Bus Passenger Survey methodological overview – Autumn 2015 wave

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transport**focus**

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1   Background

Transport Focus first established the Bus Passenger Survey (BPS) in April 2009 to generate a robust and comprehensive measure of bus passengers' journey experience within our remit area (England outside of London). The survey is an objective measure of bus passengers' experience on individual journeys and it covers: the bus stop environment, punctuality, 'on bus' comfort, the standards of the bus driver, together with overall journey satisfaction and value for money ratings. The Bus Passenger Survey has a well-established methodology, achieved over many waves of this survey. However, following an independent review in late 2014 and further development work through 2015, the Autumn 2015 survey saw some further enhancements which are detailed in this document.

Transport Focus allows local transport authorities and/or bus service operators (operators) to 'buy into' the survey to achieve boosted response numbers in their territories of interest.

BDRC Continental was appointed by Transport Focus to provide the market research agency services needed to carry out the Autumn 2015 wave of the survey. BDRC Continental is an independent market research agency and conducts research in accordance with the Market Research Society (MRS) Code of Conduct and all work is conducted in accordance with the ISO 20252 Quality Assurance Standard. BDRC Continental is also an MRS Company Partner Scheme member.

This document describes the methodology in general and specifics as they relate to the Autumn 2015 BPS wave. If there are any further questions about the methodology deployed in the survey, please call Robert Pain on 0300 123 0835.

2   Survey Overview

The BPS is designed to provide results that are statistically representative of bus passenger journeys made within a Primary Sampling Unit (PSU); a passenger journey is defined as an individual trip made on a local bus service. PSUs are typically local transport authority areas or the divisions of a bus operator. The survey is a measure of individual journey experience. It is designed to provide results that have utility at the PSU level, and in certain circumstances at remit wide level.

The sampling process generates a list of bus routes representative of journeys made in each PSU selected. Fieldworkers board buses on a representative sample of bus routes; they discuss the survey briefly with individual passengers on these buses and invite them to take part in the survey; those wishing to take part fill in a self-completion questionnaire after their journey. Details of the questionnaire and data collection method are given in sections four and five. The survey is restricted to passengers aged 16 and over. Weighting is applied to correct for differential response rates by age, gender and the day and time of day when travelling. Weighting was also applied to proportionate the individual PSU.

2.1 The Primary Sampling Units surveyed in the Autumn 2015 wave

PTE authorities	Unitary authorities	Two tier authorities	Operators not aligned to any authority areas	Scottish areas	Other special territory areas
Centro	Blackpool	Devon	Abellio routes (in Surrey)	First Aberdeen	Coventry VMA routes within Centro
Merseytravel (+ Halton)	Luton	East Sussex	First Potteries	First Glasgow	QP routes within Merseytravel (+ Halton)
Metro (West Yorkshire)	Milton Keynes	Essex	First South Coast	First Scotland East	East Sussex: boost on Stagecoach routes (Hastings / Bexhill)
Nexus (Tyne & Wear)	North East Lincolnshire	Gloucester-shire	Reading Buses		Kent: boost on non-major operators
South Yorkshire	Tees Valley Group*	Kent	Go Ahead: Brighton & Hove Bus		Nottinghamshire: boost on non-major operators
Transport for Greater Manchester	West England Partnership**	Lancashire	Go Ahead: Plymouth City Bus		
	York	Norfolk	Go Ahead: Metrobus		
		North Yorkshire	Go Ahead: Thames Travel		
		Nottinghamshire	Go Ahead: Oxford Buses Park & Ride		
		Oxfordshire	Go Ahead: Konectbus		
		Staffordshire	Go Ahead: Anglian Buses		
			Go Ahead: Hedingham & Chambers		
			Go Ahead: Bluestar		
			Go Ahead: Wilts & Dorset		
			Go Ahead: Southern Vectis		

*Comprised of Redcar & Cleveland, Middlesbrough, Stockton on Tees, Hartlepool, Darlington council areas.

**Bath and North East Somerset, Bristol City Council, North Somerset, South Gloucestershire council areas.

3   Sampling

The sampling process is designed to ensure representative results are achieved for each Primary Sampling Unit surveyed.

Sometimes in some Primary Sampling Units, sample design also accommodates requests to boost specific routes or Operators, so that substantive response numbers can be achieved for these groups; where this occurs, they are suitably weighted back when producing the final Primary Sampling Unit results.

In this wave, the following were sampled as sub-Primary Sampling Units within their respective areas:

- Routes covered by the Voluntary Multilateral Agreement (VMA) within the Centro PTE area
- Routes covered by the Quality Partnership (QP) within the Merseyside PTE area
- Stagecoach commercial routes through Hastings and Bexhill, within the East Sussex area
- Services run by non-major operators within Kent
- Services run by non-major operators within Nottinghamshire.

3.1   Sample design

A sample is designed for each Primary Sampling Unit. The sample universe is sourced from ITO World Ltd (which collects and makes available the bus journey data shown by Traveline, for example). To ensure the research encompasses the totality of routes, the starting point is to use the information from ITO World Ltd to make a list of every bus service and every timetabled occurrence of each service that runs within each Primary Sampling Unit. Bus journeys that start outside 06.00 to 21.59 are excluded, as these are outside the fieldwork hours.

This data source has some additional key fields, including: the local transport authority through which the route runs, whether or not it crosses a Local Transport Authority boundary, the journey length in minutes, the start/finish bus stops. To date no superior sample source has been identified. Experience to date has not suggested that this sample source omits any noticeable proportion of journeys. A small proportion of journeys sampled in advance of the fieldwork are found to have been withdrawn or changed (for example timetable changes) by the time of fieldwork itself. However the effect of this is relatively minor and is usually due to local changes made in the short period between sampling and fieldwork, rather than due to inaccuracies in the sample source.

The sampling process is described below:

1. The journey duration of every timetabled occurrence of every bus service is calculated using the stated start and end times provided by ITO World Ltd. Journeys which go beyond the Area boundary use the proportion of the journey within the Area boundary (unless this is less than 30 per cent of its total route time, and the portion of the journey within the area is under 15 minutes; such journeys are removed from this initial list). The PSU list (of every timetabled occurrence of every bus route) is now sorted in descending journey lengths.

2. A 'Passenger Value' (PV) is now applied to each individual bus journey. This is based on additional research and modelling work which took place during summer 2015:

   o The total number of passengers boarding during a single one-way bus journey was counted on a sample of all the bus journeys surveyed during the preceding Autumn 2014 wave

   o This data was used to generate models to predict the number of people travelling on each bus service depending on:

      • area (or type of area[1] if that area was not surveyed in 2014 and did not therefore have its own counts and model)

      • duration

      • time of day and day of week when travelling

      • operator (one of the 'big 5', or other operators).

   o The passenger values determined in this way correlated extremely strongly with published journey volume statistics when aggregated at total LA level (but are superior to the published figures because they can be applied at the level of individual bus journeys).

   o The models used for sampling in Autumn 2015 are provided in Appendix two, along with an example of the passenger value (PV2) applied to bus services in one of the areas covered in this survey. These models will be updated in advance of the Autumn 2016 survey, based on new passenger counts undertaken during the Autumn 2015 fieldwork.

   o This passenger value, known as 'PV2' thus gives a good estimation of how busy each individual bus service is relative to all others. This is an enhancement compared to previous waves of the BPS, where a PV was assigned to each bus vehicle journey based on some assumptions (for example that longer journeys would carry more passengers). The new method bases

[1]Types of areas are PTEs, Unitary Authorities and Two-tier Authorities.

the PV2 on evidence about how passenger volumes vary and accounts for more journey variables, not just the duration of the bus route

- This knowledge is used in the next stage to enable systematic selection of a representative sample of vehicle journeys on which to recruit respondents.

3. The database is now sorted by route, day-part[2] (morning peak, afternoon peak, off-peak and weekend), journey start time and day of week. In practice, each row of the database (this is each journey) shows a cumulative passenger value (PV2). Probability proportional to size is now used to sample the required number of journeys; in other words the probability proportional to PV2. A sampling interval for the PSU is calculated which is the total Passenger Value divided by the number of fieldwork shifts required. For example a PSU with total of 30,000 Passenger Value units and 30 shifts required, would have a sampling interval every 1000 fraction of the total value. In practice to allow for some journeys being infeasible to cover (e.g. non-returning market day services), or if a need arises during fieldwork to add supplementary shifts through low return rates, a sample 'overage' is built into calculating the sampling interval. In Autumn 2015, this overage was 75 per cent of the required number of shifts. So in the example for the PSU requiring 30 shifts, in practice 53 journeys will be sampled, and the sampling interval will be 566.

4. The actual sample is struck by choosing a random start point between 0 and the row with the cumulative Passenger Value of the required sampling interval, and then selecting the service corresponding to every sampling interval gap down the list. So, from the example in the previous paragraph, the random start may be 326 with 53 shifts required and a sampling interval of 566, the selected services would be taken from the rows which contain cumulative passenger values of 892, 1458, 2024, and so on.

5. The result of step 4 is a list of bus vehicle journeys; these will form the basis of fieldwork shifts. In previous waves of the BPS, fieldworkers have boarded the bus selected during this process and made outward and return journeys from that point onwards, within a three hour period. In the independent consultant's review following the Autumn 2014 BPS, a concern was raised that this approach skewed the overall survey coverage towards later journeys in the day. This is because, for example, passenger journeys happening at 6am could only ever be picked up by fieldwork shifts arranged to start at 6am, whereas journeys starting at 8am could be picked up by shifts starting at 6am, 7am and 8am, and anywhere in between. Therefore in Autumn 2015, a step was added here to correct for this: A programme was written into the sampling database to find the same journey as the one selected, but starting 1.5 hours earlier, for all bus vehicle journeys selected. That is, a journey with the same start and end point, the same operator, the same overall duration, and on the same day of the week. Inevitably, bus timetables do not run with journeys exactly 1.5 hours apart, and so the identical journey which was nearest to 1.5 hours earlier was identified (and in some cases this was actually the same journey, if the original

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[2]Day-parts are weekday morning peak (06:00 – 08:59), weekday off-peak (before 06:00, 09:00 – 16:29, or after 18:59), weekday evening peak (16:30 – 18:59) and weekends.

selection was the first of the day or the first for some hours). This newly 'adjusted' journey then became the start point for the fieldworker's shift, meaning that, in practice, the originally selected start time became the mid-point of the shift. This means that the overall profile of fieldwork shifts matched the PV2 profile for each PSU, for different times of the day. As a result this also means we can expect to see more (and a better representation of) early morning journeys contributing to the survey results, and fewer journeys from the end of the day.

6. Finally, any journey which has a start time at or later than 19.30 is removed and manually replaced by the instance of that journey which starts closest to, but before, 19.00. For example if a journey is selected which starts at 19.56, and there is another instance of the same journey at 18:56, it will be replaced with the 18.56. This is in order to ensure that a three hour shift may be worked, while still finishing at a reasonable time for the fieldworker (no later than 10:30pm). Similarly, any journey which now has a start time before 6am (as a result of the adjustment in step five) is replaced by the instance of that journey starting at or closest to, but after, 6am.

    Note in very isolated circumstances, respondents are included in the final survey dataset who travelled after 10.30pm. These are usually when a fieldwork shift has been scheduled for late in the evening and there has also been some kind of delay on the buses covered during that shift meaning the fieldworker finished a little later than normal.

3.2   Sample review

Following the systematic selection of the routes, a further process is undertaken which checks the suitability of each route for a three-hour shift. The guideline is that a shift is feasible where two hours or more of a three hour shift can be spent on board a bus (rather than waiting at a stop which is non-productive time). Some park-and-ride services and all obvious school-bus routes are excluded during this process and replaced with a randomly selected alternative journey from the sampling 'overage' already provided.

In practice, the timing of bus services means that some fieldworker shifts may be a little shorter or longer than three hours. The general principle used in Autumn 2015 was that a bus journey could be selected and covered by a fieldworker shift if:

a) It would yield a shift of no less than two and a half hours total duration
b) It would yield a shift of no more than four hours total duration (although there were a small number of 4+ hour shifts, where this was necessary to ensure that a reasonable proportion of all routes in a PSU had opportunity to be covered)
c) At least around two hours could be spent on board a bus rather than waiting at a stop
d) At least one full outward and one full return trip could be made on the selected route.

