Credit Card Market Study: Consumer Survey

Technical Report

On behalf of

FCA
FINANCIAL CONDUCT AUTHORITY

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prepared by
YouGov with Derek Farr

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1 Introduction

This technical report describes the methodology of the FCA's Credit Card Market Study survey of consumers [henceforth, the CCMS consumer survey], conducted from 1 to 16 April 2015. The fieldwork was carried out by YouGov. This report provides an overview of the data collection method used, the quality of the sample, fieldwork procedures, and data weighting. YouGov's work was supported by that of an independent statistician, Derek Farr, who has co-authored this report.[1]

A separate report on questionnaire development has been prepared by an independent consultant, John Leston, who supported the FCA in its design of the survey. This report, **'Credit Card Market Study: consumer survey. Note on questionnaire design,'** is cross-referenced here; in particular we refer to Appendices A and C of the report: these are an omnibus survey used to assess various incidence rates, and the final version of the questionnaire used for the CCMS consumer survey. Each report uses the same terminology in terms of describing the different consumer segments and survey modules.

2 Survey objectives and scale

The Credit Card Market Study was launched on 25 November 2014. It aims to build an evidence-based picture of the credit card market through engagement with industry stakeholders, consumers, representative bodies and government departments.

A component of the study is a large-scale, and nationally representative, survey of UK consumers, intended:

- To estimate the size of the total credit card market within the UK with specific reference to active card holdership
- To enhance the FCA's understanding of consumer behaviour in relation to credit cards
- To investigate usage of particular types of credit card, namely cards used for the rewards they offer, those used for balance transfers and those designed for consumers with no or a poor credit history

We set out to conduct circa 40,000 interviews with UK adults aged 18 and over, covering credit card holders and non credit card users, with interviews with non-users not to exceed 40 per cent of the achieved sample, a proportion determined as sensible by credit card ownership data provided by the UK Cards Association.[2] The FCA required a full set of anonymised responses to the survey.

A total of 39,837 valid interviews[3] were achieved with UK consumers aged 18 and over, with no upper age limit imposed:

- The split of achieved interviews between credit card holders and non-card holders was 71.4 per cent credit card holders (66.4 per cent active users and 5.0 per cent inactive users) and 28.6 per cent non-users
- This translates into the following numbers of interviews: active users 26,434, inactive users 2,006, and non-users 11,397[4]

[1] Derek Farr is a qualified statistician who is also an expert in quantitative market research; he was formerly MD of Critical Research. The sections of this report written by Derek Farr are Sections 4, 7, 9 and 10.b.

[2] UK Card Payments 2014, p. 9: "There were around 30 million credit card holders in 2013 – accounting for 60% of the UK adult population."

[3] This number of valid interviews was the result of data cleaning, including the removal of duplicates. Section 8 describes the process of removing 1,069 interview records from the total of 40,906 completed interviews, to achieve a total of 39,837 completed valid interviews.

[4] For definitions of the terms active user, inactive user and non-user, see Section 4.

3 Project stages, timeline and deliverables

The requirement for this survey was to interview from a robust and nationally representative sample of UK consumers (aged 18 and over). A further stipulation was placed on the proportion of non-users in the achieved survey sample not exceeding 40 per cent; findings from an omnibus survey[5] conducted prior to the CCMS consumer survey suggested that this was unlikely to be an issue in the study design since little more than a third of the UK adult population was estimated not to have a credit card. Consequently, no hard quotas were placed on this measure.

The interviews were conducted online with sample drawn from YouGov and Research Now online panels. Of the final 39,837 valid interviews 25,506 were sourced from the YouGov panel and 14,331 from the Research Now panel. The sample was recruited to nationally representative quotas (by Age by Gender, Social Grade and Region), as shown at Section 6 (Table 6). The data have been weighted to a nationally representative profile, as described in Section 9.

Programming of the online questionnaire, managing data collection and data preparation, collating the final data files and preparing this report has been the responsibility of YouGov. Derek Farr has been responsible for writing up sample design (see Section 4), for creating module allocation rules (Section 7), for monitoring weighting (Section 9) and for calculating confidence intervals (CIs) and design effects (Section 10.b).

Deliverables were an Excel file showing respondent level survey raw data (anonymised and including weighting factors applied to each respondent), unweighted data tables, UK nationally representative weighted data tables, and demographic profile information for selected non-respondents (as shown at Section 10.b, Table 22) .

Table 1 below provides a timeline of the research, with key project stages indicated.

[5] YouGov conducted its standard omnibus among a Great Britain sample, which excludes Northern Ireland. Given Northern Ireland typically represents just 2.5 per cent of UK nationally representative omnibus sample, it was judged that this omission would not significantly differ from the expected credit card penetration figures obtained from a UK omnibus survey, had we been able to conduct one. The omnibus research is described in Section 5 of this report.

Table 1. Research timeline detailing key project stages

Task	Description	Dates
Omnibus	Omnibus survey to show likely population profiles and estimates of the proportions of respondents eligible for different questionnaire modules	20-22 Feb 2015
Questionnaire finalisation	Refinement of questionnaire content and modular structure	23 Feb - 13 Mar 2015
Pilot interviewing/ review	Testing of questionnaire prior to launch	16-25 Mar 2015
Questionnaire amendment	Revision of questionnaire following input from pilot	26-31 Mar 2015
Soft launch	Testing of revised questionnaire	1-2 Apr 2015
Final questionnaire edits	Final revisions made to questionnaire and module allocation algorithms applied	2 Apr 2015
Survey full launch	Full deployment of survey	2-16 Apr 2015
Data cleaning	Duplicate responses, or responses that exhibit inconsistencies, are removed from the data file	17-20 Apr 2015
Unweighted raw data	Raw data files provided to the FCA for review	20 and 24 Apr 2015
Unweighted tables	Unweighted data tables run on fully cleaned data set	27 Apr 2015
Weighted raw data	Data files provided to the FCA for review, including weights allocated to each respondent	28 Apr 2015
Weighted tables	Weighted data tables run on fully cleaned data set	29 Apr 2015

4 Key elements of the design – terminology

The FCA had an ambitious list of data requirements. In addition to profiling the overall credit card market, it also wanted to explore in detail:

- The use of different types of credit card
- Consumers' behaviour when considering and taking out credit cards
- The attitudes of consumers who held credit cards but were not using them (inactive users)
- The attitudes of consumers who did not hold any credit cards (non-users)

Consequently, it was apparent at the design stage of the study that meeting these wide-ranging objectives would require:

- The use of multiple questionnaires, targeted at different groups
- For holders of multiple credit cards, generally focusing questioning on a specific credit card rather than seeking to achieve comprehensive questioning about all cards held
- The use of a modular approach so that survey lengths would not exceed 16 minutes which is the length found to be the maximum sustainable for a consumer online survey before unacceptable levels of non-completion are experienced

4.a Allocation to an appropriate questionnaire

Participants were allocated, as appropriate, to one of three questionnaires depending on whether or not they held any credit cards and, if they did, whether or not they were using the cards that they held.[6] As Table 2 shows, there were three different questionnaires, and the different qualification questions used to allocate respondents to each of these.

Table 2. Allocation of respondents to appropriate questionnaire

Questionnaire	**Qualification question (see final questionnaire in Appendix C of 'Note on questionnaire design')**	**Qualification criteria**
NON-USER	Q1	How many UK personal credit cards do you have at the moment? Answer = 0
INACTIVE USER	Q2 (Holder of a single credit card) Q3 (Holder of two or more credit cards)	Have you used this credit card in the past 12 months? Answer = No How many of these credit cards, if any, have you used in the past 12 months? Answer = 0
ACTIVE USER (also referred to as MAIN QUESTIONNAIRE)	All others	Hold 1 or more credit cards that have been used in the past 12 months Definition of used: *By used, we mean that you have not had a nil balance throughout the entire 12 months (or for as long as you have had the credit card if that is less than 12 months)*

[6] See Section 4.1 in the separate report 'Note on questionnaire design' for the survey selection process for respondents with two or more credit cards.

