APPENDIX 1

Drivers to Bus Use

Research Report

December 2004

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1. BACKGROUND & OBJECTIVES

1.1 Background

In drawing up its 2006-11 Bus Strategy METRO wishes to concentrate its attention on the one or two key drivers to bus use with the ultimate aim of shifting modal split in favour of bus.

1.2 The Survey

The survey comprised an in-home stated preference survey – using our *ClearChoice* package – and the sample of 400 was quota controlled. The fieldwork was carried out over 30 sample points, with 14 interviews in each point. Within each sample the following non-interlocking quotas were set :

• Age	16-34	5
	35-59	4
	60+	5
• Bus use	Frequent : 3+ days/week users	7
	Infrequent : 2 days/week-once/month users	7

The sample points were spread along four bus corridors which were defined by METRO as having good, average or poor quality of service.

Interviewing took place over the period October 1st to 31st, 2004.

This report is based on a set of tabulations provided to METRO under separate cover. The data are unweighted.

1.3 Executive Summary

The Market

- compared to infrequent bus users, frequent bus users are :
  - less likely to own a car
  - less likely to have a driving licence

- the local modal split to bus is :
  - 48% amongst frequent users
  - 15% amongst infrequent users.

- access time to the home bus stop is half the wait time at the stop (4.5 mins v 9 mins)

- wait time at the stop is half the subsequent on-mode time (9.48 mins v 19.75 mins)

- respondents who consider their service to be reliable spend 40% less time waiting at their home bus stops than those who consider their service to be unreliable (8.04 mins v 13.57 mins).

The Trade-Off

- the main driver to assessing bus service quality is frequency : this is six times more powerful than perceived reliability

- the vast majority of respondents would prefer to see **a maintenance of the status quo**—the same service at the same price—rather than opting for potential improvements which might result in increased fares. The bulk of passengers are more concerned about things not getting worse (they do not want a less frequent service, and they do not want fares to rise), than they are passionate about things getting better.

- while customers certainly would welcome reduced waiting times (or at least do not want waiting times to increase), **the language of frequency communicates this benefit more powerfully than language describing improvements in reliability**

- on this basis, the combined frequency/waiting driver is more influential than the second order driver of ticketing/pricing by a factor of 1.4

- service improvements are more likely to result in users **maintaining** their current levels of bus use rather than increasing them.

1.4 Conclusion

The critical element of the journey is the wait time at the bus stop, and passengers do regulate their wait time to accommodate perceived (un)reliability.

However, reliability is an accolade which is difficult to earn and high frequency is seen as the achievable solution to possible service failure. Perhaps then, a major role for METRO, in addition to seeking to improve reliability, is to inform passengers of actual timetable adherence. This could be with up-to-the minute RTPI, or could be based on recent service performance: passengers should be given not just timetable information, but also information on how reliable that information actually is, based on recent performance.

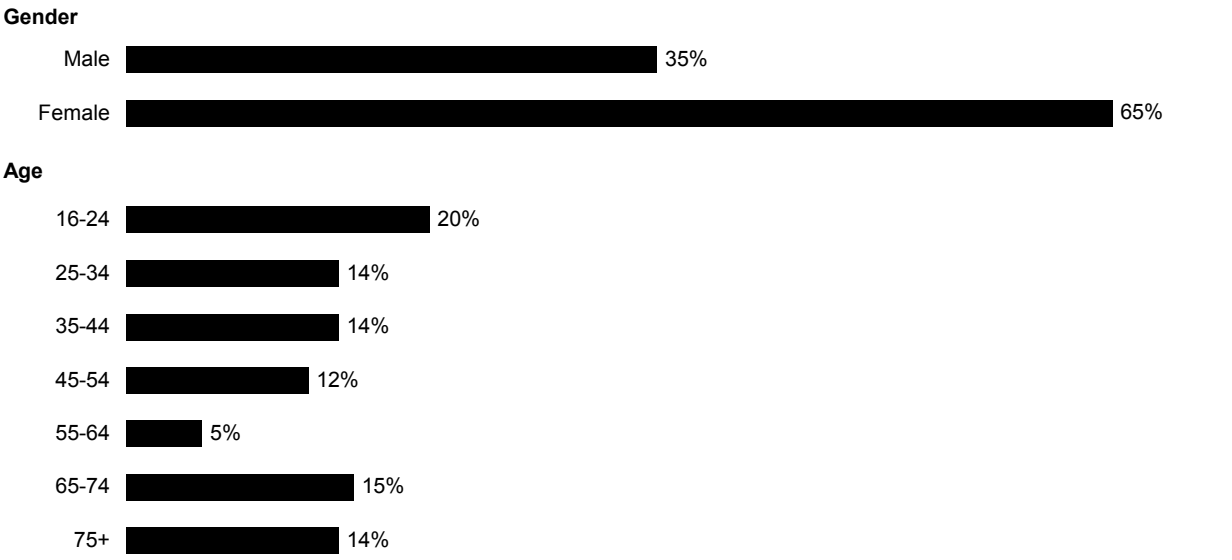
2. SAMPLE COMPOSITION

2.1 Basic Parameters

The sample is particularly purposive, being controlled by age, level of bus use and quality of service in the home corridor. This was to allow the Stated Preference analysis some control over major influencers of attitude – namely level of experience and the quality of service on offer.

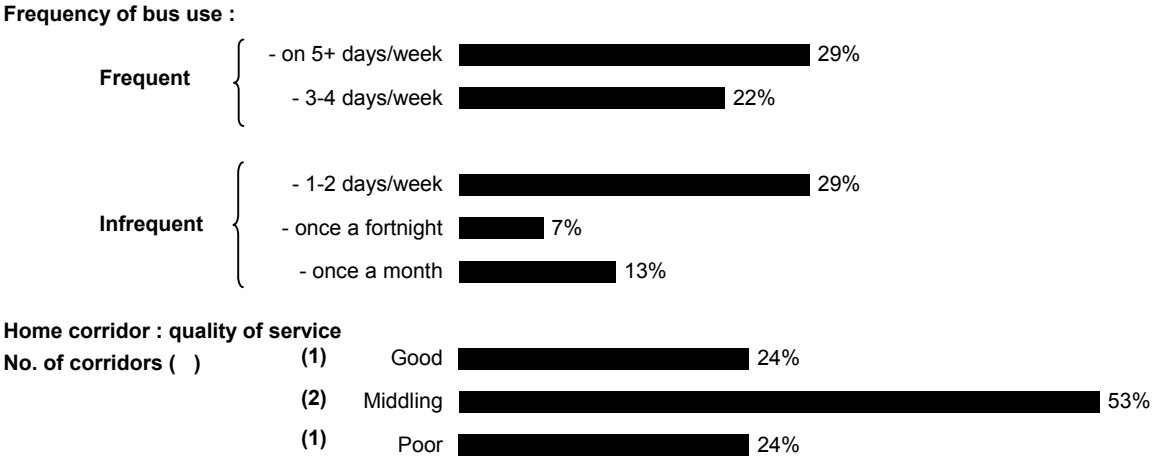
The resultant sample composition is shown in Figure 1.

FIGURE 1 : THE SAMPLE: DEMOGRAPHICS
Base: All – 416



In terms of bus use and quality of service, Figure 2 sets out the achieved distribution.