In Autumn 2015, of the 3,241 bus services reviewed for suitability in a fieldworker shift, 2,545 were accepted as shifts at the outset of fieldwork, and 696 were 'rejected'. Bus services were 'rejected' for the following reasons:

a) No return journey available (271)
b) Too small proportion of shift to be spent on board a bus (123)
c) Journey and available returns cannot fill a 3-hour (or even a 2.5-hour) shift (63)
d) Shift would finish too late (after 10.30pm), and no suitable alternative journey start time available, as described in point 6 above (6)
e) Journey would be too long for a 3-hour (or even a 4-hour) shift (216)
f) Other (17).

For areas where more than 20 per cent of selected journeys would be 'rejected' for these reasons, some slight amendments were made to the bus journeys in order to make them feasible within a shift to improve the overall representation of journeys. For instance, there were some cases where, if a fieldworker stayed on a bus to the end of its journey, there would be no suitable return service to catch; but if they disembarked two or three stops early they would be able to catch a return service. In such cases the journey would be included in the survey and the fieldworker would be instructed to disembark a little before the end of the journey. This was the main reason for including a small number of shifts lasting 4+ hours.

The target was for at least 80 per cent of journeys reviewed for suitability as shifts to be accepted. Overall, following further amendments like this, across the survey 79 per cent of the journeys reviewed for suitability as shifts, were selected to be covered in Autumn 2015. This ranged from 70 per cent (in Devon) to 100 per cent (for Go Ahead's Oxford Buses Park and Ride PSU), and for almost half (23 out of 47) of the PSUs, at least 80 per cent of bus services were accepted as suitable. This is also an improvement on the 2014 survey, in which 75 per cent of the journeys which were reviewed were selected for shifts, with a range from 59 per cent (Northumberland) to 92 per cent (Oxford Buses Park and Ride).

In addition to the 2,545 shifts scheduled at the outset of the project, a further 220 were scheduled later on, to 'top up' the fieldwork if response was looking lower than needed to generate the required sample sizes. 'Top up' shifts were selected from within the 'overage' provided at initial sample selection stage.

4   Fieldwork

Fieldwork took place between 7 September and 30 November 2015. There was a pause within this to avoid the school half-term holidays and also to allow for a review of progress with the project. In most areas this was between 17 October and 1 November, although there were some variations if school half term holidays were at a different time (as in Scotland for example).

4.1   Distribution of questionnaires

Data collection method

Before working their first shift on the project all fieldworkers received a detailed briefing from BDRC via regional supervisors. Fieldworkers join the bus routes selected from the sampling process on the day and specified start time. They travel to the final destination of the route and make the first return trip possible on that route, returning to their start point. They repeat this process to make as many trips as possible within their three-hour shift. During this time fieldworkers are required to approach all passengers who board the bus and give them the opportunity to participate in the research.

In Autumn 2015, passengers were offered the choice to take a paper questionnaire, along with a post-paid envelope, or to complete the survey online. If they chose the latter, the fieldworker took their email address and a survey invite was emailed to them as soon after the shift as possible (in most cases this was within two days). The online option was offered in 2015 after previous pilot work showed it had the potential to improve participation from certain demographic groups (especially younger males) who are typically somewhat under-represented in this type of research. All those recruited were asked to complete their questionnaire after they had finished their journey.

In Autumn 2015 fieldworkers were issued with between 50 and 80 questionnaires for each shift, driven in part by the estimated number of passengers expected to be encountered during the whole shift (based on the PV2 calculated earlier), but capped with a minimum of 50 and a maximum of 80 (to ensure there would always be enough and to control the sheer weight of questionnaires for fieldworkers to manage).

In total, 110,786 paper questionnaires were distributed (an average of 40 per shift), and 12,998 email addresses were collected (an average of 5 per shift). In total therefore, 123,784 people were recruited to take part in the survey, an average of 45 per shift. This compares to 48 per shift in Autumn 2014 where only the paper questionnaire option was offered. It is unsurprising that, on average, a smaller number of people were recruited per shift since it takes a little longer to go through the recruitment process when recording email addresses.

Travelling on buses in practice

Fieldworkers are instructed that if they were at their original start-point and the three-hour shift was not complete, but there was insufficient time to make a complete outward and return journey, they should travel outwards for half the remaining time, and then get off the bus and return so that they were back at their start-point at the completion of the three hours.

Where a route crosses a Local Transport Authority boundary (if the PSU was a Local Transport Authority) the fieldworker treats the route as truncated to the portion within the PSU, in other words only passengers boarding within the PSU would be approached.

In advance of each shift, fieldworkers are instructed to double check the journey details they have been given (since, as described above, changes can be made to bus services between the sampling and fieldwork stages). This can sometimes result in changes to a shift; either:

- if the timetable has been altered, the fieldworker may need to start the journey at a different point or at a slightly different time, or
- if a service has been withdrawn it would be replaced with another from the 'overage' in the initial sample.

Further tasks performed during fieldwork

As described in the later section on weighting, fieldworkers are issued with an 'Observation Record Form' on which they record the observed age and gender details of all passengers who are on the bus at a given point in time. For Autumn 2015, this observation was conducted twice within a fieldworker shift: at the mid-point of the first outbound journey, and again at the mid-point of the last inbound journey. These details allow the creation of a representative passenger demographic profile to be used for weighting purposes. Fieldworkers are also issued with a 'Respondent Record Form' on which they record gender and estimated age of all recruits. This is used to enable standard quality control back-checks, as well as other validation measures on returned questionnaires.

In addition, during the Autumn 2015 fieldwork, a second fieldworker accompanied the first on a sample of all shifts, to count the total number of passengers boarding during one whole outbound and one whole inbound journey. This data will be used to update the models used to estimate passenger values for all bus journeys, for use in sampling for the Autumn 2016 survey.

4.2   Authorisation to work on buses

Regarding permission to conduct interviewing on the bus, Transport Focus provides a letter which the fieldworker can show the driver to vouch for the bona fides of the survey, and Transport Focus communicates to operators that the survey can take place during the intended period. In Autumn 2015 only a small number of shifts were disrupted by bus drivers refusing to allow fieldworkers to work.

4.3   Monitoring fieldwork

Throughout fieldwork, fieldworkers report the number of questionnaires they have handed out, and how many email addresses they have collected (in other words how many people they have recruited). This is reported by the next working day after each shift, and these metrics are monitored by the team at BDRC.

As questionnaires are returned to BDRC's head office, their barcodes are scanned to provide immediate extra confirmation that a fieldwork shift took place, and a number of data fields from the questionnaire are recorded manually to enable a first stage of validation checks to take place (see section 6.2). The same information from electronic surveys completed online is recorded automatically. The numbers of completed and validated questionnaires are matched with the reported recruitment figures, to allow the project team to monitor the overall productivity of the fieldwork. Several actions may be triggered by this information, including for example:

- If the sample sizes in certain areas are likely to fall below the target, additional 'top up' shifts can be scheduled using the sample overage
- If it is found that all of the available questionnaires are routinely given out in certain areas or on certain routes, this can be recorded and more questionnaires may be printed where relevant in future waves
- Steps may be taken to address lower productivity in certain fieldworkers if this is found to be the case.

BDRC carries out all fieldwork in accordance with the MRS Code of Conduct, the IQCS (Interviewer Quality Control Scheme) and ISO 20252. Exceeding normal industry standards, at least 10 per cent of all BPS shifts are subject to unannounced spot-checks by BDRC supervisors and other project team staff. The majority of shifts to be spot-checked are selected at random, but some are chosen specifically, to monitor new or less productive fieldworkers or areas more closely, and indeed to observe more productive fieldworkers in order to study and pass on best practise techniques. Random unannounced spot-checks are also made by Transport Focus staff.

5   Questionnaire

The paper questionnaire is an 8-page self-completion booklet that is handed out along with a reply-paid envelope to all passengers on the bus who are willing to take part. The online questionnaire is exactly the same in terms of question content and has small modifications in order to work appropriately depending on the type of device (desktop, smartphone, etc.) being used by the respondent.

The questionnaire has a core set of questions to provide consistent measurement of the components of journey experience. A copy of the standard version of the questionnaire is shown in Appendix one. Transport Focus allocates a space on the questionnaire (part 6) where participating local transport authorities or bus operators can replace the core questions with questions of their choosing.

6   Response rates, and validation of returns

6.1   Response rates achieved

The metric of fieldwork outcome is the product of hand out rates achieved and response rate achieved. The tables below show the metrics achieved from fieldwork across the Primary Sampling Units in this wave.

Fieldwork metrics: PTEs

PTEs *(and boosts)*	No. shifts	Recruits: paper	Responses: paper	Response rate: paper	Recruits: online	Responses: online	Response rate: online	Recruits: total	Responses: total*	Response rate: total	Average responses per shift (total)
Centro	191	9244	2955	32%	1254	244	19%	10498	3199	30%	16.7
Coventry VMA routes	55	2550	700	27%	408	107	26%	2958	807	27%	14.7
Mersey Main (with Halton)	120	5974	1693	28%	275	67	24%	6249	1760	28%	14.7
Mersey QP (with Halton)	34	1804	499	28%	105	11	10%	1909	510	27%	15.0
South Yorks	129	4831	1508	31%	599	151	25%	5430	1659	31%	12.9
TfGM	101	4732	1056	22%	734	140	19%	5466	1196	22%	11.8
Nexus	123	5901	1552	26%	765	243	32%	6666	1795	27%	14.6
West Yorks	118	6290	1541	24%	599	129	22%	6889	1670	24%	14.2
PTE total	**871**	**41326**	**11504**	**28%**	**4739**	**1092**	**23%**	**46065**	**12596**	**27%**	**14.5**

Fieldwork metrics: unitary authorities

Unitary authorities	No. shifts	Recruits: paper	Responses: paper	Response rate: paper	Recruits: online	Responses: online	Response rate: online	Recruits: total	Responses: total*	Response rate: total	Average responses per shift (total)
Blackpool	35	1421	419	29%	322	84	26%	1743	503	29%	14.4
Luton	37	1553	479	31%	159	26	16%	1712	505	29%	13.6
Milton Keynes	36	1496	500	33%	191	45	24%	1687	545	32%	15.1
North East Lincolnshire	30	1700	390	23%	121	30	25%	1821	420	23%	14.0
Tees Valley	165	6467	1842	28%	224	56	25%	6691	1898	28%	11.5
WEP	94	3697	1342	36%	720	195	27%	4417	1537	35%	16.4
York	33	1743	542	31%	118	17	14%	1861	559	30%	16.9
Unitaries total	**430**	**18077**	**5514**	**31%**	**1855**	**453**	**24%**	**19932**	**5967**	**30%**	**13.9**

Fieldwork metrics: two tier authorities

Two tier authorities *(and boosts)*	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
Devon	39	1645	803	49%	411	142	35%	2056	945	46%	24.2
East Sussex *(main)*	40	1577	837	53%	57	2	4%	1634	839	51%	21.0
East Sussex (*Hastings & Bexhill boost*)	15	617	209	34%	13	3	23%	630	212	34%	14.1
Essex	64	2453	758	31%	339	83	24%	2792	841	30%	13.1
Gloucestershire	60	2527	968	38%	272	70	26%	2799	1038	37%	17.3
Kent *(main)*	72	2607	956	37%	207	47	23%	2814	1003	36%	13.9
Kent *(non-major groups boost)*	32	667	369	55%	18	7	39%	685	376	55%	11.8
Lancashire	57	1517	615	41%	181	50	28%	1698	665	39%	11.7
Norfolk	95	2467	1056	43%	208	83	40%	2675	1139	43%	12.0
North Yorkshire	37	1410	513	36%	52	10	19%	1462	523	36%	14.1
Nottinghamshire *(main)*	87	2671	957	36%	235	53	23%	2906	1010	35%	11.6
Nottinghamshire *(non-main operators boost)*	26	732	299	41%	34	12	35%	766	311	41%	12.0
Oxfordshire	102	3306	1130	34%	775	247	32%	4081	1377	34%	13.5
Staffordshire	65	2136	751	35%	362	64	18%	2498	815	33%	12.5
Two tier total	**791**	**26332**	**10221**	**39%**	**3164**	**873**	**28%**	**29496**	**11094**	**38%**	**14.0**