4.b Definition of main card

Throughout the main questionnaire for active users, the focus of questions was on the respondent's MAIN card. In the case of holders of a single credit card, this was automatically their MAIN card. Respondents who held two or more credit cards were asked to select one of these as their MAIN card.

The wording used to guide respondents in the selection of their MAIN card was:

*Please now think about the credit card which you consider to be your **main** credit card. If you do not have a credit card that you think of as your 'main' credit card, please choose the one you use most frequently.*

Although the questionnaire was focused on the MAIN card, there were two exceptions where some questions could be about another card. These exceptions (which applied infrequently) were:

- Respondents who qualified to be asked about a balance transfer and had not made a transfer to their MAIN card but had done so from that card. They were asked some questions about the card that had received the balance transfer
- Respondents selected to be asked about a credit card they had taken out in the last 12 months that was not their MAIN card were asked some questions about that card

4.c Credit card held/ usage modules

The first group of modules was based on the type of credit card held or type of credit card usage by the respondent, as the FCA wished to ask quite detailed questions about specific types of card and/ or card usage. The modules which it was decided to implement on a mutually exclusive basis (i.e. any individual respondent would only be asked about one of these even if they qualified for more than one) covered:

- Individuals who, in the past 12 months, **had collected or accrued** *rewards, discounts or benefits via a rewards credit card*
- Individuals who **held** a card designed for those with *no credit history or a poor credit history*
- Individuals who, in the past 12 months, **had made** *a balance transfer*

As also detailed at Section 2.2 of the 'Note on questionnaire design,' in the final version of the questionnaire, questioning and therefore module qualification was based on the nature of, or behaviour with, the respondent's MAIN card. Consequently, respondents qualified for the different modules as described in Table 3.

Table 3. Eligibility criteria for the credit card held/usage questionnaire modules

Module	Qualification requirement	Questionnaire routing
Rewards credit cards	Had collected rewards on main credit card in the past 12 months	Q8b Code 1
No credit history/ Poor credit history credit card	Main credit card was one designed specifically for people with no credit history or a poor credit history	Q8e Code 1
Balance transfer	Had made a balance transfer to or from their main credit card in the past 12 months	Q8c Code 1 (Transfer TO main credit card) OR Q8d Code 1 (Transfer FROM main credit card) Detailed questioning in the module concerned the card to which the transfer was made. If respondents had made transfer both TO and from their main card, the transfer to the main card was selected. If they had only made a transfer FROM their main card, then detailed questioning was about the card receiving the transfer.

Some respondents qualified for multiple modules in this group. Details of how they were then allocated to a single module are given in Section 7.

4.d Considering and taking out credit card modules

The second group of modules was based on respondents' recent (past 12 months) behaviour regarding considering credit cards and/ or taking out a new credit card. Respondents who, in the past 12 months, had neither considered two or more credit cards nor taken out a new card were not eligible for this module group; they were instead routed to two questions for which only they were eligible.[7] For those that were eligible, the different scenarios about which detailed questions were to be asked were:

- Had taken out a credit card without considering other cards
- Had considered two or more credit cards and taken out one as a result
- Had considered two or more credit cards but not taken out one as a result

In the final questionnaire, respondents qualified for one or more of these modules as follows:

[7] These were respondents who answered Code 2 (No) at each of Q11i, Q11ii and Q11iii. They alone qualified for Q48 & Q49.

Table 4. Eligibility criteria for considering and taking out credit card questionnaire modules

Module	Qualification requirement	Questionnaire routing
Took/ Did not look	Had taken out a new credit card in the past 12 months without considering other credit cards	Q11iii Code 1
Looked/ Took	Had considered two or more credit cards in the past 12 months and taken out a credit card as a result	Q11i Code 1
Looked/ Did not take	Had considered two or more credit cards in the past 12 months but not taken out a credit card as a result	Q11ii Code 1

5 Questionnaire development including the need for modules

The questionnaire was designed and written by the FCA in conjunction with John Leston. The questionnaire was subject to testing at various stages by YouGov to inform the design process, and to check the accuracy of online programming. These stages are described in more detail below.

5.a Omnibus – for indicative incidence rates to develop module design

An omnibus survey was conducted by YouGov to obtain a nationally representative indication of the penetrations of the three types of credit card/ usage and the three types of credit card selection that form the basis of the six modules in the survey questionnaire.

The penetrations would show the natural fall-out of each of the six groups and so inform the module allocation rules that would need to be developed, in order to ensure robust sample sizes would be obtained for each module. Furthermore, the omnibus was used to establish the likely incidence of active credit card users, inactive users and non-users to confirm whether or not quotas would need to be applied to ensure the proportion of non-users did not exceed 40 per cent in the final survey sample.

The questions in the omnibus survey emulated the questions in the draft survey questionnaire that determined card usage and module eligibility (see Tables 2, 3, and 4 above). The omnibus survey questionnaire can be found in Appendix A of the 'Note on questionnaire design' report.

The omnibus survey was conducted over 20 -22 February 2015, with a GB nationally representative sample of 2,128 adults, aged 18 and over. The results of the omnibus survey are summarised in Table 5.

Table 5. Omnibus survey estimates of likely population eligibility for different questionnaires and modules

Key Criteria	Weighted percentage
Active user	53.1%
Inactive user	13.3%
Non-user	33.6%
Rewards	34.8%
No/ Poor credit history	8.5%
Balance transfer	10.1%
Took/ Did not look	7.3%
Looked/ Did not take	18.1%
Looked/ Took	19.5%

As a result of these findings, a set of module allocation rules was drawn up and incorporated into the programming of the main online survey. See Section 7 for a full description of the module allocation rules, and their development.

5.b Pilot of the questionnaire – online and telephone depth interviews

Once the questionnaire had been agreed and programmed (including the module allocation rules), YouGov undertook a two-stage pilot test of the survey, in order to ensure that the questionnaire was working as intended.

Stage 1 – Invitations to complete the survey were sent to 1,009 YouGov panellists, recruited to the same nationally representative profile being applied to the main survey (see demographic targets in Section 6, Table 6). These respondents were shown the questions as they would be shown them in the actual survey, although after each question they were given the opportunity to provide feedback on the way it was presented (in terms of the visual style, the way it was worded and their comprehension of the pre-coded answers).

The results of these 1,009 interviews were analysed in both weighted and unweighted tabular format to check the accuracy of the routing and modular allocation. A raw data file containing respondent-level data was also produced to enable analysis of the open-ended comments made after each question, in order to identify potential improvements to questions/ associated answer options, with the key issues summarised in a separate document.

Stage 2 – After analysis of the 1,009 online pilot interview responses, 19 respondents were re-contacted to participate in an additional 30-40 minute telephone depth interview. Respondents for these interviews were selected on the basis of the comments they had made on questions in the online pilot (stage 1) and of having given their consent to be re-contacted. Recruitment also sought to provide a spread across respondents answering each of the active user, inactive user and non-user questionnaires, as well as the six modules in the active user questionnaire.

In these interviews, respondents were asked to comment on their comprehension of the questions already identified as being unclear or less easy to understand, and to explain in detail the thought process behind their answers. The interviews were carried out by experienced qualitative researchers, from YouGov's in-house qualitative team. Interviews were recorded and all those taking part were given a £5 Amazon voucher as a thank you and an acknowledgement of their time.

