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Number Cruncher Politics

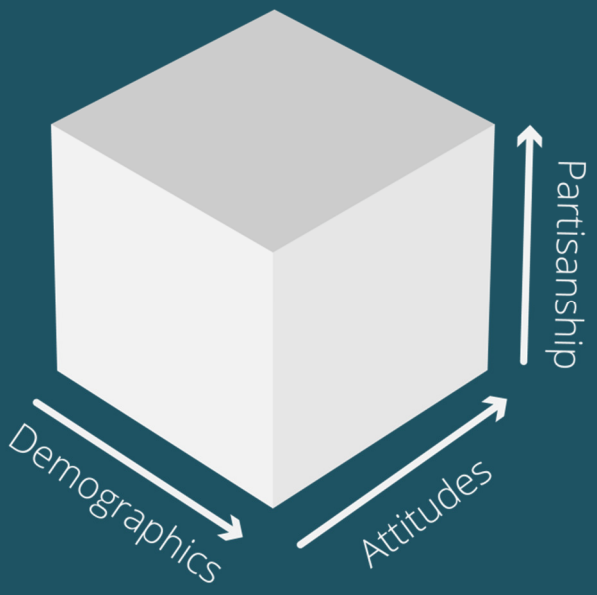
Polls apart

An investigation into the differences between phone and online polling for the UK's EU membership referendum

MARCH 2016

Matt Singh & James Kanagasooriam

A joint paper between Populus and Number Cruncher Politics



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Matt is the polling analyst that publicly predicted the polling failure at the 2015 UK General Election beforehand. Since launching Number Cruncher Politics in 2014, his work has been published by a number of media outlets and the London School of Economics. Matt has spoken both at academic and industry events and acts as a consultant to polling companies and financial markets, where in his previous career he worked as a rates trader. He tweets at @MattSingh_

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About Populus

Populus was formed with a simple idea in mind: in order to succeed, organisations, businesses and brands must first understand what matters most to the people who matter most to them. Our research and advice enables leading organisations and businesses in all sectors to understand the political, business and economic environment in which they operate.

http://www.populus.co.uk

About Number Cruncher Politics

Number Cruncher Politics is a non-partisan polling and psephology website launched in 2014, providing analysis and forecasts of UK elections. It specialises in polling accuracy and has made notable calls on the 2015 General Election and Labour leadership contest and is shortly to launch a rolling forecast of the EU referendum.

http://www.ncpolitics.uk

Acknowledgements

We are most grateful to the British Election Study team, led by Jane Green, for help with the BES data, and Steve Fisher for comments. We extend particular thanks to Alan Renny, Andy Moss, Philip DuPlessis and Vicky Heron of Populus Data Solutions for their assistance in preparing this paper.

Foreword

It is difficult to conceive of a tougher test for political pollsters, after a year they would rather forget, than the referendum on the UK's membership of the European Union: a binary decision that cuts across traditional party lines with no recent equivalent vote to turn to for reference. To make matters worse, there is currently a huge gulf between what polls conducted online and most of those administered over the phone are saying. At this rate, the political polling industry risks emerging from one post-mortem only to be plunged into the need for another.

That is why Populus commissioned Matt Singh from Number Cruncher Politics, one of a very few correctly to predict the outcome of the last General Election, to analyse the differences between the online and phone results of EU referendum polling and to proffer an explanation. He and Populus data analyst, James Kanagasooriam, have examined a year's worth of EU polling data along with individual level data from the large-scale British Election Study face-to-face and online surveys. Their task has been to try and explain why samples that look similar demographically and by voting history can give such different overall answers about people's preferred referendum outcome depending whether they are asked to give their views online or over the phone.

Together, Singh and Kanagasooriam, work their way through the impact on polls - both phone and online - of offering "Don't know" as a prompted rather than an unprompted alternative to "Remain" or "Leave". They then look for markers which correlate strongly with EU referendum voting intention but which are not readily apparent by looking at people's demographic or political background. In the process they find a third dimension; people's social attitudes to things like equality and national identity - which are at least as significant as their voting history or personal backgrounds in determining how they approach the issue of the UK's EU membership. Using these two insights they begin to reconcile the discrepancy between what the polls conducted online and over the phone are now saying about what people will do on June 23rd.

This work is designed to prompt further debate about the way political pollsters go about drawing their samples and weighting them. It is part of Populus's continuing commitment to get to the heart of where we went wrong with our political polling at the 2015 General Election, before we re-enter the fray of publishing political polls again. It should, though, be read not in the spirit of re-fighting the last war but of trying to win the next one.

Rick Nye
Managing Director, Populus
March 2016

Executive Summary

As the polling industry prepares to publish the final report of its inquiry into what went wrong at the 2015 General Election, new research from Populus & Number Cruncher Politics finds that pollsters risk further humiliation, this time at the hands of the EU referendum result. Why? Because their changes in methods are concentrating on trying to get the last election right rather than preparing for the very different kind of challenge posed by the EU referendum.

A feature of opinion polling for Britain's forthcoming referendum on EU membership has been the clear, consistent and systematic difference between the results obtained by computer-assisted telephone interviewing (CATI) and those conducted on the internet. Various theories have been advanced to explain the discrepancy, but no one has yet published a detailed analysis using individual-level polling data. This paper sets out to do that.

We conclude that there are two principal causes for the discrepancy between phone polls and online polls of the question of the UK's membership of the European Union.

The first is how the question is presented. Online polls almost always provide an explicit "don't know" option when asking about the referendum, allowing undecided voters to complete the survey without giving a voting intention, whereas telephone polls generally do not, recording only verbatim "don't know" responses. As a result, the latter method has tended to produce fewer "don't knows" with undecided voters compelled to choose, most often to the benefit of the status quo option. This explains about one third of the gap between the phone and online polls.

The second, more significant cause is that the question of the UK's EU membership has highlighted the differences in the make-up of the samples of the general public accessed by internet and telephone polls respectively. Each has lately been found to be less-than-perfect for political purposes and sometimes these separate deficiencies end up affecting online and phone polls similarly (as they did at the 2015 General Election). At other times these differences skew the outcome of online and phone polls in very different ways even after controlling for the differences in demographic and partisan make-up between the two samples. Simply put, people who seem otherwise alike in terms of who they are, where they live or how they've voted previously, can turn out to be different on the question of the EU referendum depending on whether they are part of a phone or an online sample.