Fieldwork metrics: operators (1)

Operators	No. shifts	Recruits: paper	Respon-ses: paper	Response rate: paper	Recruits: online	Respon-ses: online	Response rate: online	Recruits: total	Respon-ses: total*	Response rate: total	Average responses per shift (total)
Abellio Surrey	47	1325	528	40%	195	56	29%	1520	584	38%	12.4
First Buses Aberdeen	24	1116	567	51%	216	44	20%	1332	611	46%	25.5
First Buses Glasgow	43	2006	1462	73%	242	55	23%	2248	1517	67%	35.3
First Buses Scotland East	58	1836	1035	56%	223	65	29%	2059	1100	53%	19.0
First Potteries	57	2044	653	32%	264	62	23%	2308	715	31%	12.5
First South Coast	54	2443	828	34%	281	73	26%	2724	901	33%	16.7
GA - Anglian Bus	40	625	334	53%	63	26	41%	688	360	52%	9.0
GA - Bluestar	34	1527	368	24%	112	22	20%	1639	390	24%	11.5
GA - Brighton & Hove	51	2355	737	31%	190	30	16%	2545	767	30%	15.0
GA - Hedingham & Chambers	25	772	265	34%	58	9	16%	830	274	33%	11.0
GA - Konectbus	20	577	268	46%	107	35	33%	684	303	44%	15.2
GA - Metrobus	39	1719	534	31%	51	9	18%	1770	543	31%	13.9
GA - Oxford P&R	16	598	231	39%	150	59	39%	748	290	39%	18.1

Fieldwork metrics: operators (2)

Operators	No. shifts	Recruits: paper	Responses: paper	Response rate: paper	Recruits: online	Responses: online	Response rate: online	Recruits: total	Responses: total*	Response rate: total	Average responses per shift (total)
GA - Plymouth Citybus	32	1047	448	43%	255	85	33%	1302	533	41%	16.7
GA - Southern Vectis	22	823	318	39%	64	26	41%	887	344	39%	15.6
GA - Wilts & Dorset	32	1607	491	31%	86	13	15%	1693	504	30%	15.8
GA- Thames Travel	20	527	255	48%	161	53	33%	688	308	45%	15.4
Reading Buses	54	2127	799	38%	522	162	31%	2649	961	36%	17.8
Operator total	**668**	**25074**	**10121**	**40%**	**3240**	**884**	**27%**	**28314**	**11005**	**39%**	**16.5**

*Total number of responses shown is the total number received, before any further cleaning; a small number of responses are usually rejected during validation and analysis of the responses (see next section).

6.2 Validation of completed surveys

Completed questionnaires are subject to two stages of checks and validation; once before they are scanned electronically to pick up the tick-box responses (for paper questionnaires), and once afterwards.

The first stage takes place immediately after completed questionnaires are received. Each questionnaire has a unique ID number; for paper questionnaires this is scanned from a barcode on the front page. The answers to certain questions are then entered into a database – these are the date (top right on the paper questionnaire and time/date stamped on the electronic questionnaire), the route number of the bus (Q1, see questionnaire example in the Appendix) and the time they boarded the bus (Q2). These are checked against the original details of the fieldwork shift, to check that the passenger filled in the questionnaire about a verified journey (this also serves as a check that fieldwork has been carried out as intended). Questionnaires which do not tally with the expected journey details are investigated and may be rejected if they cannot be verified as corresponding to the correct fieldworker shift.

It is useful to carry out this stage of the validation immediately (rather than later on alongside other DP checks), because it enables more accurate monitoring of the real number of 'useable' responses which have been collected in each PSU.

At this stage, the answers to numeric questions are also recorded manually and/or checked. These are all about times (Q15, Q17, Q25 and Q26), and are recorded manually because sometimes respondents' handwriting is difficult to pick up via the electronic scanning data capture system, or passengers incorrectly record route numbers or times which use the 24-hour clock. Checks are built into the manual data entry system to avoid human error, such as a flag to alert the person if they have entered abnormally long time for waiting for the bus, etc. Also note that the answers to these questions are still scanned electronically, and a sample compared to the manually entered data, as a further check against human error at the data entry stage.

Validated paper questionnaires are then scanned electronically to record which answer boxes on the form have been ticked by respondents. At this stage, the data capture itself is 100 per cent validated, meaning that a person will check, for example, that the electronic process has picked up genuine ticks, rather than instances where a respondent may have ticked one response and then crossed it out in favour of another, or where a mark may have been made accidentally in a box.

Once all of the responses to the questionnaire are recorded in a database, other data cleaning can take place. This will include, for example, checks for multi-coded answers where a single-code was required, and responses to questions which the respondent should have routed around.

6.3 Data preparation and analysis

After the data is validated, coded and edited, an SPSS data file is provided to Transport Focus. Transport Focus also runs some checks on this file before it is ruled off as final, and then also produces a large number of reports and other outputs.

7 Weighting

7.1 Weighting by age, gender and day-part

The survey is designed to offset the effects of both non-response bias and non-participation bias based by age, gender and day-part.[3]

No known source of information exists to detail the demographic of journeys by age and gender consistently for each PSU; therefore this information is collected through the fieldwork. During the Autumn 2015 survey, fieldworkers broke from distributing questionnaires temporarily at points through their shift, to record the age (within 3 bands: 16-25, 26-59 and 60+) and gender of every passenger of the bus (from observation). As described earlier, this age and gender report was made at the mid-point of the first outbound journey, and again at the mid-point of the last inbound journey. The passenger age and gender profile is aggregated at the PSU level and compared to the profile given by the declared age and gender on the questionnaires returned for that PSU. Rim weights are then applied for each PSU for age and gender (which are not interlocked). In practice, a small proportion of respondents do not declare their age and / or gender in the questionnaire itself. Therefore the observed profiles are adjusted proportionately to allow for this. The alternative would be to exclude these respondents on account of the fact that they could not be given a weight, but this would mean a reduction in the overall sample size and the loss of passenger feedback which is otherwise entirely valid.

During the Autumn 2014 wave, a count was made of all passengers boarding throughout a whole leg of a bus journey, for a representative sample of all bus journeys covered in that survey. As described earlier in the section on sampling, this enabled the production of models to predict the number of passengers on board a bus. This therefore also provides a good estimate of the proportions of journeys being made in each day-part in each PSU. These proportions formed a further set of rim weights applied to each PSU.

This is a change from the 2014 survey, where factor weights were applied for eight interlocking age-gender cells (4 x age and 2 x gender). Following the independent review of the BPS, the day-part weight was added and the age-gender weights were simplified at the same time.

Note that for the purpose of weighting, where there are overlaps between a PSU for a local authority, and PSU(s) for operators or other boosts, local authorities were treated as "local authority excluding routes relevant to the operator/boost". For example for Norfolk, where the Autumn 2015 wave surveyed both Norfolk as a whole and separate samples for Go Ahead Anglian Buses and Go Ahead Konectbus, weights were applied to all responses for 'Norfolk excluding Anglian Buses and Konectbus', and separately for the two operators. Therefore responses from within the original 'main' Norfolk sample which were for Anglian Buses or

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[3]Day-parts are weekday morning peak (06:00 – 09:00), weekday off-peak (before 06:00, 09:01 – 16:29, or after 19:00), weekday evening peak (16:30 – 19:00) and weekends.

Konectbus, were weighted in the same way as all other responses for those respective operators.

The following tables show the observed age and gender profile of passengers from the fieldworker observation (adjusted for non-response to age and gender questions in the questionnaire itself), and the estimated day-parts generated by the PV2 models. These were therefore the target rim weights applied to each PSU.

Target rim weights

Target rim weights applied in PTE Areas

PTEs *(and boosts)*	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Centro *(ex. Cov VMA routes)*	45%	49%	6%	32%	42%	21%	6%	15%	53%	14%	17%
Coventry VMA routes	43%	53%	4%	33%	38%	26%	4%	15%	54%	14%	17%
Merseytravel (+ Halton) *(ex. QP routes)*	40%	52%	8%	23%	41%	31%	6%	15%	56%	14%	16%
Merseytravel (+ Halton) QP routes	43%	50%	8%	25%	44%	26%	5%	14%	56%	14%	17%
South Yorks	41%	54%	4%	27%	40%	31%	3%	15%	56%	14%	16%
TfGM	45%	49%	6%	36%	46%	13%	5%	15%	54%	15%	16%
West Yorks	43%	52%	4%	28%	44%	24%	4%	15%	56%	14%	16%
Tyne & Wear	43%	53%	4%	23%	43%	31%	4%	14%	57%	13%	16%

Target rim weights applied in Unitary Authority Areas

Unitary authorities	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Blackpool	44%	53%	3%	27%	29%	40%	3%	12%	61%	16%	11%
Luton	41%	55%	4%	27%	52%	17%	4%	14%	55%	18%	13%
Milton Keynes	47%	48%	5%	34%	48%	13%	4%	15%	56%	15%	14%
North East Lincolnshire	40%	57%	3%	22%	47%	27%	3%	13%	57%	17%	12%
Tees Valley	42%	54%	5%	24%	37%	35%	4%	12%	59%	14%	15%
WEP	41%	56%	3%	29%	43%	25%	4%	15%	55%	15%	15%
York	40%	57%	3%	27%	41%	29%	3%	15%	54%	17%	14%

Target rim weights applied in Two Tier Authority Areas

Two tier authorities *(and boosts)*	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Devon *(ex Plymouth Citybus)*	40%	56%	4%	26%	33%	37%	4%	15%	55%	15%	15%
East Sussex *(ex GA B&H, GA Metrobus, Stgc H&B routes)*	41%	55%	4%	0%	41%	55%	4%	15%	58%	15%	12%
East Sussex – Stagecoach H&B routes	41%	42%	17%	20%	37%	27%	16%	13%	58%	16%	13%
Essex *(ex. Hedingham & Chambers)*	39%	56%	5%	28%	35%	34%	4%	14%	56%	16%	14%
Gloucestershire	40%	56%	4%	26%	37%	34%	4%	17%	56%	15%	13%
Kent main *(ex Metrobus and ex non-major groups)*	37%	52%	11%	29%	32%	30%	9%	15%	58%	15%	12%
Kent boost *(non-major groups routes)*	38%	59%	4%	11%	34%	53%	2%	20%	61%	12%	8%
Lancashire	44%	52%	4%	29%	34%	33%	4%	13%	58%	17%	12%
Norfolk *(ex. Anglian Bus and Konectbus)*	41%	55%	3%	36%	28%	33%	2%	14%	57%	14%	16%
North Yorkshire	40%	55%	5%	16%	34%	46%	4%	11%	59%	18%	12%
Nottinghamshire *(major operators)*	40%	57%	3%	23%	42%	32%	3%	15%	57%	16%	12%
Nottinghamshire *(non-major operators)*	42%	54%	3%	14%	41%	42%	3%	11%	65%	11%	13%
Oxfordshire *(ex. Reading Buses, Thames Travel and Oxford P&R)*	43%	54%	3%	27%	50%	20%	3%	14%	56%	16%	14%
Staffordshire *(ex. First Potteries)*	42%	51%	8%	23%	35%	38%	4%	14%	59%	14%	13%

Target rim weights applied to Operator PSUs

Operators	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Abellio Surrey	38%	56%	6%	21%	40%	34%	5%	14%	55%	14%	17%
First Glasgow	43%	47%	11%	21%	44%	26%	10%	16%	54%	13%	17%
First Aberdeen	38%	56%	6%	30%	36%	29%	6%	16%	54%	15%	16%
First Scotland East	39%	53%	7%	21%	39%	32%	7%	15%	54%	16%	16%
First Potteries	44%	52%	4%	32%	34%	30%	3%	15%	56%	16%	14%
First South Coast	39%	59%	2%	32%	35%	32%	2%	15%	54%	14%	16%
GA - Brighton & Hove	39%	52%	9%	36%	33%	24%	6%	13%	57%	15%	15%
GA - Metrobus	46%	46%	8%	29%	43%	23%	5%	14%	56%	15%	14%
GA- Thames Travel	44%	50%	6%	25%	43%	28%	4%	15%	57%	15%	13%
GA - Oxford P&R	39%	56%	5%	17%	57%	23%	3%	12%	55%	18%	15%
GA - Konectbus	36%	60%	3%	30%	37%	32%	2%	16%	59%	13%	12%
GA - Anglian Bus	40%	55%	5%	19%	25%	53%	3%	16%	60%	12%	12%
GA - Hedingham & Chambers	39%	56%	5%	29%	21%	47%	3%	20%	55%	18%	7%
GA - Plymouth Citybus	45%	49%	6%	29%	37%	32%	2%	15%	56%	15%	14%
GA - Bluestar	39%	53%	8%	40%	37%	19%	4%	14%	57%	14%	15%
GA - Southern Vectis	43%	49%	8%	26%	27%	42%	4%	12%	57%	14%	17%
GA - Wilts & Dorset	43%	49%	8%	22%	36%	37%	4%	15%	58%	14%	13%
Reading Buses	37%	59%	3%	20%	49%	28%	3%	14%	53%	17%	15%

The average weights applied to respondents in each PSU, within each of the weight cells, are given in the tables below. Before settling on these final weights as shown (in other words the degree to which the final weighted profile matched the target profiles in the tables above), average weights for each of these cells were observed. For a small number of day-part within PSU cells, the average weight for all respondents in that cell was 4 or higher. In these cases, the cell was merged with the most similar other cell (e.g. a weekend cell would be merged with the weekday off-peak cell, a morning peak cell would be merged with an evening peak cell), and the weight for the combined cells applied. The aim was that no individual cell would have a weight of above 4, to control the overall level of manipulation on the data. In practice, after merging in this way, the average weight for respondents in one cell (morning peak for Go Ahead's Headingham and Chambers) was a little higher than four. This is a consequence of a relatively small sample size being collected in this cell for this relatively small operator, and was felt to be acceptable rather than to merge further cells and reduce the representativeness of the results in this cell.