Feedback from both stages was compiled, and YouGov made recommendations for adjustments to the survey. These adjustments were made to the online questionnaire which was then subject to another round of rigorous testing by YouGov prior to launch.

5.c Full survey in two stages – allocation rules adjusted after the first stage

Once the online questionnaire had been fully tested and finalised, the survey was soft launched on 1 April 2015 to a nationally representative sample target of 1,000 YouGov panellists to obtain technical feedback on the questionnaire. The full module allocation rules were still being finalised at this stage and so were not yet applied at the time of soft launch. Eligible respondents were therefore allocated to a particular module based on 'equal probability' rules. For example, anyone eligible for two modules had a 50 per cent chance of being allocated to either, while a respondent eligible for three modules in a single module section had a 33.3 per cent probability of being allocated to a particular module. A total of 1,184 interviews were achieved overnight, and on 2 April data from these interviews were subject to analysis by the YouGov project team who checked randomisation, timing and routing.

The survey was then launched fully to the YouGov panel in the afternoon of 2 April. YouGov delivered a raw interim data file to the FCA after the Easter weekend, on Wednesday 8 April, by which point 14,567

valid interviews were available for analysis. This information was used to calculate the final module allocation rules (see Section 7) which were programmed into the online questionnaire to be applied in all subsequent interviews.[8] Fieldwork then resumed on 9 April, having been paused on 8 April to enable programming of the module allocation rules. On the 16 April it was agreed that interviewing would stop, with approximately 40,000 completed interviews.

Throughout the fieldwork period, progress against recruitment quota targets was monitored on a daily basis to minimise the extent to which the data needed to be weighted in order to produce a nationally representative dataset.

[8] The FCA had requested that that a smaller proportion of the interviews were completed before the module application rules were applied. More completes were achieved than anticipated over the Easter weekend, and YouGov was not able to halt the completion of interviews during this time. Although the module allocation rules were applied after more than an ideal proportion of interviews were conducted on the basis of the 'equal probability' rules, Derek Farr has been able to address this in his work and he is confident the results of the modules are robust.

6 Sampling

The sample was designed to be representative of UK consumers, aged 18 and over. In order to obtain a nationally representative sample, recruitment quotas were placed on Age by Gender, Region and Social Grade, as shown in Table 6. These are the standard quotas applied by YouGov to nationally representative surveys; quota targets were defined by Mid-2013 ONS data.[9]

Table 6. Main survey quota targets for the three quota variables

	Target n	Target %
Age by Gender		
Male 18-24	2,360	5.9
Male 25-39	5,000	12.5
Male 40-54	5,280	13.2
Male 55-64	2,840	7.1
Male 65+	3,960	9.9
Female 18-24	2,280	5.7
Female 25-39	5,040	12.6
Female 40-54	5,440	13.6
Female 55-64	2,920	7.3
Female 65+	4,840	12.1
Region		
North East	1,640	4.1
North West	4,440	11.1
Yorkshire and the Humber	3,320	8.3
East Midlands	2,880	7.2
West Midlands	3,520	8.8
East of England	3,720	9.3
London	5,160	12.9
South East	5,480	13.7
South West	3,400	8.5
Wales	1,960	4.9
Scotland	3,400	8.5
Northern Ireland	1,120	2.8
Social Grade		
ABC1	22,000	55
C2DE	18,000	45
Total	**40,000**	

[9] The ONS source data can be found here: http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-322718.

6.a Online panel provision

Although the YouGov panel is large (circa 600,000 panellists in the UK), a decision was taken early on to source sample from both the YouGov and Research Now online panels in order to improve the likelihood of obtaining the required number of interviews in the nationally representative quotas specified, within the allocated fieldwork period. A target of 25,000 interviews sourced from the YouGov panel and of 15,000 interviews sourced from the Research Now panel was agreed prior to fieldwork, based on anticipated maximum number of interviews achievable during the specified fieldwork period via the YouGov Panel.

6.b Sampling approaches

Both YouGov and Research Now maintain engaged communities of panellists who have specifically opted in to participate in online research activities. Such panels provide continuous access to a responsive audience ready-profiled on important demographic, attitudinal and lifestyle attributes.

Recruitment of respondents began from the YouGov panel at the start of fieldwork on 1 April 2015, with recruitment from the Research Now panel beginning a week later, on 9 April 2015. The targets of 25,000 interviews on the YouGov panel (25,506 valid interviews achieved)[10] and 15,000 interviews on the Research Now panel (14,331 valid interviews achieved) were reached on 16 April, at which point fieldwork was closed.

Throughout fieldwork, recruitment from the YouGov panel was controlled using the YouGov proprietary sampling technology, a process called 'turbo sampling'. This is an active sampling system which assigns panellists to the most appropriate survey at the time they respond to an invitation. The most appropriate survey is defined based on a number of factors including the survey's 'demographic needs', time left in field and any lock-out criteria from other studies in the field at the time. This ensures that, as well as being demographically balanced, responses are distributed over the prescribed duration of the survey fieldwork, rather than the sample being just made up of those that responded to the survey invitation immediately. The step-wise process behind this active allocation of panellists to YouGov surveys is described in the points below:

1. System randomly selects 5-10 per cent of the panel
2. Evaluates the type of respondent required (taking into account all demographics of the respondents, and the targets of all the surveys)
3. Chooses whom we wish to interview and sends invitations
4. Repeats every 30 min
5. When people click on the invitation, they are allocated to one of the surveys currently in field according to fit and greatest need

Research Now utilises a similar active sampling system, with recruitment guided by progress against the same nationally representative quotas that were applied to the YouGov sample. The main difference between the YouGov and Research Now systems is that the YouGov survey invitation mail-outs are adjusted every 30 minutes, while Research Now's are adjusted daily.

The recruitment quotas and the number of interviews achieved (unweighted) against the Mid-2013 ONS quotas are shown in Table 7. Note that these are final sample counts, after data cleaning procedures had been carried out. See Section 8 for a full description of the data cleaning process.

[10] For the definition of 'valid interview; see footnote 3.

Table 7. Main survey quota targets and final achieved valid interviews

	Target n	Target %	Final achieved n	Final achieved %	Under/Over target n
Age by Gender					
Male 18-24	2,360	5.9	1,532	3.9	-828
Male 25-39	5,000	12.5	4,598	11.5	-402
Male 40-54	5,280	13.2	5,317	13.4	37
Male 55-64	2,840	7.1	3,068	7.7	228
Male 65+	3,960	9.9	4,689	11.8	729
Female 18-24	2,280	5.7	2,135	5.4	-145
Female 25-39	5,040	12.6	5,762	14.5	722
Female 40-54	5,440	13.6	5,380	13.5	-60
Female 55-64	2,920	7.3	2,887	7.3	-33
Female 65+	4,840	12.1	4,469	11.2	-371
Region					
North East	1,640	4.1	1,696	4.3	56
North West	4,440	11.1	4,349	10.9	-91
Yorkshire and the Humber	3,320	8.3	3,346	8.4	26
East Midlands	2,880	7.2	2,897	7.3	17
West Midlands	3,520	8.8	3,285	8.3	-235
East of England	3,720	9.3	3,577	9.0	-143
London	5,160	12.9	4,922	12.4	-238
South East	5,480	13.7	5,759	14.5	279
South West	3,400	8.5	3,517	8.8	117
Wales	1,960	4.9	1,999	5.0	39
Scotland	3,400	8.5	3,529	8.9	129
Northern Ireland	1,120	2.8	961	2.4	-159
Social Grade					
ABC1	22,000	55	22,859	57.4	859
C2DE	18,000	45	16,978	42.6	-1022
Total	**40,000**		**39,837**		**-163**

7 Module allocations

Section 4 detailed the two different module groups: 'Credit card held/usage' and 'Considering and taking out credit card.' Where a respondent qualified for only one module within each group of modules, they were asked that module.