In uncovering this we believe we have discovered a third, significant dimension to the challenge of drawing-up properly balanced political samples to poll, namely people's broader social attitudes. These are not simply functions of someone's demographic and partisan characteristics. Social attitudes need to be addressed in their own right because

they affect political behaviour differently even among those people who seem similar in many other ways. It is this that helps to explain why phone and online answers to the EU referendum question are so difficult to reconcile.

The most important question for pollsters, of course, is whether the phone or online polls lie nearer to the current truth on this issue. Taking all the evidence into account, our view is that the true state of public opinion on the UK's continued membership of the European Union is likely to be rather closer to what telephone polls are showing – a clear Remain lead – than the narrower contest suggested by online polling. What follows is an explanation as to why.

The Challenge

At the best of times Britain's forthcoming referendum on EU membership would present particular challenges to pollsters. Whereas General Elections occur at least once every five years, giving multiple data points and a reasonably recent benchmark, referendums are rare in the UK and differ markedly depending on the issue at hand. This blunts the effectiveness of weighting techniques and makes sample reliability even more crucial.

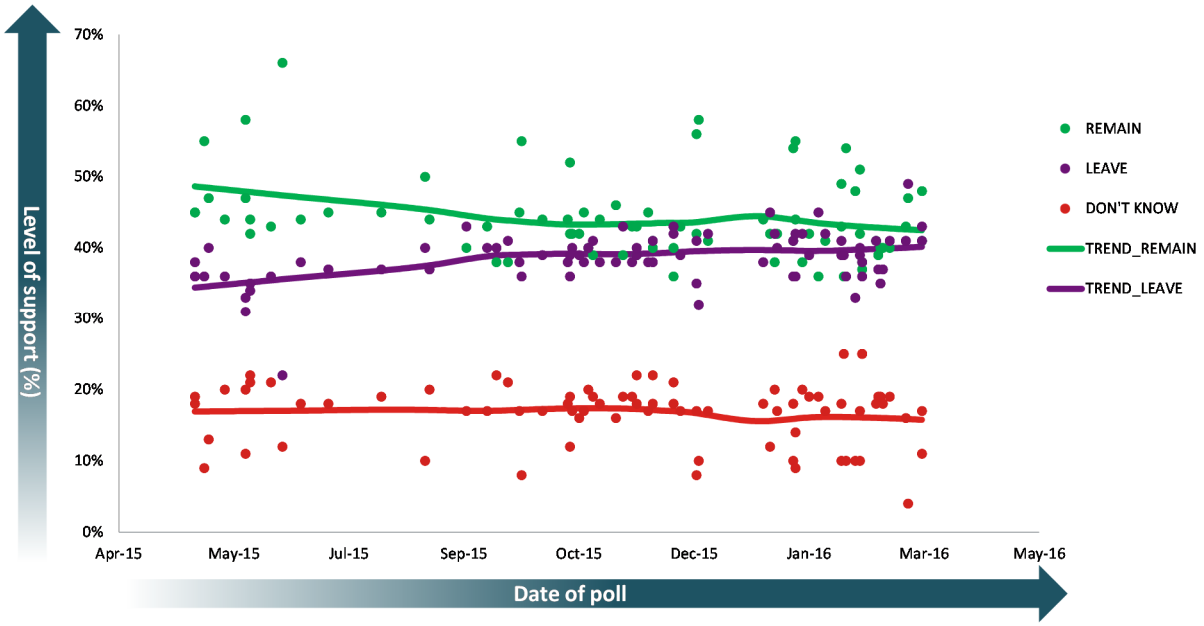
Of course, these are not the best of times for the UK political polling industry. The opinion polls at the 2015 General Election were not accurate. All of the final published polls from the 11 regular pollsters[1] underestimated support for the Conservative Party relative to the Labour Party by at least 5.5 percentage points. The miss averaged 6.5 points, the same magnitude of error as at the 1970 General Election, and only slightly less inaccurate than the 9-point net error in 1992[2].

Subsequent work both by Populus and Number Cruncher Politics[3], as well as the preliminary findings of the Sturgis Inquiry[4] -- set up by the British Polling Council to examine why the polls got the result wrong -- have uncovered a number of problems with sampling and weighting techniques that led pollsters persistently to underestimate Conservative support relative to Labour.

Time is short. As devolved elections and the EU referendum approach, attention has shifted from past errors to current anomalies. How can phone and online polls be seeming to say different things about what the British public intends to do in the referendum on the UK's membership of the EU on June 23rd?

There have been more than 80 EU referendum polls published between last year's General Election and the time of writing. On average, telephone polls have consistently shown Remain leads that are between 15 and 20 points larger than online polls conducted at the same time[5]. Is it online or telephone polls which are closer to the current picture? To find out we have to start with another set of polls altogether.

[1] Populus, Ipsos MORI, YouGov, CommunicateResearch (ComRes), Survation, Opinium Research, ICM Unlimited, Panelbase, Taylor Nelson Sofres (TNS), BMG Research and Lord Ashcroft.
[2] http://www.ncpolitics.uk/2015/05/polls-wrong-initial-postmortem.html/
[3] http://www.ncpolitics.uk/2015/11/where-the-polls-went-wrong.html/
[4] http://www.ncrm.ac.uk/polling/documents/19Jan_slides_Final1.pdf
[5] An exception was ORB's poll for the Telegraph. For details, see http://www.ncpolitics.uk/2016/03/about-that-orb-poll-and-ncps-referendum-forecast.html/



After the 2015 General Election the British Election Study[6] (BES) conducted a face-to-face random probability sampled survey by GfK. This face-to-face survey has come to be seen as something of a gold standard from a political perspective, because it produced a recalled past vote for the two main parties that more closely approximated the actual General Election result than anything pollsters were able to achieve at the time of the Election. The BES face-to-face study also asked an EU referendum question; to which the answers (excluding non-voters) were "Stay in the EU" 51%, "Leave the EU" 33%. These BES figures were significantly closer to phone polls conducted at the time than online polls albeit showing a slightly narrower lead for Remain.

There is also the British Social Attitudes Survey (BSA)[7] - another face-to-face study - conducted at roughly the same time as the BES. The underlying data from BSA was unavailable at the time of publication, but the broad conclusions published so far generally concur with those of the BES. The BSA question on EU membership found an even more decisive lead for staying in – "Continue" 60%, "Withdraw" 30% – asking a slightly different question to that on the ballot paper.