Actual weights applied

Actual weights applied in PTE areas

PTEs *(and boosts)*	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Centro *(ex. Cov VMA routes)*	1.35	0.81	1.00	1.28	0.98	0.78	1.00	0.85	0.95	1.44	1.06
Coventry VMA routes	1.23	0.87	1.00	1.48	1.05	0.68	1.00	1.18	0.82	1.67	1.31
Merseytravel (+ Halton) *(ex. QP routes)*	1.17	0.90	1.00	1.42	1.20	0.70	1.00	1.51	0.88	1.18	1.05
Merseytravel (+ Halton) QP routes	1.23	0.86	1.00	1.52	1.17	0.64	1.00	1.47	0.81	1.31	1.45
South Yorks	1.31	0.85	1.00	1.83	1.18	0.63	1.00	1.52	0.79	1.96	1.29
TfGM	1.26	0.84	1.00	1.66	1.17	0.38	1.00	0.93	0.93	1.08	1.33
West Yorks	1.33	0.83	1.00	1.97	1.18	0.55	1.00	1.48	0.83	1.21	1.35
Tyne & Wear	1.31	0.84	1.00	2.24	1.13	0.64	1.00	1.26	0.94	1.59	0.81

Actual weights applied in unitary authorities

Unitary authorities	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Blackpool	1.25	0.86	1.00	2.62	0.94	0.73	1.00	3.34	0.83	1.04	1.51
Luton	1.38	0.83	1.00	1.27	1.44	0.44	1.00	1.13	0.88	1.21	1.27
Milton Keynes	1.33	0.80	1.00	1.78	1.20	0.36	1.00	0.84	0.99	1.22	1.03
North East Lincolnshire	1.52	0.81	1.01	1.67	1.32	0.57	1.00	2.63	0.70	2.37	2.01
Tees Valley	1.27	0.86	1.00	1.91	1.24	0.65	1.00	1.10	0.82	1.70	1.73
WEP	1.23	0.88	1.00	2.02	1.10	0.57	1.00	1.14	0.88	1.15	1.33
York	1.28	0.87	1.00	2.09	1.18	0.59	1.00	1.18	0.89	1.86	0.80

Actual weights applied in two tier authorities

Two tier authorities *(and boosts)*	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Devon *(ex Plymouth Citybus)*	1.27	0.87	1.00	1.44	1.20	0.73	1.00	2.33	0.76	1.09	1.92
East Sussex *(ex GA B&H, GA Metrobus, Stgc H&B routes)*	1.60	0.78	1.00	1.25	1.60	0.80	1.00	3.05	0.95	2.81	0.42
East Sussex – Stagecoach H&B routes	1.50	0.76	1.01	1.75	1.29	0.62	1.00	3.52	0.75	2.24	1.13
Essex *(ex. Hedingham & Chambers)*	1.22	0.89	1.00	2.44	1.10	0.63	1.11	1.40	0.85	1.14	1.39
Gloucestershire	1.22	0.88	1.00	1.82	1.29	0.63	1.00	3.64	0.77	1.22	1.23
Kent main *(ex Metrobus and ex non-major groups)*	1.43	0.82	1.00	2.30	1.05	0.63	1.00	1.60	0.83	1.92	0.95
Kent boost *(non-major groups routes)*	1.21	0.90	1.00	2.20	1.48	0.76	1.00	1.60	0.80	3.26	0.93
Lancashire	1.28	0.84	1.00	2.38	1.20	0.59	1.00	1.00	0.91	1.75	0.87
Norfolk *(ex. Anglian Bus and Konectbus)*	1.27	0.86	1.00	2.84	1.10	0.56	1.00	2.66	0.75	1.56	1.60
North Yorkshire	1.41	0.83	1.00	1.70	1.46	0.73	1.00	1.82	0.73	2.55	2.09
Nottinghamshire *(major operators)*	1.36	0.84	1.00	2.00	1.46	0.56	1.00	3.24	0.84	1.74	0.66
Nottinghamshire *(non-major operators)*	1.29	0.85	1.00	2.44	1.84	0.61	1.00	3.94	0.84	1.62	1.02
Oxfordshire *(ex. Reading Buses, Thames Travel and Oxford P&R)*	1.25	0.86	1.00	1.98	1.12	0.52	1.00	0.86	0.90	1.40	1.45
Staffordshire *(ex. First Potteries)*	1.29	0.84	1.03	1.76	1.21	0.70	1.01	1.04	0.90	2.26	0.88

Actual weights applied for operators

Operators	Male	Fe-male	No res-ponse	16-25	26-59	60+	No res-ponse	AM peak	Off-peak	PM peak	Week-end
Abellio Surrey	1.22	0.89	1.00	1.38	1.44	0.65	1.00	1.93	0.78	1.15	1.72
First Glasgow	1.17	0.88	1.00	1.12	0.87	1.19	1.00	1.34	0.98	0.84	0.95
First Aberdeen	1.14	0.93	1.00	1.06	0.98	0.97	1.00	2.30	0.75	2.21	1.06
First Scotland East	1.31	0.85	1.00	1.04	0.99	0.98	1.00	0.98	0.90	1.95	0.94
First Potteries	1.22	0.87	1.00	1.51	0.99	0.74	1.00	1.12	0.87	1.28	1.33
First South Coast	1.47	0.83	1.00	2.40	1.18	0.57	1.00	1.64	0.73	2.15	1.72
GA - Brighton & Hove	1.24	0.87	1.00	2.14	0.84	0.65	1.00	1.25	0.88	1.01	1.50
GA - Metrobus	1.32	0.81	0.93	3.04	1.17	0.46	1.00	1.70	0.92	0.91	1.05
GA- Thames Travel	1.19	0.88	1.00	1.32	1.31	0.63	1.00	1.04	0.80	1.80	2.05
GA - Oxford P&R	1.26	0.87	1.00	1.85	0.97	0.79	1.00	1.07	1.05	1.12	0.73
GA - Konectbus	1.48	0.84	0.99	2.54	1.17	0.58	1.00	0.96	0.99	1.19	0.61
GA - Anglian Bus	1.21	0.88	1.01	2.13	1.43	0.75	1.00	1.91	0.74	3.43	1.61
GA - Hedingham & Chambers	1.12	0.93	1.00	1.86	1.14	0.74	1.00	4.15	0.67	3.78	0.83
GA - Plymouth Citybus	1.27	0.84	1.00	1.45	0.92	0.85	1.00	1.89	0.85	0.83	1.67
GA - Bluestar	1.15	0.90	1.07	1.95	1.26	0.40	1.06	0.81	0.90	1.62	1.37
GA - Southern Vectis	1.41	0.80	1.00	3.01	1.24	0.65	1.00	2.57	0.89	0.96	1.04
GA - Wilts & Dorset	1.33	0.82	1.01	2.80	1.62	0.57	0.99	1.31	0.79	2.03	1.55
Reading Buses	1.19	0.91	1.00	1.25	1.20	0.70	1.00	1.57	0.92	0.74	1.53

The overall weighting efficiency after rim weights had been applied (and before the second stage of weighting described below) was 74 per cent. This ranged from 58 per cent for North East Lincolnshire to 88 per cent for the West Midlands.

7.2   Weighting to proportion Primary Sampling Units within total survey dataset

Weighting is also used to proportion each PSU to the number of passenger journeys it represents within the total set of areas surveyed. Journey numbers for each local authority are sourced from DfT Bus Statistics, and the unweighted sample size for each PSU is 'grossed up' to this number. This means that, with any analysis where results are aggregated, e.g. for a type of PSU (such as 'all PTEs'), the component PSUs within that aggregate make the appropriate contribution relative to each other.

While journey numbers for local authority areas are available from the DfT, journey numbers for Operator PSUs are derived: from the sample universe supplied by ITO world, it is possible to determine the proportion of all journeys served by an individual operator within the local authorities where it operates, and therefore to estimate the journey volumes for an operator, as a proportion of the journey volumes published at local authority level by the DfT.

For most Operator PSUs in the Autumn 2015 survey, that PSU was the only (or main) coverage of bus services in its area (e.g. the survey of Abellio in Surrey was the only coverage of the areas this operator serves). However, some Operator PSUs were effectively sample boosts on local authority PSUs which were also being surveyed – such as First Potteries as a boost on the Staffordshire survey. In these cases, the same process was used to estimate the annual journey volume weights for the operator, but the same volume was also *deducted* from the journey volume weights for the respective local authority. This was necessary to ensure that the total journey volume weight for these local authorities is still proportionate to other PSUs, e.g. that the total journey volume weight for Staffordshire (which is actually made up of the Staffordshire survey plus the First Potteries boost), matches the published figures for the number of journeys in Staffordshire. The same principles apply to other types of booster samples, in other words the boost of QP routes in the Merseytravel area and the boost of VMA routes in Coventry as part of the West Midlands area.

The following tables show the journey volume weightings applied to the PSUs selected within this wave's survey. Journey volumes are shown in thousands.

