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Public Attitudes and Transport Infrastructure

Implications of Public Attitudes for Transport Infrastructure Investment

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Implications of Public Attitudes for Transport Infrastructure Investment.

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Contents

Abstract

In light of future public spending on public transport, a survey was designed to study public attitudes towards bus and rail systems, the trust invested in their infrastructure, and the perceptions regarding value added by the amenity to real estate. A sample of N=396 respondents from the Lower Hutt and Eastbourne areas of Wellington, New Zealand were divided into three groups; Waterloo, a high public transport access area for the collection attitude data; The two remaining areas Petone/Eastbourne, and Woburn were manipulation cites, where rail access was either removed or introduced in a hypothetical scenario. Results showed more positive, and universal attitudes towards rail, while attitudes to bus were influenced by a number of demographic measures. Revealed preferences showed a disinclination to use the bus when rail is available. Respondent showed greater trust in the stability of rail over bus infrastructure. Reactions towards the rail removal scenario were negative; house prices were expected to decrease. Reactions to the rail inclusion scenario were ambivalent, when they were expected to be positive. Loss aversion is cited as a possible explanation for this pattern of results. Recommendations are made for a reduced priority on bus development within rail serviced areas, and further research to confirm results.

Implications of Public Attitudes on Transport Infrastructure Investment.

The New Zealand Transport Strategy (NZTS) cites the need for efficient and effective public transport networks to stimulate economic growth and contribute to quality urban design (Ministry of Transport, 2008a). Following this strategy document, the government policy statement (GPS) included an estimate that $400 million will be invested in public transport infrastructure over the next three years (Ministry of Transport, 2008b). Given the magnitude of the investment and the contextual demands to be met, the allocation of funding must be well informed. The impact of public transport infrastructure upon a community is a complex issue involving urban form, transport behaviour and attitudes. Here, an argument is attempted that rail infrastructure is a better investment than bus related infrastructure because it is permanent, and the public recognise the value the amenity adds to their community and property. The argument is also made that the public have more positive attitudes to rail than bus systems, and trust the infrastructure more.

Increasing public transport use, or more importantly reducing private transport use, is a common topic in the current climate, and a key component of the current NZTS (Ministry of Transport, 2008a). Personal attitudes and traits, such as pro-social orientation, have been shown to predict use of public transport (Johanson, Heldt & Johansson, 2006; Lange, Van Vugt, Meertens & Ruiter, 1998). Environmental or economic beliefs also affect transport choices (Lange et al. 1998). A large proportion of private transport users remain reluctant to change. The salience of factors such as convenience and flexibility may prevent them from switching to public transport, even though they may report (hypothetically) greater overall

benefits of public transport (Anable & Gatersleben, 2005). However, the current research does not attempt to suggest how to increase public transport use. The assumption is made that the GPS target to increase public transport use by 3% each year to 2015 will be fulfilled. Accordingly, supply of public transport will need to increase, and the services provided will have to meet expectations so that people continue to use them (Reibstein, Lovelock, & Dobson, 1980). As large-scale public transport infrastructure developments are inevitable, it is important to understand what benefits bus and rail systems can offer so that appropriate plans can be made to fit the needs of individual communities.

The differing levels of infrastructure required for various public transport modes is an obvious source of disparity in the influence of public transport networks on the community. Modes, such as rail, require a greater investment in infrastructure and have more financial impact than lighter infrastructure options. Transport modes requiring little infrastructure are easily changeable, particularly in a deregulated, market driven situation (Ben-Akiva, & Morikawa, 2002; Edwards, & Mackett, 1996; Mackie, Preston, & Nash, 1995). A bus route that is being underused can easily be discontinued, whereas rail lines will remain in place much longer. Following deregulation of bus services in the UK more than 20 years ago, patronage fell at a much greater rate than expected; one potential explanation is reduced trust in route stability in a market driven situation (Mackie et al. 1995).

The presence of public transport infrastructure offers benefits to a neighbourhood beyond the user benefit of transport access. Bus and rail networks may improve residential and commercial retail prices and increase business traffic to the area (Cervero & Landis, 1993;

Lewis-Workman & Brod, 1997). For example, Powe, Garrod and Willis (1995) used an hedonic model to show that proximity to the Tyne and Wear Metro rail system increased house prices by 9%. Quantifying the value added by bus infrastructure is more difficult because routes tend to be numerous and well dispersed. However, as fixed line transport is constant, developers can rely on the feature remaining in the area (Badoe & Miller, 2000). Thus, a rail line may be more valuable to the surrounding community than a bus route by stimulating economic growth. Value added to real estate by the presence of an amenity is then, a function of the stability of supply. Therefore, before user benefits are even considered, there should be an observable difference in the reactions of the public to rail and bus services because the non user benefits of rail services are more stable than those of bus systems.

Dravitzski and Lester (2008) describe how transport developments dictate urban form. As trip time decreases, people tend to live further away from the city. Rail networks in particular allow settlements to develop and thrive further from the city centre, by providing a continuous and uninterrupted link between the two. As people gravitate to these thriving areas, they add further to the growth of the community, and value of the property. Therefore the economic stimulation seen in areas surrounding rail networks is a perpetual cycle based upon an aggregation of how and where people choose to live.

It is not assumed here that all citizens are acutely aware of the economic by-products of rail infrastructure. The economic points discussed here are expected to be reflected within general opinions towards rail and bus services. Opinions of transport modes are influenced by a multitude of factors such as convenience, timeliness and connectivity (Anable &

Gatersleben, 2005); no argument is made against that in the current study. However the perception of a link between property value and rail infrastructure is expected to coexist with positive attitudes towards the amenity.

In Salt Lake City, users and non-users alike reported more positive perceptions of light rail than bus on a survey covering affective experience, reliability, speed, and effect of the travel mode on city liveability (Brown, Werner, & Kim, 2003). A general image bias of rail over bus has been mooted by researchers in the area (Bowes, & Ihlanfeldt, 2001; Edwards, & Mackett, 1996). Ben-Akiva and Morikawa (2002) concluded bus and rail are equally preferred as transport modes when quality of service is held equal. Given that the preference for rail does appear to exist, this suggests that either rail offers better service consistently or that non-user benefits create the bias towards rail. Both explanations will be covered within this research.