FIGURE 2 : THE SAMPLE: BUS USE
Base: All – 416

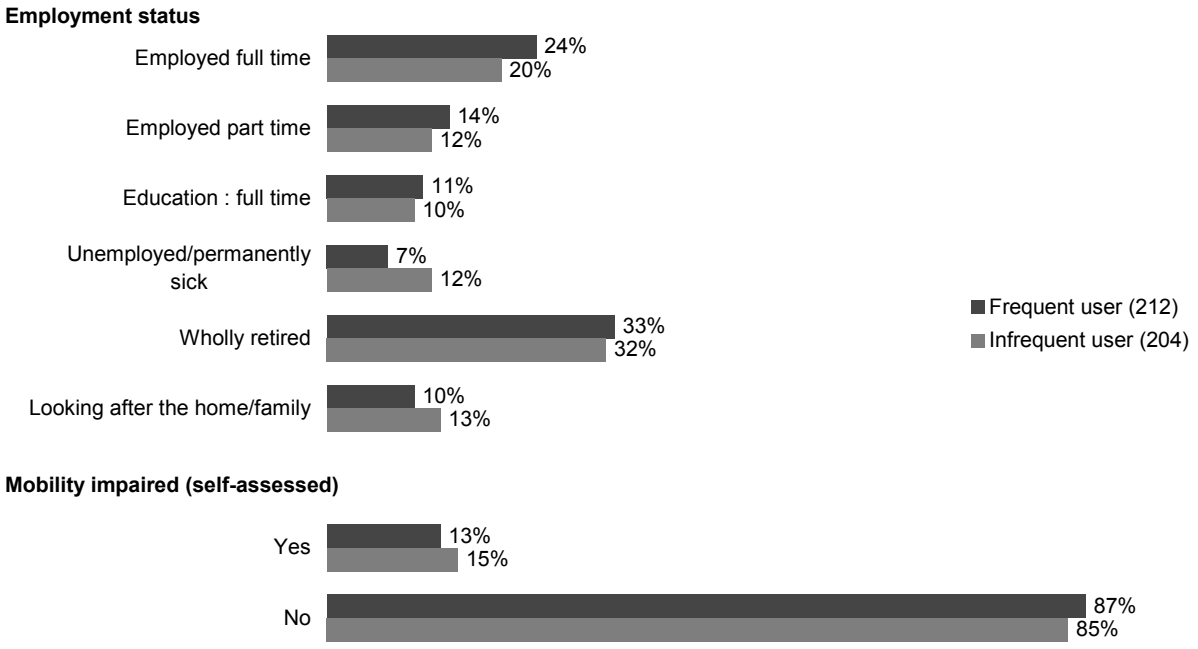


2.2 The Frequent and Infrequent Bus User

2.2.1 Household Attributes

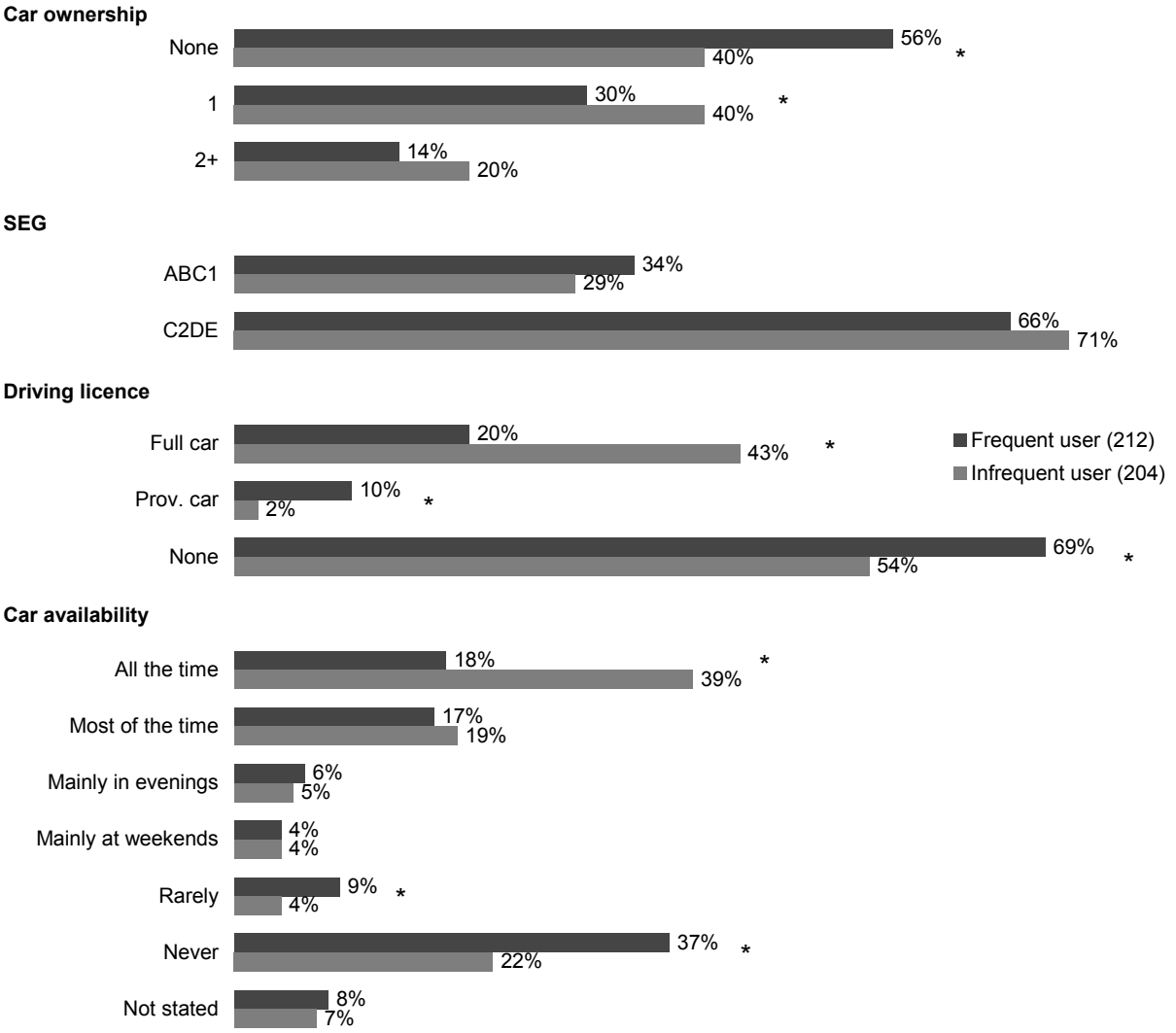
Frequent bus users differ little from infrequent bus users with respect to individual descriptors such as employment status and level of mobility.

FIGURE 3 : FREQUENT V INFREQUENT BUS USERS: PERSONAL DEMOGRAPHICS
Base: All – 416



However, at the household level, the ability to travel indicators of SEG (income) and particularly car availability do have an impact.

FIGURE 4 : FREQUENT V INFREQUENT BUS USER: HOUSEHOLD DEMOGRAPHICS
Base: All – 416



**=significant difference @ 95% confidence level between frequent v infrequent*

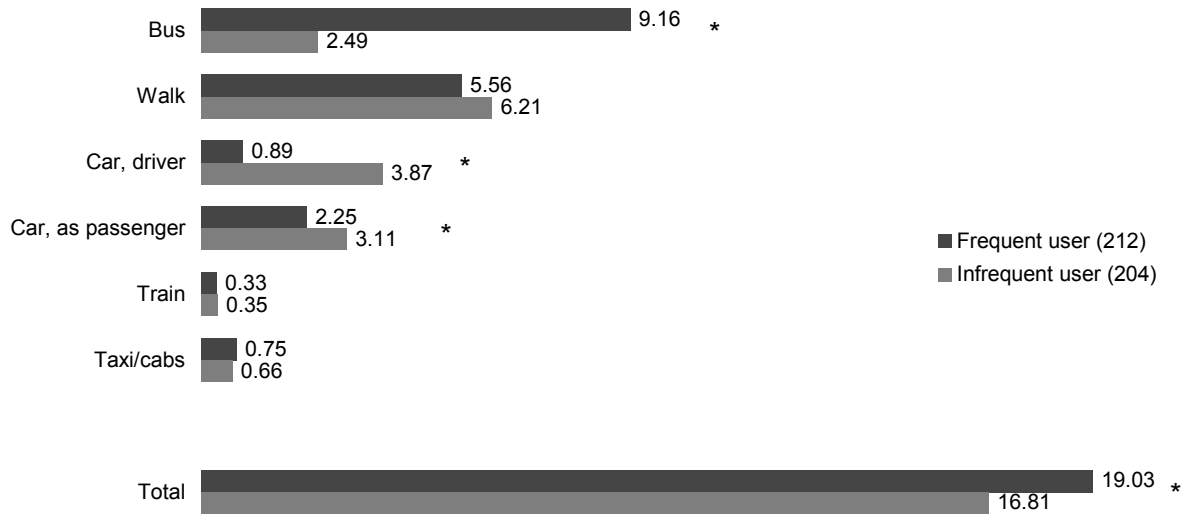
Frequent bus users are :

- less likely to own a car
- less likely to have a driving licence
- less likely to have a car available to them.

2.3 Modal Split

Respondents were asked to estimate the number of trips (boardings) they make in an average week in and around West Yorkshire.

FIGURE 5 : MODAL USE PER WEEK
Base: All – 416
Mean no. of trips
Main modes



**=significant difference @ 95% confidence level between frequent v infrequent*

That is, bus has a modal split of 48% amongst frequent users – 15% amongst infrequent users.

