

Travel Patterns to and from UBC and Response of Market Segments Collected via an Internet Web-based Scenario.

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Objective

The Transportation Advisory Committee is a multi-stakeholder committee with a general mandate to improve transportation services to and from the UBC campus and to reduce reliance on single occupancy automobile use. To assist the Committee, in anticipation of recommending changes in transportation policy, an electronic survey of members of the campus community was conducted in January 1998. The objective of the survey was to estimate current travel behavior and likely response of different market segments to the initiation of improved transit service and flexible pass options among faculty, students and staff at UBC.

Methods

It was anticipated that the campus community could be divided into faculty, staff, students in much the same way that lifestyle segmentation is used in retail analysis to establish target markets. The assumption was that each segment would be somewhat homogeneous in terms of their travel characteristics and would form an obvious target for promoting new transportation products. Individuals were selected from each segment to meet as focus groups and identify issues. Then a conventional approach to constructing a questionnaire was followed.

The actual questionnaire was embedded in a fairly sophisticated Internet web-based scenario. The request to complete the questionnaire was circulated in January 1998 by means of an e-mail solicitation of 34,000 accounts. Response rates differed dramatically by sex, department, and job classification. To some extent this differential response resulted from a survey response format that required access to a high level account capable of hosting an interactive dialogue for automatic tabulation. Since many accounts, especially student accounts, are low level script based, respondents were required to go to some effort to comply with the request.

With this survey being the first large scale Internet exercise, there was no appropriate precedent to follow in evaluating responses but it was evident that the picture of travel activity to and from campus was not consistent with earlier survey results. The methods in the post survey component of the exercise involved adjusting for obvious bias associated with the respondent's experience and facility with web-browsers and electronic mail. After processing the responses and accounting for Internet experiential bias it became clear that there was a further error and that respondents in any given segment did not necessarily display similar behavior to others in the same segment. Attitudes about possible transportation products also varied. Obviously a second source of bias was impacting the data set. One cause was traced to the nature of the solicitation, which offered rewards for completion, and in the case of cyclists, prizes of mountain bikes brought an overwhelming response. Self-interest was also a factor in response rates by those habitually using or actively considering transit. An unexpectedly low response rate by SOVers and HOVers was noted.

A second and more detailed assessment of segmentation of the campus community was conducted. A further segmentation was warranted with sub-markets being defined by mode choice. The result was a set of market segments containing individuals clustered according to consistent distributions of travel behavior. Survey results were then calibrated with known on-the-ground traffic counts taken in late November 1997. This calibration exercise required restricting the analysis of behavior to commuters to and from campus during peak morning and/or afternoon periods. Responses by campus residents were set aside for a separate study.

Background

The survey was undertaken through funding by UBC with assistance from BC Transit to provide an authoritative basis for making inferences about travel characteristics of the campus community. In this way, the UBC Transportation Advisory Committee, a multi-stakeholder committee, would gain a good impression of the profile of commuters to campus and be able to better assess the prospects of a proposed universal pass (Trek) card for UBC. At present, BC Transit offers students multi-zone privileges for single zone fare for a few dollars a year. Known as the FasTrax Program it represents a subsidy to multizone transit riders.

The proposed universal pass would be provided by UBC as three distinct packages covering various levels of access to a combination of parking facilities and transit services. In one form (Great Trek Card) the pass would primarily cover transit services with limited access to parking facilities. In a different form (Park Trek Card) the pass would replace existing parking passes and offer a limited number of transit rides. A third option (Flex Trek Card) would provide a mix of transit services and parking facilities.

Survey Classification

Traditionally university markets are classified as faculty, staff, students, and this classification was retained for reporting purposes as well as to provide a convenient way to identify appropriate representation. However, for analysis and projecting the market for different products, a more refined classification based on travel behaviors was adopted. Market segments were defined as groups of faculty, staff, and students cross-classified by mode of travel.

Analysis

Sample data, normalized to compensate for sources of bias in the results, are used to characterize travel behavior. The statistical practice of treating the resulting refined classification of groups as being essentially comparable is followed. That is, there may be individual eccentricities within a segment, but overall, commuters in a given segment could be expected to behave in a predictable way. Consequently inferences can be made about the attitudes of each group.

A number of techniques were applied including:

- Factor analysis to estimate attitudes towards current levels of service delivery.
- Sensitivity analysis to estimate market for different transportation products.
- Projections of survey responses to establish overall activity patterns of commuters to and from campus.