PTEs (and boosts)	Journeys ('000)*	Sample size (valid responses used in reported results)	Journey volume weight
Centro (ex. Cov VMA routes)	242,796	2,965	81.9
Coventry VMA routes	32,867	996	33.0
Merseytravel (+ Halton) (ex. QP routes)	97,645	1,446	67.5
Merseytravel (+ Halton) QP routes	31,043	808	38.4
South Yorks	108,388	1,655	65.5
TfGM	213,225	1,188	179.5
West Yorks	156,822	1,663	94.3
Tyne & Wear	120,116	1,778	67.6

Unitary authorities (and boosts)	Journeys ('000)*	Sample size (valid responses used in reported results)	Journey volume weight
Blackpool	11,057	487	22.7
Luton	7,948	501	15.9
Milton Keynes	9,676	538	18.0
North East Lincolnshire	7,701	418	18.4
Tees Valley	32,353	1,890	17.1
WEP	58,554	1,517	38.6
York	16,181	557	29.1

Two tier authorities (and boosts)	Journeys ('000)*	Sample size (valid responses used in reported results)	Journey volume weight
Devon (ex Plymouth Citybus)	28,270	937	30.2
East Sussex (ex GA B&H, GA Metrobus, Stgc H&B routes)	9,113	312	29.2
East Sussex – Stagecoach H&B routes	7,660	576	13.3
Essex (ex. Hedingham & Chambers)	43,602	822	53.0
Gloucestershire	20,123	1,034	19.5
Kent main (ex Metrobus and ex non-major groups)	52,146	968	53.9
Kent boost (non-major groups routes)	5,716	391	14.6
Lancashire	50,099	661	75.8
Norfolk (ex. Anglian Bus and Konectbus)	24,269	1,058	22.9
North Yorkshire	15,864	520	30.5
Nottinghamshire (major operators)	26,059	989	26.3
Nottinghamshire (non-major operators)	6,862	321	21.4
Oxfordshire (ex. Reading Buses, Thames Travel and Oxford P&R)	38,871	1,250	31.1
Staffordshire (ex. First Potteries)	15,043	554	27.2

Operators	Journeys ('000)*	Sample size (valid responses used in reported results)	Journey volume weight
Abellio Surrey	4,520	579	7.8
First Glasgow	104,000	1,507	69.0
First Aberdeen	18,500	608	30.4
First Scotland East	20,900	1,096	19.1
First Potteries	13,693	967	14.2
First South Coast	33,833	895	37.8
GA - Brighton & Hove	41,719	915	45.6
GA - Metrobus	13,843	537	25.8
GA- Thames Travel	6,572	357	18.4
GA - Oxford P&R	2,958	347	8.5
GA - Konectbus	3,670	344	10.7
GA - Anglian Bus	4,199	386	10.9
GA - Hedingham & Chambers	3,019	272	11.1
GA - Plymouth Citybus	17,436	527	33.1
GA - Bluestar	10,971	385	28.5
GA - Southern Vectis	8,081	342	23.6
GA - Wilts & Dorset	16,795	501	33.5
Reading Buses	20,850	956	21.8

*Source: table BUS0109a - Passenger journeys on local bus services by local authority1,2: England, from 2014/15.

7.3 Weighting total

The final weight is the multiplication of the two component weights as shown below:

Final weight = demographic x journey millions.

7.4 Survey accuracy

This research was designed to ensure robust sample sizes for analysis, at PSU level and in some cases among specific passenger groups within PSUs (e.g. commuters versus leisure travellers). As the survey is conducted with a sample of bus users in each PSU (as opposed to all of them), there could be some differences in results compared to a census of the whole population.

We can be 95 per cent certain that the actual figure (in the universe of all bus journeys) falls within a certain range of the survey figure. The percentages within the tables below represent the typical error variance, for a result of around 80 per cent (results nearer to 0 per cent or 100 per cent are statistically more accurate than results nearer to 50 per cent). This level of accuracy is for analysis run on the Autumn 2015 wave only; where possible, combining waves together for analysis will increase robustness and therefore accuracy.

Authority areas	Typical error variance on a result of around 80%
Blackpool	4.6
Devon	2.9
East Sussex	3.1
Essex	3.2
Gloucestershire	3.0
Kent	2.5
Lancashire	3.7
Luton	4.0
Mersey	1.8
Milton Keynes	3.9
Norfolk	3.0
North East Lincolnshire	5.0
North Yorkshire	4.3
Nottinghamshire	2.8
Oxfordshire	2.4
South Yorkshire	2.2
Staffordshire	3.0
Tees Valley	2.1
TfGM	2.6

Tyne & Wear	2.1
West England Partnership	2.3
West Midlands	1.3
West Yorkshire	2.2
York	3.9

Operators	Typical error variance on a result of around 80%
Anglian Bus (OA)	5.1
Bluestar (OA)	4.9
Brighton and Hove (OA)	3.3
Coventry VMA	2.7
East Sussex (Hasting & Bexhill boost)	4.2
First Aberdeen (OA)	3.6
First Glasgow (OA)	2.1
First Potteries (OA)	3.1
First Scotland East (OA)	2.5
First South Coast (OA)	3.5
Hedingham & Chambers (OA)	6.7
Kent (Non-major operator boost)	4.6
Konect Bus (OA)	5.6
Mersey (QP)	3.0
Metrobus (OA)	4.4
Nottinghamshire (Non-major operator boost)	5.6
Oxford P&R (OA)	5.0
Plymouth Citybus (OA)	3.8
Reading Buses (OA)	2.7
Southern Vectis (OA)	5.4
Thames Travel (OA)	5.0
Wilts & Dorset (OA)	4.6

8   Impact of changes to the survey method

8.1   Impact of changes to survey method on respondent profile

Before this Autumn 2015 wave of the BPS, only paper questionnaires were offered to passengers. It was known that younger people (especially males) were under-represented in this method. Linked to this imbalance in respondent profile, commuters and fare-paying passengers were also typically under-represented in favour of more leisure, off-peak travellers. Pilot and other work had indicated that moving to the dual paper/online method described earlier in this report could improve the response from these under-represented groups, thus improving the overall quality of the survey sample.

The tables below show the proportions of respondents in the final Autumn 2015 dataset who completed the survey on paper and online, and the profile of respondents in each method.

Method of survey completion	
Respondents completing survey on paper	92%
Respondents completing survey online	8%

Profile of respondents by method	Paper	Online
16-25	14%	34%
26-59	34%	49%
60+	48%	16%
Not stated	5%	2%

	Paper	Online
Male	32%	37%
Female	62%	61%
Not stated	6%	2%

	Paper	Online
Free pass holder	51%	17%
Fare payer	47%	83%
Not stated	2%	0%

	Paper	Online
Peak time journeys	21%	32%
Off-peak time journeys	79%	68%

	Paper	Online
Commuter	33%	57%
Non-commuter	62%	43%

This led to the overall unweighted respondent profile shown in the table below; this is shown alongside the final weighted profile to indicate the level of weighting which was still needed to achieve the final desirable respondent profile. The comparison from the Autumn 2014 survey is also shown for reference.

Overall sample profile	2015 unweighted	2015 weighted		2014 unweighted	2014 weighted
16-25	16%	28%		17%	27%
26-59	35%	41%		35%	41%
60+	45%	27%		43%	28%
Not stated	5%	5%		4%	4%
Male	32%	42%		34%	42%
Female	62%	52%		62%	54%
Not stated	6%	6%		5%	5%
Free pass holder	48%	32%		47%	34%
Fare payer	49%	65%		51%	63%
Not stated	2%	3%		2%	3%
Peak time journeys	26%	32%		21%	24%
Off-peak time journeys	74%	68%		79%	76%
Commuter	35%	46%		34%	43%
Non-commuter	61%	54%		62%	53%

While the online option appealed more to younger people, males, fare payers and peak time commuters, the relatively small contribution made by the online survey overall in 2015 (8 per cent) means that this did not have a very dramatic impact on the overall unweighted respondent profile, meaning that a similar level of weighting was needed to reach the desired profile as in 2014. The online option clearly has the potential to improve this, so continued efforts to encourage greater take-up of the online survey will be made (starting with the smaller Spring 2016 survey which will take place in the West Midlands only). More on this is given in section 8.3 later.

While greater take-up of the online option will be needed to have more of an impact on the level of weighting needed for age corrections, for example, the changes to the sampling and weighting to place more emphasis on early morning (especially morning peak) journeys *has* resulted in a much higher proportion of peak time journeys contributing to the overall sample.

8.2   Impact of changes to survey method on results

In addition to understanding how developments to the sampling, data collection and weighting in Autumn 2015 impacted on the sample profile, it is also important to understand any impact that this may have on the results. Intuitively, we might expect to see that younger people, fare payers and / or those travelling at peak times might be less satisfied with bus journeys than those travelling in quieter times and with free or subsidised tickets. There is also a potential for the data collection method itself to impact on how positive or negative someone is in their answers.

Indeed when comparing the results in 2014 and 2015 for those local authority areas which were covered in both years, there are some decreases in passenger satisfaction. For example, the average level of satisfaction with the journey overall for PTEs[4] in 2014 was 87 per cent; in 2015 it was 86 per cent. Other key measures also see a drop of one or two percentage points from one year to the next. It is therefore worthwhile to check whether these results are 'real' or influenced by the change in survey method.

The table below shows how un-weighted results compare for some key measures in the survey for paper versus online respondents in Autumn 2015.

	Paper	**Online**
Overall journey satisfaction	87%	79%
Value for money rating (fare payers only)	64%	57%
Satisfaction with on-bus journey time	85%	78%
Satisfaction with punctuality	76%	65%
Overall rating of bus stop	80%	73%

This table shows that online respondents do appear to be more negative than those who completed the survey on paper.

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[4]This year on year comparison is made for PTEs only since these were all included in both years' surveys and therefore enable a fair comparison, and since, given their size, represent a large proportion of the overall survey in each year.

The next table shows a further breakdown by age and time of travel, the latter being the main variable to have been influenced by the changes brought in the Autumn 2015 survey. This therefore shows whether the more negative response among online respondents is simply due to their different profile compared to paper respondents, or whether the method itself really does have an impact.

	16-25		26-59		60+		Peak		Off-peak	
	Paper	*Online*	*Paper*	*Online*	*Paper*	*Online*	*Paper*	*Online*	*Paper*	*Online*
Overall journey satisfaction	80%	73%	87%	85%	94%	94%	83%	75%	89%	82%
Value for money rating (fare payers only)	57%	52%	69%	63%	76%	77%	63%	55%	66%	59%
Satisfaction with on-bus journey time	76%	73%	85%	82%	93%	92%	79%	73%	88%	81%
Satisfaction with punctuality	69%	57%	76%	70%	84%	85%	70%	61%	79%	67%
Overall rating of bus stop	76%	69%	80%	77%	85%	86%	72%	71%	82%	74%

There are two important conclusions which can be drawn from this analysis:
- People who complete the survey online do appear to respond more negatively, even when controlling for other factors such as their tendency to be younger (in fact, the younger a respondent is, the stronger this effect appears to be[5])
- Peak time travelers do also respond more negatively than off-peak travelers.

Taking this one step further, we have investigated what the impact would have been if *all* of the survey responses were made with paper questionnaires, and online had not been an option. The full dataset from Autumn 2015 has been re-run to exclude all online responses, and has been re-weighted to correct for this. Thus the 'paper only' results are a direct equivalent of the actual published results in terms of the age, gender and day-part profile of

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[5]We have looked in further detail at the differences between online and paper respondents within the 16-25 year old group, since the greatest impact of the online method is present there. The online respondents within this group do appear to have slightly different lifestyles to those in the same age group responding on paper: the online 16-25 year olds are significantly more likely to be students (and therefore travelling to/from education when they make their bus journey) rather than in work, and significantly less likely to be using the bus out of choice, stating more often than paper respondents that they had no other mode of transport available for the journey and / or that it is difficult for them to access private transport in general. The latter is very likely to be a reason for lower satisfaction with bus journeys. Note that these lifestyle differences are not simply connected to age; in fact within the total 16-25 age bracket, online and paper respondents have fairly similar age profiles – 39 per cent of the online respondents are at the lower end of this range, 16-18, compared to 37 per cent of the paper respondents (not a statistically significant difference).

the sample, and the main distinguishing factor between them is the presence or absence of an online contribution. The table below shows some key results[6]:

	As published *(using both online and paper surveys)*	Paper surveys only
Overall journey satisfaction	86%	86%
Value for money rating (fare payers only)	65%	66%
Satisfaction with on-bus journey time	84%	84%
Satisfaction with punctuality	74%	75%

This analysis further confirms that, although very minimal, the results for the Autumn 2015 BPS could have been very slightly more positive if the online option had not been available and all respondents had taken part with paper questionnaires. Only some key measures are shown here, but analysis of all ratings measures continues this trend, with typically one percentage point difference between paper-only and the published results, and always the slightly higher result in the paper-only data set.

As a final confirmation of this effect, we have conducted 'key driver' analysis to help determine whether or not there is a relationship between the method of survey completion and how positive or negative a respondent is. This analysis has also previously been conducted for the Tram Passenger Survey. The results from the analysis are below, and show the influence of data collection method compared to some other variables.

Variable	F	Sig
Age	307.725	.000
Data collection method	70.206	.000
Gender	29.367	.000
Local Transport Authority area	8.191	.000

Where Sig is less than 0.05, this variable has a significant relationship with overall journey satisfaction; in other words all of the variables in this table have an impact on how people

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[6]These example results are for PTEs only. This year on year comparison is made for PTEs only since these were all included in both years' surveys and therefore enable a fair comparison, and since, given their size, represent a large proportion of the overall survey in each year.

answer the question – including the data collection method. The 'F' value is an indication of how influential each of these variables is, relative to each other.

