	

Even though the chart seems to indicate that the Safety & Cleanliness factor falls into an area where resources are being expended out of proportion to customer needs, no transit authority will want to reduce focus on safety issues. It is, in fact, quite laudable that LYNX has achieved such high levels of safety and cleanliness that their customers seem to have to come expect a high level of performance and no longer see this factor as a dominant part of their satisfaction with the system. All it would take to renew the importance of this factor, however, would be a small decrease in customer perception of safety. LYNX deserves high praise for their performance in this area and should maintain their excellent performance.

The main potential action area is Routes & Headways (high importance/medium performance). The individual Routes & Headways variables that LYNX scores particularly low on are:

Item	Mean	Index
Frequency of Service	3.31	100.16
Time to Make Trips	3.42	99.06

The Span of Service factor is borderline for medium and low importance, so it is interpreted as medium. The items of particular note in the Span of Service factor are:

Item	Mean	Index
Latest Weekend Runs	2.84	98.13
Earliest Weekend Runs	3.34	100.48
Latest Weekday Runs	3.35	107.2

Typically, these are the areas where all six systems achieved the lowest ratings. Even in these areas, LYNX is performing at least as well as other Florida transit systems from an index standpoint, and in some cases much better. LYNX could investigate routes with particularly low frequencies or extremely high ridership to see if more runs are warranted. Span of Service scores are also somewhat low but customer satisfaction is not currently being impacted in a major way by those variables. Other than that, LYNX's performance in terms of customer satisfaction is excellent.

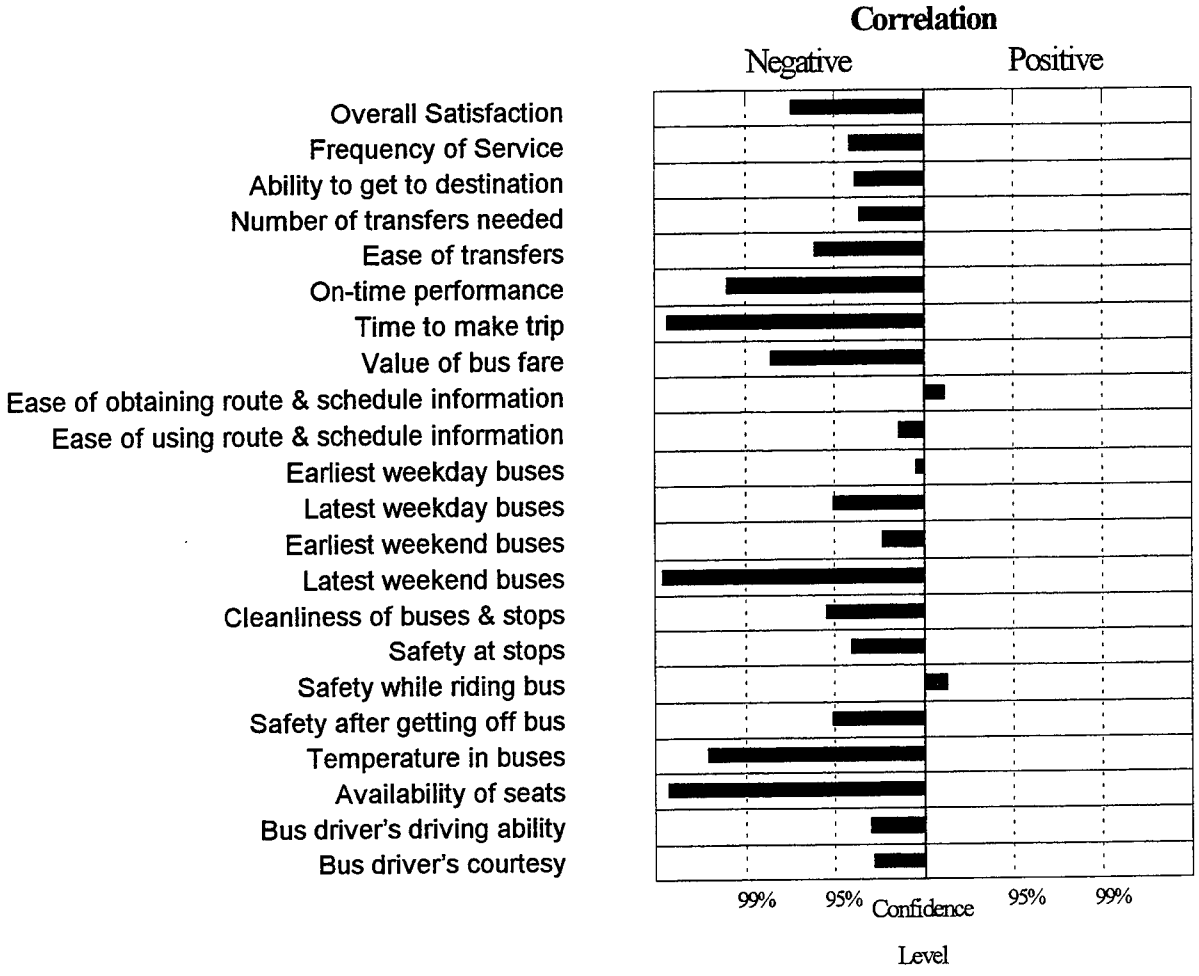
The analysis of demographics, which follows, also suggests that LYNX should consider the following actions:

- implementation of strategies to reward frequent users of the transit system,
- conduct focus groups with riders who transfer buses often to improve design of schedule information
- investigate increasing service to major shopping areas
- consider security improvements such as installation of increased lighting at shelters and stops and security cameras on buses
- investigate increasing service to predominantly Hispanic neighborhoods

Correlation of Demographics and Satisfaction Items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics are being examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

Correlation of Frequency of Ridership and Satisfaction Items



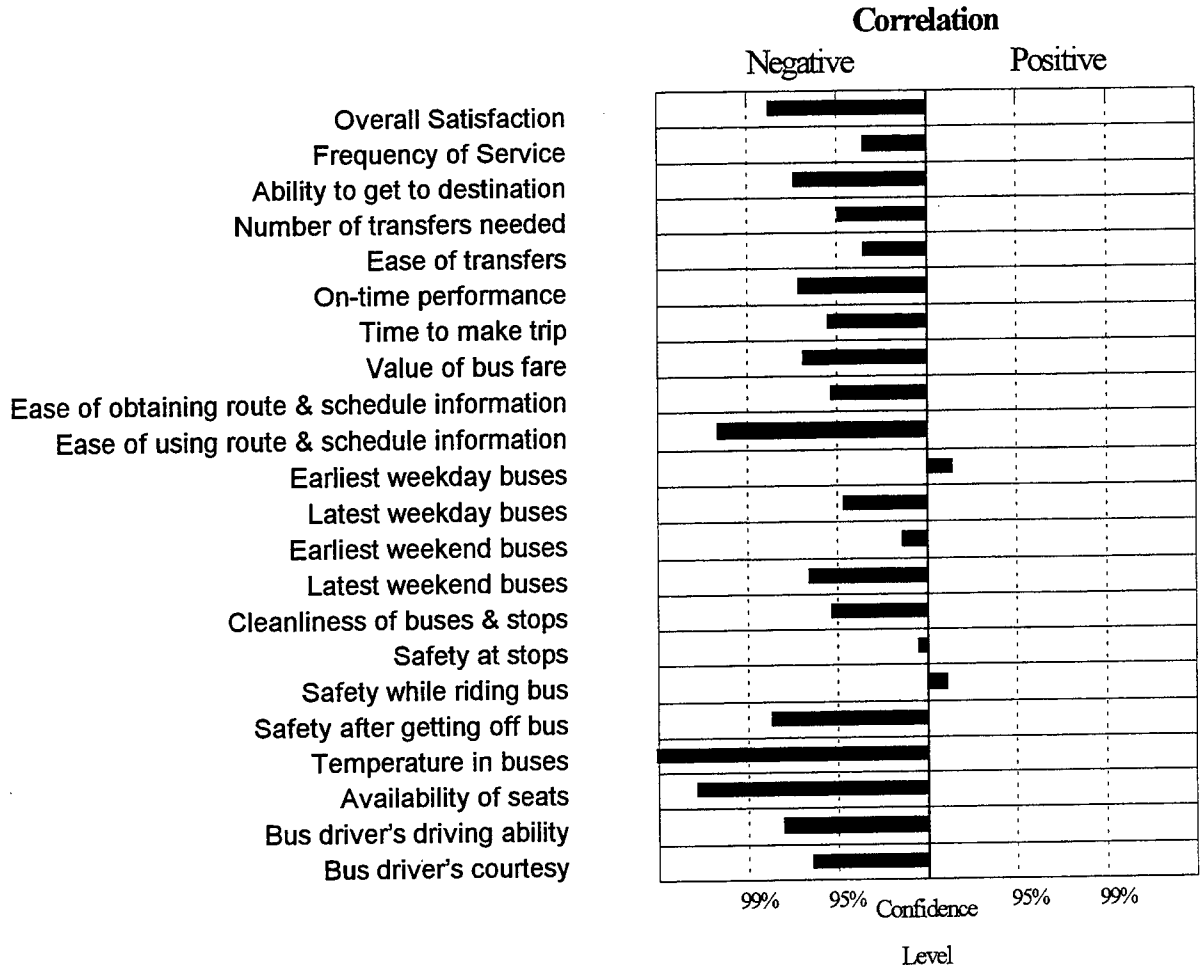
The satisfaction items are generally negatively correlated with frequency of use characteristics. Particularly strong negative correlations exist between frequency of use and satisfaction with on-time performance and the time it takes to make trips, latest weekend runs; temperature in buses and availability of seats. Almost all of the satisfaction items show some level of negative correlation with frequency of use.

People who use the bus 5 times per week or more make up 55% of the riders on the transit system, according to the estimates developed from these survey results. They represent an absolutely key constituency for the transit systems, and efforts to improve overall customer satisfaction should focus on this core group of customers.

Many industries have implemented approaches to reward the heaviest users of their products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance service or air travel).

With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25^{th} time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Number of Times Boarding a Bus and Satisfaction Items



As with the frequency of use results, most satisfaction items are negatively correlated with the number of times respondents boarded a bus on the day they responded. The strongest negative correlations are with overall satisfaction, ease of using route & schedule information, temperature in buses and availability of seats.

It should be noted that the LYNX surveys were conducted at the height of the summer and that complaints about temperature and availability of seats may have been magnified by the prevailing weather conditions at the time the surveys were taken.

The number of times a respondent boards a bus is correlated with both the number of transfers the respondent has to make and the level of dependence the respondent has on the bus for transportation. This being the case, it is not surprising that those who board

buses more are less satisfied with routing, scheduling, and the time it takes to make trips. Solutions for these types of problems are similar to those involved in improving scores for the Span of service factor, namely an operational analysis of routes and schedules.

Also, since there is a specific strong negative correlation with riders who board buses often and ease of using schedules, LYNX may want to conduct focus groups with customers who transfer buses frequently to determine how to make the schedules easier to use.

Correlation of Trip Origins & Destinations and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

For those riders who have visiting/recreation or doctor's offices as either origins or destinations, satisfaction ratings across the board appear to be markedly higher than for other passengers.

Passengers with school as a trip origin are more satisfied with value, latest buses on weekends, and ease of using route and schedule information, but less satisfied with on-time performance, ease of transferring, and number of transfers required. This is all logical because the students are probably more time sensitive and may travel at off-peak hours, and those going to UCF will almost certainly have to transfer. Weekend schedules are probably not an issue for them, and the value of riding the bus compared to owning a vehicle is probably an important factor.

Riders who had shopping as an origin are less satisfied with frequency of service and ease of transferring, as well as on-time performance. LYNX may want to investigate increasing service to major shopping areas.

Correlation of Reasons for using bus and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

People who use the bus because they don't drive are more satisfied with earliest weekend service than other riders. Those who use the bus because it is more economical are, not surprisingly, more satisfied with the value of the bus fare, as well as with safety and with availability of seats, but are less satisfied with span of service.

Those who ride the bus because it is more convenient generally give higher ratings on all items, which is quite consistent.

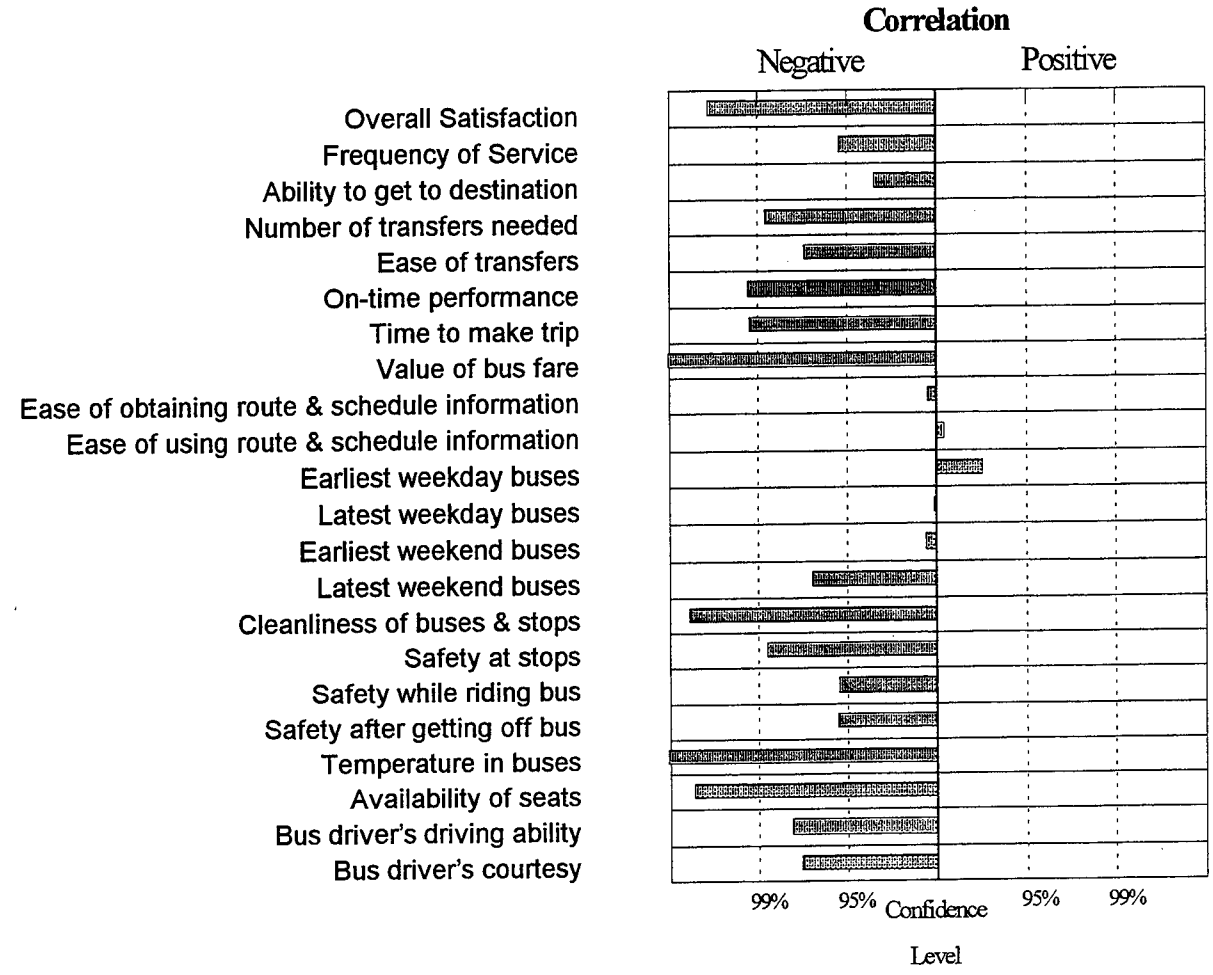
Correlation of how rider would make trip if not by bus and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Riders who would otherwise have driven give higher ratings for ease of transferring than other riders, probably because they are making fewer transfers. Those who would have gotten a ride give lower ratings for cleanliness of stops and buses and for temperature in buses. Those who would have used a taxi give higher ratings for cleanliness. Riders who would otherwise have used a bicycle give higher ratings for most items, the biggest differences occurring on the items for satisfaction with the time it takes to make a trip and the value of the bus fare and span of service on weekends. Finally, those who would otherwise have walked give lower ratings on ability to get where they want to go, transferring, ease of obtaining and using route and schedule information, latest buses on weekdays and safety while on the bus.

LYNX appears to provide less satisfactory service for riders who want to make very short trips (i.e. those who would have walked), but better service for those who take medium length trips (i.e., those who would have biked). This probably reflects the time savings that the riders receive from bus service, as well as a safer travel experience for people who would have otherwise been bicycling to their destinations, particularly early or late in the day.

Correlation of how long Rider has been using Lynx and Satisfaction Items

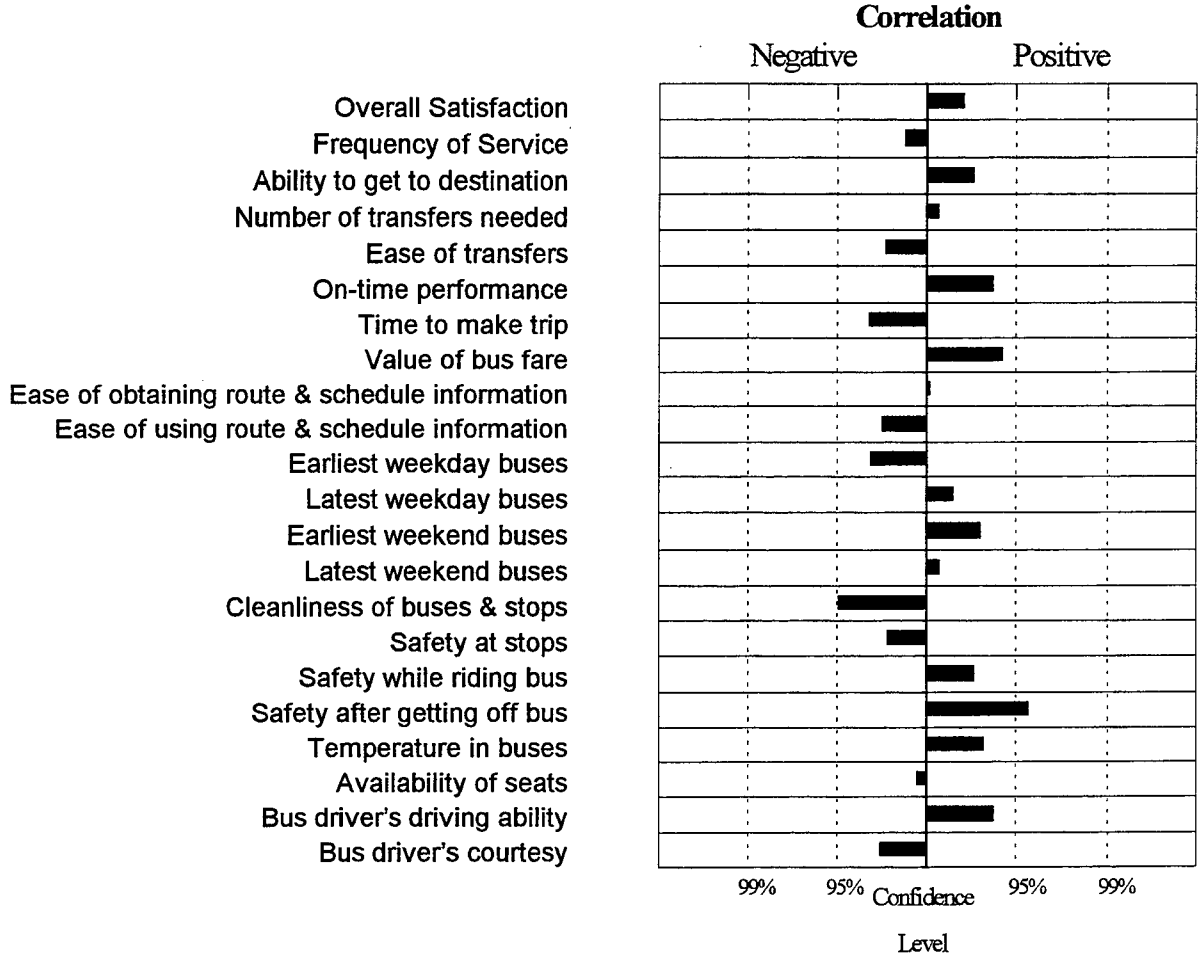


This demographic characteristic is also negatively correlated with almost all satisfaction items, indicating that those riders who have been using LYNX service for long periods of time tend to be significantly less satisfied with many aspects of transit service. The strongest negative correlations were with overall satisfaction, value of bus fare, cleanliness of buses and stops, temperature in buses and availability of seats.

Strategies along the lines of the "frequent user rewards" as outlined above may help to increase rider satisfaction.

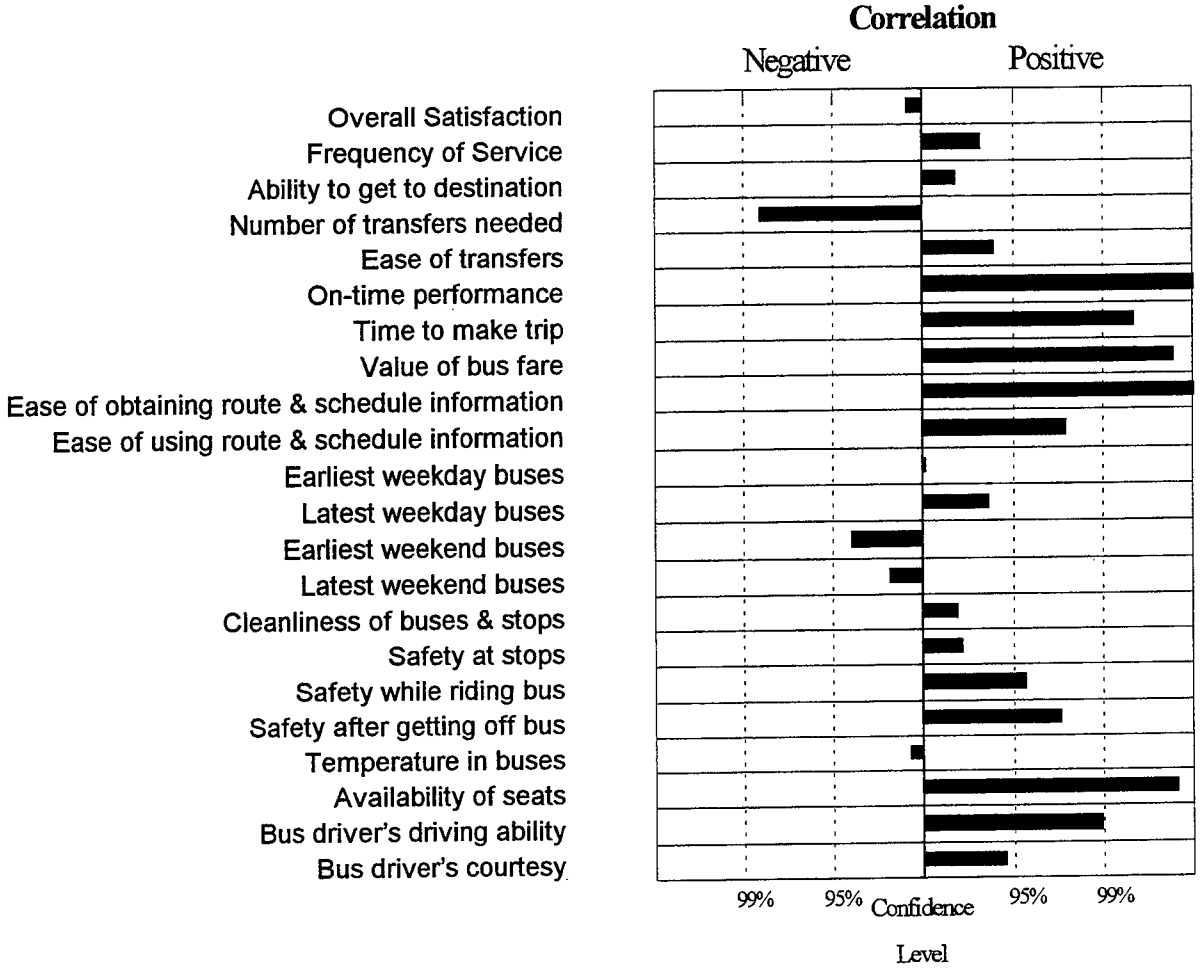
This pattern of satisfaction ratings is common to users of services provided in non-competitive markets, such as utilities, local phone service, and cable television. The longer the customer uses the products, particularly if they are not periodically rewarded for doing so, the more frustration builds up and is observed in satisfaction ratings.

Correlation of Number of Working Telephones in the Home and Satisfaction Items



There are no strong correlations for this item, not surprisingly. The main purpose of data collection for this item was to demonstrate that a sizable proportion of the bus-riding population does not have telephones and thus telephone-based surveys might inadequately cover this segment. A single significant positive correlation exists between the number of working phones and satisfaction with safety after getting off the bus. Very likely this is a random finding as explained in the introduction to this section.

Correlation of Age and Satisfaction Items



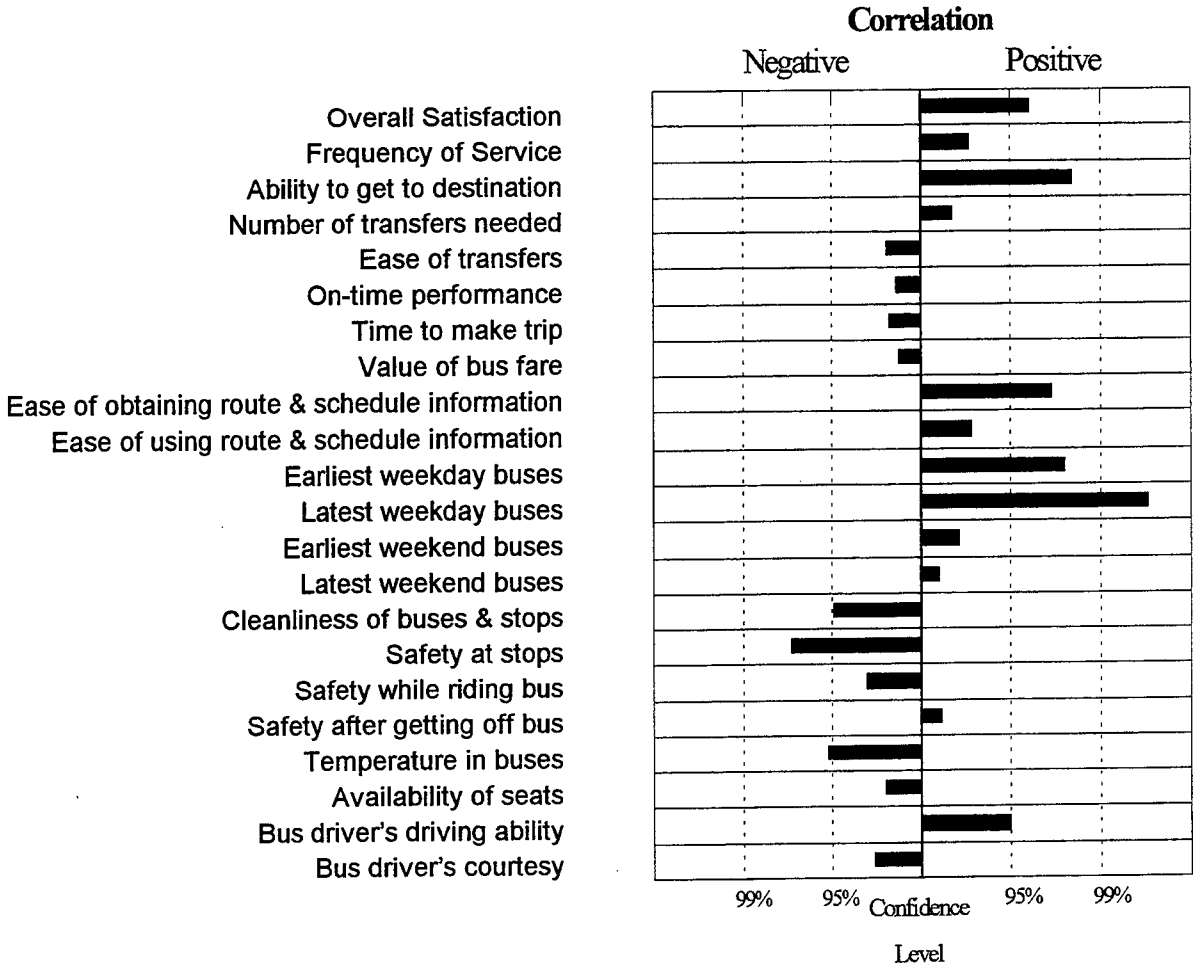
Respondent age is highly related to the satisfaction items, usually positively – that is, the older the respondent, the higher the level of satisfaction with most items. The single item that is negatively correlated with age is satisfaction with number of transfers required. This correlation is quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs.

Many items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders.

The items that have the strongest positive correlations, in order of strength of correlation, are: On-time performance, ease of obtaining route & schedule information, availability of seats on buses, value of bus fare, and bus driver's ability to drive bus.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves transportation, they should be viewed as a key customer segment. LYNX should consider it a notable achievement that they have been able to provide service that is more satisfactory to this group of customers.

Correlation of Gender and Satisfaction Items



Many of the satisfaction items have significant correlations with respondent gender. These are listed below:

Less satisfactory for females: safety at bus stop, temperature inside buses.

Less satisfactory for males: Overall satisfaction, frequency of service, ease of obtaining route and schedule information, weekday span of service, particularly for later buses.

Clearly there is an issue of safety – males would rather have buses run later, while females are relatively satisfied with the time of day the latest buses run; conversely, females feel less safe when they are waiting for the bus, compared to males.

This is not a surprising result. However, LYNX should investigate any improvements that could be made to make women feel safer at bus stops and while riding the buses, such as increased lighting at stops and shelters and installing security cameras on buses.

Correlation of Race and Satisfaction Items

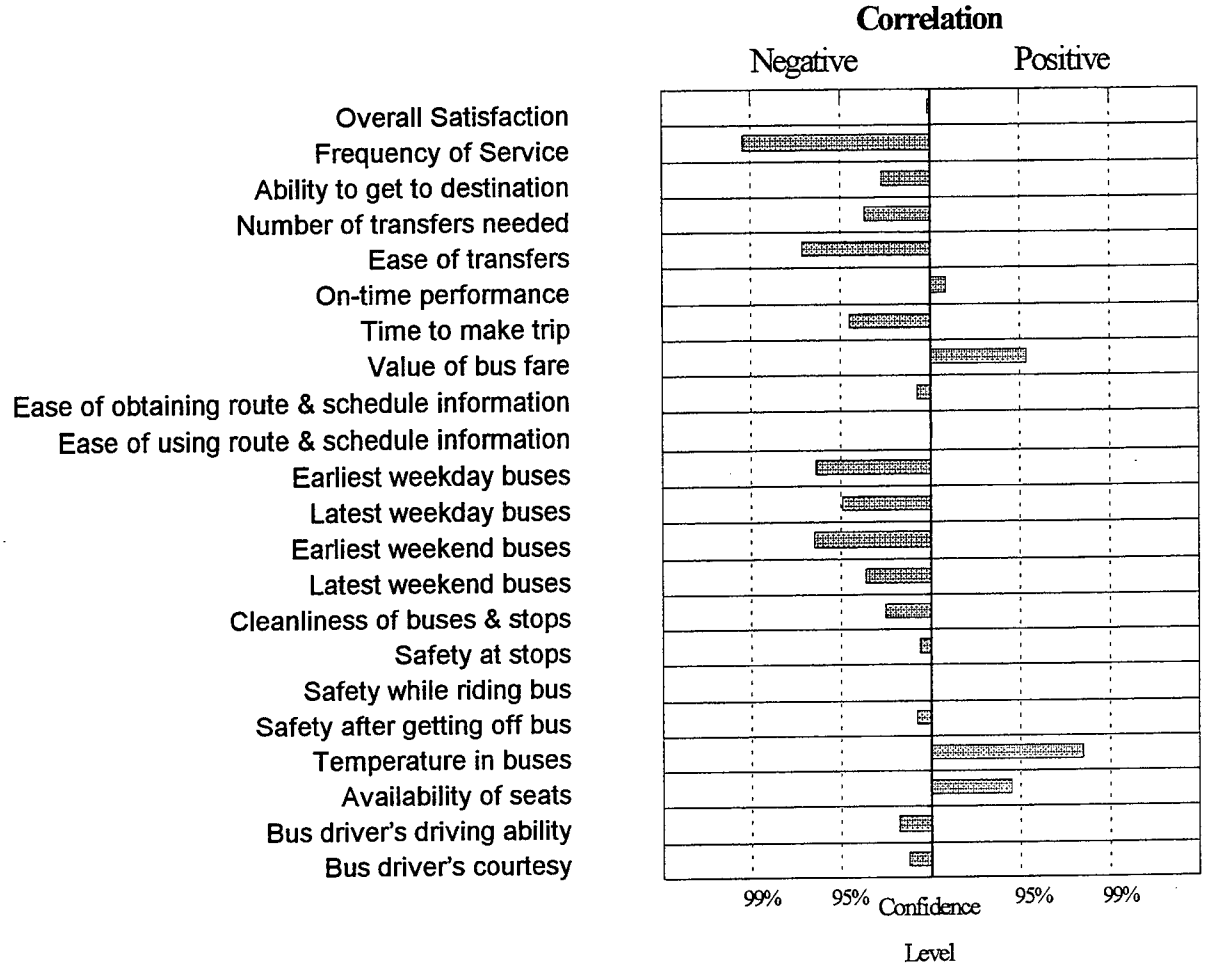
This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Whites have a significantly higher rating of satisfaction with on-time performance.