Sceptics of these face-to-face survey results have pointed to a recalled UKIP vote share that is too low compared with what it actually achieved, the implication being that understating

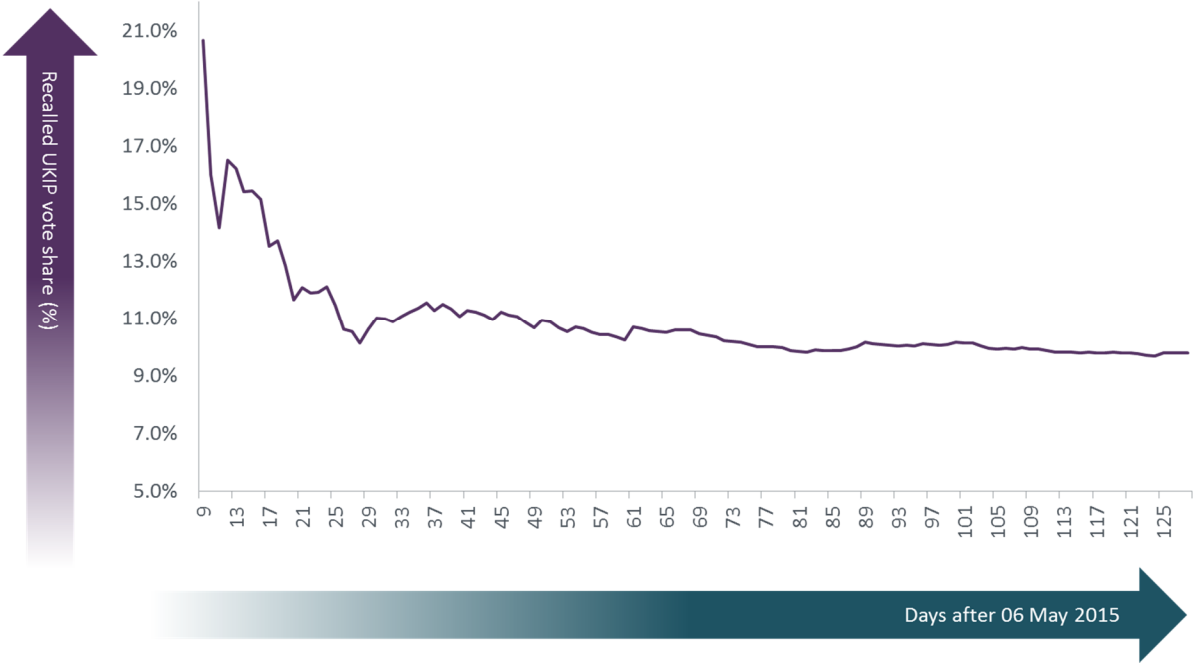
[6] www.britishelectionstudy.com
[7] www.bsa.natcen.ac.uk

UKIP support (which is overwhelmingly pro-Brexit) led to an underestimation of support for leaving the EU more generally. There is, though, an alternative explanation.

To achieve the very high response rates on which the accuracy of random probability sample-based studies like the BES and BSA rely, fieldwork was spread over several months. Over time many people – the vast majority of whom lack a consuming interest in politics – don't always accurately remember who they voted for (or even if they voted at all).

Often, different people misremember their vote in different directions, so that their faulty recall is self-cancelling. However there is evidence[8] that people are more likely to recall voting for the two largest parties when they haven't and to forget voting for smaller ones when they in fact did. This is exactly what the BES shows – Labour and Conservatives too high; UKIP, Lib Dems and Greens too low.

The following chart shows the cumulative proportion of people recalling having voted for UKIP depending on how soon after polling day 2015 they were asked. It controls for the fact that the BES will have sampled in areas of different overall levels of UKIP support at different times[9].



[8] This from John Curtice neatly summarises the work done on recall error http://eprints.ncrm.ac.uk/892/

[9] This adjustment is included for good order, but in practice it has very little effect for UKIP, largely because the party's vote is quite evenly spread. For an analysis of how it affects Labour and Conservative recalled votes in the BES, see http://www.britishelectionstudy.com/bes-resources/f2f-release/

Among the earliest respondents, the recalled UKIP vote is not too low, but too high. For the first few weeks after polling day it is at least as high as the 12.9% of the GB share of the vote that UKIP actually achieved in the Election. That the easiest people to contact are more likely to say they had voted UKIP is an important finding which we'll return to later. For now it is enough to observe that recalled support for UKIP is overstated immediately after the Election only to tail off – and to move below its actual vote share – the further away from polling day we get.

Suspect One: The Question Effect

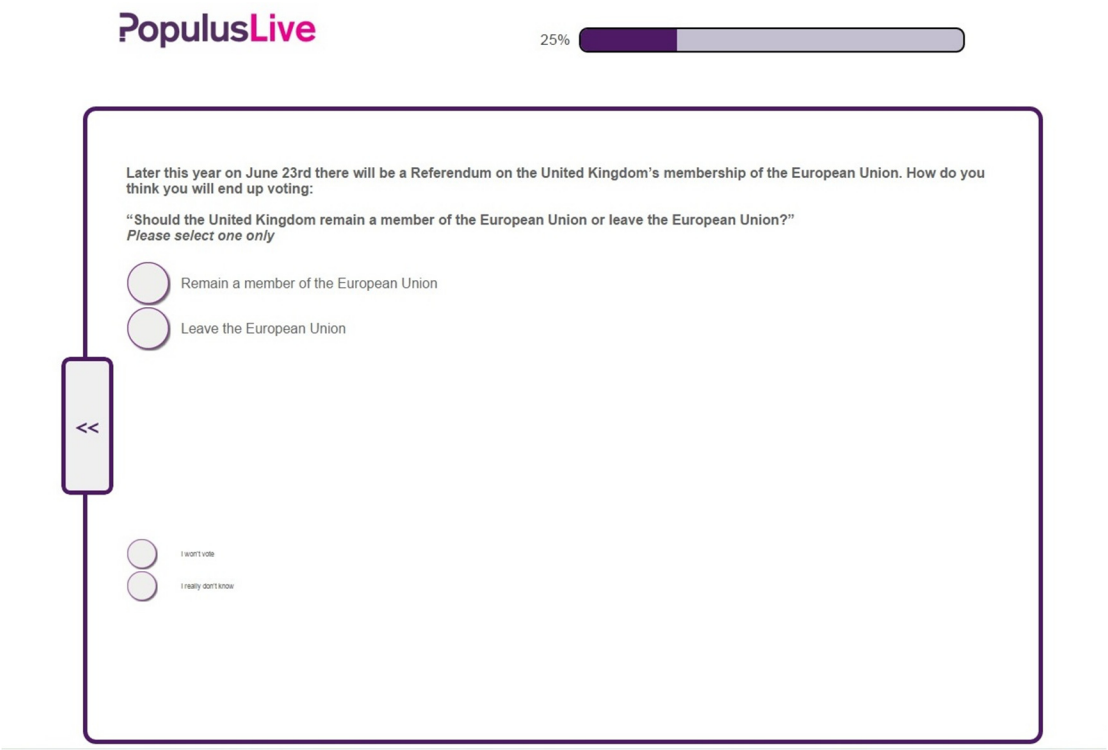
One theory put forward[10] by Stephan Shakespeare and Anthony Wells at YouGov among others is that the difference between phone and online polls can largely be explained by the different ways in which the EU referendum question is asked, or more properly by the way different answer options are or are not presented.