Non-user benefits are defined by the value of the amenity to the general public, regardless of personal opinion. The expectation is that public reactions, particularly trust, will be noticeably higher for rail than bus because of the greater stability of supply. Trust in stability of rail supply will be observable in relation to housing decisions. The public should be aware of the added value, to self and others, of living near rail infrastructure. They expect to pay for stability of supply, and believe others will willingly do so.

Public goods are commonly valued through willingness to pay measures, referred to as contingent validation, reflecting personal valuation of commodities in a dollar value. There is some concern with the validity of these measures (Diamond & Hausman, 1994), and they are

not necessary in this study as property investment (home ownership) provides a proxy willingness to pay measure, reflecting awareness of aggregate public valuation of the amenities rather than personal valuation (Abelson, 1979). The investor recognises the value of amenities in their area regardless of the utility to them personally.

Public reactions will be measured in two areas in this study. Firstly, attitudes towards bus and rail services in general will be measured (for example, convenience, timeliness, status). Secondly, expectations about housing, such as increases in rates or rent, and house prices following hypothetical infrastructure changes.

More than just house price is important here, trust in public transport supply, desire to maintain location, and regret of purchase are not reflected in the price (Abelson, 1979), although they have important future willingness to pay implications for current and potential residents. By hypothetically manipulating public transport infrastructure we can gain information on these attitudes, and results that may be relevant to development and urban design.

In this study, public transport routes are considered accessible to those residents who fall within reasonable walking distance of a stop or station. According to Walton and Sunseri (2007) the average walking distance is 820 metres, based on the stated maximum walking distance of 348 Wellington and Auckland residents. Lower Hutt is the chosen sampling area, where a large portion of the area has walking distance access to rail and bus services, mainly transporting to and from the central business district of Wellington. Lower Hutt is an

important residential suburb of Wellington, and is less geographically constrained than the city itself, creating a large area to sample from, and presenting a good example of transport infrastructure influencing urban form.

A mixed-design survey of residents in selected sample areas should reveal that, where access to both modes is reasonable, attitudes towards rail should be more positive than bus. This attitude difference is expected to be independent of actual transport use.

It is expected that the greater stability of rail will lead to the following observations. Respondents will rate relocation of local rail infrastructure as less likely than bus infrastructure. Respondents are also expected to be more inclined to pay a greater premium in rates or rent to have a closer rail station, rather than a bus stop, supposedly in recognition of the greater return they will gain from the mode. Residents within walking distance of rail will also be more likely to report that public transport contributes to their choice of location.

In response to a hypothetical increase or decrease in local rail infrastructure, respondents are expected to report that local house prices (including their own) would increase or decrease accordingly. Additionally, residents hypothetically losing rail accessibility should be more upset than those gaining access will be happy in reaction as a result of the loss aversion bias and endowment effect (Kahneman & Snell, 1992; Loewenstein & Adler, 1995; Tversky & Kahneman, 1981). More simply, the distributions of affective responses to the scenarios will not be symmetrical. As an auxiliary hypothesis, respondents are expected to report more extreme results when asked how other residents in their area would react to the same transport scenarios. This is expected as individuals may believe themselves to be better off than the average person (Zuckerman & Jost 2001), and therefore less reliant on public transport than

the general public. Such a pattern however, will reveal an awareness of the effect rail infrastructure changes could have on the average person.

The findings of this study should be generalisable, so that they can be applied to areas planning public transport upgrades. Should the hypotheses be supported, greater investment in rail, alongside a reduced priority towards bus systems, will be recommended in order to spark development, and increased satisfaction with public transport.

Method

Participants

Survey packs containing a cover letter, prize draw card, scratch and win ticket, survey and return envelope, were hand-delivered to randomly selected households within three specified sample areas named Waterloo, Woburn, and Petone/Eastbourne (the sampling procedure is detailed below), all belonging to the greater Wellington region in New Zealand, and centered around the Lower Hutt suburb. The scratch and win ticket and prize draw for a $200 voucher were included as an incentive to participate. Surveys and prize draw cards were separated immediately on arrival to maintain anonymity.

In total 1000 surveys were delivered, 400 to the Waterloo area and 300 each to the Woburn and Petone/Eastbourne areas. An overall response of 400 surveys was recorded (40% response rate). Response rates were sufficient across survey areas, with 135 (34%) from Waterloo, 130 (43%) from Woburn, and 129 (43%) from Petone/Eastbourne.

More females than males responded, 218 (55%) and 167 (42%) respectively (nine respondents did not report gender) $\chi^2(1,N=385)=6.76$, $p<0.05$. This pattern was observed

within each sample area. Waterloo respondents were 52% female, 45% male. Woburn respondents were 56% female, 43% male, and Petone/Eastbourne respondents were 58% female, 39% male.

The average age of respondents was M=50.42 (SD=14.75). Sample areas did not differ in mean, F(2,382)=2.11, ns age distributions were similar across sample areas. Average household income was equivalent across survey areas F(2,347)=0.63, ns. The home ownership rate was 82.5%, higher than the national figure of 66.9% (Statistics New Zealand, 2006).

Materials

A 30 question survey titled "Public Transport in your Neighbourhood" was developed for the present study. The front page briefly explained the purpose of the research, provided contact details should respondents have any queries, and explained that the survey should take 10 to 15 minutes to complete.

Three alternate forms were used, one for each sample area. All survey forms contained common items covering the convenience and perceived stability of local rail and bus infrastructure, perceptions of bus and rail timeliness, convenience and effect on housing decisions, transport use, household situation, and demographic items (see appendix A for a copy).