Hispanics have significantly lower satisfaction ratings with span of service.

Few Asians were surveyed. The findings are therefore not conclusive, but Asians do give much lower satisfaction ratings for frequency of service and number of transfers required. LYNX should determine if span of service could be justifiably increased for those routes serving Hispanic neighborhoods. Other findings are inconclusive and do not warrant specific recommendations.

Correlation of Income and Satisfaction Items



Most satisfaction items are negatively correlated with income. The items that have significant negative correlations with income include frequency of service, ease of transferring, and span of service. There is a positive correlation between satisfaction with value of bus fare and temperature inside buses.

This may be a geographically based result. Those riders living in higher-income neighborhoods may not get the level of service that they feel they need. This implies, however, that lower-income riders are more satisfied with frequency and span of service, which is very important since those riders are presumably more dependent on transit service for transportation.

Survey Instrument

The survey instrument is provided on the following pages. The survey was printed on 60# green cardstock, on both sides of an 8 ½ · 11 sheet.

Dear LYNX Customer: Please help us! Your opinions and information about your trip are very important in helping us improve our service for you. Please complete **both sides** of this survey and place it **in the box by the bus door** when you get off the bus. **Even if you are not finished** with the survey when you complete your trip, please drop it in the box when you get off the bus. Thanks for your help!

1. Have you filled out this survey earlier today? ❒ no **Continue** ❒ yes **STOP! Please place in return box**

2. How often do you ride the bus?
   ₁❒ 5 or more days/week ₂❒ 4 days/ week ₃❒ 3 days/ week ₄❒ 2 days/ week ₅❒ 1 day/ week ₆❒ Once every __ weeks

3. How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with LYNX	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

Continue on other side

4a. Thinking only about **last week**, did you ride the bus on:

Monday?	Tuesday?	Wednesday?	Thursday?	Friday?	Saturday?	Sunday?
1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes
2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No

4b. How many times will you board a bus today, including any times you transfer? **(circle ONE answer)**
1 2 3 4 5 6 7 8 9 10 or more

5. What is the nearest major street intersection to where you:
boarded this bus? _____ & _____
will get off this bus? _____ & _____

6a. Where are you coming from on this trip?
1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

6b. Where are you going on this trip?
1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

7. Does your trip involve a transfer? 0 ☐ No 1 ☐ Yes, one transfer 2 ☐ Yes, two or more transfers

IF YES Transferring from Link ___ to Link ___ to Link ___

8. What is the most important reason you ride the bus? (please **check only one**)
1 ☐ I don't drive 2 ☐ Car is not available 3 ☐ Bus is more economical
4 ☐ Bus is more convenient 5 ☐ Other (please specify _____)

9. How would you make this trip if not by bus? (please **check only one**)
1 ☐ Drive 2 ☐ Ride with someone 3 ☐ Taxi 4 ☐ Bicycle 5 ☐ Walk
6 ☐ Wouldn't make the trip

10. How long have you been using LYNX service? (please **check only one**)
1 ☐ Less than 6 months 2 ☐ 6 months to 1 year 3 ☐ 1 to 2 years 4 ☐ More than 2 years

11. How many working telephones do you have in your household?
0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

12. What is your age?
1 ☐ Under 18 2 ☐ 18-24 3 ☐ 25-34 4 ☐ 35-44
5 ☐ 45-54 6 ☐ 55-64 7 ☐ 65 or over

13. What is your gender?
1 ☐ male 2 ☐ female

14. What is your ethnic heritage?
1 ☐ White 2 ☐ Black 3 ☐ Hispanic 4 ☐ Asian
5 ☐ Something else (specify: _____)

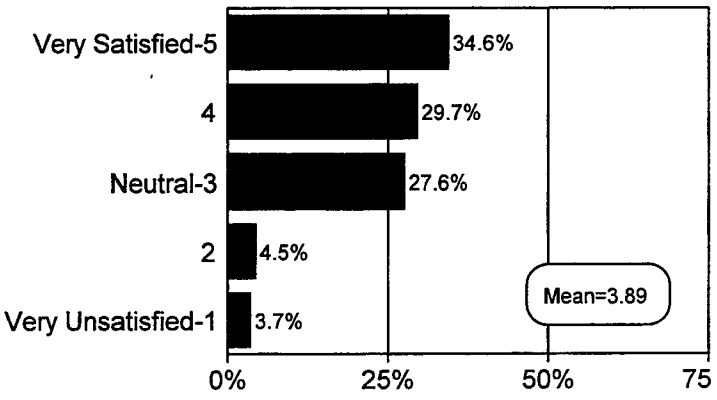
15. In what range was **your household's total income** for 1996?
1 ☐ Under $5,000 2 ☐ $5,000 to $9,999 3 ☐ $10,000 to $14,999
4 ☐ $15,000 to $19,999 5 ☐ $20,000 to $24,999 6 ☐ $25,000 to $29,999
7 ☐ $30,000 to $39,999 8 ☐ $40,000 to $49,999 9 ☐ $50,000 or more

Thank you for your assistance!

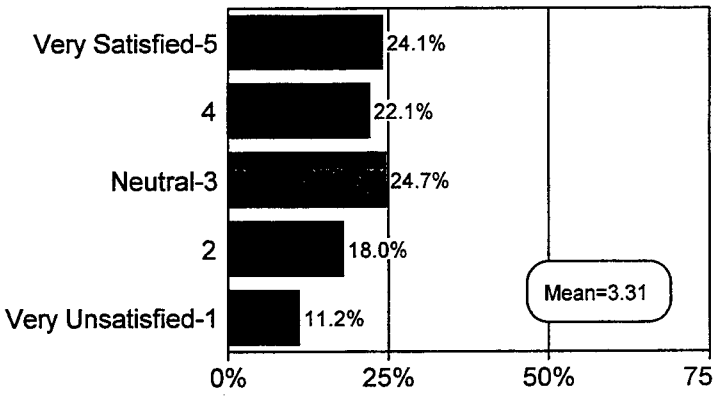
Results by Question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

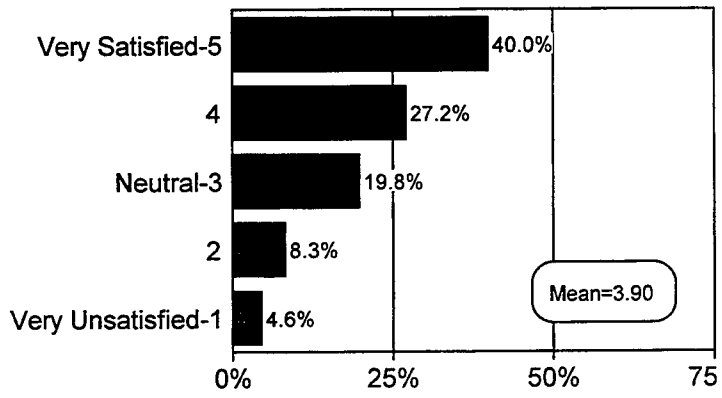
3a. Your overall satisfaction with LYNX...



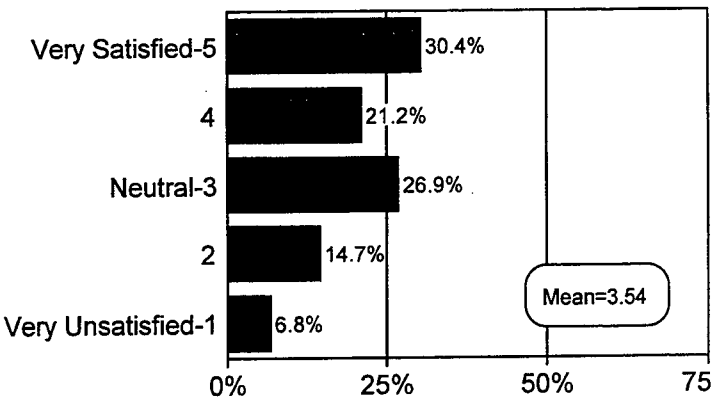
3b. Frequency of service (how often buses run)...



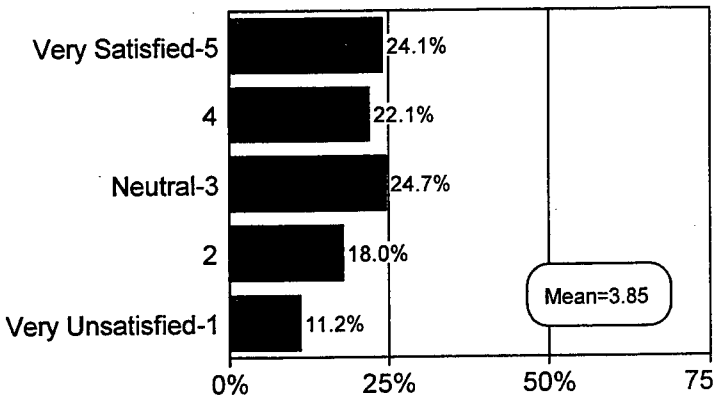
3c. Your ability to get where you want to go using the bus...



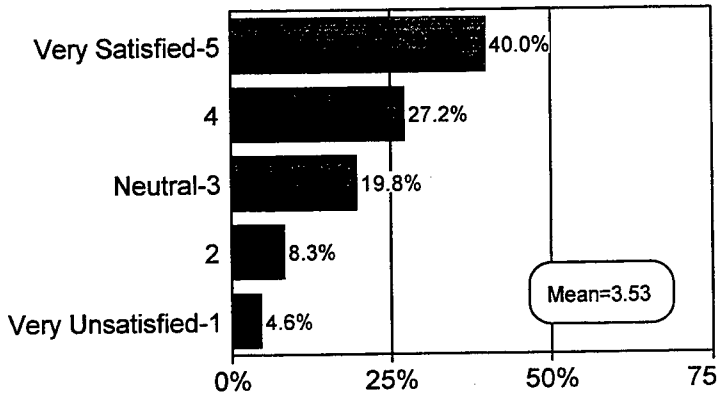
3d. The number of times you have to transfer buses...



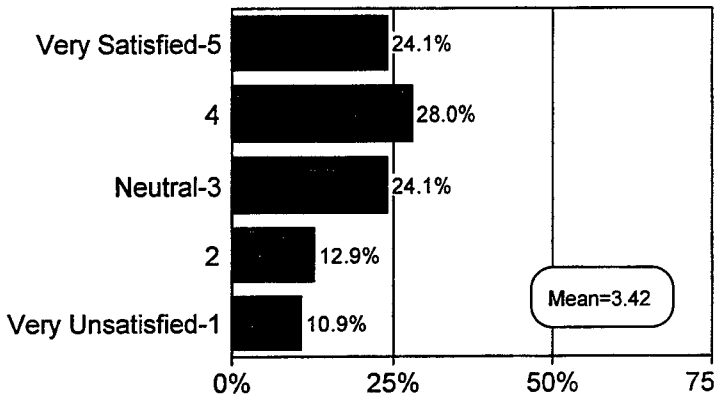
3e. How easy it is to transfer buses...



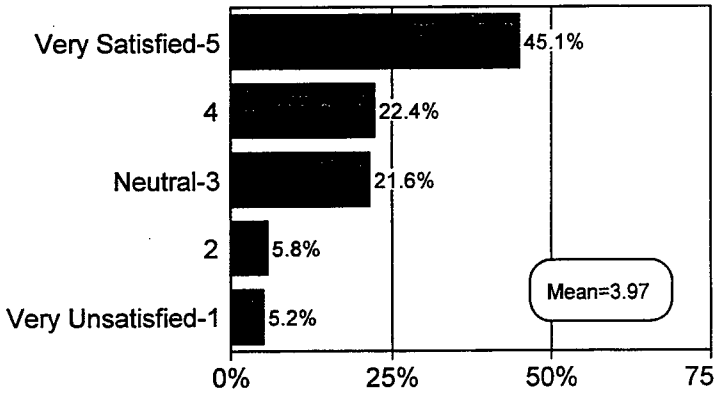
3f. How regularly buses arrive on time...



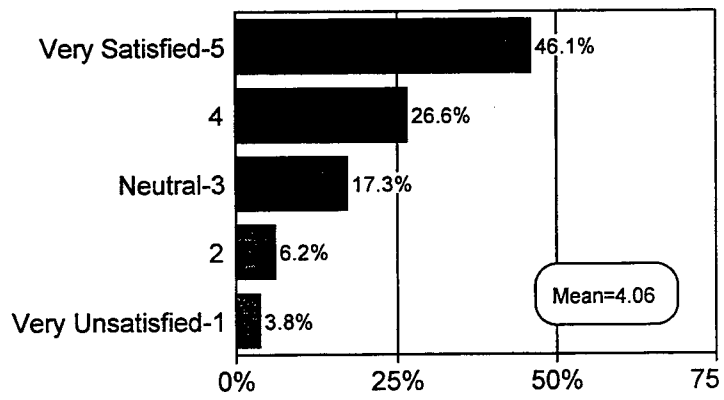
3g. The time it takes to make a trip by bus...



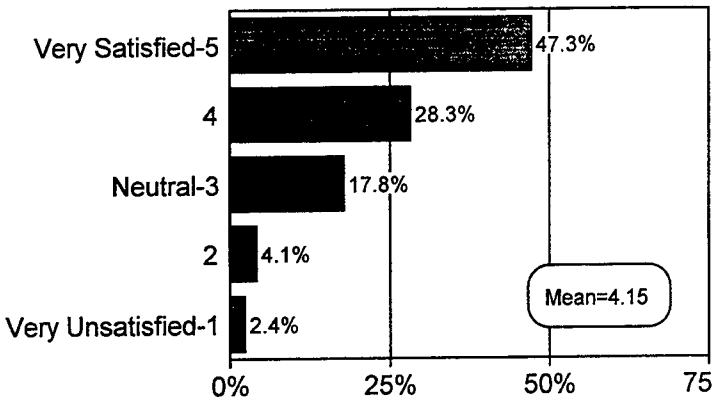
3h. Value of bus fare (service you get for what you pay)...



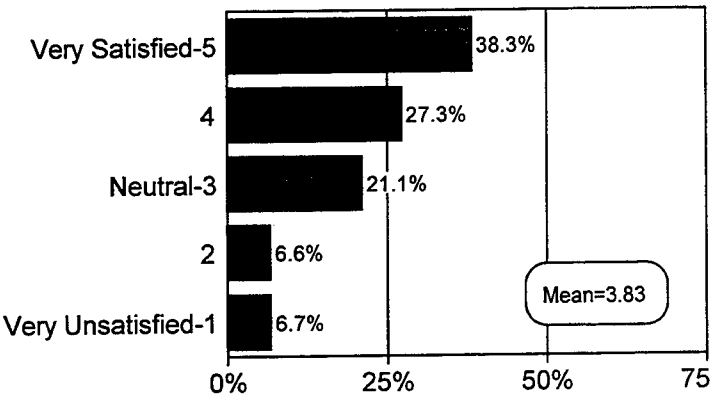
3i. How easy it is to obtain bus route & schedule information...



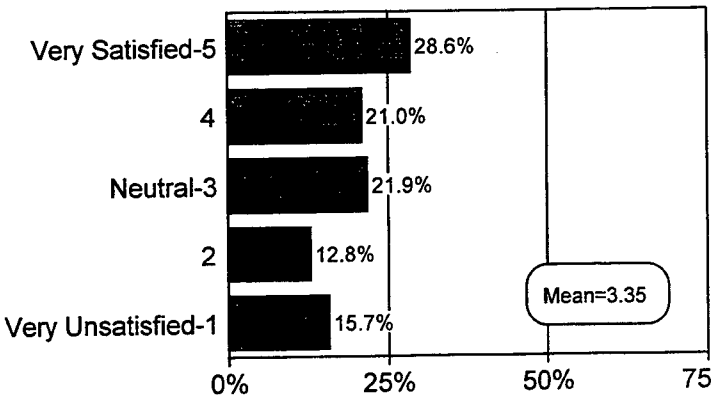
3j. How easy it is to use bus route & schedule information...



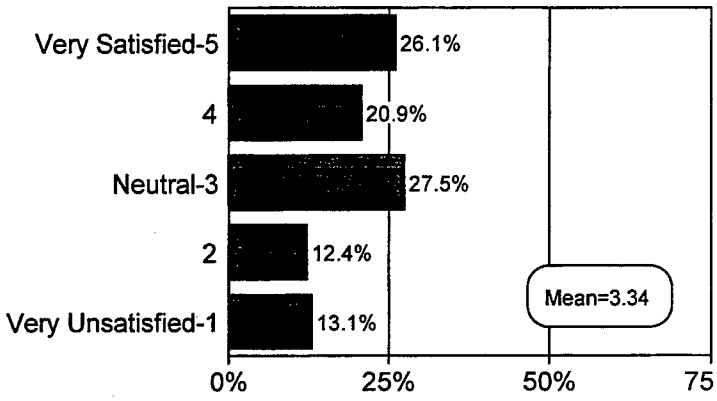
3k. The time of day the earliest buses run on weekdays...



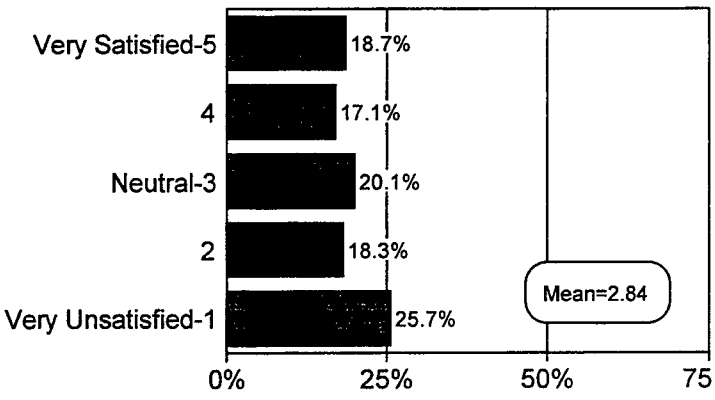
3l. The time of day the latest buses run on weekdays...



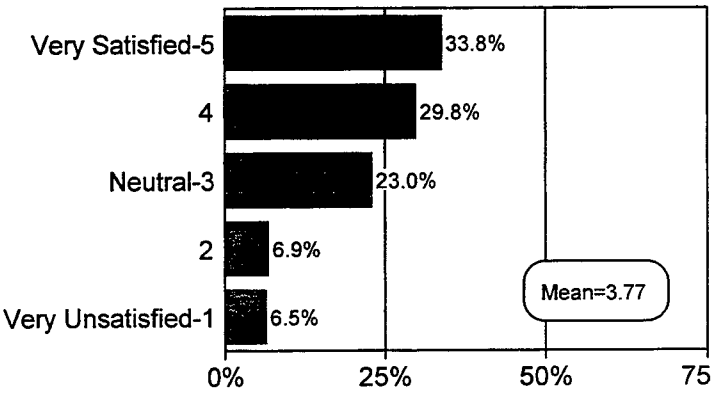
3m. The time of day the earliest buses run on weekend days...



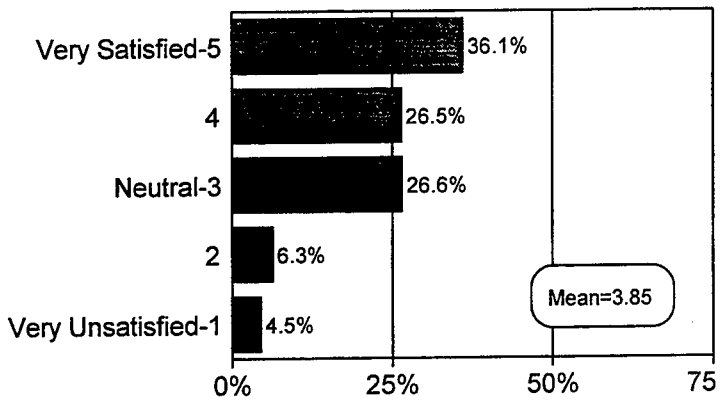
3n. The time of day the latest buses run on weekend days...



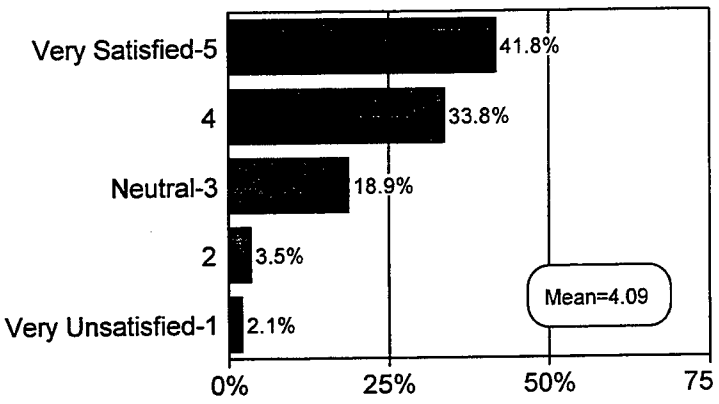
3o. How clean the buses and bus stops are...



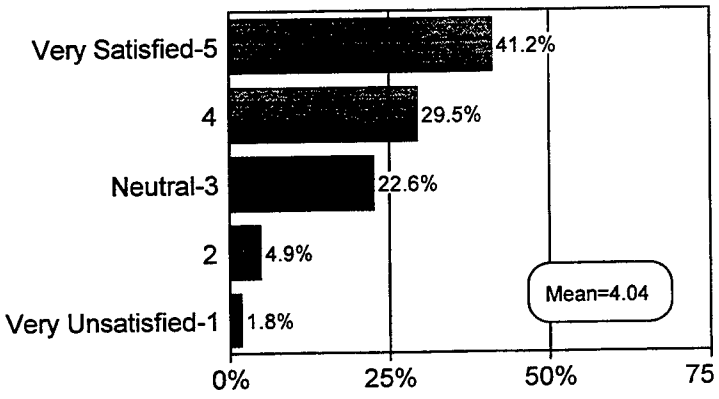
3p. Safety at the bus stop...



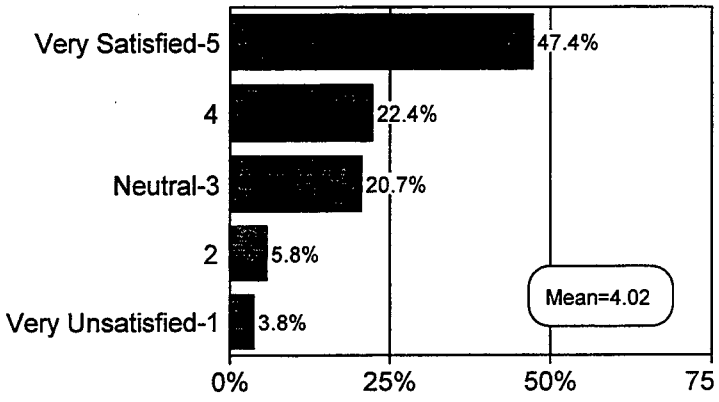
3q. Safety while riding the bus...



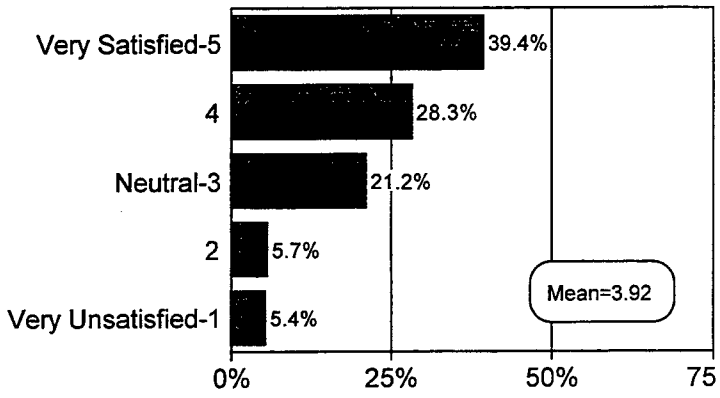
3r. Safety after getting off the bus...



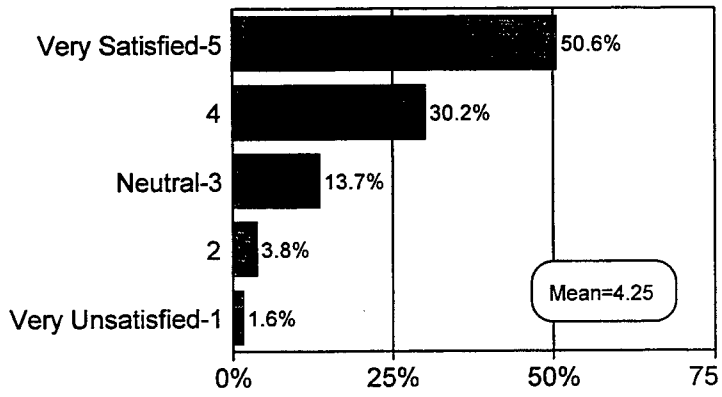
3s. Temperature inside the buses...



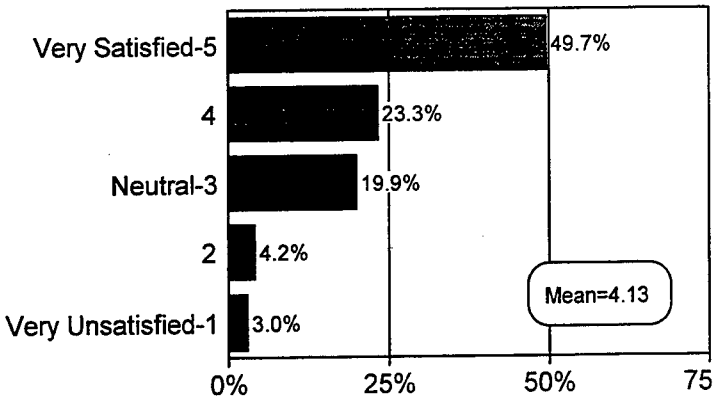
3t. Availability of seats on buses...



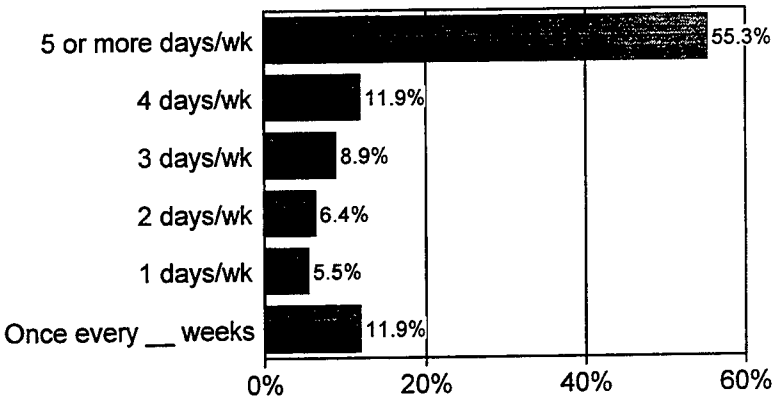
3u. The bus driver's ability to drive the bus...



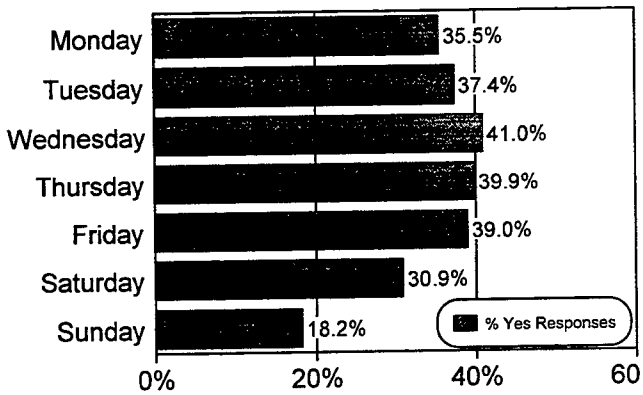
3v. The bus driver's courtesy...



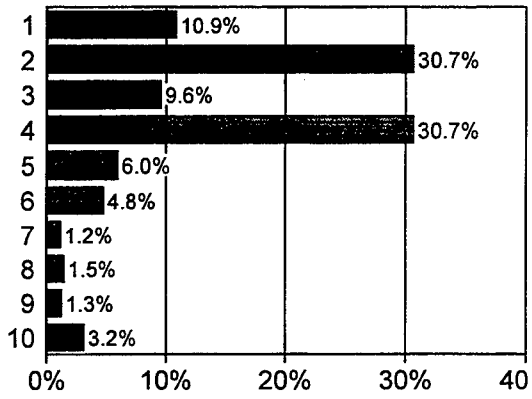
2. How often do you ride the bus?



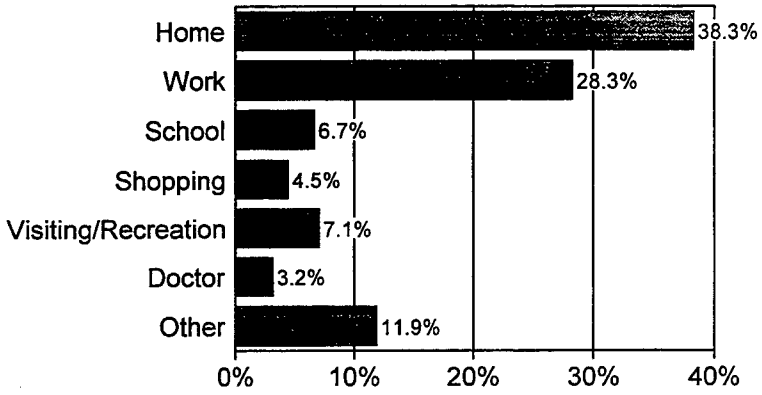
4a. Thinking only about last week, did you ride the bus on...



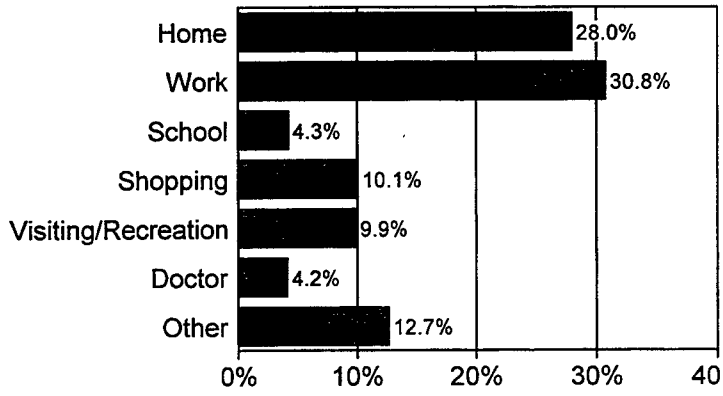
4b. How many times will you board a bus today, including transfers?