However, in each case where a respondent qualified for more than one module within a group of modules, it was necessary to determine how they should be allocated to a specific module.

Two principles were adopted:

- The approach had to be random to ensure that the results for each module were representative of all credit card holders who met the qualification criteria for that module
- As far as possible, selection would be aimed at boosting the numbers answering for those modules which would have the lowest number of respondents, had a purely random allocation process been adopted[11]

The following two sections outline:

- The use of a separate omnibus survey (at the design stage) to contribute information to help with the prediction of likely module sample sizes were a purely random allocation to be employed
- The calculation of an allocation approach and its implementation in the survey

7.a Omnibus testing of qualification criteria

Once the decision had been taken to adopt a modular approach, it was recognised as helpful to gather information on likely eligibility rates, to feed in to decisions as to how to allocate to specific modules those respondents qualifying for more than one from the same group.

Consequently, a number of potential qualification questions were put onto a YouGov Omnibus survey. On 20-22 February a total of 2,128 interviews were conducted, as already described in Section 5.a.

In the event, the qualification criteria adopted in the final questionnaire did not entirely map on to those trialled in the Omnibus. Nevertheless, the information gathered was very useful in a number of ways:

- It provided reassurance that, even with an entirely random allocation process, viable minimum sample sizes were likely to be achieved for all modules
- It identified the specific modules which would benefit from prioritisation via a module allocation algorithm
- It enabled first drafts of module allocation algorithms to be developed that subsequently formed the basis of the approach used with the final questionnaire

[11] This is because the statistical 'power' of any survey (or any part of a survey) is driven by the absolute size of the random sample achieved. Consequently, there is potential benefit in boosting the smallest sample sizes even if that is at the cost of reducing the largest sample sizes. The gain in statistical accuracy in the small groups will outweigh the reduction in statistical accuracy in the larger groups.

7.b Developing and implementing module allocation algorithms

The module allocation algorithms were developed by Derek Farr. He initially used the outcomes of the omnibus survey to develop proposed module allocation algorithms. The omnibus results were used to estimate what proportion of respondents would qualify for multiple modules within each module group and, more specifically, what proportions would qualify for each possible combination of modules.

Overall, this work provided:

- An estimate of the total number of respondents likely to be eligible to answer each module
- A means of determining what proportions of respondents eligible for every combination of two or more modules should be allocated to which specific module on a random basis, in order to optimise the distribution of interviews

The actual module allocation algorithms were developed as follows:

- For the initial tranche of edited interviews (14,567) a purely random allocation was applied (i.e. if a respondent qualified for two modules within a group, they had a 1:2 chance of being allocated to each; if they qualified for three modules, they had a 1:3 chance of being allocated to each)
- The outcome of the initial tranche was then reviewed, and modified chance ratios were applied to each module eligibility combination in order to boost the achieved sample sizes for the modules with the lowest absolute numbers of respondents qualifying for them

Different algorithms are used for single and multiple card holders, as they exhibited substantially different distributions, as Table 8 shows.

Table 8. Differences in profiles between single and multiple card holders

Unweighted results from first 14,567 interviews of the main study		
	Single card	**Multi card**
Card type/usage modules eligible to take…	% Profile	% Profile
Rewards	33.62	54.53
No/ Poor credit history	6.38	5.17
Balance transfer	3.19	14.22
Rewards & No/poor credit history	1.16	0.43
Rewards & Balance transfer	1.16	6.90
No/ poor credit history & Balance transfer	0.87	0.00
Rewards & Poor credit history & Balance transfer	0.29	0.43
None	53.33	18.32
Estimated module penetration		
Rewards	36.23	62.28
No/ poor credit history	8.70	6.03
Balance transfer	5.51	21.55
Considering and taking out credit card module eligible to take…		
Looked/ Took	8.06	13.02
Looked/ Took & looked/ Did not take	0.90	1.32
Looked/ Took & took/ Did not look	0.00	0.44
Looked/ Took & looked/ Did not take & Took/ Did not look	0.30	0.22
Looked/ Did not take	5.07	6.84
Looked/ Did not take & Took/ Did not look	0.00	1.10
Took/ Did not look	10.75	8.17
None of these	74.93	68.87
Estimated module penetration		
Looked/ Took	9.25	15.01
Looked/ Did not take	6.27	9.49
Took/ Did not look	11.04	9.93

Table 8 shows, for example, that 9.25% of single card respondents qualified for the Looked/ Took module of questions of which 8.06% qualified **only** for the Looked/Took module and none of the other 'considered and taking out credit card' modules. Among multiple card holders 15.01% were, similarly, eligible for Looked/ Took and 13.02% were qualified only for this module.

We used all these eligibility results to develop final allocation rules to ensure that samples of eligible respondents were allocated to particular modules from each of the possible module combinations.

We also created random selection '1 in n' allocation rules to ensure that we could boost the numbers of achieved interviews within each of the less populated modules.

Our aim was to have reasonably robust achieved sample sizes for each of the modules and have a more efficient allocation procedure so that we could maximise the amount and quality of information available for all modules.

We recognised that as a result of increasing the probability of allocation to modules that would otherwise be less populated, we might need to create new weights for detailed module analyses. However, on balance this procedure would give us an increased sample size within these modules and thus enable us to analyse the information in a more robust way.

The finally implemented module allocation algorithms are shown in Tables 9 to 12 below.

Table 9. Single credit card holders – allocation to card type/ usage modules

Qualify for:	**Allocated to:**		
	Rewards	No/ poor credit history	Balance transfer
Rewards	1:1		
Rewards + No/ poor credit history	1:5	4:5	
Rewards + Balance transfer	1:8		7:8
Rewards + No/ poor credit history + Balance transfer	1:12	4:12	7:12
No/ poor credit history		1:1	
No/ poor credit history + Balance transfer		4:11	7:11
Balance transfer			1:1

Table 10. Multiple credit card holders – allocation to card type/ usage modules

Qualify for:	**Allocated to:**		
	Rewards	No/poor credit history	Balance transfer
Rewards	1:1		
Rewards + No/ poor credit history	1:11	10:11	
Rewards + Balance transfer	1:4		3:4
Rewards + No/ poor credit history + Balance transfer	1:14	10:14	3:14
No/ poor credit history		1:1	
No/ poor credit history + Balance transfer		10:13	3:13
Balance transfer			1:1

Table 11. Single credit card holders – allocation to considering & taking out modules

Qualify for:	**Allocated to:**		
	Looked/ Took	Looked/ Did not take	Took/ Did not look
Looked/ Took	1:1		
Looked/ Took + Looked/ Did not take	3:7	4:7	
Looked/ Took + Took/ Did not look	3:5		2:5
Looked/ Took + Looked/ Did not take + Took/ Did not look	3:9	4:9	2:9
Looked/ Did not take		1:1	
Looked/ Did not take + Took/ Did not look		4:6	2:6
Took/ Did not look			1:1

Table 12. Multiple credit card holders – allocation to considering & taking out modules

Qualify for:	**Allocated to:**		
	Looked/ Took	Looked/ Did not take	Took/ Did not look
Looked/ Took	1:1		
Looked/ Took + Looked/ Did not take	1:3	2:3	
Looked/ Took + Took/ Did not look	1:3		2:3
Looked/ Took + Looked/ Did not take + Took/ Did not look	1:5	2:5	2:5
Looked/ Did not take		1:1	
Looked/ Did not take + Took/ Did not look		2:4	2:4
Took/ Did not look			1:1