Furthermore, Figure 6 suggests that frequency of bus use is driven more by the need to travel rather than the quality of service on offer.

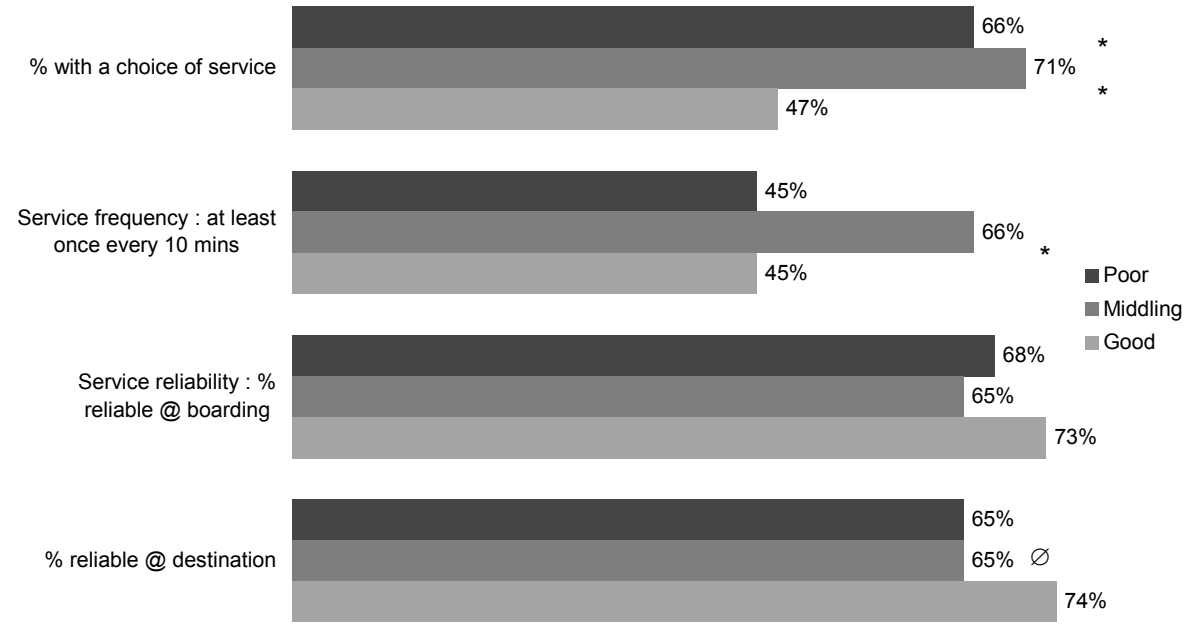
FIGURE 6 : BUS USE
Base: All – 416
Mean bus trips/week

When asked to consider only their bus trips in their home corridor, the overall weekly West Yorkshire mean of 5.89 reduces to 5.68: that is, 96% - the vast majority - of their bus travel is in their "home" corridor. This means that the Stated Preference analysis can be carried out at the home corridor level.

2.4 Assessment of Quality of Service

The fieldwork was distributed across four corridors selected by METRO as being poor, middling or good in terms of overall service delivery. This section looks at how respondents in those corridors assessed their service.

FIGURE 7 : QUALITY ISSUES WRT MOST FREQUENT BUS JOURNEYS
Base: All – 416



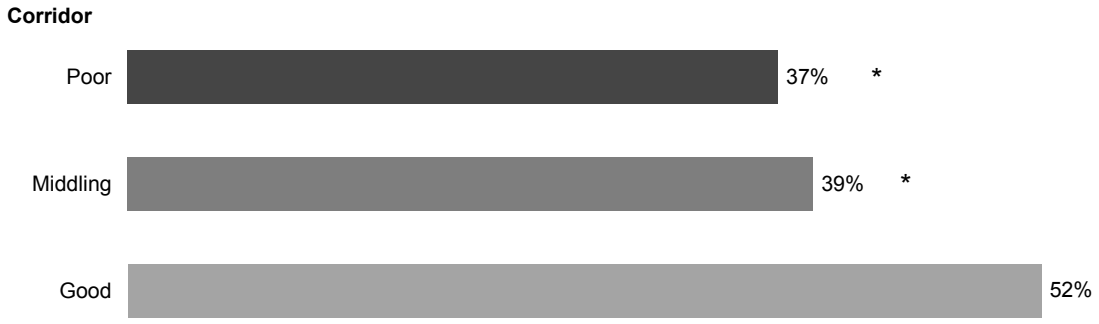
**=significant difference @ 99% confidence level wrt "Good"*

∅=significant difference @ 90% confidence level wrt "Good"

This suggests that respondents in the "good" corridor might indeed perceive their services to be more reliable (though the difference is significant only at the 90% level): not more frequent, nor offering more choice, but perhaps more reliable.

However, when respondents considered their most frequent trips in the corridor, they were asked about how long they have to wait before the bus arrives: Figure 8 shows that in the "good" corridor wait times are indeed lower.

FIGURE 8 : WAIT TIME AT HOME STOP
Base: All – 416
% under 5 mins or under



=significant difference @ 95% confidence level wrt "Good"

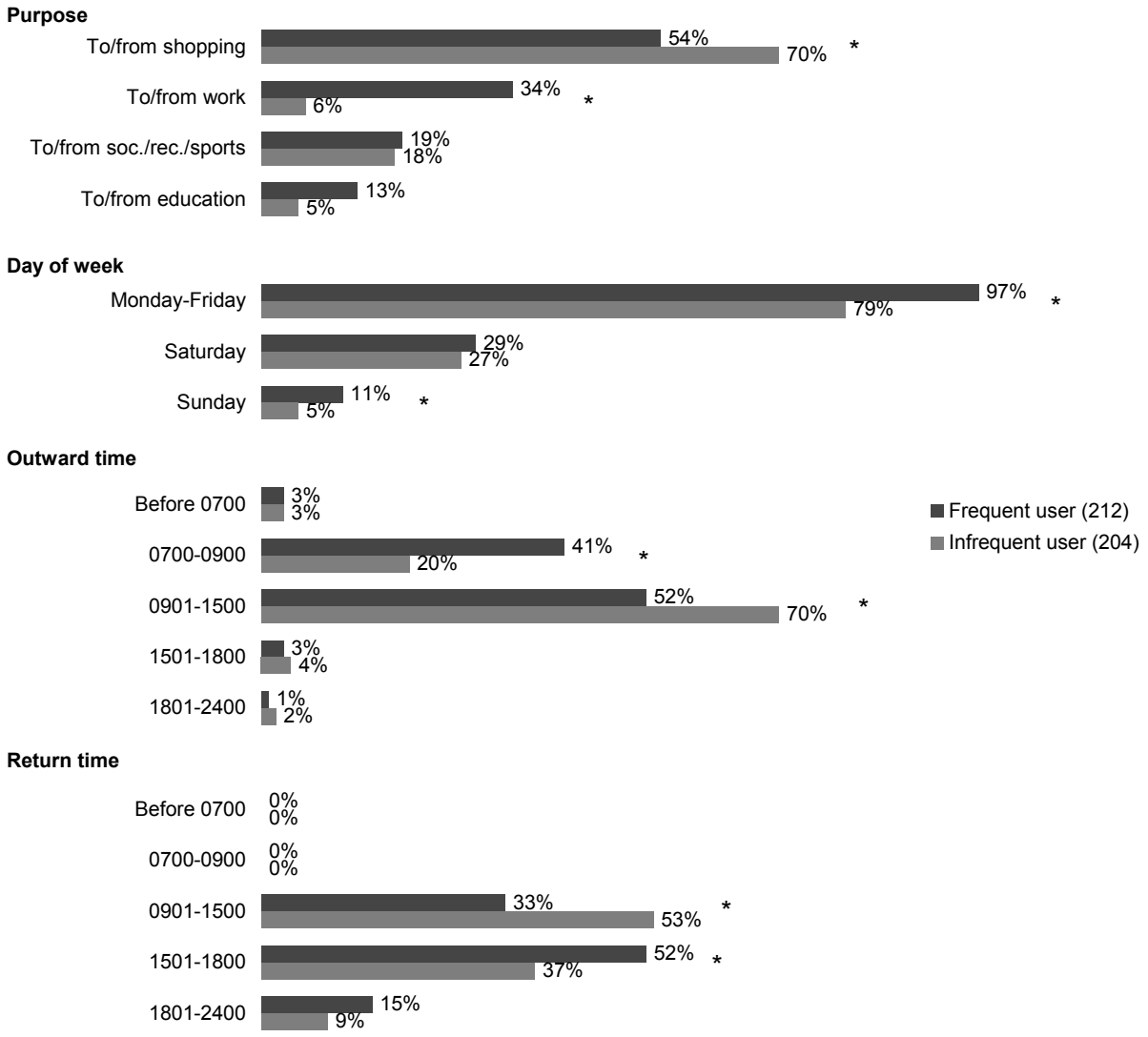
That is, behaviour is different in the "good" corridor: passenger wait times are lower.