Therefore, consistent with the other findings so far above, the data collection method is linked to whether a respondent is likely be more positive or more negative. This effect is, however, weaker than the impact of age in particular. This is also consistent with the findings from the same analysis for TPS.

We can conclude that the changes in the BPS methodology in Autumn 2015 (to introduce an online element) will have generated slightly lower satisfaction scores on average than in previous years. That said, the contribution of online surveys was very small in this wave so the effect of the data collection change is quite minimal overall.

The bigger impact in this wave comes from the steps to include more peak time journeys in the sample – although in fact we can also see that the slight drop in satisfaction overall would have happened anyway. This is shown in the table below, where results among peak-time travellers are given for 2014 and 2015. There was a drop in satisfaction among this group specifically, indicating that there was a real drop in satisfaction, even if this may have been exaggerated slightly by the higher proportion of peak travellers in the sample, and the introduction of the online completion option:

	2014 peak travellers[7]	2015 peak travellers
Overall journey satisfaction	83%	81%
Value for money rating (fare payers only)	64%	63%
Satisfaction with on-bus journey time	78%	77%
Satisfaction with punctuality	70%	67%

While these method changes are likely to have had potential to affect satisfaction ratings this wave – and, if more respondents take part online in the future (as is the intention), the effect of the data collection method could also grow - it is felt that overall the changes are a constructive move for the longer term since they make the survey more inclusive and a better representation of real passenger journeys.

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[7]Again, results are shown for PTEs only.

8.3   Increasing the contribution of online surveys

As concluded above, while the move to a dual data collection method has had only a very minimal impact on Autumn 2015 survey, the intention is to retain this methodology for the BPS for future waves. This is because of the potential advantages provided by offering passengers the choice between paper and online questionnaires, if the contribution of online surveys can be increased. These advantages include:

- Improving weighting efficiency and therefore data integrity by increasing the proportion of younger, male, peak time commuters who take part; this means that the survey provides better representation of the passengers making bus journeys.
- Increased control over respondents' 'compliance' with the requirements of the questionnaire, for instance completing all of the questions rather than leaving some unanswered, and using required formats such as the 24 hour clock for questions about the time of travel; these lead to faster processing and better quality data.
- Increasing the inclusiveness of the survey by making it easier for people with some disabilities to take part. In a separate exercise, Transport Focus and BDRC Continental have created a version of the questionnaire for the NRPS which is more accessible for people with some types of visual impairments, or learning and social disabilities; the response to this has been positive and has also highlighted the degree to which electronic questionnaires, particularly when conducted on touch devices like smartphones or tablets, are easier for these respondents. The existing electronic questionnaire for the BPS already offers some of these advantages and it would be straightforward to enhance it further with greater accessibility in mind specifically.

In order to more fully realise these potential advantages of the dual data collection method, the ambition must be to achieve a greater contribution from online surveys in future waves.

To some degree, this may come naturally: other research conducted by BDRC Continental[8] indicates that the efficiency of the process for collecting email addresses and sending out email invites to respondents improves quickly over time as fieldwork staff become more familiar with the process. It is therefore expected that, in 2016, fieldworkers will simply conduct this process more effectively.

However there are also some learnings to be taken from this Autumn 2015 wave; these are:

- Small changes to the questionnaire to reduce 'drop-out' once respondents begin the survey
- Reducing the time between recruitment (when a passenger is approached on board a bus and provides their email address) and survey access (when that passenger actually receives an email invite with a link to the survey), to increase likelihood of response.

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[8]For instance, a visitor profiling survey carried out on behalf of High Speed 1 at St Pancras International station.

These are described further through this section.

Reducing drop out

The following graph shows the proportion of all those who began the online survey, who are still answering at a number of key questions. This shows that 22% of all 'starters' are lost by the time they reach the first question where they are asked to confirm the date when they were approached[9]. A further 38% drop out when they reach Q3 which asks about their ticket type (see questionnaire in Appendix). The satisfaction rating questions also see a degree of drop out.
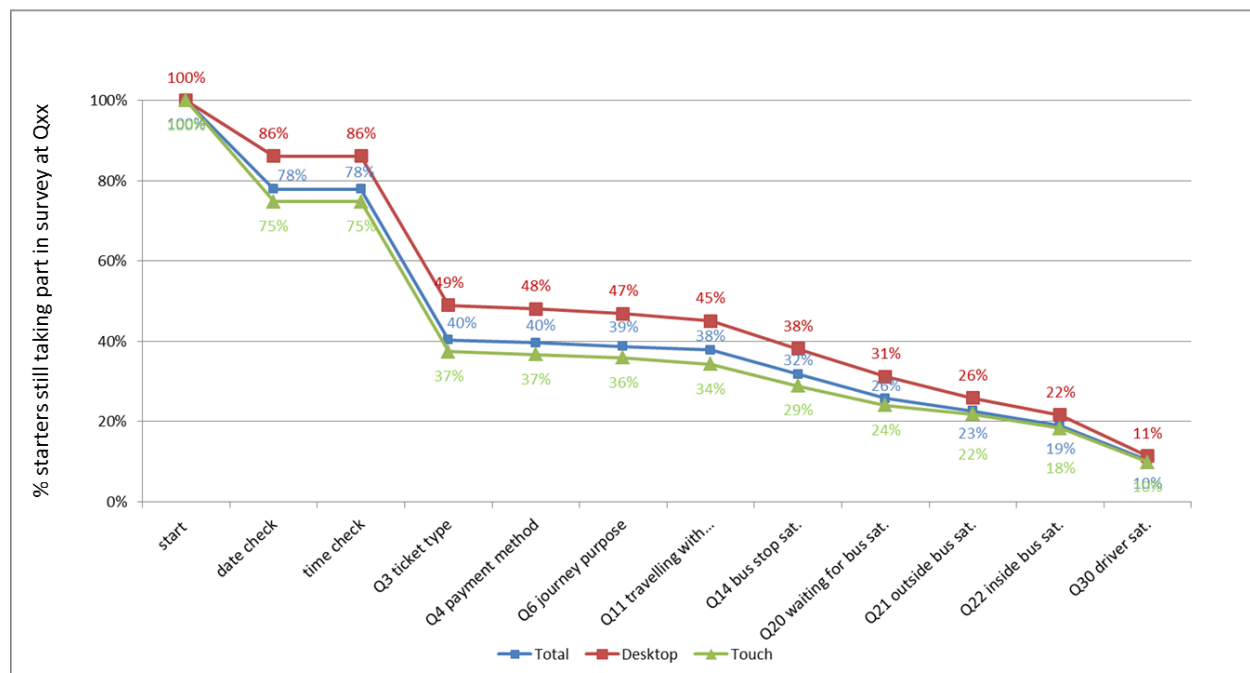
These patterns are not dissimilar to those seen in the pilot for this method, nor to the online questionnaire used for the Tram Passenger Survey. As such, some work has already been done to improve the presentation of questions and their ease of answering, and to some extent there would always be some expected level of drop-out. However some further improvements are likely to be possible; these will include:

- Further shortening, if possible, the introductory text at the very beginning of the survey, especially for those completing it on a smartphone since this is where the drop out is more dramatic.
- Tightening the date and time verification questions, by presenting as many respondents as possible with the exact date and time they were recruited rather than

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[9]The questionnaire shown in the Appendix is an example of the paper version. This does not include a question on the date of the passenger's journey, because this information can be confirmed by the fieldworker at the point of recruitment (they write the date in the top right hand corner of the questionnaire). The question about the date of the journey is included on the online questionnaire only. The survey programme gives the date the respondent is expected to have been recruited (from sample information), but the respondent is asked to verify and amend this, in case of last-minute changes to fieldwork which, in isolated cases, may not have been accounted for in the survey programme by the time of completion.

the time range in which the fieldwork shift took place; this will be possible for all respondents who provided their email address via an app in a fieldworker's tablet computer, rather than via a paper form.

- Streamlining the ticket type question into fewer response options, to reduce the amount a respondent has to read at this early question. If this question is still found to cause problems for respondents, it could also be moved further back in the questionnaire (since qualitative feedback about the questionnaire indicates that by the time respondents are further through the questions, they are more committed and more inclined to continue). Since this is a purely factual question there would be little issue with moving its placement, in terms of order-effect in the questions.

- Further upgrade of the overall look and feel of the electronic survey, especially when rendered for smartphones and tablets (while this was the case for the Autumn 2015 wave, a different software package will be used for Autumn 2016; this includes a more attractive presentation of the satisfaction ratings questions).

- As part of this overall upgrade to the look and feel, a further general review of the questions presentation will take place, informed by qualitative review work which has taken place on the rail passenger satisfaction survey alongside the Spring 2016 NRPS. This qualitative review for the NRPS included interviews with respondents to, and drop-outs from, an online version of the questionnaire which was being piloted. This provides further learning to aid improvement of the BPS questionnaire, and may be boosted with further similar qualitative interviews about the BPS questionnaire itself, alongside the Autumn 2016 wave.

Increasing response rate

The following graph shows the proportion of all recruits who go on to fully complete the survey, by the length of time between recruitment and receiving the email invite. It shows that, of respondents who receive the actual survey invite on the same day as they were first approached by the fieldworker, 33 per cent went on to complete the survey. Of respondents who received their survey invite the day after they were first approached, 27 per cent completed it, and so on. Clearly, the sooner a respondent receives the survey invite, the more likely they are to complete it (although this does appear to flatten after some time).
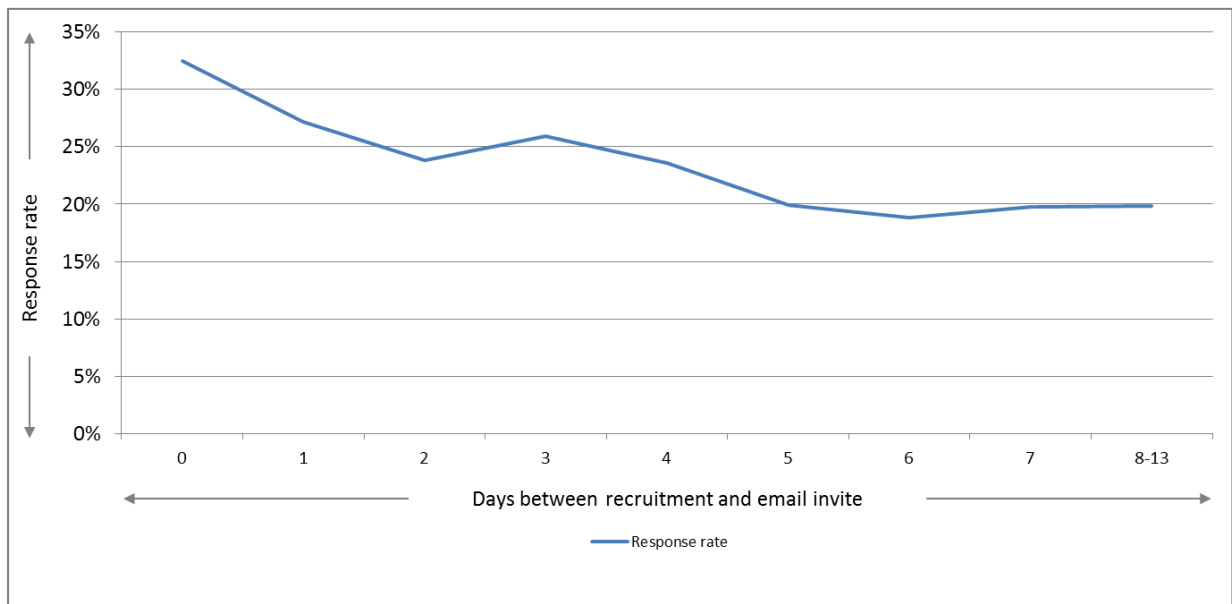
Other analysis has shown that there is no determinable pattern in the way a passenger responds, as related to this gap between recruitment and actually receiving the invite. That is, people with a larger gap are no more positive nor negative in their responses, and no more or less likely to answer 'don't know' to the questions (as might be expected if their recall of the journey diminishes over time). However, intuitively, it might be assumed that the quality and accuracy of respondents' answers must be better the sooner after their journey they complete the survey. The impact on response rate is a strong reason to find ways to reduce the gap between recruitment and survey invite, but the possible impact on data quality is another.