Forms differ in the hypothetical section, which manipulated the rail access for Petone/Eastbourne and Woburn samples using a brief description and a bird's-eye view diagram of the changes. The Woburn form contained a scenario where an existing rail service was removed. This scenario was worded so that either the station or the entire line was being

removed, to check if scenario magnitude had an effect. Equal numbers of each variation were distributed. The Petone/Eastbourne scenario described a rail line to be introduced along the coastline where there is none at present. The same 14 items followed each scenario. Items covered the likelihood of the scenario occurring, satisfaction with the changes in the scenario, subjective change to self and other property value, real estate market and local rates and rent, general satisfaction with the level of service in the scenario, and predictions of self and other public transport use following the scenario. All scenario items had 5-point Likert scale response formats, varying in the anchors, although a response of 3 was neutral in every case. Anchors were arranged so that a response of 5 was positive ("very happy", "much easier", "strongly agree"). Affective items ranged from 1= "very unhappy" to 5= "very happy"; items relating to change in the property market and public transport use ranged from 1= "large decrease" to 5= "large increase"; items regarding difficulty of selling house for self and others ranged from 1= "much more difficult" to 5= "much easier." Three statement items regarding opinions of the scenario, for example "This change would have an adverse effect on me" ranged from 1= "strongly disagree" to 5= "strongly agree."

The Waterloo form, rather than a single scenario as described above, contained a section of multiple individual item scenarios (increase train frequency, more bus stops, raise the fares). These were of lesser importance to the study, but were included in the interest of maintaining comparable form completion time and format across all three survey areas. The Waterloo site was effectively a control group, providing the main source for comparing public perceptions of existing bus and rail services as a within subjects design.

Sampling and Procedure

The three sample areas were chosen for the public transport available within walking distance, 820 metres. Petone and Eastbourne were identified as the no rail access sites, and combined into one sample group to ensure enough potential respondents. Woburn was chosen as the rail access site, and Waterloo as the high transport access site. GIS software was then used to map out the sampling boundaries. Petone/Eastboune was defined by portions of the two suburbs falling outside walking distance of any passenger train station, leaving most of Petone and all of Eastbourne within the sampling area. Woburn and Waterloo sites were defined by a walking distance radius around the respective stations. Where there was overlap between Waterloo and Woburn sampling areas, the area became part of the Waterloo sample. This truncated the Woburn area, although the residential area remaining was still sufficient to sample in.

The Waterloo site contains a train station and bus exchange at the same site, therefore this sample represents good access to both rail and bus services. Residents have equal access to both modes, hence there should be no availability bias within this sample, and they were included in the study as a control group for attitudes towards rail and bus systems. Petone/Eastbourne and Woburn sites were designed to be rail access manipulation sites, where rail access would be hypothetically introduced or removed respectively, to gain respondent reactions to these scenarios.

Results

Six cases were excluded from analysis due to incomplete and potentially unreliable replies, 394 valid cases remained after data screening. An alpha value of 0.05 was employed in all hypothesis testing.

General attitudes to bus and rail

Items addressing attitudes to bus and train services were placed in two identical scales, one for each mode, however, internal consistency was poor. The Chronbach's alpha for the bus attitude scale was 0.55, and 0.46 for the train attitude scale. The lack of shared variance in the items suggests more than one construct is measured, therefore, individual item analyses are presented below in Table 1.0.

Each item had the response range 1= "Strongly disagree" to 5= "Strongly agree." All items recorded mean responses above neutral (3= "Not sure/Neutral"), meaning that attitudes were, on average, positive towards both modes. The highest mean response was for the 'rail is a worthwhile investment' item, followed by the reverse coded 'lower class transport' items for train and bus. Paired samples t-tests showed that train related item means were higher than those for bus in each case.

Table 1.0 *Bus and train attitude scale items.*

	N	**Mean**	**SD**	**t-value**
Buses run often enough to be useful.	388	3.62	0.82	-2.25*
Trains run often enough to be useful.	385	3.73	0.81	
Buses can be relied on to stick to the timetable.	389	3.03	0.95	-4.23*
Trains can be relied on to stick to the timetable.	385	3.31	0.98	
Dedicated bus lanes are a worthwhile investment.	387	3.71	0.97	-11.87*
A rail service is a worthwhile investment.	386	4.36	0.60	
The level of bus service in my area will be as good or better in five years.	385	3.52	0.65	-2.29*
The level of rail service in my area will be as good or better in five years.	381	3.62	0.79	
Buses are a lower class form of transport. [R]	386	3.83	1.01	-5.13*
Trains are a lower class form of transport. [R]	382	4.10	0.85	

[R] Item was reverse coded.
* Statistically significant, $p<0.05$.

Table 1.1 contains the same item analysis within the high access, Waterloo sample, identified as a control area for attitude comparisons on the two public transport modes. As in the complete sample, train attitude item means were higher than corresponding bus attitude item means in each case. These item results support the hypothesis that attitudes toward rail are more positive than bus.

Table 1.1 *Control sample, bus and train attitudinal items.*

	N	Mean	SD	t-value
Buses run often enough to be useful.	131	3.47	0.72	-5.51*
Trains run often enough to be useful.	131	3.86	0.70	
Buses can be relied on to stick to the timetable.	131	3.00	0.89	-2.70*
Trains can be relied on to stick to the timetable.	131	3.27	1.10	
Dedicated bus lanes are a worthwhile investment.	132	3.31	1.06	-10.18*
A rail service is a worthwhile investment.	132	4.33	0.66	
The level of bus service in my area will be as good or better in five years.	128	3.41	0.61	-4.25*
The level of rail service in my area will be as good or better in five years.	128	3.69	0.79	
Buses are a lower class form of transport. [R]	129	3.82	0.94	-3.19*
Trains are a lower class form of transport. [R]	129	4.06	0.82	

[R] Item was reverse coded.
* Statistically significant, $p<0.05$.