Results

Characteristics of UBC Commuters (morning/afternoon peak period)

1. Travel mode of commuters

The projected total represents typical number of individuals commuting to UBC during peak periods on a typical weekday with University in regular session. The 25,174 individuals account for about half the daily volume of person trips crossing into and out of the University Endowment Lands over a twenty-four hour weekday. The sum does not include trips made during non-peak periods nor in non-peak directions.

	SOV	HOV	Transit	Bicycle	Sum
Student	7713.25	6407.61	4106.37	633.00	19032.77
Faculty	876.68	294.98	154.52	108.97	1443.10
Staff	1986.73	1507.25	878.13	93.86	4533.58
Not Stated	72.98	54.05	30.95	5.34	165.01
Grand Total	10649.64	8263.89	5169.97	841.17	25174.46
Percentage	42.30	32.83	20.54	3.34	

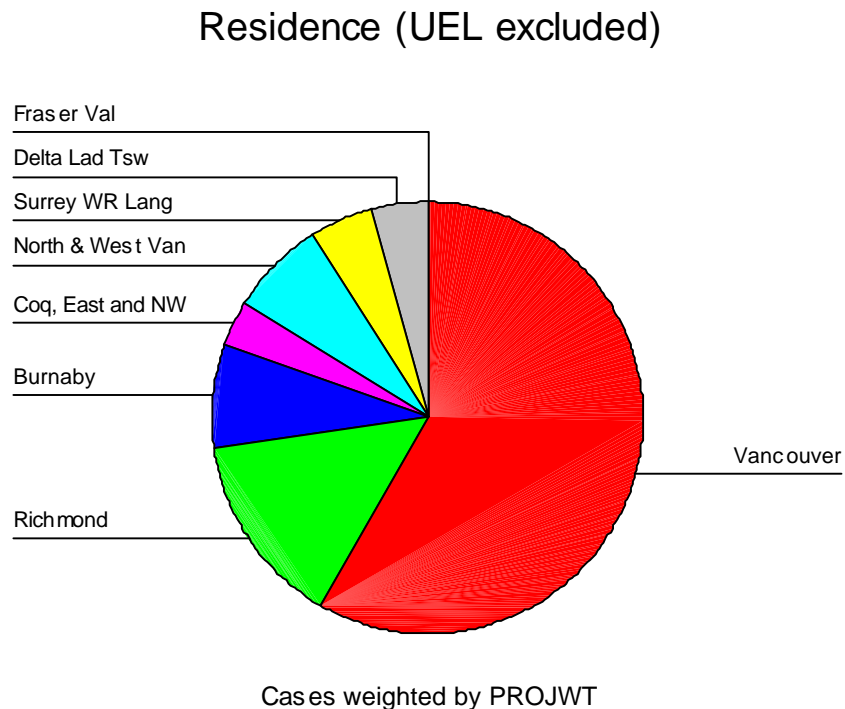
The single occupant vehicle (SOV), carrying 42.3% of commuters, is the most dominant mode of travel, followed closely by those in high occupancy vehicles with 32.83%. Only one in five commuters use transit.

It is quite difficult to identify what portion of counter flow traffic and off-peak trips are associated with UEL residents. They were not part of the survey design frame and further survey work is required to identify this component. Travel patterns of campus residents are largely counter-flow and were excluded from analysis. An on-going study is exploring travel characteristics of campus residents and their potential as a target market for combined transit and parking packages.