7.c Final achieved allocations

The final achieved sample of 39,837 valid interviews gave us the following 'eligibility' and 'allocation' statistics for our modules:

Table 13. Eligibility and allocation results for the six modules

Unweighted results from main study (39,837)			
	Eligible (n)	**Allocated (n)**	**Allocated: eligible**
Card feature (Modules EFG)[12]			
E Rewards	13,633	12,292	90%
F No/ poor credit history	2,079	1,741	84%
G Balance transfer	3,635	2,903	80%
Look/ Took (C Modules)			
C2ii (Look/ Took)	3,802	3,216	85%
C2i (Look/ Not took)	2,155	1,812	84%
C1 (Not look/ Took)	3,098	2,728	88%

As shown in Table 13, we compared the profile (Age by Gender, Region and Social Grade) of all those respondents **eligible** for each module with the actual profile of those respondents **allocated** to (and who answered) each module. This demonstrates that YouGov managed to interview a significant majority of eligible respondents within each of the study modules (at least 80 per cent of all those eligible). This was largely because in many cases the majority of eligible respondents were eligible only for a single module and were thus automatically allocated to that module.

Whilst we had interviewed a significant proportion of eligible respondents, it was possible that they may not be representative of all. To test that our allocation process had not given us unsound results, we investigated in more detail the profile differences of eligible and allocated respondents. Since the most likely problems would occur in those modules with the smallest proportion of eligible respondents allocated for interview, we looked in detail at the quota profiles of those eligible and allocated to the module which had the least proportion (80 per cent) of all eligible people covered: Balance transfer (Module G).

We looked at the quota variable that impacts most on the design effect, i.e. the quota variable that required the greatest level of weighting to ensure results represented the national profile: Age by Gender. The Age by Gender profile of the actual achieved sample (n=2,903) for Balance transfer (Module G) is virtually identical to the profile of eligible respondents (n=3,635). This tells us that the allocation rules have generated a final sample that reflects the eligible market, as Table 14 shows.

[12] These are the modules labels used in the questionnaire. See Appendix C of the 'Note on questionnaire design.'

Table 14. Comparison of eligible and achieved sample for Balance Transfer (Module G) respondents

Age by Gender	% Achieved interviews	% Eligible for Module G
Male 18-24	3	3
Male 25-39	19	20
Male 40-54	16	16
Male 55-64	6	6
Male 65+	6	6
Female 18-24	4	4
Female 25-39	22	21
Female 40-54	14	13
Female 55-64	5	4
Female 65+	5	6
Total sample size	**2,903**	**3,635**

We also looked at the quota profiles of those eligible and allocated to the 'Considering and taking out credit card' module which had the least proportion (84 per cent) of all eligible people covered: the 'Look/ Not took' (Module C2i). We again looked at the quota variable that impacts most on the design effect, i.e. Age by Gender. The Age by Gender profile of the actual achieved sample (n=1,812) for 'Look/ Not took' (Module C2i) is virtually identical to the profile of eligible respondents (n=2,155). The allocation rules have generated a final sample that reflects the eligible market, as Table 15 shows.

Table 15. Comparison of eligible and achieved sample for Look/ Not took (Module C2i) respondents

Age by Gender	% Achieved interviews	% Eligible for Module C2i
Male 18-24	3	3
Male 25-39	17	18
Male 40-54	15	15
Male 55-64	6.5	6
Male 65+	12	11
Female 18-24	2.5	4
Female 25-39	17	18
Female 40-54	11	11
Female 55-64	6	5
Female 65+	9	8
Total sample size	**1,812**	**2,155**

7.d Assessing the need for using additional module weights

As not all respondents eligible for a module were interviewed for that module, we needed to consider whether to apply module weights, to ensure that the results of the modules were representative of all respondents eligible for them.

Comparing the profiles (see Section 7.c) of eligible respondents interviewed for the two modules that had the lowest levels of 'achieved interviews to eligible' we found no significant differences in their Age by Gender profiles (see Tables 14 and 15).

The weighting that would have been required to provide an exact match with the profile of all eligible respondents (i.e. including those not interviewed for modules for which they were eligible) would have had very little statistical impact – and indeed only result in reducing the effective sample size for analysis purposes. Consequently, it was agreed with the FCA on Derek Farr's recommendation that we would not use module weights when analysing survey results.

8 Interviews conducted and the need for data cleaning

Over the course of the survey, a number of measures were put in place to maximise the accuracy of the survey data. The key elements of this process were a) the identification and removal of duplicate, erroneous or potentially fraudulent responses, and b) recoding responses or removing responses for specific questions.

8.a Duplicate, erroneous and fraudulent responses

To identify potential duplicate responses from individual panellists at the pre-survey stage, a cookie tracking facility was programmed into the questionnaire to identify and screen out panellists who enter the survey and attempt to complete it for a second time. This facility operated within each of the YouGov and Research Now panels, and across the two panels.

Once fieldwork was completed, the final data set was subject to interrogation to identify matching IP addresses and, where this occurred, date of birth and gender information held on the panellists were compared. Where date of birth and/ or gender did not match, the responses were retained on the assumption that they were provided by two individuals in the same household. In cases where respondents exhibited matching IP address, date of birth and/ or gender, all responses were removed from the data set.

In some few cases, responses were missing for some questions where the respondent should have been eligible to answer, for unknown reasons. These respondents have been excluded from the data set to remove the risk of the questionnaire not having worked as intended in these cases.

The data were also checked for responses to demographic questions being inconsistent with the profiling information held on the respondent, indicating either a lack of attention to the questionnaire on the part of the respondent, or a fraudulent response. These cases were also removed from the data set.

Table 16 summarises data discrepancies identified, and the number of responses removed from the data set as a result.

Table 16. Data discrepancies and number of records removed during data cleaning

Problem	Number of records removed
Duplicate records (based on matching IP address, gender and date of birth)	999 (all instances of duplicates were removed, including first and subsequent records)
Inconsistent records (based on data not having been collected for questions they were qualified to be asked)	25
Eleven IDs (respondents) appeared twice in the dataset (because a lock-out was not applied on one quota between soft launch and full launch)	22 (11 x 2)
During YouGov's standard data cleaning process, a small number of records showed the age of the respondent as under 18 or over the age of 100	22
One respondent was identified as an employee of YouGov (part of our quality control process)	1
Total records removed	**1,069**

8.b Data editing – removal of some answers for limited numbers of respondents

As part of the data cleaning analysis described in Section 8.a, various discrepancies were discovered in the data that required resolution, but did not warrant the removal of the respondent from the data set. Table 17 summarises these data discrepancies, and the action taken to rectify each of them.[13]

[13] Please note that the allocation of selected respondents to particular modules and their non-selection for other modules did not result in the removal of the respondent from the final data file.