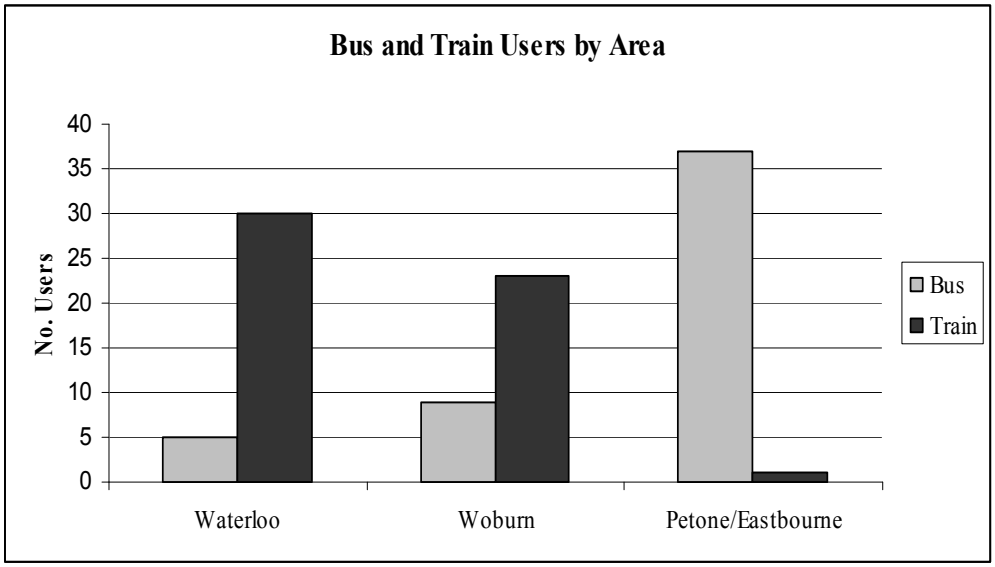
A binary (user or non-user) public transport use variable, collapsed from primary mode of transport data, was used to compare attitudes between users and non-users on the items listed in Tables 1.0 and 1.1. Several significant differences were found. Non-users of pubic transport were more likely to agree that buses, $t(381)=-2.02$, $p<0.05$ and trains, $t(377)=-3.03$, $p<0.05$, can be relied on to stick to their timetables. Users reported higher means for both "worthwhile investment" items; bus lanes, $t(379)=2.79$, $p<0.05$, and rail systems, $t(378)=2.93$, $p<0.05$. Finally, public transport users were more likely to disagree with the "bus is a lower

class form of transport" item, $t(378)=2.56$, $p<0.05$. In summary, non-users responded more positively on two items, users more positively on three items, and all five remaining comparisons were non-significant. This mixed pattern of results matches the expectation that the two groups would not differ in overall attitudes.

Bivariate correlations between demographic variables, household income, education level and age, and attitudinal items (Tables 1.0 and 1.1) were examined. Demographic variables were unrelated to train attitudes items with one exception, higher education was associated with a negative attitude towards the frequency of trains (trains run often enough to be useful), $r=-0.14$, $p<0.05$. Education level was also negatively related to attitudes about bus frequency, $r=-0.15$, $p<0.05$ and timeliness (buses can be relied on to stick to the timetable), $r=-0.20$. Income was negatively related to attitudes about bus frequency, $r=-0.14$, $p<0.05$, timeliness, $r=-0.16$, $p<0.05$, and improvement over time (Bus systems will be the same or better in five years), $r=-0.12$, $p<0.05$. Age was positively related to bus frequency, $r=0.21$, $p<0.05$, timeliness, $r=0.25$, $p<0.05$ and status (reversed bus is lower class item), $r=0.12$, $p<0.05$.

Revealed preferences were recorded in terms of transport use. 39% of respondents reported using either bus or train (or a combination) as their primary mode of transport. Figure 1.0 shows how many respondents reported travelling by either train or bus for each survey area.

Figure 1.0 *Bus and Train User Numbers by Area*



Adding bus and rail users together, Figure 1.0 shows there were 35 (26% of respondents from the area) public transport users in the Waterloo sample, 32 (25%) in Woburn, and 38 (29%) in the Petone/Eastbourne sample. Split by transport mode, the pattern of figures remain similar in the two rail accessible sample areas, and are inverted in the Petone/Eastbourne sample $\chi^2(2, N=105)=60.70$, $p<0.05$. These results suggest that, while overall public transport use is similar across sample areas, people are less likely to travel by bus when there is a train station nearby.

Stability of Supply

Responses to stability of supply items from the Petone/Eastbourne sample were excluded from the following analysis as the rail items were irrelevant to them. As shown in Figure 1.1, 65% of respondents rated the likelihood of bus infrastructure moving further from their own residence as “unlikely” or “very unlikely” while 94% of respondents chose the same responses in regards to train infrastructure. Recorded on a 5-point Likert scale, the mean responses were M=1.94 (SD=0.90) relating to bus infrastructure, and M=1.33 (SD=0.68) relating to train

relating to train infrastructure. A paired samples t-test confirmed that train infrastructure was rated as significantly less likely to relocate, $t(248)=10.59$, $p<0.05$.