2. Geographical distribution of commuters to campus (excluding on-campus residents)

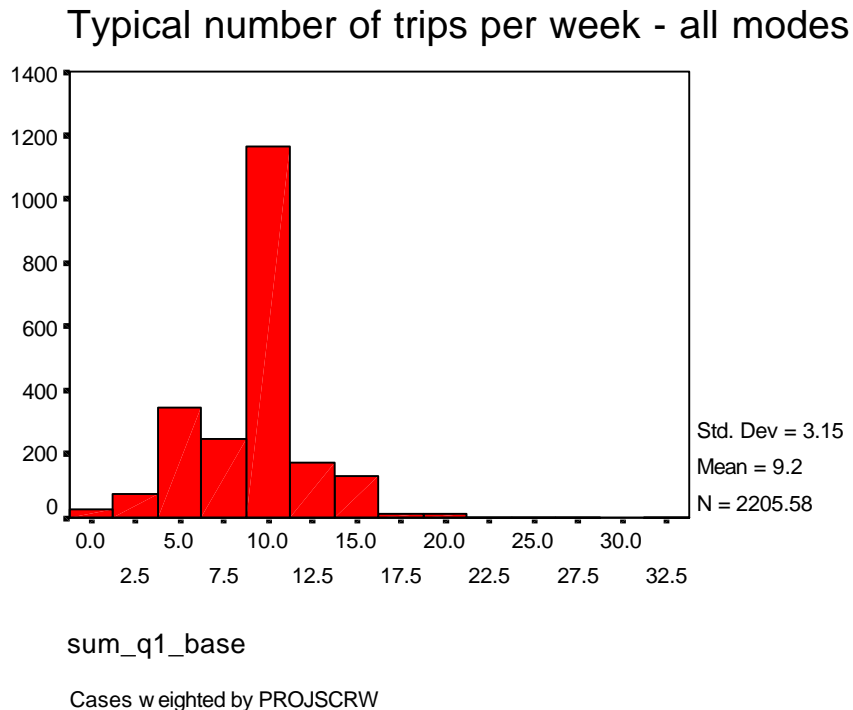
A notable distance decay effect is evident in the catchment area for UBC - the number of commuters to campus declines with distance from campus. Vancouver residents (58.2%) constitute the major source of commuting on a typical weekday during regular Winter Session. The next largest catchment area is Richmond (14.2%), followed by Burnaby (7.6%) and North shore (7.2%). The more distant suburbs account for 12.4% of trips in total.

Region	Frequency	Percent	Cumulative Percent
Vancouver	14651	58.2	58.2
Richmond	3697	14.7	72.9
Burnaby	1924	7.6	80.5
Coq, East and NW	838	3.3	83.9
North & West Van	1804	7.2	91.0
Surrey WR Lang	1209	4.8	95.8
Delta Lad Tsw	1031	4.1	99.9
Fraser Val	19	.1	100.0
Total	25174	100.0	100.0



3. Frequency of trips by commuters

There is significant variation in the number of times individual members of the campus community actually attend. During any weekday a specific member may make from 5 to 15 trips.



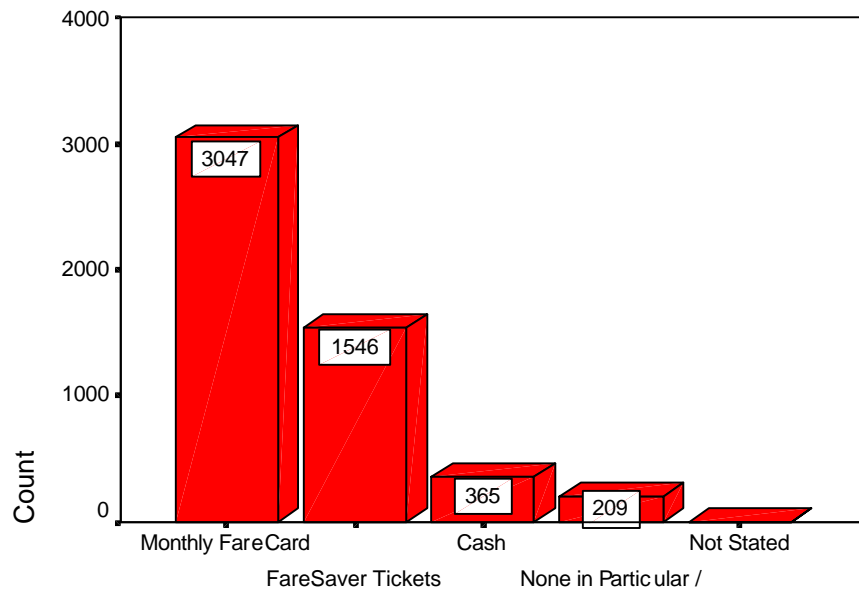
These trips represent 9.2 trips per person for the normalized survey responses. Extrapolating and allowing for variation in frequency of trips per week, the level of traffic observed is being generated by a population of 28,950.53, some of whom make a few trips per week and some who generate two round trips a day.

There is some geographical distortion associated with typical daily trips as evidenced by:

- A tendency for travel behavior of specific members not to be independent of distance or time to campus but with some consistency evident in groups according to mode of travel;
- More frequent trips by those resident closer to campus
- A greater likelihood of using transit if resident closer to campus;
- Wide variation in travel behavior for the campus community as a whole and need to project for segments of the community;
- Vanpools being formed by commuters traveling significant distances.