2.5 The Most Frequent Bus Trip : The Base for the SP Analysis

2.5.1 The Trip

As is to be expected when compared to less frequent users, the journey purpose of the most frequent bus users is skewed towards the work and education trip.

FIGURE 9 : MOST FREQUENT BUS JOURNEYS
Base: All – 416
Main responses



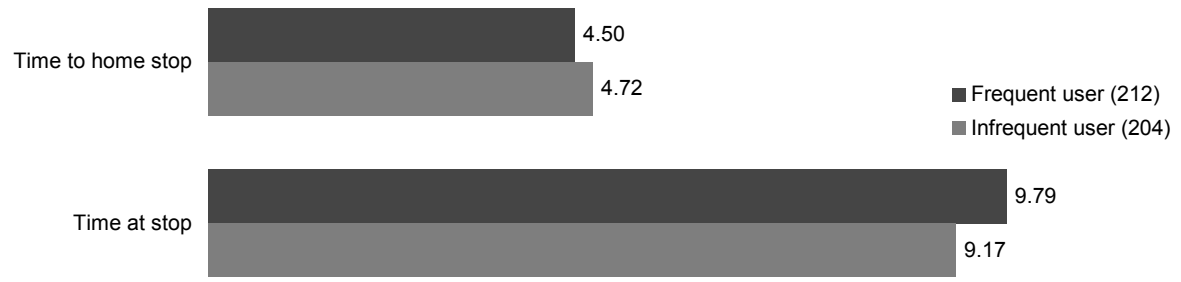
**=significant difference @ 95% confidence level*

This emphasis on the commute is reflected in the times at which the regular journey is made : frequent bus users are more likely to make their regular journey around the peak hours.

2.5.2 The Service

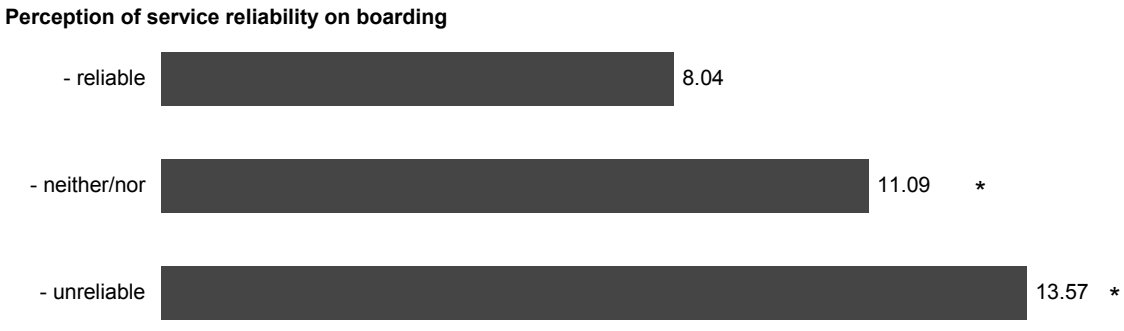
In general, the access time to the home stop is a half of the wait time: 4.5 mins v 9 mins.

FIGURE 10 : MEAN ACCESS TIME: OUTWARD TRIP
Base: All – 416
Main responses



Respondents' perceptions of the reliability of their service is reflected in the stated wait time at their home stop : those who consider their service to be reliable spend roundly 40% less time waiting at their home stop than do those who feel their service is unreliable.

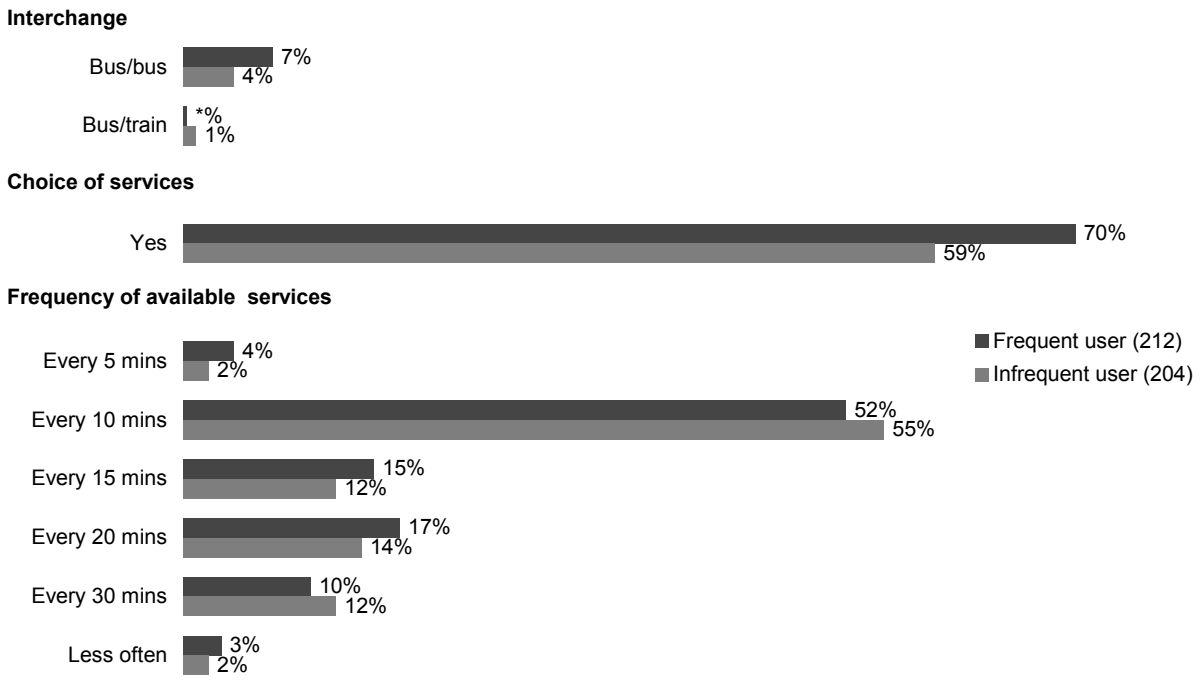
FIGURE 11 : MEAN WAITING TIME
Base: All – 416
Mean in mins



**=significant difference @ 95% confidence level w.r.t. reliable*

Overall, 6% of the bus trips under review involve interchange, two thirds have the benefit of a choice of services, and over half enjoy at least a 10 minute frequency.

FIGURE 12 : INTERCHANGE AND CHOICE
Base: All – 416

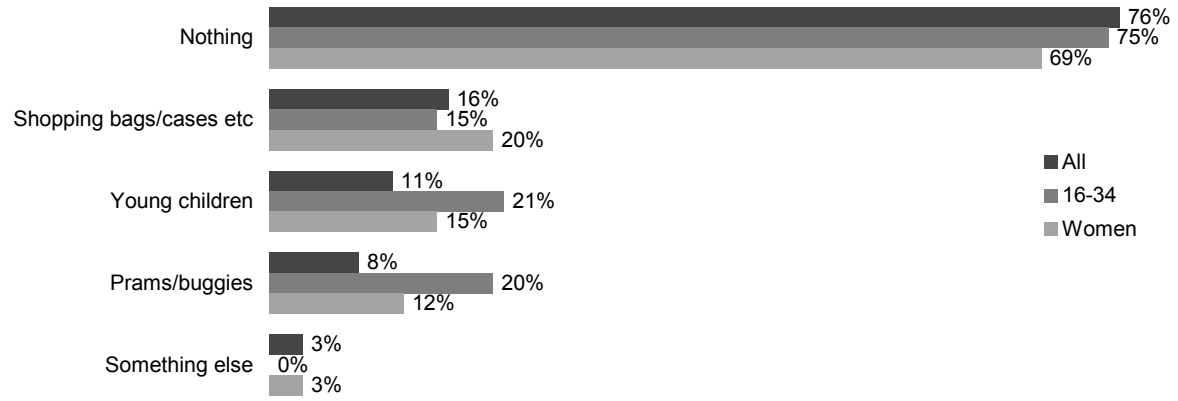


2.5.3 On-mode

The average in-mode journey time is 19.75 mins [frequent users = 20.24 mins, infrequent users = 19.25 mins]. This means that on average, the time spent waiting for a bus is roundly half the length of time spent on the bus.