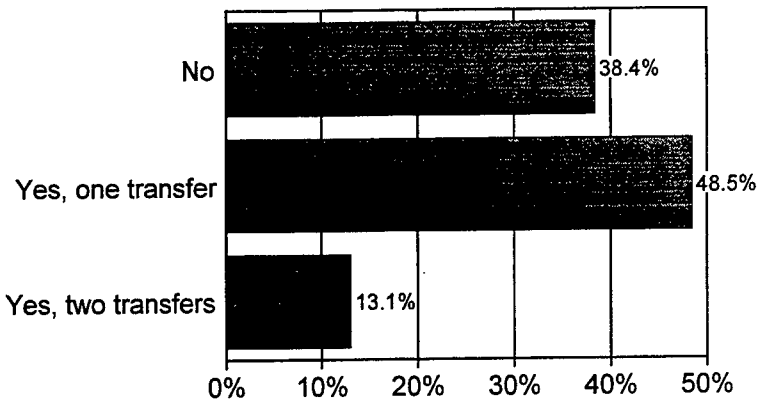
6a. Where are you coming from on this trip?



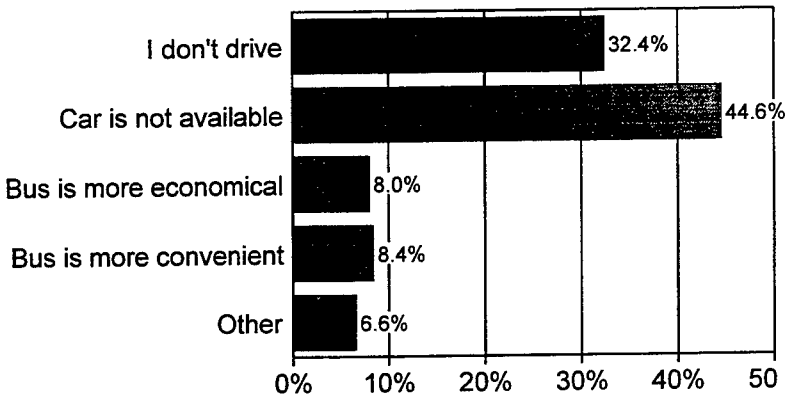
6b. Where are you going on this trip?



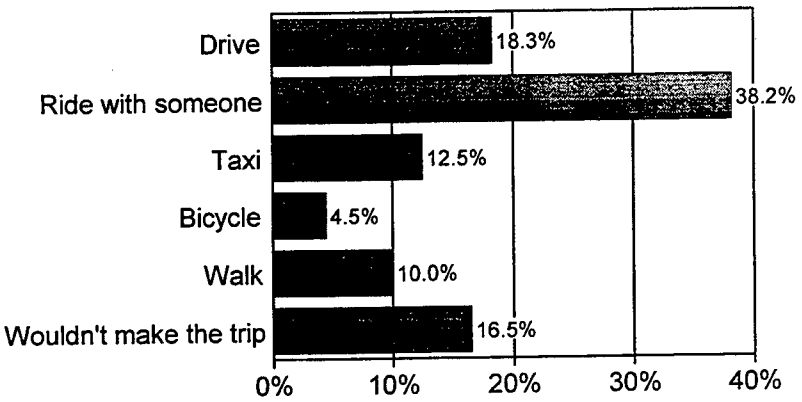
7. Does you trip involve a transfer?



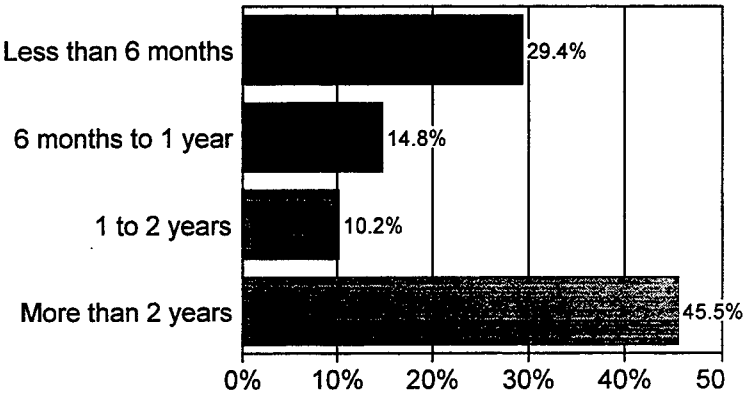
8. What is the most important reason you ride the bus?



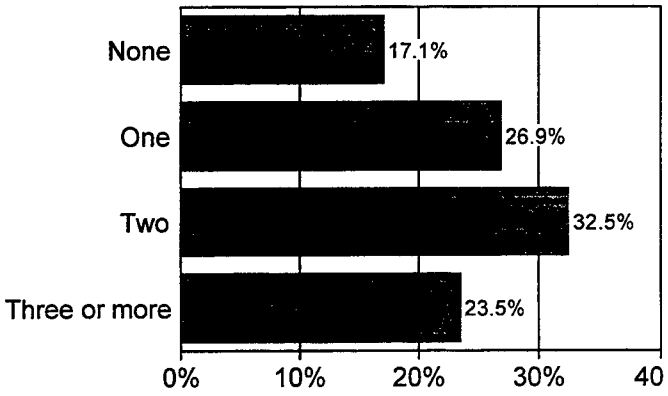
9. How would you make this trip if not by bus?



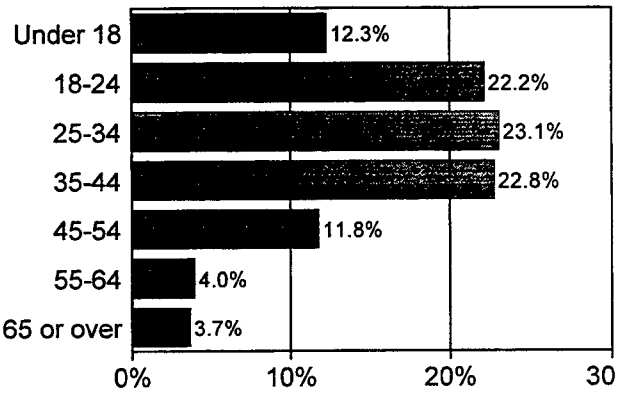
10. How long have you been using LYNX service?



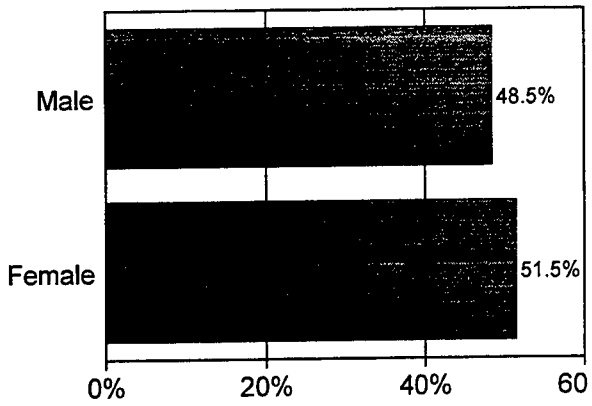
11. How many working telephones do you have in your household?



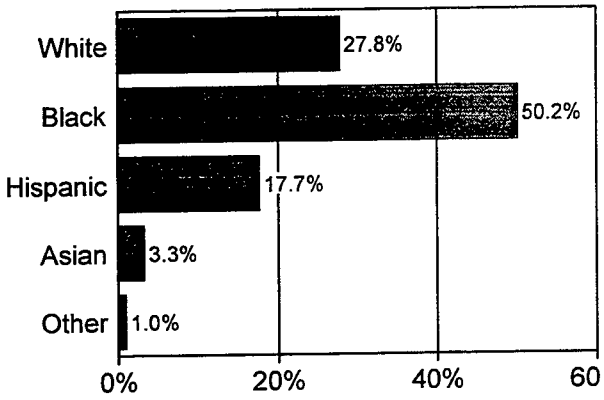
12. What is your age?



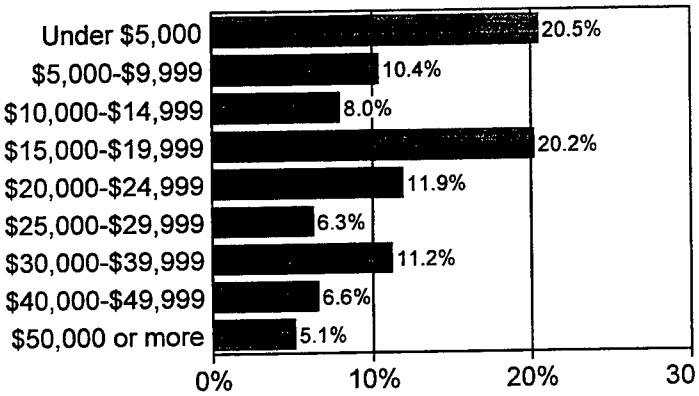
13. What is your gender?



14. What is your ethnic heritage?



15. In what range was your household's total income for 1996?



PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)

Sampling Methodology

Surveys were distributed to riders by PSTA drivers on all routes. Surveys were distributed on Thursday, May 7, 1997 and on Saturday, May 9, 1997, during all hours of service. Also, surveyors were placed on six routes identified by PSTA as having the heaviest ridership. These surveyors were responsible for aiding the drivers in passing out the surveys.

Each survey contained an identification number in the upper right hand corner. The surveys were presorted and a complete log was constructed that identified the range of survey numbers that was distributed to each scheduled run for each day. The routes were identified by matching the ID numbers of the returned surveys with the original distribution pattern.

A total of 43 of the 51 PSTA routes had surveys returned by respondents. This however, only represented route coverage from 20 percent of the total number of returned surveys. A total of 6,077 surveys were returned, 1,191 all of which were key-entered into an Excel database. A total of 974 of the 1,191 key-entered surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question, and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

The factor analysis of PSTA data identified four factors. Some variables will be observed to be part of more than one factor; for instance, "Value of Bus Fare" appears on two separate factors, which indicates that customer perception of value is, not surprisingly, connected with many different elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 32 PSTA Factor 1 - Rider Confidence		
Item	**Scores**	
	Index	**Mean**
Safety on buses	103.40	4.26
Seats available	103.21	4.16
Safety after getting off bus	102.13	4.10
Temperature in buses	99.29	3.91
Cleanliness of stops & buses	106.20	3.89
Bus driver's driving ability	101.28	4.37
Safety at stops	103.08	3.96
Using schedule/route information	105.35	4.34
Buses on time	107.40	3.77
Overall Mean		**4.08**

Table 33 PSTA Factor 2 - Span of Service		
Item	**Scores**	
	Index	**Mean**
Latest weekend runs	104.08	3.01
Earliest weekend runs	104.43	3.47
Latest weekday runs	102.07	3.19
Earliest weekday runs	104.28	3.93
Frequency of service	106.65	3.52
Overall Mean		**3.42**

Table 34 PSTA Factor 3 - Printed Schedules		
Item	Scores	
	Index	Mean
Obtaining schedule/route information	105.38	4.32
Using schedule/route information	105.35	4.34
Value of bus fare	104.58	4.14
Can get to destination	104.61	4.09
Overall Mean		**4.22**

Table 35 PSTA Factor 4 - Routes & Headways		
Item	Scores	
	Index	Mean
Number of transfers needed	99.43	3.33
Time to make trip	105.31	3.64
Ease of transfers	100.25	3.80
Can get to destination	104.61	4.09
Frequency of service	106.65	3.52
Value of bus fare	104.58	4.14
Buses on time	107.40	3.77
Overall Mean		**3.76**

The resulting linear customer satisfaction model structure using these factors takes the form:

$$\text{Customer Satisfaction} = \alpha + \beta 1 * \text{factor1} + \beta 2 * \text{factor2} + \beta 3 * \text{factor3} + \beta 4 * \text{factor4} + \beta 5 * \text{factor5}$$

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table 36 below. The coefficients can be viewed as the relative importance of each factor to overall customer satisfaction:

Table 36 PSTA Customer Satisfaction Model Coefficients		
Item	**β Coefficient (= importance)**	**Mean Performance Score**
Rider Confidence	0.43	4.08
Span of Service	0.37	3.42
Printed Schedules	0.25	4.22
Routes & Headways	0.51	3.76
(Model Intercept	4.06	N/A)

The statistics relating to this model are:

R-square = .527 % of Overall satisfaction ratings predicted within 0.5 = 57%

% Correct classification = 81%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of PSTA's operations.

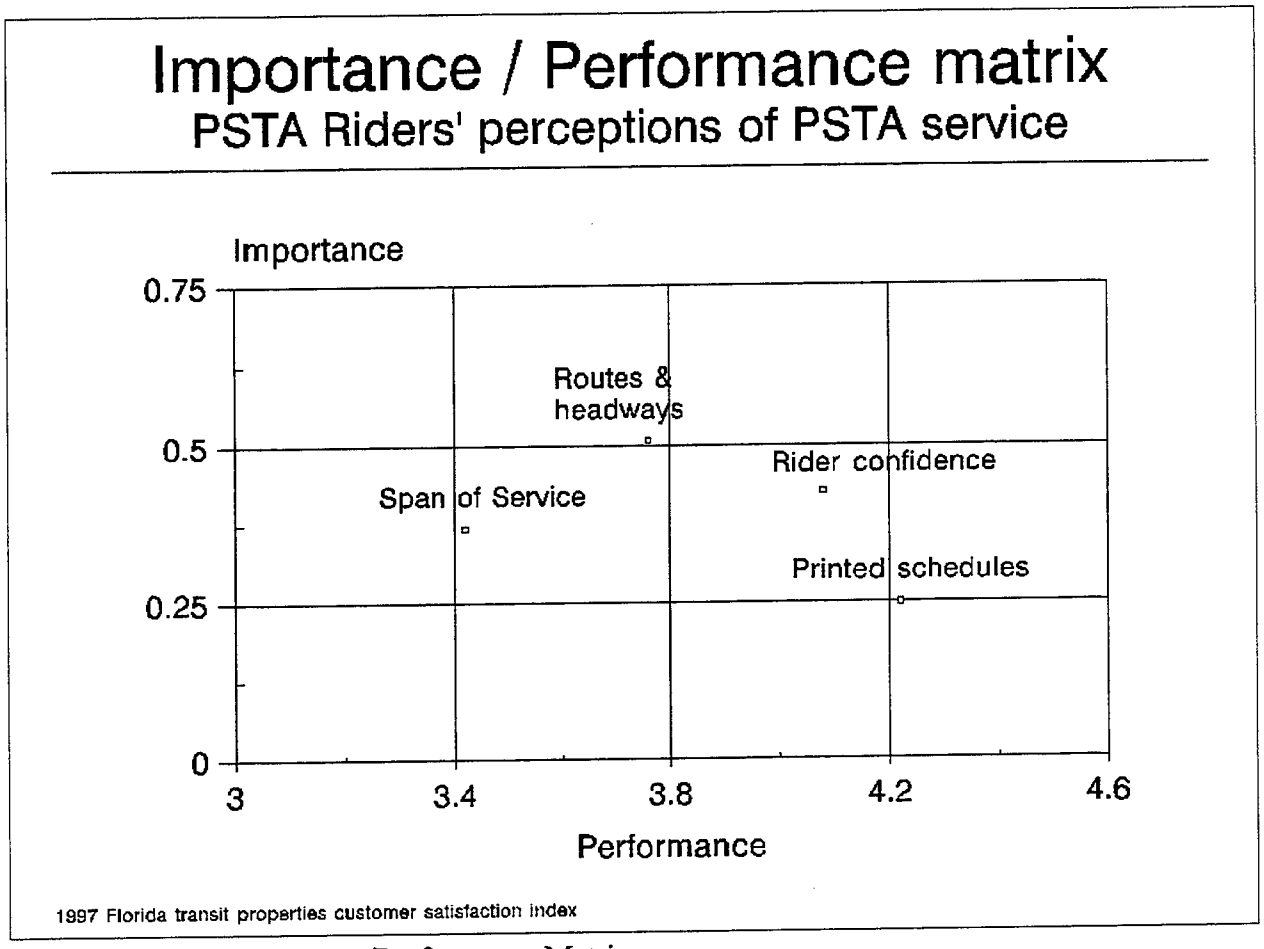


Figure 5 PSTA Importance/Performance Matrix

The chart has been divided into twelve regions, reflecting various combinations of low, medium, high, and extremely high performance and low, medium, and high importance. Only one of the other systems in the study achieved any average factor ratings over 4.2, which is already an excellent score. One of the four PSTA factors scored over 4.2, which is an extremely impressive result. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 37
Interpretations of PSTA's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High/Ex. High	Possibly reduce focus on this area	
Low	Medium	Maintain performance - no action	
Low	Low	Maintain performance - no action	
Medium	High/Ex. High	Maintain performance - no action	Rider Confidence, Printed Schedules
Medium	Medium	Maintain performance - no action	
Medium	Low	Investigate for improvements	Span of Service
High	High/Ex. High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	Routes & Headways
High	Low	Critical improvement area	

Two of the four PSTA factors are in the "maintain performance/no action" areas. The areas potentially requiring action are the Span of Service factor (although performance is borderline and actually lies in the medium rather than low area, but is re-interpreted as noted previously) and the Routes & Headways factor. On only one Routes & Headways variable does PSTA score relatively low:

Item	Mean	Index
Number of Transfers Needed	3.33	99.43

For the Span of Service factor, the items of particular note are:

Item	Mean	Index
Latest Weekend Runs	3.01	104.08
Latest Weekday Runs	3.19	102.07

Typically, these are the areas where all six systems achieved the lowest ratings. Even in these areas, PSTA is performing at least as well as other Florida transit systems from an index standpoint, and in some cases much better.

PSTA may, however, want to review existing O/D data to see if there are any particular O/D combinations that have heavy use and seem to require transfers that might be alleviated by route adjustments.

There are other items that PSTA achieves low scores on (particularly Span of Service issues), but these are not currently having a major impact on customer satisfaction.

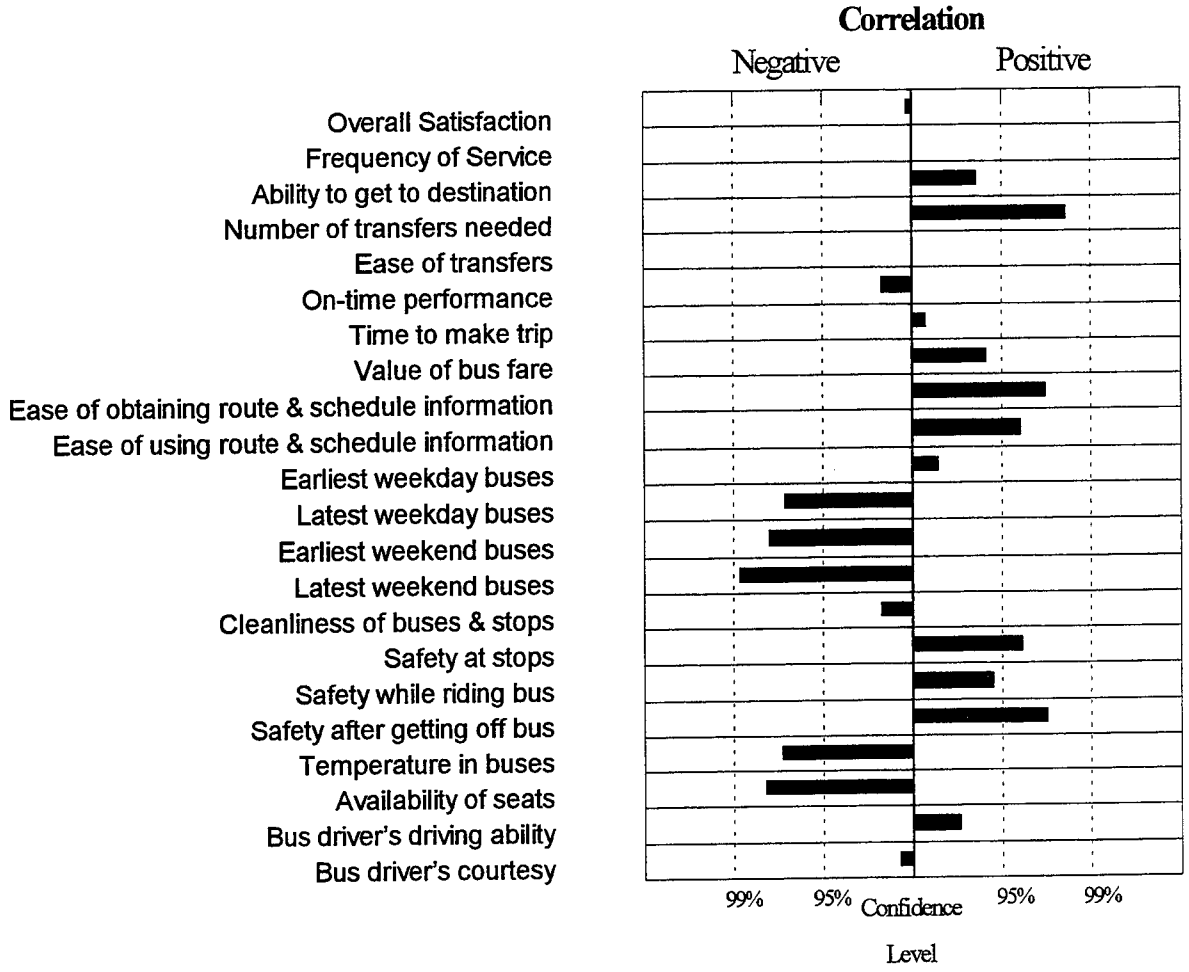
The analysis of demographics, which follows, also suggests that PSTA should:

- consider implementation of strategies to reward frequent users of the transit system
- continue tracking passenger reports of pleasant and unpleasant experiences using the bus system, and investigate those findings. Particularly key to satisfaction ratings is observation of unusually courteous actions by system personnel
- investigate safety improvements such as installation of additional lighting at bus stops and security cameras on buses

Correlation of Demographics and Satisfaction Items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics are being examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

Correlation of Frequency of Ridership and Satisfaction Items



Correlations between frequency of use and the various satisfaction items in the survey are mixed. There are more positive correlations with frequency of use in PSTA than in the other systems that were surveyed in this project.

For instance, the heaviest users of the system report that they are more satisfied with number of transfers required, ease of obtaining and using route and schedule information, and safety related issues. At the same time, however, the same users are less satisfied with latest weekday buses and weekend span of service, availability of seats on the buses and temperature in the buses.

PSTA's route system appears to adequately serve those riders who use the bus most often, and those users are also satisfied with provision and design of route and schedule information.

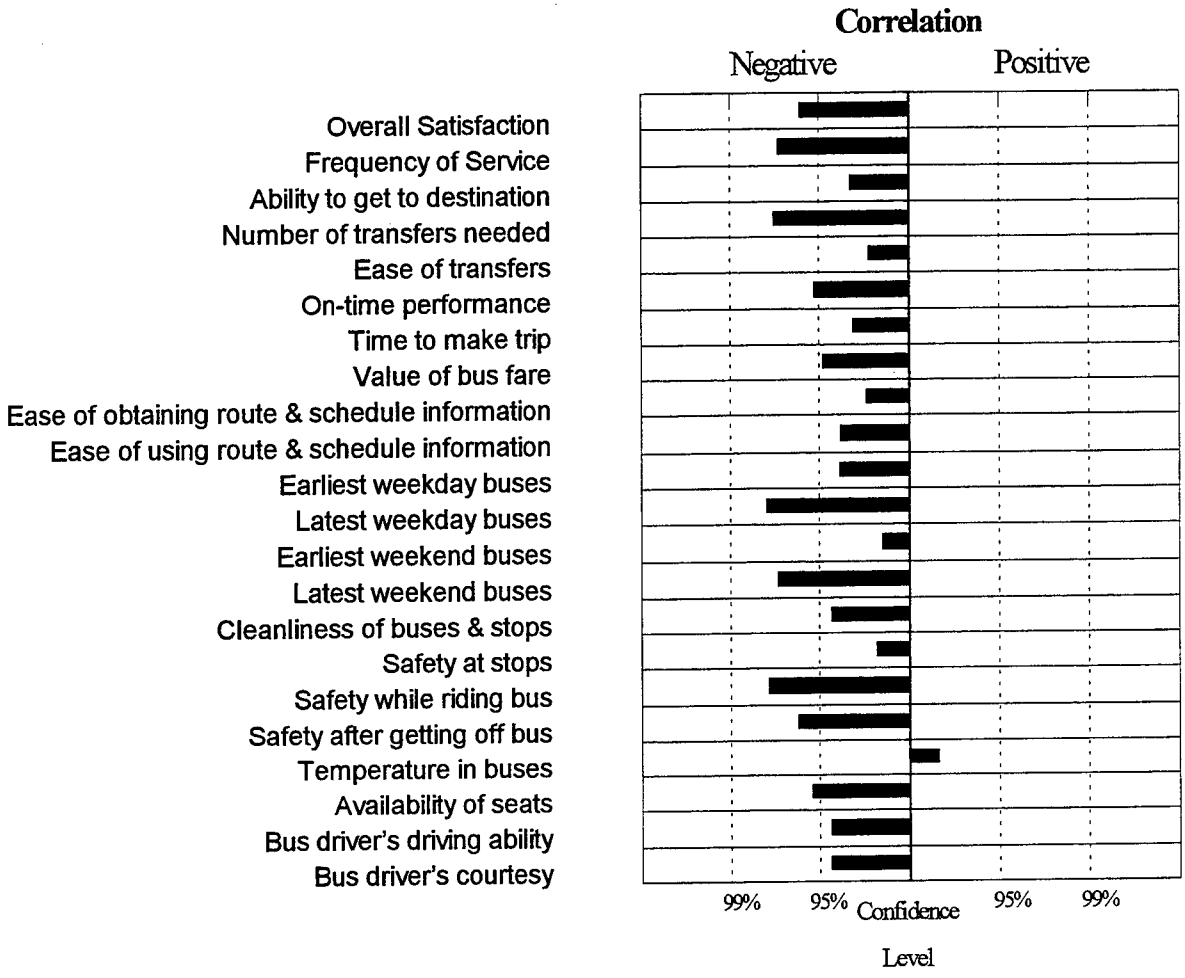
Since the heaviest users are those who are also most dependent on transit service, it is not surprising that the lower levels of satisfaction exist with some aspects of service, particularly span of service issues.

People who use the bus 5 times per week or more make up 50% of the riders on the transit system, according to the estimates developed from these survey results. They represent an absolutely key constituency for the transit systems, and efforts to improve overall customer satisfaction should focus on this core group of customers.

Many industries have implemented approaches to reward the heaviest users of their products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance service or air travel).

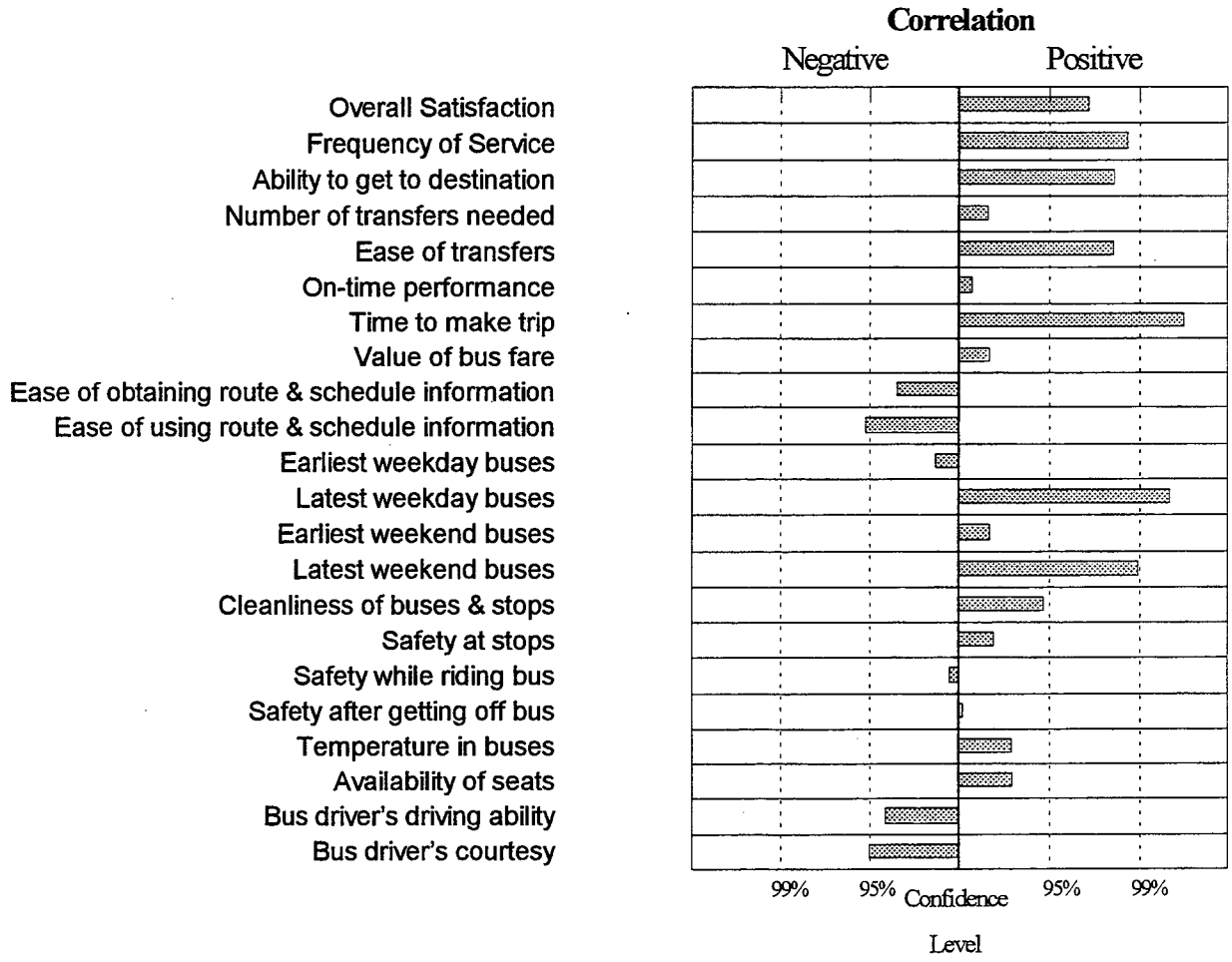
With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services. In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25th time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Time of Day Survey was filled out and Satisfaction Items



As a whole, those riders that filled the survey out later in the day are less satisfied than riders who filled the surveys out earlier in the day. The items that are most strongly correlated with time of day are overall satisfaction, satisfaction with frequency of service, number of transfers required, latest weekday and weekend service, safety while riding and after getting off bus, and availability of seats. Safety and span of service issues are understandable – the later the hour, the more riders will be concerned with these issues. The other items may be products of mood – after a long day at work. This is seen in some of the other surveys in correlations with types of origins and destinations.

Correlation of Whether People have gotten information and Satisfaction Items



About half of the riders surveyed have asked for information. People who have not asked for information are generally more satisfied with most aspects of transit service. The major exceptions, where those who have asked for information are more satisfied, included obtaining and using route & schedule information, and ratings of the bus driver. For other items, particularly time it takes to make trips, latest runs on weekdays and weekends, frequency of service, and ability to get where rider wants to go, those who have not asked for information are more satisfied.

What this indicates is that the people who are having the most difficulty with the system (i.e. can't get to destinations, need later runs, etc.) are in fact the ones calling for information, which is good. This means that those people are at least giving PSTA an opportunity to provide a solution for their transportation problems. Also, those people

are clearly more satisfied after their encounter in their ability to use route and schedule information and appreciate PSTA employee courtesy.