Most online polls provide an explicit "don't know" option when asking about the referendum, but telephone polls generally do not, accepting "don't know" responses on an unprompted basis rather than as an explicit answer option. This difference yields fewer "don't knows" on phone polls.

The theory goes that undecided voters in phone polls are likely to lean towards the status quo (as has often been the case in referendums[11]) and to express a preference for it, in this case to remain in the EU if they are not offered the choice of saying "don't know".

We tested this theory[12] by dividing an online sample into two. For one half of the sample (Online A) we attempted to replicate phone polling conditions by presenting respondents with "Remain" and "Leave" options, while offering "really don't know" and non-voting options in much smaller type much further down the page.[13] The other half of the online sample (Online B) were offered the EU referendum question with three options: "Remain", "Leave", and "don't know".

[10] https://yougov.co.uk/news/2016/02/23/commentary-what-explains-difference-between-phone-/
[11] http://electionsetc.com/2014/09/11/how-accurate-will-the-scottish-independence-referendum-polls-be/
[12] The initial polls interviewed 1,002 GB adults (phone) and 2,071 GB adults (online) between 26th and 28th February 2016. Populus is a member of the British Polling Council and abides by its rules.
[13] This may have required scrolling, depending on the panelist's device.



We then split a telephone poll sample, with half of respondents (Phone B) being prompted for "don't know" alongside "Remain" and "Leave", and the other half (Phone A) receiving the standard, two-option phone question.

All four sub samples were weighted independently by 2015 General Election vote plus the standard Populus nationally representative variables: age, gender, region, socioeconomic grade, housing tenure, employment status, car ownership and whether the respondent had taken a foreign holiday in the last three years.

	PHONE		ONLINE	
	A	B	A	B
Remain	48	39	45	39
Leave	37	36	46	45
Don't know	15	24	9	18

Online B, the version used most commonly across all online polls, showed Remain on 39% with Leave on 45% - a Leave lead of 6 points. But under Online A, with the supressed "don't

know" option, Remain increased 6 points to 45%, while Leave increased by just 1 point to 46% - a Leave lead reduced to a single point.

The phone samples were smaller, with approximately 500 respondents each, and therefore subject to greater margin of error. Nevertheless the standard phone-based two-option question (Phone A) gave Remain a lead of 11 points (48% against 37%). When "don't know" was explicitly prompted in Phone B that lead fell to 3 points (39% against 36%). The effect of eliminating "don't know" as a ready option caused a swing of 8 points from Leave to Remain on the phone and of 5 points from Leave to Remain online.

Which method is most accurate? Obviously the ballot paper has two options for those wishing to cast a valid vote: Remain or Leave. The available data suggests[14] that undecided voters generally do vote in almost the same proportions as those who say they've made up their minds. Also, pre-election polls show up to twice as many women as men saying they are undecided when voter validation exercises and face-to-face studies post-election show very small differences in turnout by gender.

Being undecided is not necessarily a proxy for being unlikely to vote. It clearly covers a range of opinions from people who are less than certain of voting one way, through complete indecision to people who are less than certain of voting the opposite way. What we can say is that in our tests when "don't know" is not a prompted answer option the Remain lead over Leave grows by 8% on the phone and online the Leave lead over Remain diminishes by 5%. On the most cautious assumption – given the small split samples involved in our phone experiment – the question effect produces a swing of 5% in of the direction of Remain between the two modes.

So the presence or absence of "don't know" makes a difference, but it is not a big enough difference by itself to explain the gap between phone and online polls. To understand that we have to look at the differences in social attitudes in the people who are forming online and telephone poll samples.

[14] In 2010, the most recent general election for which the data is available, the BES verified 69% of those undecided before the election as having voted, compared with 74% of decided voters in the survey.

Suspect Two: Sample Composition

Problems with sampling lie at the heart of what went wrong with the polls at the 2015 General Election. Both phone and online polls found it difficult to achieve representative samples when it came to surveying political opinions. In 2015 the consequences for online and phone polling were broadly similar, but it doesn't necessarily follow that the specific causes were the same. As current polling for the EU membership referendum shows, there is a wide divergence in outcomes even when samples from both modes of polling are weighted similarly to make them politically and demographically representative. There must be something else going on.

The general inquest into the last crisis in political polling before 2015 – the failure to predict the outcome of the 1992 General Election[15] – led many pollsters to introduce political quotas within their demographically representative samples, usually in the form of recalled past vote. Successful political polling has largely rested on the twin pillars of demographic and past vote weighting for the last 20 years or more; but the failure of polls of all types to predict the outcome of the 2015 General Election suggests that these two measures by themselves may no longer be adequate to produce politically representative samples. We think there has to be a third dimension; factors that were not being weighted to, or measured with statistical consistency but which could explain the differences between online and phone polling on the EU even when the samples are identically weighted demographically and by recent voting behaviour.

Our starting point was to revisit the BES face-to-face study mentioned earlier and to analyse which markers had the strongest statistical relationship to people's views on the EU. In addition to the already well-known demographic markers of age and education, and the political marker of a UKIP vote, the markers with the closest correlation to people's views on EU membership were people's social attitudes to issues like gender, racial equality and national identity.

We suspected that it was on these attitudinal measures that phone and online samples differed the most (because the age and education quotas set and weighted to were identical between the two samples) and would therefore be the key determinants of the gap between the polling modes in the support for Remain and Leave on the EU question.