Table 17. Actions taken in data editing to resolve discrepancies

Brief description	Resolution
There is a difference in the number of single credit card holders who have answers for Q6bi and Q6bii	Auto coding was not applied for all Q6b questions at the start of fieldwork. Merged tables show this correctly
There were c. 250 respondents who are active users and have multiple cards, but did not complete Q6bi	Auto coding was not applied for all Q6b questions at the start of fieldwork. Merged tables show this correctly
c. 65 respondents answered Q11a, even though they were not routed to C1 or C2ii (instead they were routed to C2i as they have qualified for that module too). This is because at the start of fieldwork, Q11a-d was open (by mistake) to people who qualified for C1 and C2ii (not just those selected to see those modules)	Answers to Q11a-d for respondents not selected to see C1 or C2ii were removed
c. 60 respondents filled in section C2ii (which they were selected for) even though they coded 1 @ Q11a (and should have skipped these questions). This was because masking on these questions was only applied post soft launch	If a respondent was chosen to see module C2ii and coded 1 @ Q11a, we removed their responses to Q45, Q47a, Q47b and Q47c
c. 40 respondents were incorrectly routed to Modules E, F and G when they did not actually qualify based on the allocation rules for these Modules	In order to maintain consistency throughout the data set, respondents who had been assigned to Modules E, F and G incorrectly were removed from those Modules
c. 400 respondents did not complete Q87 even though they had the right qualification criteria based on the paper questionnaire. This was because the masking for this question should have read: *Q87 is seen if Q86=1 and did not answer Q42e ABOUT MAIN CARD*. Unfortunately, the part in capitals was not applied and anyone who said Q86=1 and answered Q42e about any card did not see Q87	This is noted in the tables and the FCA will mark any findings based on Q87 with a footnote

9 Final achieved sample: standard and RIM weighting

Weighting adjusts the contribution of individual respondents to aggregated figures and is used to make surveyed populations more representative of a project-relevant, and typically larger, population by forcing it to mimic the distribution of that larger population's significant characteristics, or its size. The weighting tasks happen at the tail end of the data processing phase on cleaned data.

For the CCMS consumer survey, findings were reweighted to ensure the data represented the national profile of UK adults (aged 18 and over) based on ONS Statistics (Mid-2013) for Age by Gender, Region and Social Grade.

9.a Standard weighting

When we use standard weighting variables such as gender to reweight the achieved sample back to target profiles, we create a simple weighting factor for each record. This weighting factor is a decimal number, such as 1.0 or 1.2 or 0.5. It is calculated by dividing the target proportion required by the actual proportion from the achieved sample data. The weight factor is used as a multiplier for each respondent during aggregation to determine their weighted contribution.

A weight of 1 occurs when the respondent (and respondents with the same profile) exactly reflect our target (we have exactly the number of such respondents in our study that we targeted); weights of <1 occur when we have over-achieved interviews (we have more than our target), and weights of >1 occur when we have under-achieved our targets.

Table 18 provides an example of how weighting factors are calculated.

Table 18. An example of the calculation of weighting factors

Gender	Target %	Achieved %	Weight factor	Weighted data
Male	45	33	45 / 33 = 1.364	33 * 1.364 = 45
Female	55	77	55 / 77 = 0.714	77 * 0.714 = 55

For political polling YouGov also use newspaper readership and political affiliation as added weighting variables. These were not deemed to be key in this study.

Following discussion with the FCA, we did amend our standard approach to weighting in one other way. This was to reweight findings by more detailed Age by Gender breaks – quota controlling on male and female respondents aged 55-64, and 65 and over rather than the standard approach which covered males 55 plus and females 55 plus. These extra breaks were used to improve likely quota controls for older respondents who have lower internet use. [14]

The study standard weights used for each of these three variables are shown in Table 19.

[14] YouGov's standard age breaks finish at 55+.

Table 19. Final study weights for our three main quota variables

	Target n[15]	Target %	Final achieved n	Final achieved %	Under/Over target n	Standard Weight
Age by Gender						
Male 18-24	2,351	5.9	1,532	3.9	-819	1.5345953
Male 25-39	5,020	12.5	4,598	11.5	-422	1.091779034
Male 40-54	5,258	13.2	5,317	13.4	59	0.988903517
Male 55-64	2,828	7.1	3,068	7.7	240	0.921773142
Male 65+	3,944	9.9	4,689	11.8	745	0.841117509
Female 18-24	2,271	5.7	2,135	5.4	-136	1.063700234
Female 25-39	5,020	12.6	5,762	14.5	742	0.871225269
Female 40-54	5,418	13.6	5,380	13.5	-38	1.007063197
Female 55-64	2,908	7.3	2,887	7.3	-21	1.007273987
Female 65+	4,820	12.1	4,469	11.2	-351	1.078541061
Region						
North East	1,633	4.1	1,696	4.3	63	0.962853774
North West	4,422	11.1	4,349	10.9	-73	1.016785468
Yorkshire and the Humber	3,306	8.3	3,346	8.4	40	0.988045427
East Midlands	2,868	7.2	2,897	7.3	29	0.989989644
West Midlands	3,506	8.8	3,285	8.3	-221	1.067275495
East of England	3,705	9.3	3,577	9	-128	1.035784177
London	5,139	12.9	4,922	12.4	-217	1.044087769
South East	5,458	13.7	5,759	14.5	301	0.947733982
South West	3,386	8.5	3,517	8.8	131	0.962752346
Wales	1,952	4.9	1,999	5	47	0.976488244
Scotland	3,346	8.5	3,529	8.9	183	0.94814395
Northern Ireland	1,115	2.8	961	2.4	-154	1.16024974
Social Grade						
ABC1	21,910	55	22,859	57.4	949	0.958484623
C2DE	17,927	45	16,978	42.6	-949	1.055895865
Total	**39,837**		**39,837**			

Calculations were also made of the design effects that had impacted on the confidence intervals.

These design effects (see Section 10.b) were applied to the weighted study estimates to provide confidence ranges for the survey findings.

The estimated design effect of (just) reweighting results back to the nationally representative profile (Age by Gender, Region and Social Grade) is **1.0115.**

[15] The survey had originally targeted 40,000 interviews split across segments/ cells as shown in the 'Target n' column of Table 7. When the fieldwork was completed and we had checked all data we had an achieved 39,837 interviews. We compared their actual splits across segments/ cells with what they should have been if we had targeted 39,837 interviews – hence we have a different 'Target n' column in Table 19.

9.b RIM weighting to Mid-2013 ONS data

RIM (Random Iterative Method) weighting is used when there are a number of different standard weights that all need to be applied together. YouGov uses the RIM (Random Iterative Method) detailed below. This weighting method calculates weights for each individual respondent from the targets and achieved sample sizes for all of the quota variables (in this case Age by Gender, Region and Social Grade). This RIM weighting approach is the standard approach in market research. It takes into account all of the quota group targets and estimates 'best' individual weights across Age by Gender (10), Region (12) and Social Grade (2) groups, i.e. for a total of 24 different quota cells. The RIM weights are calculated in such a way that overall the 'average' weight for a single variable group will equate to the 'standard weight' and individuals within that quota variable group will have their own weight for that variable. At Table 20 we see that for Male 18-24 there is a range of weights for these individuals of 1.83 to 1.37 and the individual weights for these respondents will have an average weight of 1.53 (the standard weight shown at Table 19 above).

The standard quota variable weights, shown in the Table 19, have a range of 1.53 (to up-weight male 18-24 respondents) to 0.84 (to down-weight male 65+ respondents). These quota variable weights were used together to generate individual RIM weights for each respondent using RIM weighting, as described below.

The RIM weighting efficiency in this study is 97.8 per cent, with the highest individual weighting factor being 1.83 and the lowest 0.78. This efficiency score gives us an indication of how successful the individual RIM weights are in balancing the standard weights for all of our three quota variables. This indicates that the sampling was indeed very close to the target and very little rebalancing of the data was needed.

Table 20 shows the highest and lowest weighting factors applied in all 24 quota cells.