Unfortunately, apparently in many cases their problem is not being solved in the way they would like. These people still feel that it takes too long to make a trip by bus and that they can't get to where they want to go.

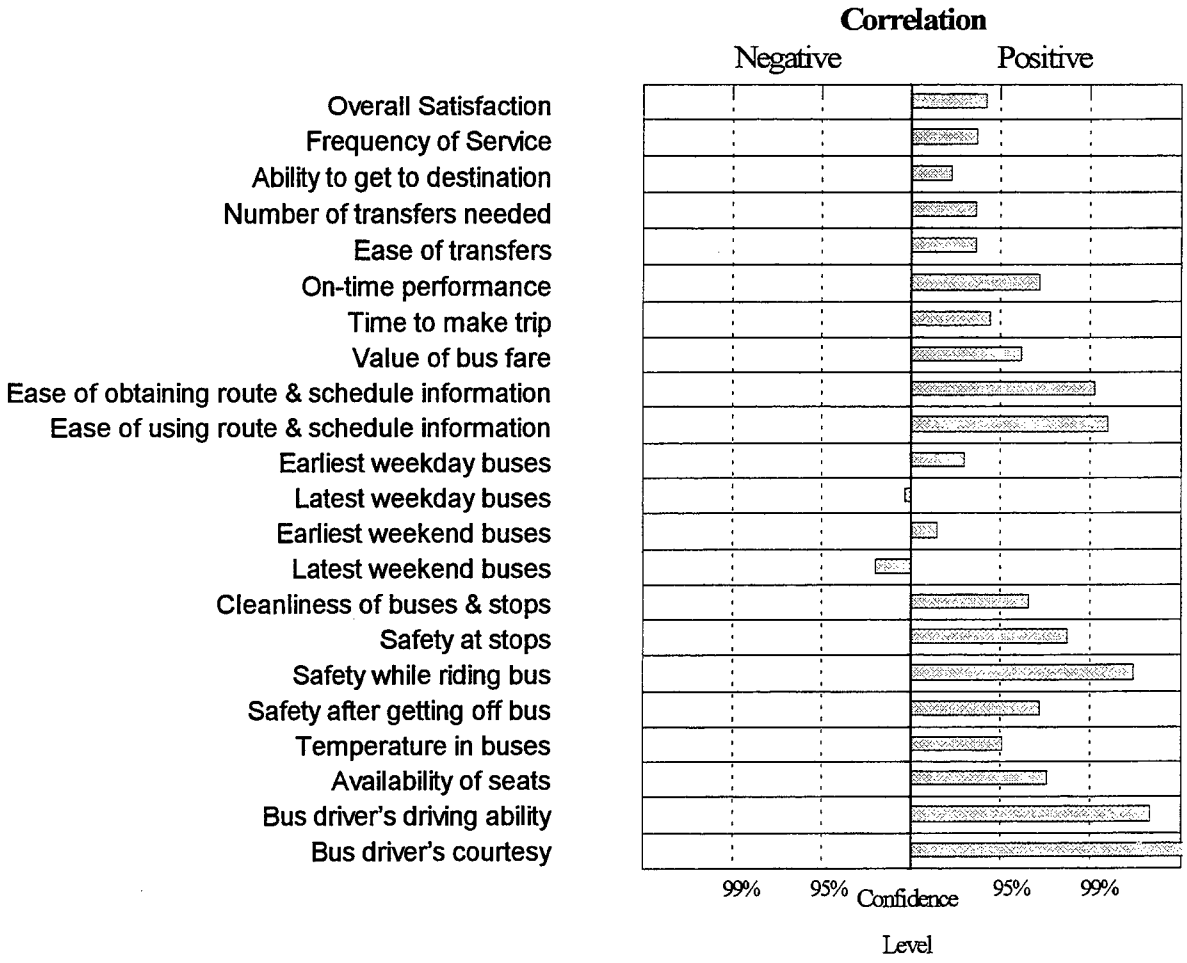
The program, however, appears to be working effectively in that these people are contacting PSTA and are getting answers to their questions. Over 80% of those people are satisfied with the accuracy of the information they are getting and the employees' courtesy, so in general the provision of the information is being handled well.

The charts on the correlation with the satisfaction with the information and courtesy with other satisfaction items are not presented. It should suffice to say that those items are extremely highly correlated with all the satisfaction items, indicating that courteous provision of the information is a key element in overall customer satisfaction.

Correlation of Unpleasant Experiences while using PSTA and Satisfaction Items

A series of questions were asked regarding how many times various unpleasant things had happened to PSTA passengers, including the bus passing by without stopping, the bus leaving early causing the rider to miss the ride, missing a connection, and waiting over an hour for a bus. The individual correlation charts are not presented, once again because the correlations are so high as to be uninformative. Clearly these unpleasant experiences are very detrimental to satisfaction ratings. What PSTA must focus on is a reduction of the number of occurrences of these experiences. The raw data is presented in charts at the end of this section.

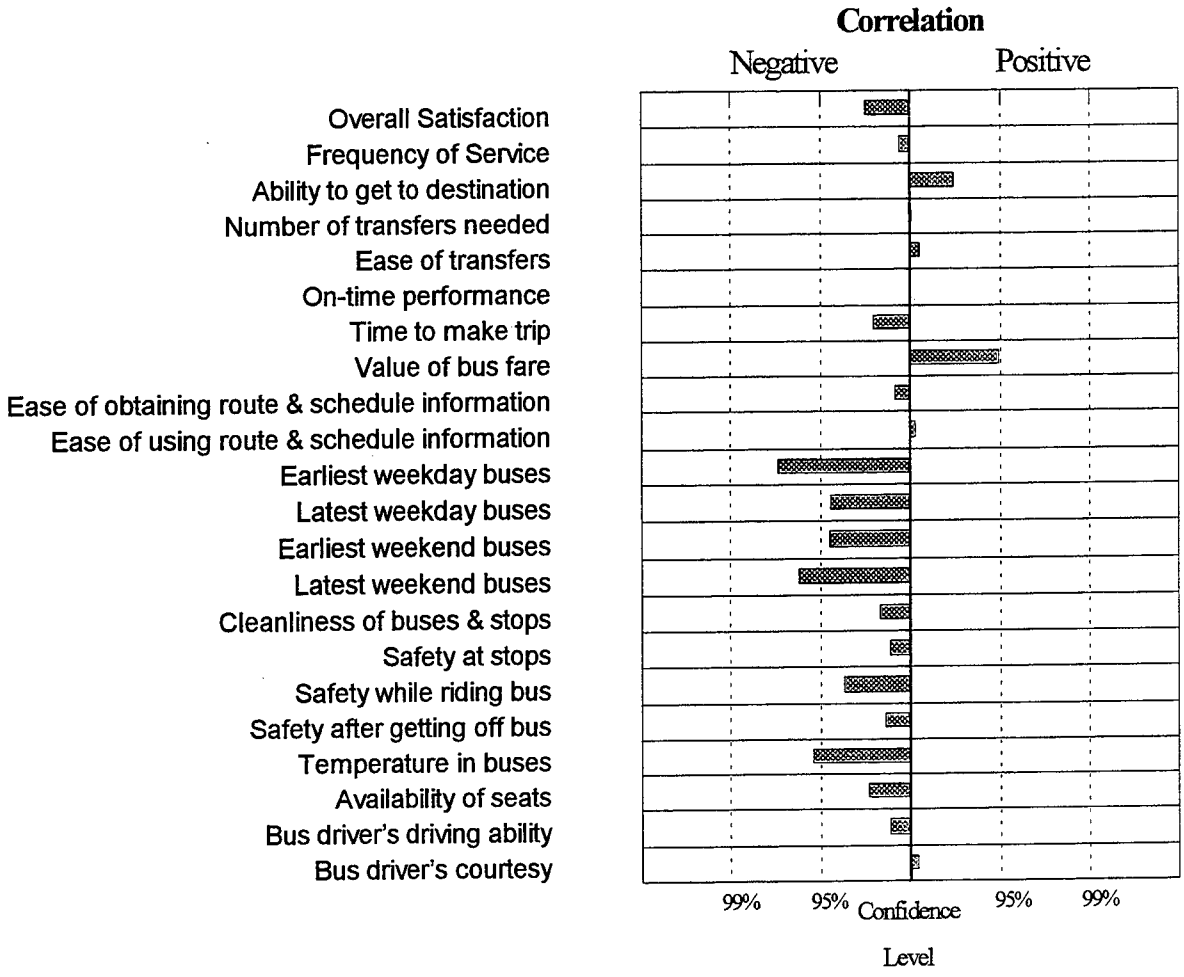
Correlation of Pleasant Experiences while Using PSTA and Satisfaction Items



A single question was asked regarding pleasant experiences, which was whether a driver had been observed to be unusually nice or courteous. Not surprisingly, this has generally positive impacts on overall satisfaction, but these impacts are not as strong as one might expect. The strongest positive correlations are with ratings of bus driver courtesy (obviously) and bus driver's ability to drive bus, perceptions of safety while riding bus, and ease of obtaining route and schedule information. Many other items (but not all) are significantly positively correlated as well. Clearly these actions provide a much more positive impression of the driver and his (or her) ability to do the job, but do not necessarily have a significant positive impact on other aspects of satisfaction.

Nonetheless, this remains a very important element of the provision of highest quality service, and it is important that PSTA continue to track the number of these experiences to gauge customer perception of their drivers.

Correlation of Number of Working Telephones in the Home and Satisfaction Items

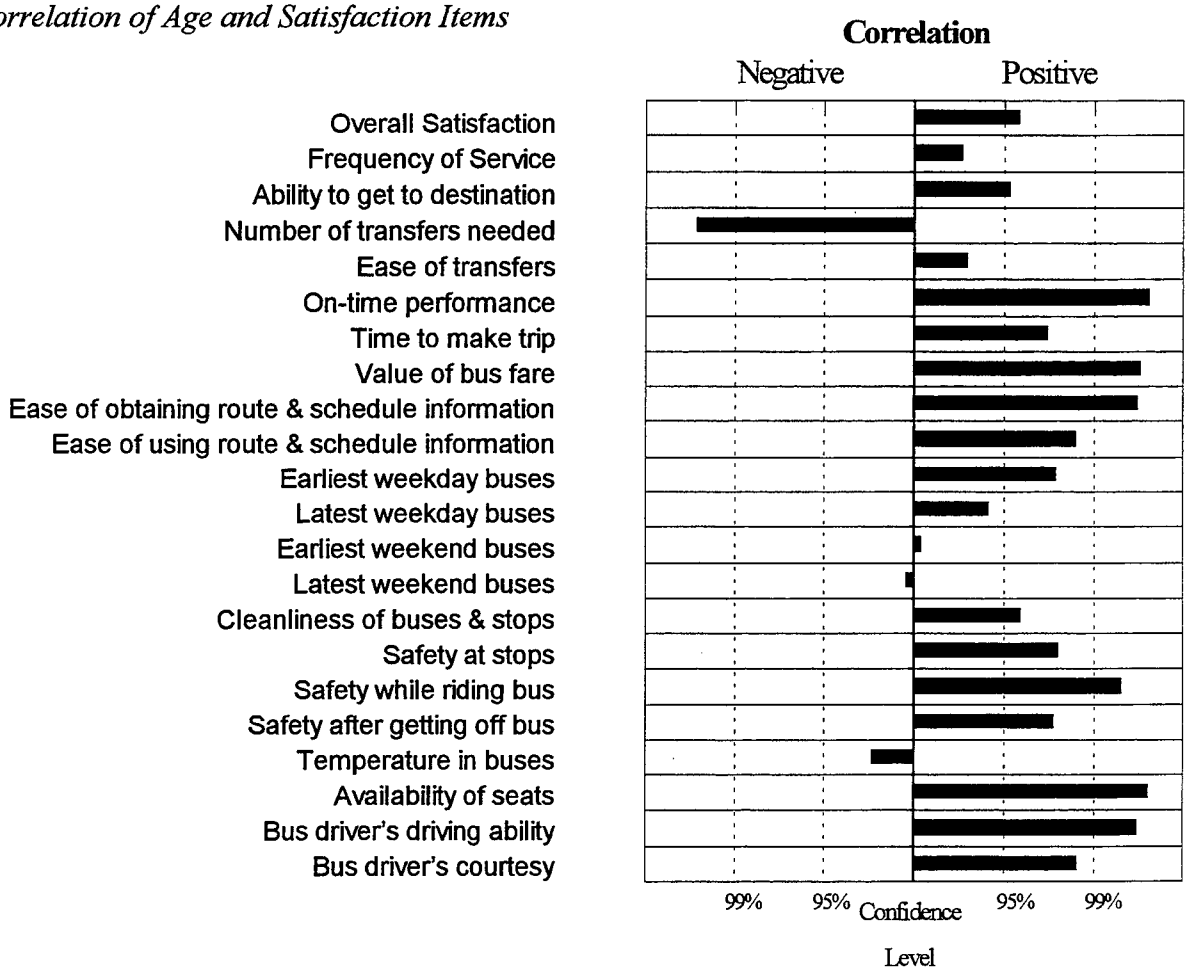


The main purpose of data collection for this item was to demonstrate that a sizable proportion of the bus-riding population does not have telephones and thus telephone-based surveys might inadequately cover this segment.

No significant positive correlations exist between number of working phones and the satisfaction items. The negatively correlated items include ratings of satisfaction with earliest weekday and latest weekend service, and availability of seats on buses.

These correlations may reflect that these are people who have more disposable income and more choices for transportation.

Correlation of Age and Satisfaction Items



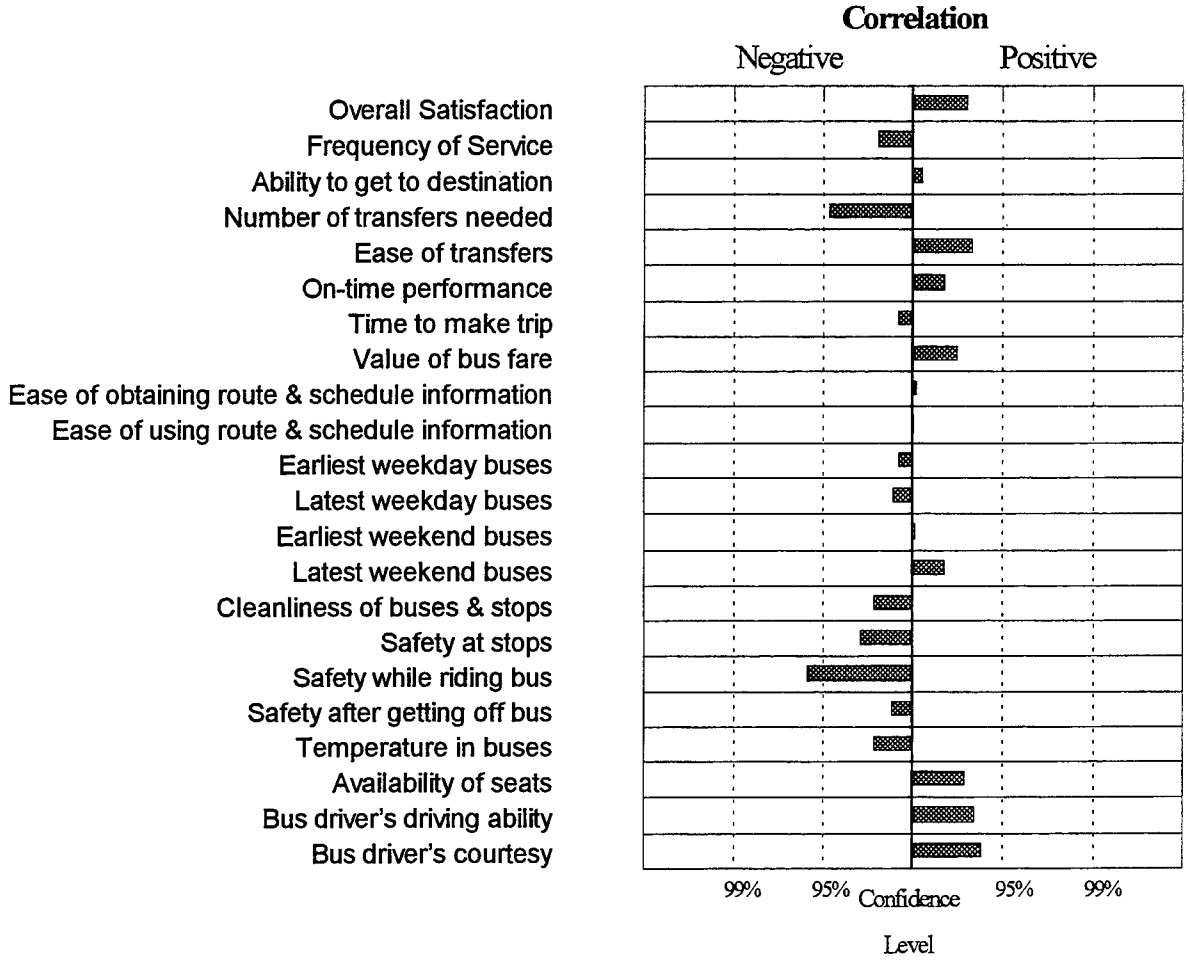
Respondent age is highly related to the satisfaction items, usually positively – that is, the older the respondent, the higher the level of satisfaction with most items. The only item that is negatively correlated with age is between increasing age and satisfaction with number of transfers required. This correlation is quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs. .

Many items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders.

The items that have the strongest positive correlations are: Availability of seats on buses, bus drivers ability to drive bus, bus driver's courtesy, safety while riding bus, on-time performance, value of bus fare and obtaining route and schedule information.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves transportation, they should be viewed as a key customer segment. PSTA should consider it a notable achievement that they have been able to provide service that is more satisfactory to this group of customers.

Correlation of Gender and Satisfaction Items



Only one satisfaction item has a significant correlation with respondent gender – females give lower ratings on perceptions of safety while riding the bus. No other items are significantly correlated with gender.

This is not a surprising result. However, PSTA should investigate any improvements that could be made to make women feel safer both at bus stops and while riding the buses, such as increased lighting at stops and shelters and installing security cameras on buses.

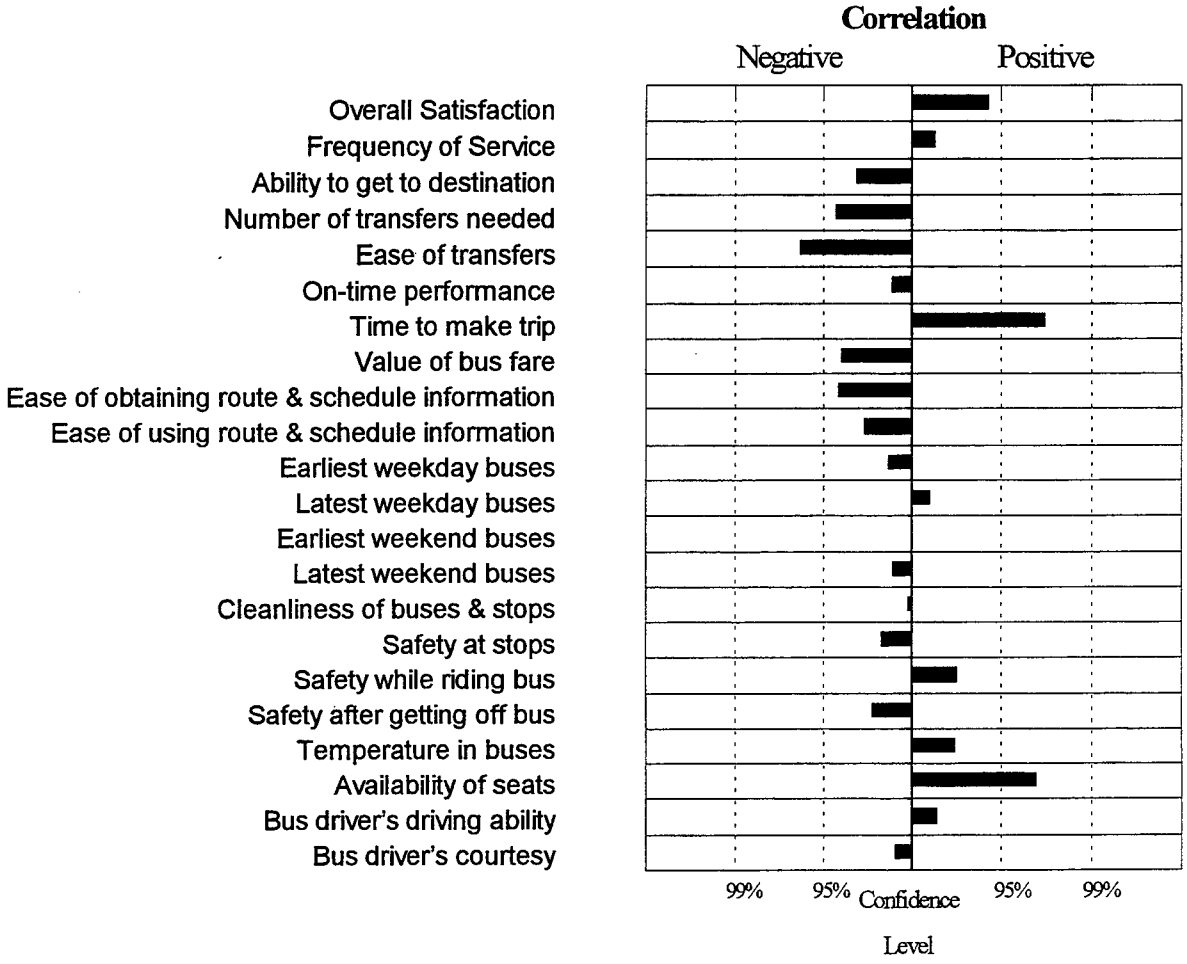
Correlation of Race and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Above average levels of satisfaction are observed for Hispanics on the following items: Ability to get to destination, time of day buses run on weekdays (both earliest and latest), and availability of seats. However, the significance of these findings is very questionable because of low sample size.

Blacks gave above average satisfaction ratings for ease of transferring buses.

Correlation of Income and Satisfaction Items



Few satisfaction items are significantly correlated with income. Satisfaction with ease of transferring is negatively correlated with income. Satisfaction with time it takes to make trips and availability of seats are positively correlated with income levels. This may be because the routes that serve higher income neighborhoods may have lower ridership and make fewer stops, thereby increasing the number of seats available and reducing the time to make trips. However, those riders in higher income households may also have less patience with transferring buses to make their trips when this becomes necessary.

Survey Instrument

The survey instrument is provided on the following pages. The survey was printed on 60# green cardstock, on both sides of an 8 ½ · 11 sheet.

Dear PSTA Customer: Please help us! Your opinions and information about your trip are very important in helping us improve our service for you. Please complete **both sides** of this survey and place it **in the box on the bus** as you are getting off the bus. **Even if you are not finished** with the survey when you complete your trip, please drop it in the box when you get off the bus. Thanks for your help!

1. Have you filled out this survey earlier this week? ❒ no **Continue** ❒ yes **STOP! Please place in return box**

2. In a **typical week**, *on how many* **days** do you ride the bus?
   1❒ One day/ week or less 2❒ 2 days/ week 3❒ 3 days/ week 4❒ 4 days/ week 5❒ 5 days/ week 6❒ 6 days/ week 7❒ 7 days/ week

3. How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with PSTA	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

Continue on other side

4. At what time were you given this survey? ₁☐ before 6 am ₂☐ 6-10 am ₃☐ 10 am - 3 pm ₄☐ 3 pm - 7 pm ₅☐ after 7 pm

5. Thinking only about **last week**, did you ride the bus on:

Monday?	Tuesday?	Wednesday?	Thursday?	Friday?	Saturday?	Sunday?
₁☐ Yes	₁☐ Yes	₁☐ Yes	₁☐ Yes	₁☐ Yes	₁☐ Yes	₁☐ Yes
₂☐ No	₂☐ No	₂☐ No	₂☐ No	₂☐ No	₂☐ No	₂☐ No

6. What is the nearest major street intersection to where you:
   a) boarded this bus? _____ & _____
   b) will get off this bus? _____ & _____

7. Are you transferring buses on this trip? ₁☐ Yes How many times? ___ ₂☐ No

8a. In the last six months, have you called PSTA for information or asked for information at the Williams Park or Park Street terminals? ₁☐ Yes (answer questions 8b and 8c) ₂☐ No (Skip to question 9)

How satisfied were you with:	☺				☹
8b. the accuracy of the information you received?	5	4	3	2	1
8c. the courtesy of the information person?	5	4	3	2	1

9. In the past month, how many times has this happened? (circle the appropriate number)

	Didn't happen	One Time								Ten Times
a. The bus you were waiting for passed you by?	0	1	2	3	4	5	6	7	8	9 10
b. A driver has been extra nice greeting or helping you or another passenger?	0	1	2	3	4	5	6	7	8	9 10
c. You missed the bus because it left early?	0	1	2	3	4	5	6	7	8	9 10
d. You missed your connecting bus because your first bus arrived late or the connecting bus left early?	0	1	2	3	4	5	6	7	8	9 10
e. You had to wait one hour or more for a bus?	0	1	2	3	4	5	6	7	8	9 10

10. How many working telephones do you have in your household? ₀☐ None ₁☐ 1 ₂☐ 2 ₃☐ 3 or more

11. What is your age? ₁☐ Under 18 ₂☐ 18-24 ₃☐ 25-34 ₄☐ 35-44 ₅☐ 45-54 ₆☐ 55-64 ₇☐ 65 or over

12. What is your gender? ₁☐ male ₂☐ female

13. What is your ethnic heritage? ₁☐ White ₂☐ Black ₃☐ Hispanic ₄☐ Asian ₅☐ Something else (specify: _____)

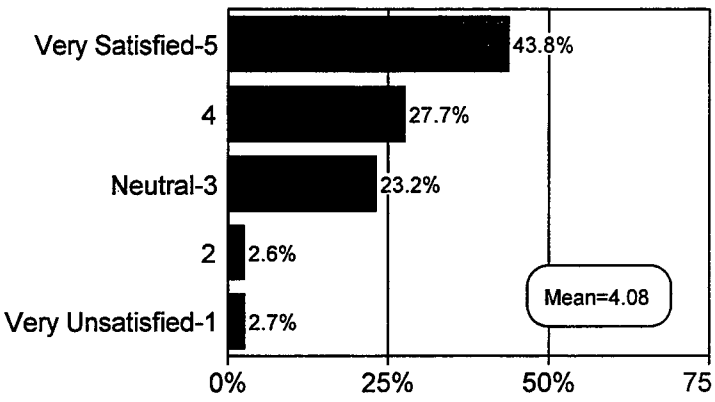
14. In what range was **your household's total income** for 1996?
   ₁☐ Under $5,000 ₂☐ $5,000 to $9,999 ₃☐ $10,000 to $14,999
   ₄☐ $15,000 to $19,999 ₅☐ $20,000 to $24,999 ₆☐ $25,000 to $29,999
   ₇☐ $30,000 to $39,999 ₈☐ $40,000 to $49,999 ₉☐ $50,000 to $69,999
   ₁₀☐ $70,000 or more

Thank you for your cooperation in completing this survey. Please drop your completed survey in the survey return box here on the bus, or return it to the driver or surveyor.

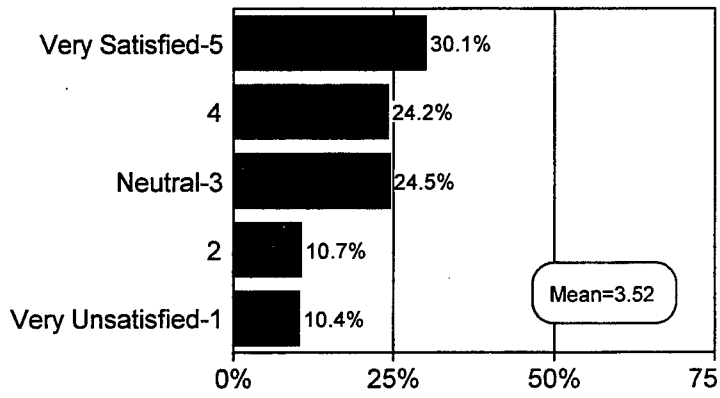
Results by question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

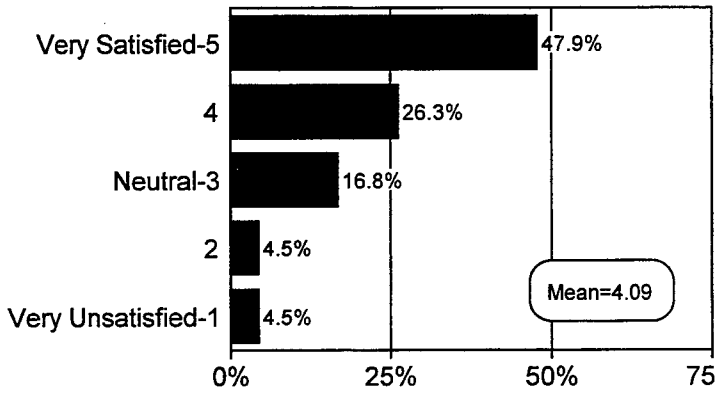
3a. Your overall satisfaction with PSTA...



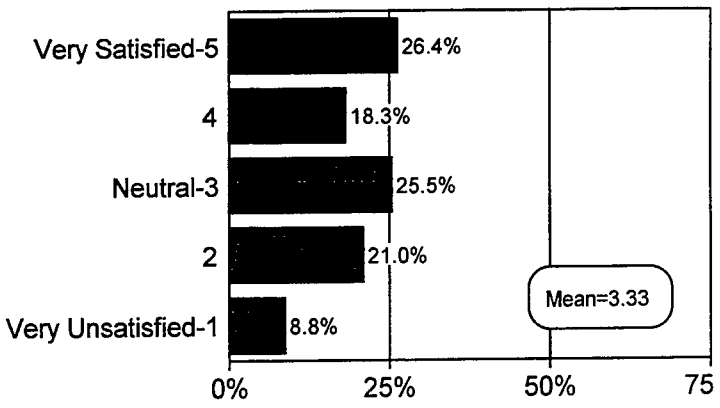
3b. Frequency of service (how often buses run)...



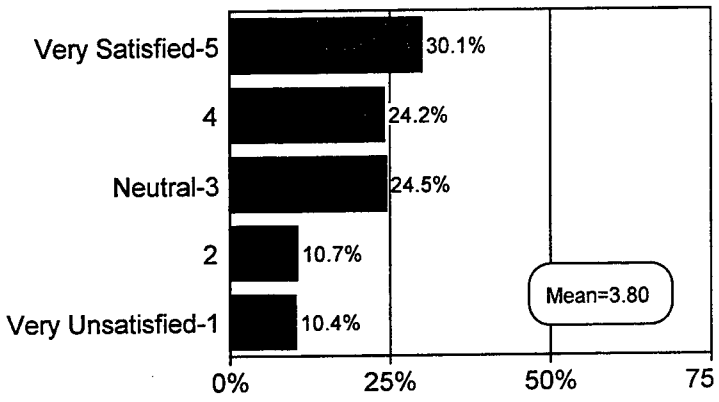
3c. Your ability to get where you want to go using the bus...



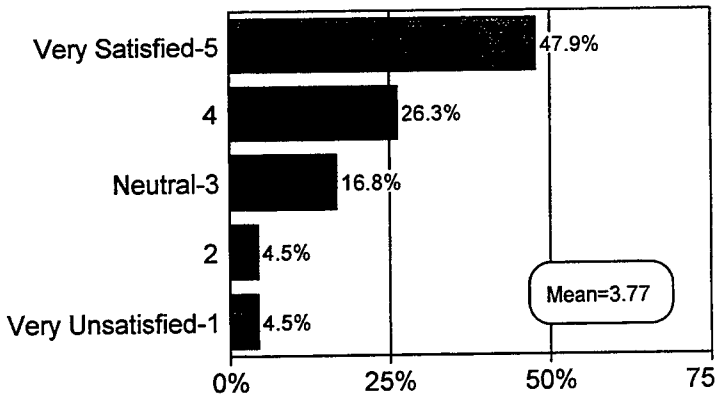
3d. The number of times you have to transfer buses...