15 http://www.ncrm.ac.uk/polling/documents/The%20Opinion%20Polls%20and%20the%201992%20General%20Election.pdf

Here, then, was a prime candidate for the missing third dimension. So we commissioned two new polls[16], one conducted online, the other on the phone. Both hid the "don't know" option to encourage people to say either that they would vote for Britain to leave the EU or to remain within it. Both polls also included BES questions on issues relating to gender, racial equality and national identity. These new polls were conducted at the same time as each other, a couple of weeks after our first experiment. They produced the following results after being weighted identically[17] to be demographically and politically representative of the population at large.

	PHONE		ONLINE	
		Change since previous poll +/-		+/-
Remain	49	1	48	3
Leave	35	-2	45	-1
Don't know	15	=	7	-2

The difference between a 3 point lead for Remain online and a 14 point lead on the phone, cannot be accounted for by sampling error. We had also done our best to eliminate the question effect, so we looked at the social attitudinal composition of both samples armed with what we had learned from the BES study about the link between people's views on social issues and how they said they would vote in an EU referendum. This is what we found:

[16] The follow-up polls interviewed 1,004 GB adults between 4th and 6th March (phone) and 4,047 GB adults between 2nd and 10th March 2016 (online). Populus is a member of the British Polling Council and abides by its rules.

[17] Because we have switched to the "squeezed" question for the online poll, the like-for-like comparator from 26th to 28th February is online sample A

	ONLINE	PHONE	BES FACE-TO-FACE
Gender equality			
Not gone far enough	39.7%	47.7%	40.2%
About right	38.5%	38.1%	46.4%
Gone too far	15.2%	10.5%	9.8%
Racial equality			
Not gone far enough	24.9%	40.0%	31.9%
About right	39.3%	39.5%	42.9%
Gone too far	26.4%	15.3%	18.7%
National identity[18]			
More British	19.2%	27.2%	20.9%
Equally British and English	38.8%	42.7%	47.6%
More English	31.7%	24.4%	23.8%

Clearly the phone poll produced what might be called the most socially liberal set of results followed by the BES face-to-face interviews, with the online responses eliciting the least socially liberal results of the three. But how much of those differences are down to the different social attitudes of samples reached differently by online, phone or face-to-face, and how much could simply be explained by people hiding or modifying their social attitudes in the presence of a telephone or a doorstep interviewer?

To help answer that, we went back to the BES face-to-face study. About 25% of that sample responded to the survey at the first attempt to contact them. These "first responders" were notably less likely to say they were in favour of staying in the EU than the sample as a whole. In fact their responses were far closer to the parallel study being run by the BES using YouGov's online panel.

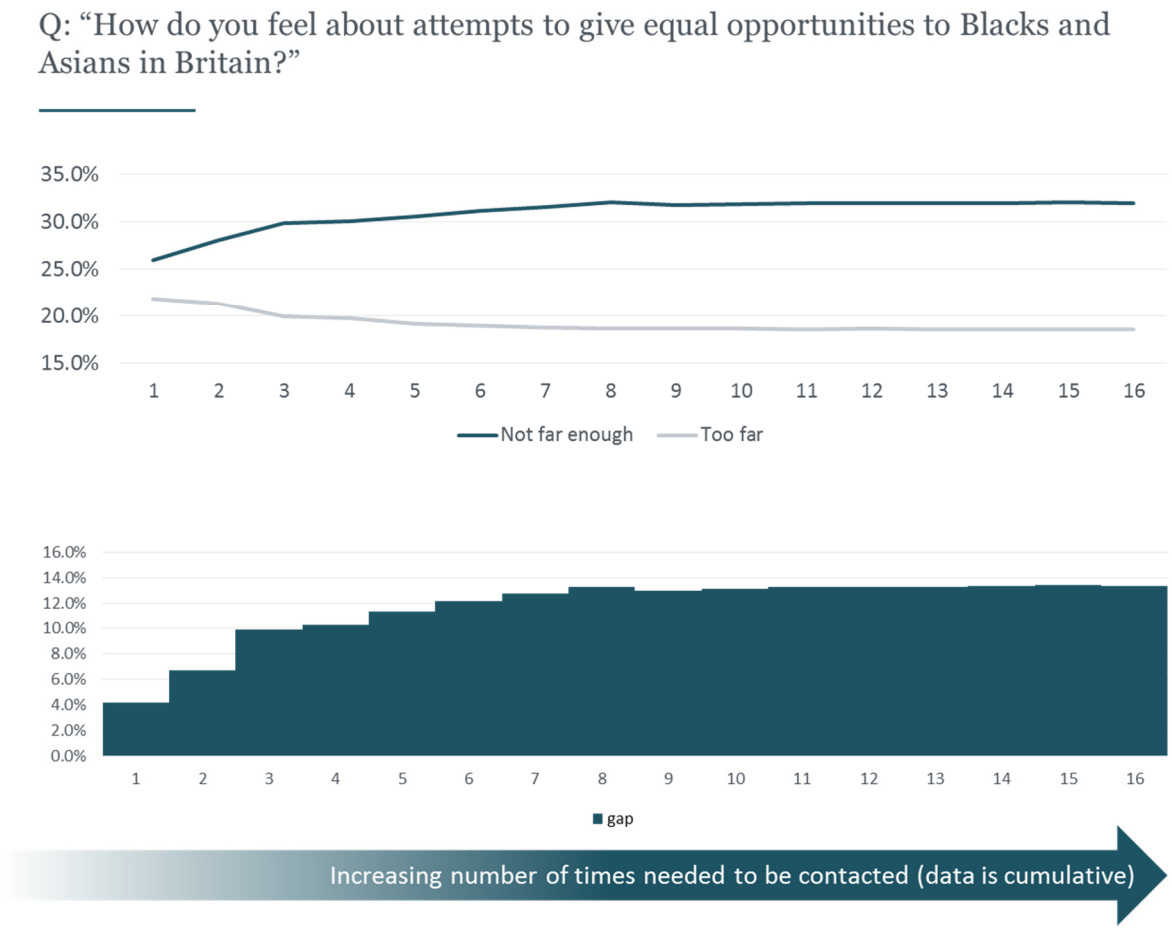
[18] Respondents in England only

	BES ONLINE PANEL		BES FACE-TO-FACE (1st contact)		BES FACE-TO-FACE (All contacts)	
2015 vote	**Stay**	**Leave**	**Stay**	**Leave**	**Stay**	**Leave**
Conservative	35.3%	44.0%	42.9%	39.3%	47.8%	36.3%
Labour	62.5%	21.7%	62.5%	24.4%	62.8%	22.7%
Lib Dem	68.4%	16.2%	73.1%	19.7%	70.6%	13.2%
UKIP	5.1%	88.7%	9.4%	88.1%	11.3%	81.7%
Others	67.8%	19.3%	75.0%	11.0%	68.8%	17.6%
Non-voters	37.9%	32.6%	39.9%	29.9%	47.0%	30.3%
Total	**44.9%**	**38.0%**	**47.2%**	**36.0%**	**50.9%**	**32.8%**