Table 20. Ranges of individual RIM weights for each quota cell

	Highest weight applied	Lowest weight applied
Age by Gender		
Male 18-24	1.830983	1.374729
Male 25-39	1.337896	1.004512
Male 40-54	1.207856	0.906876
Male 55-64	1.127079	0.846228
Male 65+	1.035983	0.777832
Female 18-24	1.271267	0.954486
Female 25-39	1.066689	0.800886
Female 40-54	1.235207	0.927412
Female 55-64	1.239401	0.930560
Female 65+	1.339099	1.005415
Region		
North East	1.505212	0.788984
North West	1.581866	0.829163
Yorkshire and the Humber	1.541298	0.807899
East Midlands	1.544703	0.809684
West Midlands	1.660475	0.870367
East of England	1.620062	0.849184
London	1.617278	0.847725
South East	1.485138	0.778462
South West	1.509090	0.791016
Wales	1.529145	0.801528
Scotland	1.483937	0.777832
Northern Ireland	1.830983	0.959742
Social Grade		
ABC1	1.696236	0.777832
C2DE	1.830983	0.839622

RIM weighting formulae (root mean square)

The formulae are shown for a rim weighting matrix consisting of two variables (dimensions), but the same principle applies when there are more dimensions. In our study we had three dimensions – Age by Gender, Region and Social Grade.

Notation	Represents
$m_{i\cdot}$	The target number in category *i* in the first dimension.
$n_{i\cdot}$	The sum of the observed numbers in category *i* in the first dimension.
$m_{\cdot j}$	The target number in category *j* in the second dimension.

Notation	Represents
$n_{\cdot j}$	The sum of the observed numbers in category *j* in the second dimension.
I	The number of categories in the first dimension.
J	The number of categories in the second dimension.

The formula for the weight adjustment is:

$$mdd_{ij} = md_{ij}\,(m_{\cdot j}/md_{\cdot j})$$

Where

md_{ij}	Represents the weight adjustment calculated in the previous iteration for the cell at the intersection of category *i* in the first dimension and category *j* in the second dimension. In the first iteration, it is substituted with $n_{ij}(m_{i\cdot}/n_{i\cdot})$
$md_{\cdot j}$	Represents the sum of the weight adjustments calculated in the previous iteration for category *j* in the second dimension. In the first iteration, the expression $(m_{\cdot j}/md_{\cdot j})$ is substituted with 1.

The calculation for the root mean square is:

$$rms = \sum_{i=1}^{I}(m_{i\cdot} - md_{i\cdot})^2 + \sum_{j=1}^{J}(m_{\cdot j} - mdd_{\cdot j})^2$$

where

$md_{i\cdot}$	Represents the sum of the weight adjustments calculated in the previous iteration for category *i* in the first dimension.
$mdd_{\cdot j}$	Represents the sum of the weight adjustments calculated in the current iteration for category *j* in the second dimension.

At the end of each iteration, the weight component compares the root mean square with the product of the weighted total and the given limit. The limit defaults to 0.005, but it can be set to another proportion.

The iterations continue until all of the weights are within the limit or the maximum number of iterations has been reached.

RIM weighting efficiency

The RIM weighting efficiency figure gives an indication of how well balanced the sample is.

Let

P_j	Be the preweight for case *j*
R_j	Be the rim weight for case *j*

Then the RIM weighting efficiency is:

$$\frac{100.0\left(\sum_j P_j R_j\right)^2}{\sum_j P_j \sum_j P_j R_j^2}$$

If the data for many respondents need to be weighted heavily up or down, the efficiency percentage will be low. The greater the percentage the more well balanced the sample.[16]

[16] For further information on rim weighting see the Rim Weighting Theoretical Basis Paper entitled "ON A LEAST SQUARES ADJUSTMENT OF A SAMPLED FREQUENCY TABLE WHEN THE EXPECTED MARGINAL TOTALS ARE KNOWN", by W. Edwards Deming and Frederick F. Stephan, in Volume 11, 1940 of the Annals of Mathematical Statistics.

10 Strengths and limitations of the survey

10.a Research strengths and limitations

Online approach

Online research has its strengths and weaknesses. The most obvious limitation is that online usership is not 100 per cent within the population and so an online survey can never reach everyone. However, the nationally representative weighting applied to the data in this survey is designed to mitigate this weakness. Furthermore, usage of the internet in the UK is high, and increasing. ONS statistics published in August 2014 indicate that 87 per cent of UK adults have used the internet in the last three months, 76 per cent use the internet every day and 84 per cent of households have internet access.[17]

The increase in the frequency of internet use since 2006 (as found in the ONS survey) can be seen by age category in Table 21. The proportion of the population accessing the internet in the last 3 months can be calculated by adding the daily, weekly and less than once a week figures together. The findings show that internet usage has increased rapidly, most notably among the over 65s, with only 23 per cent having used the internet in the last 3 months in 2006, compared with 60 per cent in 2014. Internet use among the 16-44 age groups is now nearly 100 per cent.

Table 21. Internet use estimates 2006 and 2014

	Used within the last three months						Used over 3 months ago %		Never used %	
	Daily use (%)		Weekly use (%)		Use less than once a week (%)					
	2006	2014	2006	2014	2006	2014	2006	2014	2006	2014
16-24	63	79	15	15	10	3	10	2	2	1
25-34	61	86	17	7	8	4	10	3	5	1
35-44	63	86	16	7	5	3	7	2	9	1
45-54	56	83	13	8	8	2	8	3	15	4
55-64	36	74	17	9	8	4	11	6	28	8
65 +	9	42	8	13	6	5	12	12	65	28
All	**45**	**73**	**14**	**10**	**7**	**4**	**10**	**5**	**24**	**8**

The clear strength of online surveys is that they are the most cost-effective way to obtain large and reliable survey sample sizes. Online research is also convenient for respondents; they can fill in the survey in their own time, at their own pace and can consider their answers.

The scale of interviewing that the online methodology affords has allowed a design that, unusually, covers non-users and inactive users as well as active users, in the same survey with sufficiently large sample sizes for robust analysis at total level as well as at sub-segment level.

[17] The ONS source data can be found here:
http://www.ons.gov.uk/ons/rel/rdit2/internet-access---households-and-individuals/2014/stb-ia-2014.html

10.b The impact of the survey design on study estimates and confidence intervals

When calculating confidence intervals for survey estimates, using the standard Simple Random Sample (SRS) techniques will, as here, underestimate the size of the interval as many of the assumptions on which such estimates are based do not exist in actual survey work. Thus, response rates are never 100 per cent; the sample design is not based on SRS techniques, and the need to reweight individual respondents to produce reliable overall population figures impacts on findings. When looking at the confidence intervals on results, it is necessary to take into account the impact of these factors.

Therefore, in evaluating the statistical robustness of this study the following were reviewed:

- The weighting regime applied to create Age by Gender, Region and Social Grade nationally representative weighted estimates from the survey (see Section 10)

- The estimated differential response rates across the Age by Gender (10 groups/cells); Region (12) and Social Grade (2) quota control cells (see Table 22)

- The module allocation rules for selecting respondents for our six questionnaire modules (the 'Considering and taking out credit cards' and 'Credit card held/usage' modules) and their impact on the profiles of respondents (see Section 7)

Impact of weighting back to nationally representative profiles
The CCMS consumer survey was designed to reflect the profile of the **overall** UK adult population by Age by Gender, Region and Social Grade – and sample targets were set to reflect overall population profiles, not the profiles of those having internet access. Final results needed to be ***reweighted to reflect the total population profile*** to address any under or over achievement of interviews in all of the quota cells.

Comparing the profiles of the final achieved interviews against the estimated **nationally representative population profiles** (ONS Mid-2013), YouGov calculated weights for respondents from our different quota cells – using a RIM weighting procedure that allows weights to be derived for a number of different profile variables: in this case Age by Gender, Region and Social Grade (the RIM weighting technique is described in Section 9).