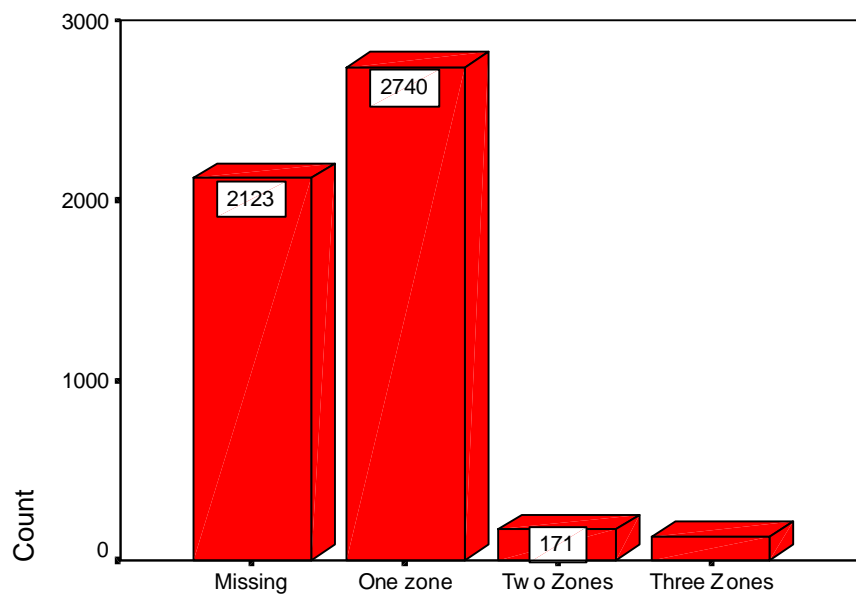
4. Transit Usage

Most regular transit users purchase monthly fare cards - accounting for 59% of the total 5170 commuters during peak periods. Of these, the overwhelming use is for origination and destination within one transit zone.



Method of payment normally used on transit.

Cases weighted by PROJTRAW



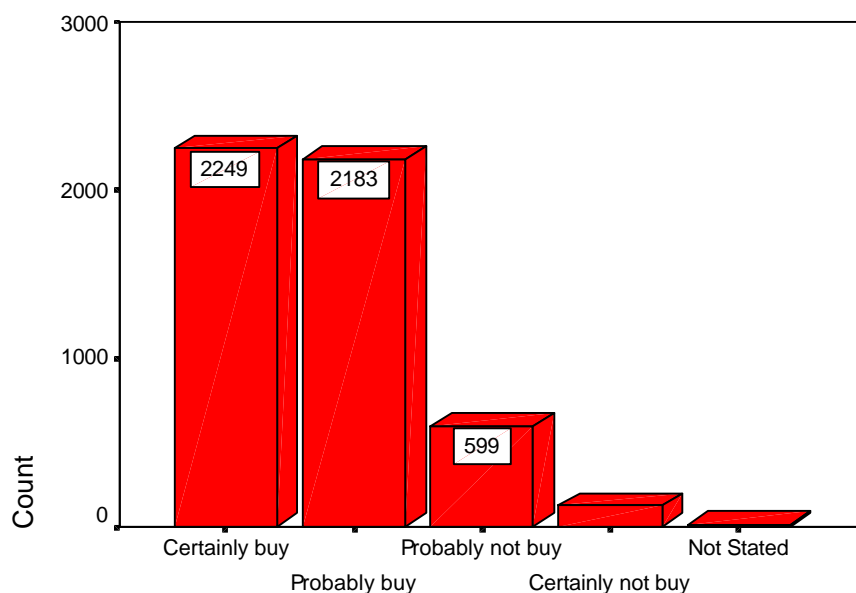
FareCard for transit

Cases weighted by PROJTRAW

Estimates of Demand for new Transportation Products by Market Segment (morning/afternoon peak period)

1. Possible demand for a new product by transit users

Regular transit users responded that they were not particularly price sensitive and that improved transit service was more important to them than fare reductions as an incentive for increased usage. Transit users identified with a new transportation package in much the same way they responded to questions about method of payment and frequency of current use.