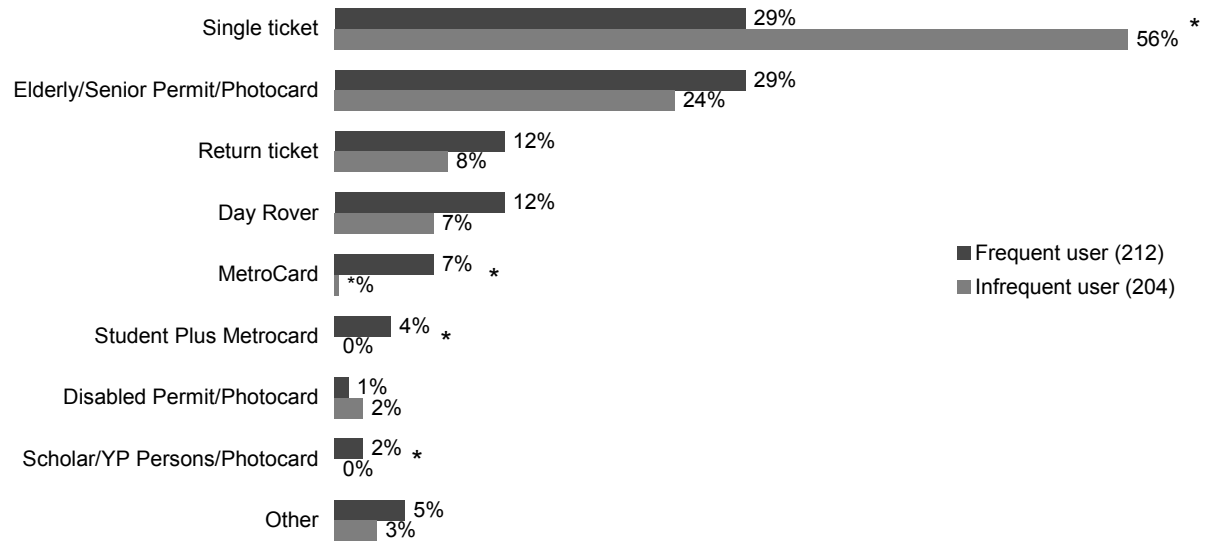
While three quarters of the trips (76%) are made with no children or shopping etc to impede the passengers' progress, those who do experience problems are more likely to be younger and female.

FIGURE 13 : THE FREQUENT BUS TRIP: IMPEDIMENTA?
Base: All – 416



Amongst the total sample, a half (52%) buy a single (42%) or return (10%) ticket for their most frequently made bus journey.

FIGURE 14 : THE TRIP: FARE PAID
Base: All – 416

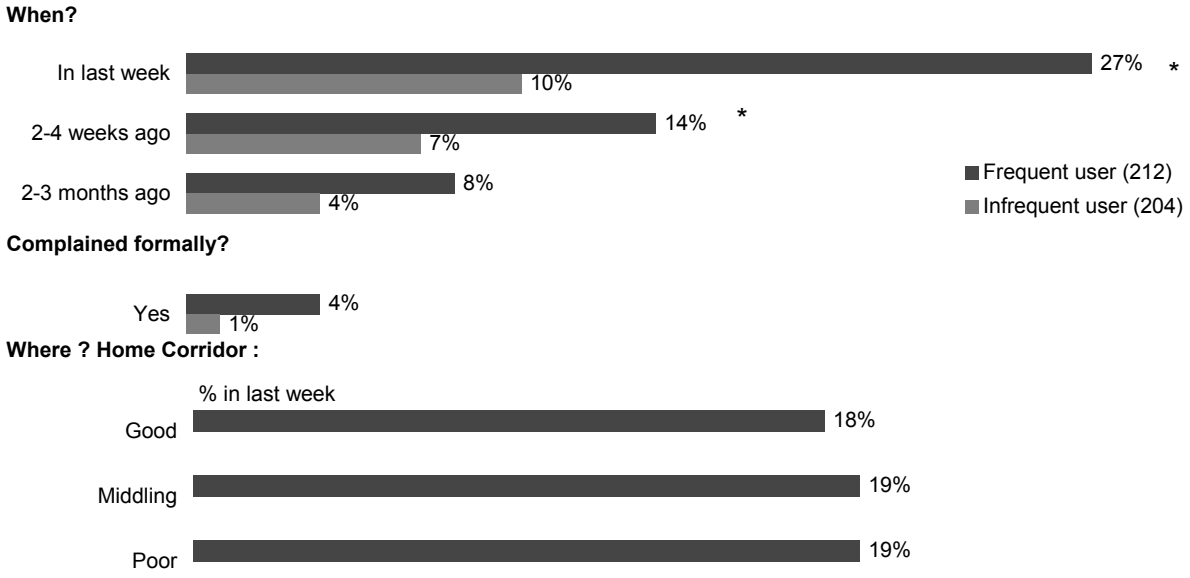


**=significant difference @ 95% confidence level*

2.6 Lateness

Not unexpectedly, the more regular bus users are the ones most likely to experience unacceptable delays or no shows.

FIGURE 15 : UNACCEPTABLE LATENESS/NO SHOW
Base: All – 416
Main responses



**=significant difference @ 95% confidence level*

The influence of such service failure does have a marked effect on perceptions of reliability.

FIGURE 16 : HOME STOP: RELIABILITY V LATENESS/NO SHOW
Base: All – 416

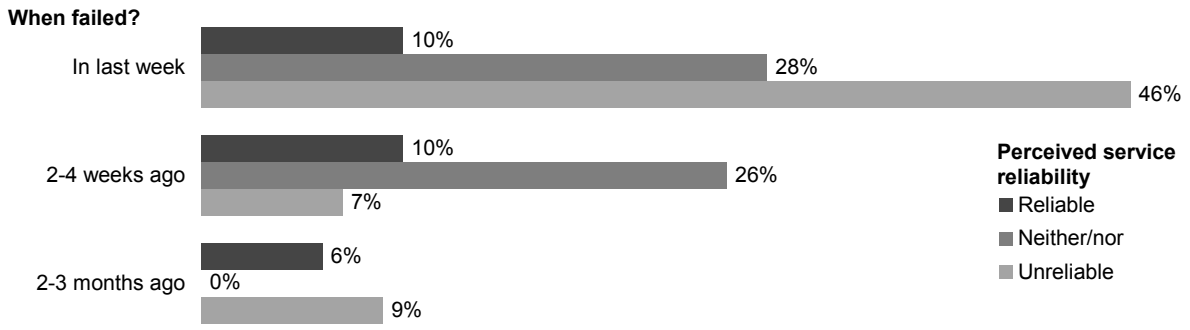


Figure 16 suggests either that:

- perceived unreliability is indeed based on a high incidence of service failure

- or that the more recent is that failure, the more it impacts on perceptions of overall service reliability

2.7 Summary: The Sample

- compared to infrequent bus users, frequent bus users are :
  - less likely to own a car
  - less likely to have a driving licence

- the local modal split to bus is :
  - 48% amongst frequent users
  - 15% amongst infrequent users.

- access time to the home bus stop is half the wait time at the stop (4.5 mins v 9 mins)

- wait time at the stop is half the subsequent on-mode time (9.48 mins v 19.75 mins)

- respondents who consider their service to be reliable spend 40% less time waiting at their home bus stops than those who consider their service to be unreliable (8.04 mins v 13.57 mins).

3. STATED PREFERENCE EXERCISE

3.1 Background

The stated preference exercise was designed to provide insight into respondents' priorities when it comes to "what they would like in the future from the bus service here in West Yorkshire." In consultation with METRO, 11 attributes of the bus service experience were identified:

- Frequency
- Reliability
- Hours of service
- Driving standards
- Staff attitude
- Cleanliness
- Safety
- Ticketing
- Accessibility
- Payment
- Use of tickets

Between two and four service levels were then constructed for each of the attributes.