We calculated the impact of this national representative weighting as **1.0115.**

Impact of differential response rates
The nature and subject matter of the survey was such that we expected ***differential response rates*** across our different quota groups – interviews were more 'difficult' to obtain amongst young males (males 18-24) and it was necessary to use proportionally more contacts to achieve interviews with these respondents. We looked at estimated differential response rates and the different levels of respondent completion for our quota cells so we could assess the likely impact on study findings. We assume, for example, that if we only needed two sample names to achieve a completed response in a particular quota group, then study findings are likely to be a more reliable estimate of the true population than if we needed to use ten names to generate a completed interview.

YouGov collected profiling information on panellists who were invited but did not enter the survey and for those who were invited but did not complete the survey, to understand the possible design effects of non-response/ non-completion on the results. At the end of the study this information was used to estimate the impact of differential non-response. The same information was not available from Research Now.

To estimate the impact of differential response, data editing and duplication we compared the profile of achieved valid interviews (39,837) with the profile of the total sample – including duplicates, records removed during data cleaning and those respondents selected for the study who did not respond or who started but did not complete a questionnaire. Using this profile information we were able to estimate the differential (total) response rates and make an estimate of the impact of these on the study design.

The profiles of the achieved valid interviews (39,837) and those of the total samples used (71,583) are shown in Table 22. As expected, differential non-response did occur – some quota groups were easier to interview than others. Overall, 'use of sample' (the proportion of all sample used that achieved a final usable interview) was 55.7 per cent. 'Use of sample' figures varied from 41.7 per cent for males 18-24 (we achieved 1,532 final interviews but the study used 3,672 different sample names) and 45.4 per cent for those in Northern Ireland to 60.5 per cent for females 25-39. The impact on study findings of the differential response rates within our different quota groups was calculated.

We calculated that the likely 'design effect' of this **differential non-response** which was very minor at **1.00422,** and we were able to use this to estimate the impact on confidence intervals for estimates from the study (see Table 24).

Table 22. Profiles of final achieved interviews and non-respondents

	Target %	Final achieved n	Achieved %	Non-response n	Non-response %	Total sample	Total profile %	Response rate %
Age by Gender								
Male 18-24	5.9	1,532	3.9	2,140	6.7	3,672	5.1	41.7
Male 25-39	12.5	4,598	11.5	3,317	10.4	7,915	11.1	58.1
Male 40-54	13.2	5,317	13.4	3,790	11.9	9,107	12.7	58.4
Male 55-64	7.1	3,068	7.7	2,343	7.4	5,411	7.6	56.7
Male 65+	9.9	4,689	11.8	4,306	13.6	8,995	12.6	52.1
Female 18-24	5.7	2,135	5.4	1,873	5.9	4,008	5.6	53.3
Female 25-39	12.6	5,762	14.5	3,765	11.9	9,527	13.3	60.5
Female 40-54	13.6	5,380	13.5	4,090	12.9	9,470	13.2	56.8
Female 55-64	7.3	2,887	7.3	2,219	7	5,106	7.1	56.5
Female 65+	12.1	4,469	11.2	3,903	12.3	8,372	12	53.4
Region								
North East	4.1	1,696	4.3	1,292	4.1	2,988	4.2	56.8
North West	11.1	4,349	10.9	3,330	10.5	7,679	10.7	56.6
Yorkshire & Humber	8.3	3,346	8.4	2,556	8.1	5,902	8.2	56.7
East Midlands	7.2	2,897	7.3	2,219	7	5,116	7.1	56.6
West Midlands	8.8	3,285	8.3	2,425	7.6	5,710	8	57.5
East of England	9.3	3,577	9	2,962	9.3	6,539	9.1	54.7
London	12.9	4,922	12.4	3,997	12.6	8,919	12.5	55.2
South East	13.7	5,759	14.5	4,723	14.9	10,482	14.6	54.9
South West	8.5	3,517	8.8	2,638	8.3	6,155	8.6	57.1
Wales	4.9	1,999	5	1,575	5	3,574	5	55.9
Scotland	8.5	3,529	8.9	2,873	9	6,402	8.9	55.1
Northern Ireland	2.8	961	2.4	1,156	3.6	2,117	3	45.4
Social Grade					0			
ABC1	55	22,859	57.4	17,641	55.6	40,500	55.6	56.4
C2DE	45	16,978	42.6	14,105	44.4	31,083	43.4	54.6
Total		**39,837**		**31,746**		**71,583**		**55.7**

Impact of module selection allocation

The ***module selection rules*** (see Section 7) were designed to select a sub-sample of actual respondents from all those eligible to complete a particular module, given the need to ensure that any single respondent was asked to answer questions for only one module. The rules developed provided a robust methodology to allocate individuals to particular modules in such a way that they had no appreciable impact on the design effect of this part of the study. We calculated the module selection rules 'design effect' to be an estimated **1.00546**.

Implications of the three weighting process: combined design effect

The design effect (deff) is the ratio of the variance of a statistic with a complex sample design to the variance of that statistic within a simple random sample of the same size. A design effect therefore represents the combined effect of a number of components such as stratification, clustering, unequal selection probabilities and weighting adjustment for non-response and non-coverage. When calculating standard errors (as opposed to variances) for estimating confidence intervals the DEFT statistic (the square root of the deff) is used to simplify calculations.

A DEFT of 1 would indicate that there is no difference between the variance of a statistic with a complex sample design and the variance achieved with a simple random design.

When calculating confidence intervals for our study statistics, we applied a design effect and thus are able to show the precision of our study estimates and also indicate whether differences in findings are statistically significant or not.

The combined DEFT we estimate by including the impact of weighting back to the nationally representative population profile, differential non-response and module allocation sampling.

Design effect: Nat rep weighting	**1.01155**
Design effect: Differential non-response	**1.00422**
Design effect: Module allocation	**1.00546**

The combined design effect or DEFT for our study estimates (study sample size of 39,837) was estimated to be **1.02137**. Consequently, the results from those interviews had confidence intervals equivalent to those from a truly simple random sample of 38,189. As a result, the confidence interval for overall survey estimates from the total sample (39,837) for an estimate of 50% is +/- 0.5% at the 95% level.[18]

Despite careful design, and calculation of the impact of this design on the precision of the results, some sub-groups, depending on the degree of segmentation required, will be represented by a relatively small number of interviews and as such the findings from these sub-groups are less reliable and need to be treated with some caution. They will give 'broad picture' estimates rather than precise likely population measures.

Confidence intervals for survey estimates

Examples of confidence intervals for both unweighted and weighted population estimates are shown in Tables 23 and 24. Sub-groups with less than 50 interviews have large confidence intervals and results should not be used.

[18] Traditionally when looking at confidence intervals for sample estimates we look at the 95% confidence interval for an estimate, and thus are able to state that statistically we are 95% confident that the likely population statistic is within the calculated range, or that when comparing sample statistics they are likely to be significantly different or not.

Table 23. Example confidence intervals (unweighted)

Unweighted base	Survey result	CI (at 95%) (No design effect)
50	50%	+/- 13.9%
100	50%	+/- 9.8%
500	50%	+/- 4.4%
1000	50%	+/-3.1%
5000	50%	+/- 1.4%
10000	50%	+/- 0.98%
20000	50%	+/-0.69%
40000	50%	+/-0.49%

Incorporating estimated design effects, we have estimated confidence intervals for our weighted study findings:

Table 24. Example confidence intervals (weighted)

Unweighted base	Survey result	CI (at 95%) (combined design effect 1.02137)
50	50%	+/- 14.1%
100	50%	+/- 10.0%
500	50%	+/- 4.5%
1000	50%	+/-3.2%
5000	50%	+/- 1.4%
10000	50%	+/- 1.0%
20000	50%	+/-0.71%
40000	50%	+/-0.50%