Figure 1.1 *Stability of Transport Infrastructure*

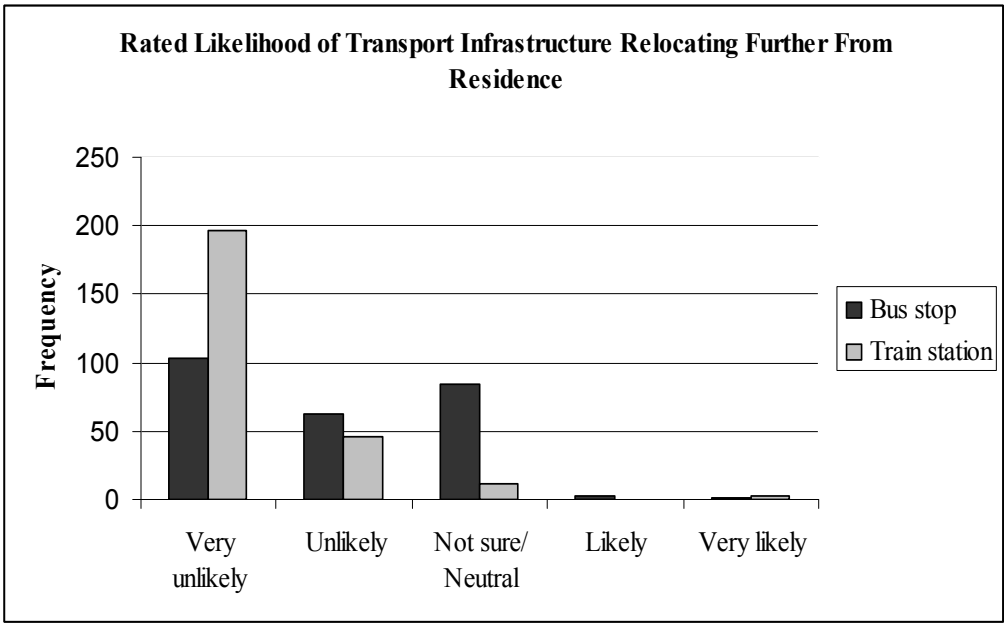


Table 1.2 below shows the frequency at which respondents agreed they would pay higher rates or rent to b closer to their nearest train station and/or bus stop (respondents were asked both). The vast majority of respondents chose No, leaving 47 (13%) respondents who said yes to either or both. These low frequencies were deemed unsuitable for further analyses. Of note, 13 out of 16 (81%) respondents who said they would pay more to be closer to a bus stop also said they would pay more to be closer to a train station. No such pattern was found in those who would pay to be closer to a train station, 18 (58%) said they would pay to be closer to a bus stop, and 13 (42%) said they would not. A significant chi square result showed the pattern of responses was no the same for train and bus items $\chi^2(1,N=364)=113.64$, $p<0.05$.

Table 1.2 *Cross-tabulation of willing to pay more for closer train station and bus stop or not*

		Pay more to be closer to train station		
		No	**Yes**	Total
Pay more to be closer to bus stop	**No**	330	18	348
	Yes	3	13	16
	Total	333	31	364

In response to the item about public transport influencing choice of residence, Waterloo residents generally agreed, with a mean beyond the halfway point, M=3.29 (SD=1.29), followed by Woburn, M=3.05 (SD=1.29), then Petone/Eastbourne who slightly disagreed on average, M=2.90 (SD=1.24), there was a significant variation within these means, $F(2,386)=3.14$, $p<0.05$. A binary, train access, variable was created to group together Waterloo and Woburn sample areas (train access areas), and allow a comparison against the Petone/Eastbourne sample (non train access area) on the above item. Those within train access areas were more likely to agree that public transport influenced their choice of location, $t(387)=2.01$, $p<0.05$. This supports the hypothesis that those within walking distance of rail are more likely to report that public transport contributed to their choice of location.

Rail Access Manipulations

Woburn and Petone/Eastbourne residents rated the rail access manipulations as equally unlikely $t(257)=1.14$, ns. On an item ranging from 1 “very unlikely” to 5 “very likely” Woburn responded with a mean of M=1.78 (SD=0.88), Petone/Eastbourne with a mean of M=1.64 (SD=1.00). Woburn respondents faced with the more extreme, entire rail line removal scenario, as opposed to a station removal scenario, rated this as less likely to occur, M=1.53

(SD=0.65) and M=1.97 (SD=0.99) respectively, the difference was significant t(128)=2.98, $p<0.05$. However, table 1.3 shows that Woburn respondents receiving the two alternate scenarios did not respond differently on the reaction items regarding personal opinion, property demand, real estate value and market, and affect. The two rail access decrease samples were therefore treated as one for the following analyses.

Table 1.3 *Alternate rail access decrease scenarios, item comparisons.*

		Station removed		Line removed		
	N	**Mean**	**SD**	**Mean**	**SD**	**t**
1. Change will adversely affect me	130	0.99	1.09	1.05	1.20	-0.32
2. Property demand	129	0.67	0.85	0.49	0.90	1.17
3. Own house value	127	0.68	0.83	0.43	0.84	1.68
4. rates and rent	127	0.46	0.78	0.24	0.78	1.60
5. Selling own house	126	0.60	0.65	0.64	0.79	-0.27
6. How will you feel	128	1.49	0.72	1.54	0.68	-0.40

Items capturing reactions to access manipulation scenarios were recoded, so that a score of 3 (neutral on each item) became 0, an extreme score in the hypothesised direction became 2, and the opposite extreme became -2. A formula, (x-3) or (3-x), was used for the transformation, depending on the direction of the item. As reactions to the two scenarios were expected to be in opposite directions, opposite transformations were used for Woburn and Petone/Eastbourne samples. This recoding meant that a positive mean on any item for either sample indicates reactions in the hypothesised direction. Tables 1.3, 1.4 and 1.5 consist of results recoded in this manner.

Woburn and Petone/Eastbourne group means were then tested against the neutral score of 0. Table 1.4 shows the test results for the Woburn sample were all significantly higher than 0. More specifically, the reactions to the rail line/station removal scenario were all negative:

1. Respondents agreed that the scenario would "adversely affect" them.

2,3 & 4. They stated that local property demand, their own house value, local rates and rent would decrease.

5. They expected that it would be more difficult to sell their house.

6. They would be unhappy about the changes.

Table 1.4 *Woburn Scenario Reactions*

	N	**Mean**	**SD**	**t value**
1. Change will adversely affect me	130	1.02	1.13	10.21*
2. Property demand	129	0.59	0.87	7.68*
3. Own house value	127	0.57	0.84	7.59*
4. rates and rent	127	0.36	0.78	5.21*
5. Selling own house	126	0.62	0.71	9.73*
6. How will you feel	128	1.52	0.70	24.55*

* Mean significantly greater than 0, $p<0.05$

Table 1.5 summarises the results for the Petone/Eastbourne group. Unlike the results from the Woburn group, only one item produced the expected positive mean. Responses were neutral to the adverse effect item and they did not expect a change in property demand or their own house value. They did expect rates and rent would increase. In the opposite direction to expected, respondents expected selling their house would be more difficult, and they stated they would be unhappy with the scenario changes. In summary, the rail access increase sample responded positively to one item out of six, with inconclusive reactions to three items and negative reactions to two.

Table 1.5 *Petone/Eastbourne Scenario Reactions*

	N	Mean	SD	t value
1. Change will adversely affect me	126	0.04	1.38	0.32
2. Property demand	125	0.09	1.26	0.78
3. Own house value	124	-0.01	1.23	-0.07
4. rates and rent	124	0.79	1.09	8.06*
5. Selling own house	122	-0.20	1.10	-2.06[a]
6. How will you feel	127	-0.40	1.25	-3.62[a]

* Mean significantly greater than 0, $p<0.05$

a Mean significantly different from 0 ($p<0.05$), against hypothesized direction.