The following graph shows what proportion of all recruited passengers experienced different gaps between recruitment and receiving their survey invite by email, in Autumn 2015.

This shows that, for example, 25 per cent of all recruits received their survey invite two days after they were first approached. Most of these were people who supplied their email address via a fieldworker's tablet computer. A small proportion (25 per cent) of fieldworkers were not able to be supplied with tablet computers in the Autumn 2015 wave, and instead collected passengers' email addresses on paper forms. For respondents providing their email addresses via paper forms, the time between recruitment and receiving the survey invite was longer, simply because those paper forms needed to be posted back to the agency head office for processing. The mean average time delay between recruitment and receiving a survey invite was 3.1 days where respondents' email addresses were collected electronically via tablets and 5.2 days where they were collected via paper forms. This indicates that:

- It will be productive for as many fieldworkers to be supplied with tablets as possible (the reason that not all were in the Autumn 2015 wave was partly due to timings – some fieldwork shifts are arranged or rearranged at short notice – and partly due to fieldworkers' proficiency with using the equipment. The latter can be improved over time with training).

- There is scope to reduce the time delay even when fieldworkers are using tablets. This can partly be achieved by more reminders to fieldworkers to upload the data they have collected as soon as they have a Wi-Fi or data connection (this is likely to account for some of the delays, even though there will always be some instances where such a connection is not available for some time). Transport Focus and BDRC Continental will also investigate the cost and feasibility of triggering survey invites to be emailed automatically when a Wi-Fi or data connection is available, so that email addresses are uploaded and contacted immediately when a connection is made. This means that more respondents will receive their survey invite on the day of recruitment, and many may in fact receive it whilst still on the bus.

9   Other analysis: key drivers of satisfaction

The 'Key Driver Analysis' looks at the relationship between overall journey satisfaction, and the 30 individual satisfaction measures which are covered in the survey (7 at the bus stop, waiting & punctuality; 4 on the bus's arrival; 8 whilst on bus; 7 bus driver; and value for money). This analysis was conducted on fare payers only so value for money could be included.

The analysis used for BPS uses Multiple Linear Regression, and is performed in two stages. First, the drivers of satisfaction are identified. Satisfied passengers are defined as those who are either very/fairly satisfied with their journey. Dissatisfied customers are classified as those saying either very/fairly dissatisfied or those saying neither/nor (thus this latter group are perhaps more accurately described as 'not satisfied'). The regression takes into account all five points of the satisfaction scale, and is run using scalar driver variables (sometimes called independent variables) – this means that moving any one point up the 5 point scale is assumed to have the same impact.

Once the drivers of satisfaction have been determined, the non-satisfied (dissatisfied and 'not satisfied' respondents) were removed, and a new regression analysis run to determine which factors drive passengers to be very satisfied (rather than fairly satisfied), again using scalar driver variables.

The two parts of the analysis therefore indicate, firstly, which service aspects should be improved in order to provide an adequate overall journey experience (in other words one which is at least satisfactory) and secondly, which service aspects should be improved in order to provide a genuinely good experience.

For Autumn 2015, the key driver analysis typically explains around two fifths of the variance in overall journey satisfaction, with a small amount of variation for individual PSUs. (The R^2 value is, on average, 0.40 for the drivers of satisfaction and 0.39 on average for the drivers of very satisfied).

Appendix 1: Core questionnaire used in BPS Autumn 2015

transportfocus

☐☐☐☐ 1 5
DATE (DD/MM/YY)
Sep-Nov 2015

Bus Passenger Survey

Thank you for agreeing to take part in our survey.

Transport Focus is the official, independent consumer watchdog that represents rail, bus, and tram passengers.

To help us represent the views of passengers in your area we would appreciate a little of your time to complete this survey. It asks about the bus journey you made when given this questionnaire.

Bus companies, local authorities and governments pay close attention to the survey's results. These results provide Transport Focus with the evidence to seek improvements on behalf of passengers.

Completing the questionnaire

Please fill in the questionnaire after completing your journey.

Please tick only one box per question, unless directed otherwise.

Return it to us in the reply paid envelope provided.

WHEN ANSWERING:
CONSIDER ONLY THE JOURNEY YOU MADE WHEN GIVEN THIS QUESTIONNAIRE

1   About your journey

Q1   Please enter the route number or letter of the bus you boarded

☐☐☐☐

Q2   Please fill in the time that you boarded the bus:
Use the 24 hr. clock e.g. 5.25pm is 17:25

☐☐ : ☐☐

Q3   What type of ticket did you use for that journey?

A free pass or free journey
Elderly person's pass………………………☐
Disabled person's pass……………………☐
Complimentary/free ticket…………………☐

A day pass - valid for
That bus company only………………………☐
Across bus companies………………………☐
Buses and other modes of transport………☐

Single/return/multi tickets
Standard single ticket………………………☐
Standard return ticket………………………☐
A deduction from a multi-ticket/carnet……☐
Reduced single/return ticket………………☐

A pass/season ticket for a longer period (e.g. weekly, monthly) - valid for
That bus company only………………………☐
Across bus companies………………………☐
Buses and other modes of transport………☐

Other……………………………………………………………………………………………☐

1

Q4   On boarding the bus, did you?

Use cash to buy a ticket or pass……………………………………………☐
Use a contactless credit or debit card to buy a ticket or pass………….☐
Show the driver a paper ticket or pass………………………………………☐
Place your smartcard onto the fare machine………………………………☐
Show the driver a ticket displayed on your smart phone…………………☐

Q5   If you bought your ticket or pass <u>before</u> getting on the bus, how did you do this?

From the driver before that day………………………………………………☐
Direct from the bus company (including web, mobile app, phone)………☐
From a travel centre/bus stn/booking office………………………………☐
From a local shop or post office………………………………………………☐
Arrangement through work/college…………………………………………☐
Other…………………………………………………………………………………☐

Did not buy your ticket before boarding the bus……………………………☐

Q6   What was the main purpose of your bus journey?

Travelling to/from work…………………………………………………………☐
Travelling to/from education (e.g. college, school)………………………☐
Shopping trip………………………………………………………………………☐
Visiting friends or relatives……………………………………………………☐
Leisure trip (e.g. day out)………………………………………………………☐
Other…………………………………………………………………………………☐

Q7   What was the main reason you chose to take the bus for that journey?

Cheaper than the car……………………☐   More convenient than other transport……☐
More convenient than car (e.g. parking)….☐   Preferred bus to walking/cycling………….☐
Cheaper than other transport……………☐   Other reason…………………………………☐

Didn't have the option of travelling by another means……………………………………☐

Q8   Did you use any other form of transport as part of your journey?
(Please do not count walking as a form of transport)

Yes………………………………………………☐
No………………………………………………☐

Q9   What was the weather like when you made your journey, was it?

Dry………………………………………☐   Heavy rain………………………………………☐
Light rain………………………………☐   Snow………………………………………………☐

Q10 Please tell us whether your bus journey was …

On a single-decker bus……………………☐
Downstairs on a double-decker bus………☐
Upstairs on a double-decker bus…………☐

Q11 Were you travelling with …
(Please tick all that apply)

Children in a buggy or pushchair…………☐   Lots of bags or luggage……………………☐
Children who were walking…………………☐   A wheelchair…………………………………☐

2

2   About the bus stop where you boarded the bus

Q12 Which of the following were provided at the stop where you caught the bus?
(Please tick all that apply)

A shelter…………………………………☐   Information on types of tickets available….☐
Seating……………………………………☐   A route map……………………………………☐
Electronic display showing bus arrival times.☐   Lighting…………………………………………☐
A timetable………………………………☐   A mobile text code for bus arrival times…..☐
Information on fares……………………☐

Q13 Thinking about the bus stop itself, how satisfied were you with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Its distance from your journey start e.g. home/shops.	☐	☐	☐	☐	☐	☐
The convenience/accessibility of its location within that road/street.	☐	☐	☐	☐	☐	☐
Its general condition/standard of maintenance.	☐	☐	☐	☐	☐	☐
Its freedom from graffiti/vandalism.	☐	☐	☐	☐	☐	☐
Its freedom from litter.	☐	☐	☐	☐	☐	☐
The information provided at the bus stop.	☐	☐	☐	☐	☐	☐
Your personal safety whilst at the bus stop.	☐	☐	☐	☐	☐	☐

Q14 Overall, how satisfied were you with the bus stop?

Very satisfied……………………………………☐
Fairly satisfied…………………………………☐
Neither satisfied nor dissatisfied……………☐
Fairly dissatisfied………………………………☐
Very dissatisfied…………………………………☐

Don't know/no opinion…………………………☐

3   Waiting for the bus

Q15 How long did you wait for your bus?
(Please write the time in minutes)   ☐☐

Q16 Did you check any of the following to find out when the bus was meant to arrive?
(Please tick all that apply)

	Before you left for the bus stop	At the bus stop
Paper timetable………………………………………………	☐	☐
Online timetable………………………………………………	☐	☐
Live bus locator/timings (e.g. via mobile app/web)……………	☐	☐
Disruption updates (e.g. on Twitter/Facebook)………………	☐	☐
Electronic display at the bus stop…………………………….		☐
Other……………………………………………………………	☐	☐

If you did not check before leaving, or at the bus stop, why was this?

Knew service was frequent…………………☐   Didn't have time……………………………☐
Already knew arrival times…………………☐   Other……………………………………………☐
Could not find the information………………☐

Q17 **How long did you expect to wait for your bus?**
(Please write the time in minutes)

Q18 **Thinking about the time you waited for the bus, was it …?**

Much longer than you expected……………☐
A little longer than you expected……………☐
About the length of time you expected……☐
A little less than you expected………………☐
Much less than you expected………………☐

Q19 **Were you able to board the first bus you wanted to travel on?**

Yes…………………………………………☐
No…………………………………………☐

Q20 **How satisfied were you with each of the following?**

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The length of time you had to wait for the bus…………	☐	☐	☐	☐	☐	☐
The punctuality of the bus…………………………………	☐	☐	☐	☐	☐	☐

4   On the bus

Q21 **Thinking about when the bus arrived, please indicate how satisfied you were with the following?**

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
Route/destination information on the outside of the bus…	☐	☐	☐	☐	☐	☐
The cleanliness & condition of the outside of the bus……	☐	☐	☐	☐	☐	☐
The ease of getting onto and off of the bus………………	☐	☐	☐	☐	☐	☐
The length of time it took to board the bus………………	☐	☐	☐	☐	☐	☐

Q22 **Thinking about whilst you were on the bus, please indicate how satisfied you were with the following?**

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
The cleanliness and condition of the inside of the bus…	☐	☐	☐	☐	☐	☐
The information provided inside the bus…………………	☐	☐	☐	☐	☐	☐
The availability of seating or space to stand……………	☐	☐	☐	☐	☐	☐
The comfort of the seats…………………………………	☐	☐	☐	☐	☐	☐
The amount of personal space you had around you……	☐	☐	☐	☐	☐	☐
Provision of grab rails to stand/move within the bus……	☐	☐	☐	☐	☐	☐
The temperature inside the bus…………………………	☐	☐	☐	☐	☐	☐
Your personal security whilst on the bus………………	☐	☐	☐	☐	☐	☐

4

Q23 Did you get a seat on the bus?

Yes - for all of the journey.........................☐	No - but you were happy to stand...............☐
Yes - for part of the journey......................☐	No - but you would have liked a seat..........☐

Q24 Did other passengers' behaviour give you cause to worry or make you feel uncomfortable during your journey?

Yes.................☐   No...................☐

If yes: **Which of the following were the reason(s) for this?** *(Please tick all that apply)*

Passengers drinking/under influence of alcohol....☐	Music being played loudly...................☐
Passengers taking/under influence of drugs........☐	Smoking..☐
Abusive or threatening behaviour.........................☐	Graffiti or vandalism..........................☐
Rowdy behaviour...☐	Other...☐
Feet on seats...☐	

Q25 How long was your journey on the bus?
(Please write the time in minutes)

Q26 How long did you expect your journey on the bus to take?
(Please write the time in minutes)

Q27 How satisfied were you with the length of time your journey on the bus took?