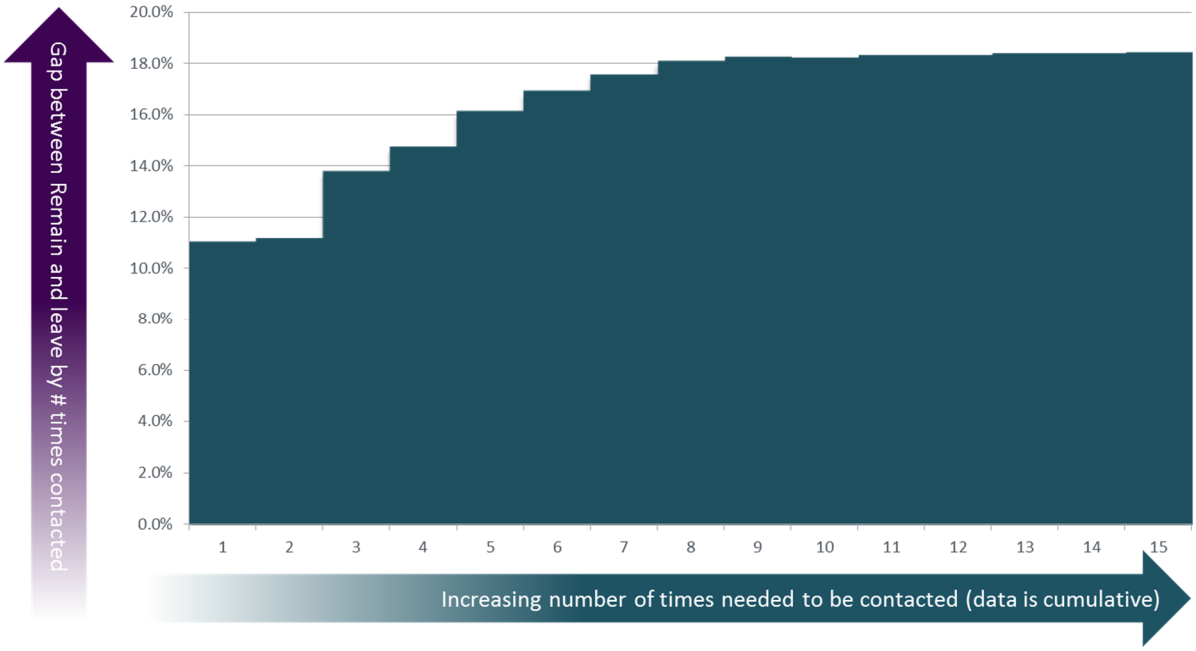
Source: British Election Study post-election[19] and cross-sectional waves

[19] Reweighted to 2015 vote instead of 2010

Now look at the answers given by the face-to-face first responders to the question about racial equality in Britain and those offered by respondents who required more attempts to be contacted.



Both first and subsequent responders give their answers to an interviewer, but the face-to-face sample yields a more liberal set of attitudes over time because harder to reach people tend to have more liberal views than those who respond quickly. Harder to reach people also tend to be more in favour of the UK remaining part of the European Union.



So the best way to make an online poll sample look more like a random probability face-to-face sample is to simulate what an online poll would look like if it included responses from hard-to-reach people (those who need to be contacted multiple times in order to participate at all). You can't poll people who are reluctant to be polled – at least you can't do so quickly and economically – but you can ensure that your online sample reflects a similar balance of views on social attitudes to the face-to-face sample. That means giving more weight to the answers of people in the online sample who share the liberal social attitudes of "hard to get" people in the face-to-face sample, the way you might give more weight to past Labour voters, or to over 65s if you didn't have enough of them in your sample.

What about phone polls? The social attitudes of phone respondents are if anything more liberal than those from the face-to-face study. Why? It may perhaps reflect the fact that up to half of CATI interviews these days are conducted with people using their mobile phones in an attempt to replicate the one in six of the British population who now live in mobile-only households. By doing so mobile sampling captures some people who would not otherwise respond to landline-only CATI or online polls. These people seem to be more liberal in their views towards racial and gender equality. Obviously the effect of including more mobile sample in telephone polls on the balance of social attitudes in phone-based polling warrants further attention and debate. However, given that both telephone and face-to-face polls

involve intermediaries, in theory the individual responses given on the phone shouldn't be shaped by an interviewer effect to a greater or lesser extent than those given on the doorstep. We have therefore simply adjusted the phone sample so that its profile on the social attitudes questions is the same as the face-to-face study.

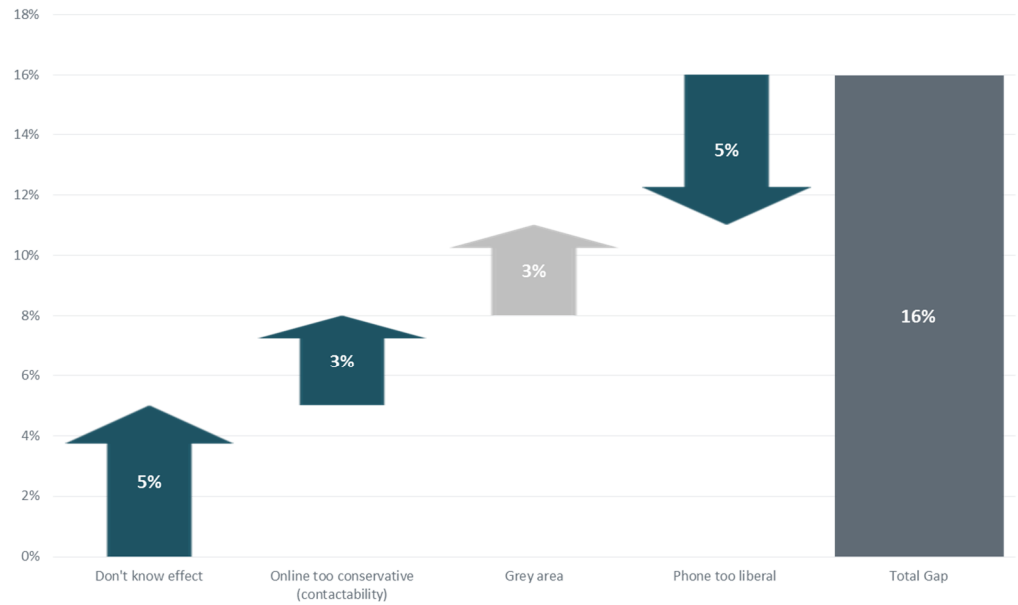
Closing the Gap

Our initial parallel polling experiment, where we placed the most common form of the EU referendum question as it appears in online and phone polls on our online and CATI surveys simultaneously, produced a Remain lead of 10.5% over the phone and a Leave lead of 5.5% online. The gap between the two was thus 16%, but which is closer to the actual picture, and to what degree?