Comparisons were then made between Woburn and Petone/Eastbourne scenario reactions using the recoded item statistics from above. This was in order to test if the mean reactions to each item were more extreme for either group. As all items produced the expected results within the Woburn sample, while only one item did within the Petone/Eastbourne sample, all but the one comparison became redundant. The Woburn sample, by default, produced more extreme results simply by facing in the direction hypothesised. Where both groups followed expected patterns, the rates and rent item, Petone/Eastbourne residents produced more extreme results, $t(249)=-3.58$, $p<0.05$, opposing the hypothesis.

Finally, self-other item comparisons were carried out to test the hypothesis that respondent would respond more strongly when asked about the reactions of others. Woburn respondents rated the difficulty of selling house following the scenario higher for others than for themselves, $t(125)=2.59$, $p<0.05$, in line with the hypothesis. However, a self-other comparison for happiness with the scenario changes did not produce significant differences, $t(127)=0.25$,ns. No self-other difference was found in expected difficulty of selling house for the Petone/Eastbourne group, $t(119)=1.55$, ns. Respondents from this group rated happiness of

others following the scenario as lower than their own, $t(125)=2.91$, $p<0.05$, when they were expected to rate the happiness of others as higher than their own.

Discussion

There is some evidence to suggest that people hold more positive attitudes towards rail than bus systems and infrastructure. They believed that train systems were more frequent, timely, worthwhile as a government investment, more likely to improve in the future and have a higher status than bus systems. Users and non-users were almost indistinguishable in attitudes towards bus and rail. Interestingly, non-users rated both systems as more timely, while users rated both as more worthwhile, and credited buses with higher status than did their less experienced counterparts. While there were several modifiers of attitudes toward bus systems, such as age and income, attitudes towards rail were almost exclusively dependant merely on the presence of relevant infrastructure in the community. If there is a train station nearby, people tend to have uniformly positive attitudes. This may support the notion that individuals recognise the value the amenity adds to their community, regardless of their personal dependence on it.

The revealed preference results indicated that people are no more likely to use public transport if a rail system is within walking distance however, they are less likely to travel by bus. While this result certainly requires confirmation in a variety of different settings, this may have important implications for planned bus routes in areas already serviced by rail facilities. Specifically, developments such as dedicated bus lanes may not be worthwhile in these areas, and extra bus routes are unlikely to be well utilised.

Both rail and bus infrastructure were rated as very stable in location, very few believing that either mode could relocate further from their home. Rail was rated as the more stable of the two, perhaps a commonsense result, although it is important to note that a difference is perceived in the stability of supply of the two modes, as this is a prerequisite for all other hypotheses within this research. The result that public transport was more likely to contribute to location choice when rail is present is further confirmation that people perceive the permanence of the infrastructure and place enough trust in it to locate nearby and invest in property (the majority of the sample were homeowners).

While a hypothetical decrease in rail access was met with negative reactions, the corresponding increase in rail access was met with mixed reactions. The addition of rail access was associated with higher rates and rent as expected, although the expectation that selling house would become more difficult, and that people would feel unhappy about the changes, opposed the hypothesis that an introduced rail line would be met with universally positive reactions. In accordance with expectations, those who had rail access removed, predicted a drop in property prices, greater difficulty in selling house, and reported negative affect towards the scenario. In addition, they believed that other people in their area would experience more difficulty than themselves in selling house following the scenario, this may provide recognition of the true expected extent of the loss in value.

A large number of comments about the hypothetical rail line ruining the coastline, and the infeasibility of the scenario indicated that respondents were opposed to the idea for reasons not related to the research, and not anticipated during the design phase. As the results suggest, positive reactions towards the addition of rail access may have been overshadowed by negative

negative reactions for the Petone and Eastbourne respondents, because of the nature of the coastline area chosen for the scenario. The mixed results from the rail access increase scenario correspond well with findings from Loewenstein and Adler (1995) who found that people underestimate the value of something they do not yet have. Kahneman & Snell, (1992) also found very little relation between predicted and actual change in preferences. These two results may mean that asking residents how they would react to an introduced rail line was unlikely to produce results accurately reflecting how they really would react. This does leave hope that the expected pattern of results may be found where a rail line is actually introduced.

Comparing the ambivalent rail loss and universally negative rail gain reactions, two possible explanations show a very good fit. These are loss aversion and the endowment effect (Tversky & Kahneman, 1981). Loss has been shown to be more psychologically powerful than gain. Here, loss aversion can explain the negative reactions of those losing the rail service eclipsing the reactions of those gaining rail. Secondly, the endowment effect, where those in possession of a good believe it to have a higher value than those who do not. Both explanations certainly fit the pattern of results here, although it is not within the scope of this paper to argue for one or the other. Despite the psychological biases likely to be at work here, one must take stock in the negative effect on the real estate market that the rail loss sample expected. Despite the mixed reactions of the rail added group, they did expect a rise in rates and rent, perhaps a hint at the recognition of some added value to the area.

An attempt was made to directly measure willingness to pay for a closer bus stop or rail station. The responses were unanimously in the negative, that is, people would not pay more for closer infrastructure. The “Yes” or “No” response scale was perhaps too primitive to gauge

the value of closer infrastructure. Alternatively the respondents may have felt they did not need to be closer to bus stops or train stations. Finally, there may again be a clue in the comments sections. Many respondents were unconvinced that the scenarios contained in the surveys were completely hypothetical, and expressed suspicion at the intent of the survey. Hence, admitting that one would pay higher rates for a closer bus stop may be an unwise move. A more sophisticated design to tease out disparity in willingness to pay between bus and rail amenities could be employed in the future. Perhaps an embedded design, where public transport amenities are compared to other amenities such as schools and recreational facilities, this could yield a more accurate comparison. The choice to avoid contingent validation in this study was deliberate, however, perhaps this method will produce interesting results in this area in future research.