Respondents were then presented with a set of 16 cards (see Appendix A), each of which contained what was explained to respondents as a "description of the type of bus service you might experience on the bus journey you make most often in this area"—that is, a configuration comprising one level from each of the 11 attributes. The respondents' task was to sort the cards in order of their appeal—from the most appealing description of a bus service to the least. The configurations on the cards were created in accordance with strict mathematical principles which allow how respondents would be likely to react to any possible configuration to be inferred from their sorting of the options they were presented with.

This type of exercise yields two types of results:

- Attribute **importances:** estimates of how much weight each attribute is contributing to respondents' decisions about their preferences
- Level **utilities:** information about how important the distinctions between the various levels of a given attribute are to respondents.

The results of the exercise were analysed across the total sample and for each of several subgroups:

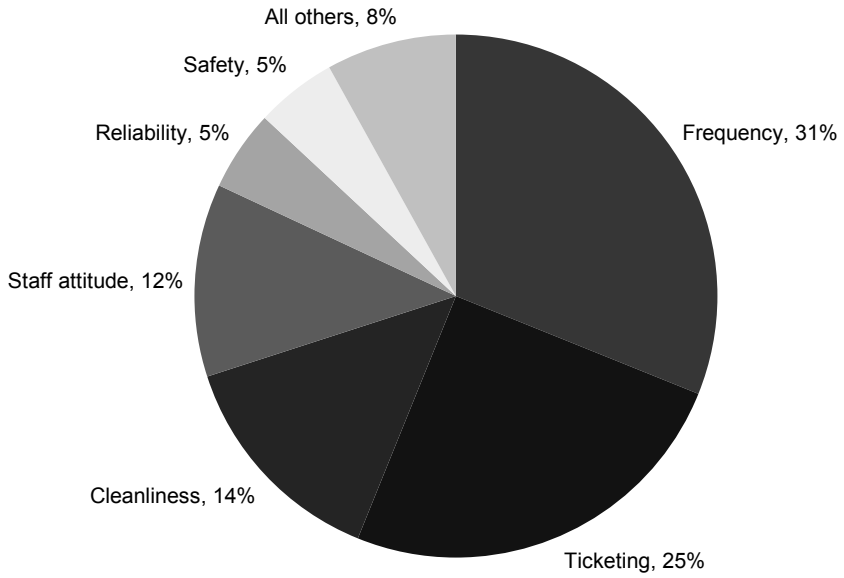
- young vs. middle-aged vs. older respondents
- high frequency vs. low frequency bus users

- those using corridors with good vs. middling vs. poor service, as classified by METRO
- those who had experienced a late bus in the last week
- those with lower perceived reliability at boarding for their most frequent journey
- and those with lower perceived frequency of buses for their most frequent journey.

3.2 Summary

Across the sample as a whole, the desire to reduce waiting times emerges as the top priority of bus passengers. Perhaps surprisingly, however, they express this desire much more powerfully in terms of **frequency** than they do in terms of **reliability.**

FIGURE 17 : STATED PREFERENCE IMPORTANCES
Base: All – 416



Across the sample as a whole, and for most of the subgroups analysed (all age groups, high frequency and low frequency bus users, those using corridors with high quality service and those using corridors with poor quality service), **frequency of service is the most important attribute,** but different groups have different ways of understanding this. For those using corridors with good quality service, while frequency is their overwhelmingly most important priority, they display no strong desire to have frequency increased—instead, they consider it critical that frequency not be reduced from current levels. By contrast, those living on corridors where service can be described as poor (perhaps unsurprisingly) do want to see an additional bus or two per hour on their most frequently travelled route.

Ticketing (essentially pricing) was the second most important issue for the sample as a whole, and the most important issue for a couple of subgroups: those using corridors of middling quality, and those who perceive the bus service on their most frequent journey to be very or fairly unreliable at the point of boarding. Equal emphasis was given to *affirming* their desire that fares not be increased from current levels, and to *rejecting* the proposed replacement of single journey fares with transferable travel cards—at least at the fares proposed.

3.3 Importances

There are no significant differences by age group in the priorities that passengers assign to the different components of their bus experience. Frequency is the most important attribute for all three age groups, and ticketing/pricing the second most important. Among those respondents aged 60 and older, ***staff attitude*** occupies third place ahead of cleanliness, but this shift is too narrow to be described as significant.

FIGURE 18 : STATED PREFERENCE IMPORTANCES
By Age

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
16-34 year olds	29%	24%	15%	12%	4%	5%	11%
35-59 year olds	30%	23%	15%	10%	6%	6%	12%
60+ year olds	32%	25%	11%	14%	6%	5%	7%

By contrast, there are major differences in priorities depending on the quality of service on the corridor most frequently used by the respondent. Those respondents using the corridor where service can be characterised as “good” placed an overwhelming weight on frequency, and in particular made clear that their top priority was that frequency not be reduced from its current levels. The service configurations offering “two more buses per hour than you have today” did not do appreciably better among “good corridor” respondents than those offering “one more bus” or “the same number of buses.” Those four configurations, however, which offered “one less bus per hour” were placed in the bottom quarter of the sixteen options evaluated 56% of the time, and in the bottom half 85% of the time.

Among those respondents using the poorer quality corridor, frequency was also the most important issue, but here there was more interest in seeing an increase in the frequency of service, rather than simply maintaining current levels.

Among those in the middling corridor, frequency comes second to ticketing/pricing as the top priority. Preserving today's ticket prices (and fare structure) is slightly more important to these passengers than preserving frequency. There was only a negligible difference for these respondents between "the same number of buses" and "one more bus per hour". However, these respondents did show some interest in the idea of "two more buses per hour."

FIGURE 19 : STATED PREFERENCE IMPORTANCES
By quality of service on most frequently used corridor

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
Good corridor	71%	2%	7%	6%	8%	1%	5%
Middling corridor	20%	31%	14%	15%	4%	6%	10%
Poor corridor	26%	24%	16%	9%	5%	8%	12%

Overall frequency of ridership, perhaps surprisingly, does not have a major influence on priorities. It is perhaps worth noting that high frequency users are slightly more sensitive to attributes such as service hours, boarding accessibility, and the ability to use tickets/travel cards across all operators' buses—though even taken together these "minor" attributes did not weigh as much in respondents' choices as each of the top four attributes taken individually.

FIGURE 20 : STATED PREFERENCE IMPORTANCES
By frequency of bus ridership

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
High frequency user	28%	23%	15%	13%	4%	5%	12%
Low frequency user	33%	26%	13%	11%	5%	5%	7%

As might be expected, those who have experienced a late running service recently attach a somewhat higher priority to reliability than others—though even among these passengers it still accounts for less than 10% of the weight in overall decision-making.

FIGURE 21 : STATED PREFERENCE IMPORTANCES
Among those experiencing a late-running service in the week prior to interview

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
Experienced late service in last week	31%	19%	15%	11%	8%	5%	11%

The priorities of those whose most frequent journey is to/from either work or school are, for the most part, closely in line with the sample as a whole. Frequency is of slightly less importance to this group (though it is still joint first in importance with ticketing/pricing). **Extended service hours** account for 6% of the importance weight among these passengers, moving it past reliability and safety into fifth place in the importance rankings for this group.

FIGURE 22 : STATED PREFERENCE IMPORTANCES
Destination of most frequent journey

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
Journey to work/school (n=119)	25%	25%	14%	12%	5%	4%	15%
Others (n=297)	33%	24%	13%	12%	5%	4%	9%

Frequency is almost twice as important to riders who set out on their most frequent journey after 9am as it is to those who begin in the earliest daypart. Among those who do begin their journey during the morning rush hour, ticketing/pricing eclipses frequency as the most important attribute, and several other attributes gain slightly in importance as frequency's weight decreases. The ability to use tickets on all operators' buses (an attribute of negligible importance across the sample as a whole) is joint fifth with reliability in importance among those setting out in the early morning, at 6%.