Very satisfied..☐
Fairly satisfied.......................................☐
Neither satisfied nor dissatisfied..............☐
Fairly dissatisfied..................................☐
Very dissatisfied....................................☐
Don't know/no opinion............................☐

Q28 Thinking about your time you spent on the bus, which one of the following statements do you most agree with?

I made very worthwhile use of my time..............☐
I made some use of my time..........................☐
My time spent on the bus was wasted time.........☐

Q29 Was the length of time your journey took affected by any of the following?
(Please tick all that apply)

Congestion/traffic jams...................☐	Poor weather conditions......................................☐
Road works....................................☐	The bus waiting too long at stops.........................☐
Bus driver driving too slowly.............☐	Time it took passengers to board/pay for tickets....☐

Q30 Were any of these items of information present on the bus?

	Yes	No	Don't know
A map of the bus route/journey times..	☐	☐	☐
Audio announcements e.g. saying the next bus stop........................	☐	☐	☐
An electronic display e.g. showing the next bus stop......................	☐	☐	☐
Information about tickets/fares..	☐	☐	☐
A timetable...	☐	☐	☐
Details of how to make a complaint, if you had one........................	☐	☐	☐

5

Q31 Thinking about the driver, please indicate how satisfied you were with the following?

	Very satisfied	Fairly satisfied	Neither satisfied nor dissatisfied	Fairly dissatisfied	Very dissatisfied	Don't know/no opinion
How near to the kerb/stop the bus stopped	☐	☐	☐	☐	☐	☐
The driver's appearance	☐	☐	☐	☐	☐	☐
The greeting/welcome you got from the driver	☐	☐	☐	☐	☐	☐
The helpfulness and attitude of the driver	☐	☐	☐	☐	☐	☐
The time the driver gave you to get to your seat	☐	☐	☐	☐	☐	☐
Smoothness/freedom from jolting during the journey	☐	☐	☐	☐	☐	☐
The safety of the driving (i.e. appropriateness of speed, driver concentrating)	☐	☐	☐	☐	☐	☐

5   Your overall opinion of the journey you made when given this questionnaire

Q32 Overall, taking everything into account from start to end of the bus journey, how satisfied were you with your bus journey?

Very satisfied..☐
Fairly satisfied..☐
Neither satisfied nor dissatisfied..............................☐
Fairly dissatisfied...☐
Very dissatisfied...☐

Don't know/no opinion...☐

Q33 If something could have been improved on your journey, what would it have been?

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Q34 How satisfied were you with the value for money of your journey?

Very satisfied..☐
Fairly satisfied..☐
Neither satisfied nor dissatisfied..............................☐
Fairly dissatisfied...☐
Very dissatisfied...☐

Don't know/no opinion...☐

Q35 What had the biggest influence on the 'value for money' rating you gave in the previous question?

The cost for the distance travelled..☐
The cost of the bus versus other modes of transport...☐
The fare in comparison to the cost of everyday items..☐
Comfort/journey quality for the fare paid...☐
A reason not mentioned above...☐

6

WHEN ANSWERING THIS SECTION PLEASE CONSIDER BUS SERVICES GENERALLY (NOT JUST THE JOURNEY YOU MADE WHEN GIVEN THIS QUESTIONNAIRE)

Q36 How would you rate your local bus services for the following:

	Very good	Fairly good	Neither good nor poor	Fairly poor	Very poor
Ease of getting to local amenities (e.g. shops, hospitals).....	☐	☐	☐	☐	☐
Connections with other forms of public transport (e.g. trains).	☐	☐	☐	☐	☐
The frequency of services in your area……………………….	☐	☐	☐	☐	☐
The reliability of services in your area……………………….	☐	☐	☐	☐	☐

7   About you

QA   Are you?

Male.. ☐
Female.. ☐

QB   In which age group are you?

16 to 18.…………………………………☐   55 to 59.……………………………………☐
19 to 25.…………………………………☐   60 to 64.……………………………………☐
26 to 34.…………………………………☐   65 to 69.……………………………………☐
35 to 44.…………………………………☐   70 to 79.……………………………………☐
45 to 54.…………………………………☐   80+.…………………………………………☐

QC   Are you?

Working full time (30+ hours)...................☐   Retired.......................................☐
Working part-time (under 30 hours)..........☐   Full time student......................................☐
Not working - seeking work......................☐   Other.......................................☐

QD   Which of the following best describes your ethnic background?

White..☐   Chinese...☐
Mixed...☐   Asian or Asian British.............................☐
Black or Black British.............................☐   Other ethnic group.................................☐

QE   In terms of having a car to drive, which of the following applies?

You have a car available and don't mind driving...................................☐
You have a car available but prefer not to drive....................................☐
You don't have a car available...☐

QF   How often are you able to ask someone else to drive you for local journeys?

All or most of the time.............................☐
Some of the time....................................☐
You don't have anybody you can ask........☐

Not applicable...☐

7

QG **Are you affected by any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?** *(Please tick all that apply)*

No: None…………………………………………………………………………………………☐

Yes: Vision (e.g. blindness or partial sight)…………………………………………………☐
Yes: Hearing (e.g. deafness or partial hearing)…………………………………………☐
Yes: Mobility (e.g. only able to walk short distances or difficulty climbing stairs)………………☐
Yes: Dexterity (e.g. difficulty lifting and carrying objects or using a keyboard)…………………☐
Yes: Learning or understanding or concentrating………………………………………………☐
Yes: Memory…………………………………………………………………………………☐
Yes: Mental health……………………………………………………………………………☐
Yes: Stamina or breathing or fatigue…………………………………………………………☐
Yes: Socially or behaviourally (for example associated with autism, attention deficit
    disorder or Asperger's syndrome)………………………………………………………☐
A reason not mentioned above………………………………………………………………☐

Does your condition/illness have an adverse affect
on your ability to make journeys by bus?

Yes, a lot…………………☐   Yes, a little……………☐   Not at all……………………☐

Thank you for completing this questionnaire.

Please return it in the envelope provided or use the following Freepost address:

Bus Passenger Survey
Perspective Research Services Ltd
FREEPOST (RSKU-SKUZ-TSYG)
12-20 Baron Street
Angel, London N1 9LL

Appendix 2: PV2 models

The following models were used to estimate the number of unique passengers on board each bus service, from one end of its route to another. Models were found to provide a better fit if the specific local authority area (or operator area) was used, than if the area type (PTE, Unitary, Two Tier) was used. Therefore where the specific local authority (or operator) area was surveyed in the previous year and thus had its own data, the specific area model was used. Where the local authority area was not surveyed previously and there was no specific model available, the relevant area type model was used. Similarly, if one of the 'big 5' operators was present in the area, a better model fit was found when the operator was factored into the model; therefore models were generate with and without this factor in order to provide the best estimates possible. As such there are four possible models.

The model for an area that has been surveyed before includes a constant specific to that area, and then coefficients covering the time of day, duration of journey and operator. For an area that has not been surveyed before, the model is of the same structure but with coefficients depending upon the type of area (PTE, unitary, LA).

	model number	1	2	3	4
			Area		Area
	basis	Area	Type	Area	Type
	big 5 operator	Yes	Yes	No	No
	constant	30.03	30.04	28.633	28.652
Duration	30 minutes or less	-9.74	-10.76	-9.10	-9.91
	30 and up to 45 mins	-1.79	-1.76	-2.05	-1.03
	45 mins and up to one hour	5.28	7.07	4.89	6.12
	over 1 hour	7.82	7.08	7.91	6.06
Day-part	Evening peak	2.74	5.71	3.66	5.89
	Morning peak	-1.67	-2.68	-2.71	-2.57
	Offpeak	1.44	1.48	1.26	1.68
	Weekend	-4.53	-5.33	-3.96	-5.96
Operator	Arriva	2.28	-0.47	0.00	0.00
	First	4.15	1.06	0.00	0.00
	Go Ahead	-5.06	-0.02	0.00	0.00
	National Express	17.79	21.30	0.00	0.00
	Other	-11.96	-7.22	0.00	0.00
	Stagecoach	3.38	-0.62	0.00	0.00
Area type	PTE	0.00	1.68	0.00	1.89
	Rural	0.00	-4.89	0.00	-3.93
	Unitary	0.00	3.38	0.00	1.63
Actual PSU	Abellio Surrey	11.04	0.00	0.06	0.00
	Blackpool	7.91	0.00	-4.78	0.00
	Centro	7.59	0.00	11.90	0.00
	Cov VMA	3.47	0.00	22.21	0.00
	Devon	-21.37	0.00	-17.43	0.00

Essex	-17.43	0.00	-12.06	0.00
First in Glasgow	-7.71	0.00	-2.65	0.00
First South Coast	-8.46	0.00	-2.53	0.00
GA Anglian Buses	-2.20	0.00	-7.07	0.00
GA Bluestar	-0.24	0.00	-3.64	0.00
GA Brighton & Hove	23.68	0.00	19.69	0.00
GA Go North East	-2.55	0.00	-0.81	0.00
GA Konectbus	-0.51	0.00	-3.79	0.00
GA Metrobus	-2.17	0.00	-4.78	0.00
GA Oxford P&R	-13.17	0.00	-17.29	0.00
GA Plymouth Citybus	-9.61	0.00	-12.72	0.00
GA Southern Vectis	-4.67	0.00	-8.79	0.00
GA Thames Travel	3.55	0.00	-2.29	0.00
GA Wilts & Dorset	-2.77	0.00	-13.79	0.00
Gloucestershire	-3.88	0.00	-6.99	0.00
Kent	-5.81	0.00	-0.55	0.00
Lothian Buses	0.00	0.00	-12.93	0.00
Medway	-4.44	0.00	-1.11	0.00
Mersey main	4.44	0.00	5.08	0.00
Mersey QP	7.68	0.00	12.01	0.00
Milton Keynes	-4.39	0.00	-0.79	0.00
Norfolk	-1.28	0.00	4.10	0.00
Northumberland	0.00	0.00	-3.89	0.00
Nottinghamshire	5.20	0.00	-6.57	0.00
Oxfordshire	0.94	0.00	0.47	0.00
Reading Buses	13.82	0.00	2.70	0.00
Scotland SESTRAN	-4.05	0.00	-18.37	0.00
Scotland SPT	-10.82	0.00	-13.48	0.00
Scotland TACTRAN	-11.93	0.00	-10.90	0.00
South Yorkshire	-3.82	0.00	0.60	0.00
Staffordshire	-15.95	0.00	-12.57	0.00
Suffolk	9.08	0.00	3.61	0.00
Tees Valley	0.00	0.00	0.30	0.00
TfGM	1.16	0.00	4.40	0.00
Thurrock	11.46	0.00	5.37	0.00
Tyne & Wear	5.83	0.00	4.65	0.00
WEP	-5.41	0.00	-1.87	0.00
West Yorks	1.66	0.00	4.76	0.00
York	8.21	0.00	10.81	0.00

To provide an example, based on local authority area Blackpool:

- This specific area was covered in 2014 and therefore the specific area can be modelled. Some services in this area are run by 'big 5' operators (there are some services are run by Stagecoach). Therefore Blackpool will use model number 1

- In this case we would start with the base assumption that all buses have 30.03 people on board (this is the constant)

- Then this figure would be increased by 7.91 for all individual bus services for the fact that they are all in the Blackpool local authority area

- It would then be increased or decreased depending on the other attributes of each bus; for instance:

  - If one whole journey for that bus service was less than 30 minutes in duration, it would be decreased by 9.74
  - If the bus service was also travelling in the evening peak it would be increased by 2.74
  - If it was run by Stagecoach it would be increased again by 3.38.

- In this case then, the 'passenger value' (PV2) for this bus service (that is the estimated total number of unique passengers on board throughout its journey) would be 34.32. That is [constant 30.03] + [Blackpool 7.91] – [<30mins 9.74] + [evening peak 2.74] + [Stagecoach 3.38].

A similar journey (less than 30 minutes long, in the evening peak, run by Stagecoach) but in a Unitary Authority area not surveyed in Autumn 2014 would have a PV2 of 27.75. This is because it would use model two (where the local authority area does not have its own specific data but the area type is known), and the values would be: [constant 30.04] + [Unitary 3.38] – [<30mins 10.76] + [evening peak 5.71] + [Stagecoach -0.62].

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