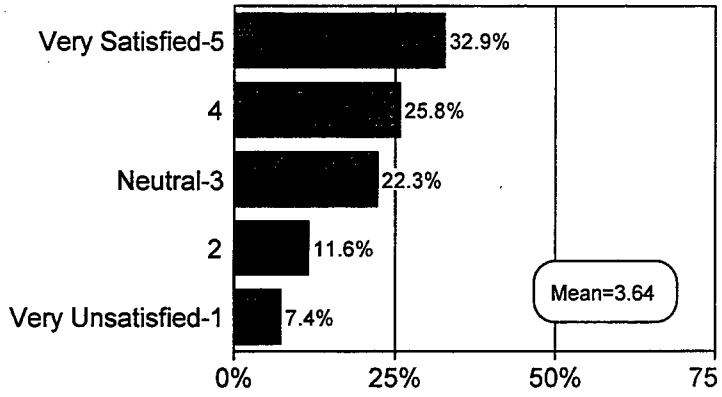
3e. How easy it is to transfer buses...



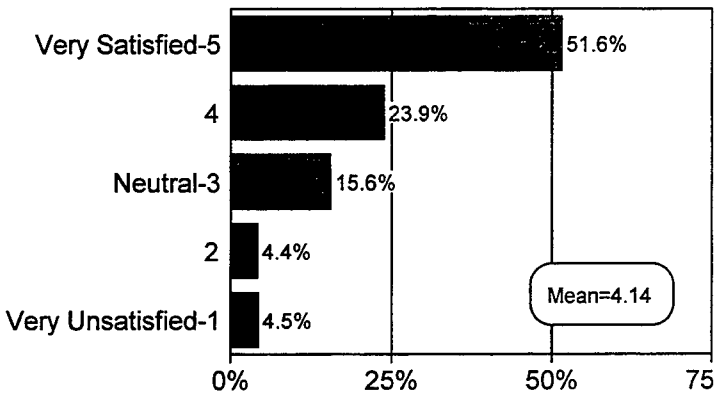
3f. How regularly buses arrive on time...



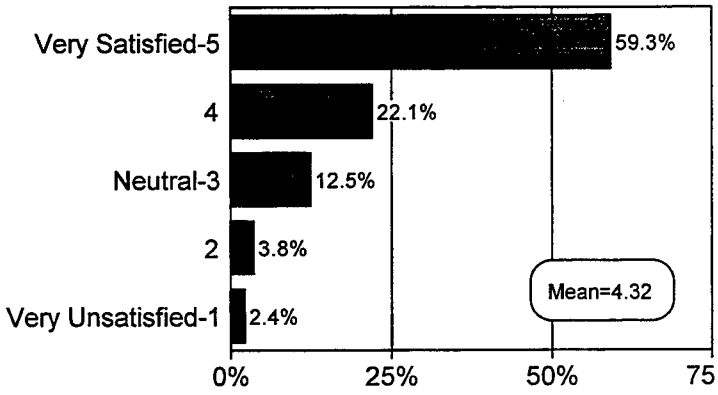
3g. The time it takes to make a trip by bus...



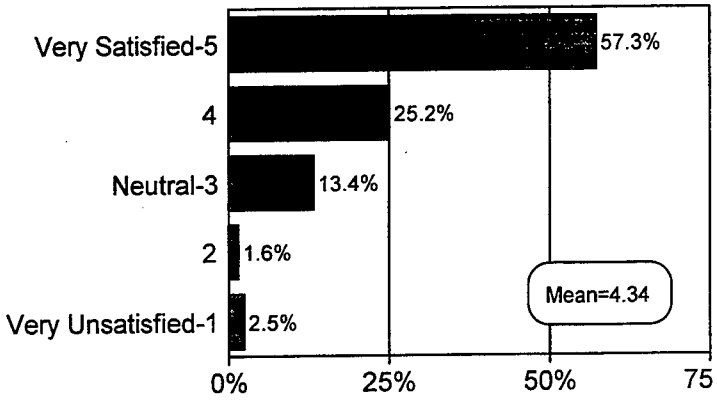
3h. Value of bus fare (service you get for what you pay)...



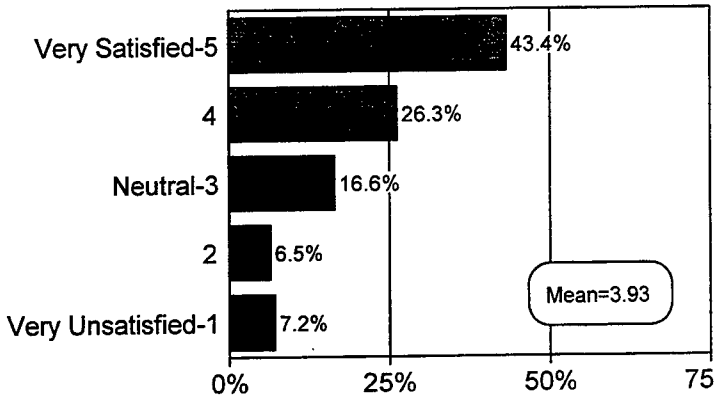
3i. How easy it is to obtain bus route & schedule information...



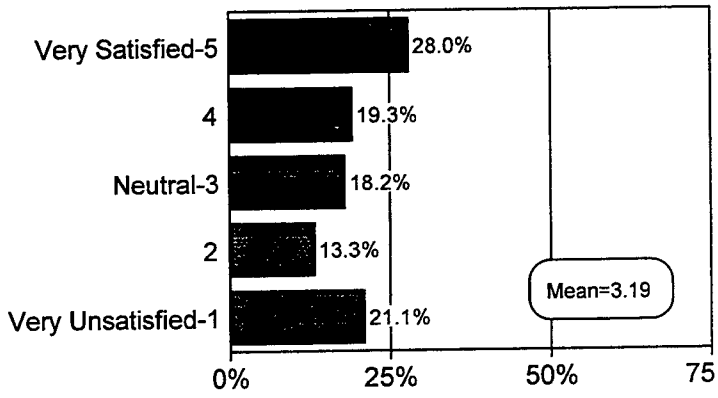
3j. How easy it is to use bus route & schedule information...



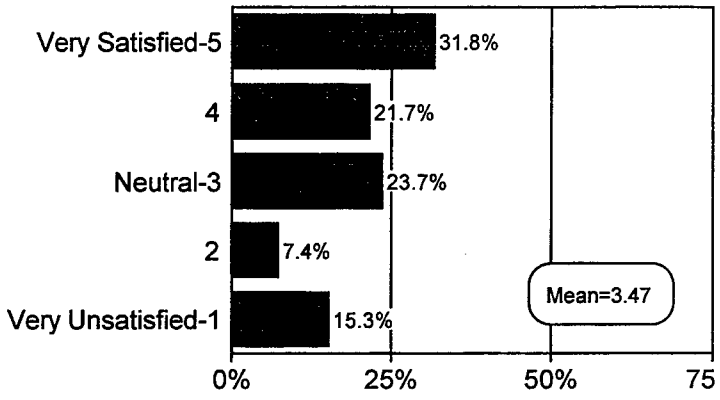
3k. The time of day the earliest buses run on weekdays...



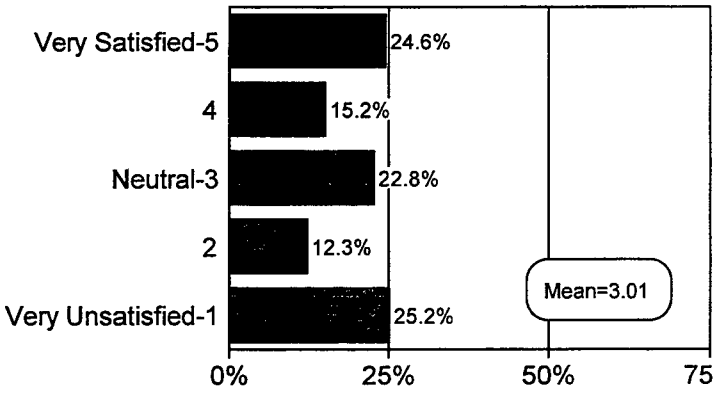
3l. The time of day the latest buses run on weekdays...



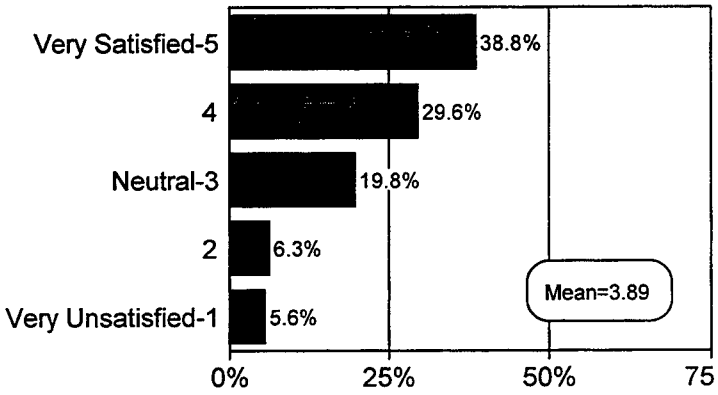
3m. The time of day the earliest buses run on weekend days...



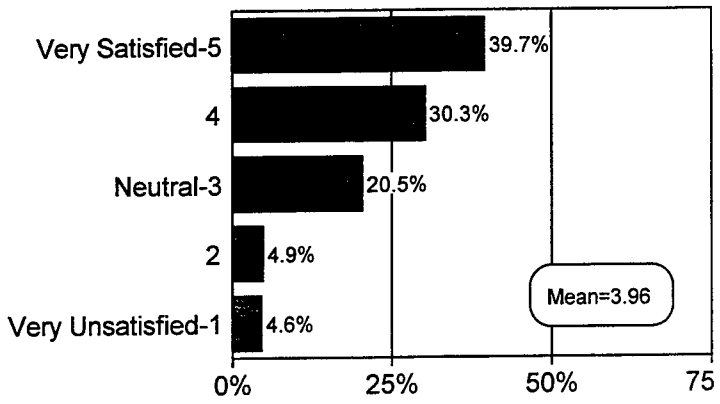
3n. The time of day the latest buses run on weekend days...



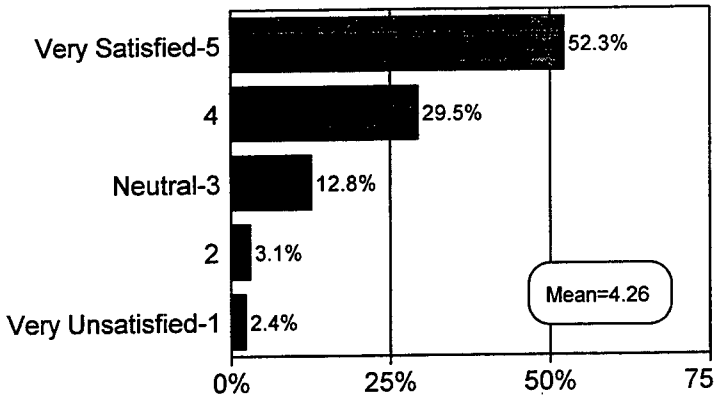
3o. How clean the buses and bus stops are...



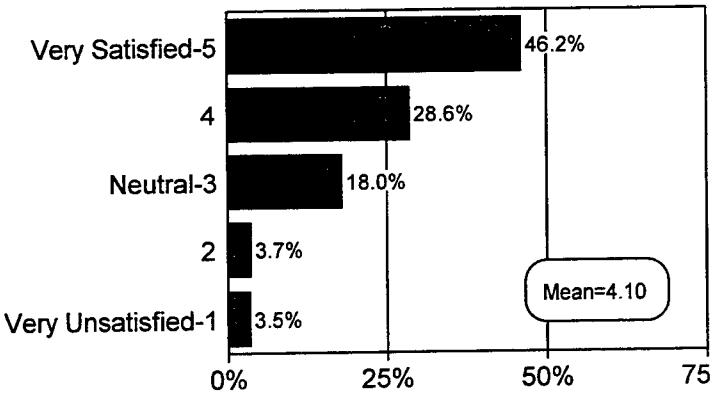
3p. Safety at the bus stop...



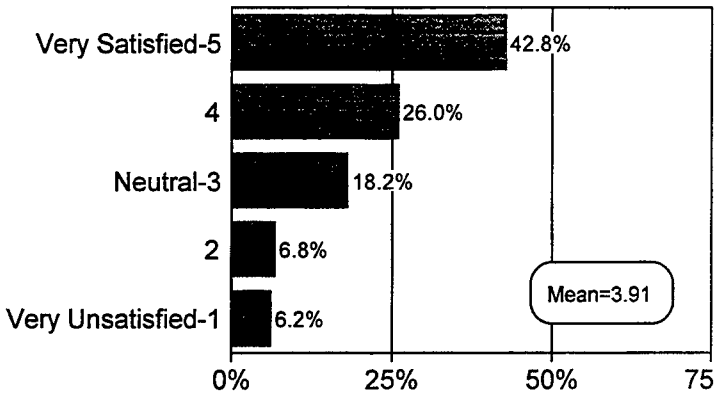
3q. Safety while riding the bus...



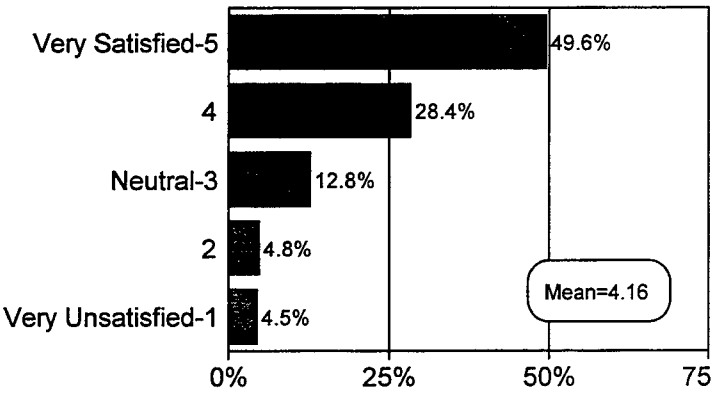
3r. Safety after getting off the bus...



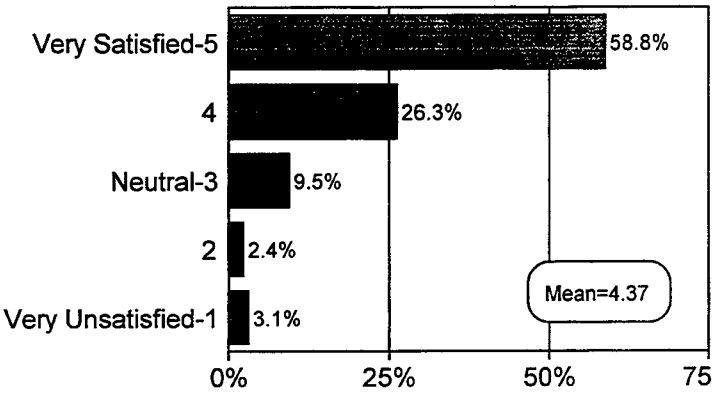
3s. Temperature inside the buses...



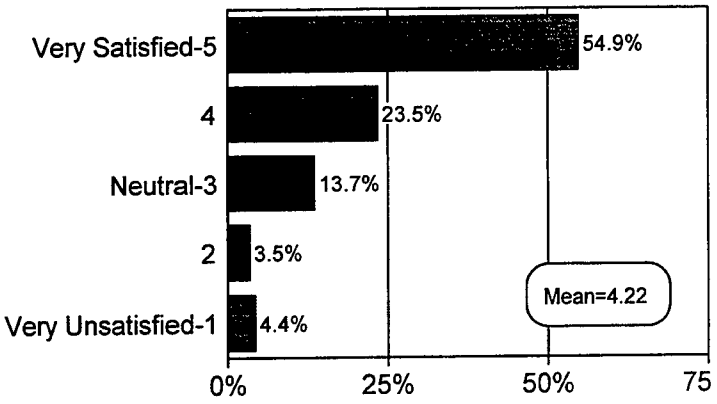
3t. Availability of seats on buses...



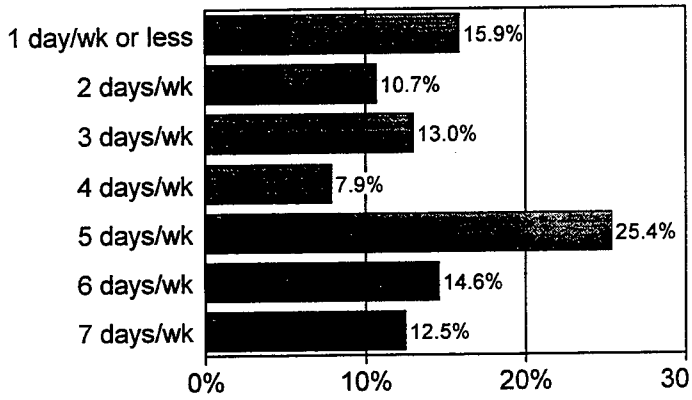
3u. The bus driver's ability to drive the bus...



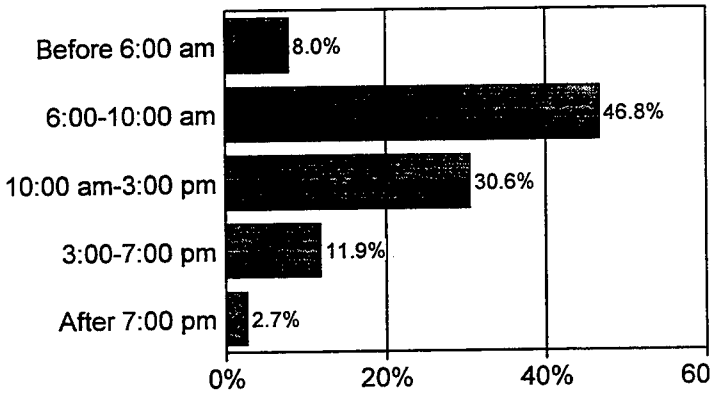
3v. The bus driver's courtesy...



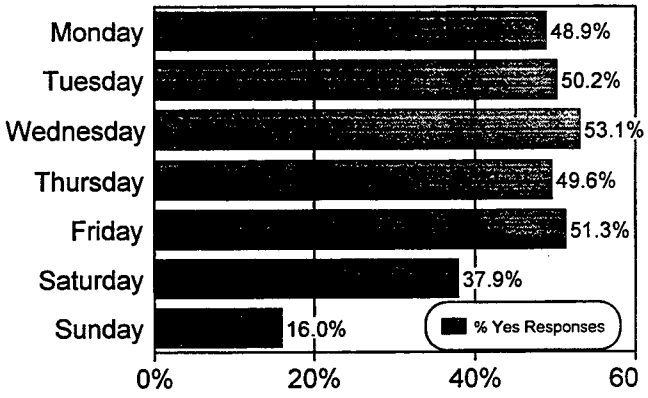
2. In a typical week, on how many days do you ride the bus?



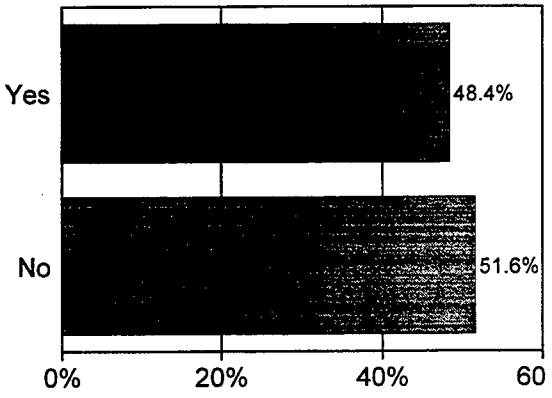
4. At what time were you given this survey?



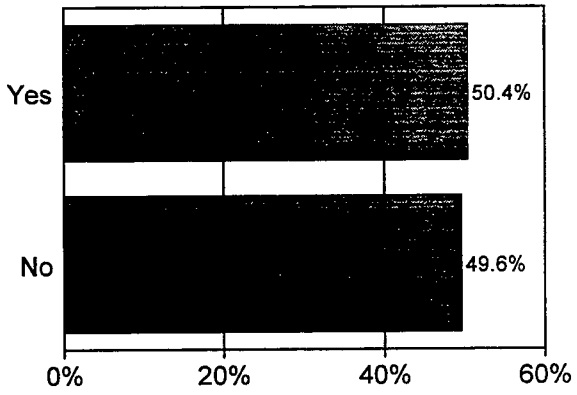
5. Thinking about only last week, did you ride the bus on...



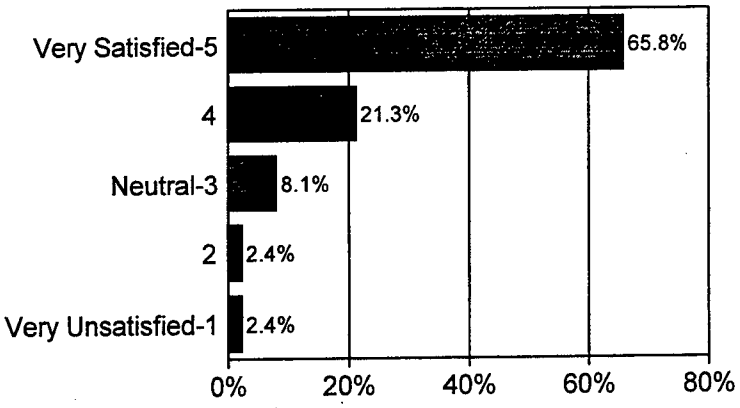
7. Are you transferring buses on this trip?



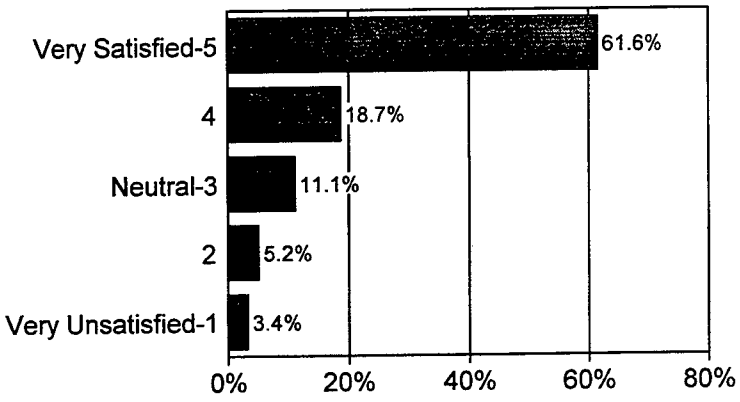
8a. In the last six months, have you called PSTA for information or asked for information at the Williams Park or Park Street terminals?



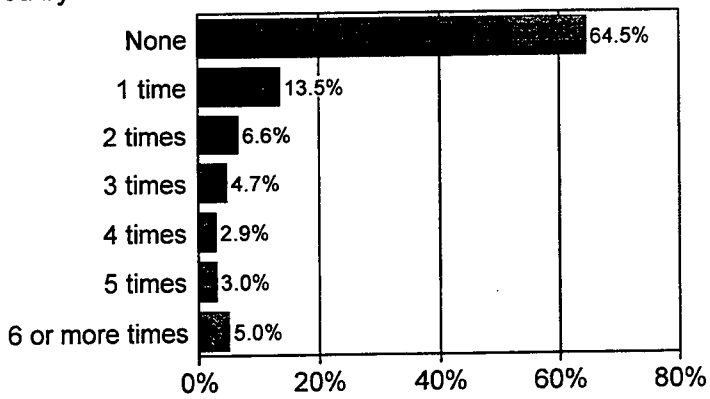
8b. How satisfied were you with the accuracy of the information you received?



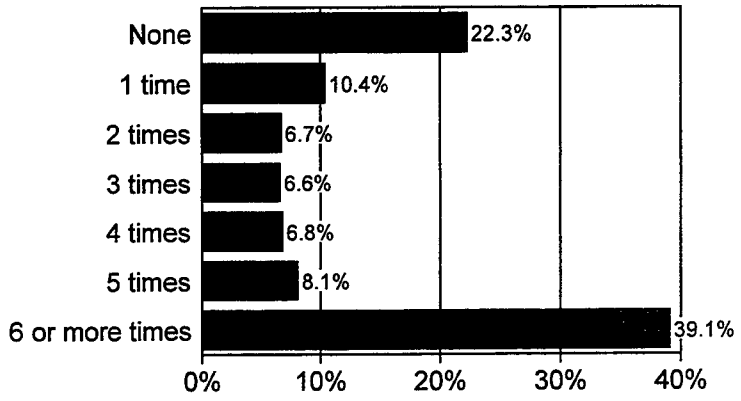
8c. How satisfied were you with the courtesy of the information person?



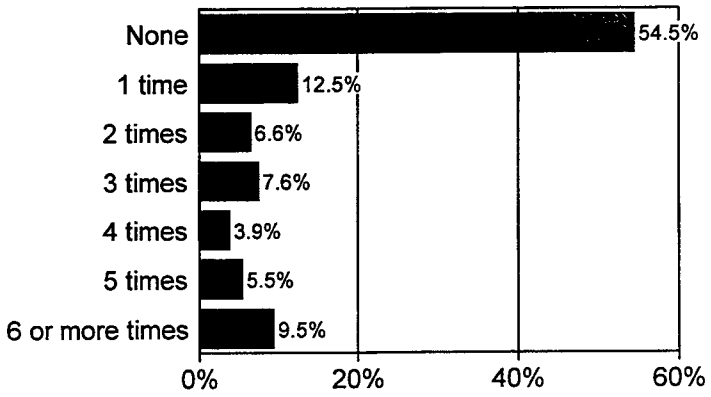
9a. In the past month, how many times has the bus you were waiting for passed you by?



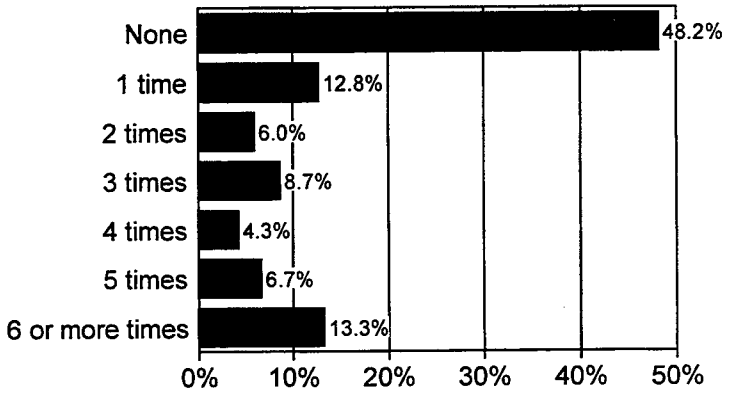
9b. In the past month, how many times has a driver been extra nice greeting or helping you or another passenger?



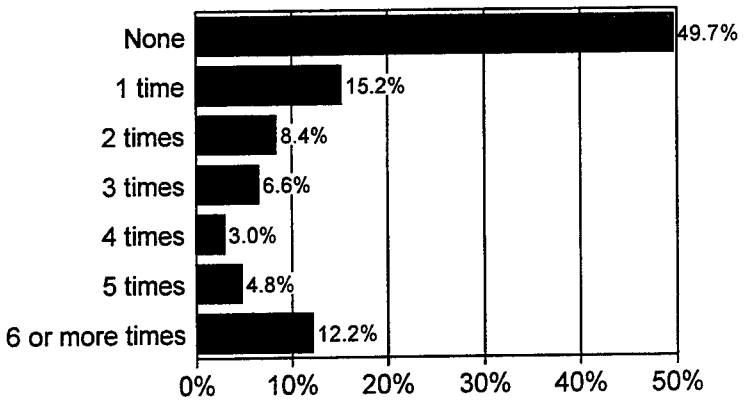
9c. In the past month, how many times have you missed the bus because it left early?



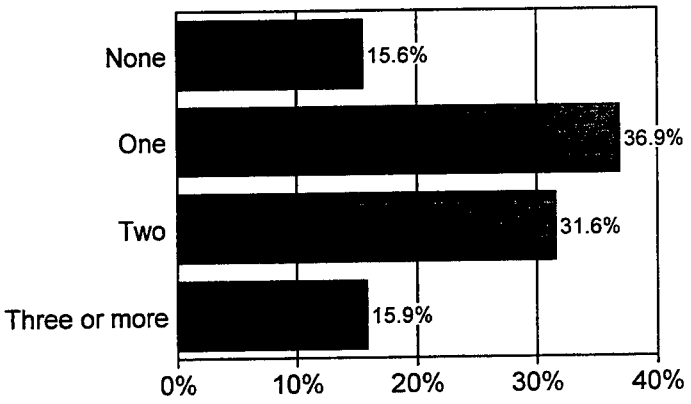
9d. In the past month, how many times have you missed your connecting bus because your first bus arrived late or the connecting bus left early?



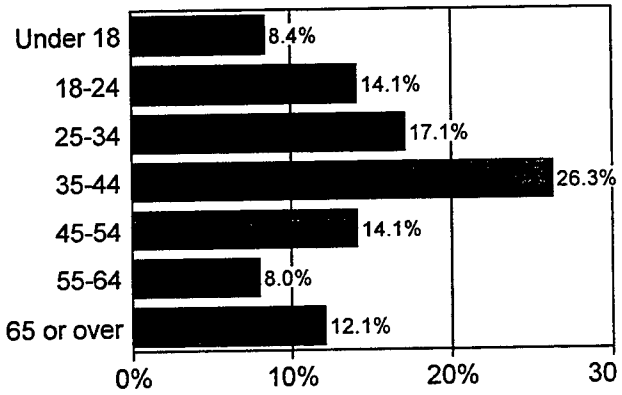
9e. In the past month, how many times have you had to wait one hour or more for a bus?



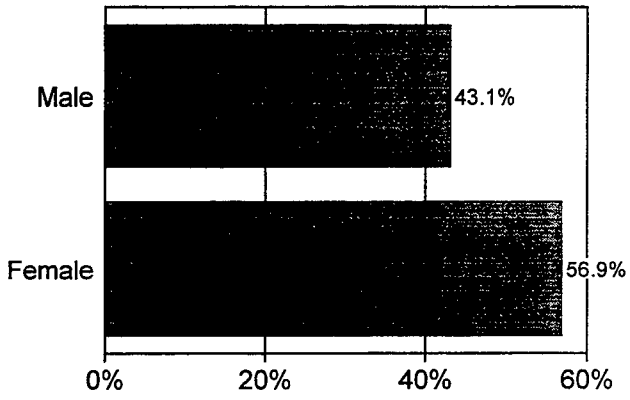
10. How many working telephones do you have in your household?



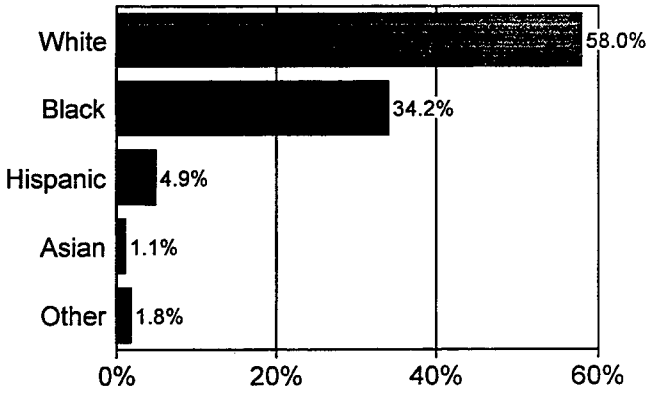
11. What is your age?