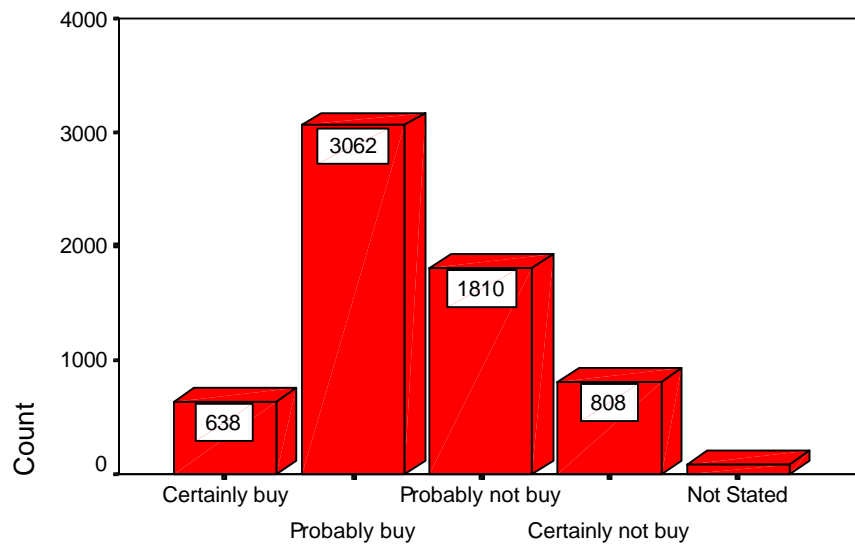
Trek Card priced and with features as expected.

Cases weighted by PROJTRAW

Given the vague appreciation by respondents of what the hypothetical transportation product (universal pass/Trek Card) entailed it was to be expected that transit users would respond according to experience. Sensitivity analysis of respondents travel behavior confirmed this. Consequently the projected numbers define market for a pass primarily covering transit services such as BC Transit's Fastrax Program or the proposed UBC Great Trek package. Albeit the market penetration would not increase much through introduction of a new product and improvements to existing fare card would more reward loyalty than increase usage.

2. Possible demand for a new product by drivers in single occupant vehicles.

Non transit users are not aware of the character, availability, and frequency of transit, as are habitual transit users. This was evident in the differences in responses to questions about acceptability of current transit performance. Those habitually driving alone can be considered as unexposed to transit and would constitute the largest component of the market for a product replacing existing parking passes such as the proposed UBC Park Trek Card.



Trek Card priced and features as expected.

Cases weighted by PROJSOVW

Selected - no transit, no HOV

3. Combined demand for a new product by drivers and passengers.

Commuter response to new products is encouraging. About 71 percent of commuters could be expected to buy or probably buy one of the packages combining transit and parking.

	Frequency	Percent	Cumulative Percent
Certainly buy	5595	22.2	22.2
Probably buy	12219	48.5	70.8
Probably not buy	5513	21.9	92.7
Certainly not buy	1659	6.6	99.2
Not Stated	189	.8	
Total	25174	100.0	100.0

	Student	Faculty	Staff	NotStated	Total
Certainly buy	4344	291	862	97	5594
Probably buy	9704	520	1930	65	12219
Probably not buy	3806	375	1332		5513
Certainly not buy	1088	238	329	3	1658
Not Stated	90	19	80		189
Total	19032	1443	4533	165	25173

Demand is a factor of awareness. There are greater possibilities for increasing transit usage by the exposed market segment of members aware or actively considering optional modes than for the unexposed who would appear to favor a parking pass based package.

The greatest gains would appear to be amongst passengers currently in high occupancy vehicles. Increasing their awareness of transit and providing an attractive transit based package could promote a shift. Albeit, this could end up both increasing transit use and if drivers do not also shift, increasing the number of single occupant vehicles.

Conclusions

A broad solicitation by E-mail of members of the campus community to participate in a web-based survey had unanticipated results. Two significant problems emerged:

- differentiation in response caused by technical restrictions and E-mail familiarity; and,
- statistical sampling problems associated with interest based involvement of members could see some benefit to participation.

The approach used to compensate was to identify market segments within which travel behavior was roughly consistent and to gain ground truth through traffic counts. This is the first large-scale survey using E-mail and experience here should provide guidelines if not a blueprint for subsequent surveys.

Specific members responded to questions according to familiarity with the issue and were grouped in the study into segments according to travel behavior. Different segments identified with packages, which closely reflected their attitudes and awareness of mode characteristics. Regular transit users were attracted to a package that provides some opportunity for parking but is fundamentally transit based. Those who habitually drive alone expressed interest in a flexible package that is parking based.

Results support the differentiation of reliance on transit and access to parking in any proposed pass. This is especially so with regards to those commuting by high occupancy vehicle. Incentives to use transit alone would likely have some attraction but would not succeed in significant change in mode split away from SOV. Indeed, it might have the reverse effect of increasing transit amongst the HOV target market while increasing reliance on single occupancy vehicles.