In conclusion, many of the hypotheses in this study were confirmed. Attitudes were more favourable to rail, the stability of rail infrastructure was recognised, and a loss in rail utility was associated with lower house prices. There are a multitude of possible reasons for the muted reactions of the Petone and Eastbourne residents to the hypothetical rail line, therefore, the result must be retested in other areas, using different formats and attempting to counter the loss aversion and endowment effects. It is possible that other New Zealand cities have better regarded bus systems in place of rail systems. The expectations of residents about rail access inclusion will be particularly interesting in these areas where there has been less exposure to the mode and its infrastructure. Given the number of caveats found in this study, it is encouraging that so many effects were found. It is possible that the only threat to the generalisation of this study is the uniqueness of the coastline on which the rail line proposed in

in the rail inclusion scenario. This being the case, further studies could shed much light on these results. Future research in the area can build from the lessons learned here and learn some interesting and important things about perceptions of public transport and its infrastructure. There is at least some evidence here for a higher priority to be placed on rail access in suburban areas, coupled with a caution against over investment in bus infrastructure.

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Appendix A: Survey text example: Woburn, station removal, survey form.

About this survey

Your answers to this survey will help us understand the effect public transport has on your neighbourhood, and how you think this may change in the future. You will be asked about your travel behaviour, and how public transport influences your housing decisions.

The survey questions revolve around public transport and we are equally interested in the responses of users and non-users.

This research is funded by the *Foundation for Research Science and Technology* (www.frst.govt.nz) as public good science research.

Your answers to this survey are completely anonymous. Please leave out any information that you do not feel comfortable providing.

Try to answer all questions by choosing the answer that fits you best even if none of them are exactly right.

This survey should take about 10-15 minutes of your time.

1. What is your primary mode of transport? (i.e. How you travel to work) *Choose the most correct answer.*

☐	Private car	☐	Walk	☐	Bus
☐	Train	☐	Train (taking the bus to and from the station)	☐	Cycle
☐	Other (please specify)				

2. Please indicate how aware you are of bus and rail services in your area eg routes, service frequency, location of stops and stations. *Place a mark on the scales below.*

	I have no idea how to use public transport		I know enough to use public transport without difficulty		I know more than I am likely to use
a) Bus	1	2	3	4	5
b) Rail	1	2	3	4	5

3. How close is public transport to your house? *Your best guess is fine*

Closest viable bus stop					**Nearest rail station**				
a) ..... minute walk					f) ..... minute walk				
b) ..... metres					g) ..... metres				
c) Is this reasonable walking distance? **Yes/No**					h) Is this reasonable walking distance? **Yes/No**				
d) Is this bus stop likely to be moved further away from you? *Mark the likelihood below*					i) Is this station likely to be moved further away from you? *Mark the likelihood below*				
Very unlikely	Unlikely	Not sure/ Neutral	Likely	Very likely	Very unlikely	Unlikely	Not sure/ Neutral	Likely	Very likely
e) Would you pay higher rates/ rent to be closer to this bus stop? **Yes/No**					j) Would you pay higher rates/ rent to be closer to this station? **Yes/No**				

For questions 4 and 5, please imagine a situation where you would need to use either the bus or train. For example, your car is broken down, or the tracks are closed for maintenance so that you may have to travel by bus to work when you would normally take the train.

4. How much do you think it would cost for you to travel by either bus or train? If you don't use public transport imagine you are forced to use it to travel to and from your regular destinations.
A rough estimate of the weekly cost is fine.

		Too low		About right		Too high
a) Bus $..... per week	b) Do you think this price is reasonable?	1	2	3	4	5
c) Train $..... per week	d) Do you think this price is reasonable?	1	2	3	4	5

5. How easy would it be for you to use the bus or train for a day (e.g. getting to and from work)?
Place a mark on the scales below.

	Very Difficult	Difficult	Not sure/ Neutral	Easy	Very easy
a) Bus	1	2	3	4	5
b) Rail	1	2	3	4	5

6. Would you prefer to travel by bus or train? *Please indicate your personal preference with a mark on the scale below*

Train		No preference		Bus
1	2	3	4	5

7. Approximately how much time do you spend travelling each day? *E.g. 0 hours 35 minutes. 1 hours 20 minutes*

..... hours ..... minutes

8. We are interested in your opinions on bus services. Do you agree or disagree with the following statements?
Please indicate your agreement with each statement by ticking the appropriate box.

	Strongly disagree	Disagree	Not sure/ neutral	Agree	Strongly agree
a) I think bus services run often enough to be useful.	☐	☐	☐	☐	☐
b) Money from rates should be used to improve local bus services.	☐	☐	☐	☐	☐
c) Busses can be relied on to stick to the timetable.	☐	☐	☐	☐	☐
d) Dedicated bus lanes (busses only) are a worthwhile investment.	☐	☐	☐	☐	☐
e) I believe the level of bus service in my area will be as good or better in five years.	☐	☐	☐	☐	☐
f) Busses are a lower class form of transport.	☐	☐	☐	☐	☐

9. How involved are you in your residential finances?
Please choose the one that fits you the best from the options below.

☐	I pay the mortgage and/or rates myself	☐	I pay mortgage and/or rates with several others e.g. in a flatting situation
☐	I pay the rent myself	☐	I share rental payments with several others e.g. in a flatting situation
☐	I pay the mortgage and/or rates with a partner	☐	I pay no rent, mortgage or rates
☐	I share rental payments with a partner	☐	Other (please specify): .....

Stability of supply is the likelihood of a service continuing in the future. When referring to public transport, stability of supply refers to the permanence of routes, service level, and infrastructure

10. Please indicate your agreement with the following statements.

	Strongly disagree	Disagree	Not sure/ neutral	Agree	Strongly agree
a) Stability of public transport systems in my neighbourhood is more important to me than to other locals.	☐	☐	☐	☐	☐
b) The existing public transport in the area influenced my choice to live here.	☐	☐	☐	☐	☐
c) I have thought about transportation developments that could inconvenience me.	☐	☐	☐	☐	☐
d) I need to have a back-up plan in case I cannot use my primary source of transport.	☐	☐	☐	☐	☐

11. Who would you prefer own the bus and rail systems in your area? Please indicate your preference for each mode by placing a mark somewhere on the lines below.