FIGURE 23 : STATED PREFERENCE IMPORTANCES
Time of setting out on most frequently made journey

	Frequency	Ticketing	Cleanliness	Staff attitude	Reliability	Safety	All others
Total sample	31%	25%	14%	12%	5%	5%	8%
Set out before 9am (n=139)	19%	28%	15%	14%	6%	5%	13%
Set out after 9 am (n=277)	36%	22%	13%	11%	5%	4%	9%

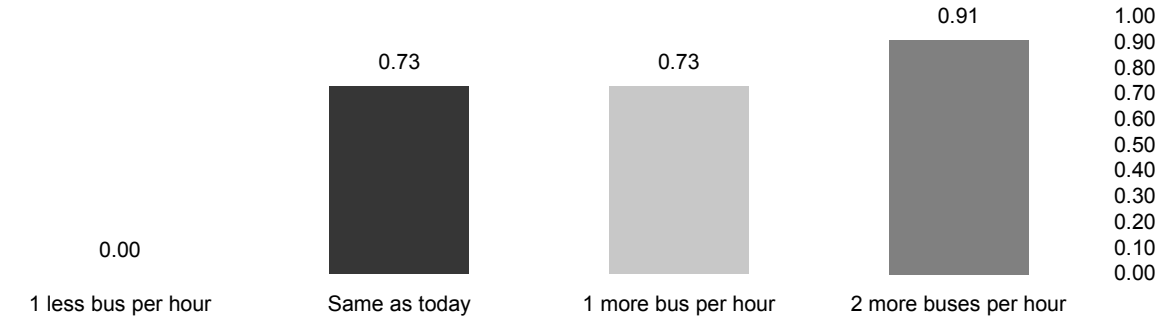
3.4 Utilities

The second major output from the stated preference attributes are **utilities** (sometimes known as "part worths"). These are figures (typically arrayed for each exercise on a scale from 0 to 1) which measure the value that respondents assign to each level of each attribute. Utilities are additive across attributes. That is to say, one can create two (or more) configurations of the bus experience by choosing one level from each of several attributes. The total utility for each configuration is computed simply by adding the utility scores assigned to the relevant level of each attribute in the configuration. All other things being equal, the greater the total utility of the configuration, the more likely it is to be preferred by passengers.

One consequence of this is that it is possible to see (particularly for attributes with three or more levels) whether the differences between the levels are seen to be roughly linear improvements, or whether instead there is a threshold at which change becomes much more meaningful to respondents.

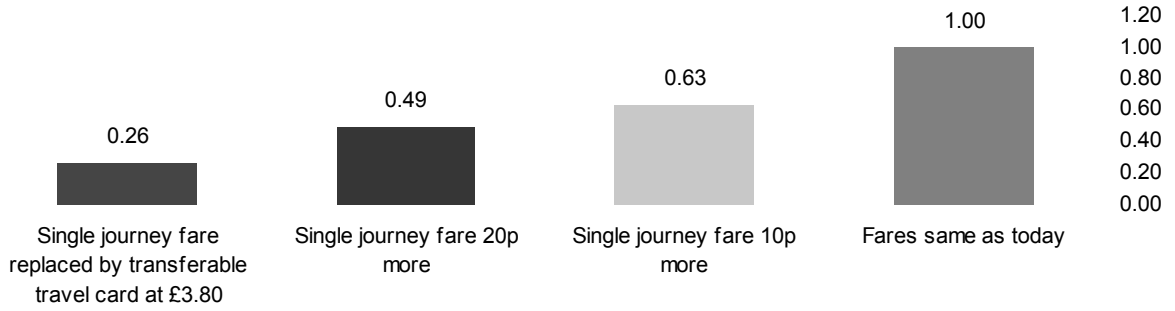
A powerful example of this comes with respect to frequency. The big step change (from 0.00 to 0.73) comes in the difference between "one less bus per hour" and "the same number of buses per hour". Taken overall, the strongest message emerging from the data is that respondents do not want to see any reduction to current service levels. There is no difference between "the same number of buses" and "one more bus per hour"—it will take "two more buses per hour"—to make a substantially positive difference to respondents' perceptions.

FIGURE 24 : STATED PREFERENCE UTILITIES: FREQUENCY
Base: All – 416



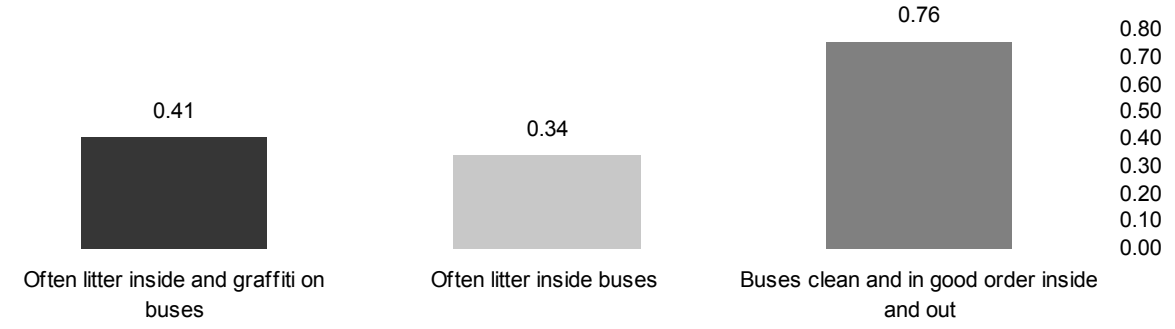
When it comes to ticketing/pricing, the biggest gap is between today's fares and a single journey increase of 10p more. There is an equally big gap between the 10p fare rise and the replacement of single journey fares by transferable travelcards. The aversion to the transferable travel card option becomes more understandable when it is noted that only 6% of respondents reported that their most frequent journey involves an interchange (see Section 2.5.2).

FIGURE 25 : STATED PREFERENCE UTILITIES: TICKETING
Base: All – 416



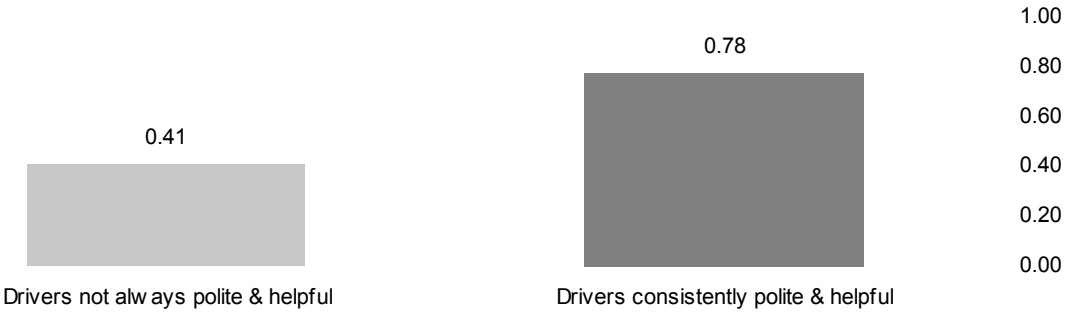
Having clean buses is an important consideration for respondents, but the prime focus appears to be litter—the utility for "litter and graffiti" is actually slightly higher than the utility for "litter" alone. This is not to be construed as any enthusiasm, but rather as evidence that respondents' main priority in this area is for buses that are clean and in good order—they are apparently not much bothered about *how* the buses become dirty

FIGURE 26 : STATED PREFERENCE UTILITIES: CLEANLINESS
Base: All – 416



Respondents had only two levels to evaluate in the "staff attitude" attribute. Note that the difference in the utilities for those levels is as great as the difference between "same fares as today" and a rise of 10p per journey, and twice as great as the difference between "same number of buses per hour as today" and "two more buses per hour."

FIGURE 27 : STATED PREFERENCE UTILITIES: STAFF ATTITUDE
Base: All – 416



The difference between lateness rates for 14% and 20% is perceived as negligible. There is a slightly bigger difference between 14% and 10%, and again between 10% and 5%. The size of these changes, however, is small enough to put reliability (along with safety) in the third tier of attribute importance—even the largest possible changes here do not make as much difference as some of the step changes to more important attributes.