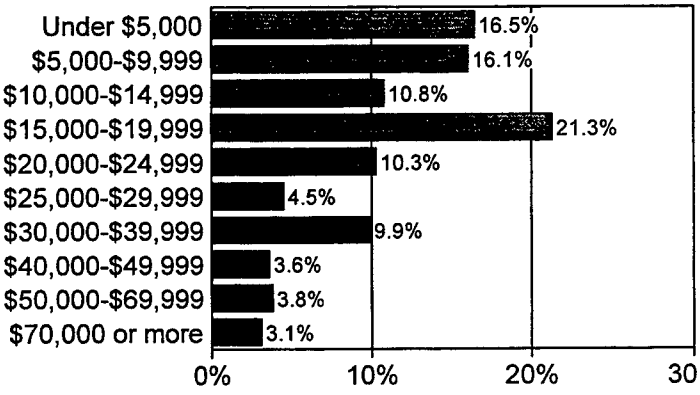
12. What is your gender?



13. What is your ethnic heritage?



14. In what range was your household's total income for 1996?



TALLAHASSEE TRANSIT (TALTRAN)

Sampling Methodology

Surveys were distributed to riders by TALTRAN drivers on all routes. Surveys were distributed on Thursday, June 19, 1997 and on Saturday, June 21, 1997, during all hours of service.

Each survey contained an identification number in the upper right hand corner. The surveys were presorted and a complete log was constructed that identified the range of survey numbers that was distributed to each scheduled run for each day. The routes were identified by matching the ID numbers of the returned surveys with the original distribution pattern.

A total of 33 of the 35 TALTRAN routes had surveys returned by respondents. A total of 2,390 surveys were returned, 1,199 all of which were key-entered into an Excel database. A total of 1,098 surveys had sufficient information for modeling analysis; that is, they had responses to the "Overall Satisfaction" question and to the question concerning which of the last 7 days (Monday-Sunday) they had ridden the bus.

Results

The factor analysis of TALTRAN data identified five factors. Some variables will be observed to be part of more than one factor; for instance, "Safety on Buses" appears on two separate factors, which indicates that customer perception of safety is connected with multiple elements of transit service. The variables for each factor are listed in order of their importance in explaining that factor.

Table 38 TALTRAN Factor 1 - Safety & Cleanliness		
Item	**Scores**	
	Index	**Mean**
Safety at stops	99.69	3.83
Safety on buses	99.24	4.09
Safety after getting off bus	99.10	3.98
Cleanliness of stops & buses	100.94	3.70
Seats available	100.94	4.07
Overall Mean		**3.93**

Table 39 TALTRAN Factor 2 - Routes & Headways		
Item	**Scores**	
	Index	**Mean**
Frequency of service	100.82	3.33
Can get to destination	100.19	3.92
Time to make trip	101.31	3.50
Number of transfers needed	104.09	3.49
Buses on time	96.83	3.40
Ease of transfers	104.23	3.95
Value of bus fare	91.51	3.62
Overall Mean		**3.60**

Table 40 TALTRAN Factor 3 - Span of Service		
Item	Scores	
	Index	Mean
Latest weekend runs	103.00	2.98
Earliest weekend runs	99.96	3.32
Latest weekday runs	99.51	3.11
Earliest weekday runs	96.76	3.64
Frequency of service	100.82	3.33
Overall Mean		**3.28**

Table 41 TALTRAN Factor 4 - Comfort of Ride		
Item	Scores	
	Index	Mean
Bus driver's courtesy	101.06	4.19
Bus driver's driving ability	99.80	4.31
Temperature in buses	97.66	3.85
Seats available	100.94	4.07
Safety on buses	99.24	4.09
Overall Mean		**4.10**

Table 42 TALTRAN Factor 5 - Printed Schedules		
Item	Scores	
	Index	Mean
Obtaining schedule/route information	95.51	3.91
Using schedule/route information	95.31	3.83
Ease of transfers	104.23	3.95
Overall Mean		**3.90**

The resulting linear customer satisfaction model structure using these factors takes the form:

Customer Satisfaction = α + β1*factor1 + β2*factor2 + β3*factor3 + β4*factor4 + β5*factor5

where α represents the intercept and the various β values represent the coefficients for the factor scores. It should be noted that the factor scores are standardized with a mean of 0 and a standard deviation of 1, so they do not have the same values as the "mean performance scores" listed in Table 43 below. The coefficients can be viewed as the relative importance of each factor to overall customer satisfaction.

Table 43
TALTRAN Customer Satisfaction Model Coefficients

Item	β Coefficient (= importance)	Mean Performance Score
Safety & Cleanliness	0.24	3.93
Routes & Headways	0.50	3.60
Span of Service	0.24	3.28
Comfort of Ride	0.29	4.10
Printed Schedules	0.10	3.90
(Model Intercept	3.87	N/A)

The statistics relating to this model are:

R-square = .46 % of Overall satisfaction ratings predicted within 0.5 = 60%

% Correct classification = 79%

Correct classification is determined by dividing riders into two groups: satisfied (those who scored a 4 or 5 on overall satisfaction) and unsatisfied (those who scored a 1, 2, or 3 on overall satisfaction). The correct classification percentage is the percentage of respondents that are classified into the appropriate group by applying the model to the individual factor scores. If the predicted satisfaction score is above 3.5, the individual is classified into the "satisfied" group by the model, and otherwise the individual is classified into the "unsatisfied" group.

Recommendations

From these data, it is possible to construct an "importance-performance" matrix which graphically illustrates current bus riders' perceptions of TALTRAN's operations:

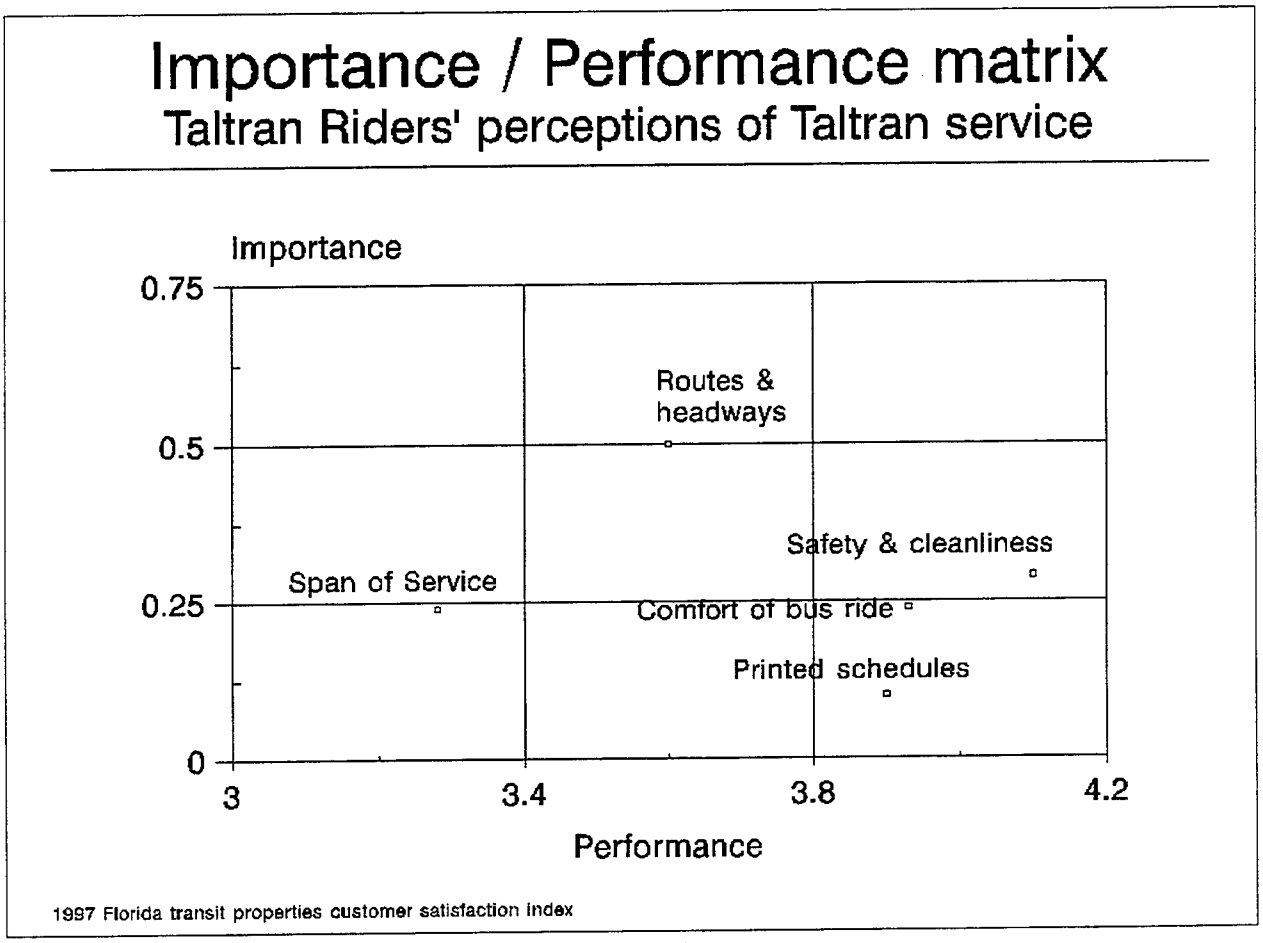


Figure 6 TALTRAN Importance/Performance Matrix

The chart has been divided into nine regions, reflecting various combinations of low, medium, and high performance and low, medium, and high importance. Borderline figures are interpreted as being in the higher of the importance categories they border on, but the lower of the performance categories. This provides the most conservative interpretation of the results. The interpretations of the chart regions are done as follows:

Table 44
Interpretations of TALTRAN's Chart Regions

Chart region		Interpretation	Areas
Importance	*Performance*		
Low	High	Possibly reduce focus on this area	Printed Schedules
Low	Medium	Maintain performance - no action	
Low	Low	Maintain performance - no action	
Medium	High	Maintain performance - no action	Comfort of Bus Ride, Safety & Cleanliness
Medium	Medium	Maintain performance - no action	
Medium	Low	Investigate for improvements	Span of Service
High	High	Maintain performance - vigorous quality checks, constant attention	
High	Medium	Investigate for improvements	Routes & Headway
High	Low	Critical improvement area	

The main potential action areas for TALTRAN are Routes & Headways (high importance/medium performance) and Span of Service (medium importance/low performance). Both factors fall into the "investigate for improvements" areas.

The individual Routes & Headways variables that TALTRAN scores particularly low on are:

Item	Mean	Index
Frequency of Service	3.33	100.82
Buses on Time	3.40	96.82

The Span of Service variables that TALTRAN scores low on are:

Item	Mean	Index
Latest Weekend Runs	2.98	103.00
Latest Weekday Runs	3.11	99.51
Earliest Weekend Runs	3.32	99.96
Frequency of Service	3.33	100.82

Typically, these are the areas where all systems achieved the lowest ratings. Even in these areas, TALTRAN is performing at least as well as other Florida transit systems from an index standpoint. TALTRAN could investigate routes with particularly low frequencies or extremely high ridership to see if more runs are warranted. .

The "Value of Bus Fare" score, while not low from an absolute standpoint (average = 3.62), was the lowest among all the systems surveyed (TALTRAN's index score = 91.51). This was expected, however, as TALTRAN implemented a fare increase shortly prior to the survey distribution. It is a testament to TALTRAN's quality of service that other satisfaction ratings appear to have been maintained at high levels even with the implementation of the fare increase.

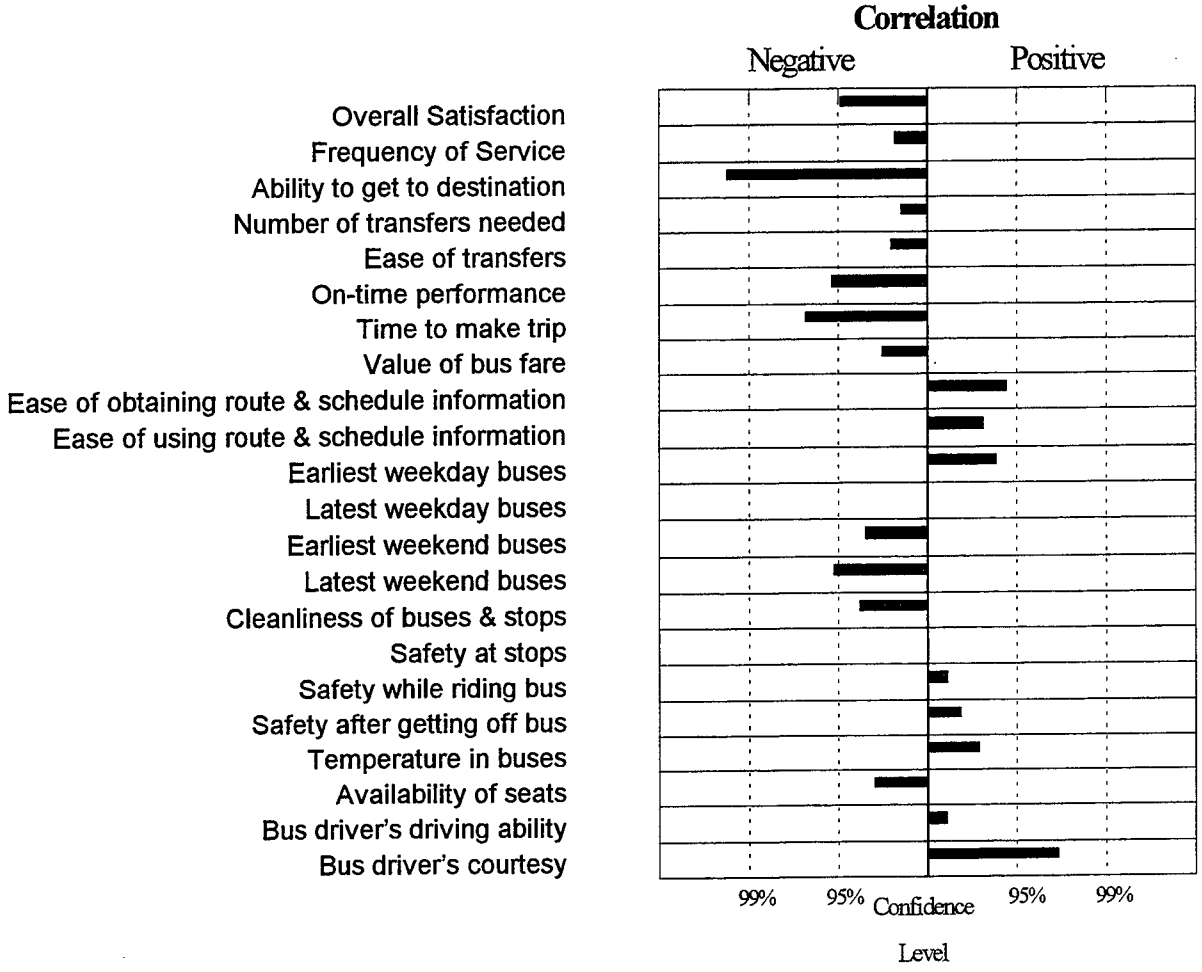
The analysis of demographics, which follows, also suggests that TALTRAN should:

- consider implementation of strategies to reward frequent users of the transit system,
- analyze service to both shopping areas and medical facilities for shortcomings,
- investigate additional safety improvements such as installation of additional lighting at stops and security cameras on buses, and
- monitor future surveys to ensure that there are no racially-based trends in customer dissatisfaction.

Correlation of Demographics and Satisfaction Items

As an introduction to this section, it should be noted that statistical theory suggests that in any examination of relationships between variables, the standard criterion of using 95% confidence levels indicates that 5% (1 in 20) of all relationships discovered will be due to random, unsystematic variation. Since relationships between 22 satisfaction items and 10 or more demographic characteristics are being examined, there will certainly be some relationships discovered, significant at a 95% level of confidence, which are nonetheless not meaningful.

Correlation of Frequency of Ridership and Satisfaction Items



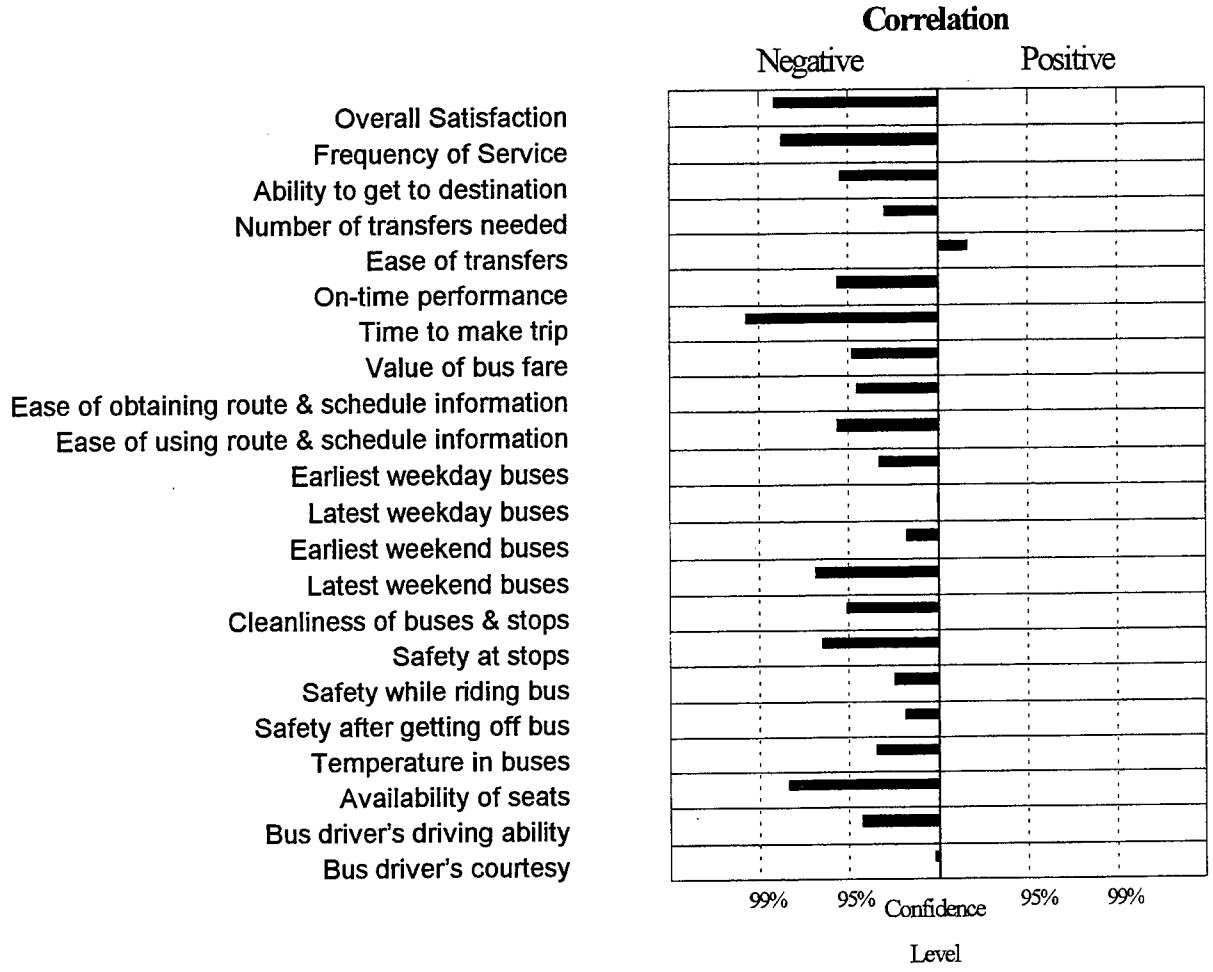
The satisfaction items tend to be negatively correlated with frequency of use characteristics. Significant negative correlations exist between frequency of use and ability to get to desired destination, on-time performance, value of bus fare, and latest weekend day runs. A positive correlation exists between frequency of use and perception of bus driver's courtesy.

Since the heaviest users are those who are also most dependent on transit service, it is perhaps not surprising that the lower levels of satisfaction exist. However, people who use the bus 5 times per week or more make up 50% of the riders on the transit system, according to the estimates developed from these survey results. They represent an absolutely key constituency for the transit systems, and efforts to improve overall customer satisfaction should focus on this core group of customers.

Many industries have implemented approaches to reward the heaviest users of their products, including frequent flyer and frequent buyer programs. For most of these industries, the heaviest users are also the most satisfied users. Transit agencies are in a unique situation in that their heaviest users do not have the freedom of choice enjoyed by purchasers of products in other industries. Hence, their use of the product is not an indicator of satisfaction, as it is with other discretionary products (such as packaged goods) or non-discretionary products in industries with heavy competition (such as long-distance service or air travel).

With the development of electronic pass readers, it is becoming possible to identify those customers that are the heaviest users of transit services. In this context, it should be possible to develop and implement some type of recognition/reward system for those users. This would have to be implemented through the bus operators, and could take the form of a "thank you" as the passenger boards the bus for, say, the 25th time in a single month. Some small token of the transit agency's appreciation could also be provided at this time. This would provide regular customers with a feeling of recognition and help to produce the sentiment that the transit agency is concerned about them and appreciates their patronage.

Correlation of Number of Times Boarding a Bus and Satisfaction Items



Most satisfaction items are negatively correlated with the number of times respondents boarded a bus on the day they responded. A 95% chance of significance is reached for about half of the items. The strongest negative correlations include those with overall satisfaction, time to make trips, and availability of seats.

The number of times a respondent boards a bus is correlated with both the number of transfers the respondent has to make and the level of dependence the respondent has on the bus for transportation. This being the case, it is not surprising that those who board buses more are less satisfied with routing, scheduling, and the time it takes to make trips. Solutions for these problems are similar to those involved in improving scores for the Span of service factor, namely an operational analysis of routes and schedules. The value issue reflects an increase in the bus fare immediately prior to the fielding of the survey.

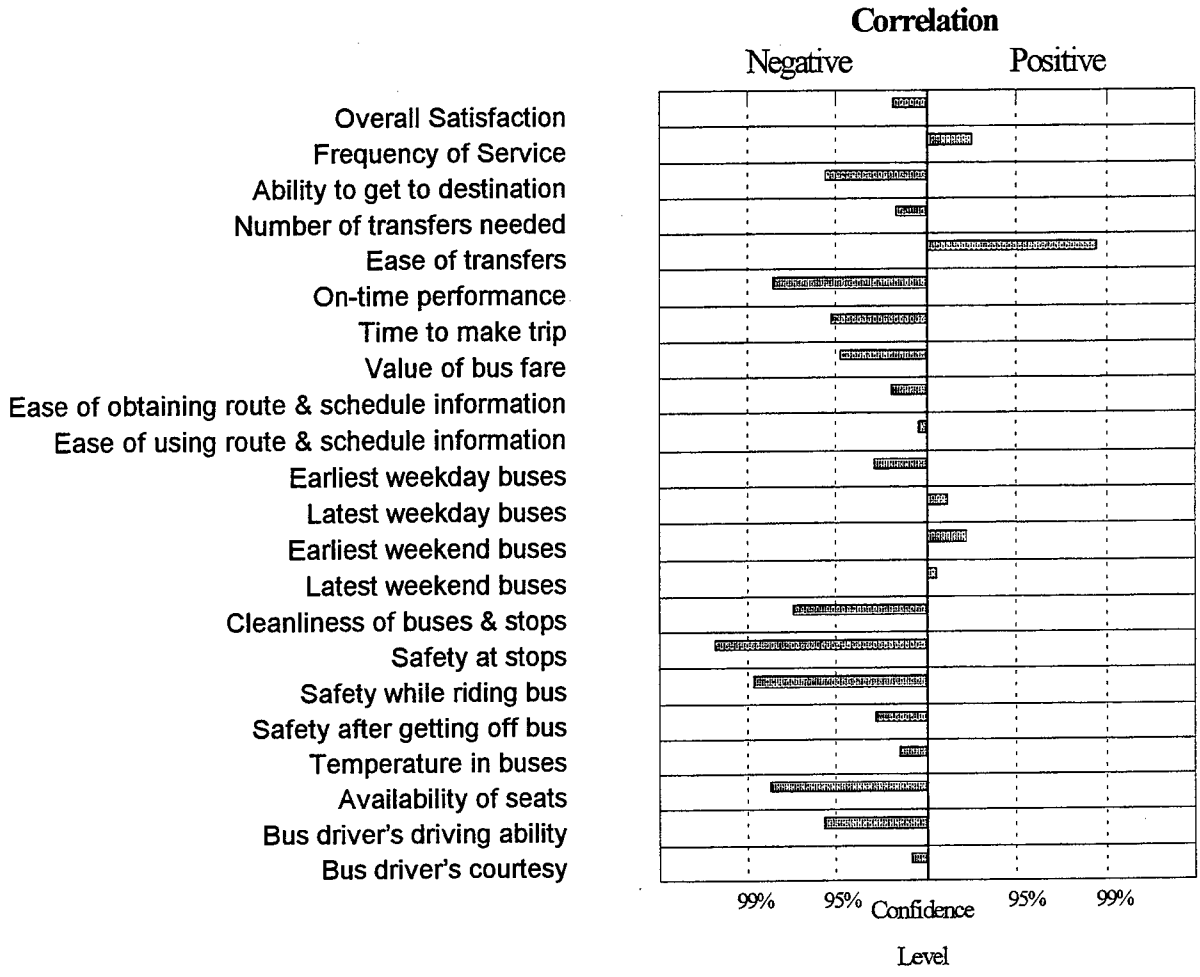
Correlation of Trip Origins & Destinations and Satisfaction Items

This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

There is a substantially lower level of satisfaction for those riders whose trip origin is shopping. This is spread across many items but the differential is largest for the items for frequency of service, on-time performance, time of day earliest buses run on weekends, availability of seats and bus drivers ability to drive, most particularly the last item. For those who have shopping as a destination, there is severe dissatisfaction with number of transfers required, and some dissatisfaction with safety while riding bus and temperature inside buses, but not to the levels seen with those who had shopping as a trip origin. Satisfaction is actually higher for weekend span of service among those who have shopping as a destination. The lower satisfaction results may be either a complaint about a particular driver's performance on a run that serves major shopping areas or a general complaint about TALTRAN's service in those areas. This service should be analyzed for potential shortcomings.

For those who have visiting or recreation as a destination, satisfaction levels tend to be higher. The lone exception is that these riders are less satisfied with cleanliness of stops and buses. For those who have doctor's office visits as a destination (25 (weighted) respondents), satisfaction is higher for many items but significantly lower for temperature in buses and bus driver's courtesy. This may again reflect performance of a particular driver on trips to a medical facility, or the patient's current state of health.

Correlation of Number of Adults Employed outside the Home and Satisfaction Items



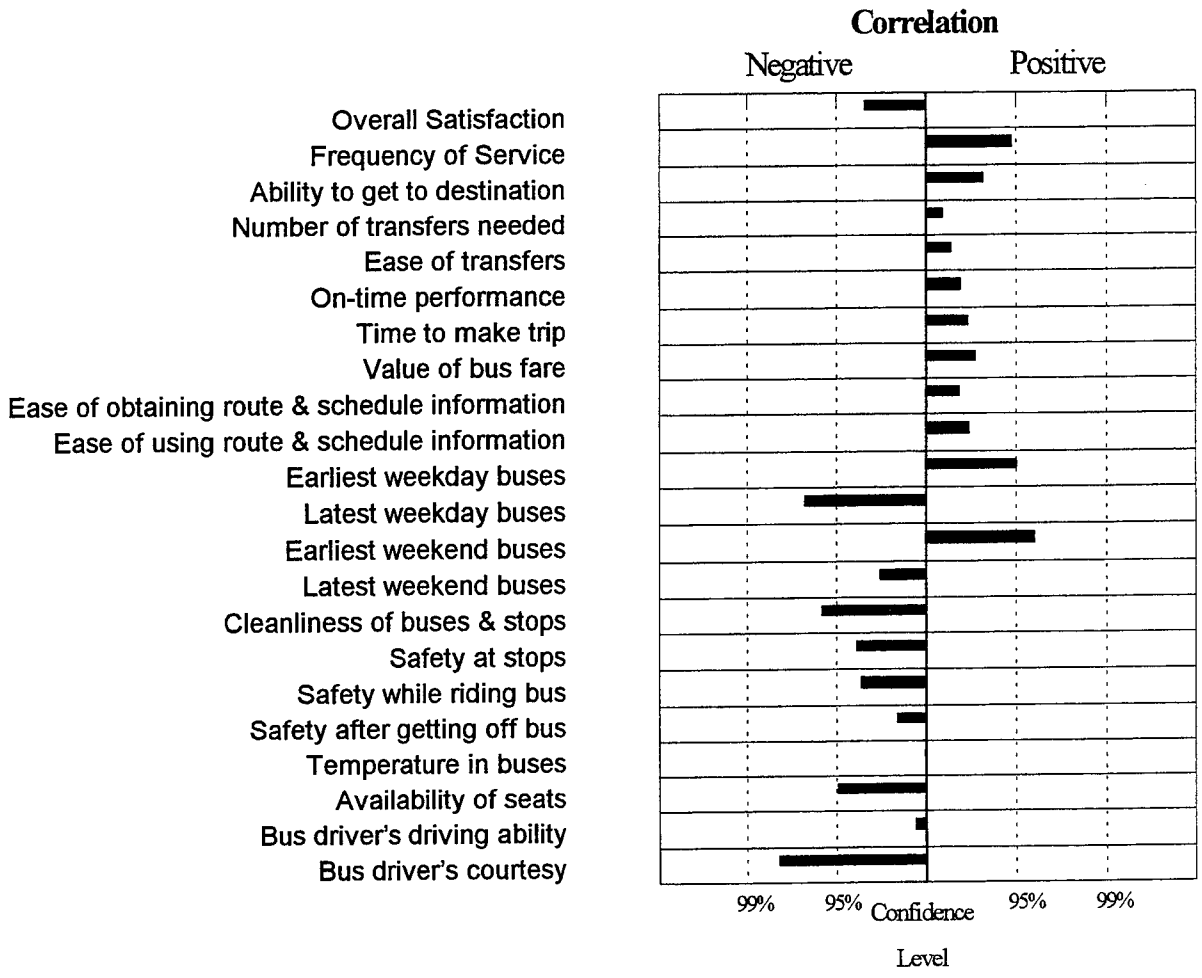
This demographic characteristic is negatively correlated with many satisfaction items, indicating that those riders living in households with larger numbers of adults working outside the home tend to be significantly less satisfied with many aspects of transit service. The strongest negative correlations are those with ratings of on-time performance, cleanliness of stops and buses, safety at stops and on bus, and availability of seats. There is a strong positive correlation with ease of transferring buses.

Part of the explanation for the generally lower levels of satisfaction is that the respondents in households with more adult workers tend to be the highest income respondents in the sample. As will be seen, higher incomes also relate negatively to satisfaction. These respondents are the people who have the highest levels of income yet still need to ride the bus. It is likely that they have at least one vehicle in the home, but cannot use it. The

level of frustration felt by these people in being dependent on fixed route services is probably the highest of all groups. Also, these people may live in areas that are less well served by transit.

There is little the transit agency can do to alleviate this situation. By its nature, fixed route service will tend to provide less satisfaction to this type of group and little about the nature of the service, other than significant service increases, can change that fact.