In our experiments not prompting for "don't know" online is responsible for about a third of this gap. Removing "don't know" as an option improves Remain's position relative to Leave by 5%.

A further half of the gap is accounted for by the difference in the composition of the online and phone samples by social attitude. Weighting the online sample to reflect the more liberal views of hard-to-reach members of the population improves Remain's net position by a further 3%. Weighting the phone sample to the social attitudes of the BES makes it less liberal and in doing so improves Leave's position by a net of 5%.

How do we explain the difference between phone and online polls?



This leaves a grey area of 3% unaccounted for by our adjustments. We think this has to do with the composition of online samples. If online samples suffer politically because they lack hard-to-reach people, they also seem to have too many of another kind of person: respondents who know exactly what their views are and who back these up with internally consistent opinions when asked for them. Take the correlation between standard demographic variables and people's stated voting intention in the EU referendum. Our online sample lacks the randomness you would expect to find in the general population, and which you do find in the phone sample and BES face-to-face study.[20] Put simply, in the online sample, too many people are conforming to the political attitudes of the demographic group of which they are a part. Holding contradictory opinions or inconsistent views about politics is a normal state for most people, most of the time not least because people aren't normally thinking about politics.

The fact that online samples seem so replete with "down-the-line" partisans of whatever stripe puts them at odds with some of the general population whom they are supposed to be representing politically. We think this point requires further investigation and we will continue to monitor it in future polls, however it suggests that phone polls usually catch greater numbers of less tribal voters than online samples. This, we think, represents a further 3% of the gap between online and phone when it comes to the EU referendum question.

So as things now stand our assessment is that the true state of public opinion lies between the online and phone numbers, but closer to phone, approximately two-thirds of the way towards the leads phone polls are on average giving Remain while, of course, current methodologies remain unchanged.

[20] r^2 or the "coefficient of determination" is a statistical term that, in this example, denotes the variance explained in voting intention in the EU referendum by common variables such as age, education and housing. The remaining variance (80%) is deemed to be a function of variables not included in the model and/or random variation.

PSEUDO r^2	ONLINE	PHONE	BES FACE-TO-FACE
With standard variables			
Remain	0.1854	0.1313	0.1345
Leave	0.2035	0.1680	0.1729

Conclusion

This study is not an attempt to forecast the result of the referendum. We have confined ourselves here to looking at the differences between polling modes on the EU referendum. Most of the polls we've looked at have not been weighted by likelihood to vote in a referendum, so turnout modelling is unlikely to be a factor in the discrepancy between the results of phone and online. That does not mean that turnout won't be absolutely crucial to the ultimate result.

The notion that Leave voters are more determined to vote in the referendum, based on what Leavers have been telling pollsters, has been little questioned. But this conclusion is heavily dependent on sampling people representatively in terms of relative political interest. Turnout self-reporting is known to be misleading this far out. If instead we consider high and low-turnout demographics, older people are more likely to vote to Leave, but more affluent people are more likely to vote to Remain than less affluent people. In fact if we compare General Election turnout between constituencies, we find that turnout is not higher in more Eurosceptic areas[21] – in fact it is slightly lower.

In analysing and attempting to explain the differences between what the online and phone polls are saying about the EU referendum we think we have discovered something important about the composition of political polling samples: that they should be balanced by social attitudes which cut across traditional demographic and party lines.

There is much more work to be done in this area but we hope if nothing else this paper will prompt further debate and discussion across the political polling profession.

[21] In fact this is the case regardless of whether we use Populus estimates, or those by others such as Chris Hanretty http://blogs.lse.ac.uk/politicsandpolicy/how-eurosceptic-is-rochester-and-strood/ and Matthew Goodwin http://www.conservativehome.com/platform/2016/02/matthew-goodwin-mapping-the-Leave-voting-heartlands.html

Appendix: Logistic Regression Outputs

Another way to analyse the phone-online gap is through a logistic regression, to isolate individual factors and their effects. The model shows a very similar pattern across the key coefficients – the intercepts highlight the structural differences on both Leave and Remain sides. The first table uses only the standard variables:

	Remain		Leave	
	Online	**Phone**	**Online**	**Phone**
Constant	0.4470***	0.4746***	0.4292***	0.3215***
2015 vote (ref Conservative)				
Labour	0.1677***	0.1705***	-0.1604**	-0.1364**
Liberal Democrat	0.2209***	0.1942**	-0.2133*	-0.1655*
UKIP	-0.2930***	-0.3341***	0.3340***	0.4499***
Green	0.2452***	0.1113	-0.2116***	-0.1545
SNP	0.1797***	0.0804	-0.1668***	-0.0870
Plaid Cymru	0.1855	-0.0050	-0.2819*	-0.0306
Another party	0.0550	-0.1461	-0.0999	0.2051
Did not vote	0.0206	-0.0139	-0.1139***	-0.1192**
Age (ref 45-54)				
18-24	0.1718***	0.1529*	-0.1497**	0.0057
25-34	0.1045***	0.0975	-0.089**	-0.0762
35-44	0.0178	0.0575	-0.0140	-0.0660
55-64	-0.0552*	-0.0540	0.0786**	0.0903
65+	-0.0552	-0.0035	0.0505	0.0600
Gender (ref female)				
Male	0.0151	0.0369	0.0191	0.0410
SEG (ref C1)				
AB	0.0489*	0.0949*	-0.0210	-0.0327
C2	-0.0483*	0.0134	0.0649**	0.0506
DE	-0.0564**	-0.0491	0.0718***	0.0258
Region (ref East Midlands)				
Eastern	-0.0283	-0.0847	0.0445	0.0242
London	-0.0147	0.0137	0.0195	-0.0181
North East	0.0176	-0.0926	-0.0063	0.0886
North West	-0.0134	-0.0860	0.0170	0.0285
Scotland	0.0395	0.0334	-0.0384	-0.0384
South East	-0.0202	-0.1198	0.0434	0.0739
South West	-0.0315	-0.0641	0.0256	0.0899
Wales	0.0059	-0.0046	-0.0062	-0.0998
West Midlands	-0.0404	-0.0866	0.0345	-0.0114