FIGURE 28 : STATED PREFERENCE UTILITIES: RELIABILITY
Base: All – 416

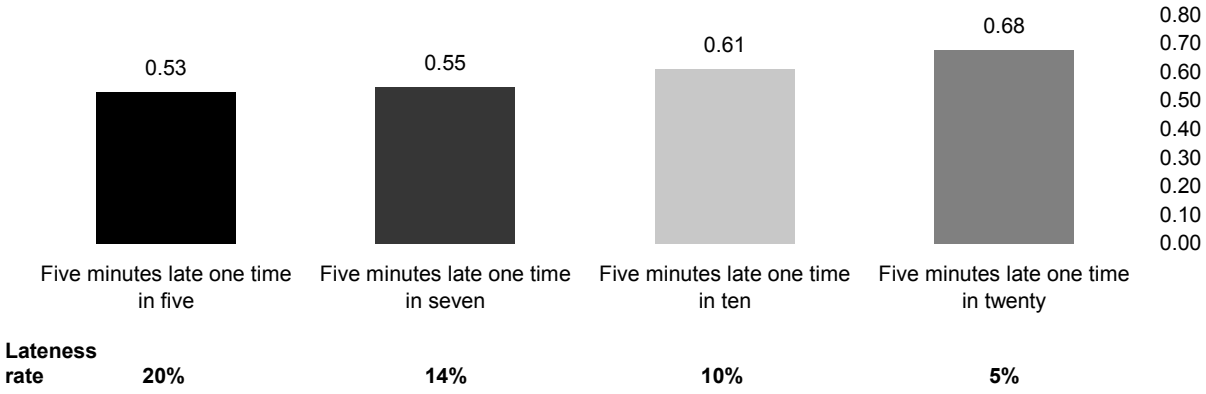
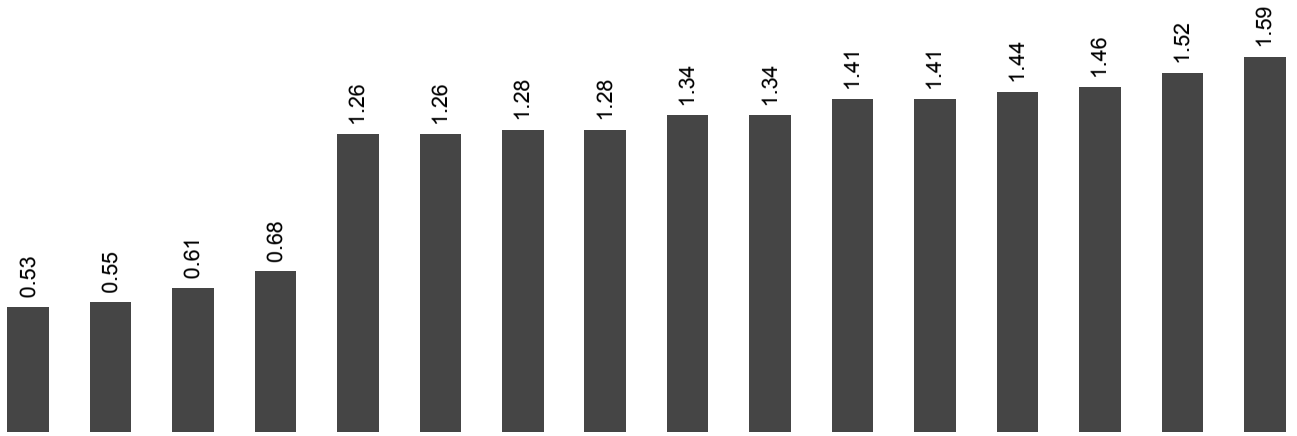


FIGURE 29 : STATED PREFERENCE UTILITIES: PERSONAL SAFETY
Base: All – 416

Utilities can be calculated for the other attributes (service hours, driver standards, accessibility, payment, and use of tickets), but they are statistically unreliable—levels that are manifestly worse on these attributes have utilities that are higher than ones that are clearly better. We cannot draw the implication that METRO riders perversely prefer bumpy rides to smooth ones, or prefer climbing stairs to level boarding, but rather that these attributes weighed very little in the overall decision-making process relative to the others presented above.

While frequency and reliability can certainly be separated from an operational perspective, they are clearly linked together in passengers' minds. Combining the utilities from the two attributes shows the total impact of increasing passengers' confidence in service reliability and its consequent influence on shortening the wait time. The difference between the highest and lowest levels of service provision rated for this concept – see Figure 30 – is more than 40% greater than the difference between the highest and lowest levels rated in the area of ticketing/pricing (see Figure 25). Moreover, movement from the lowest to the highest level on this compound variable is more meaningful to passengers than moving simultaneously between the extremes of all eight other attributes together (staff attitude, safety, cleanliness, accessibility, payment, hours of service, and driving standards). The evidence clearly suggests that improving perceptions regarding the wait for the bus is, all else being equal, the most effective way to improved passenger satisfaction. This finding also provide insight into how to communicate improvements to customers in the way that they find most understandable and meaningful.

FIGURE 30 : SP UTILITIES: COMBINED FREQUENCY/RELIABILITY

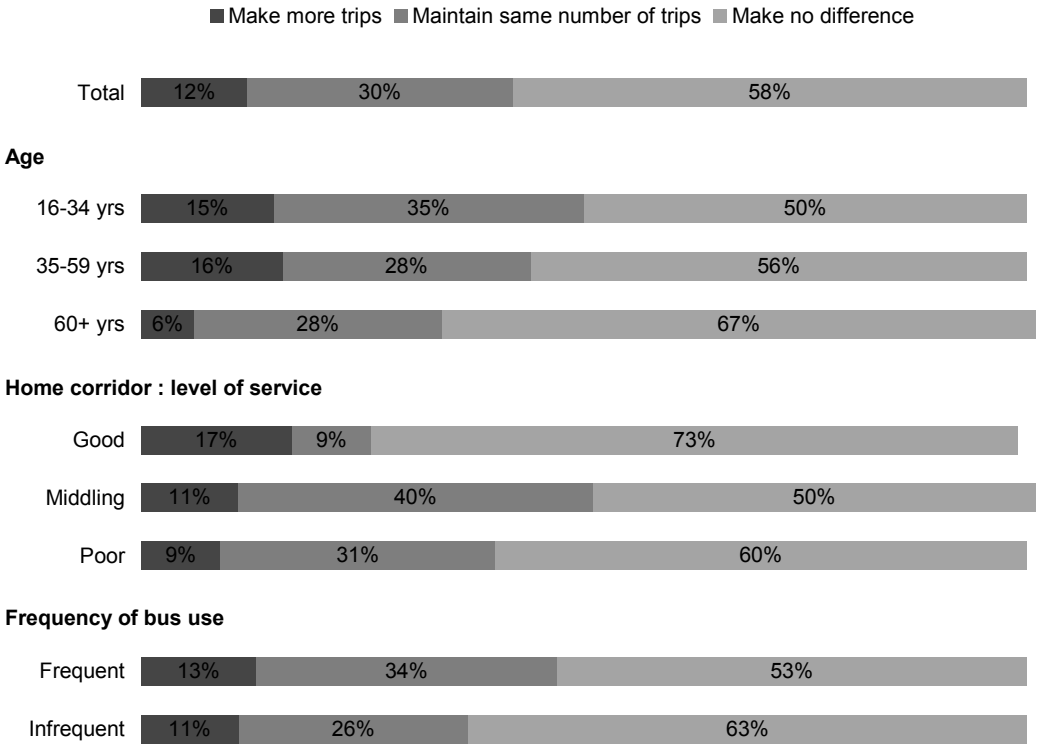


Comparative Frequency : buses per hour	-1	-1	-1	-1	+1	0	0	+1	0	+1	0	+1	+2	+2	+2	+2
Reliability : lateness rate	20%	14%	10%	5%	20%	20%	14%	14%	10%	10%	5%	5%	20%	14%	10%	5%

3.5 Impact

In all, 12% of respondents say that, if they had access to the bus service described on the configuration that they ranked highest, they would be encouraged to make more trips than they do now (a median figure consistent across the groups broken out below of two more trips per week). Another 30% of respondents say that delivery of a bus experience to the level of their most preferred configuration would encourage them to keep making the same number of trips they do today.

FIGURE 31 : IMPACT OF CHANGES ON RIDERSHIP
Base: All – 416



3.6 Conclusions

Overall, three main conclusions emerge from the data. First, on this evidence the vast majority of respondents would prefer to see **a maintenance of the status quo**—the same service at the same price—rather than opting for potential improvements which might result in increased fares. The bulk of passengers are more concerned about things not getting worse (they do not want a less frequent service, and they do not want fares to rise), than they are passionate about things getting better.

The second telling point is that at the most fundamental level, frequency emerges as the most important determinant of passengers' priorities, and it does so with a weight more than six times as great as that contributed by perceptions of reliability. While customers certainly would welcome reduced waiting times (or at least do not want waiting times to increase), **the language of frequency communicates this benefit more powerfully than language describing improvements in reliability**. Among the factors contributing to this could be the following:

- passengers may believe operators have more control over frequency than they do over reliability, so such claims are more credible.

- increases in frequency would do more to reduce waiting times than improvements in reliability, especially among lower frequency corridors.

Finally, service improvements are more likely to result in users **maintaining** their current levels of bus use rather than increasing them.