	Full private ownership		Even partnership		Full public ownership	No preference
Bus	1	2	3	4	5	☐
Rail	1	2	3	4	5	☐

12. We are interested in your opinions on rail services. Do you agree or disagree with the following statements?
Please indicate your agreement with each statement by ticking the appropriate box.

	Strongly disagree	Disagree	Not sure/ neutral	Agree	Strongly agree
a) I think passenger rail services run often enough to be useful.	☐	☐	☐	☐	☐
b) Money from rates should be used to improve local rail infrastructure.	☐	☐	☐	☐	☐
c) Trains can be relied on to stick to the timetable.	☐	☐	☐	☐	☐
d) A rail service is a worthwhile investment.	☐	☐	☐	☐	☐
e) I believe the level of rail service in my area will be as good or better in five years.	☐	☐	☐	☐	☐
f) Trains are a lower class form of transport.	☐	☐	☐	☐	☐
g) There is no rail service close enough to be useful to me	☐	☐	☐	☐	☐

Woburn station.

In this scenario the rail line running through your neighbourhood is **removed**. There is no longer a rail service running through Lower Hutt.

When you answer the following items, please consider how this change would affect you and your neighbourhood.

Your best guess is fine.

	Very unlikely	Unlikely	Not sure/ neutral	Likely	Very likely
13a. How likely is this scenario to happen?	☐	☐	☐	☐	☐
13b. The will still be a rail line operating in Lower Hutt in ten years time.	☐	☐	☐	☐	☐

14. Your reactions to removal of the Hutt Valley Line. Do you agree or disagree with the following statements?
Tick the appropriate box in each case

	Strongly disagree	Disagree	Not sure/ neutral	Agree	Strongly agree
a) This change would have an adverse effect on me	☐	☐	☐	☐	☐
b) I would be satisfied with the level of public transport access in my neighbourhood following the changes.	☐	☐	☐	☐	☐
c) I believe this is a sensible decision for the government to make.	☐	☐	☐	☐	☐

15. How do you expect the following things to change with the Hutt Valley Line gone? Your best guess is fine.
Tick the appropriate box in each case

	Large decrease	Small decrease	No change	Small increase	Large increase
a) My public transport usage	☐	☐	☐	☐	☐
b) Other's public transport usage	☐	☐	☐	☐	☐
c) Demand for property in this neighbourhood	☐	☐	☐	☐	☐
d) My house value	☐	☐	☐	☐	☐
e) Rates/rent in this neighbourhood	☐	☐	☐	☐	☐

16. How difficult will the following activities be after the Woburn station has been removed? Your best guess is fine. *Tick the appropriate box in each case*					
	Much more difficult	A little more difficult	No change	A little easier	Much easier
a) Getting to and from my common daily destinations	☐	☐	☐	☐	☐
b) Selling my house	☐	☐	☐	☐	☐
c) How difficult will it be for other people in this neighbourhood to sell their houses	☐	☐	☐	☐	☐

17. Please describe to us **how you would feel** about this scenario. Will you be happy or unhappy with these changes in local public transport infrastructure?				
Very unhappy	Unhappy	Not sure/ neutral	Happy	Very happy
☐	☐	☐	☐	☐
18. How do you think **other people will feel** about the changes? (That is, other people who live in your neighbourhood.)				
Very unhappy	Unhappy	Not sure/ neutral	Happy	Very happy
☐	☐	☐	☐	☐

[illegible]

19. Please tick the destinations you travel to on a typical weekday, then circle the general location of each.						
Travel purpose (tick the reasons you travel most weekdays)		**General location (circle the appropriate area)**				
a) Work	☐	Wellington	Hutt Valley	Upper Hutt	Johnsonville/ Porirua	Other .....
b) Education	☐	Wellington	Hutt Valley	Upper Hutt	Johnsonville/ Porirua	Other .....
c) Shopping	☐	Wellington	Hutt Valley	Upper Hutt	Johnsonville/ Porirua	Other .....
d) Family	☐	Wellington	Hutt Valley	Upper Hutt	Johnsonville/ Porirua	Other .....
e) Other (please specify)	☐	Wellington	Hutt Valley	Upper Hutt	Johnsonville/ Porirua	Other .....

20. How long have you been living at your current residence?	☐	Less than a year	☐	Between 1 and 5 years	☐	Over 5 years
21. How long have you lived in the greater Wellington region?	☐	Less than a year	☐	Between 1 and 5 years	☐	Over 5 years
22. Do you rent or own your current residence?	☐	Rent	☐	Own	☐	Other .....

23. What is your average weekly fuel bill?					
$ ..... per week	**OR**, select from the options below				
☐ Work pays for my fuel	☐	I don't use fuel	☐	Other	

24. Have you relied on public transport in the past?					
☐ No (Go to q25)					
☐ Yes	If so, what types?	☐	Bus	☐ Train	☐ Other .....

25. How many people in your household rely on public transport? *Please answer separately for train and bus*	
a) Bus	b) Train .....

26. What is your current household situation?			
¬	Person living alone	¬	Adult living with partner only
¬	Single adult with other adults	¬	Family with adults only
¬	Single adult with children	¬	Family with children
¬	Other (please specify)		

27. What is your highest educational qualification?		28. Please indicate your household income		29. Please indicate your age		30. Please indicate your gender	
¬	High School Qualification	¬	$15,000 or less	¬	17-24	¬	Male
¬	Other post-school qualification	¬	$15,001 — $30,000	¬	25-34	¬	Female
¬	Bachelor Degree	¬	$30,001 — $50,000	¬	35-44		
¬	Higher Degree	¬	$50,001 — $70,000	¬	45-54		
¬	None of the above	¬	$70,001 — $100,000	¬	55-64		
¬	Other: (please specify).....	¬	$100,001 or more	¬	65-74		
				¬	75+		

Do you have any comments you would like to make about the survey or your answers?
In addition to my answers...
About the survey...

This survey took me about ____ minutes to complete.