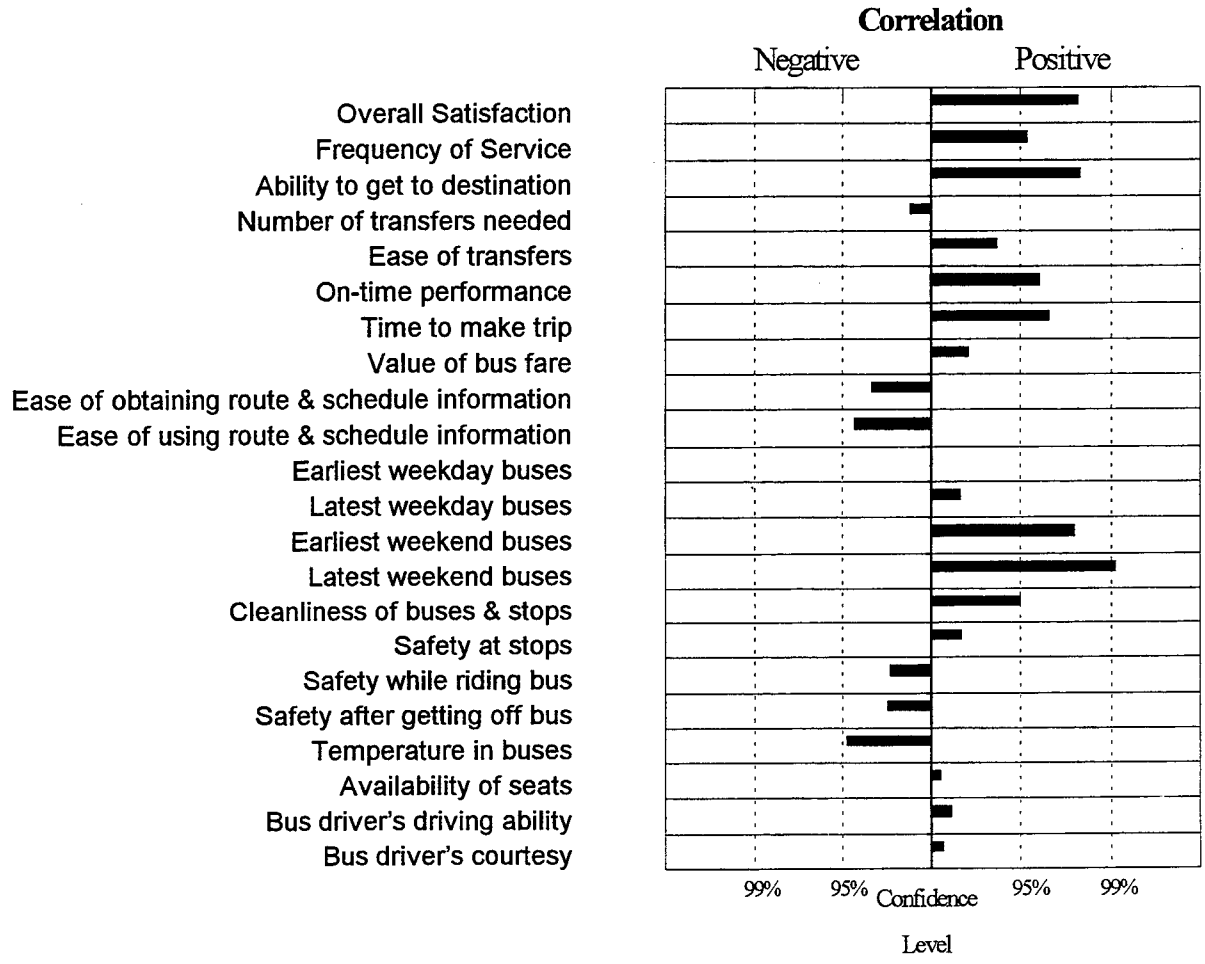
Correlation of Number of Children under 16 in the Home and Satisfaction Items



There are only a few satisfaction items that are significantly correlated with number of children in the home. Satisfaction with earliest service on weekends and weekdays is positively correlated with number of children in the home. Satisfaction with latest weekday runs, cleanliness of buses & stops, availability of seats on buses, and bus driver's courtesy is negatively correlated with number of children in the household.

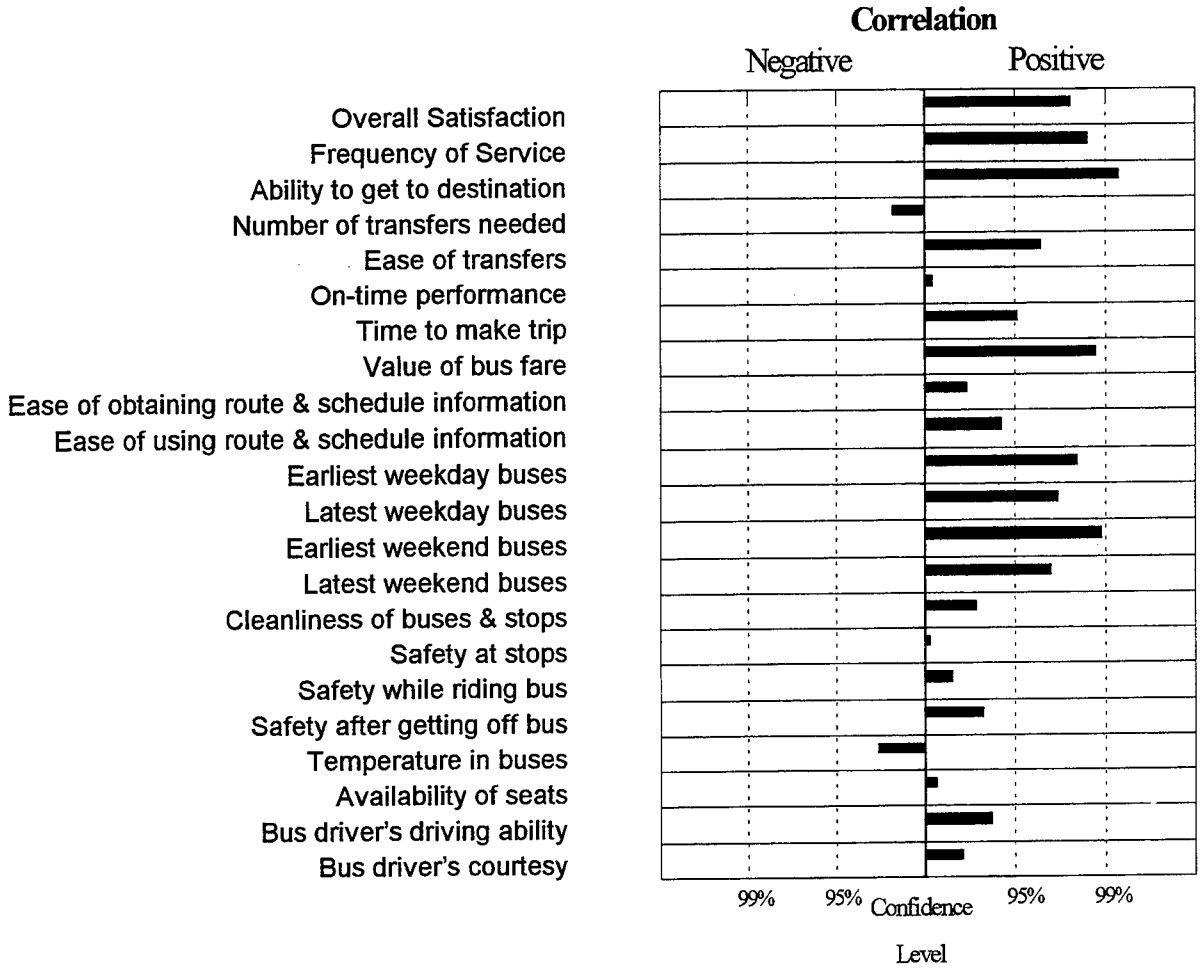
Respondents with children in the home may be less concerned with having early service because they have family obligations early in the morning, which means they don't require service earlier than it is provided. The negative correlations may stem from their experiences when riding the bus with their children, and reflect a natural tendency to be more critical of the service provided, particularly in terms of comfort and cleanliness, when their children are with them.

Correlation of Number of Working Vehicles in the Home and Satisfaction Items



Correlations for this item are generally positive. Strong positive and significant correlations exist for overall satisfaction, ability to get to desired destination, on-time performance, time to make a trip and weekend span of service. People with more vehicles are generally less dependent on transit service to meet their transportation needs, particularly on non-weekdays. Thus the positive correlation may be best understood as a much *lower* level of satisfaction among riders who have the *least* number of working vehicles in their households.

Correlation of Number of Working Telephones in the Home and Satisfaction Items

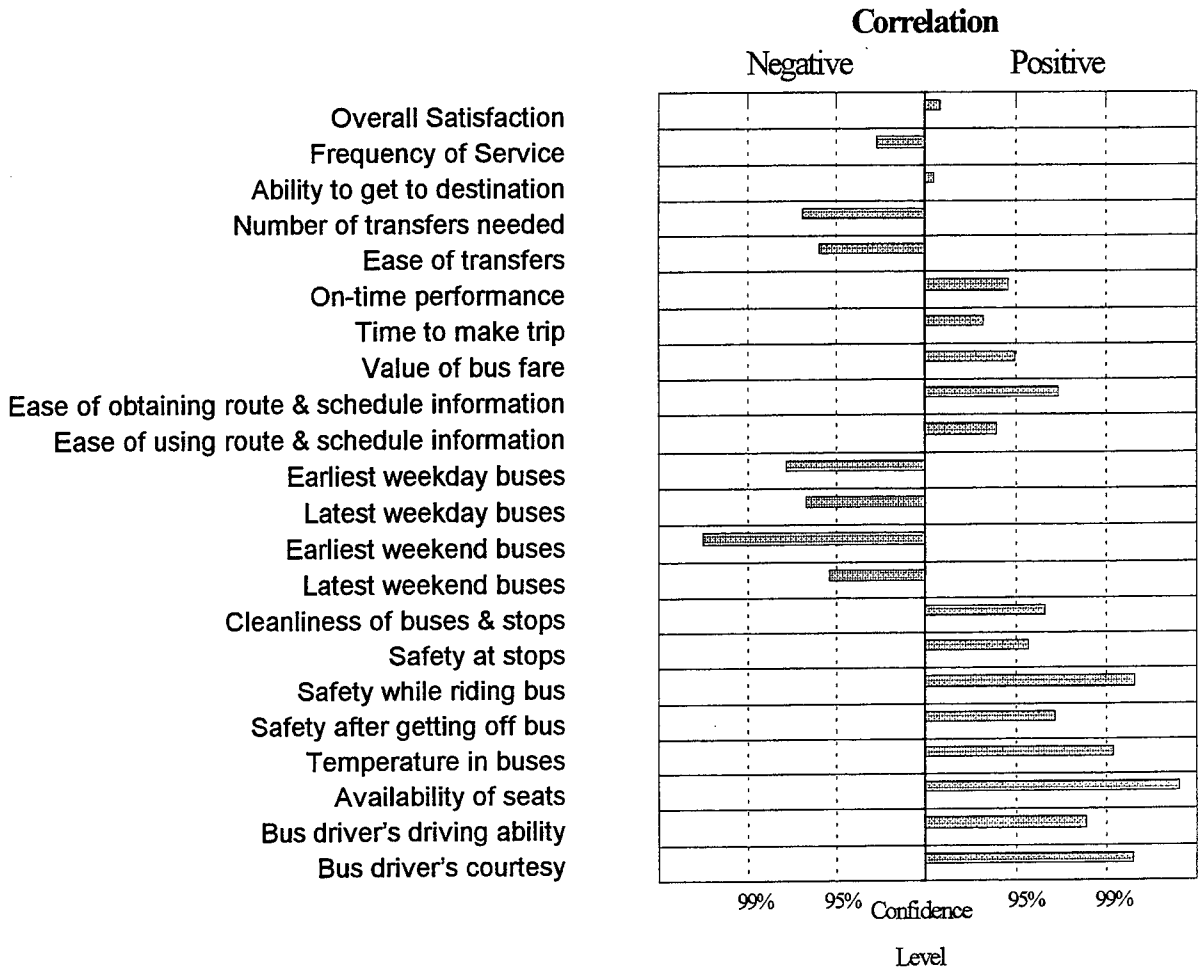


There are a number of strong correlations for this item. This indicates that no-telephone households are less satisfied with many aspects of service, and that a telephone-based survey approach would therefore report higher levels of satisfaction than is appropriate. The main purpose of data collection for this item was to demonstrate that a sizable proportion of the bus-riding population does not have telephones and thus telephone-based surveys might inadequately cover this segment.

Significant positive correlations exist between number of working phones and overall satisfaction, frequency of service, ability to get to desired destination, value of bus fare, and span of service.

The number of working telephones in the home would likely be correlated with both income levels and number of adults (working or not working) in the home. The presence of a large number of adults might also imply more working motor vehicles. In fact, the strongest correlation that exists is between number of phones and number of working vehicles (r=.43). The pattern of correlation with satisfaction items also closely mirrors the pattern between those items and the number of working vehicles in the home. The comments in the previous section also explain the results in this section.

Correlation of Age and Satisfaction Items



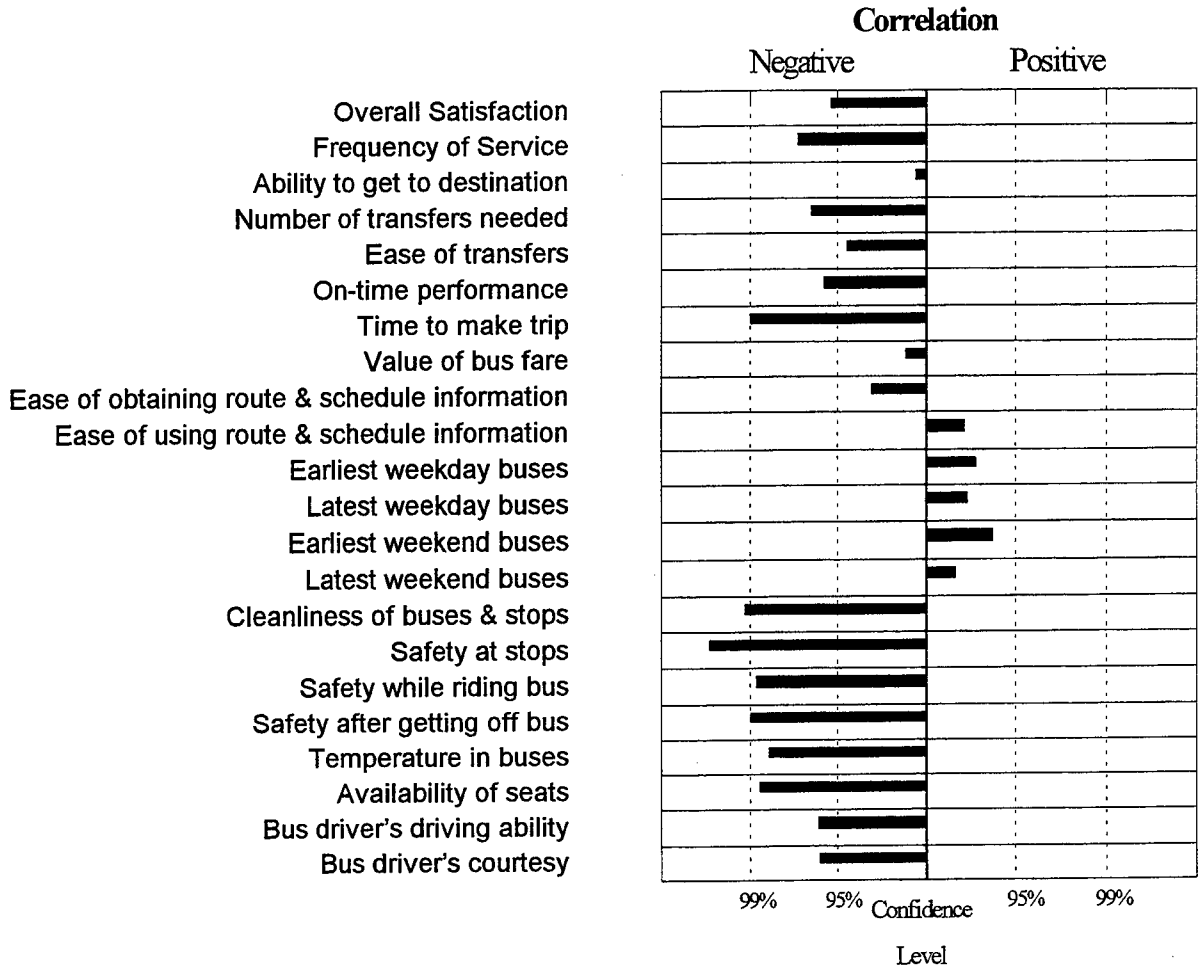
Respondent age is highly related to the satisfaction items, usually positively – that is, the older the respondent, the higher the level of satisfaction with most items. The individual items that are negatively correlated with age include a negative correlation between increasing age and satisfaction with number of transfers required and ease of transferring, and a stronger negative correlation between age and span of service issues. Both of these correlations are quite understandable. It is probably more of a physical hardship for older people to take trips, which require transfers. Also, since their destinations are less likely to be employment areas, it is quite likely that existing bus routings are not suited to their transportation needs.

Many items have significant positive correlations with increasing age. It should be noted that this could be equally viewed as negative correlations for younger riders.

The items that have the strongest positive correlations are: Availability of seats on buses, temperature in buses, bus drivers ability to drive bus, bus driver's courtesy, safety issues, and obtaining route and schedule information.

It is very important that the transit agencies provide service that is satisfactory to the older segments of the population. Since many of these people, for both physical and monetary reasons, are less likely to be able to provide themselves transportation, they should be viewed as a key customer segment. TALTRAN should consider it a notable achievement that they have been able to provide service that is more satisfactory to this group of customers.

Correlation of Gender and Satisfaction Items



The chart above shows correlations with gender using women as a greater value – that is, positive correlations are items women are more positive on, and negative correlations meaning women were more negative.

A large number of satisfaction items have significant correlations with respondent gender, and females were consistently the group less satisfied. The items that females were most significantly less satisfied with were: Safety issues, cleanliness of stops and buses, availability of seats, temperature inside buses, and time to make trip.

Clearly there is a major issue of safety – males would rather have buses run later, while females are relatively satisfied with the time of day the latest buses run; conversely, females feel less safe when they are using the bus, compared to males.

This is not a surprising result. However, TALTRAN should investigate any improvements that could be made to make women feel safer at bus stops and while riding the buses, such as increased lighting at stops and shelters and installing security cameras on buses.

Correlation of Race and Satisfaction Items

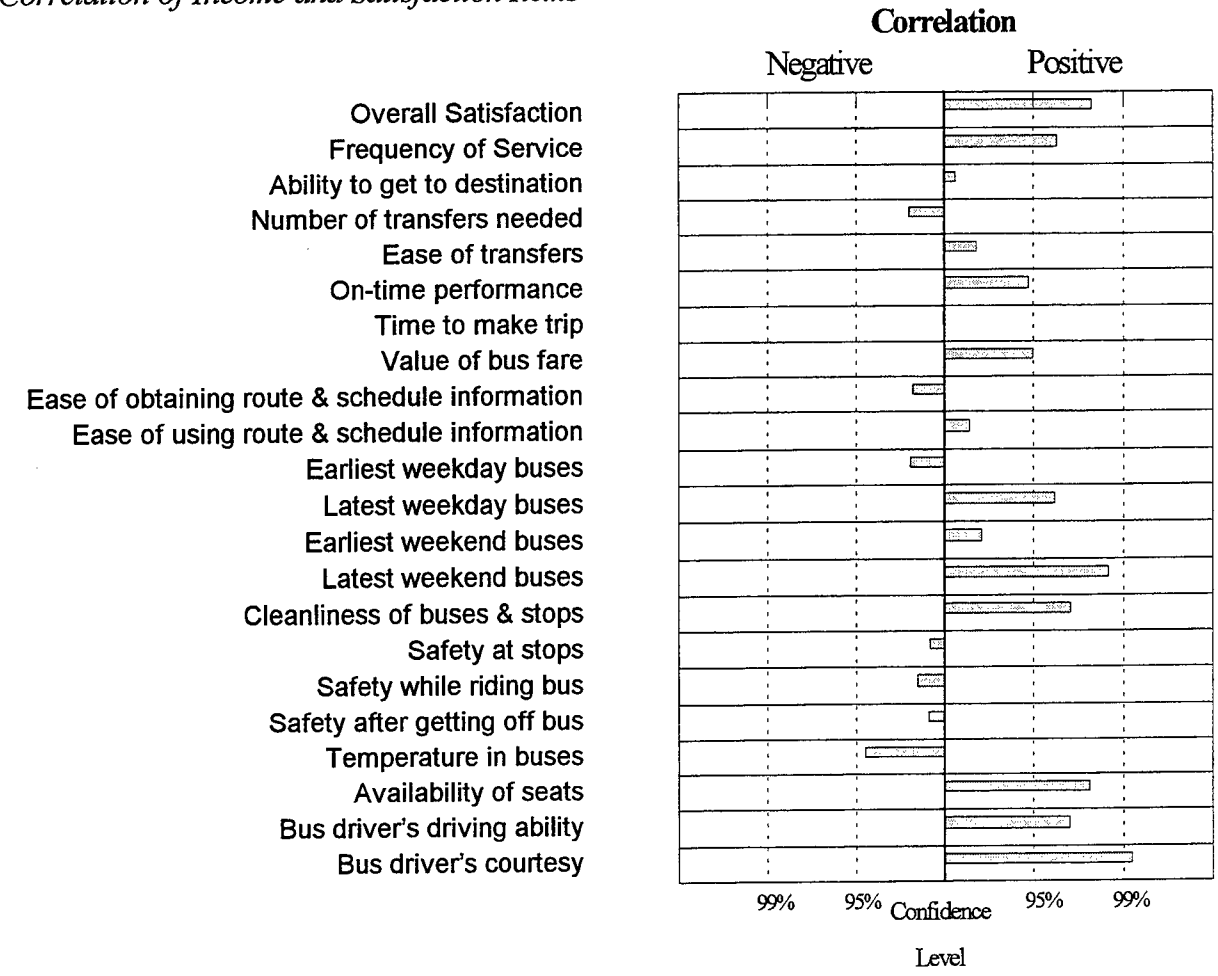
This data can not be analyzed through correlations. Rather, it is necessary to examine individual crosstabs for significant differences.

Above average levels of satisfaction were observed for whites (safety while riding bus, availability of seats) and for Hispanics (numerous items, particularly span of service issues, on-time performance and time to make trips, and frequency of service). Asians also had higher levels of satisfaction, but few of the results were significant due to small sample sizes.

This indicates that levels of satisfaction among blacks were generally lower than for other groups. Blacks make up 78% of the ridership and so can clearly not be "significantly below average" as a group because they dominate the value of the average. However, there is clearly a lower level of satisfaction among black riders.

To some extent this result may reflect lower levels of income and higher dependence on the transit system. The fare increase may also have affected blacks more than other riders, given their lower levels of income. Given the generally high level of satisfaction on most items this is probably not an item of major concern. However, TALTRAN should monitor this finding carefully in future studies to ensure that there are no racially based concerns with the transit agency.

Correlation of Income and Satisfaction Items



Most satisfaction items are positively correlated with income. There are no significant negative correlations between satisfaction items and income. Two factors may be influencing these results. The first is that the lower income riders probably reacted more negatively to the fare increase because it affected them more. The second issue is that some of the higher income households may be students at FSU, who are well served by the bus system and may not be as dependent on its service as lower income households. There was a strong relationship between household income and school as a trip origin, although the relationship between higher incomes and school as a destination was not as strong.

Survey Instrument

The survey instrument is provided on the following pages. The survey was printed on 60# blue cardstock, on both sides of an 8 ½ · 11 sheet.

Dear TALTRAN Customer: Please help us! Your opinions and information about your trip are very important in helping us improve our service for you. Please complete **both sides** of this survey and place it **in the box by the bus door** when you get off the bus. **Even if you are not finished** with the survey when you complete your trip, please drop it in the box when you get off the bus. Thanks for your help!

1. Have you filled out this survey earlier today? ❒ no **Continue** ❒ yes **STOP! Please place in return box**

2. In a **typical week**, *on how many* **days** do you ride the bus?

1❒ One day/ week or less 2❒ 2 days/ week 3❒ 3 days/ week 4❒ 4 days/ week 5❒ 5 days/ week 6❒ 6 days/ week 7❒ 7 days/ week

3. How satisfied are you with each of the following? *Circle the number* that best reflects your opinion	**Very Satisfied** ☺		**Neutral**		**Very Unsatisfied** ☹
a. Your overall satisfaction with TALTRAN	5	4	3	2	1
b. Frequency of service (how often buses run)	5	4	3	2	1
c. Your ability to get where you want to go using the bus	5	4	3	2	1
d. The number of times you have to transfer buses to get to where you want to go	5	4	3	2	1
e. How easy it is to transfer buses	5	4	3	2	1
f. How regularly buses arrive on time	5	4	3	2	1
g. The time it takes to make a trip by bus	5	4	3	2	1
h. Value of bus fare (service you get for what you pay)	5	4	3	2	1
I. How easy it is to **obtain** bus route and schedule information	5	4	3	2	1
j. How easy it is to **use** bus route and schedule information	5	4	3	2	1
k. The time of day the *earliest* buses run on **weekdays**	5	4	3	2	1
l. The time of day the *latest* buses run on **weekdays**	5	4	3	2	1
m. The time of day the *earliest* buses run on **weekend days**	5	4	3	2	1
n. The time of day the *latest* buses run on **weekend days**	5	4	3	2	1
o. How clean the buses and bus stops are	5	4	3	2	1
p. Safety at the bus stop	5	4	3	2	1
q. Safety while riding the bus	5	4	3	2	1
r. Safety after getting off the bus	5	4	3	2	1
s. Temperature inside the buses	5	4	3	2	1
t. Availability of seats on buses	5	4	3	2	1
u. The bus driver's ability to drive the bus	5	4	3	2	1
v. The bus driver's courtesy	5	4	3	2	1

Continue on other side

4a. Thinking only about **last week**, did you ride the bus on:

Monday?	Tuesday?	Wednesday?	Thursday?	Friday?	Saturday?	Sunday?
1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes	1 ☐ Yes
2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No	2 ☐ No

4b. How many times will you board a bus today, including all your transfers? **(circle ONE answer)**
1 2 3 4 5 6 7 8 9 10 or more

5. What is the nearest major street intersection to where you:
boarded this bus? _____ & _____
will get off this bus? _____ & _____

6a. Where are you coming from on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

6b. Where are you going on this trip?

1 ☐ Home 2 ☐ Work 3 ☐ School 4 ☐ Shopping 5 ☐ Visiting/ Recreation 6 ☐ Doctor 7 ☐ Other

7. Are you transferring buses on this trip? 1 ☐ Yes How many times? ___ 2 ☐ No

8. How many adults in your household are employed outside the home? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

9. How many children under the age of 16 do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

10. How many working motor vehicles does your household have? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

11. How many working telephones do you have in your household? 0 ☐ None 1 ☐ 1 2 ☐ 2 3 ☐ 3 or more

12. What is your age? 1 ☐ Under 18 2 ☐ 18-24 3 ☐ 25-34 4 ☐ 35-44 5 ☐ 45-54 6 ☐ 55-64 7 ☐ 65 or over

13. What is your gender? 1 ☐ male 2 ☐ female

14. What is your ethnic heritage? 1 ☐ White 2 ☐ Black 3 ☐ Hispanic 4 ☐ Asian 5 ☐ Something else (specify: _____)

15. In what range was **your household's total income** for 1996?

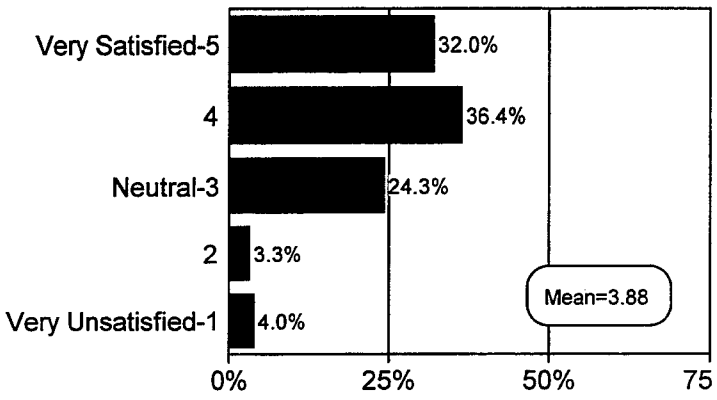
1 ☐ Under $5,000 2 ☐ $5,000 to $9,999 3 ☐ $10,000 to $14,999
4 ☐ $15,000 to $19,999 5 ☐ $20,000 to $24,999 6 ☐ $25,000 to $29,999
7 ☐ $30,000 to $39,999 8 ☐ $40,000 to $49,999 9 ☐ $50,000 or more

Thank you for your assistance!

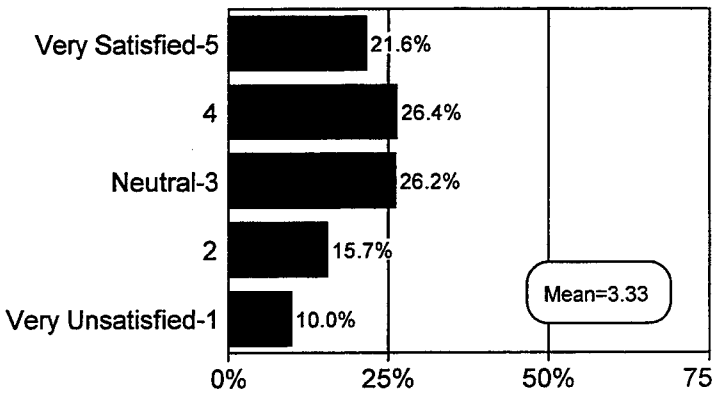
Results by question

The results of the surveys by question are presented graphically on the following pages, three questions to a page.

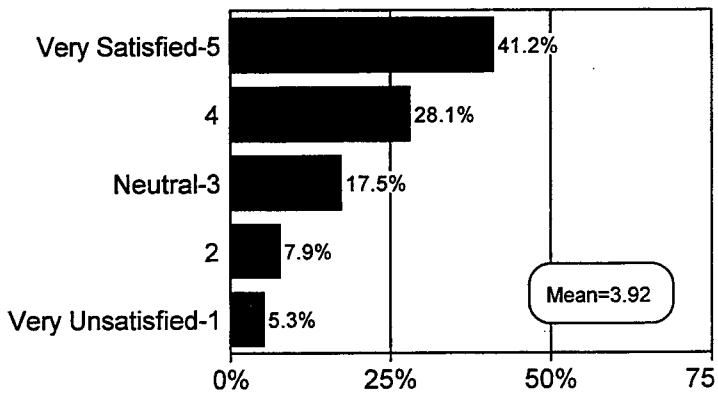
3a. Your overall satisfaction with TALTRAN...



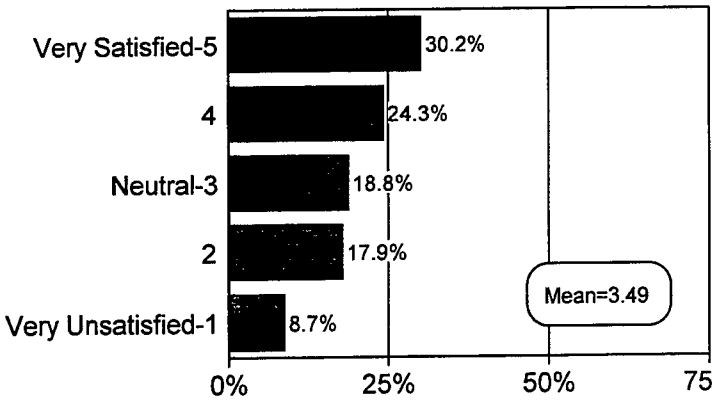
3b. Frequency of service (how often buses run)...



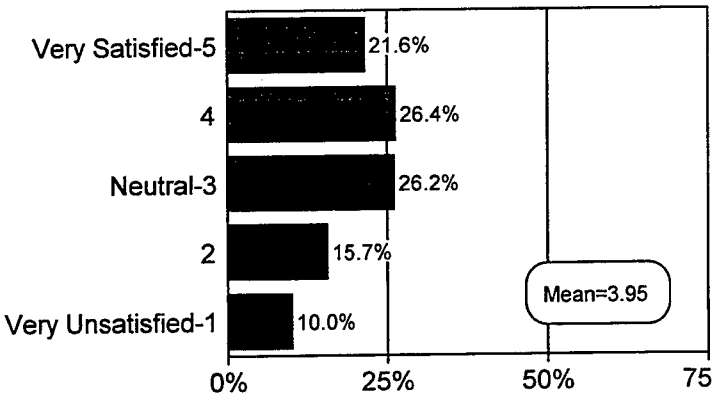
3c. Your ability to get where you want to go using the bus...