Yorkshire & Humberside	-0.0236	-0.0352	0.0347	-0.0260
Holidays (ref Yes)				
No	-0.0465**	-0.1148***	0.0426**	0.1004**
Cars (ref 1)				
2	0.0082	-0.0029	-0.0057	-0.0072
3+	-0.0156	-0.0711	0.0264	0.0403
None	0.0160	0.0461	-0.0182	-0.0377
Employment status (ref Working full time)				
House person	-0.0280	-0.0334	0.0261	0.1583
Not working, not seeking work	0.0592*	0.0841	-0.0393	-0.1537*
Not, seeking work	0.0105	0.0096	-0.0167	-0.0229
Retired, state pension only	-0.0256	-0.0192	0.0456	-0.0811
Retired, private pension	-0.0090	0.0336	0.0380	-0.0284
Working part time	0.0292	-0.0385	-0.0185	-0.0381
Tenure (ref Owned with mortgage)				
Owned outright	-0.0053	-0.0132	-0.0065	0.0392
Rent free	0.0027	-0.0701	0.0003	0.0643
Rented, housing association	-0.0734**	0.0237	0.0492	0.0014
Rented, someone else	0.0409	0.0909	-0.0230	-0.0064
Rented, council	-0.0440	-0.0677	0.0636*	0.0488
Pseudo R^2	0.1945	0.1567	0.2116	0.1587

Significance 0 *** 0.001 ** 0.01 ** 0.05 *

If we repeat the earlier logistic regression, but this time adding attitudinal variables, we get similar coefficients and intercepts – the inclusion of the attitudinal variables eliminates the structural gap between modes.

	Remain		Leave	
	Online	**Phone**	**Online**	**Phone**
Constant	0.5053***	0.4613***	0.3635***	0.3301***
2015 vote (ref Conservative)				
Labour	0.1270***	0.1026*	-0.1194***	-0.0761
Liberal Democrat	0.1845***	0.1186	-0.1745***	-0.0989
UKIP	-0.2593***	-0.2835***	0.2968***	0.4270***
Green	0.1880***	-0.0333	-0.1534***	-0.0379
SNP	0.1259**	0.0233	-0.1127*	-0.0462
Plaid Cymru	0.1383	-0.1173	-0.2248*	0.0425
Another party	0.0129	-0.1061	-0.0515	0.1827
Did not vote	0.0001	-0.0168	-0.0862***	-0.0992*
Age (ref 45-54)				
18-24	0.1575***	0.1414*	-0.1352***	0.0011
25-34	0.1011***	0.1183*	-0.0840***	-0.0922
35-44	0.0189	0.0512	-0.0148	-0.0678
55-64	-0.0402	-0.0260	0.0599*	0.0710
65+	-0.0530	0.0274	0.0448	0.0550
Gender (ref female)				
Male	0.0257	0.0419	0.0054	0.0328
SEG (ref C1)				
AB	0.0385*	0.0865*	-0.0107	-0.0195
C2	-0.0449*	0.0190	0.0596**	0.0477
DE	-0.0478*	-0.0252	0.0638**	0.0016
Region (ref East Midlands)				
Eastern	-0.0239	-0.1292	0.0466	0.0588
London	-0.0263	-0.0640	0.0413	-0.0076
North East	-0.0289	-0.0480	0.0358	0.0076
North West	0.0338	-0.0984	-0.0244	0.0795
Scotland	-0.0141	-0.0768	0.0177	0.0053
South East	0.0221	0.0303	-0.0173	-0.0356
South West	-0.0335	-0.0874	0.0285	0.0886
Wales	-0.0153	0.0216	0.0167	-0.1034
West Midlands	-0.0391	-0.0790	0.0346	-0.0435
Yorkshire & Humberside	-0.0251	-0.0031	0.0355	-0.0590
Holidays (ref Yes)				
No	-0.0401**	-0.0947**	0.036*	0.0815**

Cars (ref 1)				
2	0.0102	-0.0215	-0.0079	0.0136
3+	-0.0156	-0.0261	0.0259	0.0107
None	0.0115	0.0243	-0.0137	-0.0117
Employment status (ref Working full time)				
House person	-0.0298	-0.0164	0.0310	0.1607
Not working, not seeking work	0.0330	0.0953	-0.0133	-0.1645*
Not, seeking work	0.0022	0.0368	-0.0086	
Retired, state pension only	-0.0354	-0.0371	0.0576	-0.0712
Retired, private pension	-0.0099	0.0096	0.0386	-0.0173
Working part time	0.0247	-0.0301	-0.0122	-0.0557
Tenure (ref Owned with mortgage)				
Owned outright	-0.0045	-0.0241	-0.0053	0.0390
Rent free	-0.0093	-0.1116	0.0111	0.0979
Rented, housing association	-0.0725**	0.0147	0.0515*	0.0138
Rented, someone else	0.0341	0.0962*	-0.0149	-0.0080
Rented, council	-0.0516	-0.0437	0.0739**	0.0310
Gender equality (ref About right)				
Not gone far enough	-0.0044	0.0915*	0.0125	-0.0825*
Gone too far	-0.0004	-0.0469	0.0125	0.0747
Don't know	-0.0026	-0.0799	-0.0085	-0.1131
Racial equality (ref About right)				
Not gone far enough	0.0849***	0.0776*	-0.0798***	-0.0384
Gone too far	-0.0987***	-0.1743***	0.1091***	0.1259**
Don't know	-0.0489	-0.1638*	-0.0125	-0.0043
National identity (ref Equally British and English)				
More British	-0.0033	0.0776*	0.0082	-0.0584
More English	-0.1124***	-0.1260**	0.1226***	0.1594***
Don't know	0.0562	-0.0371	-0.0719*	0.0242
Pseudo R^2	0.2238	0.2339	0.2447	0.2197

Significance 0 *** 0.001 ** 0.01 ** 0.05 *

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