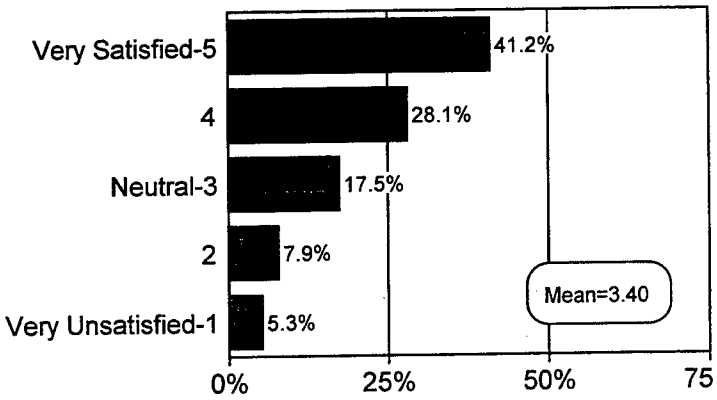
3d. The number of times you have to transfer buses...



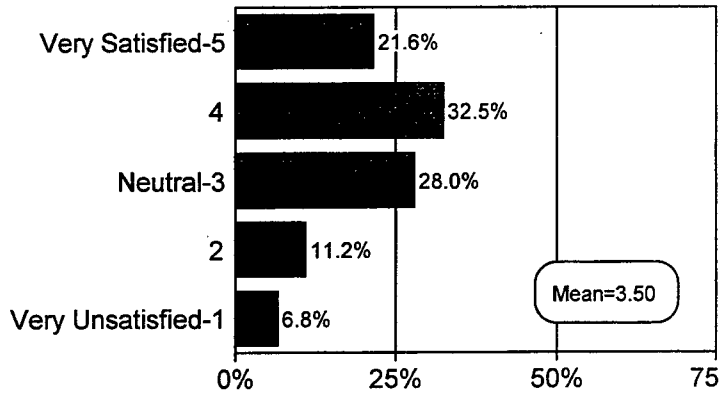
3e. How easy it is to transfer buses...



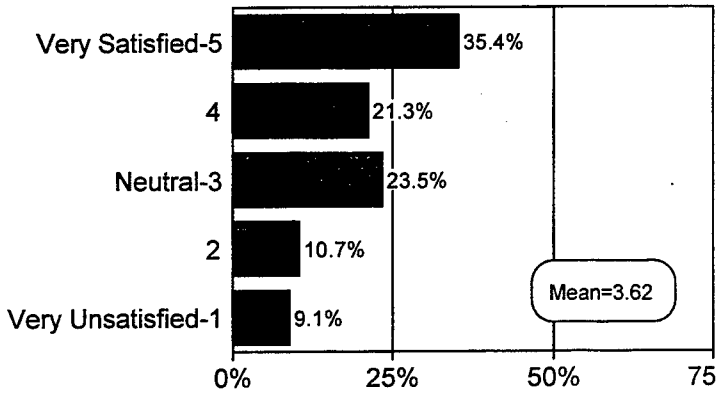
3f. How regularly buses arrive on time...



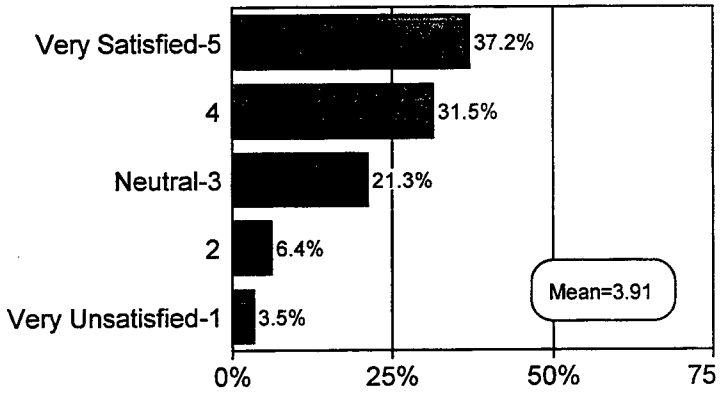
3g. The time it takes to make a trip by bus...



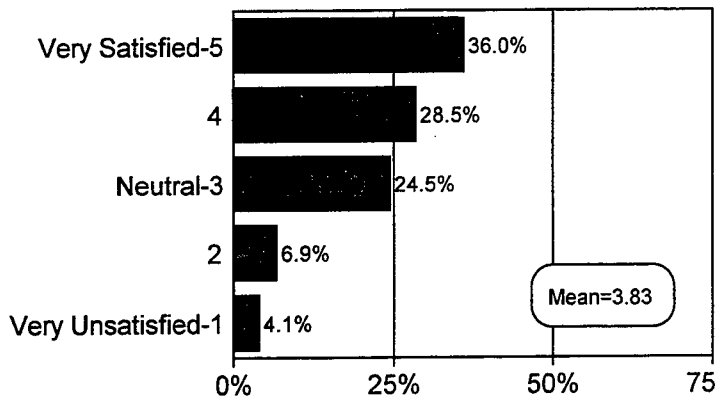
3h. Value of bus fare (service you get for what you pay)...



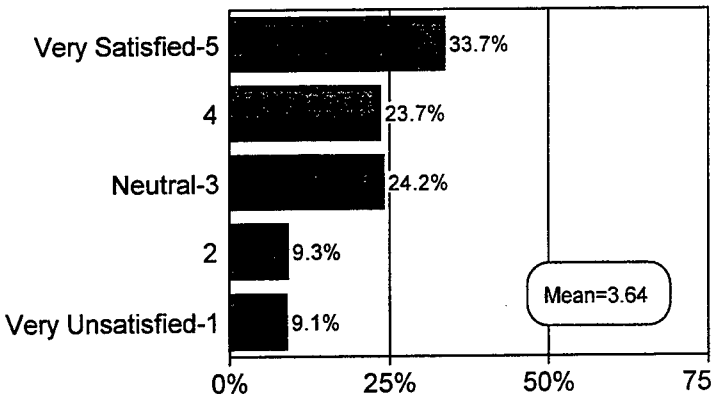
3i. How easy it is to obtain bus route & schedule information...



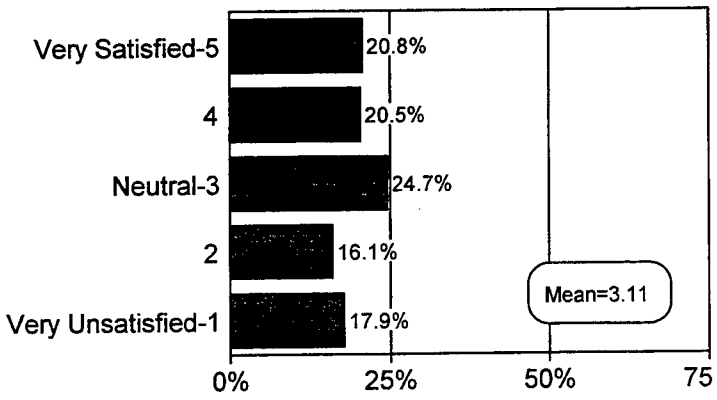
3j. How easy it is to use bus route & schedule information...



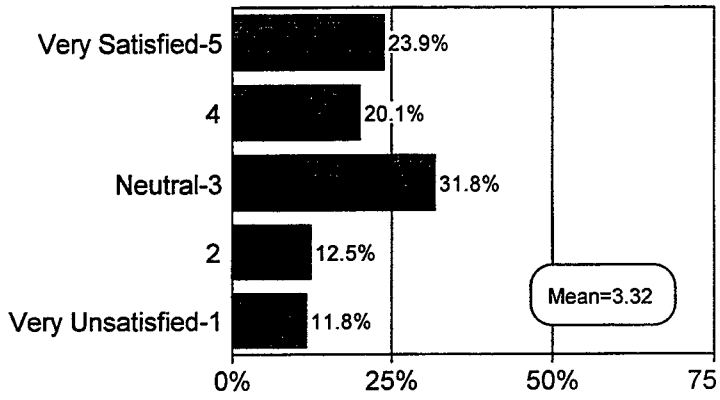
3k. The time of day the earliest buses run on weekdays...



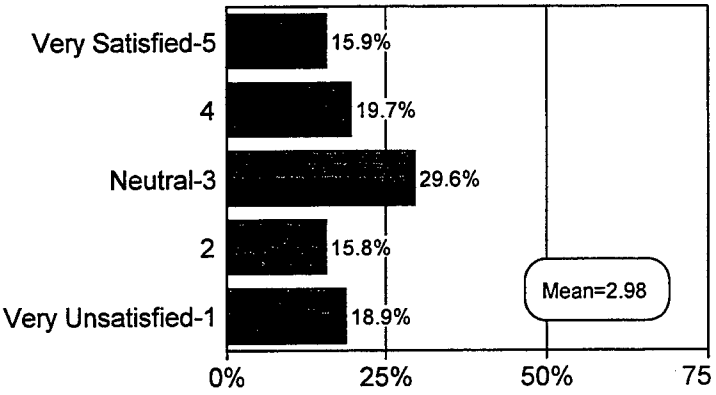
3l. The time of day the latest buses run on weekdays...



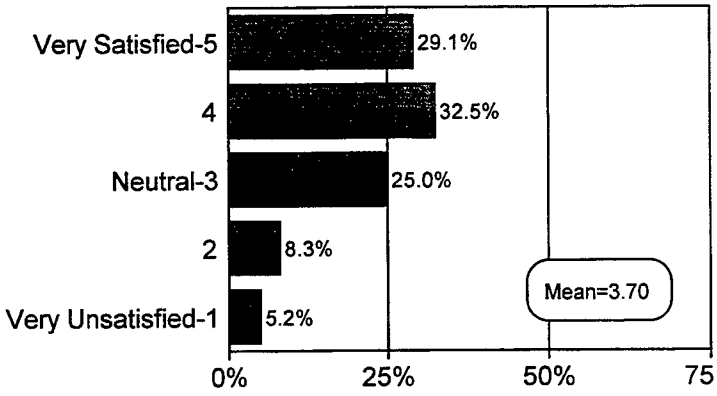
3m. The time of day the earliest buses run on weekend days...



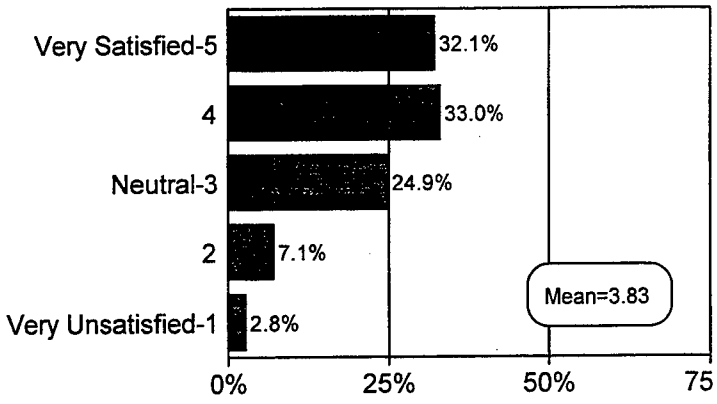
3n. The time of day the latest buses run on weekend days...



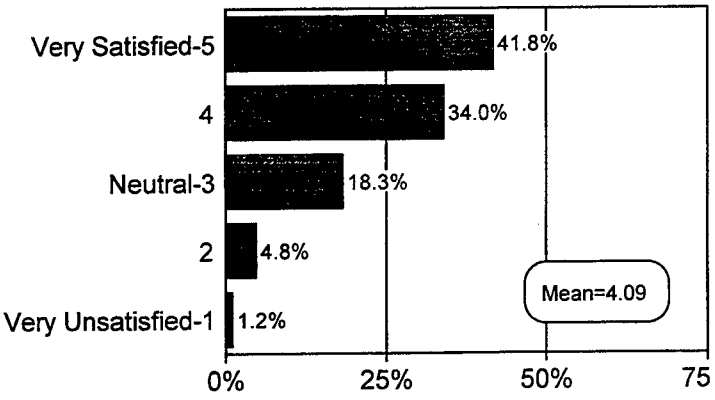
3o. How clean the buses and bus stops are...



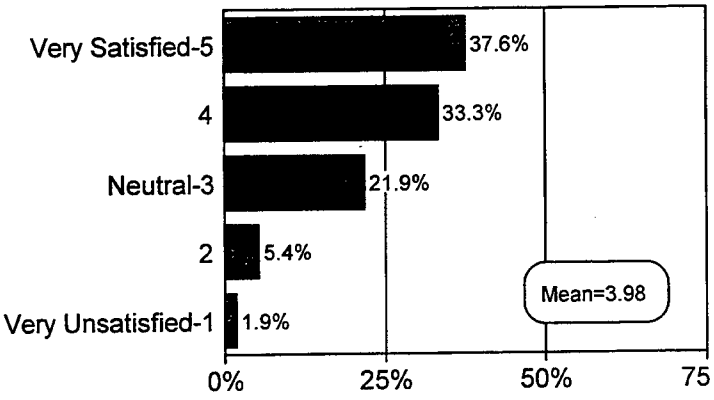
3p. Safety at the bus stop...



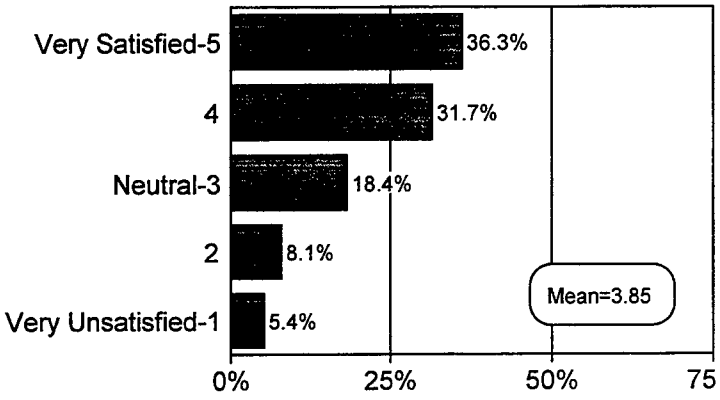
3q. Safety while riding the bus...



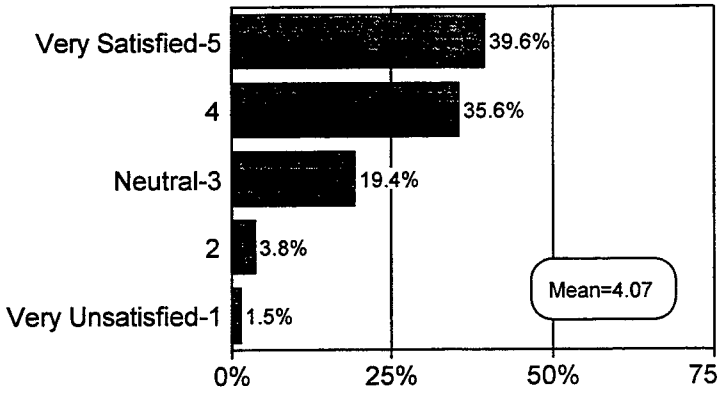
3r. Safety after getting off the bus...



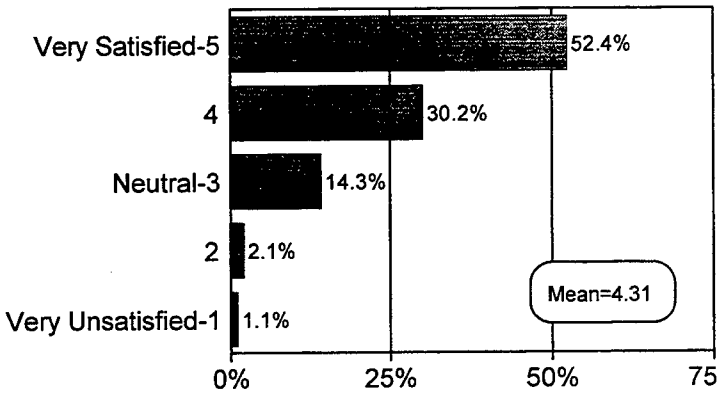
3s. Temperature inside the buses...



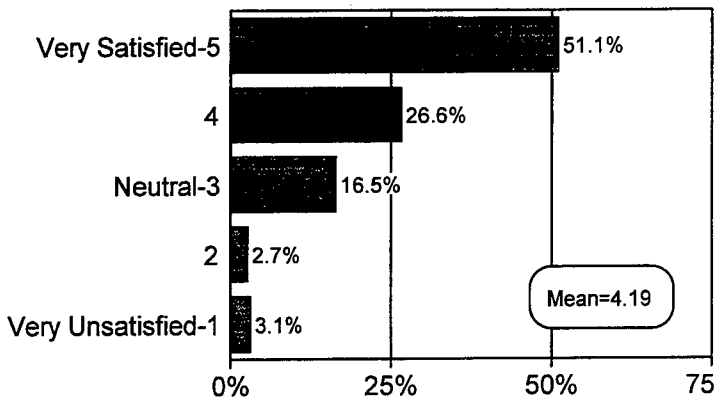
3t. Availability of seats on buses...



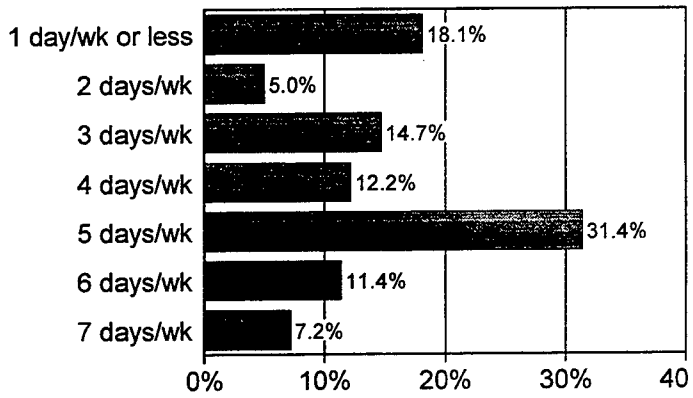
3u. The bus driver's ability to drive the bus...



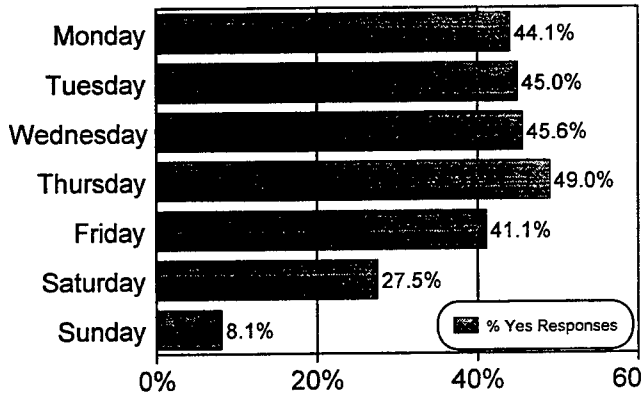
3v. The bus driver's courtesy...



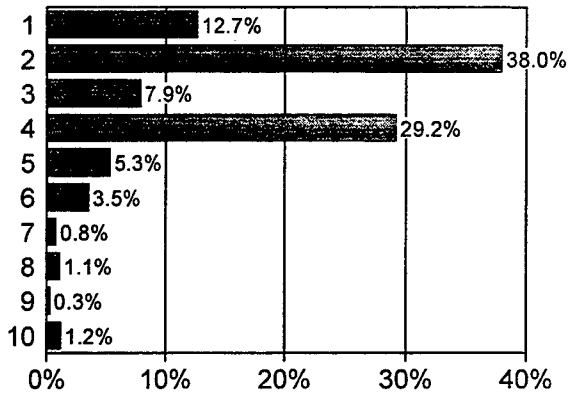
2. In a typical week, on how many days do you ride the bus?



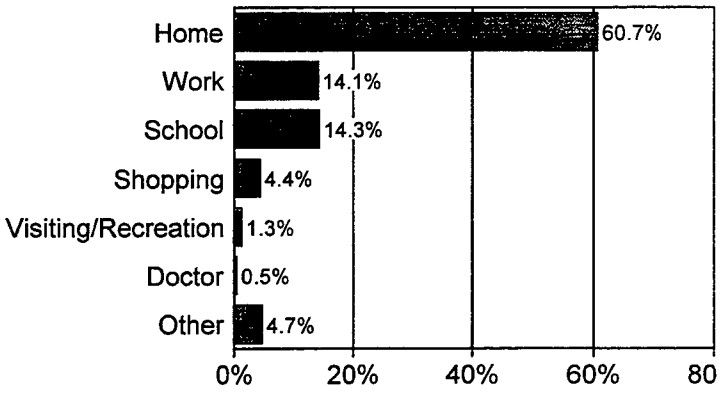
4a. Thinking only about last week, did you ride the bus on...



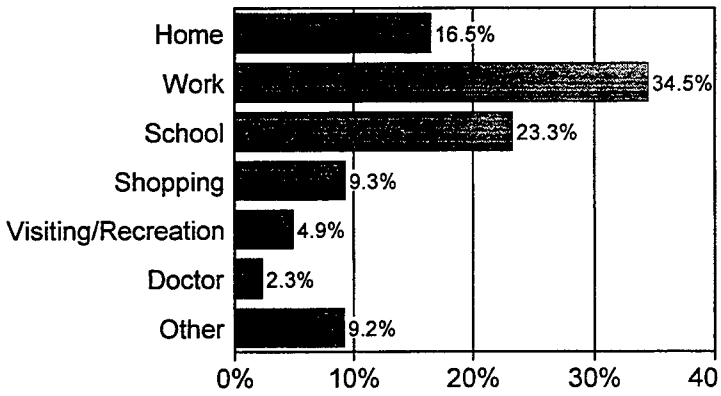
4b. How many times will you board a bus today, including transfers?



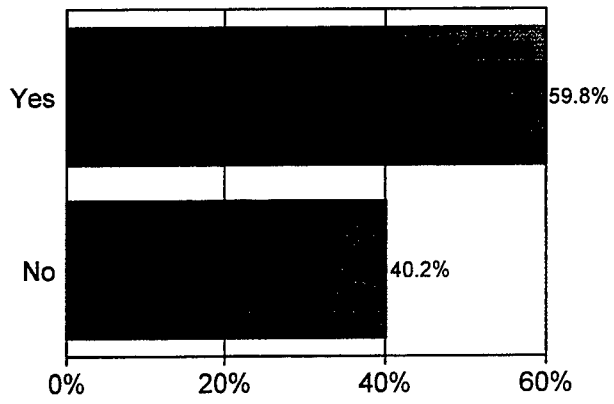
6a. Where are you coming from on this trip?



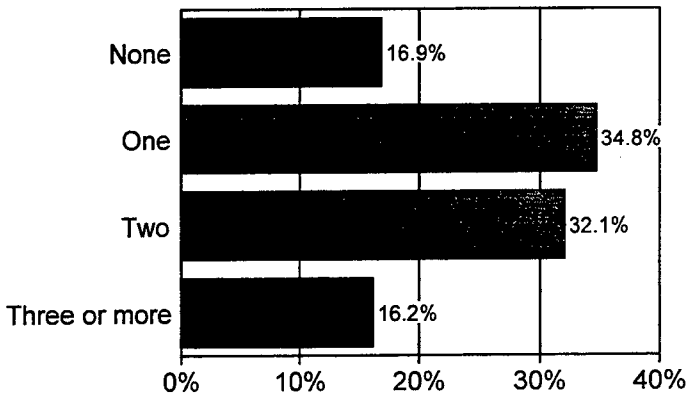
6b. Where are you going on this trip?



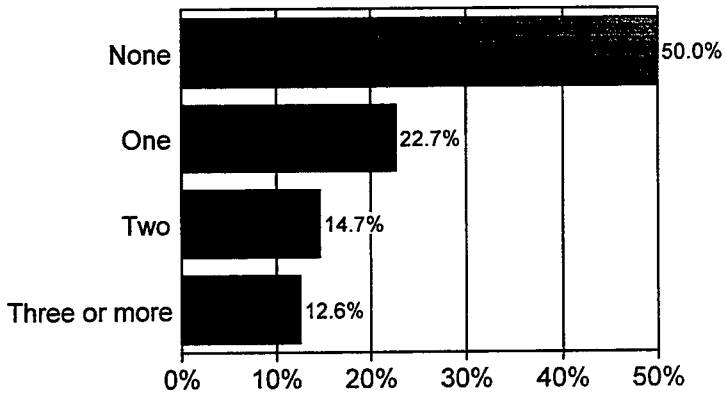
7. Are you transferring buses on this trip?



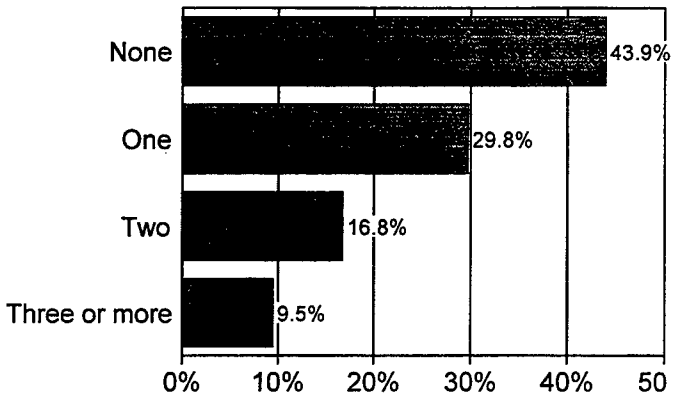
8. How many adults in your household are employed outside the home?



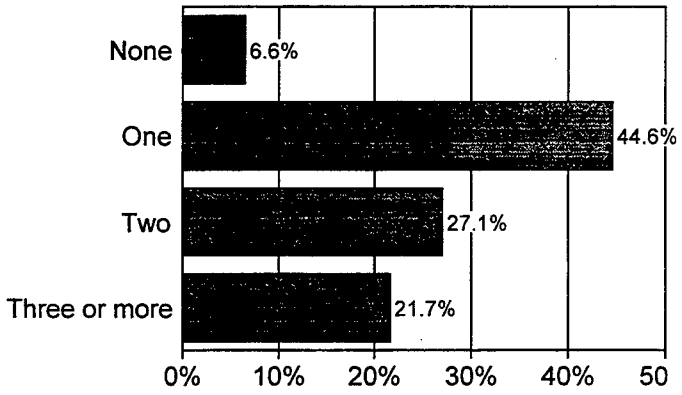
9. How many children under the age of 16 do you have in your household?



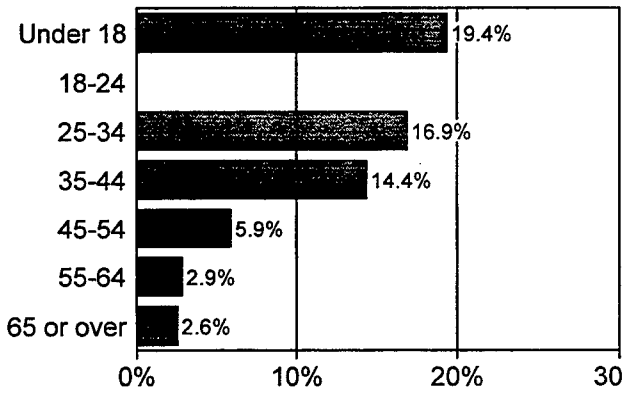
10. How many working motor vehicles does your household have?



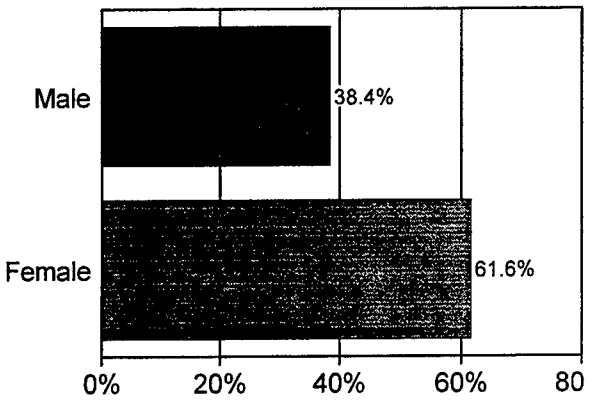
11. How many working telephones do you have in your household?



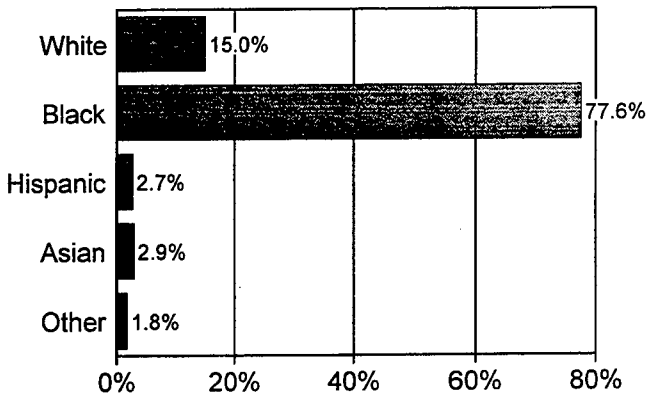
12. What is your age?



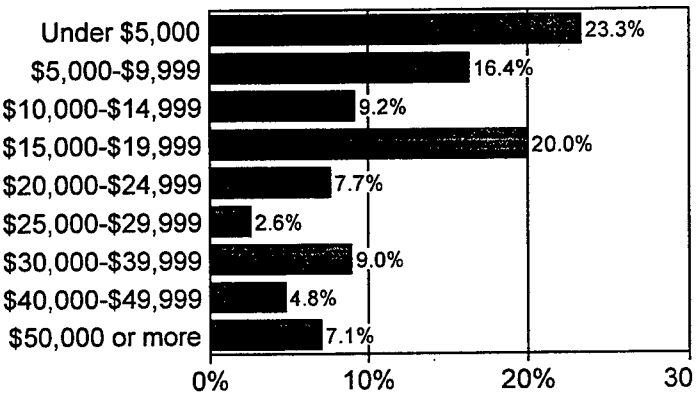
13. What is your gender?



14. What is your ethnic heritage?



15. In what range was your household's total income for 1996?



CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE APPLICATIONS

The transit customer satisfaction index provides valuable data for the transit systems that were involved in this project. The index also serves as a baseline for other Florida transit systems that may want to compare themselves to the performance of Florida systems as a whole.

The recommended process for conducting this type of study is:

Step 1. Design the Survey

Prepare a customer satisfaction survey, including the 22 satisfaction items included in the surveys used in this project, as well as a question concerning which of the last 7 days the respondent has ridden the bus. The survey should also contain an instruction which states that if the rider has filled out a survey during the previous week, they should *not* complete another survey.

The survey should cover no more than the front and back of an 8 ½ · 11 sheet. It should be printed on heavy cardstock so that respondents can easily fill out the survey without needing something to write on.

Step 2. Distribute and Collect the Surveys

Distribute the surveys on as many different routes as possible, at all times of day. Preferably survey distribution will occur during one weekday and one weekend day. Where possible, drivers on all routes should be used to distribute the surveys. On routes with particularly heavy ridership, transit checkers or other system personnel should be on hand on at least some of the runs to assist in survey distribution. A convenient survey collection method, such as a box placed near the exit door of the vehicle, should be provided to make it easy for riders to return surveys.

It is extremely important that driver cooperation be actively sought for survey distribution. CUTR's experience during this project was that with a 10-minute presentation on why the survey was being done and what the drivers were supposed to do, drivers were eager to participate and survey return levels were very high. When drivers were merely informed of the survey by memo, cooperation was not nearly as consistent and response rates were significantly lower.

Step 3. Survey Analysis

The surveys should be key-entered into a spreadsheet package, such as Lotus 1-2-3 or Excel. It may be beyond the capability of system personnel to appropriately weight survey responses by route and by ridership frequency, and to construct satisfaction models as described in this document. However, even a simple averaging procedure will yield information of some value, although it will not be directly correlated with results from this CSI project.

CUTR is, of course, always available to assist systems in the implementation and analysis of surveys. The weighting, factoring and satisfaction modeling procedures can be done quite efficiently, now that the basic process has been designed.